

ATTACHMENT E

Coating Air Quality Data Sheets

Air Quality Datasheet

Confidential information



Product name and/or code	: Hempadur Avantguard 750			
	1736G19840			RD007
Ready-for-use mixture	: 1736G = 1736U 17 Vol/ 97043 3 Vol			
% Volatile by weight	: 14.8	% Solids by weight	: 85.2	
% Volatile by volume	: 35	% Solids by volume	: 65	
VOC (Material) - Default per EU	: 2.8 lbs/gal (335.8 g/l)	Density	: 18.92 lbs/gal (2.267 g/cm ³)	
VOC (Coating, actual) - Exempt excluded	: 330 g/l (Measured)	% Water by weight	: 0	
VOC (Coating, actual), gram VOC / litre Solids	: 507	% Exempt by weight	: 0	
VOC (Regulatory) - Less exempt & water	: 330 g/l (Measured)	% HAPS by weight	: 11.53	
VOC (Regulatory), gram VOC / litre Solids	: 507	gram HAPS / litre Solids	: 402	

Ingredient name	CAS #	TX Short-term ESL (ug/m3)	TX Long-term ESL (ug/m3)	TX Short-term Odor ESL (ug/m3)	HAPS	W/W %	Type
middle molecular epoxy resin MMW 700-1200	25068-38-6	must meet NAAQS (PM10)	must meet NAAQS (PM10)			8.6974	Binders
xylene	1330-20-7	2200	180		Volatile, Listed	9.1886	Solvents
ethylbenzene	100-41-4	26000	570		Volatile, Listed	2.0443	Solvents
1-chloro-2,3-epoxypropane	106-89-8	20	2		Volatile, Listed	0.0016373	Binders, Monomers in -
toluene	108-88-3	4500	1200		Volatile, Listed	0.10548	Solvents
4,4'-isopropylidenediphenol	80-05-7	50 (PM10)	5 (PM10)			0.0017459	Binders, Monomers in -
oxirane, mono[(C12-14-alkyloxy)methyl] derivs.	68609-97-2	1000 (vapor)	100 (vapor)			0.94899	Binders
C12-14 alcohols	80206-82-2					0.019397	Chemicals
benzene	71-43-2	170	4.5		Volatile, Listed	0.0075039	Solvents
respirable quartz	14808-60-7	14 (PM10)				0.010911	Pigments, Inorganic
Quaternary ammonium compounds, benzyl (hydrogenated tallow alkyl)dimethyl, chlorides, compds. with bentonite and bis(hydrogenated tallow alkyl)dimethylammonium chlorides	71011-25-1					1.0912	Pigments, Inorganic
butan-1-ol	71-36-3	610	61	910	Volatile.	2.6424	Solvents
water	7732-18-5					0.002645	Solvents, Water
2-methylpropan-1-ol	78-83-1	1520	152		Volatile.	0.013225	Solvents
propyleneglycol	57-55-6	1560 (vapor)	156 (vapor)		Volatile.	0.013225	Solvents
polyamineamide salt						0.13225	Chemicals
zeolites	1318-02-1	50 (PM10)	5 (PM10)			0.13225	Pigments, Inorganic
pigment black 10, 77265	7782-42-5	20 (PM10)	2 (PM10)			0.96984	Pigments, Inorganic
zinc powder - zinc dust (stabilized)	7440-66-6	20	2			64.453	Pigments, Metallic
zinc oxide	1314-13-2	20	2			4.1067	Pigments, Inorganic
3-(2,3-epoxypropoxy) propyl trimethoxy silane	2530-83-8	1000 (vapor)	100 (vapor)			0.43907	Chemicals
methanol	67-56-1	3900	2100		Volatile, Listed	0.0013225	Solvents
methanol (formed by reaction)	Sec (67-56-1)	3900	2100		Volatile, Listed	0.18074	Solvents
allyl glycidyl ether	106-92-3				Volatile.	0.00043643	Solvents
glass beads	65997-17-3	must meet NAAQS (PM10)	must meet NAAQS (PM10)			1.4113	Pigments, Inorganic
precipitated silica	112926-00-8	27 (PM10)				0.043497	Pigments, Inorganic
2-methoxypropanol	1589-47-5	190	19		Volatile.	0.0018376	Solvents
1-methoxy-2-propanol	107-98-2	3700	370		Volatile.	0.61094	Solvents
3,6-diazaoctanethylenediamin	112-24-3	60	6			0.085172	Binders, Monomers in -
Polymer of: triethylenetetramine, polyaminoamide and bisphenol A-(epichlorhydrin) epoxy resin						2.4353	Binders
bis[(dimethylamino)methyl]phenol	71074-89-0	420	42			0.058181	Chemicals
2,4,6-tris(dimethylaminomethyl)phenol	90-72-2	420	42			0.32969	Chemicals

Hazardous Air Pollutant Substance (HAPS)

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Product name and/or code	: Hempadur 4774D				
	4774D10170				RD003
Ready-for-use mixture	: 4774D = 4774M 4 vol. / 9874D 1 vol.				
% Volatile by weight	: 14.6	% Solids by weight	: 85.4		
% Volatile by volume	: 23	% Solids by volume	: 77		
VOC (Material) - Default per EU	: 1.84 lbs/gal (220.3 g/l)	Density	: 12.61 lbs/gal (1.511 g/cm ³)		
VOC (Coating, actual) - Exempt excluded	: 1.84 lbs/gal (220.3 g/l)	% Water by weight	: 0		
VOC (Coating, actual), gram VOC / litre Solids	: 286 g/l	% Exempt by weight	: 0		
VOC (Regulatory) - Less exempt & water	: 1.84 lbs/gal (220.3 g/l)	% HAPS by weight	: 10.63		
VOC (Regulatory), gram VOC / litre Solids	: 286 g/l	gram HAPS / litre Solids	: 209 g/l		

Ingredient name	CAS #	TX Short-term ESL (ug/m3)	TX Long-term ESL (ug/m3)	TX Short-term Odor ESL (ug/m3)	HAPS	W/W %	Type
bisphenol A-(epichlorhydrin) epoxy resin MW < 700	25068-38-6	must meet NAAQS (PM10)	must meet NAAQS (PM10)			11.903	Binders
1-chloro-2,3-epoxypropane	106-89-8	20	2		Volatile. Listed	0.0041691	Binders, Monomers in -
4,4'-isopropylidenediphenol	80-05-7	50 (PM10)	5 (PM10)			0.012988	Binders, Monomers in -
xylene	1330-20-7	2200	180		Volatile. Listed	8.5404	Solvents
ethylbenzene	100-41-4	26000	570		Volatile. Listed	1.8893	Solvents
toluene	108-88-3	4500	1200		Volatile. Listed	0.080569	Solvents
benzene	71-43-2	170	4.5		Volatile. Listed	0.0059709	Solvents
middle molecular epoxy resin MMW 700-1200	25068-38-6	must meet NAAQS (PM10)	must meet NAAQS (PM10)			5.9358	Binders
oxirane, mono[(C12-14-alkyloxy)methyl] derivs.	68609-97-2	1000 (vapor)	100 (vapor)			6.1535	Binders
C12-14 alcohols	80206-82-2					0.12577	Chemicals
alkyd resin		50 (PM10)				0.13579	Binders
nonane	111-84-2	10500	1050		Volatile.	0.0059646	Chemicals
C10-C13 hydrocarbons (n-alkanes, isoalkanes, cyclics) <2% aromatics	64742-48-9				Volatile.	0.051099	Solvents
1,3-bis(12-hydroxyocta-decanamide-N-methyl) benzene		50	5			0.32433	Chemicals
Reaction mass of N, N'-hexane-1,6-diylbis [12-hydroxyoctadecanamide] and 12-hydroxy-N-[6-[1-oxoalkyl)amino] hexyl] octadecanamide		50	5			0.139	Chemicals
titanium dioxide	13463-67-7	50 (PM10)	5 (PM10)			12.644	Pigments, Inorganic
silicon dioxide	7631-86-9	27 (PM10)	2 (PM10)			0.13239	Pigments, Inorganic
aluminium hydroxide	21645-51-2	50 (PM10)	5 (PM10)			0.33099	Pigments, Inorganic
zirconium dioxide	1314-23-4	50 (PM10)	5 (PM10)			0.13239	Pigments, Inorganic
limestone	1317-65-3	must meet NAAQS (PM10)	must meet NAAQS (PM10)			18.449	Pigments, Inorganic
stearic acid	57-11-4	1000 (vapor)	100 (vapor)			0.98136	Chemicals
respirable quartz	14808-60-7	14 (PM10)				0.78508	Pigments, Inorganic
nepheline syenite	37244-96-5	50 (PM10)	5 (PM10)			19.038	Pigments, Inorganic
butan-1-ol	71-36-3	610	61	910	Volatile.	3.8909	Solvents
water	7732-18-5					0.0038948	Solvents, Water
3-(2,3-epoxypropoxy) propyl trimethoxy silane	2530-83-8	1000 (vapor)	100 (vapor)			0.26345	Chemicals
methanol	67-56-1	3900	2100		Volatile. Listed	0.00079353	Solvents
methanol (formed by reaction)	Sec (67-56-1)	3900	2100		Volatile. Listed	0.10845	Solvents
allyl glycidyl ether	106-92-3				Volatile.	0.00026186	Solvents
3,6-diazaoctanethylenediamin	112-24-3	60	6			0.21937	Binders, Monomers in -
Polymer of: triethylenetetramine, polymer of C18-unsatd. fatty acids dimers with tall-oil fatty acids and triethylenetetramine and bisphenol A-(epichlorhydrin) epoxy resin and bisphenol A-(epichlorhydrin) epoxy resin						6.3859	Binders
salicylic acid	69-72-7	50 (PM10)	5 (PM10)			0.1239	Chemicals
phenol	108-95-2	150	3.3	150	Volatile. Listed	0.0002483	Solvents
bis[(dimethylamino)methyl]phenol	71074-89-0	420	42			0.19554	Chemicals
2,4,6-tris(dimethylaminomethyl)phenol	90-72-2	420	42			1.108	Chemicals

Hazardous Air Pollutant Substance (HAPS)

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Product name and/or code	: Hempaprime Multi 500			
	459501217H			US003
Ready-for-use mixture	: 45950 = 45959 8 Ltr/ 95090 2 Ltr; 45953 = 45959 8 Ltr / 95093 2 Ltr			
% Volatile by weight	: 13.2	% Solids by weight	: 86.8	
% Volatile by volume	: 15	% Solids by volume	: 85	
VOC (Material) - Default per EU	: 1.61 lbs/gal (192.5 g/l)	Density	: 12.12 lbs/gal (1.452 g/cm ³)	
VOC (Coating, actual) - Exempt excluded	: 1.61 lbs/gal (192.5 g/l)	% Water by weight	: 0	
VOC (Coating, actual), gram VOC / litre Solids	: 226 g/l	% Exempt by weight	: 0	
VOC (Regulatory) - Less exempt & water	: 1.61 lbs/gal (192.5 g/l)	% HAPS by weight	: 0.16	
VOC (Regulatory), gram VOC / litre Solids	: 226 g/l	gram HAPS / litre Solids	: 3 g/l	

Ingredient name	CAS #		HAPS	W/W %	Type
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	25068-38-6			14.279	Binders
1-chloro-2,3-epoxypropane	106-89-8	Volatile.	Listed	0.0027435	Binders, Monomers in -
4,4'-isopropylidenediphenol	80-05-7			0.014151	Binders, Monomers in -
2-methylstyrene	611-15-4	Volatile.		< 0.0001	Binders, Monomers in -
phenol	108-95-2	Volatile.	Listed	0.024016	Solvents
2-phenylpropene	98-83-9	Volatile.		0.024016	Binders, Monomers in -
Methylstyrenated phenol	68512-30-1			4.7561	Binders
oxirane, mono[(C12-14-alkyloxy)methyl] derivs.	68609-97-2			4.7179	Binders
C12-14 alcohols	80206-82-2			0.096431	Chemicals
n-butyl acetate	123-86-4	Volatile.		7.1174	Solvents
water	7732-18-5			0.005115	Solvents, Water
butan-1-ol	71-36-3	Volatile.		3.7367	Solvents
xylene	1330-20-7	Volatile.	Listed	0.0089759	Solvents
ethylbenzene	100-41-4	Volatile.	Listed	0.0019703	Solvents
alkyd resin				0.24921	Binders
nonane	111-84-2	Volatile.		0.010946	Chemicals
C10-C13 hydrocarbons (n-alkanes, isoalkanes, cyclics) <2% aromatics	64742-48-9	Volatile.		0.093777	Solvents
1,3-bis(12-hydroxyocta-decanamide-N-methyle)benzene				0.55948	Chemicals
Reaction mass of N,N'-hexane-1,6-diy[bis [12-hydroxyoctadecanamide] and 12-hydroxy-N-[6-[1-oxoalkyl]amino] hexyl] octadecanamide				0.23978	Chemicals
titanium dioxide	13463-67-7			4.3217	Pigments, Inorganic
silicon dioxide	7631-86-9			0.045253	Pigments, Inorganic
aluminium hydroxide	21645-51-2			0.11313	Pigments, Inorganic
zirconium dioxide	1314-23-4			0.045253	Pigments, Inorganic
carbonblack	1333-86-4			0.02085	Pigments, Organic
iron hydroxide oxide	20344-49-4			0.047781	Pigments, Inorganic
respirable quartz	14808-60-7			1.0401	Pigments, Inorganic
nepheline syenite	37244-96-5			28.731	Pigments, Inorganic
middle molecular epoxy resin MMW 700-1200	25068-38-6			3.5132	Binders
heptan-2-one	110-43-0	Volatile.		1.1711	Solvents
polyolefins				0.041353	Chemicals
white spirit	64742-88-7	Volatile.		0.16541	Solvents
3-(2,3-epoxypropoxy) propyl trimethoxy silane	2530-83-8			0.28814	Chemicals
methanol	67-56-1	Volatile.	Listed	0.00086788	Solvents
methanol (formed by reaction)	Sec (67-56-1)	Volatile.	Listed	0.11861	Solvents
allyl glycidyl ether	106-92-3	Volatile.		0.0002864	Solvents
Talc (non-asbestiform)	14807-96-6			15.003	Pigments, Inorganic
fatty acids, c18-unsatd., dimers, polymers with triethylenetetramine, reaction products with poly (bisphenol a diglycidyl ether)	68424-41-9			7.3801	Binders
3,6-diazaoctanethylenediamin	112-24-3			0.29422	Binders, Monomers in -
bis[(dimethylamino)methyl]phenol	71074-89-0			0.15852	Chemicals
2,4,6-tris(dimethylaminomethyl)phenol	90-72-2			0.89828	Chemicals
2-methoxypropanol	1589-47-5	Volatile.		0.0017684	Solvents
1-methoxy-2-propanol	107-98-2	Volatile.		0.58789	Solvents
2-methoxypropyl acetate	70657-70-4	Volatile.		0.000563	Solvents
2-methoxy-1-methylethyl acetate	108-65-6	Volatile.		0.18711	Solvents

Hazardous Air Pollutant Substance (HAPS)

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Product name and/or code	: Hempthane HS 55610				
	556101115H				US005
Ready-for-use mixture	: 55610 = 55619 7 vol. / 97050 1 vol.				
% Volatile by weight	: 23.2	% Solids by weight	: 76.8		
% Volatile by volume	: 32	% Solids by volume	: 68		
VOC (Material) - Default per EU	: 2.79 lbs/gal (334.1 g/l)	Density	: 12.02 lbs/gal (1.441 g/cm ³)		
VOC (Coating, actual) - Exempt excluded	: 2.79 lbs/gal (334.1 g/l)	% Water by weight	: 0		
VOC (Coating, actual), gram VOC / litre Solids	: 491 g/l	% Exempt by weight	: 0		
VOC (Regulatory) - Less exempt & water	: 2.79 lbs/gal (334.1 g/l)	% HAPS by weight	: 0.5		
VOC (Regulatory), gram VOC / litre Solids	: 491 g/l	gram HAPS / litre Solids	: 11 g/l		

Ingredient name	CAS #	TX Short-term ESL (ug/m3)	TX Long-term ESL (ug/m3)	TX Short-term Odor ESL (ug/m3)	HAPS	W/W %	Type
acrylic resin	*	40				24.526	Binders
Solvent naphtha (petroleum), light arom.	64742-95-6	1250	125		Volatile.	12.116	Solvents
n-butyl acetate	123-86-4	11000	1400		Volatile.	6.2178	Solvents
lecithin	8002-43-5	must meet NAAQS (PM10)	must meet NAAQS (PM10)			0.13981	Chemicals
block copolymer		50	5			0.20999	Chemicals
polyolefins						0.014071	Chemicals
white spirit	64742-88-7	3500	350		Volatile.	0.056285	Solvents
1,3-bis(12-hydroxyocta-decanamide-N-methyl) benzene		50	5			0.58846	Chemicals
Reaction mass of N, N'-hexane-1,6-diylbis [12-hydroxyoctadecanamide] and 12-hydroxy-N-[6-[1-oxoalkyl)amino] hexyl] octadecanamide		50	5			0.2522	Chemicals
titanium dioxide	13463-67-7	50 (PM10)	5 (PM10)			20.074	Pigments, Inorganic
silicon dioxide	7631-86-9	27 (PM10)	2 (PM10)			0.22424	Pigments, Inorganic
aluminium hydroxide	21645-51-2	50 (PM10)	5 (PM10)			0.67271	Pigments, Inorganic
aluminium oxide	1344-28-1	50 (PM10)	5 (PM10)			0.67271	Pigments, Inorganic
zirconium dioxide	1314-23-4	50 (PM10)	5 (PM10)			0.22424	Pigments, Inorganic
dipotassium oxide	12136-45-7	must meet NAAQS (PM10)	must meet NAAQS (PM10)			0.11212	Chemicals
phosphorus pentoxide	1314-56-3					0.22199	Chemicals
trimethylolpropane	77-99-6	50	5			0.22199	Binders, Monomers in -
barium sulphate	7727-43-7	50 (PM10)	5 (PM10)			10.507	Pigments, Inorganic
respirable quartz	14808-60-7	14 (PM10)				0.2915	Pigments, Inorganic
limestone	1317-65-3	must meet NAAQS (PM10)	must meet NAAQS (PM10)			7.246	Pigments, Inorganic
stearic acid	57-11-4	1000 (vapor)	100 (vapor)			0.38542	Chemicals
lead powder (particle diameter < 1mm)	7439-92-1					0.0003142	Pigments, Metallic
lead compounds	1314-41-6				Listed	0.0010403	Pigments, Inorganic
zinc oxide	1314-13-2	20	2			0.031525	Pigments, Inorganic
trizinc bis(orthophosphate)	7779-90-0	20	2			1.0179	Pigments, Inorganic
1,2,4-trimethylbenzene	95-63-6	4400	54		Volatile.	3.0047	Solvents
xylene	1330-20-7	2200	180		Volatile. Listed	0.28169	Solvents
ethylbenzene	100-41-4	26000	570		Volatile. Listed	0.023475	Solvents
cumene	98-82-8	650	250	650	Volatile. Listed	0.14085	Solvents
1,2,3-trimethylbenzene	526-73-8	4400	54		Volatile.	1.0329	Solvents
1-ethyl-2-methylbenzene	611-14-3	1250	125		Volatile.	0.277	Solvents
benzene	71-43-2	170	4.5		Volatile. Listed	0.014486	Solvents
bis (1,2,2,6,6-pentamethyl-4-piperidyl) sebacate	41556-26-7	100	10			0.27998	Chemicals
methyl-1,2,2,6,6-pentamethyl-4-piperidylsebacate	82919-37-7	100	10			0.069995	Chemicals
water	7732-18-5					0.0010478	Solvents, Water
butan-1-ol	71-36-3	610	61	910	Volatile.	0.010478	Solvents
dibutyltin dilaurate	77-58-7	1 (PM10)	0.1 (PM10)			0.021441	Chemicals
hexamethylene-di-isocyanate	822-06-0	0.7	0.1		Listed	0.029393	Binders, Monomers in -
naphthalene	91-20-3	440	50	440	Volatile. Listed	0.0097912	Solvents
hexamethylene-1,6-diisocyanate homopolymer	28182-81-2	8.7	0.87			8.7778	Binders

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Product name and/or code	: Hempel's Thinner 08740		
	0874000000		RD003
% Volatile by weight	: 100	% Solids by weight	: 0
% Volatile by volume	: 100	% Solids by volume	: 0
VOC (Material) - Default per EU	: 7.48 lbs/gal (896 g/l)	Density	: 7.48 lbs/gal (0.896 g/cm ³)
VOC (Coating, actual) - Exempt excluded	: 7.48 lbs/gal (896 g/l)	% Water by weight	: 0
VOC (Coating, actual), gram VOC / litre Solids	: Not applicable.	% Exempt by weight	: 0
VOC (Regulatory) - Less exempt & water	: 7.48 lbs/gal (896 g/l)	% HAPS by weight	: 2.26
VOC (Regulatory), gram VOC / litre Solids	: Not applicable.	gram HAPS / litre Solids	: Not applicable.

Ingredient name	CAS #	HAPS	W/W %	Type
2-methoxypropanol	1589-47-5	Volatile.	0.15895	Solvents
1-methoxy-2-propanol	107-98-2	Volatile.	52.841	Solvents
Solvent naphtha (petroleum), light arom.	64742-95-6	Volatile.	23.148	Solvents
1,2,4-trimethylbenzene	95-63-6	Volatile.	15.04	Solvents
xylene	1330-20-7	Volatile.	Listed 1.41	Solvents
ethylbenzene	100-41-4	Volatile.	Listed 0.1175	Solvents
cumene	98-82-8	Volatile.	Listed 0.705	Solvents
1,2,3-trimethylbenzene	526-73-8	Volatile.	5.17	Solvents
1-ethyl-2-methylbenzene	611-14-3	Volatile.	1.3865	Solvents
benzene	71-43-2	Volatile.	Listed 0.0235	Solvents

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Air Quality Datasheet

Confidential information



Product name and/or code	: Hempel's Galvosil 15700			
	1570019840			RD029
Ready-for-use mixture	: 15700 = 15709 7.4 vol. / 97170 2.6 vol.			
% Volatile by weight	: 24.2	% Solids by weight	: 75.8	
% Volatile by volume	: 36	% Solids by volume	: 64	
VOC (Material) - Default per EU	: 5 lbs/gal (599 g/l)	Density	: 22.21 lbs/gal (2.662 g/cm ³)	
VOC (Coating, actual) - Exempt excluded	: 434 g/l (Measured)	% Water by weight	: 0	
VOC (Coating, actual), gram VOC / litre Solids	: 678	% Exempt by weight	: 0	
VOC (Regulatory) - Less exempt & water	: 434 g/l (Measured)	% HAPS by weight	: 4.61	
VOC (Regulatory), gram VOC / litre Solids	: 678	gram HAPS / litre Solids	: 192	

Ingredient name	CAS #		HAPS	W/W %	Type
xylene	1330-20-7	Volatile.	Listed	3.7	Solvents
ethylbenzene	100-41-4	Volatile.	Listed	0.8257	Solvents
toluene	108-88-3	Volatile.	Listed	0.043951	Solvents
benzene	71-43-2	Volatile.	Listed	0.0052528	Solvents
respirable quartz	14808-60-7			0.087898	Pigments, Inorganic
quaternary ammonium modified bentonite	121888-68-4			0.29161	Pigments, Inorganic
2-methylpropan-1-ol	78-83-1	Volatile.		0.015031	Solvents
propyleneglycol	57-55-6	Volatile.		0.015031	Solvents
polyamineamide salt				0.15031	Chemicals
ethanol (formed by reaction)	Sec (64-17-5)	Volatile.		1.4371	Solvents
2-methoxypropanol	1589-47-5	Volatile.		0.018496	Solvents
1-methoxy-2-propanol	107-98-2	Volatile.		6.1488	Solvents
ethanol	64-17-5	Volatile.		3.9847	Solvents
propan-2-ol	67-63-0	Volatile.		2.0892	Solvents
hydrogen chloride	7647-01-0		Listed	0.0075949	Chemicals
ethylpolysilicate	11099-06-2	Volatile.		4.1948	Binders
amorphous silica	68611-44-9			0.22539	Pigments, Inorganic
china clay	1332-58-7			7.1788	Pigments, Inorganic
quartz (chrySTALLINE, non respirable)	14808-60-7			0.33133	Pigments, Inorganic
mica	12001-26-2			0.15777	Pigments, Inorganic
Feldspar-group minerals	68476-25-5			0.11833	Pigments, Inorganic
titanium dioxide	13463-67-7			0.023666	Pigments, Inorganic
Solvent naphtha (petroleum), light arom.	64742-95-6	Volatile.		0.88805	Solvents
1,2,4-trimethylbenzene	95-63-6	Volatile.		0.577	Solvents
cumene	98-82-8	Volatile.	Listed	0.027047	Solvents
1,2,3-trimethylbenzene	526-73-8	Volatile.		0.19835	Solvents
1-ethyl-2-methylbenzene	611-14-3	Volatile.		0.053193	Solvents
water	7732-18-5			0.0018309	Solvents, Water
zinc oxide	1314-13-2			4.1069	Pigments, Inorganic
zinc chloride	7646-85-7			0.1184	Chemicals
zinc powder - zinc dust (stabilized)	7440-66-6			64.416	Pigments, Metallic

Hazardous Air Pollutant Substance (HAPS)

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Air Quality Datasheet

Confidential information



Product name and/or code	: Hempadur Multi-Strength 35842		
	3584211630		RD001
% Volatile by weight	: 6.7	% Solids by weight	: 93.3
% Volatile by volume	: 0	% Solids by volume	: 100
VOC (Material) - Default per EU	: 0.186 lbs/gal (22.2 g/l)	Density	: 10.76 lbs/gal (1.289 g/cm ³)
VOC (Coating, actual) - Exempt excluded	: 0.185 lbs/gal (22.2 g/l)	% Water by weight	: 0
VOC (Coating, actual), gram VOC / litre Solids	: 22 g/l	% Exempt by weight	: 0.0005
VOC (Regulatory) - Less exempt & water	: 0.185 lbs/gal (22.2 g/l)	% HAPS by weight	: 0.32
VOC (Regulatory), gram VOC / litre Solids	: 22 g/l	gram HAPS / litre Solids	: 4 g/l

Ingredient name	CAS #		HAPS	W/W %	Type
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	25068-38-6			37.211	Binders
1-chloro-2,3-epoxypropane	106-89-8	Volatile.	Listed	0.00095748	Binders, Monomers in -
4,4'-isopropylidenediphenol	80-05-7			0.036876	Binders, Monomers in -
1,6-hexanediol diglycidylether	16096-31-4			10.631	Binders
2,6-dimethylheptan-4-one	108-83-8	Volatile.		0.11156	Solvents
4,6-dimethyl-2-heptanone	19549-80-5	Volatile.		0.041816	Solvents
fluoro polysiloxane				0.0013189	Chemicals
octamethylcyclotetrasiloxane (D4)	556-67-2	Exempted		0.00015361	Chemicals
decamethylcyclopentasiloxane (D5)	541-02-6	Exempted		0.00015361	Chemicals
Dodecamethylcyclohexasiloxane (D6)	540-97-6	Exempted		0.00015361	Chemicals
hydrogenated castor oil	8001-78-3			1.4549	Chemicals
octadecanoic acid, 12-hydroxy-, reaction products with ethylenediamine	100545-48-0			0.48498	Chemicals
titanium dioxide	13463-67-7			3.7797	Pigments, Inorganic
silicon dioxide	7631-86-9			0.039578	Pigments, Inorganic
aluminium hydroxide	21645-51-2			0.098945	Pigments, Inorganic
zirconium dioxide	1314-23-4			0.039578	Pigments, Inorganic
Talc (non-asbestiform)	14807-96-6			10.679	Pigments, Inorganic
respirable quartz	14808-60-7			0.10785	Pigments, Inorganic
3-(2,3-epoxypropoxy) propyl trimethoxy silane	2530-83-8			0.7727	Chemicals
methanol	67-56-1	Volatile.	Listed	0.0023274	Solvents
methanol (formed by reaction)	Sec (67-56-1)	Volatile.	Listed	0.31808	Solvents
allyl glycidyl ether	106-92-3	Volatile.		0.00076804	Solvents
glass beads	65997-17-3			10.088	Pigments, Inorganic
benzaldehyde	100-52-7	Volatile.		0.011788	Solvents
benzyl alcohol	100-51-6	Volatile.		6.1827	Solvents, Coalscent (Calculated as solids)
dibenzyl ether	103-50-4			0.0061385	Solvents
α-chlorotoluene	100-44-7	Volatile.		0.00061348	Solvents
m-Xylylene-diamine	1477-55-0			0.32912	Binders, Monomers in -
polyoxypropylenediamine	9046-10-0			7.0396	Binders
Polymer of: m-Xylylene-diamine, (versatic acid) monoglycidylester and bisphenol A-(epichlorhydrin) epoxy resin				9.5263	Binders
bis[(dimethylamino)methyl]phenol	71074-89-0			0.19822	Chemicals
2,4,6-tris(dimethylaminomethyl)phenol	90-72-2			1.1232	Chemicals

Hazardous Air Pollutant Substance (HAPS)

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Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Regulation (EU) No. 2015/830 - Europe

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name : HEMPADUR MULTISTRENGTH GF 35848
Product identity : 3584811150
Product type : epoxy primer (base for multi-component product)

1.2 Relevant identified uses of the substance or mixture and uses advised against

Field of application : Splash Zone, general
Ready-for-use mixture : 35842 =35848 13.5 ltr / 95620 4.5 ltr
Identified uses : Professional applications, Used by spraying.

1.3 Details of the supplier of the safety data sheet

Company details : HEMPEL A/S
Lundtoftegårdsvej 91
DK-2800 Kgs. Lyngby
Denmark
Tel.: + 45 45 93 38 00
hempel@hempel.com
Date of issue : 13 November 2019
Date of previous issue : 19 September 2019.

1.4 Emergency telephone number

Emergency telephone number (with hours of operation)

+45 45 93 38 00 (08.00 - 17.00)
See section 4 First aid measures.

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition : Mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Skin Irrit. 2, H315 SKIN CORROSION/IRRITATION - Category 2
Eye Irrit. 2, H319 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
Skin Sens. 1, H317 SKIN SENSITIZATION - Category 1
Aquatic Chronic 2, H411 AQUATIC HAZARD (LONG-TERM) - Category 2

See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : H319 - Causes serious eye irritation.
H315 - Causes skin irritation.
H317 - May cause an allergic skin reaction.
H411 - Toxic to aquatic life with long lasting effects.

Precautionary statements :

Prevention : Avoid breathing vapors, spray or mists. Wear protective gloves/protective clothing/eye protection/face protection.

Response : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If skin irritation occurs: Get medical attention.

Hazardous ingredients : bisphenol A-(epichlorhydrin) epoxy resin MW =< 700
1,6-hexanediol diglycidylether
octadecanoic acid, 12-hydroxy-, reaction products with ethylenediamine

Supplemental label elements : Contains epoxy constituents. May produce an allergic reaction.

Special packaging requirements

Containers to be fitted with child-resistant fastenings : Not applicable.

Tactile warning of danger : Not applicable.

SECTION 2: Hazards identification

2.3 Other hazards

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

Other hazards which do not result in classification : None known.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Product/ingredient name	Identifiers	%	Regulation (EC) No. 1272/2008 [CLP]	Type
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	REACH #: 01-2119456619-26 EC: 500-033-5 CAS: 25068-38-6 Index: 603-074-00-8	≥25 - ≤50	Skin Irrit. 2, H315 Eye Irrit. 2, H319 Skin Sens. 1, H317 Aquatic Chronic 2, H411	[1]
1,6-hexanediol diglycidylether	REACH #: 01-2119463471-41 EC: 240-260-4 CAS: 16096-31-4	≥10 - ≤25	Skin Irrit. 2, H315 Eye Irrit. 2, H319 Skin Sens. 1, H317 Aquatic Chronic 3, H412	[1]
benzyl alcohol	REACH #: 01-2119492630-38 EC: 202-859-9 CAS: 100-51-6 Index: 603-057-00-5	≥5 - ≤10	Acute Tox. 4, H302 Acute Tox. 4, H332 Eye Irrit. 2, H319	[1]
octadecanoic acid, 12-hydroxy-, reaction products with ethylenediamine	REACH #: 01-2119979085-27 EC: 309-629-8 CAS: 100545-48-0	<1	Skin Sens. 1B, H317 Aquatic Chronic 3, H412	[1]

See Section 16 for the full text of the H statements declared above.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Type

- [1] Substance classified with a health or environmental hazard
- [2] Substance with a workplace exposure limit, see section 8.
- [3] Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII
- [4] Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII
- [5] Substance of equivalent concern
- [6] Additional disclosure due to company policy

SECTION 4: First aid measures

4.1 Description of first aid measures

General :	In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person. If breathing is irregular, drowsiness, loss of consciousness or cramps: Call 112 and give immediate treatment (first aid).
Eye contact :	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Seek immediate medical attention.
Inhalation :	Remove to fresh air. Keep person warm and at rest. If unconscious, place in recovery position and seek medical advice.
Skin contact :	Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.
Ingestion :	If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting unless directed to do so by medical personnel. Lower the head so that vomit will not re-enter the mouth and throat.
Protection of first-aiders :	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact :	Causes serious eye irritation.
Inhalation :	No known significant effects or critical hazards.
Skin contact :	Causes skin irritation. May cause an allergic skin reaction.
Ingestion :	No known significant effects or critical hazards.

Over-exposure signs/symptoms

SECTION 4: First aid measures

Eye contact :	Adverse symptoms may include the following: pain or irritation watering redness
Inhalation :	No specific data.
Skin contact :	Adverse symptoms may include the following: irritation redness
Ingestion :	No specific data.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician :	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments :	No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Extinguishing media :	Recommended: alcohol resistant foam, CO ₂ , powders, water spray. Not to be used: waterjet.
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5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture :	In a fire or if heated, a pressure increase will occur and the container may burst. This material is toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
Hazardous combustion products :	Decomposition products may include the following materials: carbon oxides halogenated compounds metal oxide/oxides

5.3 Advice for firefighters

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard. Cool closed containers exposed to fire with water. Do not release runoff from fire to drains or watercourses. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Refer to protective measures listed in sections 7 and 8. No action shall be taken involving any personal risk or without suitable training.

6.2 Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

6.3 Methods and materials for containment and cleaning up

Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Use spark-proof tools and explosion-proof equipment. Contaminated absorbent material may pose the same hazard as the spilled product.

6.4 Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Contains epoxy constituents. Avoid all possible skin contact with epoxy and amine containing products, they may cause allergic reactions. Avoid inhalation of vapour, dust and spray mist. Avoid contact with skin and eyes. Eating, drinking and smoking should be prohibited in area where this material is handled, stored and processed. Appropriate personal protective equipment: see Section 8. Always keep in containers made from the same material as the original one.

7.2 Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in a cool, well-ventilated area away from incompatible materials and ignition sources. Keep out of the reach of children. Keep away from: Oxidizing agents, strong alkalis, strong acids. No smoking. Prevent unauthorized access. Containers that are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

See separate Product Data Sheet for recommendations or industrial sector specific solutions.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Product/ingredient name	Exposure limit values
No exposure limit value known.	

Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Derived effect levels

Product/ingredient name	Type	Exposure	Value	Population	Effects
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	DNEL	Long term Dermal	8.33 mg/kg bw/day	Workers	Systemic
1,6-hexanediol diglycidylether	DNEL	Long term Inhalation	12.25 mg/m ³	Workers	Systemic
	DNEL	Long term Dermal	2.8 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	0.44 mg/m ³	Workers	Systemic
benzyl alcohol	DNEL	Long term Inhalation	22 mg/m ³	Workers	Systemic
	DNEL	Long term Dermal	8 mg/kg bw/day	Workers	Systemic

Predicted effect concentrations

Product/ingredient name	Compartment Detail	Value	Method Detail
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	Fresh water	0.006 mg/l	-
	Marine	0.0006 mg/l	-
	Sewage Treatment Plant	10 mg/l	-
	Fresh water sediment	0.996 mg/l	-
	Marine water sediment	0.0996 mg/l	-
	Soil	0.196 mg/l	-
1,6-hexanediol diglycidylether	Fresh water	0.0115 mg/l	-
	Fresh water sediment	0.283 mg/kg dwt	-
	Marine water	0.00115 mg/l	-
	Marine water sediment	0.0283 mg/kg dwt	-
	Soil	0.223 mg/kg dwt	-
	Sewage Treatment Plant	1 mg/l	-
benzyl alcohol	Soil	0.456 mg/kg wwt	Assessment Factors
	Sewage Treatment Plant	39 mg/l	Assessment Factors
	Sediment	5.27 mg/kg wwt	Assessment Factors
	Marine water sediment	0.527 mg/kg wwt	Assessment Factors
	Marine	0.1 mg/l	Assessment Factors
	Fresh water	1 mg/l	Assessment Factors

8.2 Exposure controls

Appropriate engineering controls

SECTION 8: Exposure controls/personal protection

Arrange sufficient ventilation by local exhaust ventilation and good general ventilation to keep the airborne concentrations of vapors or dust lowest possible and below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the workstation location.

Individual protection measures

- General : Gloves must be worn for all work that may result in soiling. Apron/coveralls/protective clothing must be worn when soiling is so great that regular work clothes do not adequately protect skin against contact with the product. Safety eyewear should be used when there is a likelihood of exposure.
- Hygiene measures : Wash hands, forearms, and face thoroughly after handling compounds and before eating, smoking, using lavatory, and at the end of day.
- Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
- Hand protection : Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training. The quality of the chemical-resistant protective gloves must be chosen as a function of the specific workplace concentrations and quantity of hazardous substances.
- Since the actual work situation is unknown. Supplier of gloves should be contacted in order to find the appropriate type. Below listed glove(s) should be regarded as generic advice:
- Recommended: Silver Shield / Barrier / 4H gloves, Viton®
May be used: polyvinyl alcohol (PVA), butyl rubber, nitrile rubber
Short term exposure: natural rubber (latex), polyvinyl chloride (PVC), neoprene rubber
- Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved handling this product.
Wear suitable protective clothing. Always wear protective clothing when spraying.
- Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If working areas have insufficient ventilation: When the product is applied by means that will not generate an aerosol such as, brush or roller wear half or totally covering mask equipped with gas filter of type A, when grinding use particle filter of type P. Be sure to use an approved/certified respirator or equivalent.

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- Physical state : Liquid.
- Odor : Amine-like.
- pH : Testing not relevant or not possible due to nature of the product.
- Melting point/freezing point : -16°C This is based on data for the following ingredient: bisphenol A-(epichlorhydrin) epoxy resin MW = < 700
- Boiling point/boiling range : Testing not relevant or not possible due to nature of the product.
- Flash point : Closed cup: 86°C (186.8°F)
- Evaporation rate : Testing not relevant or not possible due to nature of the product.
- Flammability : Highly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge.
Slightly flammable in the presence of the following materials or conditions: heat.
- Lower and upper explosive (flammable) limits : 1.3 - 13 vol %
- Vapor pressure : 0 kPa This is based on data for the following ingredient: bisphenol A-(epichlorhydrin) epoxy resin MW = < 700
- Vapor density : Testing not relevant or not possible due to nature of the product.
- Specific gravity : 1.395 g/cm³
- Solubility(ies) : Partially soluble in the following materials: cold water and hot water.
- Partition coefficient (LogKow) : Testing not relevant or not possible due to nature of the product.
- Auto-ignition temperature : Lowest known value: 436°C (816.8°F) (benzyl alcohol).

SECTION 9: Physical and chemical properties

Decomposition temperature :	Testing not relevant or not possible due to nature of the product.
Viscosity :	Testing not relevant or not possible due to nature of the product.
Explosive properties :	Slightly explosive in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
Oxidizing properties :	Testing not relevant or not possible due to nature of the product.

9.2 Other information

Solvent(s) % by weight :	Weighted average: 7 %
Water % by weight :	Weighted average: 0 %
VOC content :	24.8 g/l
TOC Content :	Weighted average: 19 g/l
Solvent Gas :	Weighted average: 0.023 m ³ /l

SECTION 10: Stability and reactivity

10.1 Reactivity

No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability

The product is stable.

10.3 Possibility of hazardous reactions

Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid

No specific data.

10.5 Incompatible materials

Reactive or incompatible with the following materials: oxidizing materials.
Slightly reactive or incompatible with the following materials: reducing materials.

10.6 Hazardous decomposition products

When exposed to high temperatures (i.e. in case of fire) harmful decomposition products may be formed:
Decomposition products may include the following materials: carbon oxides halogenated compounds metal oxide/oxides

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Exposure to component solvent vapor concentrations may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on the kidneys, liver and central nervous system. Solvents may cause some of the above effects by absorption through the skin. Symptoms and signs include headaches, dizziness, fatigue, muscular weakness, drowsiness and, in extreme cases, loss of consciousness. Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin. If splashed in the eyes, the liquid may cause irritation and reversible damage. Accidental swallowing may cause stomach pain. Chemical lung inflammation may occur if the product is taken into the lungs via vomiting.

Epoxy and amine containing products can cause skin disorders such as allergic eczema. The allergy may arise after only a short exposure period.

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Dermal	Rat	>2000 mg/kg	-
	LD50 Oral	Rat	>2000 mg/kg	-
1,6-hexanediol diglycidylether	LD50 Dermal	Rat	>2000 mg/kg	-
	LD50 Oral	Rat	2190 mg/kg	-
benzyl alcohol	LC50 Inhalation Dusts and mists	Rat	>4178 mg/m ³	4 hours
	LD50 Oral	Rat	1230 mg/kg	-

Acute toxicity estimates

SECTION 11: Toxicological information

Product/ingredient name	Oral mg/kg	Dermal mg/kg	Inhalation (gases) ppm	Inhalation (vapors) mg/l	Inhalation (dusts and mists) mg/l
HEMPADUR MULTISTRENGTH GF 35848 1,6-hexanediol diglycidylether benzyl alcohol	20923.8 2190 1230			187.1 11	

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	Eyes - Mild irritant	Rabbit	-	-
1,6-hexanediol diglycidylether	Skin - Mild irritant	Rabbit	-	-
	Skin - Irritant	Rabbit	-	-
	Eyes - Irritant	Rabbit	-	-
benzyl alcohol	Eyes - Visible necrosis	Rabbit	-	-
	Skin - Mild irritant	Rabbit	-	-
octadecanoic acid, 12-hydroxy-, reaction products with ethylenediamine	Skin - Mild irritant	Rabbit	-	-
	Eyes - Mild irritant	Rabbit	-	-

Sensitizer

Product/ingredient name	Route of exposure	Species	Result
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	skin	Guinea pig	Sensitizing
1,6-hexanediol diglycidylether	skin	Guinea pig	Sensitizing

Mutagenic effects

No known significant effects or critical hazards.

Carcinogenicity

No known significant effects or critical hazards.

Reproductive toxicity

No known significant effects or critical hazards.

Teratogenic effects

No known significant effects or critical hazards.

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
No known data available in our database.			

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target organs
No known data available in our database.			

Aspiration hazard

Product/ingredient name	Result
No known data available in our database.	

Information on the likely routes of exposure

Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential chronic health effects

Sensitization : Contains bisphenol A-(epichlorhydrin) epoxy resin MW =< 700, 1,6-hexanediol diglycidylether, octadecanoic acid, 12-hydroxy-, reaction products with ethylenediamine. May produce an allergic reaction.

Other information : No additional known significant effects or critical hazards.

SECTION 12: Ecological information

12.1 Toxicity

Do not allow to enter drains or watercourses. Toxic to aquatic life with long lasting effects.

Product/ingredient name	Result	Species	Exposure
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	Acute EC50 >11 mg/l	Algae	72 hours
	Acute EC50 2.1 mg/l	Daphnia - Daphnia magna	48 hours
	Acute LC50 3.1 mg/l	Fish - fathead minnow (Pimephales promelas)	96 hours
1,6-hexanediol diglycidylether	Acute EC50 23.1 mg/l	Algae	48 hours
	Acute LC50 47 mg/l	Daphnia	48 hours
	Acute LC50 30 mg/l	Fish	96 hours
benzyl alcohol	Acute EC50 230 mg/l	Daphnia	48 hours
	Acute IC50 770 mg/l	Algae	72 hours
	Acute LC50 460 mg/l	Fish	96 hours
octadecanoic acid, 12-hydroxy-, reaction products with ethylenediamine	Acute EC50 >100 mg/l	Algae	72 hours
	Acute EC50 >10 mg/l	Daphnia	48 hours
	Acute EC50 >10 mg/l	Fish	96 hours

12.2 Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	OECD 302B Inherent Biodegradability: Zahn-Wellens/EMPA Test	12 % - Not readily - 28 days	-	-
1,6-hexanediol diglycidylether	OECD 301D Ready Biodegradability - Closed Bottle Test	47 % - Inherent - 28 days	2 mg/l	-
benzyl alcohol	OECD 301A 301A Ready Biodegradability - DOC Die-Away Test	95 - 97 % - Readily - 21 days	-	-
	OECD 301C 301C Ready Biodegradability - Modified MITI Test (I)	92 - 96 % - Readily - 14 days	-	-
octadecanoic acid, 12-hydroxy-, reaction products with ethylenediamine	OECD 301D Ready Biodegradability - Closed Bottle Test	22 % - Not readily - 28 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	-	-	Not readily
1,6-hexanediol diglycidylether	-	-	Inherent
benzyl alcohol	-	-	Readily
octadecanoic acid, 12-hydroxy-, reaction products with ethylenediamine	-	-	Not readily

12.3 Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	2.64 - 3.78	31	low
1,6-hexanediol diglycidylether	0.822	3.57	low
benzyl alcohol	0.87	1.37	low
octadecanoic acid, 12-hydroxy-, reaction products with ethylenediamine	5.86	-	high

12.4 Mobility in soil

Soil/water partition coefficient (K_{oc}) : No known data available in our database.

Mobility : No known data available in our database.

12.5 Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

12.6 Other adverse effects

SECTION 12: Ecological information

No known significant effects or critical hazards.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

The generation of waste should be avoided or minimized wherever possible. Residues of the product is listed as hazardous waste. Dispose of according to all state and local applicable regulations. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Spillage, remains, discarded clothes and similar should be discarded in a fireproof container.

European waste catalogue no. (EWC) is given below.







European waste catalogue (EWC) : 08 01 11*

Packaging

The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

SECTION 14: Transport information

Transport may take place according to national regulation or ADR for transport by road, RID for transport by train, IMDG for transport by sea, IATA for transport by air.

	14.1 UN no.	14.2 Proper shipping name	14.3 Transport hazard class(es)		14.4 PG*	14.5 Env*	Additional information
ADR/RID Class	UN3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (bisphenol A-(epichlorhydrin) epoxy resin MW =< 700)	9	 	III	Yes.	This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.
IMDG Class	UN3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.. (bisphenol A-(epichlorhydrin) epoxy resin MW =< 700)	9	 	III	Yes.	This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8. Emergency schedules F-A, S-F
IATA Class	UN3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (bisphenol A-(epichlorhydrin) epoxy resin MW =< 700)	9	 	III	Yes.	This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 5.0.2.4.1, 5.0.2.6.1.1 and 5.0.2.8.

PG* : Packing group

Env.* : Environmental hazards

14.6 Special precautions for user

Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

Not applicable.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU Regulation (EC) No. 1907/2006 (REACH) Annex XIV - List of substances subject to authorization - Substances of very high concern

Annex XIV

None of the components are listed.

Substances of very high concern

None of the components are listed.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

Not applicable.

Other EU regulations

Seveso category This product is controlled under the Seveso III Directive.

Seveso category
E2: Hazardous to the aquatic environment - Chronic 2

SECTION 16: Other information

Abbreviations and acronyms :
 ATE = Acute Toxicity Estimate
 CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
 EUH statement = CLP-specific Hazard statement
 RRN = REACH Registration Number
 DNEL = Derived No Effect Level
 PNEC = Predicted No Effect Concentration

Full text of abbreviated H statements :
 H302 Harmful if swallowed.
 H315 Causes skin irritation.
 H317 May cause an allergic skin reaction.
 H319 Causes serious eye irritation.
 H332 Harmful if inhaled.
 H411 Toxic to aquatic life with long lasting effects.
 H412 Harmful to aquatic life with long lasting effects.

Full text of classifications [CLP/GHS] :
 Acute Tox. 4, H302 ACUTE TOXICITY (oral) - Category 4
 Acute Tox. 4, H332 ACUTE TOXICITY (inhalation) - Category 4
 Aquatic Chronic 2, H411 AQUATIC HAZARD (LONG-TERM) - Category 2
 Aquatic Chronic 3, H412 AQUATIC HAZARD (LONG-TERM) - Category 3
 Eye Irrit. 2, H319 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
 Skin Irrit. 2, H315 SKIN CORROSION/IRRITATION - Category 2
 Skin Sens. 1, H317 SKIN SENSITIZATION - Category 1
 Skin Sens. 1B, H317 SKIN SENSITIZATION - Category 1B

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Classification	Justification
SKIN CORROSION/IRRITATION - Category 2	Calculation method
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2	Calculation method
SKIN SENSITIZATION - Category 1	Calculation method
AQUATIC HAZARD (LONG-TERM) - Category 2	Calculation method

Notice to reader

➤ Indicates information that has changed from previously issued version.

The information contained in this safety data sheet is based on the present state of knowledge and EU and national legislation. It provides guidance on health, safety and environmental aspects for handling the product in a safe way and should not be construed as any guarantee of the technical performance or suitability for particular applications.

It is always the duty of the user/employer to ascertain that the work is planned and carried out in accordance with the national regulations.

This document is intended to communicate the conditions of safe use for the product and should always be read in combination with the product's Safety Data Sheet and labels.

General description of the process covered

Indoor or outdoor spray painting by professionals or with brush, roller, putty knife, dipping etc. with good general room ventilation

This safe use information is linked to : Professional spray painting and/or low-energy painting, local effect - Level II
Skin Sens. 1, Eye Irrit. 2 , Asp. Tox. 1 or Solvent.

Sector(s) of use : Industrial uses - Professional uses

Product category(ies) : Coatings and paints, thinners, paint removers

Operational conditions

Place of use : Indoor or outdoor use




Risk management measures (RMM)

Contributing activity	Process category (ies)	Maximum duration	Ventilation		Respiratory	Eye	Hands
			Type and air changes per hour				
Preparation of material for application	PROC05	More than 4 hours	Good general room ventilation - Outdoors	3 - 5	None	Use eye protection according to EN 166.	Wear suitable gloves tested to EN374.
Loading of application equipment and handling of coated parts before curing	PROC08a	More than 4 hours	Good general room ventilation - Outdoors	3 - 5	None	Use eye protection according to EN 166.	Wear suitable gloves tested to EN374.
Professional application of coatings by brush or roller	PROC10	More than 4 hours	Good general room ventilation - Outdoors	3 - 5	None	Use eye protection according to EN 166.	Wear suitable gloves tested to EN374.
Professional application of coatings by spraying	PROC11	More than 4 hours	Good general room ventilation - Outdoors	3 - 5	Wear a respirator conforming to EN140 with an assigned protection factor of at least 10.	Use eye protection according to EN 166.	Wear suitable gloves tested to EN374.
Film formation - force drying, stoving and other technologies	PROC04	More than 4 hours	Good general room ventilation - Outdoors	3 - 5	None	None	None
Cleaning	PROC05	More than 4 hours	Good general room ventilation - Outdoors	3 - 5	None	Use eye protection according to EN 166.	Wear suitable gloves tested to EN374.
Waste management	PROC08a	More than 4 hours	Good general room ventilation - Outdoors	3 - 5	None	Use eye protection according to EN 166.	Wear suitable gloves tested to EN374.

See chapter 8 of this Safety Data Sheet for specifications.



Conforms to ANSI Z400.1-2010 Standard - HCS 2012

Protective Clothing	General Hazard	DOT
		

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name : Hempaprime Multi 500 Base
 Product identity : 4595900010
 Product type : epoxy paint

1.2 Relevant identified uses of the substance or mixture and uses advised against

Field of application : metal industry
 Ready-for-use mixture : 45950 = 45959 8 Ltr/ 95090 2 Ltr; 45953 = 45959 8 Ltr / 95093 2 Ltr
 Identified uses : Industrial/Professional use
 TSCA : **Unless otherwise stated. All components are listed or exempted.**

1.3 Details of the supplier of the safety data sheet

Company details :	HEMPEL (USA), Inc. 600 Conroe Park North Drive Conroe, Texas 77303 Toll free: (800) 678-6641, if outside area codes 713, 281, 409, 936 Regular phone number: (936) 523-6000 E-mail Hempel@Hempel.com	HEMPEL (USA), Inc. 2728 Empire Central Dallas, TX 75235 Phone number: 1-214-353-1600 E-mail: hempel@hempel.com
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1.4 Emergency telephone number (with hours of operation)

For Transportation Emergencies : (24 hours) CHEMTREC: **1-800-424-9300** (Toll-free in the U.S., Canada and the U.S. Virgin Islands) **703-527-3887**
 For calls originating elsewhere (Collect calls are accepted). Contract number: CCN10384
 To preserve the effectiveness of arrangements for providing accurate and timely emergency response information, the basic identifying information (shipper name or contract number) must be included on shipping papers.
 If the purchaser of this product is going to be shipping this product to other locations, the purchaser must arrange for its own Emergency Information Provider to respond to transport incidents. Hempel's 24 hour response contract does not cover non-Hempel shipments.

For all other information : (8 AM - 5 PM CST) In USA toll free calling available: 1-800- 678-6641 or (936)-523-6000
 See Section 4 of the safety data sheet (first aid measures).

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

GHS Classification :
 FLAMMABLE LIQUIDS - Category 3
 SKIN IRRITATION - Category 2
 EYE IRRITATION - Category 2A
 SKIN SENSITIZATION - Category 1
 CARCINOGENICITY - Category 1A
 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

2.2 Label elements

Hazard pictograms :



SECTION 2: Hazards identification

Signal word :	Danger
Hazard statements :	H226 - Flammable liquid and vapor. H315 - Causes skin irritation. H317 - May cause an allergic skin reaction. H319 - Causes serious eye irritation. H350 - May cause cancer. H372 - Causes damage to organs through prolonged or repeated exposure. (hearing organs, lungs)
Precautionary statements :	
Prevention :	Obtain special instructions before use. Wear protective gloves. Wear protective clothing. Wear eye or face protection. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating or lighting equipment. Use non-sparking tools. Take action to prevent static discharges. Do not breathe vapor, mist or spray. Do not eat, drink or smoke when using this product. Wash thoroughly after handling.
Response :	IF exposed or concerned: Get medical advice or attention. Take off contaminated clothing and wash it before reuse. Wash contaminated clothing before reuse. IF ON SKIN: Wash with plenty of water. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice or attention.
Storage :	Store in a well-ventilated place. Keep cool.
Disposal :	Dispose of contents and container in accordance with all local, regional, national and international regulations.
Supplemental label elements :	None known.

2.3 Other hazards

Hazards not otherwise classified : None known.

SECTION 3: Composition/information on ingredients

Product definition :	Mixture
Physical state :	Liquid.

Product/ingredient name	Identifiers	%	GHS Classification
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	25068-38-6	≥10 - ≤25	SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A SKIN SENSITIZATION - Category 1
Talc (non-asbestiform)	14807-96-6	≥10 - ≤25	Not classified.
titanium dioxide	13463-67-7	≥10 - ≤25	Not classified.
xylene	1330-20-7	≥5 - ≤10	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (dermal) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2 SKIN IRRITATION - Category 2 SKIN SENSITIZATION - Category 1
oxirane, mono[(C12-14-alkyloxy)methyl] derivs.	68609-97-2	≥5 - ≤10	SKIN IRRITATION - Category 2 SKIN IRRITATION - Category 2 SKIN SENSITIZATION - Category 1
Methylstyrenated phenol	68512-30-1	≥3 - ≤5	SKIN IRRITATION - Category 2 SKIN SENSITIZATION - Category 1B
middle molecular epoxy resin MMW 700-1200	25068-38-6	≥3 - ≤5	SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A SKIN SENSITIZATION - Category 1
ethylbenzene	100-41-4	≥1 - ≤3	FLAMMABLE LIQUIDS - Category 2 ACUTE TOXICITY (inhalation) - Category 4 CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2
butan-1-ol	71-36-3	≥1 - <3	ASPIRATION HAZARD - Category 1 FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (oral) - Category 4 SKIN IRRITATION - Category 2 SERIOUS EYE DAMAGE - Category 1 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
respirable quartz	14808-60-7	≥1 - ≤3	CARCINOGENICITY - Category 1A SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2

SECTION 3: Composition/information on ingredients

			EXPOSURE) - Category 1
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Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

SECTION 4: First aid measures

4.1 Description of first aid measures

General :	In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person. If breathing is irregular, drowsiness, loss of consciousness or cramps: Call 911 and give immediate treatment (first aid).
Eye contact :	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Seek immediate medical attention.
Inhalation :	Remove to fresh air. Keep person warm and at rest. If unconscious, place in recovery position and seek medical advice.
Skin contact :	Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.
Ingestion :	If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting unless directed to do so by medical personnel. Lower the head so that vomit will not re-enter the mouth and throat.
Protection of first-aiders :	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact :	Causes serious eye irritation.
Inhalation :	No known significant effects or critical hazards.
Skin contact :	Causes skin irritation. May cause an allergic skin reaction.
Ingestion :	No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact :	Adverse symptoms may include the following: pain or irritation watering redness
Inhalation :	No specific data.
Skin contact :	Adverse symptoms may include the following: irritation redness
Ingestion :	No specific data.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician :	Not applicable.
Specific treatments :	No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Extinguishing media : Recommended: alcohol resistant foam, CO₂, powders, water spray.
Not to be used: waterjet.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture : Flammable liquid and vapor. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous combustion products : Decomposition products may include the following materials: carbon oxides halogenated compounds metal oxide/oxides

5.3 Advice for firefighters

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard. Cool closed containers exposed to fire with water. Do not release runoff from fire to drains or watercourses. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Exclude sources of ignition and be aware of explosion hazard. Ventilate the area. Refer to protective measures listed in sections 7 and 8. No action shall be taken involving any personal risk or without suitable training.

6.2 Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material.

6.3 Methods and materials for containment and cleaning up

Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Use spark-proof tools and explosion-proof equipment. Contaminated absorbent material may pose the same hazard as the spilled product.

6.4 Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Vapors are heavier than air and may spread along floors. Vapors may form explosive mixtures with air. Prevent the creation of flammable or explosive concentrations of vapors in air and avoid vapor concentrations higher than the occupational exposure limits. In addition, the product should be used only in areas from which all naked lights and other sources of ignition have been excluded. Electrical equipment should be protected to the appropriate standard. To dissipate static electricity during transfer, ground drum and connect to receiving container with bonding strap. No sparking tools should be used. Contains epoxy constituents. Avoid all possible skin contact with epoxy and amine containing products, they may cause allergic reactions. Avoid inhalation of vapour, dust and spray mist. Avoid contact with skin and eyes. Eating, drinking and smoking should be prohibited in area where this material is handled, stored and processed. Appropriate personal protective equipment: see Section 8. Always keep in containers made from the same material as the original one.

7.2 Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in a cool, well-ventilated area away from incompatible materials and ignition sources. Keep out of the reach of children. Keep away from: Oxidizing agents, strong alkalis, strong acids. No smoking. Prevent unauthorized access. Containers that are opened must be carefully resealed and kept upright to prevent leakage.

SECTION 7: Handling and storage

7.3 Specific end use(s)

See separate Product Data Sheet for recommendations or industrial sector specific solutions.

This product may be applied using several application techniques and methods of handling may be different for each. Application techniques include [but are not limited to] brushing, rolling, and spray application [conventional, HPLV, airless, pleural component or aerosol can]. Avoid the breathing of vapors and, if spraying, do not breath spray mist or aerosols.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Product/ingredient name	Exposure limit values
Talc (non-asbestiform)	<p>ACGIH TLV (United States, 3/2019). TWA: 0.1 f/cc 8 hours. Form: Respirable fibers: length greater than 5 µm; aspect ratio equal to or greater than 3:1 as determined by the membrane filter method at 400-450X magnification (4-mm objective) phase contrast illumination.</p> <p>OSHA PEL Z3 (United States, 6/2016). TWA: 0.1 f/cc 8 hours. Form: containing asbestos STEL: 1 f/cc 30 minutes. Form: containing asbestos</p>
titanium dioxide	<p>OSHA PEL (United States, 5/2018). TWA: 15 mg/m³ 8 hours. Form: Total dust</p> <p>ACGIH TLV (United States, 3/2019). TWA: 10 mg/m³ 8 hours.</p>
xylene	<p>ACGIH TLV (United States, 3/2019). TWA: 100 ppm 8 hours. TWA: 434 mg/m³ 8 hours. STEL: 150 ppm 15 minutes. STEL: 651 mg/m³ 15 minutes.</p> <p>OSHA PEL (United States, 5/2018). TWA: 100 ppm 8 hours. TWA: 435 mg/m³ 8 hours.</p>
ethylbenzene	<p>ACGIH TLV (United States, 3/2019). TWA: 20 ppm 8 hours.</p> <p>NIOSH REL (United States, 10/2016). STEL: 545 mg/m³ 15 minutes. STEL: 125 ppm 15 minutes. TWA: 435 mg/m³ 10 hours. TWA: 100 ppm 10 hours.</p> <p>OSHA PEL (United States, 5/2018). TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours.</p>
butan-1-ol	<p>ACGIH TLV (United States, 3/2019). TWA: 20 ppm 8 hours.</p> <p>NIOSH REL (United States, 10/2016). Absorbed through skin. CEIL: 50 ppm CEIL: 150 mg/m³</p> <p>OSHA PEL (United States, 5/2018). TWA: 100 ppm 8 hours. TWA: 300 mg/m³ 8 hours.</p>
respirable quartz	<p>OSHA PEL Z3 (United States, 6/2016). TWA: 250 mppcf / (%SiO₂+5) 8 hours. Form: Respirable TWA: 10 mg/m³ / (%SiO₂+2) 8 hours. Form: Respirable</p> <p>OSHA PEL (United States, 5/2018). TWA: 50 µg/m³ 8 hours. Form: Respirable dust</p> <p>ACGIH TLV (United States, 3/2019). TWA: 0.025 mg/m³ 8 hours. Form: Respirable fraction</p> <p>NIOSH REL (United States, 10/2016). TWA: 0.05 mg/m³ 10 hours. Form: respirable dust</p>

Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

SECTION 8: Exposure controls/personal protection

8.2 Exposure controls

Appropriate engineering controls

Provide local exhaust and general ventilation systems to maintain airborne concentrations below OSHA, ACGIH, and manufacturer recommended exposure limits. Local exhaust ventilation is preferred because it prevents contaminant dispersion into work areas by controlling it at its source. Use local and general exhaust ventilation to effectively remove and prevent buildup of mists/vapors/fumes generated from the handling of this product.

Note: Local exhaust ventilation is designed to capture an emitted contaminant at or near its source, before the contaminant has a chance to disperse into the workplace air. General exhaust ventilation, also called dilution ventilation, is different from local exhaust ventilation because instead of capturing emissions at their source and removing them from the air, general exhaust ventilation allows the contaminant to be emitted into the workplace air and then dilutes the concentration of the contaminant to an acceptable level (e.g., to the PEL or below).

Individual protection measures

General : Gloves must be worn for all work that may result in soiling. Apron/coveralls/protective clothing must be worn when soiling is so great that regular work clothes do not adequately protect skin against contact with the product. Safety eyewear should be used when there is a likelihood of exposure.

Hygiene measures : Wash hands, forearms, and face thoroughly after handling compounds and before eating, smoking, using lavatory, and at the end of day.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Hand protection : Wear chemical-resistant gloves in combination with 'basic' employee training. The quality of the chemical-resistant protective gloves must be chosen as a function of the specific workplace concentrations and quantity of hazardous substances.
Since the actual work situation is unknown. Supplier of gloves should be contacted in order to find the appropriate type. Below listed glove(s) should be regarded as generic advice:

Recommended: Silver Shield / Barrier / 4H gloves, polyvinyl alcohol (PVA), Viton®
May be used: nitrile rubber, butyl rubber
Short term exposure: neoprene rubber, natural rubber (latex), polyvinyl chloride (PVC)

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved handling this product.
Wear suitable protective clothing. Always wear protective clothing when spraying.

Respiratory protection : If working areas have insufficient ventilation, wear half or totally covering mask equipped with gas filter of type Organic Vapor, when grinding use particle filter of type P95, P99 or P100. When spraying use a combined filter (organic vapor / HEPA or organic vapor / P100 type). Be sure to use approved/certified respirator or equivalent. Always wear an air-fed respirator when spraying in a continuous and prolonged work situation (e.g. hood with supply of fresh or compressed air or a full face, powered air purifying filter).

Protective clothing (pictograms) :



Note: Application of paint products by spraying requires additional safety precautions: Full body suit, Full face respirator with air supplied.

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state : Liquid.
Odor : Amine-like.
pH : Testing not relevant or not possible due to nature of the product.
Melting point/freezing point : Testing not relevant or not possible due to nature of the product.
Boiling point/boiling range : Testing not relevant or not possible due to nature of the product.
Flash point : Closed cup: 25°C (77°F)

SECTION 9: Physical and chemical properties

Evaporation rate :	Testing not relevant or not possible due to nature of the product.
Flammability :	Highly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
Upper/lower flammability or explosive limits :	0.8 - 11.3 vol %
Vapor pressure :	Testing not relevant or not possible due to nature of the product.
Vapor density :	Testing not relevant or not possible due to nature of the product.
Relative density :	1.659 g/cm ³
Solubility(ies) :	Partially soluble in the following materials: cold water and hot water.
Partition coefficient (LogKow) :	Testing not relevant or not possible due to nature of the product.
Auto-ignition temperature :	Testing not relevant or not possible due to nature of the product.
Decomposition temperature :	Testing not relevant or not possible due to nature of the product.
Viscosity :	Testing not relevant or not possible due to nature of the product.
Explosive properties :	Explosive in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
Oxidizing properties :	Testing not relevant or not possible due to nature of the product.

9.2 Other information

Solvent(s) % by weight (Included exempt solvent(s)):	9.2 % (w/w)
Water % by weight :	Weighted average: 0 %
VOC content (Coatings) :	1.27 lbs/gal (152.6 g/l)
VOC content (Regulatory) :	1.27 lbs/gal (152.6 g/l)
TOC Content (Volatile) :	Weighted average: 131 g/l
Solvent Gas :	Weighted average: 0.038 m ³ /l

SECTION 10: Stability and reactivity

10.1 Reactivity

No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability

The product is stable.

10.3 Possibility of hazardous reactions

Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid

Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

10.5 Incompatible materials

Highly reactive or incompatible with the following materials: oxidizing materials.
Reactive or incompatible with the following materials: reducing materials.

10.6 Hazardous decomposition products

When exposed to high temperatures (i.e. in case of fire) harmful decomposition products may be formed:

Decomposition products may include the following materials: carbon oxides halogenated compounds metal oxide/oxides

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Exposure to component solvent vapor concentrations may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on the kidneys, liver and central nervous system. Solvents may cause some of the above effects by absorption through the skin. Symptoms and signs include headaches, dizziness, fatigue, muscular weakness, drowsiness and, in extreme cases, loss of consciousness. Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin. If splashed in the eyes, the liquid may cause irritation and reversible damage. Accidental swallowing may cause stomach pain. Chemical lung inflammation may occur if the product is taken into the lungs via vomiting.

Epoxy and amine containing products can cause skin disorders such as allergic eczema. The allergy may arise after only a short exposure period.

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Dermal	Rat	>2000 mg/kg	-
titanium dioxide	LD50 Oral	Rat	>2000 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat	>6.8 mg/l	4 hours
xylene	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation Gas.	Rat	5000 ppm	4 hours
	LC50 Inhalation Vapor	Rat	6350 ppm	4 hours
oxirane, mono[(C12-14-alkyloxy) methyl] derivs.	LD50 Dermal	Rabbit	>4200 mg/kg	-
	LD50 Oral	Rat	3523 mg/kg	-
	LD50 Dermal	Rat	>4500 mg/kg	-
Methylstyrenated phenol	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat	>5 mg/l	4 hours
middle molecular epoxy resin MMW 700-1200	LD50 Dermal	Rat	>2000 mg/kg	-
	LD50 Dermal	Rat	>2000 mg/kg	-
ethylbenzene	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-
butan-1-ol	LC50 Inhalation Vapor	Rat	24000 mg/m ³	4 hours
	LD50 Dermal	Rabbit	3400 mg/kg	-
	LD50 Oral	Rat	790 mg/kg	-

Acute toxicity estimates

Route	ATE value
Oral	59958.46 mg/kg
Dermal	17841.24 mg/kg
Inhalation (gases)	65052.36 ppm
Inhalation (vapors)	146 mg/l

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	Eyes - Mild irritant	Rabbit	-	-
	Skin - Mild irritant	Rabbit	-	-
Talc (non-asbestiform)	Skin - Mild irritant	Human	-	72 hours 300 Micrograms Intermittent
	Skin - Mild irritant	Human	-	72 hours 300 Micrograms Intermittent
titanium dioxide	Skin - Mild irritant	Human	-	72 hours 300 Micrograms Intermittent
	Skin - Mild irritant	Human	-	72 hours 300 Micrograms Intermittent
xylene	Eyes - Severe irritant	Rabbit	-	24 hours 5 milligrams
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams
oxirane, mono[(C12-14-alkyloxy) methyl] derivs.	Eyes - Mild irritant	Rabbit	-	-
	Eyes - Mild irritant	Rabbit	-	-
Methylstyrenated phenol	Skin - Moderate irritant	Rabbit	-	-
	Eyes - Mild irritant	Rabbit	-	-
ethylbenzene	Skin - Irritant	Rabbit	-	-
	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams
	Respiratory - Mild irritant	Rabbit	-	-
butan-1-ol	Eyes - Mild irritant	Rabbit	-	-
	Eyes - Severe irritant	Rabbit	-	24 hours 2 milligrams
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams

Sensitizer

SECTION 11: Toxicological information

Product/ingredient name	Route of exposure	Species	Result
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	skin	Guinea pig	Sensitizing
oxirane, mono[(C12-14-alkyloxy)methyl] derivs.	skin	Guinea pig	Sensitizing
middle molecular epoxy resin MMW 700-1200	skin	Guinea pig	Sensitizing

Carcinogen Classification

Product/ingredient name	IARC	NTP	OSHA
Talc (non-asbestiform)	1	-	-
titanium dioxide	2B	-	-
xylene	3	-	-
ethylbenzene	2B	-	-
respirable quartz	1	Known to be a human carcinogen.	-

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
butan-1-ol	Category 3		Respiratory tract irritation
	Category 3		Narcotic effects

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target organs
ethylbenzene	Category 2	-	hearing organs
respirable quartz	Category 1	inhalation	lungs

Aspiration hazard

Product/ingredient name	Result
ethylbenzene	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure

Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential chronic health effects

Sensitization : Contains bisphenol A-(epichlorhydrin) epoxy resin MW =< 700, oxirane, mono[(C12-14-alkyloxy)methyl] derivs., Methylstyrenated phenol, middle molecular epoxy resin MMW 700-1200, 1,3-bis (12-hydroxyocta-decanamide-N-methyle)benzene. May produce an allergic reaction.

Other information : No additional known significant effects or critical hazards.

SECTION 12: Ecological information

12.1 Toxicity

Do not allow to enter drains or watercourses. Harmful to aquatic life with long lasting effects.

When spilled, this product may act as an oil, causing a film, sheen, emulsion, or sludge at or beneath the surface of a body of water. Oils of any kind can cause: (a) drowning of waterfowl due to lack of buoyancy, loss of insulating capacity of feathers, starvation and vulnerability to predators due to lack of mobility; (b) lethal effect on fish by coating gill surfaces, preventing respiration; (c) potential fish kills resulting from alteration in biochemical oxygen demand; (d) asphyxiation of benthic life forms when floating masses become engaged with surface debris and settle on the bottom; and (e) adverse aesthetic effects of fouled shoreline and beaches.

SECTION 12: Ecological information

Product/ingredient name	Result	Species	Exposure
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	Acute EC50 >11 mg/l	Algae	72 hours
	Acute EC50 2.1 mg/l	Daphnia - Daphnia magna	48 hours
	Acute LC50 3.1 mg/l	Fish - fathead minnow (Pimephales promelas)	96 hours
titanium dioxide	Acute LC50 >100 mg/l	Daphnia	48 hours
oxirane, mono[(C12-14-alkyloxy)methyl] derivs.	Acute LC50 >100 mg/l	Fish	96 hours
	Acute IC50 843.75 mg/l	Algae	72 hours
Methylstyrenated phenol	Acute LC50 5000 mg/l	Fish	96 hours
	Acute EC50 15 mg/l	Algae	72 hours
middle molecular epoxy resin MMW 700-1200	Acute EC50 14 - 51 mg/l	Daphnia	48 hours
	Acute EC50 25.8 mg/l	Fish	96 hours
	Acute EC50 >100 mg/l	Daphnia	48 hours
ethylbenzene	Acute LC50 >100 mg/l	Fish	96 hours
	Chronic NOEC <1000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
butan-1-ol	Acute EC50 1328 mg/l	Daphnia	96 hours
	Acute LC50 1.376 mg/l	Fish	96 hours

12.2 Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	OECD 302B Inherent Biodegradability: Zahn-Wellens/EMPA Test	12 % - Not readily - 28 days	-	-
xylene	-	>60 % - Readily - 28 days	-	-
oxirane, mono[(C12-14-alkyloxy)methyl] derivs.	-	87 % - Readily - 28 days	-	-
ethylbenzene	-	>70 % - Readily - 28 days	-	-
butan-1-ol	OECD 301D Ready Biodegradability - Closed Bottle Test	92 % - 20 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	-	-	Not readily
xylene	-	-	Readily
oxirane, mono[(C12-14-alkyloxy)methyl] derivs.	-	-	Readily
Methylstyrenated phenol	-	-	Not readily
ethylbenzene	-	-	Readily
butan-1-ol	-	-	Readily

12.3 Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
bisphenol A-(epichlorhydrin) epoxy resin MW =< 700	2.64 - 3.78	31	low
xylene	3.12	8.1 - 25.9	low
oxirane, mono[(C12-14-alkyloxy)methyl] derivs.	3.77	160 - 263	low
Methylstyrenated phenol	3.627	-	low
middle molecular epoxy resin MMW 700-1200	2.64 - 3.78	31	low
ethylbenzene	3.6	-	low
butan-1-ol	1	3.16	low

12.4 Mobility in soil

Soil/water partition coefficient (K_{oc}) : No known data available in our database.

Mobility : No known data available in our database.

12.5 Other adverse effects

No known significant effects or critical hazards.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7 and Section 8 for additional handling information and protection of employees.






The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Xylene 1-Butanol (I); n-Butyl alcohol (I)	1330-20-7 71-36-3	Listed Listed	U239 U031

SECTION 14: Transport information

Transport may take place according to national regulation or DOT for transport by road and by train, IMDG for transport by sea, IATA for Air shipment. Refer to specific Dangerous Goods Transport requirements under 49CFR, ICAO and IATA.

	14.1 UN no.	14.2 Proper shipping name	14.3 Transport hazard class(es)	14.4 PG*	14.5 Env*	14.5 Additional information
DOT Code	UN1263	PAINT	3 - 	III	No.	ERG : 128 Reportable quantity (xylene) 1618.1 lbs / 734.62 kg [116.98 gal / 442.81 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.
TDG Code	UN1263	PAINT	3 - 	III	No.	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.18-2.19 (Class 3).
SCT Code	UN1263	PAINT	3 - 	III	No.	-
IMDG Code	UN1263	PAINT	3 - 	III	No.	Emergency schedules F-E, S-E
IATA Code	UN1263	PAINT	3 - 	III	No.	-

Code : Classification

PG* : Packing group

Env.* : Environmental hazards

14.6 Special precautions for user

Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

SECTION 14: Transport information

14.7 Transport in bulk according to IMO instruments

Not applicable.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

TSCA 8(a) CDR Exempt/Partial exemption: Not determined

United States inventory (TSCA 8b): Not determined.

Clean Water Act (CWA) 307: ethylbenzene; toluene; benzene; phenol

Clean Water Act (CWA) 311: 1-chloro-2,3-epoxypropane; xylene; ethylbenzene; toluene; benzene; phenol

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Listed

Product/ingredient name	CAS number	Concentration
1-chloro-2,3-epoxypropane	106-89-8	0.0035685
xylene	1330-20-7	6.1801
ethylbenzene	100-41-4	1.3718
toluene	108-88-3	0.076475
benzene	71-43-2	0.0062361
phenol	108-95-2	0.020991
methanol (formed by reaction)	Sec (67-56-1)	0.13407

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304 :

Product/ingredient name	%	EHS	SARA 302 TPQ		SARA 304 RQ	
			(lbs)	(gallons)	(lbs)	(gallons)
phenol	≤0.1	Yes.	500 / 10000	-	1000	-
1-chloro-2,3-epoxypropane	<0.1	Yes.	1000	101.6	100	10.2

SARA 304 RQ :

2802291.8 lbs / 1272240.5 kg [202586.1 gal / 766871.9 L]

SARA 311/312 Classification :

FLAMMABLE LIQUIDS - Category 3
 SKIN IRRITATION - Category 2
 EYE IRRITATION - Category 2A
 SKIN SENSITIZATION - Category 1
 CARCINOGENICITY - Category 1A
 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

Product/ingredient name	%	Classification
bisphenol A-(epichlorhydrin) epoxy resin MW = < 700	≥10 - ≤25	SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A SKIN SENSITIZATION - Category 1
xylene	≥5 - ≤10	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (dermal) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2
oxirane, mono[(C12-14-alkyloxy)methyl] derivs.	≥5 - ≤10	SKIN IRRITATION - Category 2 SKIN SENSITIZATION - Category 1
Methylstyrenated phenol	≥3 - ≤5	SKIN IRRITATION - Category 2 SKIN SENSITIZATION - Category 1B
middle molecular epoxy resin MMW 700-1200	≥3 - ≤5	SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A SKIN SENSITIZATION - Category 1
ethylbenzene	≥1 - ≤3	FLAMMABLE LIQUIDS - Category 2 ACUTE TOXICITY (inhalation) - Category 4 CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2
butan-1-ol	≥1 - <3	ASPIRATION HAZARD - Category 1 FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (oral) - Category 4 SKIN IRRITATION - Category 2 SERIOUS EYE DAMAGE - Category 1 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
respirable quartz	≥1 - ≤3	CARCINOGENICITY - Category 1A SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

SECTION 15: Regulatory information

SARA 313 : SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

Form R - Reporting requirements :

Product/ingredient name	CAS number	Concentration
xylene	1330-20-7	5 - 10
ethylbenzene	100-41-4	1 - 3
butan-1-ol	71-36-3	1 - 3

Supplier notification :

Product/ingredient name	CAS number	Concentration
xylene	1330-20-7	5 - 10
middle molecular epoxy resin MMW 700-1200	25068-38-6	3 - 5
ethylbenzene	100-41-4	1 - 3
butan-1-ol	71-36-3	1 - 3

State regulations :

Connecticut Carcinogen Reporting: None of the components are listed.
Connecticut Hazardous Material Survey: None of the components are listed.
Florida substances: None of the components are listed.
Illinois Chemical Safety Act: None of the components are listed.
Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.
Louisiana Reporting: None of the components are listed.
Louisiana Spill: None of the components are listed.
Massachusetts Spill: None of the components are listed.
Massachusetts Substances: The following components are listed: SILICA, CRYSTALLINE, QUARTZ; TALC; SOAPSTONE; TITANIUM DIOXIDE; TIN DIOXIDE DUST; XYLENE; DIMETHYLBENZENE; ETHYL BENZENE; ETHYLBENZENE; N-BUTYL ALCOHOL; 1-BUTANOL
Michigan Critical Material: None of the components are listed.
Minnesota Hazardous Substances: None of the components are listed.
New Jersey Hazardous Substances: The following components are listed: SILICA, QUARTZ; QUARTZ (SiO₂); SOAPSTONE; TITANIUM DIOXIDE; TITANIUM OXIDE (TiO₂); XYLENES; BENZENE, DIMETHYL-; ETHYL BENZENE; BENZENE, ETHYL-; n-BUTYL ALCOHOL; 1-BUTANOL
New Jersey Spill: None of the components are listed.
New Jersey Toxic Catastrophe Prevention Act: None of the components are listed.
New York Acutely Hazardous Substances: The following components are listed: Xylene mixed; Ethylbenzene; Butyl alcohol; 1-Butanol
New York Toxic Chemical Release Reporting: None of the components are listed.
Pennsylvania RTK Hazardous Substances: The following components are listed: QUARTZ DUST; QUARTZ; TALC; SOAPSTONE DUST; TITANIUM OXIDE; SILICA; BENZENE, DIMETHYL-; BENZENE, ETHYL-; 1-BUTANOL
Rhode Island Hazardous Substances: None of the components are listed.

California Prop. 65 PFF : **WARNING:** This product can expose you to chemicals including Benzene and Epichlorohydrin, which are known to the State of California to cause cancer and birth defects or other reproductive harm. This product can expose you to chemicals including Talc containing asbestiform fibers, Titanium dioxide, Ethylbenzene, Silica, crystalline and α -Methyl styrene, which are known to the State of California to cause cancer, and Toluene, Bisphenol A and Methanol, which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Product/ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Talc (non-asbestiform)	Yes.	No.		
titanium dioxide	Yes.	No.		
ethylbenzene	Yes.	No.	Yes.	
respirable quartz	Yes.	No.		
toluene	No.	Yes.		Yes.
2-phenylpropene	Yes.	No.		
4,4'-isopropylidenediphenol	No.	Yes.		Yes.
benzene	Yes.	Yes.	Yes.	Yes.
1-chloro-2,3-epoxypropane	Yes.	Yes.	Yes.	
methanol	No.	Yes.		Yes.

SECTION 16: Other information

Remarks : Note: In USA, consult Code of Federal Regulations, Title 29, Labor, Parts 1910 and 1915 concerning occupational safety and health standards and regulations, as well as any other applicable Federal, State or local regulations that apply to safe practices in coating operations.

Warning! If you scrape, sand, or remove old paint, you may release lead dust. LEAD is TOXIC.

Validation : Validated by US - HSE Products Coordinator on 27 June 2020

GHS Classification

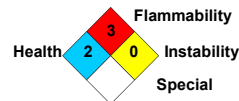
Procedure used to derive the classification.

Classification	Justification
FLAMMABLE LIQUIDS - Category 3	On basis of test data
SKIN IRRITATION - Category 2	Calculation method
EYE IRRITATION - Category 2A	Calculation method
SKIN SENSITIZATION - Category 1	Calculation method
CARCINOGENICITY - Category 1A	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1	Calculation method

Hazardous Material Information System (U.S.A.)

Health	* 3
Fire hazard	3
Physical hazards	0
Personal protection	X

National Fire Protection Association (U.S.A.)



Personal Protective Equipment (PPE) shown in this section is a suggestion. Since conditions vary from one work location to another consult the facility safety & health program. Customer or end user is responsible to evaluate worker exposure conditions at the site of application and determine the appropriate PPE suitable for workers at that particular facility or location.

Abbreviations and acronyms :

ANSI = American National Standards Institute

HCS = Hazardous Communication System

TSCA = Toxic Substances Control Act

CFR = Code of federal Regulations

GHS = Globally Harmonized System of Classification and Labelling of Chemicals

OSHA = United States Occupational Health and Safety Administration

NIOSH = National Institute for Occupational Safety and Health

ACGIH = American Conference of Industrial Hygienists

IARC = International Agency for Research on Cancer.

NTP = National Toxicology Program

ATE = Acute Toxicity Estimate

OECD = Organisation for Economic Co-operation and Development

BCF = Bioconcentration Factor

DOT = United States Department of Transportation

ERG = Emergency Response Guide

TDG = Transport of Dangerous Goods, Canada

SCT = Transportation & Communications Ministry, Mexico

IMDG = International Maritime Dangerous Goods

IATA = International Air Transport Association

SARA = Superfund Amendments Reauthorization Act


EPCRA = Emergency Planning and Community Right to Know Act

Notice to reader

 Indicates information that has changed from previously issued version.

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Conforms to ANSI Z400.1-2010 Standard - HCS 2012

Protective Clothing	General Hazard	DOT
		

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name : HEMPEL'S CURING AGENT 95090
 Product identity : 9509000000
 Product type : Curing agent

1.2 Relevant identified uses of the substance or mixture and uses advised against

Field of application : used only as part of two- or multi component products.
 Ready-for-use mixture : (see base component)
 Identified uses : Industrial/Professional use
 TSCA : **Unless otherwise stated. All components are listed or exempted.**

1.3 Details of the supplier of the safety data sheet

Company details :	HEMPEL (USA), Inc. 600 Conroe Park North Drive Conroe, Texas 77303 Toll free: (800) 678-6641, if outside area codes 713, 281, 409, 936 Regular phone number: (936) 523-6000 E-mail Hempel@Hempel.com	HEMPEL (USA), Inc. 2728 Empire Central Dallas, TX 75235 Phone number: 1-214-353-1600 E-mail: hempel@hempel.com
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1.4 Emergency telephone number (with hours of operation)

For Transportation Emergencies : (24 hours) CHEMTREC: **1-800-424-9300** (Toll-free in the U.S., Canada and the U.S. Virgin Islands) **703-527-3887**
 For calls originating elsewhere (Collect calls are accepted). Contract number: CCN10384
 To preserve the effectiveness of arrangements for providing accurate and timely emergency response information, the basic identifying information (shipper name or contract number) must be included on shipping papers.
 If the purchaser of this product is going to be shipping this product to other locations, the purchaser must arrange for its own Emergency Information Provider to respond to transport incidents. Hempel's 24 hour response contract does not cover non-Hempel shipments.

For all other information : (8 AM - 5 PM CST) In USA toll free calling available: 1-800- 678-6641 or (936)-523-6000
 See Section 4 of the safety data sheet (first aid measures).

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

GHS Classification :
 FLAMMABLE LIQUIDS - Category 3
 SKIN CORROSION - Category 1C
 SERIOUS EYE DAMAGE - Category 1
 SKIN SENSITIZATION - Category 1
 CARCINOGENICITY - Category 2
 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (hearing organs) - Category 2

2.2 Label elements

Hazard pictograms :



SECTION 2: Hazards identification

Signal word :	Danger
Hazard statements :	H226 - Flammable liquid and vapor. H314 - Causes severe skin burns and eye damage. H317 - May cause an allergic skin reaction. H351 - Suspected of causing cancer. H373 - May cause damage to organs through prolonged or repeated exposure. (hearing organs)
Precautionary statements :	
Prevention :	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Do not breathe vapor. Wash hands thoroughly after handling. Contaminated work clothing must not be allowed out of the workplace.
Response :	Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or physician. IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or physician. IF ON SKIN: Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.
Storage :	Store locked up. Store in a well-ventilated place. Keep cool.
Disposal :	Dispose of contents and container in accordance with all local, regional, national and international regulations.
Supplemental label elements :	None known.

2.3 Other hazards

Hazards not otherwise classified : None known.

SECTION 3: Composition/information on ingredients

Product definition : Mixture

Physical state : Liquid.

Product/ingredient name	Identifiers	%	GHS Classification
xylene	1330-20-7	≥10 - ≤21	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (dermal) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2
Methylstyrenated phenol	68512-30-1	≥5 - ≤10	SKIN IRRITATION - Category 2 SKIN SENSITIZATION - Category 1
2,4,6-tris(dimethylaminomethyl)phenol	90-72-2	≥5 - ≤10	SKIN CORROSION - Category 1C SERIOUS EYE DAMAGE - Category 1 SKIN SENSITIZATION - Category 1B
1-methoxy-2-propanol	107-98-2	≥5 - ≤10	FLAMMABLE LIQUIDS - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
ethylbenzene	100-41-4	≥3 - ≤4.7	FLAMMABLE LIQUIDS - Category 2 ACUTE TOXICITY (inhalation) - Category 4 CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (hearing organs) - Category 2
triethylenetetramine	112-24-3	≥1 - ≤3	ASPIRATION HAZARD - Category 1 ACUTE TOXICITY (dermal) - Category 4 SKIN CORROSION - Category 1B SERIOUS EYE DAMAGE - Category 1
bis[(dimethylamino)methyl]phenol	71074-89-0	≥1 - ≤3	SKIN SENSITIZATION - Category 1 SKIN CORROSION - Category 1C SERIOUS EYE DAMAGE - Category 1 SKIN SENSITIZATION - Category 1B

SECTION 3: Composition/information on ingredients

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

SECTION 4: First aid measures

4.1 Description of first aid measures

General :	In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person. If breathing is irregular, drowsiness, loss of consciousness or cramps: Call 911 and give immediate treatment (first aid).
Eye contact :	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Seek immediate medical attention.
Inhalation :	Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Give nothing by mouth. If unconscious, place in recovery position and get medical attention immediately.
Skin contact :	Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.
Ingestion :	If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting unless directed to do so by medical personnel. Lower the head so that vomit will not re-enter the mouth and throat.
Protection of first-aiders :	No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact :	Causes serious eye damage.
Inhalation :	No known significant effects or critical hazards.
Skin contact :	Causes severe burns. May cause an allergic skin reaction.
Ingestion :	No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact :	Adverse symptoms may include the following: pain watering redness
Inhalation :	No specific data.
Skin contact :	Adverse symptoms may include the following: pain or irritation redness blistering may occur
Ingestion :	Adverse symptoms may include the following: stomach pains

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician :	If gasses have been inhaled, from the decomposition of the product, symptoms may be delayed.
Specific treatments :	No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Extinguishing media : Recommended: alcohol resistant foam, CO₂, powders, water spray.
Not to be used: waterjet.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture : Flammable liquid and vapor. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Hazardous combustion products : Decomposition products may include the following materials: carbon oxides nitrogen oxides

5.3 Advice for firefighters

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard. Cool closed containers exposed to fire with water. Do not release runoff from fire to drains or watercourses. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid all direct contact with the spilled material. Exclude sources of ignition and be aware of explosion hazard. Ventilate the area. Avoid breathing vapor or mist. Refer to protective measures listed in sections 7 and 8. No action shall be taken involving any personal risk or without suitable training. If the product contaminates lakes, rivers, or sewers, inform the appropriate authorities in accordance with local regulations.

6.2 Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

6.3 Methods and materials for containment and cleaning up

Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Use spark-proof tools and explosion-proof equipment. Contaminated absorbent material may pose the same hazard as the spilled product.

6.4 Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Vapors are heavier than air and may spread along floors. Vapors may form explosive mixtures with air. Prevent the creation of flammable or explosive concentrations of vapors in air and avoid vapor concentrations higher than the occupational exposure limits. In addition, the product should be used only in areas from which all naked lights and other sources of ignition have been excluded. Electrical equipment should be protected to the appropriate standard. To dissipate static electricity during transfer, ground drum and connect to receiving container with bonding strap. No sparking tools should be used.

Avoid inhalation of vapour, dust and spray mist. Avoid contact with skin and eyes. Eating, drinking and smoking should be prohibited in area where this material is handled, stored and processed. Appropriate personal protective equipment: see Section 8. Always keep in containers made from the same material as the original one.

7.2 Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in a cool, well-ventilated area away from incompatible materials and ignition sources. Keep out of the reach of children. Keep away from: Oxidizing agents, strong alkalis, strong acids. No smoking. Prevent unauthorized access. Containers that are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

SECTION 7: Handling and storage

See separate Product Data Sheet for recommendations or industrial sector specific solutions.

This product may be applied using several application techniques and methods of handling may be different for each. Application techniques include [but are not limited to] brushing, rolling, and spray application [conventional, HPLV, airless, pleural component or aerosol can]. Avoid the breathing of vapors and, if spraying, do not breath spray mist or aerosols.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Product/ingredient name	Exposure limit values
xylene	ACGIH TLV (United States, 3/2017). TWA: 100 ppm 8 hours. TWA: 434 mg/m ³ 8 hours. STEL: 150 ppm 15 minutes. STEL: 651 mg/m ³ 15 minutes. OSHA PEL (United States, 6/2016). TWA: 100 ppm 8 hours. TWA: 435 mg/m ³ 8 hours.
1-methoxy-2-propanol	ACGIH TLV (United States, 3/2017). STEL: 369 mg/m ³ 15 minutes. STEL: 100 ppm 15 minutes. TWA: 184 mg/m ³ 8 hours. TWA: 50 ppm 8 hours. NIOSH REL (United States, 10/2016). STEL: 540 mg/m ³ 15 minutes. STEL: 150 ppm 15 minutes. TWA: 360 mg/m ³ 10 hours. TWA: 100 ppm 10 hours.
ethylbenzene	ACGIH TLV (United States, 3/2017). TWA: 20 ppm 8 hours. NIOSH REL (United States, 10/2016). STEL: 545 mg/m ³ 15 minutes. STEL: 125 ppm 15 minutes. TWA: 435 mg/m ³ 10 hours. TWA: 100 ppm 10 hours. OSHA PEL (United States, 6/2016). TWA: 435 mg/m ³ 8 hours. TWA: 100 ppm 8 hours.
triethylenetetramine	AIHA WEEL (United States, 10/2011). Absorbed through skin. TWA: 1 ppm 8 hours.

Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

8.2 Exposure controls

Appropriate engineering controls

Provide local exhaust and general ventilation systems to maintain airborne concentrations below OSHA, ACGIH, and manufacturer recommended exposure limits. Local exhaust ventilation is preferred because it prevents contaminant dispersion into work areas by controlling it at its source. Use local and general exhaust ventilation to effectively remove and prevent buildup of mists/vapors/fumes generated from the handling of this product.


Note: Local exhaust ventilation is designed to capture an emitted contaminant at or near its source, before the contaminant has a chance to disperse into the workplace air. General exhaust ventilation, also called dilution ventilation, is different from local exhaust ventilation because instead of capturing emissions at their source and removing them from the air, general exhaust ventilation allows the contaminant to be emitted into the workplace air and then dilutes the concentration of the contaminant to an acceptable level (e.g., to the PEL or below).

Individual protection measures

General : Gloves must be worn for all work that may result in soiling. Apron/coveralls/protective clothing must be worn when soiling is so great that regular work clothes do not adequately protect skin against contact with the product. Safety eyewear should be used when there is a likelihood of exposure.

Hygiene measures : Wash hands, forearms, and face thoroughly after handling compounds and before eating, smoking, using lavatory, and at the end of day.

SECTION 8: Exposure controls/personal protection

Eye/face protection :	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.
Hand protection :	<p>Wear chemical-resistant gloves in combination with 'basic' employee training. The quality of the chemical-resistant protective gloves must be chosen as a function of the specific workplace concentrations and quantity of hazardous substances.</p> <p>Since the actual work situation is unknown. Supplier of gloves should be contacted in order to find the appropriate type. Below listed glove(s) should be regarded as generic advice:</p> <p>May be used: nitrile rubber, butyl rubber Recommended: Silver Shield / Barrier / 4H gloves, polyvinyl alcohol (PVA), Viton® Short term exposure: neoprene rubber, natural rubber (latex), polyvinyl chloride (PVC)</p>
Body protection :	<p>Personal protective equipment for the body should be selected based on the task being performed and the risks involved handling this product.</p> <p>Wear suitable protective clothing. Always wear protective clothing when spraying.</p>
Respiratory protection :	If working areas have insufficient ventilation, wear half or totally covering mask equipped with gas filter of type Organic Vapor, when grinding use particle filter of type P95, P99 or P100. When spraying use a combined filter (organic vapor / HEPA or organic vapor / P100 type). Be sure to use approved/certified respirator or equivalent. Always wear an air-fed respirator when spraying in a continuous and prolonged work situation (e.g. hood with supply of fresh or compressed air or a full face, powered air purifying filter).
Protective clothing (pictograms) :	 <p>Note: Application of paint products by spraying requires additional safety precautions: Full body suit, Full face respirator with air supplied.</p>

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state :	Liquid.
Odor :	Solvent-like
pH :	Testing not relevant or not possible due to nature of the product.
Melting point/freezing point :	Testing not relevant or not possible due to nature of the product.
Boiling point/boiling range :	Testing not relevant or not possible due to nature of the product.
Flash point :	Closed cup: 27°C (80.6°F)
Evaporation rate :	Testing not relevant or not possible due to nature of the product.
Flammability :	Highly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
Upper/lower flammability or explosive limits :	0.8 - 13.74 vol %
Vapor pressure :	Testing not relevant or not possible due to nature of the product.
Vapor density :	Testing not relevant or not possible due to nature of the product.
Relative density :	0.956 g/cm ³
Solubility(ies) :	Very slightly soluble in the following materials: cold water and hot water.
Partition coefficient (LogKow) :	Testing not relevant or not possible due to nature of the product.
Auto-ignition temperature :	Testing not relevant or not possible due to nature of the product.
Decomposition temperature :	Testing not relevant or not possible due to nature of the product.

SECTION 9: Physical and chemical properties

Viscosity :	Testing not relevant or not possible due to nature of the product.
Explosive properties :	Not available.
Oxidizing properties :	Testing not relevant or not possible due to nature of the product.

9.2 Other information

Solvent(s) % by weight (Included exempt solvent(s)):	27.8 % (w/w)
Water % by weight :	Weighted average: 0 %
VOC content (Coatings) :	2.22 lbs/gal (266.1 g/l)
VOC content (Regulatory) :	2.22 lbs/gal (266.1 g/l)
TOC Content (Volatile) :	Weighted average: 222 g/l
Solvent Gas :	Weighted average: 0.062 m ³ /l

SECTION 10: Stability and reactivity

10.1 Reactivity

No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability

The product is stable.

10.3 Possibility of hazardous reactions

Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid

Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

10.5 Incompatible materials

Extremely reactive or incompatible with the following materials: acids.
Highly reactive or incompatible with the following materials: oxidizing materials.
Reactive or incompatible with the following materials: reducing materials and organic materials.

10.6 Hazardous decomposition products

When exposed to high temperatures (i.e. in case of fire) harmful decomposition products may be formed:
Decomposition products may include the following materials: carbon oxides nitrogen oxides

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Exposure to component solvent vapor concentrations may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on the kidneys, liver and central nervous system. Solvents may cause some of the above effects by absorption through the skin. Symptoms and signs include headaches, dizziness, fatigue, muscular weakness, drowsiness and, in extreme cases, loss of consciousness. Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin. If splashed in the eyes, the liquid may cause irritation and reversible damage. Accidental swallowing may cause stomach pain. Chemical lung inflammation may occur if the product is taken into the lungs via vomiting.

Acute toxicity

SECTION 11: Toxicological information

Product/ingredient name	Result	Species	Dose	Exposure
xylene	LC50 Inhalation Gas.	Rat	5000 ppm	4 hours
	LC50 Inhalation Vapor	Rat	6350 ppm	4 hours
	LD50 Dermal	Rabbit	>4200 mg/kg	-
Methylstyrenated phenol	LD50 Oral	Rat	3523 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat	>5 mg/l	4 hours
2,4,6-tris(dimethylaminomethyl) phenol	LD50 Dermal	Rat	>2000 mg/kg	-
	LD50 Dermal	Rat	1280 mg/kg	-
1-methoxy-2-propanol	LD50 Oral	Rat	1200 mg/kg	-
	LD50 Oral	Rat	2169 mg/kg	-
	LD50 Dermal	Rabbit	13 g/kg	-
ethylbenzene	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	4016 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-
triethylenetetramine	LD50 Dermal	Rabbit	550 mg/kg	-
	LD50 Oral	Rat	1716 mg/kg	-

Acute toxicity estimates

Route	ATE value
Oral	13920.2 mg/kg
Dermal	5804.5 mg/kg
Inhalation (gases)	23339.8 ppm
Inhalation (vapors)	52.37 mg/l

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure
xylene	Eyes - Severe irritant	Rabbit	-	24 hours 5 milligrams
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams
Methylstyrenated phenol	Eyes - Mild irritant	Rabbit	-	-
	Eyes - Severe irritant	Rabbit	-	24 hours 50 Micrograms
1-methoxy-2-propanol	Skin - Severe irritant	Rabbit	-	24 hours 2 milligrams
	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams
ethylbenzene	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams
	Respiratory - Mild irritant	Rabbit	-	-
triethylenetetramine	Eyes - Mild irritant	Rabbit	-	-
	Eyes - Moderate irritant	Rabbit	-	24 hours 20 milligrams
	Skin - Severe irritant	Rabbit	-	24 hours 5 milligrams

Sensitizer

Product/ingredient name	Route of exposure	Species	Result
triethylenetetramine	skin	Guinea pig	Sensitizing

Carcinogen Classification

Product/ingredient name	IARC	NTP	OSHA
xylene	3	-	-
ethylbenzene	2B	-	-

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
1-methoxy-2-propanol	Category 3	Not applicable.	Narcotic effects

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target organs
ethylbenzene	Category 2	Not determined	hearing organs

Aspiration hazard

SECTION 11: Toxicological information

Product/ingredient name	Result
ethylbenzene	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure

Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential chronic health effects

Sensitization : Contains Methylstyrenated phenol, triethylenetetramine. May produce an allergic reaction.

Other information : No additional known significant effects or critical hazards.

SECTION 12: Ecological information

12.1 Toxicity

Do not allow to enter drains or watercourses.

When spilled, this product may act as an oil, causing a film, sheen, emulsion, or sludge at or beneath the surface of a body of water. Oils of any kind can cause: (a) drowning of waterfowl due to lack of buoyancy, loss of insulating capacity of feathers, starvation and vulnerability to predators due to lack of mobility; (b) lethal effect on fish by coating gill surfaces, preventing respiration; (c) potential fish kills resulting from alteration in biochemical oxygen demand; (d) asphyxiation of benthic life forms when floating masses become engaged with surface debris and settle on the bottom; and (e) adverse aesthetic effects of fouled shoreline and beaches.

Product/ingredient name	Result	Species	Exposure
Methylstyrenated phenol	Acute EC50 15 mg/l	Algae	72 hours
	Acute EC50 14 - 51 mg/l	Daphnia	48 hours
	Acute EC50 25.8 mg/l	Fish	96 hours
2,4,6-tris(dimethylaminomethyl) phenol	Acute EC50 84 mg/l	Algae	72 hours
1-methoxy-2-propanol	Acute LC50 175 mg/l	Fish	96 hours
	Acute EC50 1000 mg/l	Algae - Pseudokirchneriella subcapitata (green algae)	7 days
	Acute EC50 23300 mg/l	Daphnia - Daphnia magna (Water flea)	48 hours
	Acute LC50 6812 mg/l	Fish - Leuciscus idus	96 hours
ethylbenzene	Chronic NOEC <1000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
triethylenetetramine	Acute EC50 20 mg/l	Algae	72 hours
	Acute EC50 31.1 mg/l	Daphnia	48 hours
	Acute LC50 330 mg/l	Fish	96 hours

12.2 Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
xylene	-	>60 % - Readily - 28 days	-	-
2,4,6-tris(dimethylaminomethyl) phenol	OECD 301D 301D Ready	4 % - Not readily - 28 days	-	-
1-methoxy-2-propanol	Biodegradability - Closed Bottle Test OECD 301E Ready	96 % - Readily - 28 days	-	-
ethylbenzene	Biodegradability - Modified OECD Screening Test	>70 % - Readily - 28 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
xylene	-	-	Readily
2,4,6-tris(dimethylaminomethyl) phenol	-	-	Not readily
1-methoxy-2-propanol	-	-	Readily
ethylbenzene	-	-	Readily

12.3 Bioaccumulative potential

SECTION 12: Ecological information

Product/ingredient name	LogP _{ow}	BCF	Potential
xylene	3.12	8.1 - 25.9	low
Methylstyrenated phenol	3.627	-	low
2,4,6-tris(dimethylaminomethyl)phenol	0.219	-	low
1-methoxy-2-propanol	<1	-	low
ethylbenzene	3.6	-	low
triethylenetetramine	-1.66 - -1.4	-	low

12.4 Mobility in soil

Soil/water partition coefficient (K_{oc}) : No known data available in our database.

Mobility : No known data available in our database.

12.5 Other adverse effects

No known significant effects or critical hazards.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7 and Section 8 for additional handling information and protection of employees.





The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List







Ingredient	CAS #	Status	Reference number
Xylene	1330-20-7	Listed	U239

SECTION 14: Transport information

Transport may take place according to national regulation or DOT for transport by road and by train, IMDG for transport by sea, IATA for Air shipment. Refer to specific Dangerous Goods Transport requirements under 49CFR, ICAO and IATA.

	14.1 UN no.	14.2 Proper shipping name	14.3 Transport hazard class(es)	14.4 PG*	14.5 Env* Additional information
DOT Code	UN3469	PAINT, FLAMMABLE, CORROSIVE	3 8  	III	No. Reportable quantity (xylene, ethylbenzene) 541.06 lbs / 245.64 kg [67.879 gal / 256.95 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.
TDG Code	UN3469	PAINT, FLAMMABLE, CORROSIVE	3 8  	III	No. Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.18-2.19 (Class 3), 2.40-2.42 (Class 8).

SECTION 14: Transport information

SCT Code	UN3469	PAINT, FLAMMABLE, CORROSIVE	3 8	 	III	No. -
IMDG Code	UN3469	PAINT, FLAMMABLE, CORROSIVE	3 8	 	III	No. <u>Emergency schedules</u> F-S, S-E
IATA Code	UN3469	PAINT, FLAMMABLE, CORROSIVE	3 8	 	III	No. -

Code : Classification
 PG* : Packing group
 Env.* : Environmental hazards

14.6 Special precautions for user

Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

Not applicable.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

U.S. Federal regulations : Not determined.

TSCA 8(a) CDR Exempt/Partial exemption: Not determined

United States inventory (TSCA 8b): Not determined.

Clean Water Act (CWA) 307: ethylbenzene; phenol

Clean Water Act (CWA) 311: xylene; ethylbenzene; phenol

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Listed

Product/ingredient name	CAS number	Concentration
xylene	1330-20-7	18.482
ethylbenzene	100-41-4	4.057
phenol	108-95-2	0.0041552

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304 - SARA 311/312: SARA 302/304: phenol

SARA 311/312 Hazards identification: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard

Product/ingredient name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
xylene	10 - 25	Yes.	No.	No.	Yes.	No.
Methylstyrenated phenol	5 - 10	No.	No.	No.	Yes.	No.
2,4,6-tris(dimethylaminomethyl)phenol	5 - 10	No.	No.	No.	Yes.	No.
1-methoxy-2-propanol	5 - 10	Yes.	No.	No.	Yes.	No.
ethylbenzene	3 - 5	Yes.	No.	No.	Yes.	Yes.
triethylenetetramine	1 - 3	No.	No.	No.	Yes.	No.
bis(dimethylamino)methyl]phenol	1 - 3	No.	No.	No.	Yes.	No.

SARA 313 :

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

Form R - Reporting requirements :

Product/ingredient name	CAS number	Concentration
xylene	1330-20-7	10 - 20
ethylbenzene	100-41-4	3 - 5

SECTION 15: Regulatory information

Supplier notification :

Product/ingredient name	CAS number	Concentration
xylene	1330-20-7	10 - 20
ethylbenzene	100-41-4	3 - 5

State regulations :

Connecticut Carcinogen Reporting: None of the components are listed.
Connecticut Hazardous Material Survey: None of the components are listed.
Florida substances: None of the components are listed.
Illinois Chemical Safety Act: None of the components are listed.
Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.
Louisiana Reporting: None of the components are listed.
Louisiana Spill: None of the components are listed.
Massachusetts Spill: None of the components are listed.
Massachusetts Substances: The following components are listed: XYLENE; DIMETHYLBENZENE; ETHYL BENZENE; ETHYLBENZENE; TRIETHYLENETETRAMINE; PROPYLENE GLYCOL METHYL ETHER; PROPYLENE GLYCOL MONOMETHYL ETHER
Michigan Critical Material: None of the components are listed.
Minnesota Hazardous Substances: None of the components are listed.
New Jersey Hazardous Substances: The following components are listed: XYLENES; BENZENE, DIMETHYL-; ETHYL BENZENE; BENZENE, ETHYL-; TRIETHYLENE TETRAMINE; 1, 2-ETHANEDIAMINE, N,N'-BIS(2-AMINOETHYL)-; PROPYLENE GLYCOL MONOMETHYL ETHER; 1-METHOXY-2-PROPANOL
New Jersey Spill: None of the components are listed.
New Jersey Toxic Catastrophe Prevention Act: None of the components are listed.
New York Acutely Hazardous Substances: The following components are listed: Xylene mixed; Ethylbenzene
New York Toxic Chemical Release Reporting: None of the components are listed.
Pennsylvania RTK Hazardous Substances: The following components are listed: BENZENE, DIMETHYL-; BENZENE, ETHYL-; 1,2-ETHANEDIAMINE, N,N'-BIS(2-AMINOETHYL)-; 2-PROPANOL, 1-METHOXY-
Rhode Island Hazardous Substances: None of the components are listed.

California Prop. 65 PFF :

WARNING: This product contains a chemical known to the State of California to cause cancer.

Product/ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
ethylbenzene	Yes.	No.	Yes.	
2-phenylpropene	Yes.	No.		

SECTION 16: Other information

Remarks :

Note: In USA, consult Code of Federal Regulations, Title 29, Labor, Parts 1910 and 1915 concerning occupational safety and health standards and regulations, as well as any other applicable Federal, State or local regulations that apply to safe practices in coating operations.
 Warning! If you scrape, sand, or remove old paint, you may release lead dust. LEAD is TOXIC.

Validation :

Validated by US - HSE Products Coordinator on 8 March 2018

GHS Classification

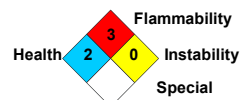
Procedure used to derive the classification.

Classification	Justification
FLAMMABLE LIQUIDS - Category 3 SKIN CORROSION - Category 1C SERIOUS EYE DAMAGE - Category 1 SKIN SENSITIZATION - Category 1 CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (hearing organs) - Category 2	On basis of test data Calculation method Calculation method Calculation method Calculation method Calculation method

Hazardous Material Information System (U.S.A.)

Health	3
Fire hazard	3
Physical hazards	0
Personal protection	X

National Fire Protection Association (U.S.A.)



Personal Protective Equipment (PPE) shown in this section is a suggestion. Since conditions vary from one work location to another consult the facility safety & health program. Customer or end user is responsible to evaluate worker exposure conditions at the site of application and determine the appropriate PPE suitable for workers at that particular facility or location.

Abbreviations and acronyms :

SECTION 16: Other information

ANSI = American National Standards Institute
HCS = Hazardous Communication System
TSCA = Toxic Substances Control Act
CFR = Code of federal Regulations
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
OSHA = United States Occupational Health and Safety Administration
NIOSH = National Institute for Occupational Safety and Health
ACGIH = American Conference of Industrial Hygienists
IARC = International Agency for Research on Cancer.
NTP = National Toxicology Program
ATE = Acute Toxicity Estimate

OECD = Organisation for Economic Co-operation and Development
BCF = Bioconcentration Factor
DOT = United States Department of Transportation
ERG = Emergency Response Guide
TDG = Transport of Dangerous Goods, Canada
SCT = Transportation & Communications Ministry, Mexico
IMDG = International Maritime Dangerous Goods
IATA = International Air Transport Association
SARA = Superfund Amendments Reauthorization Act
EPCRA = Emergency Planning and Community Right to Know Act

Notice to reader

 Indicates information that has changed from previously issued version.

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Regulation (EU) No. 2015/830 - Europe

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name : CURING AGENT 95620
Product identity : 9562000000
Product type : Curing agent

1.2 Relevant identified uses of the substance or mixture and uses advised against

Field of application : metal industry
Ready-for-use mixture : 35629:95620 3:1

Identified uses : Industrial applications, Professional applications.

1.3 Details of the supplier of the safety data sheet

Company details : HEMPEL A/S
Lundtoftegårdsvej 91
DK-2800 Kgs. Lyngby
Denmark
Tel.: + 45 45 93 38 00
hempel@hempel.com
Date of issue : 20 September 2019
Date of previous issue : No previous validation.

1.4 Emergency telephone number

Emergency telephone number (with hours of operation)

+45 45 93 38 00 (08.00 - 17.00)
See section 4 First aid measures.

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition : Mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Skin Corr. 1C, H314 SKIN CORROSION/IRRITATION - Category 1C
Eye Dam. 1, H318 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1
Skin Sens. 1, H317 SKIN SENSITIZATION - Category 1
Aquatic Chronic 3, H412 AQUATIC HAZARD (LONG-TERM) - Category 3

See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : H314 - Causes severe skin burns and eye damage.
H317 - May cause an allergic skin reaction.
H412 - Harmful to aquatic life with long lasting effects.

Precautionary statements :

Prevention : Avoid breathing vapors, spray or mists. Wear protective gloves/protective clothing/eye protection/face protection.

Response : IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF ON SKIN (or hair): Rinse skin with water or shower. Take off immediately all contaminated clothing. Immediately call a POISON CENTER or doctor.

Hazardous ingredients : polyoxypropylenediamine
m-Xylylene-diamine
bis[(dimethylamino)methyl]phenol

Supplemental label elements :

Special packaging requirements

Containers to be fitted with child-resistant fastenings : Not applicable.

SECTION 2: Hazards identification

Tactile warning of danger : Not applicable.

2.3 Other hazards

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

Other hazards which do not result in classification : None known.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Product/ingredient name	Identifiers	%	Regulation (EC) No. 1272/2008 [CLP]	Type
polyoxypropylenediamine	REACH #: 01-2119557899-12 EC: 618-561-0 CAS: 9046-10-0	≥25 - ≤50	Skin Corr. 1C, H314 Eye Dam. 1, H318 Aquatic Chronic 3, H412	[1]
benzyl alcohol	REACH #: 01-2119492630-38 EC: 202-859-9 CAS: 100-51-6 Index: 603-057-00-5	≥5 - ≤10	Acute Tox. 4, H302 Acute Tox. 4, H332 Eye Irrit. 2, H319	[1]
2,4,6-tris(dimethylaminomethyl) phenol	REACH #: 01-2119560597-27 EC: 202-013-9 CAS: 90-72-2	≥5 - ≤10	Acute Tox. 4, H302 Skin Irrit. 2, H315 Eye Irrit. 2, H319	[1]
m-Xylylene-diamine	REACH #: 01-2119480150-50 EC: 216-032-5 CAS: 1477-55-0	≥1 - ≤3	Acute Tox. 4, H302 Acute Tox. 4, H332 Skin Corr. 1B, H314 Eye Dam. 1, H318 Skin Sens. 1B, H317 Aquatic Chronic 3, H412 EUH071	[1] [2]
bis[(dimethylamino)methyl] phenol	EC: 275-162-0 CAS: 71074-89-0	≥1 - ≤3	Skin Corr. 1C, H314 Eye Dam. 1, H318 Skin Sens. 1B, H317 See Section 16 for the full text of the H statements declared above.	[1]

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Type

- [1] Substance classified with a health or environmental hazard
- [2] Substance with a workplace exposure limit, see section 8.
- [3] Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII
- [4] Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII
- [5] Substance of equivalent concern
- [6] Additional disclosure due to company policy

SECTION 4: First aid measures

4.1 Description of first aid measures

General :	In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person. If breathing is irregular, drowsiness, loss of consciousness or cramps: Call 112 and give immediate treatment (first aid).
Eye contact :	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Seek immediate medical attention.
Inhalation :	Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Give nothing by mouth. If unconscious, place in recovery position and get medical attention immediately.
Skin contact :	Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners. In case of burns flush with water until the pain ceases. While flushing remove clothing from the affected area unless it is burnt into the skin. If hospital treatment is necessary flushing must continue during transfer and until the hospital staff takes over the treatment.
Ingestion :	If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting unless directed to do so by medical personnel. Lower the head so that vomit will not re-enter the mouth and throat.
Protection of first-aiders :	No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

SECTION 4: First aid measures

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact :	Causes serious eye damage.
Inhalation :	No known significant effects or critical hazards.
Skin contact :	Causes severe burns. May cause an allergic skin reaction.
Ingestion :	No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact :	Adverse symptoms may include the following: pain watering redness
Inhalation :	No specific data.
Skin contact :	Adverse symptoms may include the following: pain or irritation redness blistering may occur
Ingestion :	Adverse symptoms may include the following: stomach pains

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician :	If gasses have been inhaled, from the decomposition of the product, symptoms may be delayed. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments :	No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Extinguishing media :	Recommended: alcohol resistant foam, CO ₂ , powders, water spray. Not to be used: waterjet.
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5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture :	In a fire or if heated, a pressure increase will occur and the container may burst. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
Hazardous combustion products :	Decomposition products may include the following materials: carbon oxides nitrogen oxides

5.3 Advice for firefighters

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard. Cool closed containers exposed to fire with water. Do not release runoff from fire to drains or watercourses. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid all direct contact with the spilled material. Refer to protective measures listed in sections 7 and 8. No action shall be taken involving any personal risk or without suitable training. If the product contaminates lakes, rivers, or sewers, inform the appropriate authorities in accordance with local regulations.

6.2 Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

6.3 Methods and materials for containment and cleaning up

SECTION 6: Accidental release measures

Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Contaminated absorbent material may pose the same hazard as the spilled product.

6.4 Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid inhalation of vapour, dust and spray mist. Avoid contact with skin and eyes. Eating, drinking and smoking should be prohibited in area where this material is handled, stored and processed. Appropriate personal protective equipment: see Section 8. Always keep in containers made from the same material as the original one.

7.2 Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in a cool, well-ventilated area away from incompatible materials and ignition sources. Keep out of the reach of children. Keep away from: Oxidizing agents, strong alkalis, strong acids. No smoking. Prevent unauthorized access. Containers that are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

See separate Product Data Sheet for recommendations or industrial sector specific solutions.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Product/ingredient name	Exposure limit values
m-Xylylene-diamine	EU OEL (Europe, 2/2010). Absorbed through skin. (ACGIH) C: 0.1 mg/m ³

Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Derived effect levels

Product/ingredient name	Type	Exposure	Value	Population	Effects
polyoxypropylenediamine	DNEL	Long term Dermal	2.5 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	1.36 mg/m ³	Workers	Systemic
benzyl alcohol	DNEL	Long term Inhalation	22 mg/m ³	Workers	Systemic
	DNEL	Long term Dermal	8 mg/kg bw/day	Workers	Systemic
2,4,6-tris(dimethylaminomethyl)phenol	DNEL	Long term Inhalation	0.13 mg/m ³	Workers	Systemic
	DNEL	Long term Dermal	0.15 mg/kg bw/day	Workers	Systemic
m-Xylylene-diamine	DNEL	Long term Dermal	0.33 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	1.2 mg/m ³	Workers	Systemic

Predicted effect concentrations

SECTION 8: Exposure controls/personal protection

Product/ingredient name	Compartment Detail	Value	Method Detail
polyoxypropylenediamine	Fresh water	0.015 mg/l	-
	Marine water sediment	0.125 mg/kg	-
	Fresh water sediment	0.132 mg/kg	-
	Marine water	0.0143 mg/l	-
	Soil	0.0176 mg/kg	-
benzyl alcohol	Sewage Treatment Plant	7.5 mg/l	-
	Soil	0.456 mg/kg wwt	Assessment Factors
	Sewage Treatment Plant	39 mg/l	Assessment Factors
	Sediment	5.27 mg/kg wwt	Assessment Factors
	Marine water sediment	0.527 mg/kg wwt	Assessment Factors
2,4,6-tris(dimethylaminomethyl)phenol	Marine	0.1 mg/l	Assessment Factors
	Fresh water	1 mg/l	Assessment Factors
	Fresh water	0.084 mg/l	-
	Marine water	0.0084 mg/l	-
	Sewage Treatment Plant	0.2 mg/l	-
m-Xylylene-diamine	Fresh water	0.094 mg/l	-
	Marine water	0.0094 mg/l	-
	Fresh water sediment	0.43 mg/kg	-
	Marine water sediment	0.043 mg/kg	-
	Soil	0.045 mg/kg	-
	Sewage Treatment Plant	10 mg/l	-

8.2 Exposure controls

Appropriate engineering controls

Arrange sufficient ventilation by local exhaust ventilation and good general ventilation to keep the airborne concentrations of vapors or dust lowest possible and below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Individual protection measures

- General :** Gloves must be worn for all work that may result in soiling. Apron/coveralls/protective clothing must be worn when soiling is so great that regular work clothes do not adequately protect skin against contact with the product. Safety eyewear should be used when there is a likelihood of exposure.
- Hygiene measures :** Wash hands, forearms, and face thoroughly after handling compounds and before eating, smoking, using lavatory, and at the end of day.
- Eye/face protection :** Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.
- Hand protection :** Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training. The quality of the chemical-resistant protective gloves must be chosen as a function of the specific workplace concentrations and quantity of hazardous substances.
Since the actual work situation is unknown. Supplier of gloves should be contacted in order to find the appropriate type. Below listed glove(s) should be regarded as generic advice:

Recommended: Silver Shield / Barrier / 4H gloves, Viton®
May be used: nitrile rubber, neoprene rubber, polyvinyl alcohol (PVA)
Short term exposure: butyl rubber, natural rubber (latex), polyvinyl chloride (PVC)
- Body protection :** Personal protective equipment for the body should be selected based on the task being performed and the risks involved handling this product.
Wear suitable protective clothing.
Chemical-resistant apron.
- Respiratory protection :** Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If working areas have insufficient ventilation: When the product is applied by means that will not generate an aerosol such as, brush or roller wear half or totally covering mask equipped with gas filter of type A, when grinding use particle filter of type P. Be sure to use an approved/certified respirator or equivalent.

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state :	Liquid.
Odor :	Non-characteristic.
pH :	Testing not relevant or not possible due to nature of the product.
Melting point/freezing point :	Testing not relevant or not possible due to nature of the product.
Boiling point/boiling range :	Testing not relevant or not possible due to nature of the product.
Flash point :	Closed cup: 130°C (266°F)
Evaporation rate :	Testing not relevant or not possible due to nature of the product.
Flammability :	Highly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge. Slightly flammable in the presence of the following materials or conditions: heat.
Lower and upper explosive (flammable) limits :	1.3 - 13 vol %
Vapor pressure :	0.091 kPa This is based on data for the following ingredient: polyoxypropylenediamine
Vapor density :	Testing not relevant or not possible due to nature of the product.
Specific gravity :	1.011 g/cm ³
Solubility(ies) :	Partially soluble in the following materials: cold water and hot water.
Partition coefficient (LogKow) :	Testing not relevant or not possible due to nature of the product.
Auto-ignition temperature :	Lowest known value: 382°C (719.6°F) (2,4,6-tris(dimethylaminomethyl)phenol).
Decomposition temperature :	Testing not relevant or not possible due to nature of the product.
Viscosity :	Testing not relevant or not possible due to nature of the product.
Explosive properties :	Slightly explosive in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
Oxidizing properties :	Testing not relevant or not possible due to nature of the product.

9.2 Other information

Solvent(s) % by weight :	Weighted average: 7 %
Water % by weight :	Weighted average: 0 %
VOC content :	14.4 g/l
TOC Content :	Weighted average: 13 g/l
Solvent Gas :	Weighted average: 0.016 m ³ /l

SECTION 10: Stability and reactivity

10.1 Reactivity

No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability

The product is stable.

10.3 Possibility of hazardous reactions

Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid

No specific data.

10.5 Incompatible materials

Reactive or incompatible with the following materials: oxidizing materials.
Slightly reactive or incompatible with the following materials: reducing materials.

10.6 Hazardous decomposition products

When exposed to high temperatures (i.e. in case of fire) harmful decomposition products may be formed:
Decomposition products may include the following materials: carbon oxides nitrogen oxides

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Exposure to component solvent vapor concentrations may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on the kidneys, liver and central nervous system. Solvents may cause some of the above effects by absorption through the skin. Symptoms and signs include headaches, dizziness, fatigue, muscular weakness, drowsiness and, in extreme cases, loss of consciousness. Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin. If splashed in the eyes, the liquid may cause irritation and reversible damage. Accidental swallowing may cause stomach pain. Chemical lung inflammation may occur if the product is taken into the lungs via vomiting.

Inhalation of a corrosive substance may result in health effects such as stinging, coughing and in extreme cases, dyspnoea or loss of consciousness with a risk of lung damage, possibly lung oedema. Cauterization of skin and mucous membrane. If splashed in the eyes, the liquid may cause irreversible damage. Accidental swallowing may cause stinging and cauterization to mouth, oesophagus and stomach. Symptoms and signs include bloody vomiting, chock and loss of consciousness.

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
polyoxypropylenediamine	LD50 Dermal	Rabbit	2980 mg/kg	-
	LD50 Oral	Rat	2880 mg/kg	-
benzyl alcohol	LC50 Inhalation Dusts and mists	Rat	>4178 mg/m ³	4 hours
	LD50 Oral	Rat	1230 mg/kg	-
2,4,6-tris(dimethylaminomethyl) phenol	LD50 Dermal	Rat	1280 mg/kg	-
	LD50 Oral	Rat	1200 mg/kg	-
m-Xylylene-diamine	LD50 Oral	Rat	2169 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat	1.34 mg/l	4 hours
	LD50 Dermal	Rabbit	>3100 mg/kg	-
	LD50 Oral	Rat	930 mg/kg	-

Acute toxicity estimates

Product/ingredient name	Oral mg/kg	Dermal mg/kg	Inhalation (gases) ppm	Inhalation (vapors) mg/l	Inhalation (dusts and mists) mg/l
CURING AGENT 95620	8895.4			137.9	
polyoxypropylenediamine	2880	2980			
benzyl alcohol	1230			11	
2,4,6-tris(dimethylaminomethyl)phenol	1200				
m-Xylylene-diamine	930			11	

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure
polyoxypropylenediamine	Skin - Severe irritant	Rabbit	-	-
	Eyes - Severe irritant	Rabbit	-	-
benzyl alcohol	Eyes - Visible necrosis	Rabbit	-	-
	Skin - Mild irritant	Rabbit	-	-
2,4,6-tris(dimethylaminomethyl) phenol	Eyes - Severe irritant	Rabbit	-	24 hours 50 Micrograms
	Skin - Severe irritant	Rabbit	-	24 hours 2 milligrams
m-Xylylene-diamine	Eyes - Severe irritant	Rabbit	-	24 hours 50 Micrograms
	Skin - Severe irritant	Rabbit	-	24 hours 750 Micrograms
	Respiratory - Severe irritant	Rabbit	-	-
		Rabbit	-	-

Mutagenic effects

No known significant effects or critical hazards.

Carcinogenicity

No known significant effects or critical hazards.

Reproductive toxicity

No known significant effects or critical hazards.

Teratogenic effects

No known significant effects or critical hazards.

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
No known data available in our database.			

Specific target organ toxicity (repeated exposure)

SECTION 11: Toxicological information

Product/ingredient name	Category	Route of exposure	Target organs
No known data available in our database.			

Aspiration hazard

Product/ingredient name	Result
No known data available in our database.	

Information on the likely routes of exposure

Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential chronic health effects

Sensitization : Contains m-Xylylene-diamine. May produce an allergic reaction.

Other information : No additional known significant effects or critical hazards.

SECTION 12: Ecological information

12.1 Toxicity

Do not allow to enter drains or watercourses. Harmful to aquatic life with long lasting effects.

Product/ingredient name	Result	Species	Exposure
polyoxypropylenediamine	Acute EC50 15 mg/l	Algae	72 hours
	Acute EC50 80 mg/l	Daphnia	48 hours
	Acute LC50 772 mg/l	Fish	96 hours
benzyl alcohol	Acute EC50 230 mg/l	Daphnia	48 hours
	Acute IC50 770 mg/l	Algae	72 hours
	Acute LC50 460 mg/l	Fish	96 hours
2,4,6-tris(dimethylaminomethyl) phenol	Acute EC50 84 mg/l	Algae	72 hours
	Acute LC50 175 mg/l	Fish	96 hours
m-Xylylene-diamine	Acute EC50 12 mg/l	Algae	72 hours
	Acute EC50 15.2 mg/l	Daphnia - Daphnia	48 hours
	Acute LC50 75 mg/l	Fish - Leuciscus idus	96 hours
	Acute NOEC 4.7 mg/l	Daphnia	21 days

12.2 Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
polyoxypropylenediamine	-	0 % - Not readily - 28 days	-	-
benzyl alcohol	OECD 301A 301A Ready Biodegradability - DOC Die-Away Test	95 - 97 % - Readily - 21 days	-	-
	OECD 301C 301C Ready Biodegradability - Modified MITI Test (I)	92 - 96 % - Readily - 14 days	-	-
2,4,6-tris(dimethylaminomethyl) phenol	OECD 301D 301D Ready Biodegradability - Closed Bottle Test	4 % - Not readily - 28 days	-	-
m-Xylylene-diamine	OECD 301B 301B Ready Biodegradability - CO ₂ Evolution Test	49 % - Inherent - 28 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
polyoxypropylenediamine	-	-	Not readily
benzyl alcohol	-	-	Readily
2,4,6-tris(dimethylaminomethyl) phenol	-	-	Not readily
m-Xylylene-diamine	-	-	Inherent

12.3 Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
polyoxypropylenediamine	1.34	-	low
benzyl alcohol	0.87	1.37	low
2,4,6-tris(dimethylaminomethyl)phenol	0.219	-	low
m-Xylylene-diamine	0.18	2.69	low

12.4 Mobility in soil

SECTION 12: Ecological information

Soil/water partition coefficient (K_{oc}) : No known data available in our database.
 Mobility : No known data available in our database.

12.5 Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

12.6 Other adverse effects

No known significant effects or critical hazards.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

The generation of waste should be avoided or minimized wherever possible. Residues of the product is listed as hazardous waste. Dispose of according to all state and local applicable regulations. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

European waste catalogue no. (EWC) is given below.




European waste catalogue (EWC) : 08 01 11*

Packaging

The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

SECTION 14: Transport information

Transport may take place according to national regulation or ADR for transport by road, RID for transport by train, IMDG for transport by sea, IATA for transport by air.

	14.1 UN no.	14.2 Proper shipping name	14.3 Transport hazard class(es)	14.4 PG*	14.5 Env*	Additional information
ADR/RID Class	UN3066	PAINT	8 	III	No.	Tunnel code (E)
IMDG Class	UN3066	PAINT	8 	III	No.	Emergency schedules F-A, S-B
IATA Class	UN3066	PAINT	8 	III	No.	-

PG* : Packing group

Env.* : Environmental hazards

14.6 Special precautions for user

Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

Not applicable.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU Regulation (EC) No. 1907/2006 (REACH) Annex XIV - List of substances subject to authorization - Substances of very high concern

Annex XIV

None of the components are listed.

Substances of very high concern

None of the components are listed.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

Not applicable.

SECTION 15: Regulatory information

Other EU regulations

Seveso category This product is not controlled under the Seveso III Directive.

SECTION 16: Other information

Abbreviations and acronyms :
 ATE = Acute Toxicity Estimate
 CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
 EUH statement = CLP-specific Hazard statement
 RRN = REACH Registration Number
 DNEL = Derived No Effect Level
 PNEC = Predicted No Effect Concentration

Full text of abbreviated H statements :
 H302 Harmful if swallowed.
 H314 Causes severe skin burns and eye damage.
 H315 Causes skin irritation.
 H317 May cause an allergic skin reaction.
 H318 Causes serious eye damage.
 H319 Causes serious eye irritation.
 H332 Harmful if inhaled.
 H412 Harmful to aquatic life with long lasting effects.

Full text of classifications [CLP/GHS] :
 Acute Tox. 4, H302 ACUTE TOXICITY (oral) - Category 4
 Acute Tox. 4, H332 ACUTE TOXICITY (inhalation) - Category 4
 Aquatic Chronic 3, H412 AQUATIC HAZARD (LONG-TERM) - Category 3
 EUH071 Corrosive to the respiratory tract.
 Eye Dam. 1, H318 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1
 Eye Irrit. 2, H319 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
 Skin Corr. 1B, H314 SKIN CORROSION/IRRITATION - Category 1B
 Skin Corr. 1C, H314 SKIN CORROSION/IRRITATION - Category 1C
 Skin Irrit. 2, H315 SKIN CORROSION/IRRITATION - Category 2
 Skin Sens. 1, H317 SKIN SENSITIZATION - Category 1
 Skin Sens. 1B, H317 SKIN SENSITIZATION - Category 1B

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Classification	Justification
SKIN CORROSION/IRRITATION - Category 1C	Calculation method
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1	Calculation method
SKIN SENSITIZATION - Category 1	Calculation method
AQUATIC HAZARD (LONG-TERM) - Category 3	Calculation method

Notice to reader

🔍 Indicates information that has changed from previously issued version.

The information contained in this safety data sheet is based on the present state of knowledge and EU and national legislation. It provides guidance on health, safety and environmental aspects for handling the product in a safe way and should not be construed as any guarantee of the technical performance or suitability for particular applications.

It is always the duty of the user/employer to ascertain that the work is planned and carried out in accordance with the national regulations.

This document is intended to communicate the conditions of safe use for the product and should always be read in combination with the product's Safety Data Sheet and labels.

General description of the process covered

Indoor or outdoor spray painting by professionals or with brush, roller, putty knife, dipping etc. with good general room ventilation

This safe use information is linked to : Professional spray painting and/or low-energy painting, local effect - Level III
Skin Corr. 1, Eye Dam. 1, Resp. Sens. 1 or EUH071

Sector(s) of use : Industrial uses - Professional uses

Product category(ies) : Coatings and paints, thinners, paint removers

Operational conditions

Place of use : Indoor or outdoor use


Risk management measures (RMM)

Contributing activity	Process category (ies)	Maximum duration	Ventilation		Respiratory	Eye	Hands
			Type	and air changes per hour			
Preparation of material for application	PROC05	More than 4 hours	Good general room ventilation - Outdoors	3 - 5	Wear a respirator conforming to EN140 with an assigned protection factor of at least 10.	Use eye protection according to EN 166.	Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.
Loading of application equipment and handling of coated parts before curing	PROC08a	More than 4 hours	Good general room ventilation - Outdoors	3 - 5	None	Use eye protection according to EN 166.	Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.
Professional application of coatings by brush or roller	PROC10	More than 4 hours	Good general room ventilation - Outdoors	3 - 5	None	Use eye protection according to EN 166.	Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.
Professional application of coatings by spraying	PROC11	More than 4 hours	Good general room ventilation - Outdoors	3 - 5	Wear a respirator conforming to EN140 with an assigned protection factor of at least 10.	Use eye protection according to EN 166.	Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.
Film formation - force drying, stoving and other technologies	PROC04	More than 4 hours	Good general room ventilation - Outdoors	3 - 5	None	None	Wear suitable gloves tested to EN374.
Cleaning	PROC05	More than 4 hours	Good general room ventilation - Outdoors	3 - 5	Wear a respirator conforming to EN140 with an assigned protection factor of at least 10.	Use eye protection according to EN 166.	Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.
Waste management	PROC08a	More than 4 hours	Good general room ventilation - Outdoors	3 - 5	None	Use eye protection according to EN 166.	Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.

See chapter 8 of this Safety Data Sheet for specifications.



Conforms to ANSI Z400.1-2010 Standard - HCS 2012

Protective Clothing	General Hazard	DOT
		

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name : **HEMPEL'S GALVOSIL 15709**
 Product identity : **1570919840**
 Product type : zinc silicate primer (base for multi-component product)

1.2 Relevant identified uses of the substance or mixture and uses advised against

Field of application : metal industry
 Ready-for-use mixture : 15700 = 15709 7.4 vol. / 97170 2.6 vol. 1570A = 15709 7.4 vol. / 97170 2.6 vol.
 Identified uses : Industrial/Professional use
 TSCA : **Unless otherwise stated. All components are listed or exempted.**

1.3 Details of the supplier of the safety data sheet

Company details :	HEMPEL (USA), Inc. 600 Conroe Park North Drive Conroe, Texas 77303 Toll free: (800) 678-6641, if outside area codes 713, 281, 409, 936 Regular phone number: (936) 523-6000 E-mail Hempel@Hempel.com	HEMPEL (USA), Inc. 2728 Empire Central Dallas, TX 75235 Phone number: 1-214-353-1600 E-mail: hempel@hempel.com
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1.4 Emergency telephone number (with hours of operation)

For Transportation Emergencies : (24 hours) CHEMTREC: **1-800-424-9300** (Toll-free in the U.S., Canada and the U.S. Virgin Islands) **703-527-3887**
 For calls originating elsewhere (Collect calls are accepted). Contract number: CCN10384
 To preserve the effectiveness of arrangements for providing accurate and timely emergency response information, the basic identifying information (shipper name or contract number) must be included on shipping papers.
 If the purchaser of this product is going to be shipping this product to other locations, the purchaser must arrange for its own Emergency Information Provider to respond to transport incidents. Hempel's 24 hour response contract does not cover non-Hempel shipments.
 For all other information : (8 AM - 5 PM CST) In USA toll free calling available: 1-800- 678-6641 or (936)-523-6000
 See Section 4 of the safety data sheet (first aid measures).

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
 GHS Classification : **FLAMMABLE LIQUIDS - Category 2**
SKIN IRRITATION - Category 2
CARCINOGENICITY - Category 2
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (hearing organs, lungs) - Category 1

2.2 Label elements

Hazard pictograms :



SECTION 2: Hazards identification

Signal word :	Danger
Hazard statements :	H225 - Highly flammable liquid and vapor. H315 - Causes skin irritation. H351 - Suspected of causing cancer. H336 - May cause drowsiness or dizziness. H372 - Causes damage to organs through prolonged or repeated exposure. (hearing organs, lungs)
Precautionary statements :	
Prevention :	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.
Response :	Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical attention.
Storage :	Store locked up. Store in a well-ventilated place. Keep cool.
Disposal :	Dispose of contents and container in accordance with all local, regional, national and international regulations.
Supplemental label elements :	None known.

2.3 Other hazards

Hazards not otherwise classified : None known.

SECTION 3: Composition/information on ingredients

Product definition :	Mixture
Physical state :	Liquid.

Product/ingredient name	Identifiers	%	GHS Classification
china clay	1332-58-7	≥10 - ≤25	Not classified. FLAMMABLE LIQUIDS - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
1-methoxy-2-propanol	107-98-2	≥10 - ≤25	
ethylpolysilicate	11099-06-2	≥10 - ≤25	Not classified. FLAMMABLE LIQUIDS - Category 2 FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (dermal) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2 FLAMMABLE LIQUIDS - Category 2 EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 FLAMMABLE LIQUIDS - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 ASPIRATION HAZARD - Category 1 FLAMMABLE LIQUIDS - Category 2 ACUTE TOXICITY (inhalation) - Category 4 CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (hearing organs) - Category 2 ASPIRATION HAZARD - Category 1 FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A
ethanol	64-17-5	≥10 - ≤25	
xylene	1330-20-7	≥10 - ≤18	
isopropanol	67-63-0	≥5 - ≤7.8	
solvent naphtha (petroleum), light arom.	64742-95-6	≥1 - ≤3	
ethylbenzene	100-41-4	≥1 - ≤3	
1,2,4-trimethylbenzene	95-63-6	≥1 - ≤2.1	

SECTION 3: Composition/information on ingredients

respirable quartz	14808-60-7	<1	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 CARCINOGENICITY - Category 1A SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (lungs) (inhalation) - Category 1
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Any concentration shown as a range is to protect confidentiality or is due to batch variation.

Occupational exposure limits, if available, are listed in Section 8.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

SECTION 4: First aid measures

4.1 Description of first aid measures

General :	In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person. If breathing is irregular, drowsiness, loss of consciousness or cramps: Call 911 and give immediate treatment (first aid).
Eye contact :	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. In all cases of doubt, or when symptoms persist, seek medical attention.
Inhalation :	Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Give nothing by mouth. If unconscious, place in recovery position and get medical attention immediately.
Skin contact :	Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.
Ingestion :	If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting unless directed to do so by medical personnel. Lower the head so that vomit will not re-enter the mouth and throat.
Protection of first-aiders :	No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact :	No known significant effects or critical hazards.
Inhalation :	Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness.
Skin contact :	Causes skin irritation.
Ingestion :	Can cause central nervous system (CNS) depression.

Over-exposure signs/symptoms

Eye contact :	Adverse symptoms may include the following: pain or irritation watering redness
Inhalation :	Adverse symptoms may include the following: nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
Skin contact :	Adverse symptoms may include the following: irritation redness
Ingestion :	No specific data.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician : Not applicable.

SECTION 4: First aid measures

Specific treatments : No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Extinguishing media : Recommended: alcohol resistant foam, CO₂, powders, water spray.
Not to be used: waterjet.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture : Highly flammable liquid and vapor. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous combustion products : Decomposition products may include the following materials: carbon oxides metal oxide/oxides

5.3 Advice for firefighters

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard. Cool closed containers exposed to fire with water. Do not release runoff from fire to drains or watercourses. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid all direct contact with the spilled material. Exclude sources of ignition and be aware of explosion hazard. Ventilate the area. Avoid breathing vapor or mist. Refer to protective measures listed in sections 7 and 8. No action shall be taken involving any personal risk or without suitable training. If the product contaminates lakes, rivers, or sewers, inform the appropriate authorities in accordance with local regulations.

6.2 Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

6.3 Methods and materials for containment and cleaning up

Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Use spark-proof tools and explosion-proof equipment. Contaminated absorbent material may pose the same hazard as the spilled product.

6.4 Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Vapors are heavier than air and may spread along floors. Vapors may form explosive mixtures with air. Prevent the creation of flammable or explosive concentrations of vapors in air and avoid vapor concentrations higher than the occupational exposure limits. In addition, the product should be used only in areas from which all naked lights and other sources of ignition have been excluded. Electrical equipment should be protected to the appropriate standard. To dissipate static electricity during transfer, ground drum and connect to receiving container with bonding strap. No sparking tools should be used.
Avoid inhalation of vapour, dust and spray mist. Avoid contact with skin and eyes. Eating, drinking and smoking should be prohibited in area where this material is handled, stored and processed. Appropriate personal protective equipment: see Section 8. Always keep in containers made from the same material as the original one.

SECTION 7: Handling and storage

7.2 Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in a cool, well-ventilated area away from incompatible materials and ignition sources. Keep out of the reach of children. Keep away from: Oxidizing agents, strong alkalis, strong acids. No smoking. Prevent unauthorized access. Containers that are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

See separate Product Data Sheet for recommendations or industrial sector specific solutions. This product may be applied using several application techniques and methods of handling may be different for each. Application techniques include [but are not limited to] brushing, rolling, and spray application [conventional, HPLV, airless, pleural component or aerosol can]. Avoid the breathing of vapors and, if spraying, do not breath spray mist or aerosols.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Product/ingredient name	Exposure limit values
china clay	<p>ACGIH TLV (United States, 3/2017). TWA: 2 mg/m³ 8 hours. Form: Respirable fraction</p> <p>NIOSH REL (United States, 10/2016). TWA: 5 mg/m³ 10 hours. Form: Respirable fraction TWA: 10 mg/m³ 10 hours. Form: Total</p> <p>OSHA PEL (United States, 6/2016). TWA: 5 mg/m³ 8 hours. Form: Respirable fraction TWA: 15 mg/m³ 8 hours. Form: Total dust</p>
1-methoxy-2-propanol	<p>ACGIH TLV (United States, 3/2017). STEL: 369 mg/m³ 15 minutes. STEL: 100 ppm 15 minutes. TWA: 184 mg/m³ 8 hours. TWA: 50 ppm 8 hours.</p> <p>NIOSH REL (United States, 10/2016). STEL: 540 mg/m³ 15 minutes. STEL: 150 ppm 15 minutes. TWA: 360 mg/m³ 10 hours. TWA: 100 ppm 10 hours.</p>
ethanol	<p>ACGIH TLV (United States, 3/2017). STEL: 1000 ppm 15 minutes.</p> <p>NIOSH REL (United States, 10/2016). TWA: 1000 ppm 10 hours. TWA: 1900 mg/m³ 10 hours.</p> <p>OSHA PEL (United States, 6/2016). TWA: 1000 ppm 8 hours. TWA: 1900 mg/m³ 8 hours.</p>
xylene	<p>ACGIH TLV (United States, 3/2017). TWA: 100 ppm 8 hours. TWA: 434 mg/m³ 8 hours. STEL: 150 ppm 15 minutes. STEL: 651 mg/m³ 15 minutes.</p> <p>OSHA PEL (United States, 6/2016). TWA: 100 ppm 8 hours. TWA: 435 mg/m³ 8 hours.</p>
isopropanol	<p>ACGIH TLV (United States, 3/2017). TWA: 200 ppm 8 hours. STEL: 400 ppm 15 minutes.</p> <p>NIOSH REL (United States, 10/2016). TWA: 400 ppm 10 hours. TWA: 980 mg/m³ 10 hours. STEL: 500 ppm 15 minutes. STEL: 1225 mg/m³ 15 minutes.</p> <p>OSHA PEL (United States, 6/2016). TWA: 400 ppm 8 hours. TWA: 980 mg/m³ 8 hours.</p>
solvent naphtha (petroleum), light arom.	<p>ACGIH TLV (United States). TWA Tentative: 25 ppm 8 hours.</p>
ethylbenzene	<p>ACGIH TLV (United States, 3/2017).</p>

SECTION 8: Exposure controls/personal protection

<p>1,2,4-trimethylbenzene</p>	<p>TWA: 20 ppm 8 hours. NIOSH REL (United States, 10/2016). STEL: 545 mg/m³ 15 minutes. STEL: 125 ppm 15 minutes. TWA: 435 mg/m³ 10 hours. TWA: 100 ppm 10 hours. OSHA PEL (United States, 6/2016). TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours.</p>
<p>respirable quartz</p>	<p>ACGIH TLV (United States, 3/2017). TWA: 123 mg/m³ 8 hours. TWA: 25 ppm 8 hours. NIOSH REL (United States, 10/2016). TWA: 125 mg/m³ 10 hours. TWA: 25 ppm 10 hours. OSHA PEL Z3 (United States, 6/2016). TWA: 250 mppcf / (%SiO₂+5) 8 hours. Form: Respirable TWA: 10 mg/m³ / (%SiO₂+2) 8 hours. Form: Respirable OSHA PEL (United States, 6/2016). TWA: 50 µg/m³ 8 hours. Form: Respirable dust ACGIH TLV (United States, 3/2017). TWA: 0.025 mg/m³ 8 hours. Form: Respirable fraction NIOSH REL (United States, 10/2016). TWA: 0.05 mg/m³ 10 hours. Form: respirable dust</p>

Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

8.2 Exposure controls

Appropriate engineering controls

Provide local exhaust and general ventilation systems to maintain airborne concentrations below OSHA, ACGIH, and manufacturer recommended exposure limits. Local exhaust ventilation is preferred because it prevents contaminant dispersion into work areas by controlling it at its source. Use local and general exhaust ventilation to effectively remove and prevent buildup of mists/vapors/fumes generated from the handling of this product.

Note: Local exhaust ventilation is designed to capture an emitted contaminant at or near its source, before the contaminant has a chance to disperse into the workplace air. General exhaust ventilation, also called dilution ventilation, is different from local exhaust ventilation because instead of capturing emissions at their source and removing them from the air, general exhaust ventilation allows the contaminant to be emitted into the workplace air and then dilutes the concentration of the contaminant to an acceptable level (e.g., to the PEL or below).

Individual protection measures

- General : Gloves must be worn for all work that may result in soiling. Apron/coveralls/protective clothing must be worn when soiling is so great that regular work clothes do not adequately protect skin against contact with the product. Safety eyewear should be used when there is a likelihood of exposure.
- Hygiene measures : Wash hands, forearms, and face thoroughly after handling compounds and before eating, smoking, using lavatory, and at the end of day.
- Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
- Hand protection : Wear chemical-resistant gloves in combination with 'basic' employee training. The quality of the chemical-resistant protective gloves must be chosen as a function of the specific workplace concentrations and quantity of hazardous substances.
 Since the actual work situation is unknown. Supplier of gloves should be contacted in order to find the appropriate type. Below listed glove(s) should be regarded as generic advice:
 Recommended: Silver Shield / Barrier / 4H gloves, Viton®
 May be used: polyvinyl alcohol (PVA), nitrile rubber, neoprene rubber, butyl rubber
 Short term exposure: natural rubber (latex), polyvinyl chloride (PVC)

SECTION 8: Exposure controls/personal protection

Body protection :	Personal protective equipment for the body should be selected based on the task being performed and the risks involved handling this product. Wear suitable protective clothing. Always wear protective clothing when spraying.
Respiratory protection :	If working areas have insufficient ventilation, wear half or totally covering mask equipped with gas filter of type Organic Vapor, when grinding use particle filter of type P95, P99 or P100. When spraying use a combined filter (organic vapor / HEPA or organic vapor / P100 type). Be sure to use approved/certified respirator or equivalent. Always wear an air-fed respirator when spraying in a continuous and prolonged work situation (e.g. hood with supply of fresh or compressed air or a full face, powered air purifying filter). This product contains low-boiling point liquids. Any respiratory protective equipment should be air-fed.

Protective clothing (pictograms) :



Note: Application of paint products by spraying requires additional safety precautions: Full body suit, Full face respirator with air supplied.

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state :	Liquid.
Odor :	Solvent-like
pH :	Testing not relevant or not possible due to nature of the product.
Melting point/freezing point :	Testing not relevant or not possible due to nature of the product.
Boiling point/boiling range :	Testing not relevant or not possible due to nature of the product.
Flash point :	☑ Closed cup: 14°C (57.2°F)
Evaporation rate :	Testing not relevant or not possible due to nature of the product.
Flammability :	Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge. Highly flammable in the presence of the following materials or conditions: heat and oxidizing materials. Slightly flammable in the presence of the following materials or conditions: reducing materials.
Upper/lower flammability or explosive limits :	0.8 - 19 vol %
Vapor pressure :	Testing not relevant or not possible due to nature of the product.
Vapor density :	Testing not relevant or not possible due to nature of the product.
Relative density :	1.128 g/cm ³
Solubility(ies) :	Insoluble in the following materials: cold water and hot water.
Partition coefficient (LogKow) :	Testing not relevant or not possible due to nature of the product.
Auto-ignition temperature :	Testing not relevant or not possible due to nature of the product.
Decomposition temperature :	Testing not relevant or not possible due to nature of the product.
Viscosity :	Testing not relevant or not possible due to nature of the product.
Explosive properties :	Explosive in the presence of the following materials or conditions: open flames, sparks and static discharge, heat and oxidizing materials. Slightly explosive in the presence of the following materials or conditions: reducing materials.
Oxidizing properties :	Testing not relevant or not possible due to nature of the product.

9.2 Other information

Solvent(s) % by weight (Included exempt solvent(s)):	☑ 1.5 % (w/w)
Water % by weight :	Weighted average: 0 %

SECTION 9: Physical and chemical properties

VOC content (Coatings) :	585 g/l (Measured)
VOC content (Regulatory) :	585 g/l (Measured)
TOC Content (Volatile) :	Weighted average: 461 g/l
Solvent Gas :	Weighted average: 0.335 m³/l

SECTION 10: Stability and reactivity

10.1 Reactivity

No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability

The product is stable.

10.3 Possibility of hazardous reactions

Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid

Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

10.5 Incompatible materials

Highly reactive or incompatible with the following materials: oxidizing materials and acids.

Reactive or incompatible with the following materials: reducing materials.

10.6 Hazardous decomposition products

When exposed to high temperatures (i.e. in case of fire) harmful decomposition products may be formed:

Decomposition products may include the following materials: carbon oxides metal oxide/oxides

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Exposure to component solvent vapor concentrations may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on the kidneys, liver and central nervous system. Solvents may cause some of the above effects by absorption through the skin. Symptoms and signs include headaches, dizziness, fatigue, muscular weakness, drowsiness and, in extreme cases, loss of consciousness. Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin. If splashed in the eyes, the liquid may cause irritation and reversible damage. Accidental swallowing may cause stomach pain. Chemical lung inflammation may occur if the product is taken into the lungs via vomiting.

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
1-methoxy-2-propanol	LD50 Dermal	Rabbit	13 g/kg	-
	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	4016 mg/kg	-
ethanol	LC50 Inhalation Vapor	Rat	124700 mg/m³	4 hours
	LD50 Oral	Rat	7060 mg/kg	-
xylene	LC50 Inhalation Gas.	Rat	5000 ppm	4 hours
	LC50 Inhalation Vapor	Rat	6350 ppm	4 hours
	LD50 Dermal	Rabbit	>4200 mg/kg	-
isopropanol	LD50 Oral	Rat	3523 mg/kg	-
	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Intraperitoneal	Rabbit	667 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
solvent naphtha (petroleum), light arom.	LDLo Oral	Human	3570 mg/kg	-
	LC50 Inhalation Vapor	Rat	6193 mg/m³	4 hours
	LD50 Dermal	Rabbit	3160 mg/kg	-
ethylbenzene	LD50 Oral	Rat	3492 mg/kg	-
	LD50 Dermal	Rabbit	>5000 mg/kg	-

SECTION 11: Toxicological information

1,2,4-trimethylbenzene	LD50 Oral	Rat	3500 mg/kg	-
	LC50 Inhalation Vapor	Rat	18000 mg/m ³	4 hours
	LD50 Oral	Rat	5 g/kg	-

Acute toxicity estimates

Route	ATE value
Oral	10325.6 mg/kg
Dermal	8959.8 mg/kg
Inhalation (gases)	31137.9 ppm
Inhalation (vapors)	73.79 mg/l

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure
1-methoxy-2-propanol ethanol	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams
	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams
xylene	Eyes - Severe irritant	Rabbit	-	24 hours 5 milligrams
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams
isopropanol	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams
	Skin - Mild irritant	Rabbit	-	500 milligrams
solvent naphtha (petroleum), light arom.	Eyes - Mild irritant	Rabbit	-	24 hours 100 microliters
	Respiratory - Mild irritant	Rabbit	-	-
ethylbenzene	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams
	Respiratory - Mild irritant	Rabbit	-	-
	Eyes - Mild irritant	Rabbit	-	-
	Eyes - Mild irritant	Rabbit	-	-

Carcinogen Classification

Product/ingredient name	IARC	NTP	OSHA
ethanol	1	-	-
xylene	3	-	-
isopropanol	3	-	-
ethylbenzene	2B	-	-
respirable quartz	1	Known to be a human carcinogen.	-

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
1-methoxy-2-propanol	Category 3	Not applicable.	Narcotic effects
isopropanol	Category 3	Not applicable.	Narcotic effects
solvent naphtha (petroleum), light arom.	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
1,2,4-trimethylbenzene	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target organs
ethylbenzene	Category 2	Not determined	hearing organs
respirable quartz	Category 1	Inhalation	lungs

Aspiration hazard

Product/ingredient name	Result
solvent naphtha (petroleum), light arom.	ASPIRATION HAZARD - Category 1
ethylbenzene	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure

Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential chronic health effects

Other information : No additional known significant effects or critical hazards.

SECTION 12: Ecological information

12.1 Toxicity

Do not allow to enter drains or watercourses. Harmful to aquatic life with long lasting effects.

When spilled, this product may act as an oil, causing a film, sheen, emulsion, or sludge at or beneath the surface of a body of water. Oils of any kind can cause: (a) drowning of waterfowl due to lack of buoyancy, loss of insulating capacity of feathers, starvation and vulnerability to predators due to lack of mobility; (b) lethal effect on fish by coating gill surfaces, preventing respiration; (c) potential fish kills resulting from alteration in biochemical oxygen demand; (d) asphyxiation of benthic life forms when floating masses become engaged with surface debris and settle on the bottom; and (e) adverse aesthetic effects of fouled shoreline and beaches.

Product/ingredient name	Result	Species	Exposure
1-methoxy-2-propanol	Acute EC50 1000 mg/l	Algae - Pseudokirchneriella subcapitata (green algae)	7 days
ethanol	Acute EC50 23300 mg/l	Daphnia - Daphnia magna (Water flea)	48 hours
	Acute LC50 6812 mg/l	Fish - Leuciscus idus	96 hours
	Chronic NOEC 4.995 mg/l Marine water	Algae - Ulva pertusa	96 hours
	Chronic NOEC 0.375 µl/L Fresh water	Fish - Gambusia holbrooki - Larvae	12 weeks
solvent naphtha (petroleum), light arom.	Acute EC50 2.6 mg/l	Algae - Pseudokirchneriella subcapitata (green algae)	96 hours
	Acute EC50 6.14 mg/l	Daphnia - Daphnia magna	48 hours
ethylbenzene 1,2,4-trimethylbenzene	Acute LC50 9.22 mg/l	Fish - Oncorhynchus mykiss (rainbow trout)	96 hours
	Chronic NOEC <1000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute LC50 4910 µg/l Marine water	Crustaceans - Elasmopus pectinicus - Adult	48 hours
	Acute LC50 7720 µg/l Fresh water	Fish - Pimephales promelas	96 hours

12.2 Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
1-methoxy-2-propanol	OECD 301E Ready Biodegradability - Modified OECD Screening Test	96 % - Readily - 28 days	-	-
xylene	-	>60 % - Readily - 28 days	-	-
solvent naphtha (petroleum), light arom.	-	>70 % - Readily - 28 days	-	-
ethylbenzene	-	>70 % - Readily - 28 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
1-methoxy-2-propanol	-	-	Readily
xylene	-	-	Readily
solvent naphtha (petroleum), light arom.	-	-	Readily
ethylbenzene	-	-	Readily

12.3 Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
1-methoxy-2-propanol	<1	-	low
ethanol	-0.35	-	low
xylene	3.12	8.1 - 25.9	low
isopropanol	0.05	-	low
solvent naphtha (petroleum), light arom.	-	10 - 2500	high
ethylbenzene	3.6	-	low
1,2,4-trimethylbenzene	3.63	243	low

12.4 Mobility in soil

Soil/water partition coefficient (K_{oc}) : No known data available in our database.

Mobility : No known data available in our database.

12.5 Other adverse effects

SECTION 12: Ecological information

No known significant effects or critical hazards.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7 and Section 8 for additional handling information and protection of employees.







The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Xylene	1330-20-7	Listed	U239

SECTION 14: Transport information

Transport may take place according to national regulation or DOT for transport by road and by train, IMDG for transport by sea, IATA for Air shipment. Refer to specific Dangerous Goods Transport requirements under 49CFR, ICAO and IATA.

	14.1 UN no.	14.2 Proper shipping name	14.3 Transport hazard class(es)	14.4 PG*	14.5 Env* Additional information
DOT Code	UN1263	PAINT	3 - 	II	No. ERG : 128 Reportable quantity (xylene, chlorine) 839.85 lbs / 381.29 kg [89.296 gal / 338.02 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.
TDG Code	UN1263	PAINT	3 - 	II	No. Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.18-2.19 (Class 3).
SCT Code	UN1263	PAINT	3 - 	II	No. -
IMDG Code	UN1263	PAINT	3 - 	II	No.  Emergency schedules F-E, S-E
IATA Code	UN1263	PAINT	3 - 	II	No. -

Code : Classification
PG* : Packing group
Env.* : Environmental hazards

SECTION 14: Transport information

14.6 Special precautions for user

Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

Not applicable.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

U.S. Federal regulations : All components are listed or exempted.

TSCA 8(a) CDR Exempt/Partial exemption: Not determined

United States inventory (TSCA 8b): All components are listed or exempted.

Clean Water Act (CWA) 307: ethylbenzene; benzene; Zinc chloride; Zinc; zinc oxide

Clean Water Act (CWA) 311: Hydrochloric acid; xylene; ethylbenzene; benzene; Zinc chloride

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Listed

Product/ingredient name	CAS number	Concentration
Hydrochloric acid	7647-01-0	0.024126
xylene	1330-20-7	11.907
ethylbenzene	100-41-4	2.6229
Cumen	98-82-8	0.085918
benzene	71-43-2	0.0028639

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304 - SARA 311/312: SARA 302/304: chlorine; Hydrochloric acid

SARA 311/312 Hazards identification: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard

Product/ingredient name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Methoxy-2-propanol	10 - 25	Yes.	No.	No.	Yes.	No.
ethanol	10 - 25	Yes.	No.	No.	No.	No.
xylene	10 - 25	Yes.	No.	No.	Yes.	No.
isopropanol	5 - 10	Yes.	No.	No.	Yes.	No.
solvent naphtha (petroleum), light arom.	1 - 3	Yes.	No.	No.	Yes.	No.
ethylbenzene	1 - 3	Yes.	No.	No.	Yes.	Yes.
1,2,4-trimethylbenzene	1 - 3	Yes.	No.	No.	Yes.	No.
respirable quartz	0.5 - 1	No.	No.	No.	No.	Yes.

SARA 313 : SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

Form R - Reporting requirements :

Product/ingredient name	CAS number	Concentration
xylene	1330-20-7	10 - 20
ethylbenzene	100-41-4	1 - 3
1,2,4-trimethylbenzene	95-63-6	1 - 3

Supplier notification :

Product/ingredient name	CAS number	Concentration
xylene	1330-20-7	10 - 20
ethylbenzene	100-41-4	1 - 3
1,2,4-trimethylbenzene	95-63-6	1 - 3

State regulations :

Connecticut Carcinogen Reporting: None of the components are listed.

Connecticut Hazardous Material Survey: None of the components are listed.

Florida substances: None of the components are listed.

Illinois Chemical Safety Act: None of the components are listed.

Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.

Louisiana Reporting: None of the components are listed.

Louisiana Spill: None of the components are listed.

Massachusetts Spill: None of the components are listed.

Massachusetts Substances: The following components are listed: ETHYL ALCOHOL; DENATURED ALCOHOL; PROPYLENE GLYCOL METHYL ETHER; PROPYLENE GLYCOL MONOMETHYL

SECTION 15: Regulatory information

ETHER; ISOPROPYL ALCOHOL; 2-PROPANOL; XYLENE; DIMETHYLBENZENE; ETHYL BENZENE; ETHYLBENZENE; PSEUDOCUMENE

Michigan Critical Material: None of the components are listed.

Minnesota Hazardous Substances: None of the components are listed.

New Jersey Hazardous Substances: The following components are listed: KAOLIN; ETHYL ALCOHOL; ALCOHOL; PROPYLENE GLYCOL MONOMETHYL ETHER; 1-METHOXY-2-PROPANOL; ISOPROPYL ALCOHOL; 2-PROPANOL; XYLENES; BENZENE, DIMETHYL-; ETHYL BENZENE; BENZENE, ETHYL-; PSEUDOCUMENE; 1,2,4-TRIMETHYL BENZENE

New Jersey Spill: None of the components are listed.

New Jersey Toxic Catastrophe Prevention Act: None of the components are listed.

New York Acutely Hazardous Substances: The following components are listed: Xylene mixed; Ethylbenzene

New York Toxic Chemical Release Reporting: None of the components are listed.

Pennsylvania RTK Hazardous Substances: The following components are listed: KAOLIN; SILICIC ACID, ETHYL ESTER; DENATURED ALCOHOL; ETHANOL; 2-PROPANOL, 1-METHOXY-; 2-PROPANOL; BENZENE, DIMETHYL-; BENZENE, ETHYL-; PSEUDOCUMENE

Rhode Island Hazardous Substances: None of the components are listed.

California Prop. 65 PFF :

WARNING: This product contains a chemical known to the State of California to cause cancer.

WARNING: This product contains less than 1% of a chemical known to the State of California to cause birth defects or other reproductive harm.

Product/ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Ethylbenzene	Yes.	No.	Yes.	
respirable quartz	Yes.	No.		
Cumen	Yes.	No.		
1-ethyl-2-methylbenzene	No.	Yes.		
benzene	Yes.	Yes.	Yes.	Yes.
cadmium	Yes.	Yes.		

SECTION 16: Other information

Remarks :

Note: In USA, consult Code of Federal Regulations, Title 29, Labor, Parts 1910 and 1915 concerning occupational safety and health standards and regulations, as well as any other applicable Federal, State or local regulations that apply to safe practices in coating operations.

Warning! If you scrape, sand, or remove old paint, you may release lead dust. LEAD is TOXIC.

Validation :

Validated by US - HSE Products Coordinator on 30 January 2018

GHS Classification

Procedure used to derive the classification.

Classification	Justification
FLAMMABLE LIQUIDS - Category 2 SKIN IRRITATION - Category 2 CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (hearing organs, lungs) - Category 1	On basis of test data Calculation method Calculation method Calculation method Calculation method

Hazardous Material Information System (U.S.A.)

Health	3
Fire hazard	3
Physical hazards	0
Personal protection	X

National Fire Protection Association (U.S.A.)

Health	2	Flammability	4
		Instability	0
		Special	

Personal Protective Equipment (PPE) shown in this section is a suggestion. Since conditions vary from one work location to another consult the facility safety & health program. Customer or end user is responsible to evaluate worker exposure conditions at the site of application and determine the appropriate PPE suitable for workers at that particular facility or location.

Abbreviations and acronyms :

ANSI = American National Standards Institute
 HCS = Hazardous Communication System
 TSCA = Toxic Substances Control Act
 CFR = Code of federal Regulations
 GHS = Globally Harmonized System of Classification and Labelling of Chemicals
 OSHA = United States Occupational Health and Safety Administration
 NIOSH = National Institute for Occupational Safety and Health
 ACGIH = American Conference of Industrial Hygienists
 IARC = International Agency for Research on Cancer.
 NTP = National Toxicology Program
 ATE = Acute Toxicity Estimate

OECD = Organisation for Economic Co-operation and Development
 BCF = Bioconcentration Factor
 DOT = United States Department of Transportation
 ERG = Emergency Response Guide
 TDG = Transport of Dangerous Goods, Canada
 SCT = Transportation & Communications Ministry, Mexico
 IMDG = International Maritime Dangerous Goods
 IATA = International Air Transport Association
 SARA = Superfund Amendments Reauthorization Act
 EPCRA = Emergency Planning and Community Right to Know Act

SECTION 16: Other information

Notice to reader

▣ Indicates information that has changed from previously issued version.

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Regulation (EU) No. 2015/830 - Europe

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name : Hempel's Thinner 08080
Product identity : 0808000000
Product type : thinner

1.2 Relevant identified uses of the substance or mixture and uses advised against

Field of application : buildings and metal industry. yacht, ships and shipyards.
Identified uses : Consumer applications, Industrial applications, Professional applications.

1.3 Details of the supplier of the safety data sheet

Company details : HEMPEL A/S
Lundtoftegårdsvej 91
DK-2800 Kgs. Lyngby
Denmark
Tel.: + 45 45 93 38 00
hempel@hempel.com
Date of issue : 1 July 2020
Date of previous issue : 19 September 2019.

1.4 Emergency telephone number

Emergency telephone number (with hours of operation)

+45 45 93 38 00 (08.00 - 17.00)
See section 4 First aid measures.

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition : Mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Flam. Liq. 3, H226	FLAMMABLE LIQUIDS
Acute Tox. 4, H312	ACUTE TOXICITY (dermal)
Acute Tox. 4, H332	ACUTE TOXICITY (inhalation)
Skin Irrit. 2, H315	SKIN CORROSION/IRRITATION
STOT RE 2, H373	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE)
Asp. Tox. 1, H304	ASPIRATION HAZARD

See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : H226 - Flammable liquid and vapor.
H304 - May be fatal if swallowed and enters airways.
H312 + H332 - Harmful in contact with skin or if inhaled.
H315 - Causes skin irritation.
H373 - May cause damage to organs through prolonged or repeated exposure.

Precautionary statements :

General : If medical advice is needed, have product container or label at hand. Keep out of reach of children.
Prevention : Avoid breathing vapors, spray or mists. Wear protective gloves/protective clothing/eye protection/face protection. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Response : IF SWALLOWED: Do NOT induce vomiting. Immediately call a POISON CENTER or doctor.
Storage : Keep cool. Store locked up.
Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.
Hazardous ingredients : xylene
ethylbenzene

Supplemental label elements :

Special packaging requirements

SECTION 2: Hazards identification

Containers to be fitted with child-resistant fastenings : Yes, applicable.

Tactile warning of danger : Yes, applicable.

2.3 Other hazards

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

Other hazards which do not result in classification : None known.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Product/ingredient name	Identifiers	%	Regulation (EC) No. 1272/2008 [CLP]	Type
xylene	REACH #: 01-2119488216-32 EC: 215-535-7 CAS: 1330-20-7 Index: 601-022-00-9	≥75 - ≤90	Flam. Liq. 3, H226 Acute Tox. 4, H312 Acute Tox. 4, H332 Skin Irrit. 2, H315	C [1] [2]
ethylbenzene	REACH #: 01-2119489370-35 EC: 202-849-4 CAS: 100-41-4 Index: 601-023-00-4	≥10 - ≤25	Flam. Liq. 2, H225 Acute Tox. 4, H332 STOT RE 2, H373 (hearing organs) Asp. Tox. 1, H304	- [1] [2]
toluene	REACH #: 01-2119471310-51 EC: 203-625-9 CAS: 108-88-3 Index: 601-021-00-3	≥1 - <3	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Repr. 2, H361d STOT SE 3, H336 STOT RE 2, H373 Asp. Tox. 1, H304 See Section 16 for the full text of the H statements declared above.	- [1] [2]

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Type

- [1] Substance classified with a health or environmental hazard
- [2] Substance with a workplace exposure limit, see section 8.
- [3] Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII
- [4] Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII
- [5] Substance of equivalent concern
- [6] Additional disclosure due to company policy

SECTION 4: First aid measures

4.1 Description of first aid measures

- General : In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person.
If breathing is irregular, drowsiness, loss of consciousness or cramps: Call 112 and give immediate treatment (first aid).
- Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 5 minutes, occasionally lifting the upper and lower eyelids. In all cases of doubt, or when symptoms persist, seek medical attention.
- Inhalation : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Give nothing by mouth. If unconscious, place in recovery position and get medical attention immediately.
- Skin contact : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.
- Ingestion : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting unless directed to do so by medical personnel. Lower the head so that vomit will not re-enter the mouth and throat.
- Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

SECTION 4: First aid measures

Eye contact :	No known significant effects or critical hazards.
Inhalation :	Harmful if inhaled.
Skin contact :	Harmful in contact with skin. Causes skin irritation.
Ingestion :	May be fatal if swallowed and enters airways.

Over-exposure signs/symptoms

Eye contact :	Adverse symptoms may include the following: pain or irritation watering redness
Inhalation :	No specific data.
Skin contact :	Adverse symptoms may include the following: irritation redness
Ingestion :	Adverse symptoms may include the following: nausea or vomiting

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician :	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments :	No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Extinguishing media :	Recommended: alcohol resistant foam, CO ₂ , powders, water spray. Not to be used: waterjet.
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5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture :	Flammable liquid and vapor. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.
Hazardous combustion products :	Decomposition products may include the following materials: carbon oxides

5.3 Advice for firefighters

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard. Cool closed containers exposed to fire with water. Do not release runoff from fire to drains or watercourses. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid all direct contact with the spilled material. Exclude sources of ignition and be aware of explosion hazard. Ventilate the area. Avoid breathing vapor or mist. Refer to protective measures listed in sections 7 and 8. No action shall be taken involving any personal risk or without suitable training. If the product contaminates lakes, rivers, or sewers, inform the appropriate authorities in accordance with local regulations.

6.2 Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

6.3 Methods and materials for containment and cleaning up

Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Use spark-proof tools and explosion-proof equipment. Contaminated absorbent material may pose the same hazard as the spilled product.

6.4 Reference to other sections

SECTION 6: Accidental release measures

See Section 1 for emergency contact information.
 See Section 8 for information on appropriate personal protective equipment.
 See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Vapors are heavier than air and may spread along floors. Vapors may form explosive mixtures with air. Prevent the creation of flammable or explosive concentrations of vapors in air and avoid vapor concentrations higher than the occupational exposure limits. In addition, the product should be used only in areas from which all naked lights and other sources of ignition have been excluded. Electrical equipment should be protected to the appropriate standard. To dissipate static electricity during transfer, ground drum and connect to receiving container with bonding strap. No sparking tools should be used.

Avoid inhalation of vapour, dust and spray mist. Avoid contact with skin and eyes. Eating, drinking and smoking should be prohibited in area where this material is handled, stored and processed. Appropriate personal protective equipment: see Section 8. Always keep in containers made from the same material as the original one.

7.2 Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in a cool, well-ventilated area away from incompatible materials and ignition sources. Keep out of the reach of children. Keep away from: Oxidizing agents, strong alkalis, strong acids. No smoking. Prevent unauthorized access. Containers that are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

See separate Product Data Sheet for recommendations or industrial sector specific solutions.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Product/ingredient name	Exposure limit values
xylene	EU OEL (Europe, 10/2019). Absorbed through skin. TWA: 50 ppm 8 hours. TWA: 221 mg/m ³ 8 hours. STEL: 100 ppm 15 minutes. STEL: 442 mg/m ³ 15 minutes.
ethylbenzene	EU OEL (Europe, 10/2019). Absorbed through skin. STEL: 884 mg/m ³ 15 minutes. STEL: 200 ppm 15 minutes. TWA: 442 mg/m ³ 8 hours. TWA: 100 ppm 8 hours.
toluene	EU OEL (Europe, 10/2019). Absorbed through skin. TWA: 192 mg/m ³ 8 hours. TWA: 50 ppm 8 hours. STEL: 384 mg/m ³ 15 minutes. STEL: 100 ppm 15 minutes.

Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Derived effect levels

Product/ingredient name	Type	Exposure	Value	Population	Effects
xylene	DNEL	Long term Inhalation	77 mg/m ³	Workers	Systemic
	DNEL	Long term Dermal	180 mg/kg bw/day	Workers	Systemic
ethylbenzene	DNEL	Long term Dermal	180 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	77 mg/m ³	Workers	Systemic
toluene	DNEL	Long term Dermal	384 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	192 mg/m ³	Workers	Systemic

Predicted effect concentrations

SECTION 8: Exposure controls/personal protection

Product/ingredient name	Compartment Detail	Value	Method Detail
xylene toluene	Fresh water	0.327 mg/l	-
	Marine water	0.327 mg/l	-
	Fresh water sediment	12.46 mg/kg	-
	Marine water sediment	12.46 mg/kg	-
	Soil	2.31 mg/kg	-
	Sewage Treatment Plant	6.68 mg/l	-
	Fresh water	0.68 mg/l	-
	Marine water	0.68 mg/l	-
	Sewage Treatment Plant	13.61 mg/l	-
	Fresh water sediment	16.39 mg/kg	-
	Marine water sediment	16.39 mg/kg	-
	Soil	2.89 mg/kg	-

8.2 Exposure controls

Appropriate engineering controls

Arrange sufficient ventilation by local exhaust ventilation and good general ventilation to keep the airborne concentrations of vapors or dust lowest possible and below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Individual protection measures

- General : Gloves must be worn for all work that may result in soiling. Apron/coveralls/protective clothing must be worn when soiling is so great that regular work clothes do not adequately protect skin against contact with the product. Safety eyewear should be used when there is a likelihood of exposure.
- Hygiene measures : Wash hands, forearms, and face thoroughly after handling compounds and before eating, smoking, using lavatory, and at the end of day.
- Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
- Hand protection : Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training. The quality of the chemical-resistant protective gloves must be chosen as a function of the specific workplace concentrations and quantity of hazardous substances.
Since the actual work situation is unknown. Supplier of gloves should be contacted in order to find the appropriate type. Below listed glove(s) should be regarded as generic advice:



Recommended: Silver Shield / Barrier / 4H gloves, polyvinyl alcohol (PVA), Viton®
May be used: nitrile rubber
Short term exposure: neoprene rubber, butyl rubber, natural rubber (latex), polyvinyl chloride (PVC)
- Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved handling this product.
- Respiratory protection : Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If working areas have insufficient ventilation: When the product is applied by means that will not generate an aerosol such as, brush or roller wear half or totally covering mask equipped with gas filter of type A, when grinding use particle filter of type P. Be sure to use an approved/certified respirator or equivalent.

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- Physical state : Liquid.
- Color :  Transparent
- Odor : Solvent-like
- pH : Testing not relevant or not possible due to nature of the product.
- Melting point/freezing point : -94.96°C This is based on data for the following ingredient: xylene
- Boiling point/boiling range : Testing not relevant or not possible due to nature of the product.
- Flash point :  Closed cup: 23°C (73.4°F)

SECTION 9: Physical and chemical properties

Evaporation rate :	Testing not relevant or not possible due to nature of the product.
Flammability :	Highly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge, heat and oxidizing materials.
Lower and upper explosive (flammable) limits :	0.8 - 7.1 vol %
Vapor pressure :	0.893 kPa This is based on data for the following ingredient: xylene
Vapor density :	3.7 Air = 1 This is based on data for the following ingredient: xylene
Specific gravity :	0.87 g/cm ³
Solubility(ies) :	Very slightly soluble in the following materials: cold water and hot water.
Partition coefficient (LogKow) :	Testing not relevant or not possible due to nature of the product.
Auto-ignition temperature :	Lowest known value: 432°C (809.6°F) (xylene).
Decomposition temperature :	Testing not relevant or not possible due to nature of the product.
Viscosity :	☑ Kinematic (40°C): >0.09 cm ² /s
Explosive properties :	Testing not relevant or not possible due to nature of the product.
Oxidizing properties :	Testing not relevant or not possible due to nature of the product.

9.2 Other information

Solvent(s) % by weight :	Weighted average: 100 %
Water % by weight :	Weighted average: 0 %
VOC content :	870 g/l
TOC Content :	Weighted average: 788 g/l
Solvent Gas :	Weighted average: 0.197 m ³ /l

SECTION 10: Stability and reactivity

10.1 Reactivity

No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability

The product is stable.

10.3 Possibility of hazardous reactions

Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid

Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

10.5 Incompatible materials

Highly reactive or incompatible with the following materials: oxidizing materials.
Reactive or incompatible with the following materials: reducing materials.

10.6 Hazardous decomposition products

When exposed to high temperatures (i.e. in case of fire) harmful decomposition products may be formed:
Decomposition products may include the following materials: carbon oxides

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Exposure to component solvent vapor concentrations may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on the kidneys, liver and central nervous system. Solvents may cause some of the above effects by absorption through the skin. Symptoms and signs include headaches, dizziness, fatigue, muscular weakness, drowsiness and, in extreme cases, loss of consciousness. Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin. If splashed in the eyes, the liquid may cause irritation and reversible damage. Accidental swallowing may cause stomach pain. Chemical lung inflammation may occur if the product is taken into the lungs via vomiting.

SECTION 11: Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
xylene	LC50 Inhalation Gas.	Rat	5000 ppm	4 hours
	LC50 Inhalation Vapor	Rat	6350 ppm	4 hours
	LD50 Dermal	Rabbit	>4200 mg/kg	-
ethylbenzene	LD50 Oral	Rat	3523 mg/kg	-
	LD50 Dermal	Rabbit	>5000 mg/kg	-
toluene	LD50 Oral	Rat	3500 mg/kg	-
	LC50 Inhalation Vapor	Rat	>20 mg/l	4 hours
	LD50 Oral	Rat	636 mg/kg	-

Acute toxicity estimates

Product/ingredient name	Oral mg/kg	Dermal mg/kg	Inhalation (gases) ppm	Inhalation (vapors) mg/l	Inhalation (dusts and mists) mg/l
Hempel's Thinner 08080					
xylene	3523	1359.7	6180.4	61.1	
ethylbenzene	3500	1100	5000	11	

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure
xylene	Eyes - Severe irritant	Rabbit	-	24 hours 5 milligrams
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams
ethylbenzene	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams
	Respiratory - Mild irritant	Rabbit	-	-
toluene	Eyes - Mild irritant	Rabbit	-	-
	Eyes - Mild irritant	Rabbit	-	0.5 minutes 100 milligrams
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams

Mutagenic effects

No known significant effects or critical hazards.

Carcinogenicity

No known significant effects or critical hazards.

Reproductive toxicity

No known significant effects or critical hazards.

Teratogenic effects

No known significant effects or critical hazards.

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
toluene	Category 3		Narcotic effects

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target organs
ethylbenzene	Category 2	-	hearing organs
toluene	Category 2	-	-

Aspiration hazard

Product/ingredient name	Result
ethylbenzene	ASPIRATION HAZARD - Category 1
toluene	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure

Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential chronic health effects

Other information : No additional known significant effects or critical hazards.

SECTION 12: Ecological information

12.1 Toxicity

Do not allow to enter drains or watercourses.

Product/ingredient name	Result	Species	Exposure
ethylbenzene toluene	Chronic NOEC <1000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Chronic NOEC <500000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Chronic NOEC 1000 µg/l Fresh water	Daphnia - Daphnia magna	21 days

12.2 Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
xylene ethylbenzene toluene	-	>60 % - Readily - 28 days	-	-
	-	>70 % - Readily - 28 days	-	-
	-	100 % - Readily - 14 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
xylene ethylbenzene toluene	-	-	Readily
	-	-	Readily
	-	-	Readily

12.3 Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
xylene ethylbenzene toluene	3.12	8.1 - 25.9	low
	3.6	-	low
	2.73	90	low

12.4 Mobility in soil

Soil/water partition coefficient (K_{oc}) : No known data available in our database.

Mobility : No known data available in our database.

12.5 Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

12.6 Other adverse effects

No known significant effects or critical hazards.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

The generation of waste should be avoided or minimized wherever possible. Residues of the product is listed as hazardous waste. Dispose of according to all state and local applicable regulations. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Spillage, remains, discarded clothes and similar should be discarded in a fireproof container.

European waste catalogue no. (EWC) is given below.

European waste catalogue (EWC) : 08 01 11*




Packaging

The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

SECTION 14: Transport information

Transport may take place according to national regulation or ADR for transport by road, RID for transport by train, IMDG for transport by sea, IATA for transport by air.

SECTION 14: Transport information

	14.1 UN no.	14.2 Proper shipping name	14.3 Transport hazard class(es)	14.4 PG*	14.5 Env*	Additional information
ADR/RID Class	UN1263	PAINT RELATED MATERIAL	3 	III	No.	<u>Tunnel code</u> (D/E)
IMDG Class	UN1263	PAINT RELATED MATERIAL	3 	III	No.	<u>Emergency schedules</u> F-E, S-E
IATA Class	UN1263	PAINT RELATED MATERIAL	3 	III	No.	-

PG* : Packing group

Env.* : Environmental hazards

14.6 Special precautions for user

Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Transport in bulk according to IMO instruments

Not applicable.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU Regulation (EC) No. 1907/2006 (REACH) Annex XIV - List of substances subject to authorization - Substances of very high concern

Annex XIV

None of the components are listed.

Substances of very high concern

None of the components are listed.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

Not applicable.

Other EU regulations

Seveso category This product is controlled under the Seveso III Directive.

Seveso category
P5c: Flammable liquids 2 and 3 not falling under P5a or P5b

15.2 Chemical Safety Assessment

SECTION 16: Other information

Abbreviations and acronyms :

ATE = Acute Toxicity Estimate

CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]

EUH statement = CLP-specific Hazard statement

RRN = REACH Registration Number

DNEL = Derived No Effect Level

PNEC = Predicted No Effect Concentration

Full text of abbreviated H statements :

H225	Highly flammable liquid and vapor.
H226	Flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H332	Harmful if inhaled.
H336	May cause drowsiness or dizziness.
H361d	Suspected of damaging the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.

SECTION 16: Other information

Full text of classifications [CLP/GHS] :

<input checked="" type="checkbox"/> Acute Tox. 4	ACUTE TOXICITY - Category 4
Asp. Tox. 1	ASPIRATION HAZARD - Category 1
Flam. Liq. 2	FLAMMABLE LIQUIDS - Category 2
Flam. Liq. 3	FLAMMABLE LIQUIDS - Category 3
Repr. 2	TOXIC TO REPRODUCTION - Category 2
Skin Irrit. 2	SKIN CORROSION/IRRITATION - Category 2
STOT RE 2	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2
STOT SE 3	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) - Category 3

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Classification	Justification
<input checked="" type="checkbox"/> FLAMMABLE LIQUIDS ACUTE TOXICITY (dermal) ACUTE TOXICITY (inhalation) SKIN CORROSION/IRRITATION SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) ASPIRATION HAZARD	On basis of test data Calculation method Calculation method Calculation method Calculation method Calculation method

Notice to reader

Indicates information that has changed from previously issued version.

The information contained in this safety data sheet is based on the present state of knowledge and EU and national legislation. It provides guidance on health, safety and environmental aspects for handling the product in a safe way and should not be construed as any guarantee of the technical performance or suitability for particular applications.

It is always the duty of the user/employer to ascertain that the work is planned and carried out in accordance with the national regulations.

This document is intended to communicate the conditions of safe use for the product and should always be read in combination with the product's Safety Data Sheet and labels.

General description of the process covered

Indoor painting by professionals by dipping or with brush, roller, putty knife etc. with enhanced ventilation or local exhaust ventilation (LEV)

This safe use information is linked to : Professional low-energy painting, near-industrial setting - Level I
HMP I/PW 02a

Sector(s) of use : Industrial uses - Professional uses

Product category(ies) : Coatings and paints, thinners, paint removers

Operational conditions

Place of use : Indoor use

Range of application/Process conditions : Assumes a good standard of occupational hygiene and safety management has been implemented.

Risk management measures (RMM)

Contributing activity	Process category (ies)	Maximum duration	Ventilation		Respiratory	Eye	Hands
			Type and air changes per hour				
Preparation of material for application	PROC05	More than 4 hours	Enhanced (mechanical) room ventilation	5 - 10	None	Use eye protection according to EN 166.	Wear suitable gloves tested to EN374.
Loading of application equipment and handling of coated parts before curing	PROC08b	More than 4 hours	Enhanced (mechanical) room ventilation	5 - 10	None	Use eye protection according to EN 166.	Wear suitable gloves tested to EN374.
Industrial application of coatings by other than spraying	PROC10	More than 4 hours	Local exhaust ventilation	Refer to relevant technical standards	Wear a respirator conforming to EN140 with an assigned protection factor of at least 10.	Use eye protection according to EN 166.	Wear suitable gloves tested to EN374.
Film formation - force drying, stoving and other technologies	PROC04	More than 4 hours	Enhanced (mechanical) room ventilation	5 - 10	None	None	None
Cleaning	PROC05	More than 4 hours	Enhanced (mechanical) room ventilation	5 - 10	None	Use eye protection according to EN 166.	Wear suitable gloves tested to EN374.
Waste management	PROC08b	More than 4 hours	Enhanced (mechanical) room ventilation	5 - 10	None	Use eye protection according to EN 166.	Wear suitable gloves tested to EN374.

See chapter 8 of this Safety Data Sheet for specifications.



This document is intended to communicate the conditions of safe use for the product and should always be read in combination with the product's Safety Data Sheet and labels.

General description of the process covered

Outdoor painting by professionals by dipping or with brush, roller, putty knife etc.

This safe use information is linked to : Professional low-energy painting, near-industrial setting - Level V
HMP I/PW 06e

Sector(s) of use : Industrial uses - Professional uses

Product category(ies) : Coatings and paints, thinners, paint removers

Operational conditions

Place of use : Outdoor use

Range of application/Process conditions : Assumes a good standard of occupational hygiene and safety management has been implemented.

Risk management measures (RMM)

Contributing activity	Process category (ies)	Maximum duration	Ventilation		Respiratory	Eye	Hands
			Type	air changes per hour			
Preparation of material for application	PROC05	More than 4 hours	Outdoors	3 - 5	Wear a respirator conforming to EN140 with an assigned protection factor of at least 10.	Use eye protection according to EN 166.	Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.
Loading of application equipment and handling of coated parts before curing	PROC08b	More than 4 hours	Outdoors	3 - 5	Wear a respirator conforming to EN140 with an assigned protection factor of at least 10.	Use eye protection according to EN 166.	Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.
Industrial application of coatings by other than spraying	PROC10	More than 4 hours	Outdoors	3 - 5	Use a properly fitted, air-purifying or air-fed respirator. EN 14594 with an assigned protection factor of at least 20.	Use eye protection according to EN 166.	Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.
Film formation - force drying, stoving and other technologies	PROC04	More than 4 hours	Outdoors	3 - 5	None	Use eye protection according to EN 166.	Wear suitable gloves tested to EN374.
Cleaning	PROC05	More than 4 hours	Outdoors	3 - 5	Wear a respirator conforming to EN140 with an assigned protection factor of at least 10.	Use eye protection according to EN 166.	Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.
Waste management	PROC08b	More than 4 hours	Outdoors	3 - 5	Wear a respirator conforming to EN140 with an assigned protection factor of at least 10.	Use eye protection according to EN 166.	Wear chemical-resistant gloves (tested to EN374) in combination with 'basic' employee training.

See chapter 8 of this Safety Data Sheet for specifications.



Conforms to ANSI Z400.1-2010 Standard - HCS 2012

Protective Clothing	General Hazard	DOT
		

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name : HEMPEL'S THINNER 08450
 Product identity : 0845000000
 Product type : thinner

1.2 Relevant identified uses of the substance or mixture and uses advised against

Field of application : yacht, ships and shipyards. buildings and metal industry.
 Identified uses : Industrial/Professional use
 TSCA : **Unless otherwise stated. All components are listed or exempted.**

1.3 Details of the supplier of the safety data sheet

Company details :	HEMPEL (USA), Inc. 600 Conroe Park North Drive Conroe, Texas 77303 Toll free: (800) 678-6641, if outside area codes 713, 281, 409, 936 Regular phone number: (936) 523-6000 E-mail Hempel@Hempel.com	HEMPEL (USA), Inc. 2728 Empire Central Dallas, TX 75235 Phone number: 1-214-353-1600 E-mail: hempel@hempel.com
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1.4 Emergency telephone number (with hours of operation)

For Transportation Emergencies : CHEMTREC: **1-800-424-9300** (Toll-free in the U.S., Canada and the U.S. Virgin Islands) **703-527-3887** (24 hours)
 For calls originating elsewhere (Collect calls are accepted). Contract number: CCN10384
 To preserve the effectiveness of arrangements for providing accurate and timely emergency response information, the basic identifying information (shipper name or contract number) must be included on shipping papers.
 If the purchaser of this product is going to be shipping this product to other locations, the purchaser must arrange for its own Emergency Information Provider to respond to transport incidents. Hempel's 24 hour response contract does not cover non-Hempel shipments.

For all other information : In USA toll free calling available: 1-800- 678-6641 or (936)-523-6000
 (8 AM - 5 PM CST) See Section 4 of the safety data sheet (first aid measures).

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

GHS Classification :
 FLAMMABLE LIQUIDS - Category 3
 ACUTE TOXICITY (dermal) - Category 4
 ACUTE TOXICITY (inhalation) - Category 4
 SKIN IRRITATION - Category 2
 SERIOUS EYE DAMAGE - Category 1
 CARCINOGENICITY - Category 2
 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (hearing organs) - Category 2
 ASPIRATION HAZARD - Category 1

2.2 Label elements

SECTION 2: Hazards identification

Hazard pictograms :



Signal word :

Danger

Hazard statements :

H226 - Flammable liquid and vapor.
 H312 + H332 - Harmful in contact with skin or if inhaled.
 H318 - Causes serious eye damage.
 H315 - Causes skin irritation.
 H351 - Suspected of causing cancer.
 H304 - May be fatal if swallowed and enters airways.
 H335 - May cause respiratory irritation.
 H336 - May cause drowsiness or dizziness.
 H373 - May cause damage to organs through prolonged or repeated exposure. (hearing organs)

Precautionary statements :

General :

Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

Prevention :

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Do not breathe vapor. Wash hands thoroughly after handling.

Response :

Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or physician if you feel unwell. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

Storage :

Store locked up. Store in a well-ventilated place. Keep cool.

Disposal :

Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental label elements :

None known.

2.3 Other hazards

Hazards not otherwise classified : None known.

SECTION 3: Composition/information on ingredients

Product definition :

Mixture

Physical state :

Liquid.

Product/ingredient name	Identifiers	%	GHS Classification
xylene	1330-20-7	≥50 - ≤75	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (dermal) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2
n-butanol	71-36-3	≥10 - ≤25	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (oral) - Category 4 SKIN IRRITATION - Category 2 SERIOUS EYE DAMAGE - Category 1 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3

SECTION 3: Composition/information on ingredients

ethylbenzene	100-41-4	≥10 - ≤19	FLAMMABLE LIQUIDS - Category 2 ACUTE TOXICITY (inhalation) - Category 4 CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (hearing organs) - Category 2 ASPIRATION HAZARD - Category 1
solvent naphtha (petroleum), light arom.	64742-95-6	≥3 - ≤5	FLAMMABLE LIQUIDS - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 ASPIRATION HAZARD - Category 1
1,2,4-trimethylbenzene	95-63-6	≥3 - ≤4.8	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
1,2,3-trimethylbenzene Cumene	526-73-8 98-82-8	≥1 - ≤3 ≤0.3	FLAMMABLE LIQUIDS - Category 3 FLAMMABLE LIQUIDS - Category 3 CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 ASPIRATION HAZARD - Category 1

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

Occupational exposure limits, if available, are listed in Section 8.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

SECTION 4: First aid measures

4.1 Description of first aid measures

General :	In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person. If breathing is irregular, drowsiness, loss of consciousness or cramps: Call 911 and give immediate treatment (first aid).
Eye contact :	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 5 minutes, occasionally lifting the upper and lower eyelids. Seek immediate medical attention.
Inhalation :	Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Give nothing by mouth. If unconscious, place in recovery position and get medical attention immediately.
Skin contact :	Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.
Ingestion :	If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting unless directed to do so by medical personnel. Lower the head so that vomit will not re-enter the mouth and throat.
Protection of first-aiders :	No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact :	Causes serious eye damage.
Inhalation :	Harmful if inhaled. Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness. May cause respiratory irritation.
Skin contact :	Harmful in contact with skin. Causes skin irritation.
Ingestion :	Can cause central nervous system (CNS) depression. May be fatal if swallowed and enters airways.

Over-exposure signs/symptoms

SECTION 4: First aid measures

Eye contact :	Adverse symptoms may include the following: pain watering redness
Inhalation :	Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
Skin contact :	Adverse symptoms may include the following: pain or irritation redness blistering may occur
Ingestion :	Adverse symptoms may include the following: stomach pains nausea or vomiting

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician :	Not applicable.
Specific treatments :	No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Extinguishing media :	Recommended: alcohol resistant foam, CO ₂ , powders, water spray. Not to be used: waterjet.
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5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture :	Flammable liquid and vapor. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
Hazardous combustion products :	Decomposition products may include the following materials: carbon oxides

5.3 Advice for firefighters

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard. Cool closed containers exposed to fire with water. Do not release runoff from fire to drains or watercourses. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid all direct contact with the spilled material. Exclude sources of ignition and be aware of explosion hazard. Ventilate the area. Avoid breathing vapor or mist. Refer to protective measures listed in sections 7 and 8. No action shall be taken involving any personal risk or without suitable training. If the product contaminates lakes, rivers, or sewers, inform the appropriate authorities in accordance with local regulations.

6.2 Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material.

6.3 Methods and materials for containment and cleaning up

SECTION 6: Accidental release measures

Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Use spark-proof tools and explosion-proof equipment. Contaminated absorbent material may pose the same hazard as the spilled product.

6.4 Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Vapors are heavier than air and may spread along floors. Vapors may form explosive mixtures with air. Prevent the creation of flammable or explosive concentrations of vapors in air and avoid vapor concentrations higher than the occupational exposure limits. In addition, the product should be used only in areas from which all naked lights and other sources of ignition have been excluded. Electrical equipment should be protected to the appropriate standard. To dissipate static electricity during transfer, ground drum and connect to receiving container with bonding strap. No sparking tools should be used.

Avoid inhalation of vapour, dust and spray mist. Avoid contact with skin and eyes. Eating, drinking and smoking should be prohibited in area where this material is handled, stored and processed. Appropriate personal protective equipment: see Section 8. Always keep in containers made from the same material as the original one.

7.2 Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in a cool, well-ventilated area away from incompatible materials and ignition sources. Keep out of the reach of children. Keep away from: Oxidizing agents, strong alkalis, strong acids. No smoking. Prevent unauthorized access. Containers that are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

See separate Product Data Sheet for recommendations or industrial sector specific solutions. This product may be applied using several application techniques and methods of handling may be different for each. Application techniques include [but are not limited to] brushing, rolling, and spray application [conventional, HPLV, airless, pleural component or aerosol can]. Avoid the breathing of vapors and, if spraying, do not breath spray mist or aerosols.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Product/ingredient name	Exposure limit values
xylene	ACGIH TLV (United States, 3/2018). TWA: 100 ppm 8 hours. TWA: 434 mg/m ³ 8 hours. STEL: 150 ppm 15 minutes. STEL: 651 mg/m ³ 15 minutes. OSHA PEL (United States, 5/2018). TWA: 100 ppm 8 hours. TWA: 435 mg/m ³ 8 hours.
n-butanol	ACGIH TLV (United States, 3/2018). TWA: 20 ppm 8 hours. NIOSH REL (United States, 10/2016). Absorbed through skin. CEIL: 50 ppm CEIL: 150 mg/m ³ OSHA PEL (United States, 5/2018). TWA: 100 ppm 8 hours. TWA: 300 mg/m ³ 8 hours.
ethylbenzene	ACGIH TLV (United States, 3/2018). TWA: 20 ppm 8 hours. NIOSH REL (United States, 10/2016). STEL: 545 mg/m ³ 15 minutes. STEL: 125 ppm 15 minutes. TWA: 435 mg/m ³ 10 hours. TWA: 100 ppm 10 hours. OSHA PEL (United States, 5/2018).

SECTION 8: Exposure controls/personal protection

solvent naphtha (petroleum), light arom.	TWA: 435 mg/m ³ 8 hours. TWA: 100 ppm 8 hours.
1,2,4-trimethylbenzene	ACGIH TLV (United States). TWA Tentative: 25 ppm 8 hours.
1,2,3-trimethylbenzene	ACGIH TLV (United States, 3/2018). TWA: 123 mg/m ³ 8 hours. TWA: 25 ppm 8 hours.
Cumen	NIOSH REL (United States, 10/2016). TWA: 125 mg/m ³ 10 hours. TWA: 25 ppm 10 hours.
	ACGIH TLV (United States, 3/2018). TWA: 123 mg/m ³ 8 hours. TWA: 25 ppm 8 hours.
	NIOSH REL (United States, 10/2016). TWA: 125 mg/m ³ 10 hours. TWA: 25 ppm 10 hours.
	ACGIH TLV (United States, 3/2018). TWA: 50 ppm 8 hours.
	NIOSH REL (United States, 10/2016). Absorbed through skin. TWA: 245 mg/m ³ 10 hours. TWA: 50 ppm 10 hours.
	OSHA PEL (United States, 5/2018). Absorbed through skin. TWA: 245 mg/m ³ 8 hours. TWA: 50 ppm 8 hours.

Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

8.2 Exposure controls

Appropriate engineering controls


Provide local exhaust and general ventilation systems to maintain airborne concentrations below OSHA, ACGIH, and manufacturer recommended exposure limits. Local exhaust ventilation is preferred because it prevents contaminant dispersion into work areas by controlling it at its source. Use local and general exhaust ventilation to effectively remove and prevent buildup of mists/vapors/fumes generated from the handling of this product.

Note: Local exhaust ventilation is designed to capture an emitted contaminant at or near its source, before the contaminant has a chance to disperse into the workplace air. General exhaust ventilation, also called dilution ventilation, is different from local exhaust ventilation because instead of capturing emissions at their source and removing them from the air, general exhaust ventilation allows the contaminant to be emitted into the workplace air and then dilutes the concentration of the contaminant to an acceptable level (e.g., to the PEL or below).

Individual protection measures

- General : Gloves must be worn for all work that may result in soiling. Apron/coveralls/protective clothing must be worn when soiling is so great that regular work clothes do not adequately protect skin against contact with the product. Safety eyewear should be used when there is a likelihood of exposure.
- Hygiene measures : Wash hands, forearms, and face thoroughly after handling compounds and before eating, smoking, using lavatory, and at the end of day.
- Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.
- Hand protection : Wear chemical-resistant gloves in combination with 'basic' employee training. The quality of the chemical-resistant protective gloves must be chosen as a function of the specific workplace concentrations and quantity of hazardous substances.
 Since the actual work situation is unknown. Supplier of gloves should be contacted in order to find the appropriate type. Below listed glove(s) should be regarded as generic advice:
 Recommended: Silver Shield / Barrier / 4H gloves, polyvinyl alcohol (PVA), Viton®
 May be used: nitrile rubber
 Short term exposure: neoprene rubber, butyl rubber, natural rubber (latex), polyvinyl chloride (PVC)

SECTION 8: Exposure controls/personal protection

Body protection :	Personal protective equipment for the body should be selected based on the task being performed and the risks involved handling this product. Wear suitable protective clothing. Always wear protective clothing when spraying.
Respiratory protection :	If working areas have insufficient ventilation, wear half or totally covering mask equipped with gas filter of type Organic Vapor, when grinding use particle filter of type P95, P99 or P100. When spraying use a combined filter (organic vapor / HEPA or organic vapor / P100 type). Be sure to use approved/certified respirator or equivalent. Always wear an air-fed respirator when spraying in a continuous and prolonged work situation (e.g. hood with supply of fresh or compressed air or a full face, powered air purifying filter).
Protective clothing (pictograms) :	 <p>Note: Application of paint products by spraying requires additional safety precautions: Full body suit, Full face respirator with air supplied.</p>

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state :	Liquid.
Odor :	Solvent-like
pH :	Testing not relevant or not possible due to nature of the product.
Melting point/freezing point :	-94.96°C This is based on data for the following ingredient: xylene
Boiling point/boiling range :	Testing not relevant or not possible due to nature of the product.
Flash point :	Closed cup: 25°C (77°F)
Evaporation rate :	Testing not relevant or not possible due to nature of the product.
Flammability :	Highly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat. Flammable in the presence of the following materials or conditions: oxidizing materials. Slightly flammable in the presence of the following materials or conditions: reducing materials.
Upper/lower flammability or explosive limits :	0.8 - 11.3 vol %
Vapor pressure :	0.893 kPa This is based on data for the following ingredient: xylene
Vapor density :	Testing not relevant or not possible due to nature of the product.
Relative density :	0.857 g/cm ³
Solubility(ies) :	Partially soluble in the following materials: cold water and hot water.
Partition coefficient (LogKow) :	Testing not relevant or not possible due to nature of the product.
Auto-ignition temperature :	Testing not relevant or not possible due to nature of the product.
Decomposition temperature :	Testing not relevant or not possible due to nature of the product.
Viscosity :	<7 x 10 ⁻⁶ m ² /s Kinematic viscosity at 40°C
Explosive properties :	Explosive in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
Oxidizing properties :	Testing not relevant or not possible due to nature of the product.

9.2 Other information

Solvent(s) % by weight (Included exempt solvent(s)):	100 % (w/w)
Water % by weight :	Weighted average: 0 %
VOC content (Coatings) :	7.15 lbs/gal (856.8 g/l)
VOC content (Regulatory) :	7.15 lbs/gal (857 g/l)

SECTION 9: Physical and chemical properties

TOC Content (Volatile) : Weighted average: 720 g/l
 Solvent Gas : Weighted average: 0.209 m³/l

SECTION 10: Stability and reactivity

10.1 Reactivity

No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability

The product is stable.

10.3 Possibility of hazardous reactions

Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid

Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

10.5 Incompatible materials

Highly reactive or incompatible with the following materials: oxidizing materials.
 Reactive or incompatible with the following materials: reducing materials.

10.6 Hazardous decomposition products

When exposed to high temperatures (i.e. in case of fire) harmful decomposition products may be formed:

Decomposition products may include the following materials: carbon oxides

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Exposure to component solvent vapor concentrations may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on the kidneys, liver and central nervous system. Solvents may cause some of the above effects by absorption through the skin. Symptoms and signs include headaches, dizziness, fatigue, muscular weakness, drowsiness and, in extreme cases, loss of consciousness. Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin. If splashed in the eyes, the liquid may cause irritation and reversible damage. Accidental swallowing may cause stomach pain. Chemical lung inflammation may occur if the product is taken into the lungs via vomiting.

Aspiration hazard if swallowed. Can enter lungs and cause damage.

Direct contact with the eyes can cause irreversible damage, including blindness.

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
xylene	LC50 Inhalation Gas.	Rat	5000 ppm	4 hours
	LC50 Inhalation Vapor	Rat	6350 ppm	4 hours
	LD50 Dermal	Rabbit	>4200 mg/kg	-
n-butanol	LD50 Oral	Rat	3523 mg/kg	-
	LC50 Inhalation Vapor	Rat	24000 mg/m³	4 hours
	LD50 Dermal	Rabbit	3400 mg/kg	-
ethylbenzene	LD50 Oral	Rat	790 mg/kg	-
	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-
solvent naphtha (petroleum), light arom.	LC50 Inhalation Vapor	Rat	6193 mg/m³	4 hours
	LD50 Dermal	Rabbit	3160 mg/kg	-
	LD50 Oral	Rat	3492 mg/kg	-
1,2,4-trimethylbenzene	LC50 Inhalation Vapor	Rat	18000 mg/m³	4 hours
	LD50 Oral	Rat	5 g/kg	-
	LC50 Inhalation Vapor	Rat	39000 mg/m³	4 hours
Cumene	LD50 Dermal	Rabbit	12300 uL/kg	-
	LD50 Oral	Rat	1400 mg/kg	-

SECTION 11: Toxicological information

Acute toxicity estimates

Route	ATE value
Oral	3953.95 mg/kg
Dermal	1906.41 mg/kg
Inhalation (gases)	6641.58 ppm
Inhalation (vapors)	15.22 mg/l

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure
xylene	Eyes - Severe irritant	Rabbit	-	24 hours 5 milligrams
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams
n-butanol	Eyes - Severe irritant	Rabbit	-	24 hours 2 milligrams
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams
ethylbenzene	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams
	Respiratory - Mild irritant	Rabbit	-	-
solvent naphtha (petroleum), light arom.	Eyes - Mild irritant	Rabbit	-	-
	Eyes - Mild irritant	Rabbit	-	24 hours 100 microliters
Cumene	Respiratory - Mild irritant	Rabbit	-	-
	Skin - Moderate irritant	Rabbit	-	-
	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams
	Skin - Moderate irritant	Rabbit	-	24 hours 100 milligrams

Carcinogen Classification

Product/ingredient name	IARC	NTP	OSHA
xylene	3	-	-
ethylbenzene	2B	-	-
Cumene	2B	Reasonably anticipated to be a human carcinogen.	-

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
n-butanol	Category 3	Not applicable.	Narcotic effects
	Category 3	Not applicable.	Respiratory tract irritation
solvent naphtha (petroleum), light arom.	Category 3	Not applicable.	Narcotic effects
	Category 3	Not applicable.	Respiratory tract irritation
1,2,4-trimethylbenzene	Category 3	Not applicable.	Respiratory tract irritation
Cumene	Category 3	Not applicable.	Respiratory tract irritation
			Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target organs
ethylbenzene	Category 2	Not determined	hearing organs

Aspiration hazard

Product/ingredient name	Result
ethylbenzene	ASPIRATION HAZARD - Category 1
solvent naphtha (petroleum), light arom.	ASPIRATION HAZARD - Category 1
Cumene	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure

Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential chronic health effects

Other information : No additional known significant effects or critical hazards.

SECTION 12: Ecological information

12.1 Toxicity

Do not allow to enter drains or watercourses. Harmful to aquatic life with long lasting effects.

When spilled, this product may act as an oil, causing a film, sheen, emulsion, or sludge at or beneath the surface of a body of water. Oils of any kind can cause: (a) drowning of waterfowl due to lack of buoyancy, loss of insulating capacity of feathers, starvation and vulnerability to predators due to lack of mobility; (b) lethal effect on fish by coating gill surfaces, preventing respiration; (c) potential fish kills resulting from alteration in biochemical oxygen demand; (d) asphyxiation of benthic life forms when floating masses become engaged with surface debris and settle on the bottom; and (e) adverse aesthetic effects of fouled shoreline and beaches.

Product/ingredient name	Result	Species	Exposure
n-butanol	Acute EC50 1328 mg/l	Daphnia	96 hours
	Acute LC50 1.376 mg/l	Fish	96 hours
ethylbenzene solvent naphtha (petroleum), light arom.	Chronic NOEC <1000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute EC50 2.6 mg/l	Algae - Pseudokirchneriella subcapitata (green algae)	96 hours
1,2,4-trimethylbenzene	Acute EC50 3.2 mg/l	Daphnia	48 hours
	Acute LC50 9.22 mg/l	Fish - Oncorhynchus mykiss (rainbow trout)	96 hours
	Acute LC50 4910 µg/l Marine water	Crustaceans - Elasmopus pectinicus - Adult	48 hours
Cumene	Acute LC50 7720 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Acute EC50 2.6 mg/l	Algae	72 hours
	Acute EC50 7400 - 11290 µg/l Fresh water	Crustaceans - Artemia sp. - Nauplii	48 hours
	Acute EC50 1 - 10 mg/l	Daphnia	48 hours
	Acute LC50 2700 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
	Acute NOEC 0.35 mg/l	Algae	21 days

12.2 Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
xylene n-butanol	-	>60 % - Readily - 28 days	-	-
	OECD 301D Ready Biodegradability - Closed Bottle Test	92 % - 20 days	-	-
ethylbenzene solvent naphtha (petroleum), light arom.	-	>70 % - Readily - 28 days	-	-
	-	>70 % - Readily - 28 days	-	-
	-	>60 % - Readily - 28 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
xylene	-	-	Readily
n-butanol	-	-	Readily
ethylbenzene	-	-	Readily
solvent naphtha (petroleum), light arom.	-	-	Readily

12.3 Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
xylene	3.12	8.1 - 25.9	low
n-butanol	1	3.16	low
ethylbenzene	3.6	-	low
solvent naphtha (petroleum), light arom.	-	10 - 2500	high
1,2,4-trimethylbenzene	3.63	243	low
1,2,3-trimethylbenzene	3.66	194.98	low
Cumene	3.55	35.48	low

12.4 Mobility in soil

Soil/water partition coefficient (K_{oc}): No known data available in our database.

Mobility: No known data available in our database.

12.5 Other adverse effects

No known significant effects or critical hazards.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7 and Section 8 for additional handling information and protection of employees.

The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.






RCRA classification : D001 [Ignitable]

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Xylene 1-Butanol (I); n-Butyl alcohol (I)	1330-20-7 71-36-3	Listed Listed	U239 U031

SECTION 14: Transport information

Transport may take place according to national regulation or DOT for transport by road and by train, IMDG for transport by sea, IATA for Air shipment. Refer to specific Dangerous Goods Transport requirements under 49CFR, ICAO and IATA.

	14.1 UN no.	14.2 Proper shipping name	14.3 Transport hazard class(es)	14.4 PG*	14.5 Env*	14.5 Additional information
DOT Code	UN1263	PAINT RELATED MATERIAL	3 - 	III	No.	ERG : 128 Reportable quantity (xylene, ethylbenzene) 173.31 lbs / 78.683 kg [24.254 gal / 91.812 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.
TDG Code	UN1263	PAINT RELATED MATERIAL	3 - 	III	No.	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.18-2.19 (Class 3).
SCT Code	UN1263	PAINT RELATED MATERIAL	3 - 	III	No.	-
IMDG Code	UN1263	PAINT RELATED MATERIAL	3 - 	III	No.	Emergency schedules F-E, S-E
IATA Code	UN1263	PAINT RELATED MATERIAL	3 - 	III	No.	-

Code : Classification

PG* : Packing group

Env.* : Environmental hazards

14.6 Special precautions for user

SECTION 14: Transport information

Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

Not applicable.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

U.S. Federal regulations :

All components are listed or exempted.

TSCA 8(a) CDR Exempt/Partial exemption: Not determined

United States inventory (TSCA 8b): All components are listed or exempted.

Clean Water Act (CWA) 307: ethylbenzene; benzene

Clean Water Act (CWA) 311: xylene; ethylbenzene; benzene

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Listed

Product/ingredient name	CAS number	Concentration
xylene	1330-20-7	57.7
ethylbenzene	100-41-4	12.625
Cumen	98-82-8	0.15
benzene	71-43-2	0.005

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 311/312 Classification :

FLAMMABLE LIQUIDS - Category 3
 ACUTE TOXICITY (dermal) - Category 4
 ACUTE TOXICITY (inhalation) - Category 4
 SKIN IRRITATION - Category 2
 SERIOUS EYE DAMAGE - Category 1
 CARCINOGENICITY - Category 2
 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (hearing organs) - Category 2
 ASPIRATION HAZARD - Category 1

Product/ingredient name	%	Classification
xylene	≥50 - ≤75	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (dermal) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2
n-butanol	≥10 - ≤25	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (oral) - Category 4 SKIN IRRITATION - Category 2 SERIOUS EYE DAMAGE - Category 1 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
ethylbenzene	≥10 - ≤19	FLAMMABLE LIQUIDS - Category 2 ACUTE TOXICITY (inhalation) - Category 4 CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (hearing organs) - Category 2 ASPIRATION HAZARD - Category 1
solvent naphtha (petroleum), light arom.	≥3 - ≤5	FLAMMABLE LIQUIDS - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
1,2,4-trimethylbenzene	≥3 - ≤4.8	ASPIRATION HAZARD - Category 1 FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
1,2,3-trimethylbenzene Cumen	≥1 - ≤3 ≤0.3	FLAMMABLE LIQUIDS - Category 3 FLAMMABLE LIQUIDS - Category 3 CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 ASPIRATION HAZARD - Category 1

SECTION 15: Regulatory information

SARA 313 : SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

Form R - Reporting requirements :

Product/ingredient name	CAS number	Concentration
xylene	1330-20-7	50 - 100
n-butanol	71-36-3	10 - 20
ethylbenzene	100-41-4	10 - 20
1,2,4-trimethylbenzene	95-63-6	3 - 5

Supplier notification :

Product/ingredient name	CAS number	Concentration
xylene	1330-20-7	50 - 100
n-butanol	71-36-3	10 - 20
ethylbenzene	100-41-4	10 - 20
1,2,4-trimethylbenzene	95-63-6	3 - 5

State regulations :

Connecticut Carcinogen Reporting: None of the components are listed.
Connecticut Hazardous Material Survey: None of the components are listed.
Florida substances: None of the components are listed.
Illinois Chemical Safety Act: None of the components are listed.
Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.
Louisiana Reporting: None of the components are listed.
Louisiana Spill: None of the components are listed.
Massachusetts Spill: None of the components are listed.
Massachusetts Substances: The following components are listed: XYLENE; DIMETHYLBENZENE; ETHYL BENZENE; ETHYLBENZENE; N-BUTYL ALCOHOL; 1-BUTANOL; TRIMETHYL BENZENE; PSEUDOCUMENE
Michigan Critical Material: None of the components are listed.
Minnesota Hazardous Substances: None of the components are listed.
New Jersey Hazardous Substances: The following components are listed: XYLENES; BENZENE, DIMETHYL-; ETHYL BENZENE; BENZENE, ETHYL-; n-BUTYL ALCOHOL; 1-BUTANOL; TRIMETHYL BENZENE (mixed isomers); BENZENE, TRIMETHYL-; CUMENE; BENZENE, (1-METHYLETHYL-); PSEUDOCUMENE; 1,2,4-TRIMETHYL BENZENE
New Jersey Spill: None of the components are listed.
New Jersey Toxic Catastrophe Prevention Act: None of the components are listed.
New York Acutely Hazardous Substances: The following components are listed: Xylene mixed; Ethylbenzene; Butyl alcohol; 1-Butanol; Cumene; Benzene, 1-methylethyl-
New York Toxic Chemical Release Reporting: None of the components are listed.
Pennsylvania RTK Hazardous Substances: The following components are listed: BENZENE, DIMETHYL-; BENZENE, ETHYL-; 1-BUTANOL; BENZENE, (1-METHYLETHYL-); PSEUDOCUMENE
Rhode Island Hazardous Substances: None of the components are listed.

California Prop. 65 PFF : **WARNING:** This product can expose you to chemicals including Benzene, which is known to the State of California to cause cancer and birth defects or other reproductive harm. This product can expose you to chemicals including Ethylbenzene and Cumene, which are known to the State of California to cause cancer, and 1-ethyl-2-methylbenzene, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Product/ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
ethylbenzene	Yes.	No.	Yes.	
1-ethyl-2-methylbenzene	No.	Yes.		
Cumen	Yes.	No.		
benzene	Yes.	Yes.	Yes.	Yes.

SECTION 16: Other information

Remarks : Note: In USA, consult Code of Federal Regulations, Title 29, Labor, Parts 1910 and 1915 concerning occupational safety and health standards and regulations, as well as any other applicable Federal, State or local regulations that apply to safe practices in coating operations.
Warning! If you scrape, sand, or remove old paint, you may release lead dust. LEAD is TOXIC.

Validation : Validated by US - HSE Products Coordinator on 25 June 2019

GHS Classification

Procedure used to derive the classification.

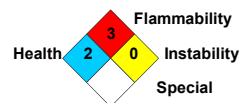
SECTION 16: Other information

Classification	Justification
FLAMMABLE LIQUIDS - Category 3	On basis of test data
ACUTE TOXICITY (dermal) - Category 4	Calculation method
ACUTE TOXICITY (inhalation) - Category 4	Calculation method
SKIN IRRITATION - Category 2	Calculation method
SERIOUS EYE DAMAGE - Category 1	Calculation method
CARCINOGENICITY - Category 2	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (hearing organs) - Category 2	Calculation method
ASPIRATION HAZARD - Category 1	Calculation method

Hazardous Material Information System (U.S.A.)

Health	* 3
Fire hazard	3
Physical hazards	0
Personal protection	X

National Fire Protection Association (U.S.A.)



Personal Protective Equipment (PPE) shown in this section is a suggestion. Since conditions vary from one work location to another consult the facility safety & health program. Customer or end user is responsible to evaluate worker exposure conditions at the site of application and determine the appropriate PPE suitable for workers at that particular facility or location.

Abbreviations and acronyms :

ANSI = American National Standards Institute

HCS = Hazardous Communication System

TSCA = Toxic Substances Control Act

CFR = Code of federal Regulations

GHS = Globally Harmonized System of Classification and Labelling of Chemicals

OSHA = United States Occupational Health and Safety Administration

NIOSH = National Institute for Occupational Safety and Health

ACGIH = American Conference of Industrial Hygienists

IARC = International Agency for Research on Cancer.

NTP = National Toxicology Program

ATE = Acute Toxicity Estimate

OECD = Organisation for Economic Co-operation and Development

BCF = Bioconcentration Factor

DOT = United States Department of Transportation

ERG = Emergency Response Guide

TDG = Transport of Dangerous Goods, Canada

SCT = Transportation & Communications Ministry, Mexico

IMDG = International Maritime Dangerous Goods

IATA = International Air Transport Association

SARA = Superfund Amendments Reauthorization Act



EPCRA = Emergency Planning and Community Right to Know Act

Notice to reader

 Indicates information that has changed from previously issued version.



To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Conforms to ANSI Z400.1-2010 Standard - HCS 2012

Protective Clothing	General Hazard	DOT
		

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name :  HEMPEL'S ZINC METAL PIGMENT 97170
 Product identity :  7170XXXX0
 Product type : Zinc. powder

1.2 Relevant identified uses of the substance or mixture and uses advised against

Field of application : metal industry, ships and shipyards.
 Identified uses : Industrial/Professional use
 TSCA : **Unless otherwise stated. All components are listed or exempted.**

1.3 Details of the supplier of the safety data sheet

Company details :	HEMPEL (USA), Inc. 600 Conroe Park North Drive Conroe, Texas 77303 Toll free: (800) 678-6641, if outside area codes 713, 281, 409, 936 Regular phone number: (936) 523-6000 E-mail Hempel@Hempel.com	HEMPEL (USA), Inc. 2728 Empire Central Dallas, TX 75235 Phone number: 1-214-353-1600 E-mail: hempel@hempel.com
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1.4 Emergency telephone number (with hours of operation)

For Transportation Emergencies : CHEMTREC: **1-800-424-9300** (Toll-free in the U.S., Canada and the U.S. Virgin Islands) **703-527-3887** (24 hours)
 For calls originating elsewhere (Collect calls are accepted). Contract number: CCN10384
 To preserve the effectiveness of arrangements for providing accurate and timely emergency response information, the basic identifying information (shipper name or contract number) must be included on shipping papers.
 If the purchaser of this product is going to be shipping this product to other locations, the purchaser must arrange for its own Emergency Information Provider to respond to transport incidents. Hempel's 24 hour response contract does not cover non-Hempel shipments.

For all other information : In USA toll free calling available: 1-800- 678-6641 or (936)-523-6000
 (8 AM - 5 PM CST) See Section 4 of the safety data sheet (first aid measures).

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

GHS Classification : Not classified.

2.2 Label elements

Hazard pictograms :
 Signal word : No signal word.
 Hazard statements : No known significant effects or critical hazards.
 Precautionary statements :
 Supplemental label elements : Handling and/or processing of this material may generate a dust which can cause mechanical irritation of the eyes, skin, nose and throat. Do not get in eyes, on skin, or on clothing. IF ON SKIN: Wash with plenty of soap and water. IF IN EYES: Remove contact lenses, if present and easy to do. Continue rinsing.

SECTION 2: Hazards identification

2.3 Other hazards

Hazards not otherwise classified : Handling and/or processing of this material may generate a dust which can cause mechanical irritation of the eyes, skin, nose and throat.

SECTION 3: Composition/information on ingredients

Product definition : Mixture

Physical state : Solid. [Powder.]

Product/ingredient name	Identifiers	%	GHS Classification
zinc powder - zinc dust (stabilized) zinc oxide	7440-66-6 1314-13-2	≥90 ≥5 - ≤10	Not classified. Not classified.

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

Occupational exposure limits, if available, are listed in Section 8.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

SECTION 4: First aid measures

4.1 Description of first aid measures

General : In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person.
If breathing is irregular, drowsiness, loss of consciousness or cramps: Call 911 and give immediate treatment (first aid).

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. In all cases of doubt, or when symptoms persist, seek medical attention.

Inhalation : Remove to fresh air. Keep person warm and at rest. If unconscious, place in recovery position and seek medical advice.

Skin contact : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.

Ingestion : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting unless directed to do so by medical personnel. Lower the head so that vomit will not re-enter the mouth and throat.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

Inhalation : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
irritation
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Skin contact : No specific data.

Ingestion : No specific data.

4.3 Indication of any immediate medical attention and special treatment needed

SECTION 4: First aid measures

Notes to physician : Not applicable.
Specific treatments : No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Extinguishing media : Recommended: Approved Class D extinguisher or smother with dry sand, dry clay or dry ground limestone.
NOT TO BE USED: WATER. Risk of formation of very flammable and explosive vapours.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture : This material is very toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
Hazardous combustion products : Decomposition products may include the following materials: metal oxide/oxides

5.3 Advice for firefighters

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Exposure to decomposition products may cause a health hazard. Cool closed containers exposed to fire with water. Do not release runoff from fire to drains or watercourses. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Do not use water. Violent reaction may occur. Refer to protective measures listed in sections 7 and 8. No action shall be taken involving any personal risk or without suitable training. If the product contaminates lakes, rivers, or sewers, inform the appropriate authorities in accordance with local regulations.

6.2 Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

6.3 Methods and materials for containment and cleaning up

Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal.

6.4 Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Open with care, danger of overpressure.
Avoid inhalation of vapour, dust and spray mist. Avoid contact with skin and eyes. Eating, drinking and smoking should be prohibited in area where this material is handled, stored and processed. Appropriate personal protective equipment: see Section 8. Always keep in containers made from the same material as the original one.

7.2 Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations for flammable liquids. Store in a cool, well-ventilated area away from incompatible materials and ignition sources. Keep out of the reach of children. Keep away from: Oxidizing agents, strong alkalis, strong acids as well as of amines, alcohols and water. No smoking. Prevent unauthorized access. Containers that are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

SECTION 7: Handling and storage

See separate Product Data Sheet for recommendations or industrial sector specific solutions.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Product/ingredient name	Exposure limit values
Zinc oxide	<p>NIOSH REL (United States, 10/2016). CEIL: 15 mg/m³ Form: Dust TWA: 5 mg/m³ 10 hours. Form: Dust and fumes STEL: 10 mg/m³ 15 minutes. Form: Fume</p> <p>OSHA PEL (United States, 6/2016). TWA: 5 mg/m³ 8 hours. Form: Fume TWA: 5 mg/m³ 8 hours. Form: Respirable fraction TWA: 15 mg/m³ 8 hours. Form: Total dust</p> <p>ACGIH TLV (United States, 3/2017). STEL: 10 mg/m³ 15 minutes. Form: Respirable fraction TWA: 2 mg/m³ 8 hours. Form: Respirable fraction</p>

Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

8.2 Exposure controls

Appropriate engineering controls

Provide local exhaust and general ventilation systems to maintain airborne concentrations below OSHA, ACGIH, and manufacturer recommended exposure limits. Local exhaust ventilation is preferred because it prevents contaminant dispersion into work areas by controlling it at its source. Use local and general exhaust ventilation to effectively remove and prevent buildup of mists/vapors/fumes generated from the handling of this product.

Note: Local exhaust ventilation is designed to capture an emitted contaminant at or near its source, before the contaminant has a chance to disperse into the workplace air. General exhaust ventilation, also called dilution ventilation, is different from local exhaust ventilation because instead of capturing emissions at their source and removing them from the air, general exhaust ventilation allows the contaminant to be emitted into the workplace air and then dilutes the concentration of the contaminant to an acceptable level (e.g., to the PEL or below).

Individual protection measures

- General : Gloves must be worn for all work that may result in soiling. Apron/coveralls/protective clothing must be worn when soiling is so great that regular work clothes do not adequately protect skin against contact with the product. Safety eyewear should be used when there is a likelihood of exposure.
- Hygiene measures : Wash hands, forearms, and face thoroughly after handling compounds and before eating, smoking, using lavatory, and at the end of day.
- Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields. If operating conditions cause high dust concentrations to be produced, use dust goggles.
- Hand protection : Wear chemical-resistant gloves in combination with 'basic' employee training. The quality of the chemical-resistant protective gloves must be chosen as a function of the specific workplace concentrations and quantity of hazardous substances.
 Since the actual work situation is unknown. Supplier of gloves should be contacted in order to find the appropriate type.
- Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved handling this product.
- Respiratory protection : Use appropriate respiratory protection if there is a risk of exceeding any exposure limits. Use dust protection mask, when there is a risk for dust.
- Protective clothing (pictograms) :



Note: Application of paint products by spraying requires additional safety precautions: Full body suit, Full face respirator with air supplied.

SECTION 8: Exposure controls/personal protection

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state :	Powder.
Odor :	Non-characteristic.
pH :	Testing not relevant or not possible due to nature of the product.
Melting point/freezing point :	419.85°C This is based on data for the following ingredient: Zinc
Boiling point/boiling range :	Testing not relevant or not possible due to nature of the product.
Flash point :	Non-flammable.
Evaporation rate :	Testing not relevant or not possible due to nature of the product.
Flammability :	Non-flammable.
Upper/lower flammability or explosive limits :	No specific data.
Vapor pressure :	Testing not relevant or not possible due to nature of the product.
Vapor density :	Testing not relevant or not possible due to nature of the product.
Relative density :	7.1 g/cm ³
Solubility(ies) :	
Partition coefficient (LogKow) :	Testing not relevant or not possible due to nature of the product.
Auto-ignition temperature :	Testing not relevant or not possible due to nature of the product.
Decomposition temperature :	Testing not relevant or not possible due to nature of the product.
Viscosity :	Testing not relevant or not possible due to nature of the product.
Explosive properties :	Slightly explosive in the presence of the following materials or conditions: moisture.
Oxidizing properties :	Testing not relevant or not possible due to nature of the product.

9.2 Other information

Solvent(s) % by weight (Included exempt solvent(s)):	0 % (w/w)
Water % by weight :	Weighted average: 0 %
VOC content (Coatings) :	0 lbs/gal (0 g/l)
VOC content (Regulatory) :	0 lbs/gal (0 g/l)
TOC Content (Volatile) :	Weighted average: 0 g/l
Solvent Gas :	Weighted average: 0 m ³ /l

SECTION 10: Stability and reactivity

10.1 Reactivity

No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability

The product is stable.

10.3 Possibility of hazardous reactions

Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid

SECTION 10: Stability and reactivity

No specific data.

10.5 Incompatible materials

Highly reactive or incompatible with the following materials: oxidizing materials and acids.
Reactive or incompatible with the following materials: reducing materials, organic materials, alkalis and moisture.

10.6 Hazardous decomposition products

When exposed to high temperatures (i.e. in case of fire) harmful decomposition products may be formed:
Decomposition products may include the following materials: metal oxide/oxides

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Repeated inhalation of dust can produce varying degrees of respiratory irritation or lung damage.

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
zinc powder - zinc dust (stabilized) zinc oxide	LC50 Inhalation Dusts and mists	Rat	5.41 mg/l	4 hours
	LD50 Oral	Rat	>2000 mg/kg	-
	LC50 Inhalation Vapor	Rat	>5.7 mg/l	4 hours
	LD50 Dermal	Rat	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-

Acute toxicity estimates

Route	ATE value
No known significant effects or critical hazards.	

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure
zinc powder - zinc dust (stabilized) zinc oxide	Skin - Mild irritant	Human	-	72 hours 300 Micrograms Intermittent
	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams

Information on the likely routes of exposure

Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential chronic health effects

Other information : No additional known significant effects or critical hazards.

SECTION 12: Ecological information

12.1 Toxicity

Do not allow to enter drains or watercourses. Very toxic to aquatic life with long lasting effects.

When spilled in water or drains, this product can cause: (a) contribute to suspended solid loading of the water body; (b) turbidity and reduce penetration of light into the water column; (c) alter water pH and/or alkalinity; (d) contribute to sediments at bottom of water column; (e) add colour to the sediment. When spilled to land surface with no runoff due to precipitation, this product can cause: (a) fines present may become air-borne and be transported by wind; (b) contribute to accumulation of surface "dirt"; (c) colour changes to surfaces on which it is spilled.

Product/ingredient name	Result	Species	Exposure
zinc powder - zinc dust (stabilized)	Acute EC50 0.3 mg/l Marine water	Algae	72 hours
	Acute EC50 0.354 mg/l Fresh water	Daphnia	48 hours
	Acute LC50 0.238 - 0.269 mg/l Fresh water	Fish	96 hours
	Chronic EC10 27.3 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
		- Exponential growth phase	
	Chronic EC10 59.2 µg/l Fresh water	Daphnia - Daphnia magna	21 days
	Chronic NOEC 9 mg/l Fresh water	Aquatic plants - Ceratophyllum demersum	3 days
	Chronic NOEC 178 µg/l Marine water	Crustaceans - Palaemon elegans	21 days
	Chronic NOEC 2.6 µg/l Fresh water	Fish - Cyprinus carpio	4 weeks

SECTION 12: Ecological information

zinc oxide	Acute EC50 0.17 mg/l	Algae - Pseudokirchneriella subcapitata - Exponential growth phase	72 hours
	Acute EC50 1 mg/l	Daphnia - Pseudokirchneriella subcapitata - Exponential growth phase	48 hours
	Acute LC50 24600 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
zinc oxide	2.2	60960	high

12.4 Mobility in soil

Soil/water partition coefficient (K_{oc}) : No known data available in our database.

Mobility : No known data available in our database.

12.5 Other adverse effects

No known significant effects or critical hazards.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.



The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7 and Section 8 for additional handling information and protection of employees.









The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information

Transport may take place according to national regulation or DOT for transport by road and by train, IMDG for transport by sea, IATA for Air shipment. Refer to specific Dangerous Goods Transport requirements under 49CFR, ICAO and IATA.

14.1 UN no.	14.2 Proper shipping name	14.3 Transport hazard class(es)	14.4 PG*	14.5 Env*	14.5 Additional information
DOT Code UN3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc). (zinc powder - zinc dust (stabilized))	9 -	 	III Yes.	ERG : 171 The marine pollutant mark is not required when transported on inland waterways in sizes of ≤5 L or ≤5 kg or by road, rail, or inland air in non-bulk sizes. Reportable quantity (Zinc, zinc powder - zinc dust (stabilized)) 20.4 lbs / 463.27 kg Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.

SECTION 14: Transport information

TDG Code	UN3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc). (zinc powder - zinc dust (stabilized))	9 -	 	III Yes.	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.43-2.45 (Class 9), 2.7 (Marine pollutant mark). Non-bulk packages of this product are not regulated as dangerous goods when transported by road or rail.
SCT Code	UN3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc)	9 -	 	III Yes.	The environmentally hazardous substance mark is not required when transported in sizes of ≤5 L or ≤5 kg.
IMDG Code	UN3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc). (Zinc)	9 -	 	III Yes.	This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8. Emergency schedules F-A, S-F
IATA Code	UN3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc)	9 -	 	III Yes.	This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 5.0.2.4.1, 5.0.2.6.1.1 and 5.0.2.8.

Code : Classification
PG* : Packing group
Env.* : Environmental hazards

14.6 Special precautions for user

Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

Not applicable.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

U.S. Federal regulations :

All components are listed or exempted.

TSCA 8(a) CDR Exempt/Partial exemption: Not determined

United States inventory (TSCA 8b): All components are listed or exempted.

Clean Water Act (CWA) 307: Zinc; zinc powder - zinc dust (stabilized); zinc oxide

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304 - SARA 311/312:

SARA 302/304: chlorine

SARA 311/312 Hazards identification: Delayed (chronic) health hazard

SARA 313 :

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

Form R - Reporting requirements :

Product/ingredient name	CAS number	Concentration
Zinc zinc powder - zinc dust (stabilized) zinc oxide	Sec. (7440-66-6) 7440-66-6 1314-13-2	50 - 100 50 - 100 5 - 10

Supplier notification :

Product/ingredient name	CAS number	Concentration
Zinc powder - zinc dust (stabilized) zinc oxide	7440-66-6 1314-13-2	50 - 100 5 - 10

SECTION 15: Regulatory information

State regulations :

Connecticut Carcinogen Reporting: None of the components are listed.
Connecticut Hazardous Material Survey: None of the components are listed.
Florida substances: None of the components are listed.
Illinois Chemical Safety Act: None of the components are listed.
Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.
Louisiana Reporting: None of the components are listed.
Louisiana Spill: None of the components are listed.
Massachusetts Spill: None of the components are listed.
Massachusetts Substances: The following components are listed: ZINC; ZINC OXIDE FUME
Michigan Critical Material: None of the components are listed.
Minnesota Hazardous Substances: None of the components are listed.
New Jersey Hazardous Substances: The following components are listed: ZINC; ZINC OXIDE
New Jersey Spill: None of the components are listed.
New Jersey Toxic Catastrophe Prevention Act: None of the components are listed.
New York Acutely Hazardous Substances: The following components are listed: Zinc
New York Toxic Chemical Release Reporting: None of the components are listed.
Pennsylvania RTK Hazardous Substances: The following components are listed: ZINC COMPOUNDS; ZINC OXIDE; ZINC OXIDE FUME
Rhode Island Hazardous Substances: None of the components are listed.

California Prop. 65 PFF :

WARNING: This product contains less than 0.1% of a chemical known to the State of California to cause cancer. **WARNING:** This product contains less than 1% of a chemical known to the State of California to cause birth defects or other reproductive harm.

Product/ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Cadmium	Yes.	Yes.		

SECTION 16: Other information

Remarks :

Note: In USA, consult Code of Federal Regulations, Title 29, Labor, Parts 1910 and 1915 concerning occupational safety and health standards and regulations, as well as any other applicable Federal, State or local regulations that apply to safe practices in coating operations.
 Warning! If you scrape, sand, or remove old paint, you may release lead dust. LEAD is TOXIC.

Validation :

Validated by US - HSE Products Coordinator on 1 February 2018

GHS Classification

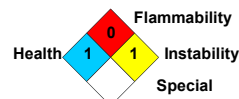
Procedure used to derive the classification.

Classification	Justification
Not classified.	

Hazardous Material Information System (U.S.A.)

Health	/ 0
Fire hazard	0
Physical hazards	1
Personal protection	E

National Fire Protection Association (U.S.A.)



Personal Protective Equipment (PPE) shown in this section is a suggestion. Since conditions vary from one work location to another consult the facility safety & health program. Customer or end user is responsible to evaluate worker exposure conditions at the site of application and determine the appropriate PPE suitable for workers at that particular facility or location.

Abbreviations and acronyms :

ANSI = American National Standards Institute
 HCS = Hazardous Communication System
 TSCA = Toxic Substances Control Act
 CFR = Code of federal Regulations
 GHS = Globally Harmonized System of Classification and Labelling of Chemicals
 OSHA = United States Occupational Health and Safety Administration
 NIOSH = National Institute for Occupational Safety and Health
 ACGIH = American Conference of Industrial Hygienists
 IARC = International Agency for Research on Cancer.
 NTP = National Toxicology Program
 ATE = Acute Toxicity Estimate

OECD = Organisation for Economic Co-operation and Development
 BCF = Bioconcentration Factor
 DOT = United States Department of Transportation
 ERG = Emergency Response Guide
 TDG = Transport of Dangerous Goods, Canada
 SCT = Transportation & Communications Ministry, Mexico
 IMDG = International Maritime Dangerous Goods
 IATA = International Air Transport Association
 SARA = Superfund Amendments Reauthorization Act
 EPCRA = Emergency Planning and Community Right to Know Act

Notice to reader

Indicates information that has changed from previously issued version.

SECTION 16: Other information

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET



Methyl Ethyl Ketone

Section 1. Identification

GHS product identifier	: Methyl Ethyl Ketone
Chemical name	: 2-Butanone
Other means of identification	: Not available.
Product type	: Liquid.
Supplier's details	: Barton Solvents, Inc. 1920 NE Broadway PO Box 221 Des Moines, IA 50306-0221 (515) 265-7998
Emergency telephone number	: CHEMTREC (800) 424-9300 (AVAILABLE 24 HOURS A DAY)

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: FLAMMABLE LIQUIDS - Category 2 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) [Narcotic effects] - Category 3

GHS label elements

Hazard pictograms



Signal word	: Danger
Hazard statements	: Highly flammable liquid and vapor. Causes serious eye irritation. May cause drowsiness and dizziness.

Precautionary statements

General	: Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.
Prevention	: Wear protective gloves. Wear eye or face protection. Keep away from heat, sparks, open flames and hot surfaces. - No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Avoid breathing vapor. Wash hands thoroughly after handling.
Response	: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.
Storage	: Store locked up. Store in a well-ventilated place. Keep cool.
Disposal	: Dispose of contents and container in accordance with all local, regional, national and international regulations.
Hazards not otherwise classified	: None known.

Section 3. Composition/information on ingredients

Substance/mixture	: Substance
Chemical name	: 2-Butanone
Other means of identification	: Not available.

CAS number/other identifiers

Section 3. Composition/information on ingredients

CAS number : 78-93-3

Product code : 0500005

Ingredient name	%	CAS number
2-Butanone	100	78-93-3

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Causes serious eye irritation.
- Inhalation** : Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness.
- Skin contact** : No known significant effects or critical hazards.
- Ingestion** : Can cause central nervous system (CNS) depression. Irritating to mouth, throat and stomach.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
pain or irritation
watering
redness
- Inhalation** : Adverse symptoms may include the following:
nausea or vomiting
headache
drowsiness/fatigue
dizziness/vertigo
unconsciousness
- Skin contact** : No specific data.
- Ingestion** : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.

Section 4. First aid measures

- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use dry chemical, CO₂, water spray (fog) or foam.

- Unsuitable extinguishing media** : Do not use water jet.

- Specific hazards arising from the chemical** : Highly flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

- Hazardous thermal decomposition products** : No specific data.

- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

- Small spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

- Large spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

2-Butanone

OSHA PEL (United States).

TWA: 200 ppm

ACGIH TLV (United States).

TWA: 200 ppm

STEL: 300 ppm

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Section 8. Exposure controls/personal protection

- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

- Physical state** : Liquid.
- Color** : Colorless.
- Odor** : Pungent.
- Odor threshold** : Not available.
- pH** : Not available.
- Melting point** : Not available.
- Boiling point** : 79°C (174.2°F)
- Flash point** : Closed cup: -5°C (23°F). (Tagliabue.)
- Burning time** : Not applicable.
- Burning rate** : Not applicable.
- Evaporation rate** : 3.8 compared with Butyl acetate.
- Flammability (solid, gas)** : Highly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
- Lower and upper explosive (flammable) limits** : Lower: 1% Upper: 11%
- Vapor pressure** : 10.4 kPa (78 mm Hg) (at 20°C)
- Vapor density** : 2.5 (Air = 1)
- Relative density** : 0.8101 (Water = 1)
- Solubility** : Easily soluble in the following materials: methanol, acetone.
Partially soluble in the following materials: hot water.
Very slightly soluble in the following materials: cold water.
- Solubility in water** : Not available.
- Partition coefficient: n-octanol/water** : 0.3
- Auto-ignition temperature** : 404°C (759.2°F)
- Decomposition temperature** : Not available.
- SADT** : Not available.
- Viscosity** : Kinematic: 0.51 cSt

Section 10. Stability and reactivity

- Reactivity** : No specific test data related to reactivity available for this product or its ingredients.
- Chemical stability** : The product is stable.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
- Conditions to avoid** : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.

Section 10. Stability and reactivity

Incompatible materials : Reactive or incompatible with the following materials:
oxidizing materials

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
2-Butanone	LC50 Inhalation Gas.	Rat	>5000 ppm	1 hours
	LD50 Dermal	Rabbit	>500 mg/kg	-
	LD50 Oral	Rat	2193 mg/kg	-

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
2-Butanone	-	4	-

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
2-Butanone	Category 3	Not applicable.	Narcotic effects

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

- Eye contact** : Causes serious eye irritation.
- Inhalation** : Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness.
- Skin contact** : No known significant effects or critical hazards.
- Ingestion** : Can cause central nervous system (CNS) depression. Irritating to mouth, throat and stomach.

Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : Adverse symptoms may include the following:
pain or irritation
watering
redness

Section 11. Toxicological information

- Inhalation** : Adverse symptoms may include the following:
nausea or vomiting
headache
drowsiness/fatigue
dizziness/vertigo
unconsciousness
- Skin contact** : No specific data.
- Ingestion** : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Long term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Potential chronic health effects

Not available.

- General** : No known significant effects or critical hazards.
- Carcinogenicity** : No known significant effects or critical hazards.
- Mutagenicity** : No known significant effects or critical hazards.
- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Not available.

Mobility in soil


- Soil/water partition coefficient (K_{oc})** : Not available.

- Other adverse effects** : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	UN number	UN proper shipping name	Transport hazard class(es)	Packing group	Environmental hazards	Additional information
DOT Classification	UN1193	Methyl Ethyl Ketone	3 	II	No.	-

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined
United States inventory (TSCA 8b): This material is listed or exempted.
Clean Water Act (CWA) 307: No products were found.
Clean Water Act (CWA) 311: No products were found.
Clean Air Act (CAA) 112 regulated flammable substances: No products were found.
Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Fire hazard
 Immediate (acute) health hazard
 Delayed (chronic) health hazard

Canada inventory : Not determined.

International regulations

Section 15. Regulatory information

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

Section 16. Other information

Hazardous Material Information System (U.S.A.)

Health	2
Flammability	3
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 5/29/2015.
Revision Date : 8/24/05; 8/8/09; 5/29/15
Revision comments : Removal from SARA 313 list, 08/24/2005; MSDS Update 8/8/09; GHS Update 5/29/15
Version : 1
Prepared by : Daytime Phone - (515) 265-7998
Key to abbreviations : ATE = Acute Toxicity Estimate
 BCF = Bioconcentration Factor
 GHS = Globally Harmonized System of Classification and Labelling of Chemicals
 IATA = International Air Transport Association
 IBC = Intermediate Bulk Container
 IMDG = International Maritime Dangerous Goods
 LogPow = logarithm of the octanol/water partition coefficient
 MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
 UN = United Nations

References : Not available.

Notice to reader

Section 16. Other information

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

ATTACHMENT F

Material Data Sheets

NUCOR[®]

SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Trade Name: Carbon and Alloy Steels

CAS Number: Not applicable

Synonyms: Steels

Use/Description: Plate products

Company Identification:	24 Hour Contact – CHEMTREC 1-800-424-9300
Nucor Steel Hertford County PO Box 279 Winton, North Carolina 27986	Safety Officer [8:00 am – 5:00 pm]: 1-252-356-3929
Nucor Steel Tuscaloosa, Inc. 1700 Holt Road, N.E. Tuscaloosa, Alabama 35404	Safety Officer [8:00 am – 5:00 pm]: 1-205-562-1244
Nucor Steel Longview LLC 5400 W. Loop 281, Bldg 52 Longview, TX 75603	Safety Officer [8:00 am – 5:00 pm]: 1-903-653-1647

For general product information, contact facility as listed above. For emergencies, use the 24 Hour Contact.

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

STEEL PRODUCTS AS SOLD BY NUCOR ARE NOT HAZARDOUS PER OSHA GHS 29 CFR 1910, 1915, 1926. However, individual customer processes, (such as welding, sawing, brazing, grinding, abrasive blasting, and machining) may result in the formation of fumes, dust (combustible or otherwise), and/or particulate that may present the following hazards:

OSHA Hazards: Carcinogen
Skin Sensitizer
Target Organ Effect – Lungs

GHS Classification: Carcinogenicity (Category 2)
Skin Sensitization (Category 1)
Specific Target Organ Toxicity-Repeated Exposure (Category 1)

Pictogram(s):



Signal Word: Danger

Hazard Statement(s)

H317: Dust/fumes may cause an allergic skin reaction.

H351: Dust/fumes suspected of causing cancer via inhalation.

Carbon and Alloy Steels

H372: Inhalation of dust/fumes causes damage to respiratory tract through prolonged or repeated exposure

Precautionary Statement(s)

P202: Do not handle until all safety precautions have been read and understood.

P261: Avoid breathing dust/fumes.

P281: Use personal protective equipment as required.

P308+P313: If exposed or concerned: Get medical advice/attention.

Potential Health Effects

Eye Contact

Dusts or particulates may cause mechanical irritation including pain, tearing, and redness. Scratching of the cornea can occur if eye is rubbed. Fumes may be irritating. Contact with the heated material may cause thermal burns.

Skin Contact

Dusts or particulates may cause mechanical irritation due to abrasion. Coated steel may cause skin irritation in sensitive individuals (see Section 16 for additional information.) Some components in this product are capable of causing an allergic reaction, possibly resulting in burning, itching and skin eruptions. Contact with heated material may cause thermal burns.

Inhalation

Dusts may cause irritation of the nose, throat, and lungs. Excessive inhalation of metallic fumes and dusts may result in metal fume fever, an influenza-like illness. It is characterized by a sweet or metallic taste in the mouth, accompanied by dryness and irritation of the throat, cough, shortness of breath, pulmonary edema, general malaise, weakness, fatigue, muscle and joint pains, blurred vision, fever and chills. Typical symptoms last from 12 to 48 hours.

Ingestion

Not expected to be acutely toxic via ingestion based on the physical and chemical properties of the product. Swallowing of excessive amounts of the dust may cause irritation, nausea, and diarrhea.

Potential Fire and Explosion Hazards

Under normal conditions, steel products do not present fire or explosion hazards, and dust generated by handling steel products is oxidized and not combustible. Processing of steel product by some individual customers may produce potentially combustible dust that may represent a fire or explosion hazard.

Chronic or Special Toxic Effects

Repeated exposure to fine dusts may inflame the nasal mucosa and cause changes to the lung. In addition, a red-brown pigmentation of the eye and/or skin may occur. Welding fumes have been associated with adverse health effects. Contains components that may cause cancer or reproductive effects. The following components are listed by NTP, OSHA, or IARC as carcinogens: Nickel, chromium (hexavalent), cobalt, lead, cadmium, antimony (trioxide), arsenic, and beryllium. See Section 11, for additional, specific information on effects noted above.

Target Organs

Overexposure to specific components of this product that are generated in dusts or fumes may cause adverse effects to the following organs or systems: eyes, skin, liver, kidney, central nervous system, cardiovascular system, respiratory system.

Medical Conditions Aggravated by Exposure

Diseases of the skin such as eczema may be aggravated by exposure. Also, disorders of the respiratory system including asthma, bronchitis, and emphysema. Long-term inhalation exposure to agents that cause pneumoconiosis (e.g. dust) may act synergistically with inhalation of oxide fumes or dusts of this product.

Carbon and Alloy Steels

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS No.	% Weight	Exposure Limits			
			ACGIH TLV (mg/m ³)		OSHA PEL (mg/m ³)	
Base Metal:						
Iron (Fe)	7439-89-6	Balance	5	Oxide Dust/Fume	10	Oxide Dust/Fume
Alloying Elements						
Chromium (Cr)	7440-47-3	0.01-5.5	0.5	Metal	1	Metal
Copper (Cu)	7440-50-8	<1.75	1	Dust Fume	1	Dust Fume
			0.2		0.1	
Manganese (Mn)	7439-96-5	0-2	0.2	Elemental Mn and Inorg Compounds	5	Fume (Ceiling)
		0.01-3.65				
Nickel (Ni)	7440-02-0		1.5	Metal	1	Metal and Insoluble Compounds
Components	CAS No.	% Weight	Exposure Limits			
			ACGIH TLV (mg/m ³)		OSHA PEL (mg/m ³)	

NOTE: No permissible exposure limits (PEL) or threshold limit values (TLV) exist for steel. The above listing is a summary of elements used in alloying Nucor Steel Products. Various grades of steel will contain different combinations of these elements and/or trace materials. Exact specifications may be found by calling the division and asking for a specifications sheet.

4. FIRST AID MEASURES

Eye Contact- In case of overexposure to dusts or fumes, immediately flush eyes with plenty of water for at least 15 minutes occasionally lifting the eye lids. Get medical attention if irritation persists. Thermal burns should be treated as medical emergencies.

Skin Contact - In case of overexposure to dusts or particulates, wash with soap and plenty of water. Get medical attention if irritation develops or persists. If thermal burn occurs, flush area with cold water and get immediate medical attention.

Inhalation - In case of overexposure to dusts or fumes, remove to fresh air. Get immediate medical attention if symptoms described in this Safety Data Sheet (SDS) develop.

Ingestion - Not considered an ingestion hazard. However, if excessive amounts of dust or particulates are swallowed, treat symptomatically and supportively. Get medical attention.

Notes to Physician - Inhalation of metal fume or metal oxides may produce an acute febrile state, with cough, chills, weakness, and general malaise, nausea, vomiting, muscle cramps, and remarkable leukocytosis. Treatment is symptomatic, and condition is self limited in 24-48 hours. Chronic exposure to dusts may result in pneumoconiosis of mixed type.

5. FIRE FIGHTING MEASURES

Flash Point (Method) - Not applicable

Flammable Limits (% volume in air) - Not applicable

Auto ignition Temperature - Not applicable

Extinguishing Media - For molten metal, use dry powder or sand. For steel dust use or dry sand, water, foam, argon or nitrogen.

Carbon and Alloy Steels

Special Fire Fighting Procedures - Do not use water on molten metal. Do not use Carbon Dioxide (CO₂). Firefighters should not enter confined spaces without wearing NIOSH/MSHA approved positive pressure breathing apparatus (SCBA) with full face mask and full protective equipment.

Unusual Fire or Explosion Hazards - Steel products do not present fire or explosion hazards under normal conditions. Any non-oxidized fine metal particles/ dust generated by grinding, sawing, abrasive blasting, or individual customer processes may produce materials that the customer should test for combustibility and other hazards in accordance with applicable regulations. High concentrations of combustible metallic fines in the air may present an explosion hazard.

6. ACCIDENTAL RELEASE MEASURES

Precautions if Material is Spilled or Released - Emergency response is unlikely unless in the form of combustible dust. Avoid inhalation, eye, or skin contact of dusts by using appropriate precautions outlined in this SDS (see section 8). Fine turnings and small chips should be swept or vacuumed and placed into appropriate disposable containers. Keep fine dust or powder away from sources of ignition. Scrap should be reclaimed for recycling. Prevent materials from entering drains, sewers, or waterways. Specific standards and regulations may be applicable to materials generated by individual customer processes. As appropriate, these standards and regulations should be consulted for applicability.

Fire and Explosion Hazards

Some customer processes may generate combustible dust that may require specific precautions when cleaning spills or releases of dust.

Environmental Precautions - Some grades of steel may contain reportable quantities of alloying elements. See Section 15 for additional information.

Waste Disposal Methods - Dispose used or unused product in accordance with applicable Federal, State, and Local regulations. Please recycle.

7. HANDLING AND STORAGE

Storage Temperatures - Stable under normal temperatures and pressures.

Precautions to be Taken in Handling and Storing - Store away from strong oxidizers. Dusts and/or powders, alone, or combined with process specific fluids, may form explosive mixtures with air. Applicable Federal, state and local laws and regulations may require testing dust generated from processing of steel products to determine if it represents a fire or explosion hazard and to determine appropriate protection methods. Avoid breathing dusts or fumes.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Operations with potential for generating high concentrations of airborne particulates or fumes should be evaluated and controlled as necessary.

Eye Protection - Use safety glasses. Dust resistant safety goggles are recommended under circumstances where particles could cause mechanical injury such as grinding or cutting. Face shield should be used when welding or cutting.

Skin - Appropriate protective gloves should be worn as necessary. Good personal hygiene practices should be followed including cleansing exposed skin several times daily with soap and water, and laundering or dry cleaning soiled work clothing.

Respiratory Protection - NIOSH/MSHA approved dust/fume/mist respirator should be used to avoid excessive exposure. See Section 3 for component material information exposure limits. If such concentrations are sufficiently high that this respirator is inadequate, or high enough to cause oxygen deficiency, use a positive pressure self-contained breathing apparatus (SCBA). Follow all applicable respirator use, fitting, and training standards and regulations.

Ventilation - Provide general and/or local exhaust ventilation to control airborne levels of dust or fumes below exposure limits.

Carbon and Alloy Steels

Exposure Guidelines - No permissible exposure limits (PEL) or threshold limit values (TLV) exist for steel. See Section 3 for component materials. Various grades of steel will contain different combinations of these elements. Trace elements may also be present in minute amounts.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor - Silver grey to grey black with metallic luster.

Boiling Point - Not applicable

Melting Point - Approximately 2800°F

pH - Not applicable

Specific Gravity (at 15.6°C) - Not applicable

Density (at 15.6 °C) - Not applicable

Vapor Pressure - Not applicable

Vapor Density (air = 1) - Not applicable %

Volatile, by Volume - Not applicable

Solubility in Water - Insoluble.

Evaporation Rate (Butyl Acetate = 1) - Not applicable

Other Physical and Chemical Data - None

10. STABILITY AND REACTIVITY

Stability - Stable

Conditions to Avoid - Steel at temperatures above the melting point may liberate fumes containing oxides of iron and alloying elements. Avoid generation of airborne fume.

Hazardous Polymerization - Will not occur.

Incompatibility (Materials to Avoid) - Reacts with strong acids to form hydrogen gas. Do not store near strong oxidizers.

Hazardous Decomposition Products - Metallic fumes may be produced during welding, burning, grinding, and possibly machining or any situation with the potential for thermal decomposition. Refer to ANSI Z49.1

11. TOXICOLOGICAL INFORMATION

The primary component of this product is iron. Long-term exposure to iron dusts or fumes can result in a condition called siderosis which is considered to be a benign pneumoconiosis. Symptoms may include chronic bronchitis, emphysema, and shortness of breath upon exertion. Penetration of iron particles in the skin or eye may cause an exogenous or ocular siderosis which may be characterized by a red-brown pigmentation of the affected area. Ingestion overexposures to iron may affect the gastrointestinal, nervous, and hematopoietic system and the liver. Iron and steel fuming, but not iron or iron oxide, has been listed as carcinogenic (Group 1) by IARC.

When this product is welded, fumes are generated. Welding fumes may be different in composition from the original welding product, with the chief component being ordinary oxides of the metal being welded. Chronic health effects (including cancer) have been associated with the fumes and dusts of individual component metals (see above), and welding fumes as a general category have been listed by IARC as a carcinogen (Group 2B). There is also limited evidence that welding fumes may cause adverse reproductive and fetal effects. Evidence is stronger where welding materials contain known reproductive toxins, e.g., lead which may be present in the coating material of this product.

Breathing fumes or dusts of this product may result in metal fume fever, which is an illness produced by inhaling metal oxides. These oxides are produced by heating various metals including cadmium, zinc, magnesium, copper, antimony, nickel, cobalt, manganese, tin, lead, beryllium, silver, chromium, aluminum, selenium, iron, and arsenic. The most common agents involved are zinc and copper.

Carbon and Alloy Steels

This product may contain small amounts of manganese. Prolonged exposure to manganese dusts or fumes is associated with "manganism", a Parkinson-like syndrome characterized by a variety of neurological symptoms including muscle spasms, gait disturbances, tremors, and psychoses.

This product may contain small amounts of cadmium. Primary target organs for cadmium overexposure are the lung and the kidney. Because of its cumulative nature, chronic cadmium poisoning can cause serious disease which takes many years to develop and may continue to progress despite cessation of exposure. Progression of the disease may not reflect current exposure conditions. It is also capable of causing a painful osteomalacia called "Itai-Itai" in postmenopausal women, and has caused developmental effects and/or reproductive effects in male and female animals. Cadmium is a listed carcinogen by NTP, OSHA, and IARC (Group 1).

This product may contain small amounts of chromium. Prolonged and repeated overexposure to chromium dusts or fumes may cause skin ulcers, nasal irritation and ulceration, kidney damage and cancer of the respiratory system. Chromium is skin sensitizer. Cancer is generally attributed to the hexavalent (+6) form of chromium which is listed as a carcinogen by NTP and IARC (Group 1).

This product may contain small amounts of nickel. Prolonged and repeated contact with nickel may cause sensitization dermatitis. Inhalation of nickel compounds has caused lung damage as well as sinus, nasal and lung cancer in laboratory animals. Nickel is a listed carcinogen by NTP and IARC (Group 1).

This product may contain small amounts of vanadium. Adverse effects from dermal, inhalation or parenteral exposure to various vanadium compounds have been reported. The major target for vanadium pentoxide toxicity is the respiratory tract. Fumes or dust can cause severe eye and respiratory irritation, and systemic effects. Chronic bronchitis, green tongue, conjunctivitis, pharyngitis, rhinitis, rales, chronic productive cough, and tightness of the chest have been reported following overexposure. Allergic reactions resulting from skin and inhalation exposures have also been reported. A statistical association between vanadium air levels and lung cancer has been suggested, but vanadium currently is not regarded as a human carcinogen.

This product may contain small amounts of lead. Lead can accumulate in the body. Consequently, exposure to fumes or dust may produce signs of polyneuritis, diminished vision and peripheral neuropathy, such as tingling and loss of feeling in fingers, arms and legs. Lead is a known reproductive and developmental toxin. It is also associated with central nervous system disorders, anemia, kidney dysfunction and neurobehavioral abnormalities. The brain is a major target organ for lead exposure. Elemental lead is listed as an IARC 2B carcinogen.

The product may contain small amounts of copper. Copper dust and fumes can irritate the eyes, nose and throat causing coughing, wheezing, nosebleeds, ulcers and metal fume fever. Other effects from repeated inhalation of copper fumes include a metallic or sweet taste, and discoloration of skin, teeth or hair. Copper also may cause an allergic skin reaction. Overexposure to copper can affect the liver.

12. ECOLOGICAL INFORMATION

Aquatic Ecotoxicological Data - No specific information available on this product.

Environmental Fate Data - No specific information available on this product.

13. DISPOSAL CONSIDERATIONS

Recovery and reuse, rather than disposal, should be the ultimate goal of handling efforts. Dispose in accordance with federal, state, and local health and environmental regulations. Prevent materials from entering drains, sewers, or waterways.

Carbon and Alloy Steels

14. TRANSPORT INFORMATION

DOT Proper Shipping Name - Not regulated
DOT Hazard Classification - Not regulated
UN/NA Number - Not applicable
DOT Packing Group - Not applicable
Labeling Requirements - Not applicable
Placards - Not applicable
DOT Hazardous Substance - Not applicable
DOT Marine Pollutant - Not applicable

15. REGULATORY INFORMATION

This product is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200. However, dusts and fumes from this product may be combustible or hazardous and require protection to comply with applicable Federal, state and local laws and regulations.

California Proposition 65:

⚠ WARNING: This product can expose you to chemicals including antimony [oxide], arsenic, beryllium, chromium [hexavalent], cobalt, cadmium, lead, and nickel which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Massachusetts Substance List: Aluminum, Antimony, Arsenic, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Hydrochloric acid, Lead, Magnesium, Manganese, Molybdenum, Nickel, Nitrogen, Phosphorus, Selenium, Silicon, Sulfur, Tin, Titanium, Tungsten, Vanadium, Zinc

Pennsylvania Hazardous Substance List: Aluminum, Antimony, Arsenic, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Hydrochloric acid, Lead, Magnesium, Manganese, Molybdenum, Nickel, Nitrogen, Phosphorus, Selenium, Silicon, Sulfur, Tin, Titanium, Tungsten, Vanadium, Zinc

New Jersey Hazardous Substance List: Aluminum, Antimony, Arsenic, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Hydrochloric acid, Lead, Magnesium, Manganese, Molybdenum, Nickel, Nitrogen, Phosphorus, Selenium, Silicon, Sulfur, Tin, Titanium, Tungsten, Vanadium, Zinc

Toxic Substances Control Act (TSCA)

Components of this product are listed on the TSCA Inventory.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

Steel is not reportable, however, it contains hazardous substances that may be reportable if released in pieces with diameters less than or equal to 0.004 inches.

<u>Chemical Name</u>	<u>Reportable Quantity (in lb)</u>
Chromium	5,000
Copper	5,000
Nickel	100

Superfund Amendments and Reauthorization Act of 1986 (SARA), Title III

SECTION 311/312 HAZARD CATEGORIES: Immediate Health Effect, Delayed Health Effect

This product contains the following EPCRA Section 313 chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right – To – Know Act of 1986 (40 CFR 372):

SECTION 313 REPORTABLE INGREDIENTS:

Carbon and Alloy Steels

<u>Chemical Name</u>	<u>CAS Number</u>	<u>Concentration (% by weight)</u>	<u>Reportable</u>
Chromium	7440-47-3	0.01-5.5	Yes – Greater than 1%
Copper	7440-50-8	<1.75	Yes – Greater than 1%
Manganese	7439-96-5	0-2	Yes – Greater than 1%
Nickel	7440-02-0	0.01-3.65	Yes – Greater than 0.1%

Concentrations based on analytical data and process knowledge of typical products distributed by the facility.

16. OTHER INFORMATION

This SDS covers Nucor product as delivered from the Nucor facility, but does not include chemicals that may be applied by subsequent handlers and/or distributors of this product. This could include a variety of materials including oils, paints, galvanization, etc. that are not included in this SDS. Additionally, specialty orders may require application of coating material not listed in this SDS. SDSs for any Nucor-applied specialty coating will be provided separately. During welding, precautions should be taken for airborne contaminants that may originate from components of the welding rod. Arc or spark generated when welding or burning could be a source of ignition for combustible and/or flammable materials. The information in this SDS was obtained from sources which we believe are reliable; however, the information is provided without any representation or warranty, expressed or implied, regarding the accuracy or correctness. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with the handling, storage, use, or disposal of this product.

NS Plus[®] and NS CopperFree[™] CARBON WELDING WIRES

TYPICAL WIRE CHEMISTRY PERCENTAGES (as required per AWS)

		C	Mn	Si	P	S	Cu	Ni	Cr	Mo	V
101	NS Plus [®] -101 Typ.	0.09	1.17	0.59	0.009	0.009	0.16	0.04	0.04	0.012	0.005
	NS 101 CopperFree [™] Typ.	0.09	1.17	0.60	0.012	0.014	0.07	0.06	0.07	0.008	0.005
	AWS A5.18/A5.18M	0.06/0.15	0.90/1.40	0.45/0.70	0.025 (max.)	0.035 (max.)	0.50 (max.)	0.15 (max.)	0.15 (max.)	0.15 (max.)	0.03 (max.)
	AWS A5.17/A5.17M	0.06/0.16	0.90/1.40	0.35/0.75	0.030 (max.)	0.030 (max.)	0.35 (max.)	-	-	-	-
102	NS Plus [®] -102 Typ.	0.09	1.76	0.66	0.009	0.01	0.14	0.07		0.46	
	NS 102 CopperFree [™] Typ.	0.1	1.81	0.63	0.016	0.016	0.06	0.06		0.47	
	AWS A5.28/A5.28M	0.07/0.12	1.60/2.10	0.50/0.80	0.025 (max.)	0.025 (max.)	0.50 (max.)	0.15 (max.)		0.40/0.60	
	AWS A5.23/A5.23M	0.05/0.15	1.60/2.10	0.50/0.80	0.025 (max.)	0.025 (max.)	0.35 (max.)			0.40/0.60	
115	NS Plus [®] -115 Typ.	0.08	1.49	0.9	0.011	0.01	0.14	0.05	0.04	0.008	0.006
	NS 115 CopperFree [™] Typ.	0.09	1.52	0.91	0.012	0.011	0.07	0.06	0.06	0.01	0.01
	AWS A5.18/A5.18M	0.06/0.15	1.40/1.85	0.80/1.15	0.025 (max.)	0.035 (max.)	0.50 (max.)	0.15 (max.)	0.15 (max.)	0.15 (max.)	0.03 (max.)
	AWS A5.17/A5.17M	0.06/0.15	1.40/1.85	0.80/1.15	0.030 (max.)	0.030 (max.)	0.35 (max.)				

BÖHLER HL 51 L-MC

Laser-sealed

Ultra low-hydrogen metal-cored wire for welding structural steel up to of 460 MPa YS



Features	User benefits
» Ultra low-hydrogen weld metal	» Optimal protection against hydrogen cracking
» Wide parameter envelop	» Easy arc setting » More spray arc welding
» Dependable starting	» No starting defects
» Stable arc / no spatter	» No weld cleaning
» Excellent feedability	» Stable arc » Less downtime for maintenance
» Low contact tip wear	» Less downtime for maintenance
» Straight welds with smooth tie-in	» High fatigue resistance
» Low amount of silicate islands	» No weld cleaning
» No undercut at high travel speed	» Productive welding



Exceptional weldability, productivity and low-hydrogen performance


BÖHLER HL 51 L-MC is a seamless, laser-sealed metal-cored wire from the Diamond Spark range. It has been developed for the high duty cycle, mechanized and robotic welding of unalloyed and fine-grained constructional steel up to 460 MPa yield and impact requirements down to -40°C. The ultra-low weld metal hydrogen content – at the level of solid wires – combined with absolute resistance against moisture reabsorption during storage and use – gives the best possible protection against hydrogen assisted / induced cracking.

BÖHLER HL 51 L-MC is especially designed for semi-automatic and fully automatic welding of constructional steels. It has an extra high weld recovery of 95-97% and allows easy arc setting and spray arc welding over a wider envelop of welding parameters than solid wire. The high rigidity, controlled cast & helix and perfect surface finish of the wire result in excellent feedability, low contact tip wear, an extremely stable, spatter-free arc and perfectly positioned, straight welds with smooth tie-in. High resistance to weld porosity.

Minimum oxide residues permit the welding of multi passes without the need for inter-run cleaning. Ideal for horizontal and flat fillet welds. Typical applications are long, straight fillet welds in bridges, building and vehicles.

With the innovative laser-sealed cored wires, fabricators have the ultimate precision tool for the most demanding of welding applications at their disposal. These advanced products yield ultra-low hydrogen weld metal – at the level of solid wires – and perform at high levels of welding productivity, while the unique fabrication technology and product concept enable superb characteristics for high duty cycle welding in mechanized and robotic applications.

BÖHLER HL 51 L-MC

Classifications		Operating data		
EN ISO 17632-A	AWS A5.36	Allows welding with standard power sources		
T46 4 M M21 1 H5	E71T15-M21A4-CS2-H4 E71T15-M20A4-CS2-H4	Welding positions	Polarity	Shielding gas
			DC+	EN ISO 14175: M20, M21

Typical chemical composition, all weld metal, wt. %			
Shielding gas	C	Si	Mn
M21	0.07	0.7	1.5

Mechanical properties, all weld metal (single values typical)							
Shielding gas	Condition	Yield strength $R_{p0.2\%}$ MPa	Tensile strength R_m MPa	Elongation A_5 %	CVN Impact toughness ISO-V KV J		
					+20 °C	-40 °C	-46 °C
Ar + 5 - 25 % CO ₂	as welded	490 (≥ 460)	600 (550 - 740)	27 (≥ 20)	170	120 (≥ 47)	70 (≥ 27)
PWHT	620 °C / 2 h	450	550	29	180	100	

Steels to be welded	
EN	ASTM
Steels up to a yield strength of 460 MPa	Steels up to a yield strength of 67 ksi

Approvals
TÜV, DB, ABS, BV, CWB, DNV-GL, LR, CE

Hydrogen performance	
» BÖHLER HL51 L-MC shows a solid wire like low-hydrogen performance 2 - 3 ml / 100 g.	» The wire stays factory dry beyond 75 hours of unprotected exposure.

Overview diameters and packaging			
BS 300 16 kg		EcoDrum 250 kg	
	Wire basket Precision layer wound		Octagonal drum Weight: 250 kg Flux cored wire
	Dimensions: ø external 300 mm ø internal 180 mm Width 100 mm		Dimensions: Height 780 mm ø 510 mm
	Available diameters: 1.0 mm 1.4 mm 1.2 mm 1.6 mm		Available diameters: 1.0 mm 1.4 mm 1.2 mm 1.6 mm

Accessories for safe and efficient internal transport and installation of drums			
A range of accessories for efficient internal transport and installation of the drums is available, including a choice of four different "click and go" liner types to connect the drums with the wire feed unit.			

ULTRACORE® 712A80-H PLUS

Mild Steel, All Positions ▪ AWS E71T-12M-JH4, E71T1-M21A6-CS2-H4, E81T1-GM

KEY FEATURES

- Innovative design capable of superior toughness at -50°F in both the as-welded and stress-relieved conditions
- Designed for welding with 75-80% Argon/Balance CO₂ shielding gas
- H4 diffusible hydrogen levels
- Q2 Lot® - Certificate showing actual deposit chemistry and mechanical properties per lot available online
- ProTech® foil bag packaging

CONFORMANCES

AWS A5.20/A5.20M:	E71T-12M-JH4
AWS A5.36/A5.36M:	E71T1-M21A6-CS2-H4, E71T1-M21P5-CS2-H4
AWS A5.29/A5.29M:	E81T1-GM
ASME SFA-5.20/SFA-5.20M:	E71T-12M-JH4
ABS:	4YSA H5
Lloyds Register:	4YS H5
DNV Grade:	IV YMS H5
CWB/CSA W48-06:	E491T-12MJ H4

WELDING POSITIONS

All

SHIELDING GAS

75-80% Argon / Balance CO₂
Flow Rate: 40-50 CFH

TYPICAL APPLICATIONS

- Offshore Platforms & Pipe Systems
- Oil & Gas Pipelines
- Petrochemical Pipelines
- Pressure Vessels
- Bridge Fabrication

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15kg) Plastic Spool
0.045 (1.1)	ED034845
0.052 (1.3)	ED034846
1/16 (1.6)	ED034847

MECHANICAL PROPERTIES⁽¹⁾

	Yield Strength ⁽²⁾ MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Charpy V-Notch J (ft·lbf)		
				-40°C (40°F)	-45°C (-50°F)	@ -51°C (-60°F)
Requirements						
AWS A5.20: E71T-12M-JH4 As-Welded with 75-80% Ar/balance CO ₂	400 (58) min	480-620 (70-90)	22 min	27 (20) min	-	-
AWS A5.36: E71T1-M21A6-CS2-H4 As-Welded with 75-80% Ar/balance CO ₂	400 (58) min	480-655 (70-95)	22 min	-	-	27 (20) min
AWS A5.36: E71T1-M21P5-CS2-H4 Stress Relieved with 75-80% Ar/ balance CO ₂ for 1 hr @ 621°C (1150°F)	400 (58) min	480-655 (70-95)	22 min	-	27 (20) min	-
AWS A5.29: E81T1-GM As-Welded with 75-80% Ar/balance CO ₂	470 (68) min	550-690 (80-100)	19 min	-	-	-
Typical Results⁽³⁾						
As-Welded with 75-80% Ar/balance CO ₂	530-545 (77-79)	590-605 (86-88)	26-28	95-150 (69-112)	65-145 (49-106)	75-140 (55-102)
Stress Relieved with 75-80% Ar/balance CO ₂ for 1 hr @ 621°C (1150°F)	445-470 (65-68)	545-565 (79-82)	31-33	85-150 (62-109)	60-125 (43-91)	-

⁽¹⁾ Typical all weld metal. ⁽²⁾ Measure with 0.2% offset. ⁽³⁾ See test results disclaimer

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%S
Requirements AWS A5.20: E71T-12M-JH4	0.12 max	1.60 max	0.90 max	0.03 max
AWS A5.36: E71T1-M21A6-CS2-H4, E71T1-M21P5-CS2-H4 AWS A5.29: E81T1-GM				0.030 max
Typical Results⁽³⁾ with 75-80% Ar / Balance CO ₂				0.008
	%P	%Ni	Diffusible Hydrogen (mL/100g weld deposit)	
Requirements AWS A5.20: E71T-12M-JH4	0.03 max	0.50 max	4.0 max	
AWS A5.36: E71T1-M21A6-CS2-H4, E71T1-M21P5-CS2-H4 AWS A5.29: E81T1-GM	0.030 max		4 max	
Typical Results⁽³⁾ with 75-80% Ar / Balance CO ₂	0.015		2-4	

TYPICAL OPERATING PROCEDURES

Diameter, Polarity Shielding Gas	CTWD ⁽⁴⁾ mm (in)	Wire Feed Speed m/min (in/min)	Voltage (Volts)	Approx. Current (amps)	Melt-Off Rate kg/hr (lb/hr)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 75-80% Ar/balance CO ₂							
Optimal Settings	22 (7/8)	11.2 (440)	28	220	1.8-5.2 (4.0-11.4)	1.6-4.7 (3.5-10.4)	84-91
Min - Max	19-25 (3/4-1)	4.4-12.7 (175-500)	21-33	140-275			
0.052 in (1.3 mm), DC+ 75-80% Ar/balance CO ₂							
Optimal Settings	25 (1)	8.6 (340)	29	235	2.0-5.4 (4.5-12.0)	1.8-4.7 (3.9-10.4)	84-87
Min - Max	19-25 (3/4-1)	3.8-10.2 (150-400)	21-33	150-310			
1/16 in (1.6 mm), DC+ 75-80% Ar/balance CO ₂							
Optimal Settings	25 (1)	7.6 (300)	27	295	2.9-6.7 (6.3-14.7)	2.5-5.8 (5.5-12.8)	83-87
Min - Max	19-25 (3/4-1)	3.8-8.9 (150-350)	22-33	200-365			

⁽¹⁾ Typical all weld metal. ⁽³⁾ See test results disclaimer ⁽⁴⁾ To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

Material Safety Data Sheets (MSDS) and Certificates of Conformance are available on our website at www.lincolnelectric.com

TEST RESULTS

Test results for mechanical properties, deposit or electrode composition and diffusible hydrogen levels were obtained from a weld produced and tested according to prescribed standards, and should not be assumed to be the expected results in a particular application or weldment. Actual results will vary depending on many factors, including, but not limited to, weld procedure, plate chemistry and temperature, weldment design and fabrication methods. Users are cautioned to confirm by qualification testing, or other appropriate means, the suitability of any welding consumable and procedure before use in the intended application.

CUSTOMER ASSISTANCE POLICY

The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectric.com for any updated information.

OK Flux 10.72

Agglomerated aluminate-basic flux for Submerged Arc Welding especially for applications with toughness requirements at low temperature. Excellent slag removal also in narrow V-joints. For wind tower productions, pressure vessels, general constructions etc. Extremely high current carrying capacity. For single or multi wire procedures. Suitable for DC and AC welding. Single layer and multi layer welding of unlimited plate thickness.

Classifications	EN ISO 14174 : S A AB 1 57 AC H5
Approvals	CE EN 13479 DB 51.039.12

Approvals are based on factory location. Please contact ESAB for more information.

Diffusible Hydrogen	max 5 ml H/100g weld metal (Redried flux)
Slag Type	Aluminate-basic
Alloy Transfer	No Silicon and moderately Manganese alloying
Density	nom 1.2 kg/dm ³
Basicity Index	nom 1.9
Grain Size	0.315-2.0 mm (9x48 mesh)

Flux Consumption

Volts	kg Flux / kg Wire DC+	kg Flux / kg Wire AC
26 V	0.7 kg	0.6 kg
30 V	1.0 kg	0.9 kg
34 V	1.3 kg	1.2 kg
38 V	1.6 kg	1.4 kg

Dimensions	Amps	Travel Speed
Ø 4.0 mm	580 A	55 cm/min

Classifications

Wire	AWS/EN	AWS - As Welded	AWS - PWHT
OK Autrod 12.20	A5.17:EM12/ 14171-A:S2	A5.17: F7A8-EM12	A5.17: F6P8-EM12
OK Autrod 12.22	A5.17:EM12K/ 14171-A:S2Si	A5.17: F7A8-EM12K	A5.17: F6P8-EM12K
OK Autrod 12.24	A5.23:EA2/ 14171-A:S2Mo; 24598-A:S S Mo	A5.23: F8A5-EA2-A3	A5.23: F8P5-EA2-A3
OK Autrod 13.24	A5.23:ENi6/ 14171-A:S3Ni1Mo0,2		
OK Autrod 13.27	A5.23:ENi2/ 14171-A:S2Ni2	A5.23: F8A8-ENi2-Ni2	A5.23: F7P8-ENi2-Ni2
OK Autrod 13.62	A5.23:EG/ 14171-A:SZ3TiB		
OK Autrod 13.64	A5.23:EA2TiB/ 14171-A:S2MoTiB	A5.23: F8TA8-EA2TiB	

Approvals

Combined with Wire	DNV	GL	DB	CE	CWB	VdTUV
OK Autrod 12.20	-	-	•	•	-	•
OK Autrod 12.22	•	•	•	•	•	•
OK Autrod 12.24	-	-	•	•	-	•
OK Autrod 13.27	-	-	-	•	-	-

Typical Mechanical Properties

Combined with Wire	Condition	Yield Strength	Tensile Strength	Elongation	Charpy V-Notch
Spoolarc 75	As Welded	550 MPa (76 ksi)	655 MPa (89 ksi)	28 %	149 J @ -40°C (110 ft-lb @ -40°F)
Spoolarc 81	As Welded	425 MPa (62 ksi)	515 MPa (75 ksi)	30 %	50 J @ -62°C (35 ft-lb @ -80°F)
Spoolarc 81	Stress Relieved 1 hr @ 621C (1150F)	405 MPa (59 ksi)	510 MPa (74 ksi)	32 %	50 J @ -62°C (35 ft-lb @ -80°F)



OK Flux 10.72

Typical Mechanical Properties

Combined with Wire	Condition	Yield Strength	Tensile Strength	Elongation	Charpy V-Notch
Spoolarc 81	Stress Relieved 8 hrs @ 621C (1150F)	400 MPa (58 ksi)	510 MPa (74 ksi)	34 %	163 J @ -46°C (120 ft-lb @ -50°F)
Spoolarc ENi4	As Welded	585 MPa (85 ksi)	680 MPa (96 ksi)	26 %	156 J @ -40°C (115 ft-lb @ -40°F)

Typical Weld Metal Analysis %

C	Mn	Si	S	P	Ni	Mo	Cu
Spoolarc 75							
0.06	1.80	0.50	0.009	0.013	0.90	-	-
Spoolarc 81							
0.06	1.60	0.30	0.0069	0.013	-	-	-
Spoolarc ENi4							
0.07	1.60	0.20	0.006	0.012	1.80	0.15	0.15



Spoolarc 81

Medium manganese and silicon wire - nominal rust and mill scale tolerance. Developed for general purpose welding on low and medium carbon steels. Applications include structural steels, medium strength pressure vessels, ship, barge and offshore oil rig fabrication. Use with OK Flux 429, 231, 350, 10.71, 10.72, and 10.62.

Classifications	AWS A5.17 : EM12K ASME SFA 5.17
Approvals	ABS AWS A5.17: EM12K CWB CSA W48
Industry	Offshore Oil Pressure Vessels Ship and Offshore Yards Structural Steel Fabrication Windtower

Approvals are based on factory location. Please contact ESAB for more information.

Typical Wire Composition %

C	Mn	Si	S	P
0.09	0.95	0.26	0.01	0.01



W Abrasives[®]

MATERIAL SAFETY DATA SHEET

CAST STEEL ABRASIVES

Date of Preparation: October 5, 2009

Section 1. PRODUCT IDENTIFICATION.

Product Name:	Steel Shot, Steel Grit, Steel Shot/Grit blend.	Manufacturer:	Wheelabrator Abrasives, Inc. 1 Abrasive Avenue Bedford, Virginia 24523 USA www.wabrasives.com
Chemical Name:	Steel	Emergency Phone:	(540) 586-0856
Chemical Family:	Metals		
Formula:	Not Applicable (N/A)		

Section 2. HAZARDOUS INGREDIENTS.

Round or angular steel pellets used primarily for impact treatment of metallic surfaces. There are no threshold limit values (TLV) or permissible exposure limits (PEL) for cast steel abrasives.

CHEMICAL NAME	CAS NUMBER	% WEIGHT	ACGIH LEVEL (mg/m3)	OSHA PEL (mg/m3)
Iron – Fe Oxide & Fume, as Fe	7439-89-6	>95	5	10
Manganese – Mn Inorganic compounds, as Mn Fume, as Mn	7439-96-5	<1.2	0.2	5 (ceiling) 5 (ceiling)
Silicon – Si Total Dust Respirable Fraction	7440-21-3	<1.2	10	15 5
Carbon – C	1333-86-4	<1.2	3.5	3.5
Chromium – Cr Metal Cr II compounds, as Cr Cr III compounds, as Cr Cr VI compounds, water soluble Cr VI compounds, insoluble	7440-47-3	<0.8	0.5 0.5 0.05 0.01	0.5 0.5 0.5
Nickel – Ni Metal & other compounds, as Ni Elemental Soluble inorganic compounds Insoluble inorganic compounds	7440-02-0	<0.2	1.5 0.1 0.2	1

Note: This product is manufactured from recycled steel scrap and may contain hazardous materials not listed above. The following is a list of typical chemicals that may be found in recycled steel scrap (this list is not all inclusive): aluminum, antimony, arsenic, bismuth, cadmium, chromium, cobalt, copper, lead, magnesium, molybdenum, nickel, phosphorus, potassium, selenium, sodium, sulfur, tin, vanadium, zinc.

Section 3. PHYSICAL DATA.

Melting Point:	1371-1482°C
Vapor Pressure:	Not applicable
Vapor density:	Not applicable
Solubility in water:	Negligible
Specific gravity:	> 7 g/cc
% Volatile:	N/A
Evaporation rate:	N/A
Appearance and odor:	Metallic gray to blue odorless spherical and/or angular pellets.

Section 4. FIRE AND EXPLOSION HAZARD DATA.

Flash Point:	Not applicable
Flammable limits:	Not applicable
Autoignition Temperature (of solid iron exposed to oxygen):	930°C
Extinguishing media:	Select media appropriate for the surrounding area, including dry chemical, soda ash etc. Note: Do not use water, CO, or form of Iron Oxide fume/dust materials.
Unusual fire and explosion hazards:	Dusts generated from use may be explosive.
Special fire fighting equipment:	Dry chemicals, dry sand, soda ash or lime.

Section 5. REACTIVITY DATA.

Stability:	Stable
Incompatibility:	Strong Acids
Hazardous Polymerization:	Not applicable
Conditions to avoid:	None

Section 6. HEALTH HAZARD DATA.

There is no applicable statutory or recommended occupational exposure limits for cast steel abrasives. However, operations that elevate the temperature of the product or the dust to above its melting point, generate metal fumes and result in the breaking down of the product into dusts may present hazards. These operations should be performed in well-ventilated areas. The major exposure hazard is inhalation.

Inert or nuisance dust:	OSHA PEL:
Respirable fraction:	5 mg/m ³
Total dust:	15 mg/m ³

Carcinogenicity:

Chromium and Nickel are confirmed human carcinogens according to the ACGIH.

Carbon and Nickel are potential occupational carcinogens according to the NIOSH Pocket Guide to Chemical Hazards.

The NIOSH Pocket Guide to Chemical Hazards list the following symptoms for chronic or prolonged inhalation of fumes or dust:

Iron oxide: Benign pneumoconiosis with X-ray shadows indistinguishable from fibrotic pneumoconiosis (siderosis).

Manganese: Parkinson's; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; lower back pain; vomiting; malaise (vague feeling of discomfort); fatigue; kidney damage.

Silicon: irritation eyes, skin, upper respiratory system; cough.

Carbon: cough, irritation eyes.

Chromium: irritation eyes, skin; lung fibrosis (histologic); sensitization dermatitis.

Nickel: sensitization dermatitis, allergic asthma, pneumonitis.

Copper: irritation eyes, upper respiratory system, nose, pharynx; nasal septum perforation; dermatitis; metal fume fever: chills, muscle ache, nausea, fever, dry throat, cough, weakness, lassitude (weakness, exhaustion); metallic or sweet taste; discoloration skin, hair.

Lead: weakness, lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypotension.

Section 6a. EMERGENCY AND FIRST AID PROCEDURES.

- If inhaled, move to fresh air, and if symptoms persist, consult a qualified medical person.
- If shot, grit or dust particles get in the eyes, flush eyes with running water for at least 15 minutes and have any remaining particles removed from eyes by a qualified medical person.
- Wash with soap and water after contact with dust.

Section 7. SPILL OR LEAK PROCEDURES.

Shot and/or grit spilled or leaked onto floors can create hazardous walking conditions. In case material is released or spilled, sweep up and collect for reclamation or disposal.

Waste disposal method: the material may be reused or disposed of in sanitary landfills in compliance with local, federal and state regulations. The dust generated by the use of the material may be classified as hazardous and therefore must be disposed of according to local, federal and state regulations.

Section 8. SPECIAL PROTECTION INFORMATION.

- Ventilation: adequate ventilation and exhaust of the dust and fumes generated during operations should be provided to reduce the exposure levels.
- Respiratory protection: NIOSH approved respirator is recommended.
- Eye protection: Approved safety eye protection (ANSI-Z87) with side shields should be worn.

Section 9. SPECIAL PRECAUTIONS.

Precautions to be taken in handling and storing: keep dry to reduce rusting.

Section 10. NOTIFICATION ABOUT TOXIC CHEMICALS.

This product contains the following chemicals subject to the requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Abstract Nb	Chemical Name	% By Weight
7440-47-43	Chromium	< 0.8%
7439-96-5	Manganese	< 1.2%
7440-02-0	Nickel	< 0.2%
1336-86-4	Carbon	< 1.2%

This notification must not be detached from this MSDS and must be included in all MSDS's that are copied and distributed for this product.

DISCLAIMER.

The information contained in this Material Safety Data Sheet was obtained from sources W Abrasives believes to be reliable. However, W Abrasives makes no guarantee, representation or warranty as to the correctness or accuracy of the information.

The information in this Material Safety Data Sheet is intended as a guide to be used in safety training and education. It is the responsibility of the user to provide a safe workplace, and to determine if precautions in addition to those described herein are required.

Compliance with all applicable federal, state and local laws and regulations is the responsibility of the user. The user assumes all risk and liability for any use. W Abrasives does not assume responsibility and disclaims liability for any losses, damages or expense associated with the use of these products.

1. Product and company identification

- a) Product Name : P963S
- b) Recommended use of the chemical and restrictions on use
 - Recommended use : Coated Abrasives. Used for sanding materials.
 - Restrictions on use : Use only for intended purpose, Sanding.
- c) Manufacturer/Supplier/Distributor Information
 - Manufacturer : SUN ABRASIVES CO.,LTD
 - Address : SONGKOG-DONG ANSAN-CITY, KYONGGI-DO, KOREA (425-110)
 - Emergency phone number : + 82-31-495-6076 / Fax number : + 82-31-494-6878
 - Issued date : 2014. 07. 30
 - Supersedes date : 2018. 05. 17

2. Hazards identification

- a) Hazard Risk Classification : N/A.
- b) Label elements including precautionary statements
 - Symbol : N/A.
 - Signal Word : N/A.
 - Hazard Risk Statement : N/A.
 - Precautionary Statement
 - Prevention : N/A.
 - Opposition : N/A.
 - Storage : N/A.
 - Abolition : Contaminated coated abrasives should be disposed according to Local Waste Control laws.
- c) Other Hazard Risks which are not included in the classification criteria
 - Coated abrasives are inert products which do not create any risk when handled or stored. When used on grinding machines they require specific measures to protect the operators. During the grinding operation 90% or more of the particulates of the dust come from the material being ground and, for wet grinding, from aerosols generated by grinding fluid. Specific attention must therefore be given to the nature of the part and of the fluid and the appropriate protection devices must be installed.
 - Eye contact : Signs / symptoms may include pain, redness, tearing and corneal abrasion..
 - Skin contact : Signs / symptoms may include abrasion, redness, pain and itching.

- Inhalation : Dust from grinding, sanding or machining may cause irritation of the respiratory system. Signs / symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.
- Ingestion : No health effects are expected, but not recommended to eat.

3. Composition/Information on ingredients

Component	Material	CAS No.	Percent (%)
Backing	Polyester	N/A	20 ~ 50
Abrasives Grain	Aluminum Oxide	1344-28-1	20 ~ 45
Bonding Resin	Cured Phenolic Resin	9003-35-4	5 ~ 15
Filler	Calcium Carbonate	16389-88-1	2 ~ 7
	Cryolite	13775-53-6	2 ~ 12
	Potassium Floroborate	14075-53-7	0 ~ 12

4. First aid measures

- a) Eye contact : Not possible, due to the form of the product.
- b) Skin contact : No harmful effects known.
- c) Inhalation : Not possible, due to the form of the product.
- d) Ingestion : Not likely, due to the form of the product; if necessary contact physician.
- e) Indication of immediate medical attention and notes for physician : Not available.

5. Fire-Fighting measures

- a) Suitable(and unsuitable) extinguishing media
 - Use normal fire extinguishing agent or sprinkle with little amount of water.
- b) Specific hazards arising from the chemical
 - N/A.
- c) Special protective equipment and precautions for fire-fighters
 - Do not inhale the substance or the product of combustion.

6. Accidental release measures

- a) Personal precautions, protective equipment and emergency procedures : N/A.
- b) Environmental precautions and protective procedures : N/A.
- c) Methods and materials for containment and cleaning up : N/A.

7. Handling and storage

- a) Precautions for safe handling : N/A.
- b) Conditions for safe storage(including any incompatibilities)

- Keep the materials out of direct sunlight.
- Do not place the materials on ground and concrete floor.
- Avoid humid place and heating element such as heater and radiator.
- Keep it in condition of Temperature, 15°C~27°C and Humidity, 40%~50%.

8. Exposure controls & personal protection

- a) Control parameters : N/A.
- b) Appropriate Engineering Controls : Ventilator
 - Local Ventilation System : Use general dilution ventilation and / or local exhaust ventilation to control airborne exposures to below Occupational Exposure Limits and / or control dust, fume, or airborne particles.
 - Electric Precipitator : Use when there are more atmospheric pollutants than the allowable limit
- c) Personal protective equipment
 - Respiratory protection : Use respiratory protective equipment.
 - Eye protection : Wear protective goggles or face shield.
 - Hand protection : Wear protective gloves.
 - Hearing protection : Use hearing protection.
 - Note : Hazardous dust of the work piece material may be generated during grinding and/or sanding operation
National regulations for dust exposure limit values have to be taken into consideration.

9. Physical and chemical Properties

a) Appearance	Solid
b) Odor	N/A
c) Odor threshold	N/A
d) pH	N/A
e) Melting point/Freezing point	N/A
f) Initial boiling point and boiling range	N/A
g) Flashing point	N/A
h) Evaporation	N/A
i) Flammability(solid, gas)	N/A
j) Upper/lower flammability or explosive limits	N/A
k) Vapor pressure	N/A
l) Solubility	N/A
m) Vapor density	N/A
n) Relative density	N/A
o) Partition coefficient(n-octanol/water)	N/A
p) Auto-ignition temperature	N/A
q) Decomposition temperature	N/A
r) Viscosity	N/A
s) Formula mass	N/A

10. Stability and Reactivity

- a) Chemical stability and possibility of hazardous reactions : Stable.
- b) Conditions to avoid : None
- c) Incompatible material : Strong acids, Strong bases & Strong oxidizing agents may modify the mechanical characteristics of the products and create safety hazards when used on machines.
- d) Hazardous decomposition products : In use, dust and decomposing odors may be generated. In most cases, the material removed from the workplace will be significantly greater than the coated abrasives components.

11. Toxicological Information

- a) Information on the likely routes of exposure
 - Inhalation : N/A.
 - Ingestion : N/A.
 - Skin contact : N/A.
 - Eye contact : N/A.

- b) Health hazards information
 - Acute toxic : Not determined.
 - Skin corrosive/irritant : Not determined.
 - Serious eye damage/eye irritation : Not determined.
 - Respiratory sensitization : Not determined.
 - Skin sensitization : Not determined.
 - Carcinogenicity : Not determined.
 - Germ Cell Mutagenicity : Not determined.
 - Reproductive toxicity : Not determined.
 - Specific target organ toxicity(single exposure) : Not determined.
 - Specific target organ toxicity(repeated exposure) : Not determined.
 - Aspiration hazard : Not determined.

12. Ecological Information

- a) Aquatic and terrestrial ecotoxicity : Not determined.
- b) Persistence and degradability : Not determined.
- c) Bioaccumulative potential : Not determined.
- d) Mobility in soil : Not determined.
- e) Other adverse effects : Not determined.

13. Disposal Considerations

- a) Disposal method : Follow relevant local regulations.

b) Disposal precaution : Refer to #8. Exposure controls & personal protection.

14. Transport Information

- a) UN number : N/A.
- b) UN proper shipping name : N/A.
- c) Transport hazard class : N/A.
- d) Packing group : N/A.
- e) Marin pollution : N/A.
- f) Special precaution which a user to be aware of or needs to comply with in connection with transport or conveyance either within or outside their premises : N/A.

15. Regulatory information

- a) Industrial safety and Health Act : N/A.
- b) Toxic Chemical Control Act : N/A.
- c) Dangerous Material Safety Control Act : N/A.
- d) Wastes Management Act : N/A.
- e) Other requirements in domestic and other countries : N/A.

16. Other Information

- a) Information source and references
 - Occupational Safety & Health Administration(<http://www.osha.gov>)
 - Korea Occupational Safety & Health Agency (<http://www.kosha.or.kr>)
 - National Institute of Environmental Research(<http://ncis.nier.go.kr>)
- b) Issuing date : 2014.07.30
- c) Revision number and date : 2018.05.17(4th)
- d) Others

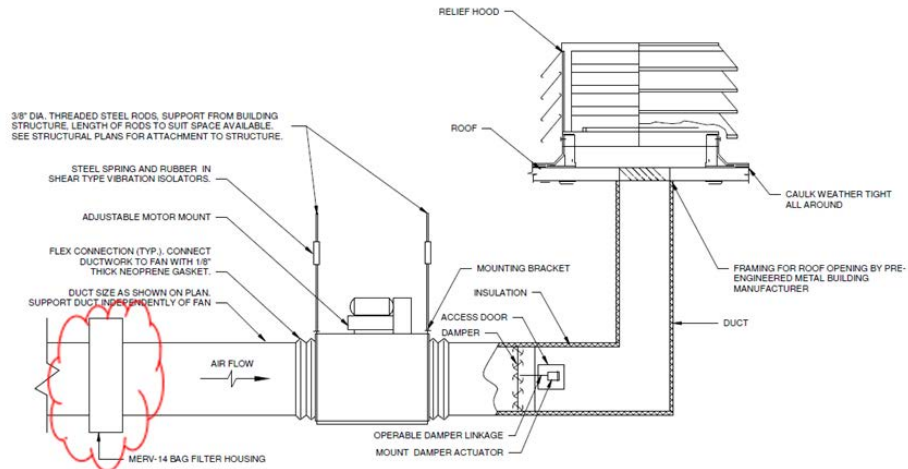
DISCLAIMER

The information and recommendations set forth herein are taken from sources believed to be accurate as of the date hereof; however, the Company makes no warranty with respect to the accuracy of the information or the suitability of the recommendations, and assumes no liability to any user thereof.

ATTACHMENT G

Equipment Technical Data Sheets

U-MFR_A, U-MFR_B (Building A and B Ventilation System Filtration and Exhaust Vent Configuration)



Technical data sheets for the selected Camfil Hi-Flo ES filters (24" X 24" X 30" MERV 14) for Buildings A and B ventilation systems are provided in subsequent pages.



Hi-Flo[®] ES

Energy Saving, Extended Surface Area, High Efficiency Air Filter

ENERGY COST INDEX



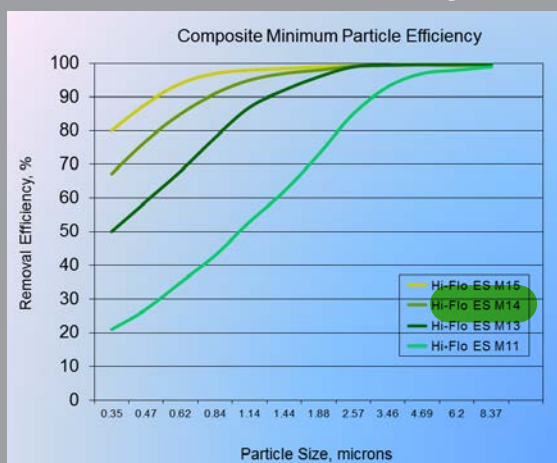
Air filters are the first line of defense to protect people and processes in buildings. The Camfil Hi-Flo ES can remove contaminants including fumes, smoke, bacteria, fungi, and virus-bearing droplet nuclei. The Hi-Flo ES is also the filter of choice for the removal of nuisance contaminants such as pollen, paper dust, and other atmospheric impurities.

Hi-Flo ES filters are available in four efficiencies: MERV 11, MERV 13, MERV 14 and MERV 15, when evaluated per ASHRAE Standard 52.2. The Hi-Flo ES also has a MERV-A value of 11A, 13A, 14A and 15A, respectively when tested per Appendix J of the same Standard, ensuring that the Hi-Flo ES will provide maintained particle capture efficiency throughout the life of the filter. It has respective efficiencies of ePM₁₀-70, ePM₁-65, ePM₁-70, and ePM₁-80 when evaluated per ISO filter testing standard 16890.

Air filters are the most significant component of an HVAC system that should be considered for total cost of ownership. The Hi-Flo ES:

- Has the lowest operating cost in terms of energy usage. Energy cost per filter can be as high as three times the cost of the filter itself. The Hi-Flo ES air filter's low maintained pressure drop can save over 30% of electric utility costs when compared to other filters.
- Requires less filter changes than other high efficiency filters. Savings include lower labor costs to change filters, decreased disposal costs, less space in landfills, and a lower carbon footprint.

Energy saving pocket filter with guaranteed lifetime efficiency.



The above chart shows relative efficiency values at various particle sizes when tested in accordance with ASHRAE Standard 52.2-2007. When tested in accordance with Appendix J of that Standard, the Hi-Flo ES maintains these efficiency values throughout the life of the filter.

The Camfil Hi-Flo ES 5-Star ECI rating ensures maintained efficiency and a longer service life than same class high efficiency filters. Its sustainable features meet the green demands of building owners at the lowest cost of ownership. Performance is also guaranteed!



¹ A 5-Star rating indicates that this filter performs in the top 20% of all products of similar construction in the HVAC industry. Factors of consideration include maintained efficiency, energy usage and resistance to air flow. Detailed evaluation information is available from your Camfil sales outlet or on the web at www.camfil.com.

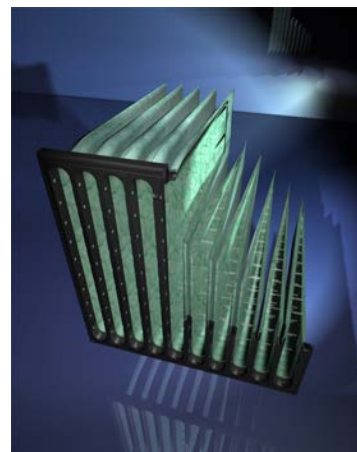


The Hi-Flo ES incorporates exclusive Camfil air laid microfiber glass media that ensures reliable efficiency throughout the life of the filter. Its fine fiber diameter and uniform loft results in a consistent sub-micron particle capture and a low resistance to airflow. This exclusive media is designed to maintain this low resistance to air flow, saving energy, while still holding efficiency throughout the filter life. The Hi-Flo ES will maintain its particle efficiency, regardless of dust loading and/or humidity.

A synthetic micro mesh media backing ensures media protection and support in turbulent or varying airflows.

Camfil is the only manufacturer to use tapered pocket stitching — pockets are stitched to prevent pocket contact throughout the entire depth of the filter, ensuring uniform airflow and allowing full use of the media area. This results in a longer filter life, lower HVAC energy costs, less filter changes, lower labor costs, lower disposal costs and an overall greener, and environmentally-friendly product.

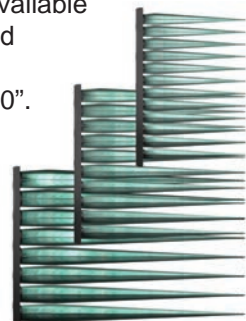
Pocket stitching is sealed to eliminate air bypass through stitching points. This unique sealant maintains a flexibility that is unaffected by turbulence or varying airflows.



The Hi-Flo ES pockets are also tapered from the air entering side of the filter to the air exiting side of the filter. This conical pocket configuration also prevents media contact against duct interiors.

Each filter is identified on the filter as to its MERV and MERV-A.

The Hi-Flo ES is available in 4 efficiencies and 3 pocket depths, 12", 15", 22" and 30".



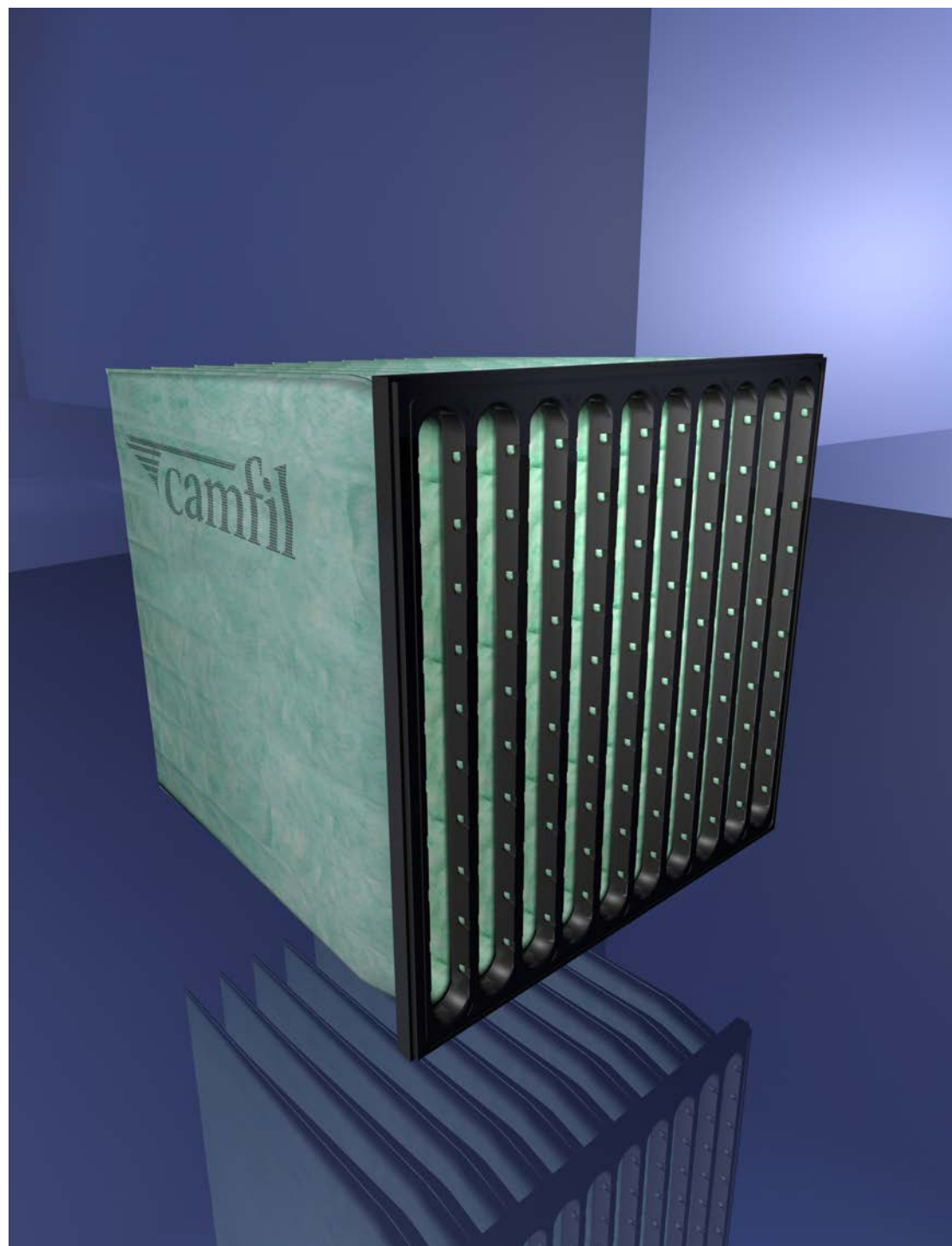
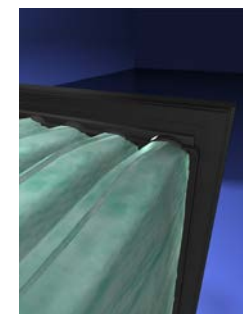
The Camfil Hi-Flo ES (Energy Saver) comes fully guaranteed ¹ to outperform all competitive products of its kind and to deliver the highest energy savings possible in the industry while maintaining its rated efficiency.

This guarantee eliminates associated risks with choosing or converting to the Hi-Flo ES and serves as proof that Camfil stands behind the product's design features and performance capabilities.



¹ Includes all models with 20" depth or longer.

Exclusive pocket guard protects pockets during installation — pockets are isolated and not subject to damage or tearing during installation.

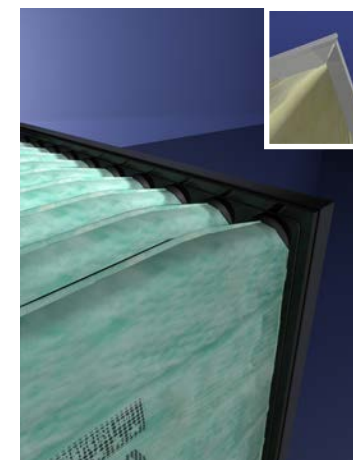


The reinforced ABS plastic header frame is assembled from matching halves to provide rigid and durable filter support. Frame racking is eliminated and the filter fits securely into the side-access housing or built-up bank holding frame. Its rigidity reduces the possibility of air bypass, even during turbulent airflow. One vertical header includes a gasket to prevent air bypass between filters when they are installed in a filter track.

Each air tunnel on the air entering side of each pocket is formed to promote uniform airflow through the entire length of the pocket.



Filter bypass between pockets is eliminated through a unique snap-to-seal pocket retainer feature that is an integral part of the 2-piece header design. The media pocket is securely attached to the header frame with anchor ports allowing for visual confirmation.

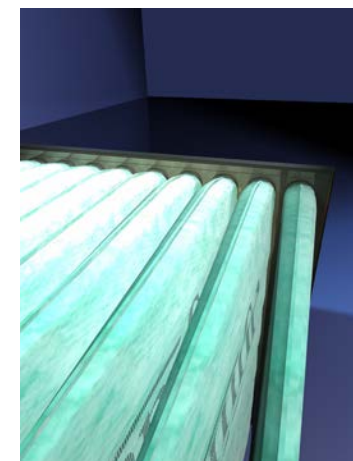


The snap-together design of the header results in frame junctions that are completely enclosed.

Sharp corners (see inset) are eliminated for the protection of service personnel. Pocket damage, or other damage related to sharp metal edges or projections is prevented.

The air exiting side of the air tunnels include a pocket flange to ensure pocket integrity throughout the life of the filter. Pockets are also protected during turbulent air flow.

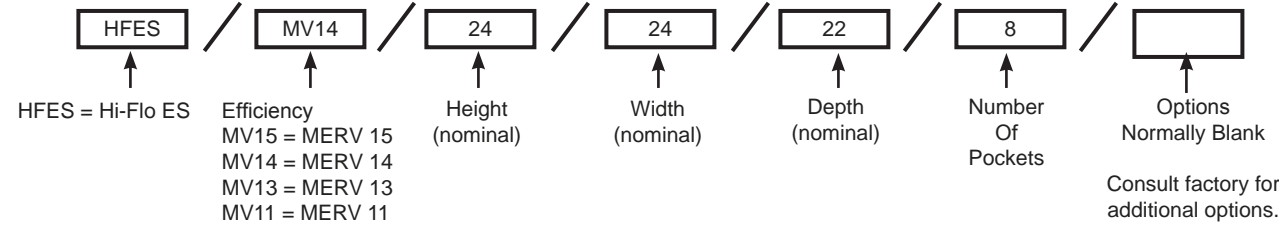
A downstream pocket-to-pocket partition provides additional pocket separation to ensure full flow through the entire media area.



PERFORMANCE DATA

Camfil Hi-Flo® ES Model Selection

HI-FLO® ES



Efficiency	Part Number	Model	Nominal size H X W	Pocket Depth	Actual dimensions (inches) H X W X D	Airflow capacity (cfm)	Initial resistance (inches, w.g.)	Media area (sq. ft.)
MERV 15 15-A ISO ePM ₁ - 80	405620A15	HFESMV15/24/24/15/10	24 X 24	15	23.31 x 23.31 x 15	2000	0.81"	48.72
	405620A22	HFESMV15/24/24/22/10	24 X 24	22	23.31 x 23.31 x 22	2000	0.62"	71.45
	405620A30	HFESMV15/24/24/30/10	24 X 24	30	23.31 x 23.31 x 30	2000	0.53"	97.03
	405620B15	HFESMV15/24/20/15/8	24 X 20	15	23.31 x 19.31 x 15	1600	0.81"	38.97
	405620B22	HFESMV15/24/20/22/8	24 X 20	22	23.31 x 19.31 x 22	1600	0.62"	57.16
	405620B30	HFESMV15/24/20/30/8	24 X 20	30	23.31 x 19.31 x 30	1600	0.53"	77.62
	405620C15	HFESMV15/24/12/15/5	24 X 12	15	23.31 x 11.31 x 15	1000	0.81"	24.36
	405620C22	HFESMV15/24/12/22/5	24 X 12	22	23.31 x 11.31 x 22	1000	0.62"	35.73
	405620C30	HFESMV15/24/12/30/5	24 X 12	30	23.31 x 11.31 x 30	1000	0.53"	48.52
	405620D15	HFESMV15/20/20/15/8	20 X 20	15	19.31 x 19.31 x 15	1320	0.81"	32.15
	405620D22	HFESMV15/20/20/22/8	20 X 20	22	19.31 x 19.31 x 22	1320	0.62"	47.16
	405620D30	HFESMV15/20/20/30/8	20 X 20	30	19.31 x 19.31 x 30	1320	0.53"	63.98
	405620E15	HFESMV15/20/24/15/10	20 X 24	15	19.31 x 23.31 x 15	1600	0.81"	38.97
	405620E22	HFESMV15/20/24/22/10	20 X 24	22	19.31 x 23.31 x 22	1600	0.62"	57.16
	405620E30	HFESMV15/20/24/30/10	20 X 24	30	19.31 x 23.31 x 30	1600	0.53"	77.62
	405620F15	HFESMV15/12/24/15/10	12 X 24	15	11.31 x 23.31 x 15	1000	0.81"	24.36
	405620F22	HFESMV15/12/24/22/10	12 X 24	22	11.31 x 23.31 x 22	1000	0.62"	35.73
	405620F30	HFESMV15/12/24/30/10	12 X 24	30	11.31 x 23.31 x 30	1000	0.53"	48.52
MERV 14 14A ISO ePM ₁ - 70	405619A12	HFESMV14/24/24/12/10	24 x 24	12	23.31 x 23.31 x 12	2000	0.67"	39.21
	405619A15	HFESMV14/24/24/15/10	24 X 24	15	23.31 x 23.31 x 15	2000	0.55"	48.72
	405619A22	HFESMV14/24/24/22/10	24 X 24	22	23.31 x 23.31 x 22	2000	0.45"	71.45
	405619A30	HFESMV14/24/24/30/10	24 X 24	30	23.31 x 23.31 x 30	2000	0.41"	97.03
	405619B12	HFESMV14/24/20/12/8	24 X 20	12	23.31 x 19.31 x 12	1600	0.67"	31.37
	405619B15	HFESMV14/24/20/15/8	24 X 20	15	23.31 x 19.31 x 15	1600	0.55"	39.2125
	405619B22	HFESMV14/24/20/22/8	24 X 20	22	23.31 x 19.31 x 22	1600	0.45"	57.16
	405619B30	HFESMV14/24/20/30/8	24 X 20	30	23.31 x 19.31 x 30	1600	0.41"	77.62
	405619C12	HFESMV14/24/12/12/5	24 X 12	12	23.31 x 11.31 x 12	1000	0.67"	19.61
	405619C15	HFESMV14/24/12/15/5	24 X 12	15	23.31 x 11.31 x 15	1000	0.55"	24.5125
	405619C22	HFESMV14/24/12/22/5	24 X 12	22	23.31 x 11.31 x 22	1000	0.45"	35.73
	405619C30	HFESMV14/24/12/30/5	24 X 12	30	23.31 x 11.31 x 30	1000	0.41"	48.52
	405619D12	HFESMV14/20/20/12/8	20 X 20	12	19.31 x 19.31 x 12	1320	0.67"	25.81
	405619D15	HFESMV14/20/20/15/8	20 X 20	15	19.31 x 19.31 x 15	1320	0.55"	32.2625
	405619D22	HFESMV14/20/20/22/8	20 X 20	22	19.31 x 19.31 x 22	1320	0.45"	47.16
	405619D30	HFESMV14/20/20/30/8	20 X 20	30	19.31 x 19.31 x 30	1320	0.41"	63.98
	405619E12	HFESMV14/20/24/12/10	20 X 24	12	19.31 x 23.31 x 12	1600	0.67"	31.37
	405619E15	HFESMV14/20/24/15/10	20 X 24	15	19.31 x 23.31 x 15	1600	0.55"	39.2125
	405619E22	HFESMV14/20/24/22/10	20 X 24	22	19.31 x 23.31 x 22	1600	0.45"	57.16
	405619E30	HFESMV14/20/24/30/10	20 X 24	30	19.31 x 23.31 x 30	1600	0.41"	77.62
405619F12	HFESMV14/12/24/12/10	12 X 24	12	11.31 x 23.31 x 12	1000	0.67"	19.61	
405619F15	HFESMV14/12/24/15/10	12 X 24	15	11.31 x 23.31 x 15	1000	0.55"	24.5125	
405619F22	HFESMV14/12/24/22/10	12 X 24	22	11.31 x 23.31 x 22	1000	0.45"	35.73	
405619F30	HFESMV14/12/24/30/10	12 X 24	30	11.31 x 23.31 x 30	1000	0.41"	48.52	

See data notes on last page.

PERFORMANCE DATA (continued)

HI-FLO® ES

Efficiency	Part Number	Model	Nominal size H X W	Pocket Depth	Actual dimensions (inches) H X W X D	Airflow capacity (cfm)	Initial resistance (inches, w.g.)	Media area (sq. ft.)
MERV 13 13-A ISO ePM ₁ - 65	405618A12	HFESMV13/24/24/12/10	24 x 24	12	23.31 x 23.31 x 12	2000	0.52"	39.21
	405618A15	HFESMV13/24/24/15/10	24 X 24	15	23.31 x 23.31 x 15	2000	0.48"	48.72
	405618A22	HFESMV13/24/24/22/10	24 X 24	22	23.31 x 23.31 x 22	2000	0.38"	71.45
	405618A30	HFESMV13/24/24/30/10	24 X 24	30	23.31 x 23.31 x 30	2000	0.34"	97.03
	405618B12	HFESMV13/24/20/12/8	24 X 20	12	23.31 x 19.31 x 12	1600	0.52"	31.37
	405618B15	HFESMV13/24/20/15/8	24 X 20	15	23.31 x 19.31 x 15	1600	0.48"	39.2125
	405618B22	HFESMV13/24/20/22/8	24 X 20	22	23.31 x 19.31 x 22	1600	0.38"	57.16
	405618B30	HFESMV13/24/20/30/8	24 X 20	30	23.31 x 19.31 x 30	1600	0.34"	77.62
	405618C12	HFESMV13/24/12/12/5	24 X 12	12	23.31 x 11.31 x 12	1000	0.52"	19.61
	405618C15	HFESMV13/24/12/15/5	24 X 12	15	23.31 x 11.31 x 15	1000	0.48"	24.5125
	405618C22	HFESMV13/24/12/22/5	24 X 12	22	23.31 x 11.31 x 22	1000	0.38"	35.73
	405618C30	HFESMV13/24/12/30/5	24 X 12	30	23.31 x 11.31 x 30	1000	0.34"	48.52
	405618D12	HFESMV13/20/20/12/8	20 X 20	12	19.31 x 19.31 x 12	1320	0.52"	25.81
	405618D15	HFESMV13/20/20/15/8	20 X 20	15	19.31 x 19.31 x 15	1320	0.48"	32.2625
	405618D22	HFESMV13/20/20/22/8	20 X 20	22	19.31 x 19.31 x 22	1320	0.38"	47.16
	405618D30	HFESMV13/20/20/30/8	20 X 20	30	19.31 x 19.31 x 30	1320	0.34"	63.98
	405618E12	HFESMV13/20/24/12/10	20 X 24	12	19.31 x 23.31 x 15	1600	0.52"	31.37
	405618E15	HFESMV13/20/24/15/10	20 X 24	15	19.31 x 23.31 x 22	1600	0.48"	39.2125
	405618E22	HFESMV13/20/24/22/10	20 X 24	22	19.31 x 23.31 x 30	1600	0.38"	57.16
	405618E30	HFESMV13/20/24/30/10	20 X 24	30	19.31 x 23.31 x 30	1600	0.34"	77.62
MERV 11 11-A ISO ePM ₁₀ - 70	405617A12	HFESMV11/24/24/12/10	24 x 24	12	23.31 x 23.31 x 12	2000	0.28"	39.21
	405617A15	HFESMV11/24/24/15/10	24 X 24	15	23.31 x 23.31 x 15	2000	0.26"	48.72
	405617A22	HFESMV11/24/24/22/10	24 X 24	22	23.31 x 23.31 x 22	2000	0.24"	71.45
	405617A30	HFESMV11/24/24/30/10	24 X 24	30	23.31 x 23.31 x 30	2000	0.23"	97.03
	405617B12	HFESMV11/24/20/12/8	24 X 20	12	23.31 x 19.31 x 12	1600	0.28"	31.37
	405617B15	HFESMV11/24/20/15/8	24 X 20	15	23.31 x 19.31 x 15	1600	0.26"	39.2125
	405617B22	HFESMV11/24/20/22/8	24 X 20	22	23.31 x 19.31 x 22	1600	0.24"	57.16
	405617B30	HFESMV11/24/20/30/8	24 X 20	30	23.31 x 19.31 x 30	1600	0.23"	77.62
	405617C12	HFESMV11/24/12/12/5	24 X 12	12	23.31 x 11.31 x 12	1000	0.28"	19.61
	405617C15	HFESMV11/24/12/15/5	24 X 12	15	23.31 x 11.31 x 15	1000	0.26"	24.5125
	405617C22	HFESMV11/24/12/22/5	24 X 12	22	23.31 x 11.31 x 22	1000	0.24"	35.73
	405617C30	HFESMV11/24/12/30/5	24 X 12	30	23.31 x 11.31 x 30	1000	0.23"	48.52
	405617D12	HFESMV11/20/20/12/8	20 X 20	12	19.31 x 19.31 x 12	1320	0.28"	25.81
	405617D15	HFESMV11/20/20/15/8	20 X 20	15	19.31 x 19.31 x 15	1320	0.26"	32.2625
	405617D22	HFESMV11/20/20/22/8	20 X 20	22	19.31 x 19.31 x 22	1320	0.24"	47.16
	405617D30	HFESMV11/20/20/30/8	20 X 20	30	19.31 x 19.31 x 30	1320	0.23"	63.98
	405617E12	HFESMV11/20/24/12/10	20 X 24	12	19.31 x 23.31 x 15	1600	0.28"	31.37
	405617E15	HFESMV11/20/24/15/10	20 X 24	15	19.31 x 23.31 x 22	1600	0.26"	39.2125
	405617E22	HFESMV11/20/24/22/10	20 X 24	22	19.31 x 23.31 x 30	1600	0.24"	57.16
	405617E30	HFESMV11/20/24/30/10	20 X 24	30	19.31 x 23.31 x 30	1600	0.23"	77.62
405617F12	HFESMV11/12/24/12/10	12 X 24	12	11.31 x 23.31 x 22	1000	0.28"	19.61	
405617F15	HFESMV11/12/24/15/10	12 X 24	15	11.31 x 23.31 x 30	1000	0.26"	24.5125	
405617F22	HFESMV11/12/24/22/10	12 X 24	22	11.31 x 23.31 x 22	1000	0.24"	35.73	
405617F30	HFESMV11/12/24/30/10	12 X 24	30	11.31 x 23.31 x 30	1000	0.23"	48.52	

See data notes on last page.

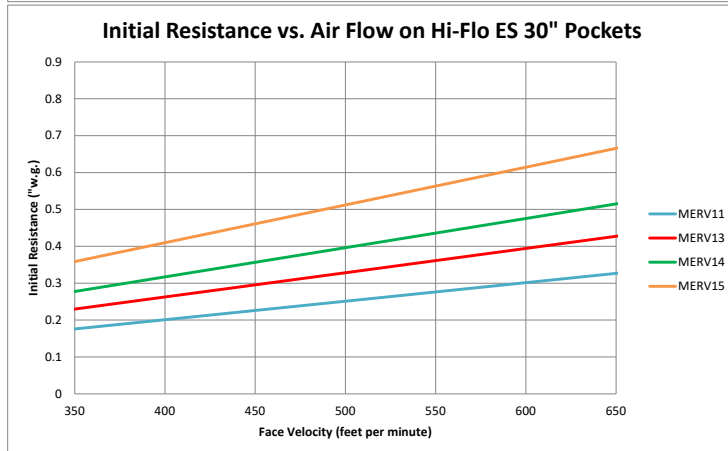
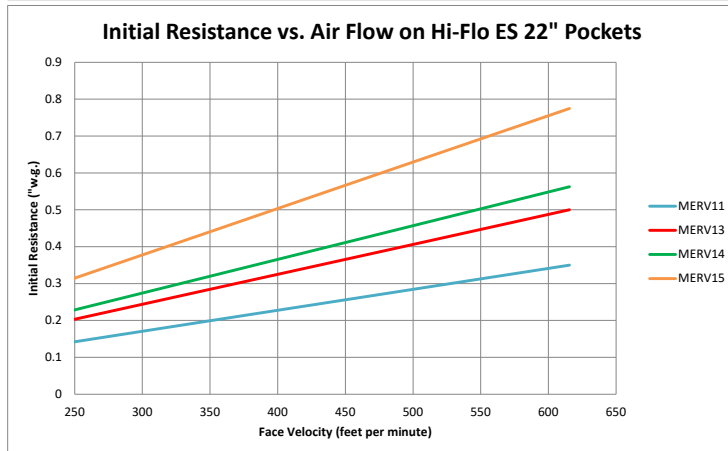
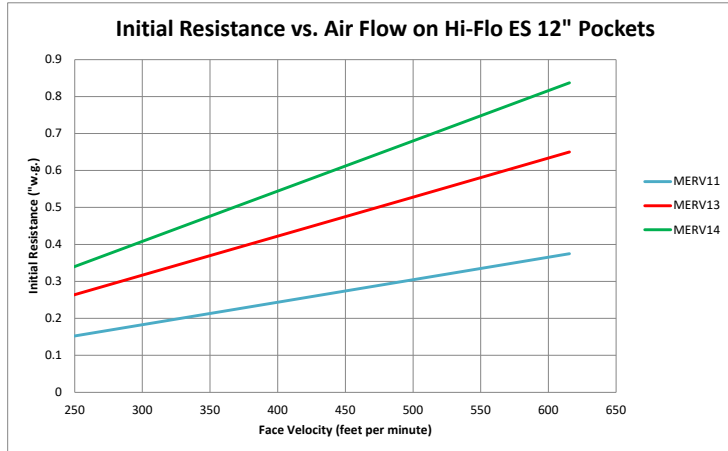


Hi-Flo® ES

Energy Saving, Extended Surface Area, High Efficiency Air Filter

Initial Resistance Versus Airflow

Contact factory before operating outside of airflow region.



Contact factory for information on 15" deep model.

Options:

Standard Hi-Flo ES includes filter-to-filter sealing gasket on one vertical header side. Gasket or additional gaskets are available on all header sides and on face of filter. Contact factory.



All Hi-Flo ES filters are shipped in an easy-to-handle container that includes a transport handle. Filter service personnel can easily transport eight filters and discard the old filters in the same container. Filter change is easy and disposal costs are reduced, Hi-Flo ES filters can reduce dumpster volume by up to 60%.

DATA NOTES:

Standard Hi-Flo ES includes 0.81" (1" nominal) header. Contact factory for lead times.

CFM value is at a velocity of 500 feet per minute. Filter may be operated at velocities of 350 fpm to 600 fpm without contacting factory.

To establish a schedule for filter change, record initial pressure drop when installed, order filters for change when pressure drop has doubled and service the unit when replacements are available. Maximum recommended pressure drop for this product is 1.5 inches w.g.

The Hi-Flo ES is classified by Underwriters Laboratories as UL Class 900. Maximum operating temperature is 158° F (70° C). Performance tolerances conform to Section 7.4 of AHRI Standard 850-78.

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ASHRAE® 52.2-2012 Test Results w/Appendix J Results

Filter Description							
Manufacturer		Filter Model			Filter Part Number		
Camfil		Hi-Flo ES M14/24/24/22/10			405619A22		
Filter Type		Media Type		Media Color		Media Area (ft ²)	
Pocket		Fiberglass/Air Laid		Green		71	
Nominal Size		Actual Size					
HxWxD		Hgt (in)	Wid (in)	Dep (in)	Pleats/Pockets	UL Rating	LabFile
24x24x22		23 3/8	23 3/8	22	10	Yes	1414

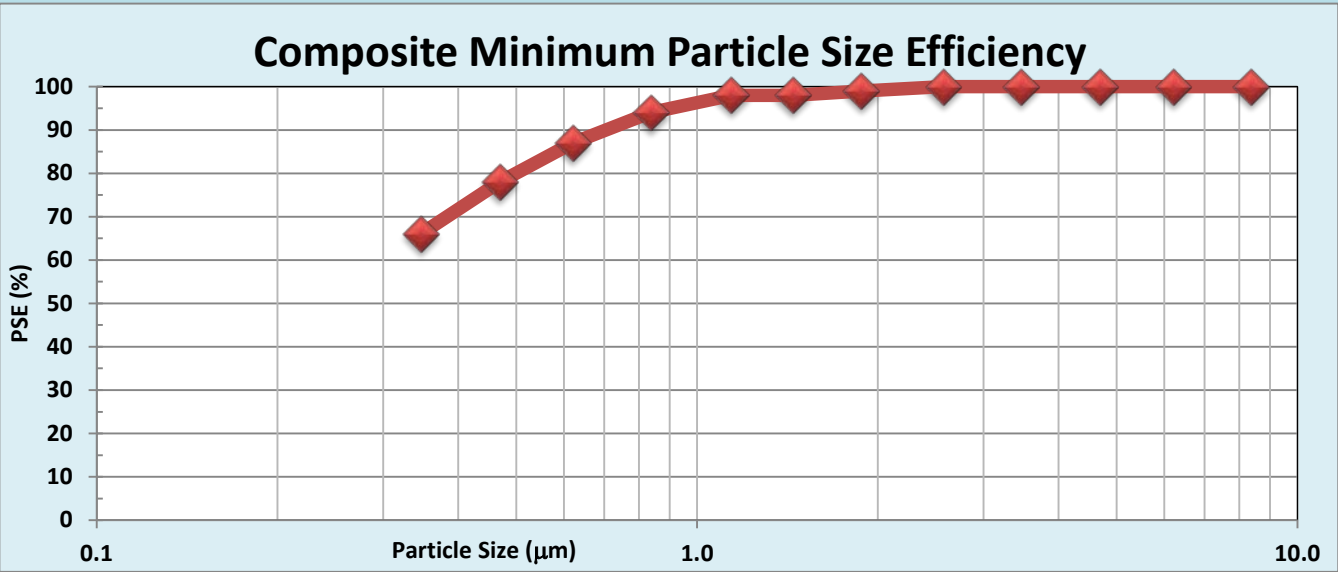
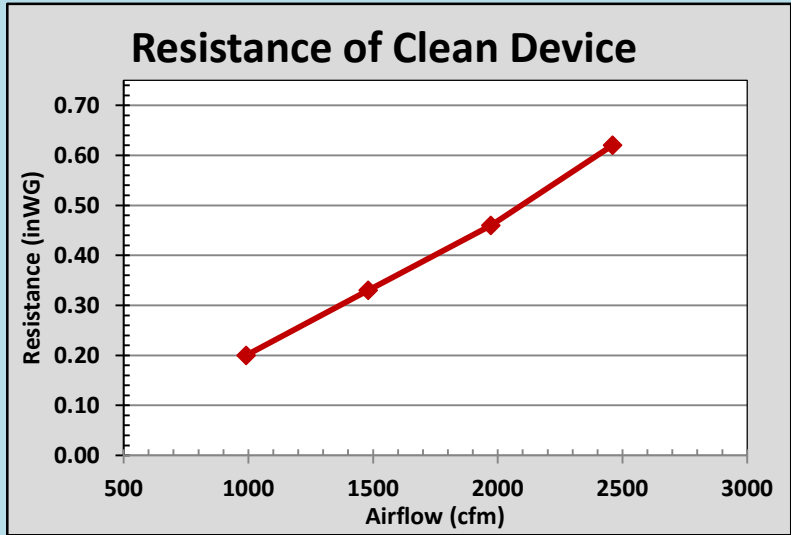
ASHRAE® 52.2-2012				ASHRAE® 52.2-2012 w/App J			
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Test Number:	16003-025_00003985.047.aec			Test Number:	16003-017_00003861.047.aec		
Test Data	Test Results	Rated Values		Test Data	Test Results	Rated Values	
AirFlow (cfm)	1970	1970		AirFlow (cfm)	1969	1971	
Nominal Vel (fpm)	493	493		Nominal Vel (fpm)	492	493	
Initial ΔP (inWG)	0.46	0.45		Initial ΔP (inWG)	0.43	0.45	
MERV	14	14	@1970cfm	MERV-A	14A	14A	@1969cfm
E ₁ (0.3-1.0μm), (%)	81	≥ 75		E ₁ -A (0.3-1.0μm), (%)	80	≥ 75	
E ₂ (1.0-3.0μm), (%)	99	≥ 90		E ₂ -A (1.0-3.0μm), (%)	98	≥ 90	
E ₃ (3.0-10μm), (%)	100	≥ 90		E ₃ -A (3.0-10μm), (%)	100	≥ 90	
Final DP, (inWG)	1.5	1.5		Final DP, (inWG)	1.5	1.5	
Arrestance, (%)	100	14		Arrestance-A, (%)	100	14	
DHC, (g)	412			DHC-A, (g)	385		
Temp, (F)	73	Test Aerosol	KCI	Temp, (F)	75	Test Aerosol	KCI
RH, (%)	48	Loading Dust	ASHRAE	RH, (%)	48	Loading Dust	ASHRAE
Comments				Comments			

Certified Test Per ASHRAE 52.2-2012		Operator	Particle Counter	Model
Approval:	<i>Don Thornburg</i> Electronic Signature, Original on file	AA	TSI	OPS 3330
Camfil Permission Required for Distribution				

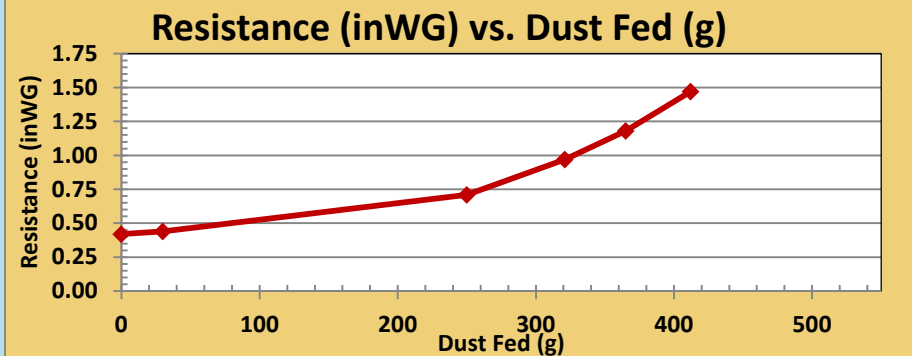
ASHRAE® 52.2-2012 Test Results

Date:	Jun 10, 2016	Test Number:	16003-025_00003985.047.aec
Manufacturer	Filter Model		Filter Part Number
Camfil	Hi-Flo ES M14/24/24/22/10		405619A22

Clean Resistance Table			
cfm	m ³ /s	inWG	Pa
991	0.47	0.2	50
1481	0.70	0.33	82
1972	0.93	0.46	114
2460	1.16	0.62	154



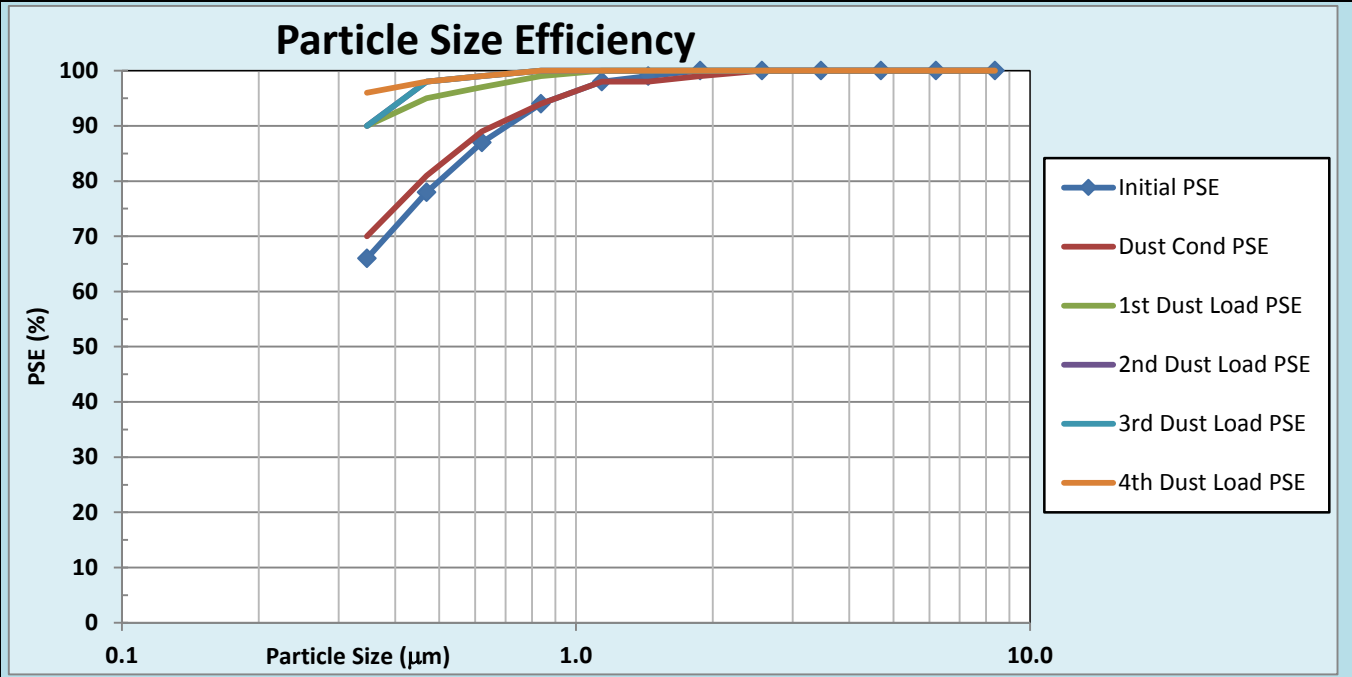
ΔP (inWG)	Dust Fed (g)
0.42	0
0.44	30
0.71	250
0.97	321
1.18	365
1.47	412





ASHRAE® 52.2-2012 Test Results

Date:	Jun 10, 2016	Test Number:	16003-025_00003985.047.aec									
Manufacturer				Filter Model					Filter Part Number			
Camfil				Hi-Flo ES M14/24/24/22/10					405619A22			
Efficiency Data Table												
	1	2	3	4	5	6	7	8	9	10	11	12
Minimum Dia (µm)	0.3	0.4	0.55	0.7	1.0	1.3	1.6	2.2	3.0	4.0	5.5	7.0
Maximum Dia (µm)	0.4	0.55	0.7	1.0	1.3	1.6	2.2	3.0	4.0	5.5	7.0	10.0
Geometric Mean (µm)	0.35	0.47	0.62	0.84	1.14	1.44	1.88	2.57	3.46	4.69	6.20	8.37
Initial PSE	66	78	87	94	98	99	100	100	100	100	100	100
Dust Cond PSE	70	81	89	94	98	98	99	100	100	100	100	100
1st Dust Load PSE	90	95	97	99	100	100	100	100	100	100	100	100
2nd Dust Load PSE	90	98	99	100	100	100	100	100	100	100	100	100
3rd Dust Load PSE	90	98	99	100	100	100	100	100	100	100	100	100
4th Dust Load PSE	96	98	99	100	100	100	100	100	100	100	100	100
Composite Min PSE	66	78	87	94	98	98	99	100	100	100	100	100



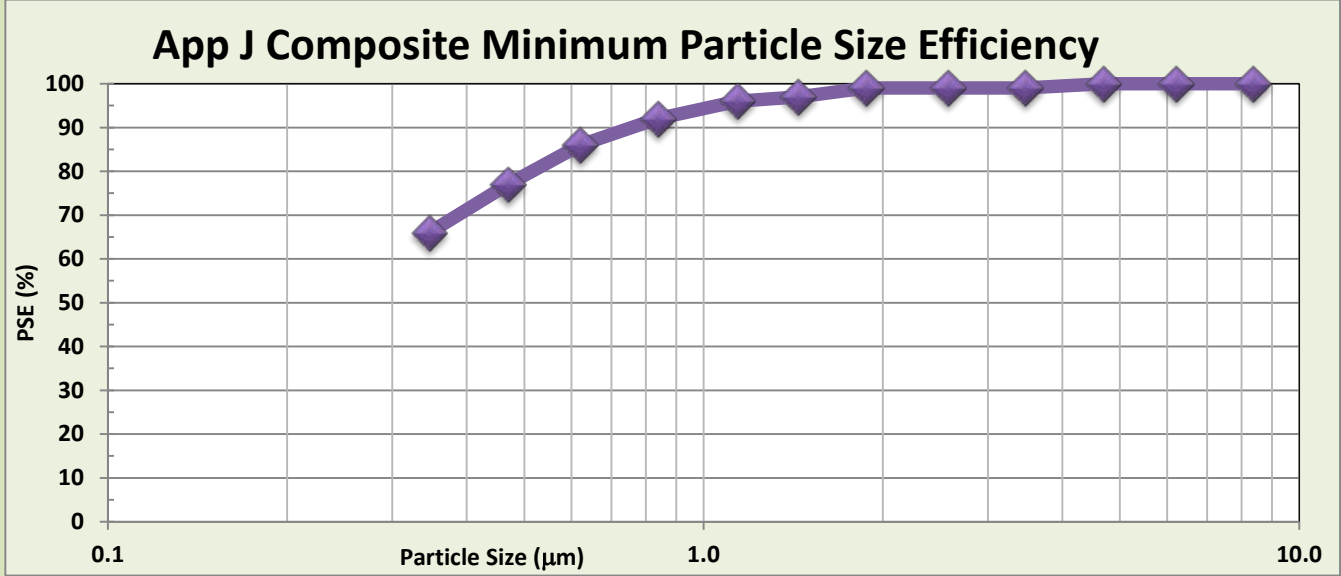
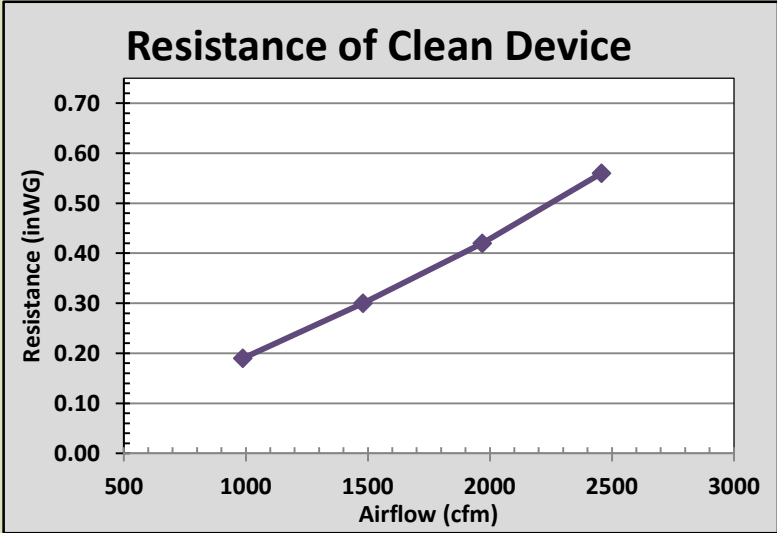
All testing is performed in compliance with the latest revision of ASHRAE Standard 52.2 in a state-of-the-art laboratory facility located at the Camfil USA headquarters in Riverdale, NJ. Test Reports without DHC values show efficiency only and the associated MERV value is a estimated value based on the single efficiency data shown. For more information, contact your local Camfil representative or distributor.

This report and the data contained herein is the property of Camfil and is confidential between Camfil and the recipient only. It may only be reused or reprinted or distributed with the written permission of Camfil.

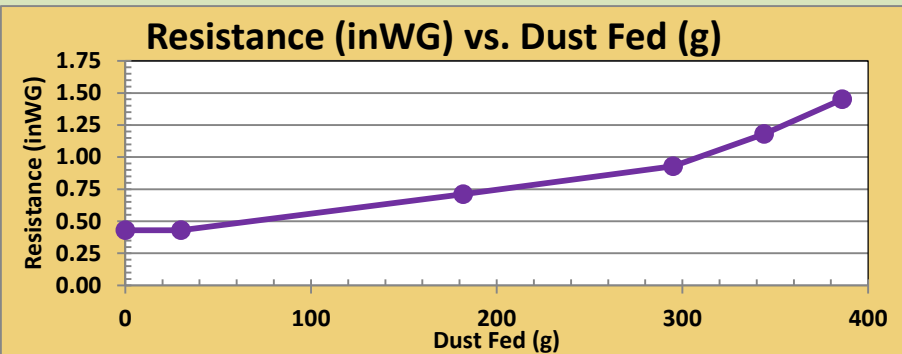
ASHRAE® 52.2-2012 Test Results w/ Appendix J Results

Date:	05/12/2016	Test Number:	16003-017_00003861.047.aec
Manufacturer	Filter Model		Filter Part Number
Camfil	Hi-Flo ES M14/24/24/22/10		405619A22

Clean Resistance Table			
cfm	m ³ /s	inWG	Pa
988	0.47	0.19	47
1480	0.70	0.3	75
1969	0.93	0.42	105
2457	1.16	0.56	139



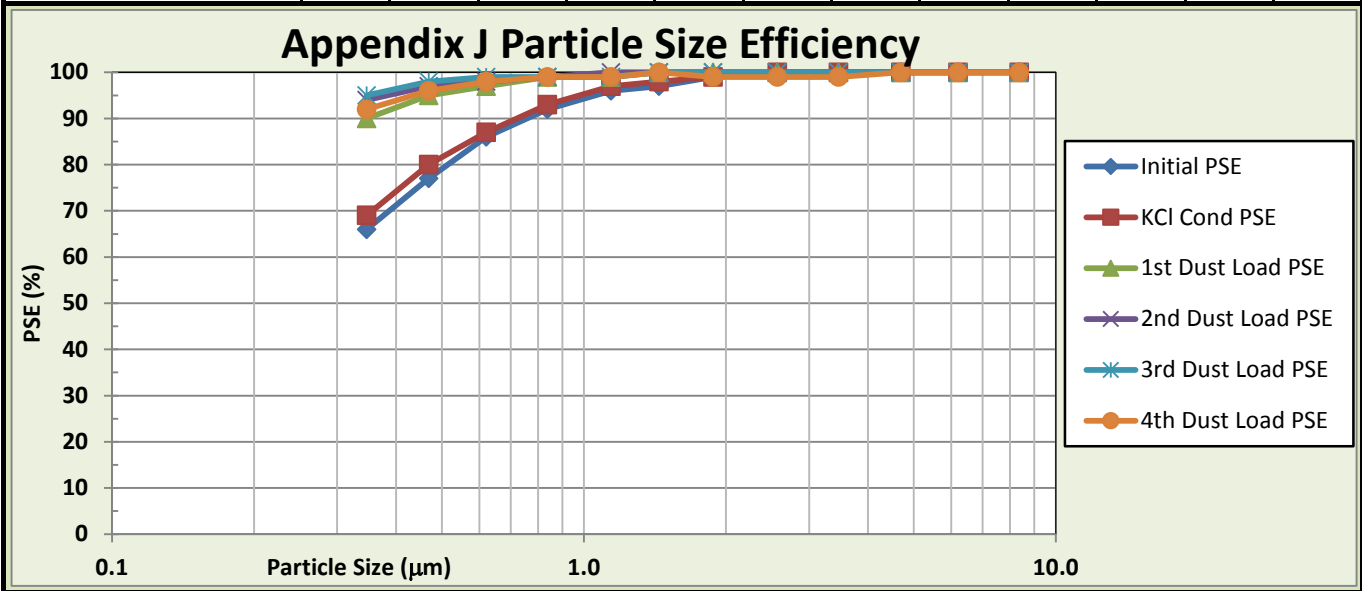
ΔP (inWG)	Dust Fed (g)
0.43	0
0.43	30
0.71	182
0.93	295
1.18	344
1.45	386





ASHRAE® 52.2-2012 Test Results w/ Appendix J Results

Date:	05/12/2016	Test Number:	16003-017_00003861.047.aec									
Manufacturer		Filter Model							Filter Part Number			
Camfil		Hi-Flo ES M14/24/24/22/10							405619A22			
App J Efficiency Data Table												
	1	2	3	4	5	6	7	8	9	10	11	12
Minimum Dia (µm)	0.3	0.4	0.55	0.7	1.0	1.3	1.6	2.2	3.0	4.0	5.5	7.0
Maximum Dia (µm)	0.4	0.55	0.7	1.0	1.3	1.6	2.2	3.0	4.0	5.5	7.0	10.0
Geometric Mean (µm)	0.35	0.47	0.62	0.84	1.14	1.44	1.88	2.57	3.46	4.69	6.20	8.37
Initial PSE	66	77	86	92	96	97	99	100	100	100	100	100
KCl Cond PSE	69	80	87	93	97	98	99	100	100	100	100	100
1st Dust Load PSE	90	95	97	99	99	100	100	100	100	100	100	100
2nd Dust Load PSE	94	97	98	99	100	100	100	100	100	100	100	100
3rd Dust Load PSE	95	98	99	99	99	100	100	100	100	100	100	100
4th Dust Load PSE	92	96	98	99	99	100	99	99	99	100	100	100
Composite Min PSE	66	77	86	92	96	97	99	99	99	100	100	100

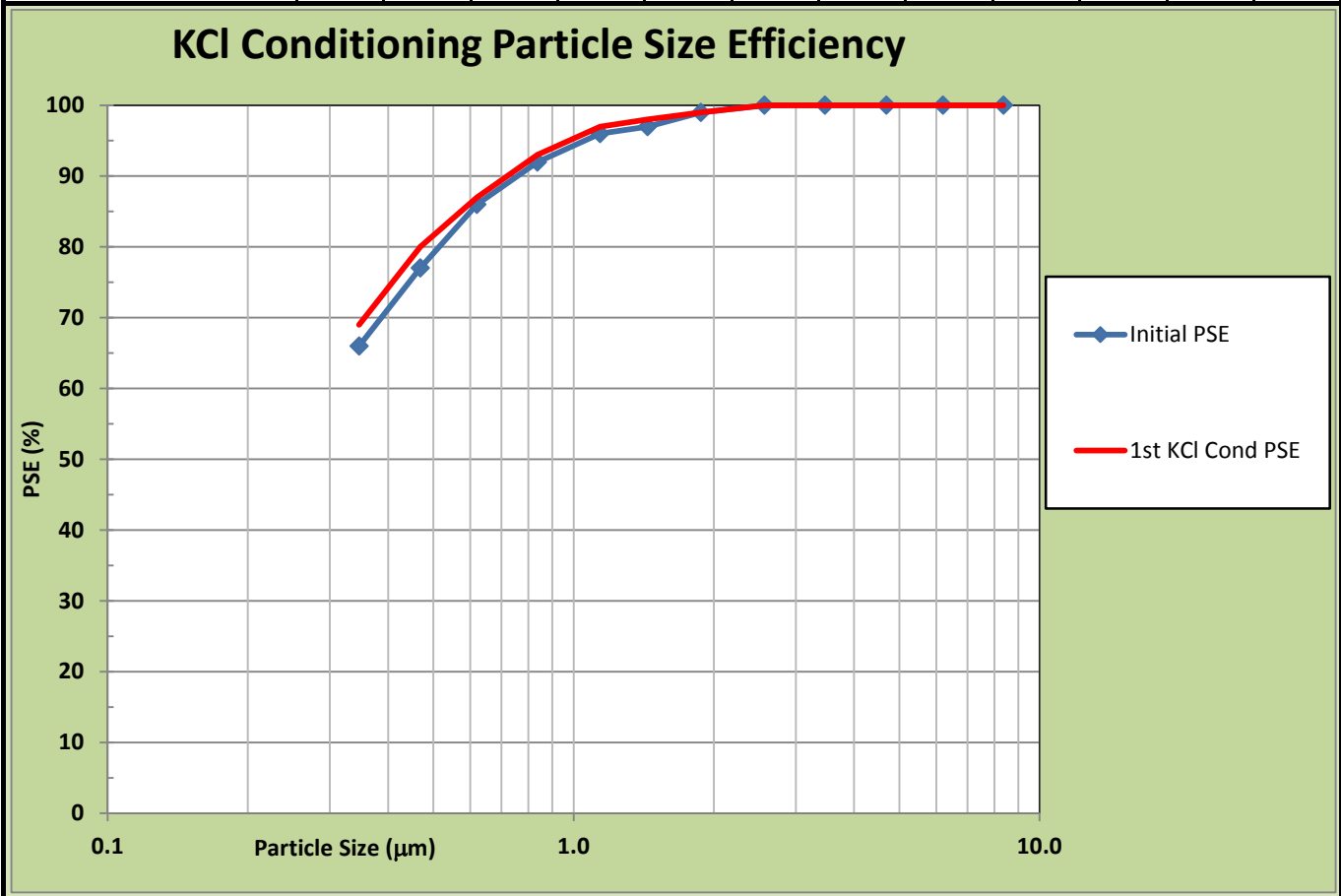



Bkg Concentration (particles/cm ³)	Avg Cond Aerosol Conc (particles/cm ³)	Cumulative Cond Duration (minutes)	Cumulative Cond CT (particles-min/cm ³)	
196.0	4.25E+05	225	95626333	
Large Particle Concentration (Particles ft ³)	Ratio Small to Large (>20,000)	Conditioning ΔP (inWG)		Same duct?
		Initial ΔP	Final ΔP	
18,434	652,860	0.41	0.41	No



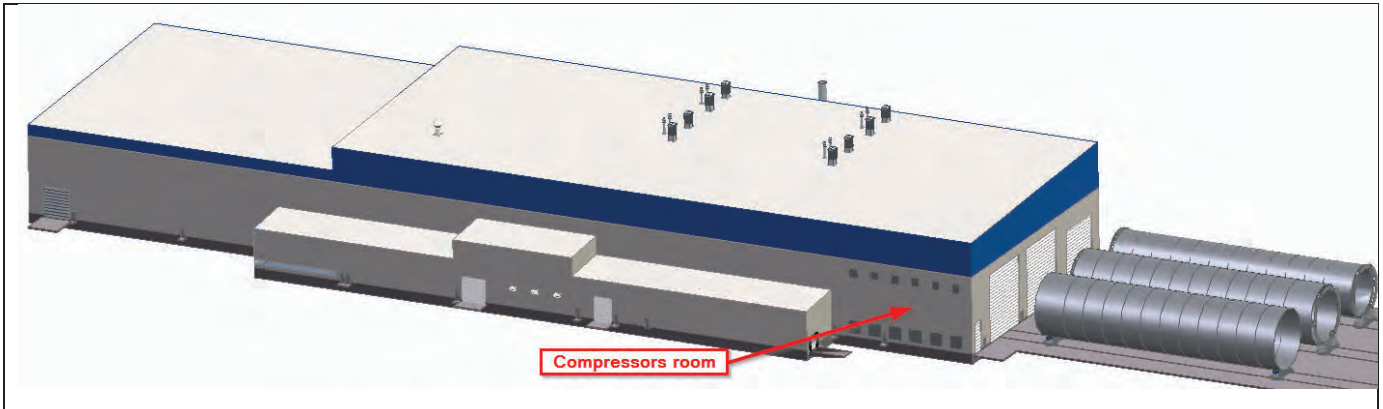
ASHRAE® 52.2-2012 Test Results w/ Appendix J Results

Date:	05/12/2016			Test Number:	16003-017_00003861.047.aec								
Manufacturer				Filter Model					Filter Part Number				
Camfil				Hi-Flo ES M14/24/24/22/10					405619A22				
KCI Conditioning Data Table	1	2	3	4	5	6	7	8	9	10	11	12	
	Minimum Dia (µm)	0.3	0.4	0.55	0.7	1.0	1.3	1.6	2.2	3.0	4.0	5.5	7.0
	Maximum Dia (µm)	0.4	0.55	0.7	1.0	1.3	1.6	2.2	3.0	4.0	5.5	7.0	10.0
	Geometric Mean (µm)	0.35	0.47	0.62	0.84	1.14	1.44	1.88	2.57	3.46	4.69	6.20	8.37
	Initial PSE	66	77	86	92	96	97	99	100	100	100	100	100
	1st KCI Cond PSE	69	80	87	93	97	98	99	100	100	100	100	100
	2nd KCI Cond PSE												
	3rd KCI Cond PSE												
	4th KCI Cond PSE												
	5th KCI Cond PSE												
	Final KCI Cond PSE	69	80	87	93	97	98	99	100	100	100	100	100



Revision	Description of changes	Date	Prepared by	Approved by
00	Document creation	06-04-2022	J. Doucet ing.	 J. Doucet ing. 2022-04-11

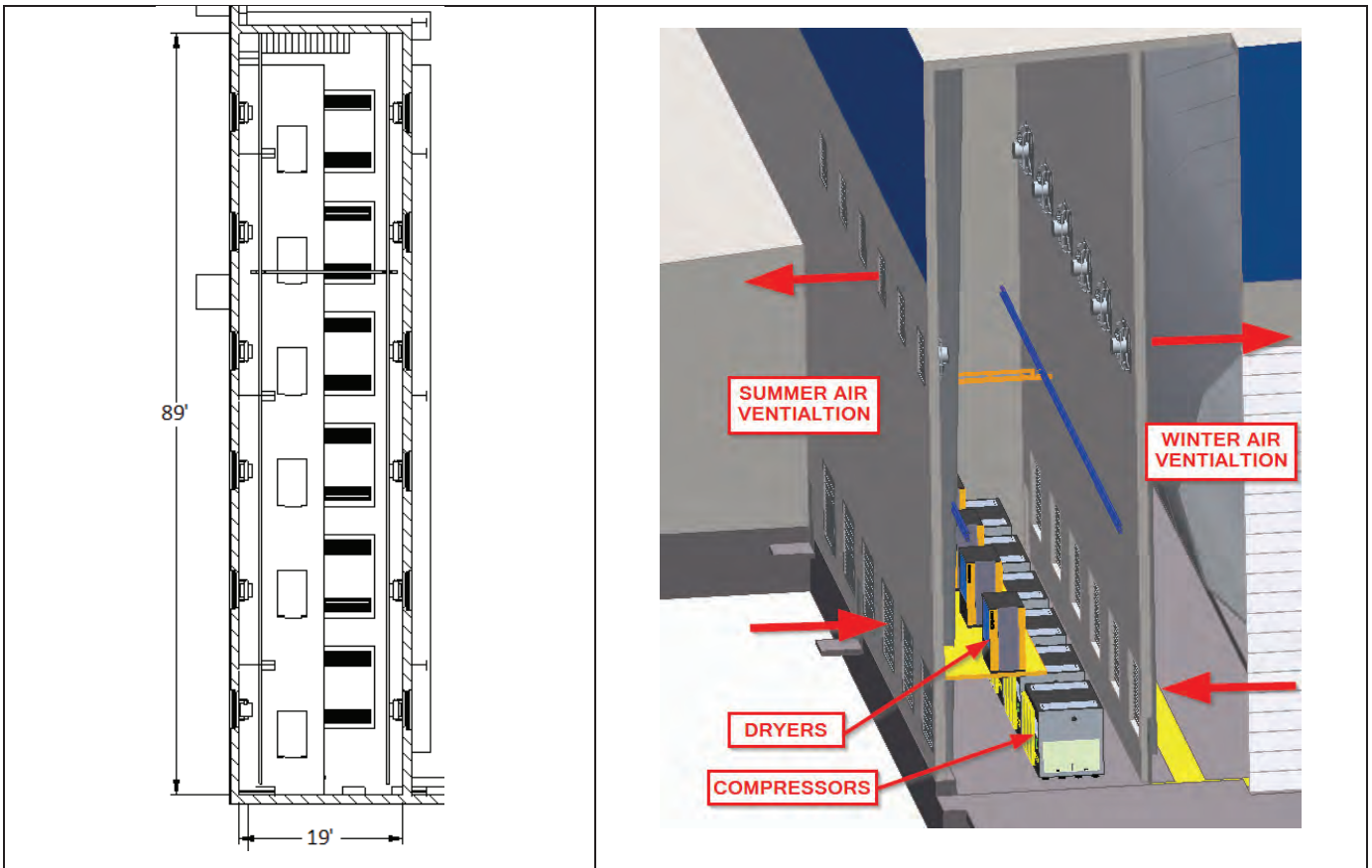
1 COMPRESSORS ROOM



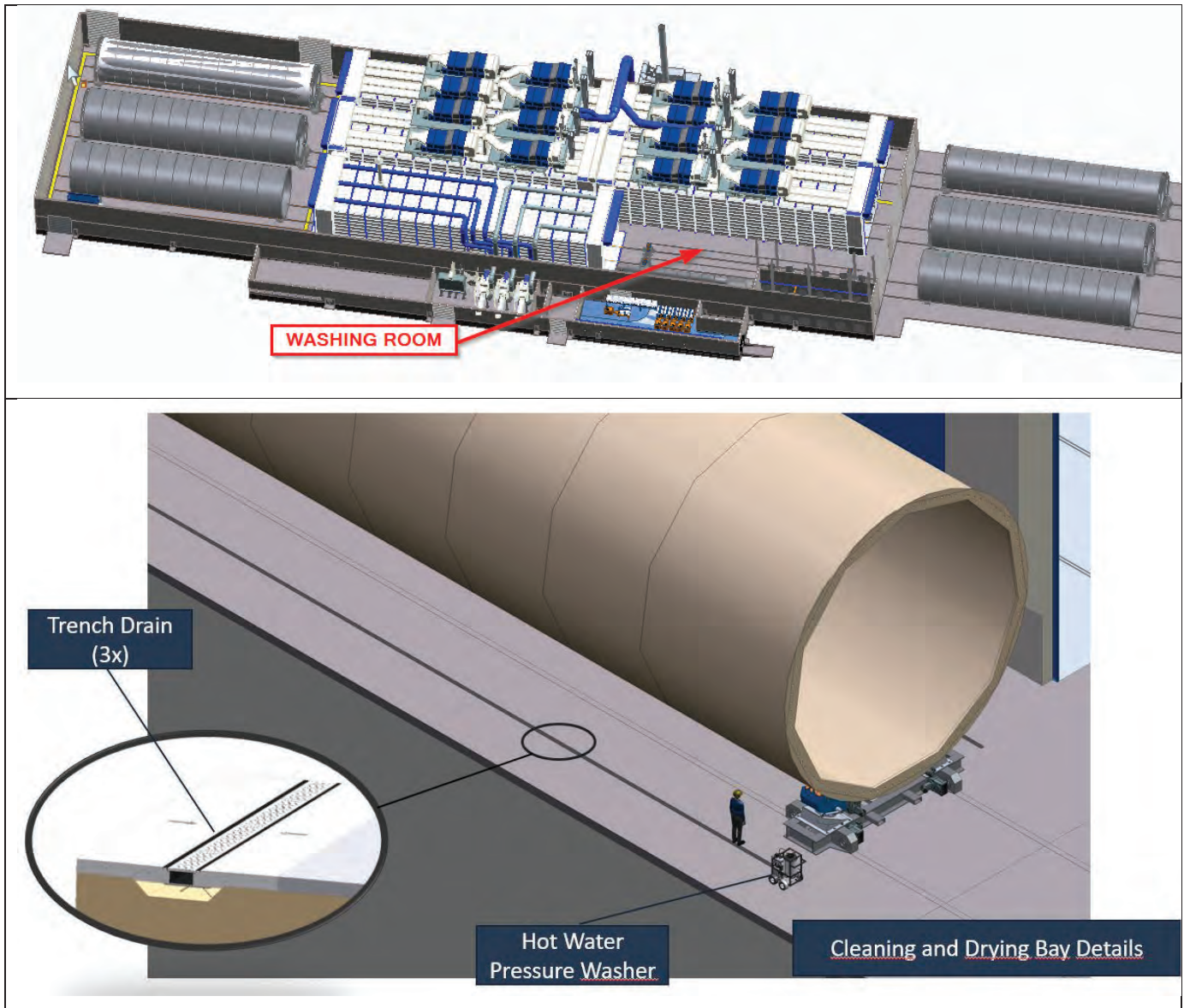
Equipment:

- 6 Air compressors KAESER ESD 300, 125psi, Air cooled, see data sheet
- 6 Cycling Refrigerated Air Dryers KAESER SECOTEC TG 520, see data sheet
- 6 Condensate Management KAESER KCF 400, see data sheet

Room layout:



2 WASHING AREA



Operation:

Cleaning the section before shot blasting using clear water

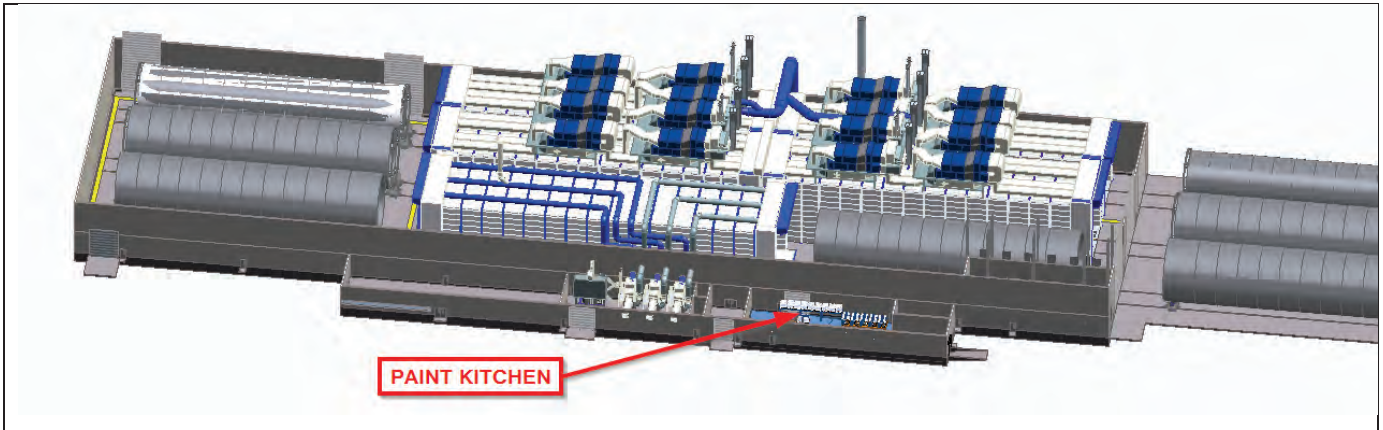
Product on section:

- Magnaflux Echogel 20, see data sheet

Equipment:

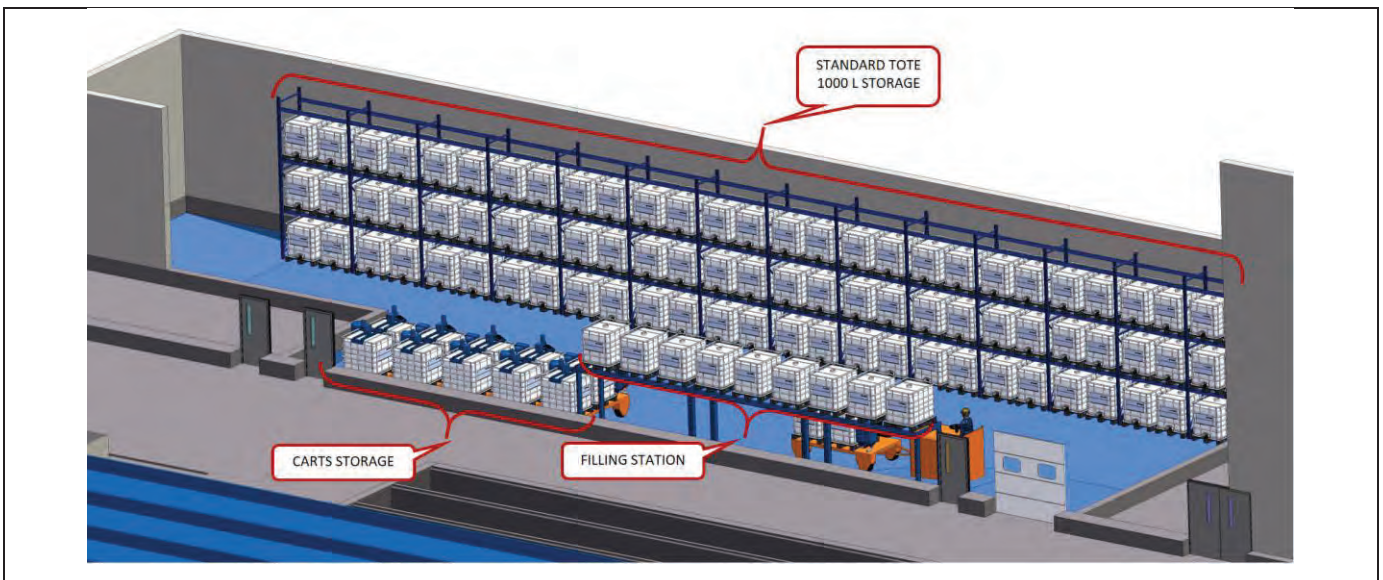
- Hot water pressure washer Dynablast H4030BEE48-3C, see data sheet

3 PAINT KITCHEN



Operation:

Paint storage, cleaning and refilling of paint carts



Storage capacity:

- 25 000 gallons

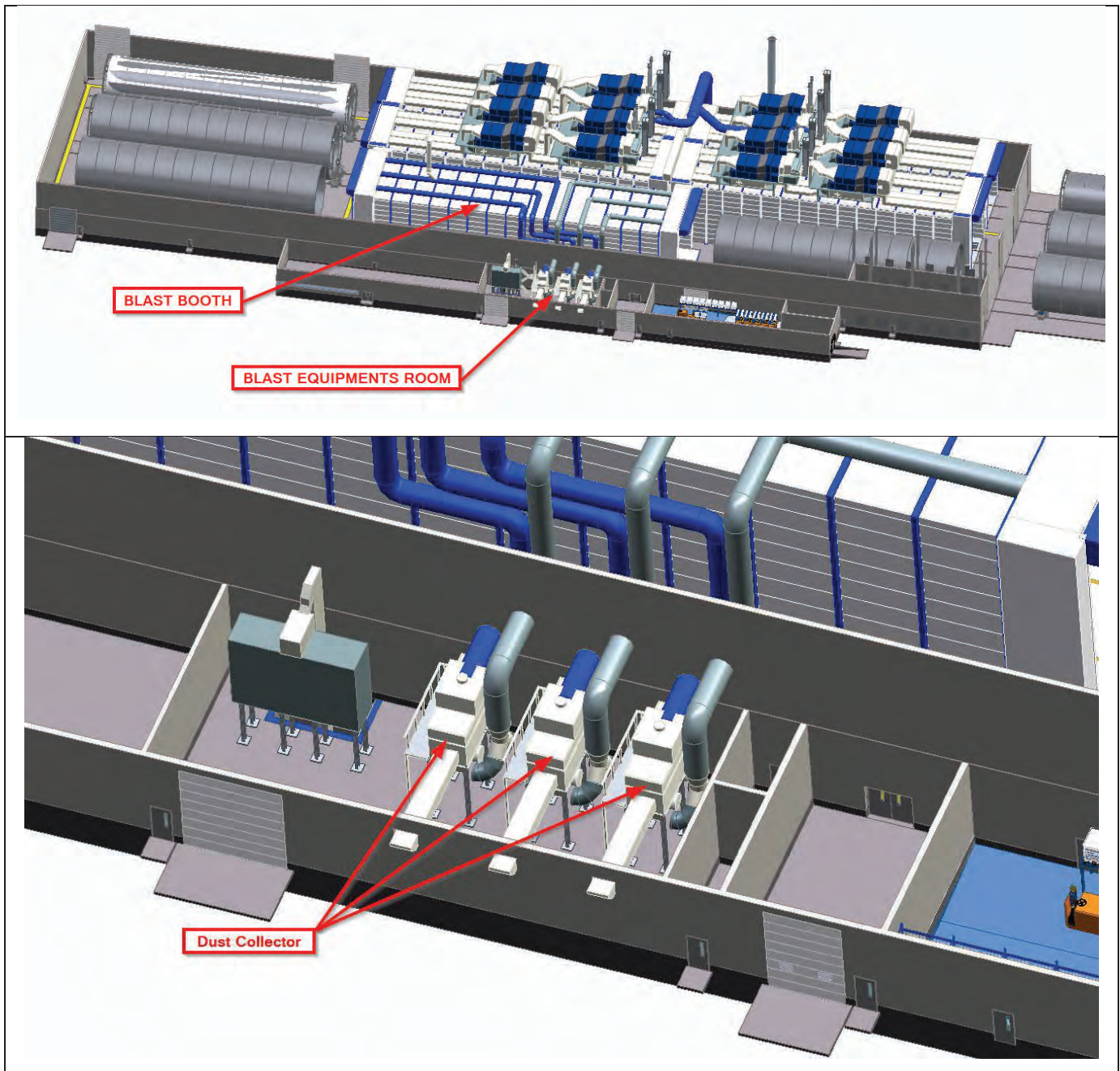
Product in storage:

- Paint, (Base and Agent) see data sheet
- Solvent, see data sheet

Equipment:

- Paint cart
- Solvent recycler SR180, see data sheet

4 BLAST BOOTH

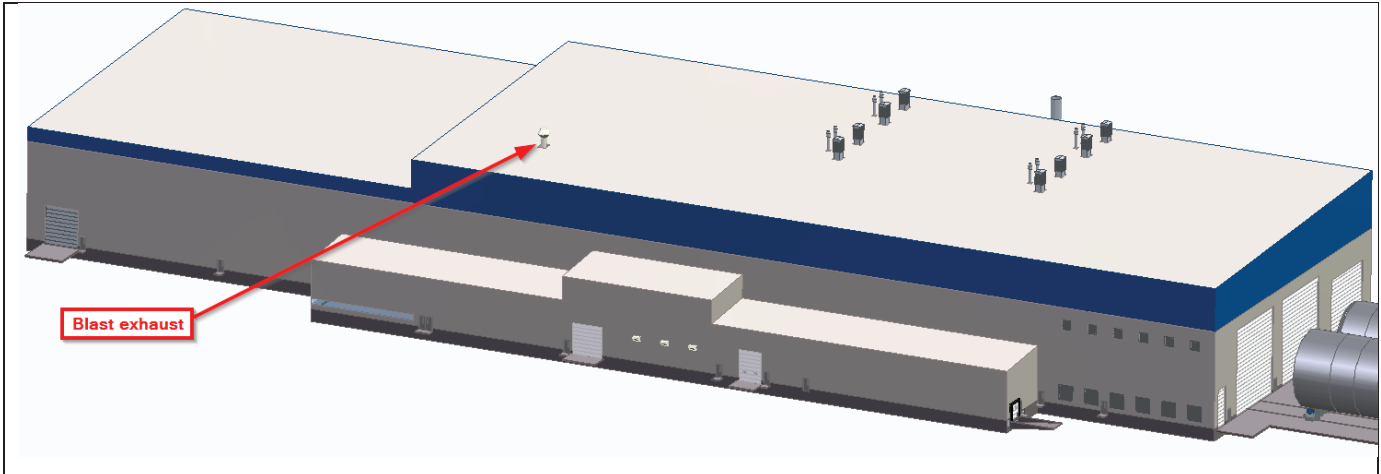


Equipment:

- One blast Booth 47' wide x 45' high x 220' long, Sciteex BLASTLUX PC-BL 671414
- 3 Dust collectors, Sciteex DM-FC 48/70, see data sheet
- Dust emission controller, install at the dust collectors outlet, see SciTeeX DEC data sheet

Exhaust:

20% of the air volume after filtration is evacuated outside to maintain a negative pressure in the booth



- Quantity of emitters: 1 pcs
- Vertical discharge no rain cap
- Height of emitters from floor level: 85 feet
- Efficiency of emitters: 24 720 cfm (42 000 m³/h)
- Diameter of the emitters: dia 35 ½" (900mm)
- Speed of exhaust air: 3545 feet/min (18.3m/s)
- Stack exhaust exit temperature: 75°F

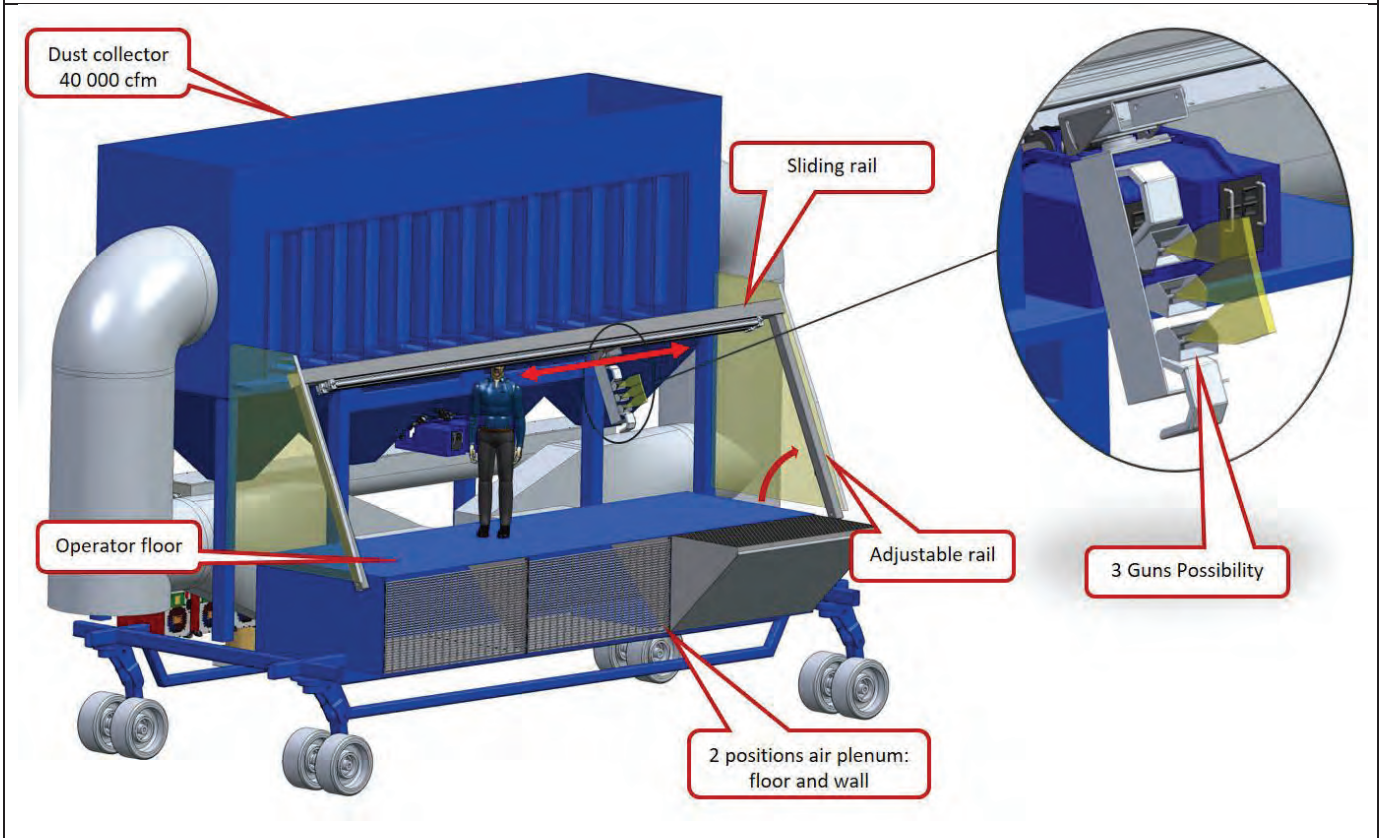
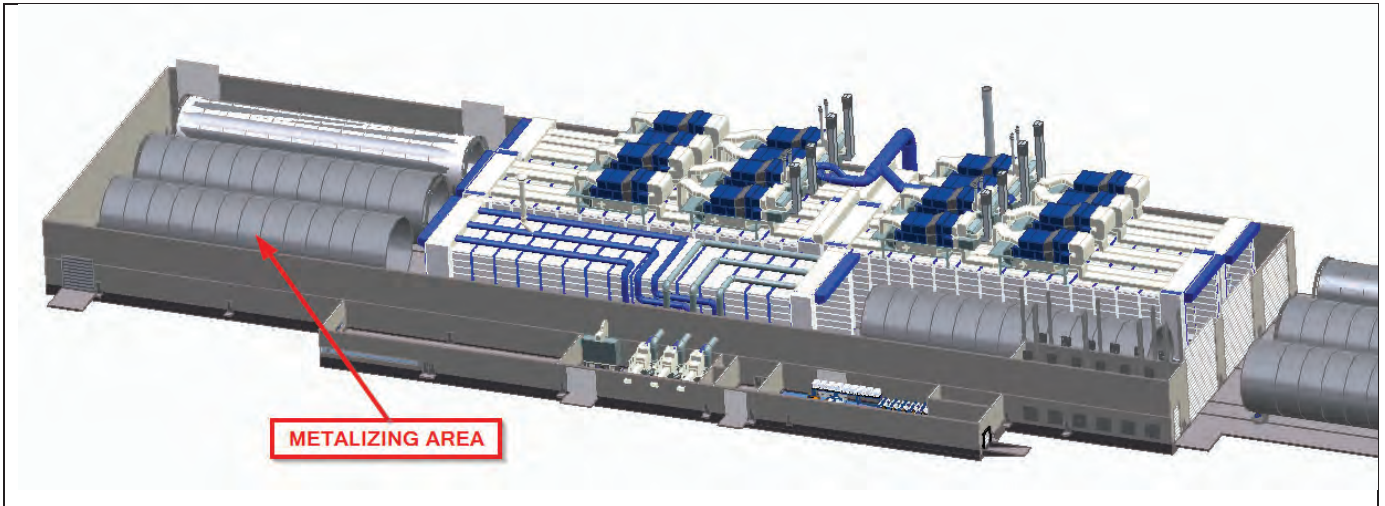
Filter:

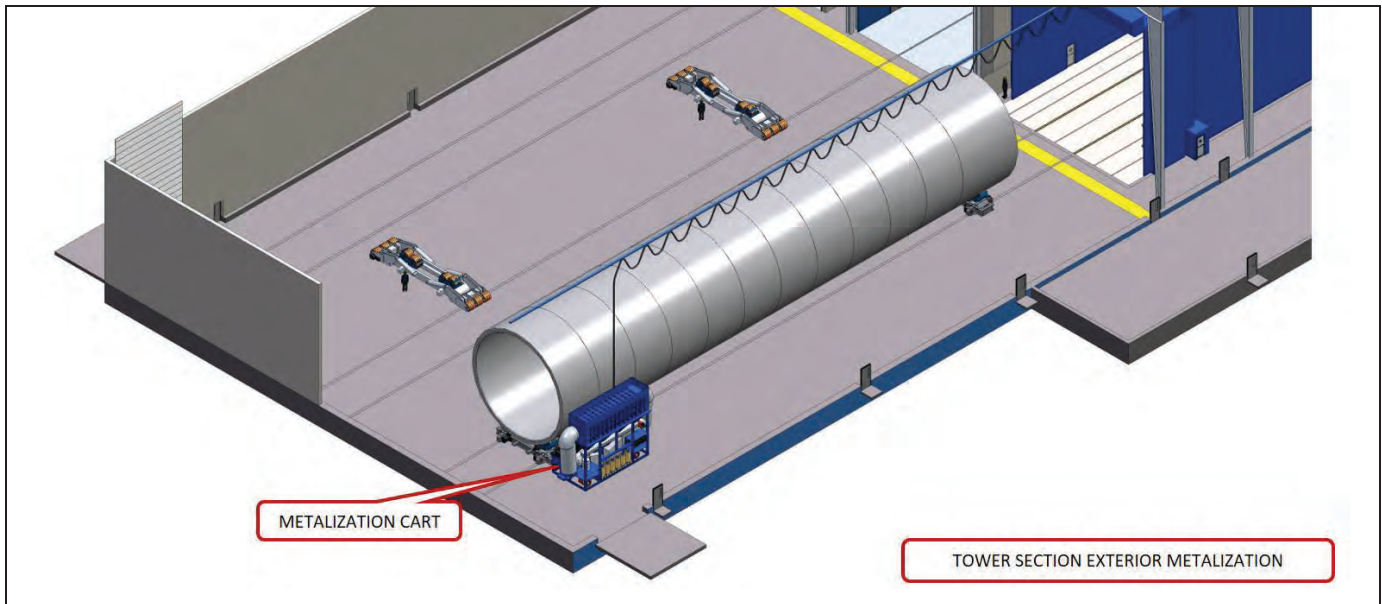
- Filter cartridges Donaldson Ultra-Web Flame Retardant, see data sheet

Blast process:

- Blast nozzle: 12 nozzle #10 @ 120 psi, 3500lbs abrasive lb/hr by nozzle
- Abrasive: Steel grid GH40, see data sheet
- Duty cycle: 8 hours by day
- Abrasive consumption: 2500lbs by week (abrasive reduce to dust)

5 METALIZATION





Equipment:

- 3 Thermion Precision Arc 5.0, see data sheet
- Dust collector, Sciteex DM-FC 96/70, see data sheet

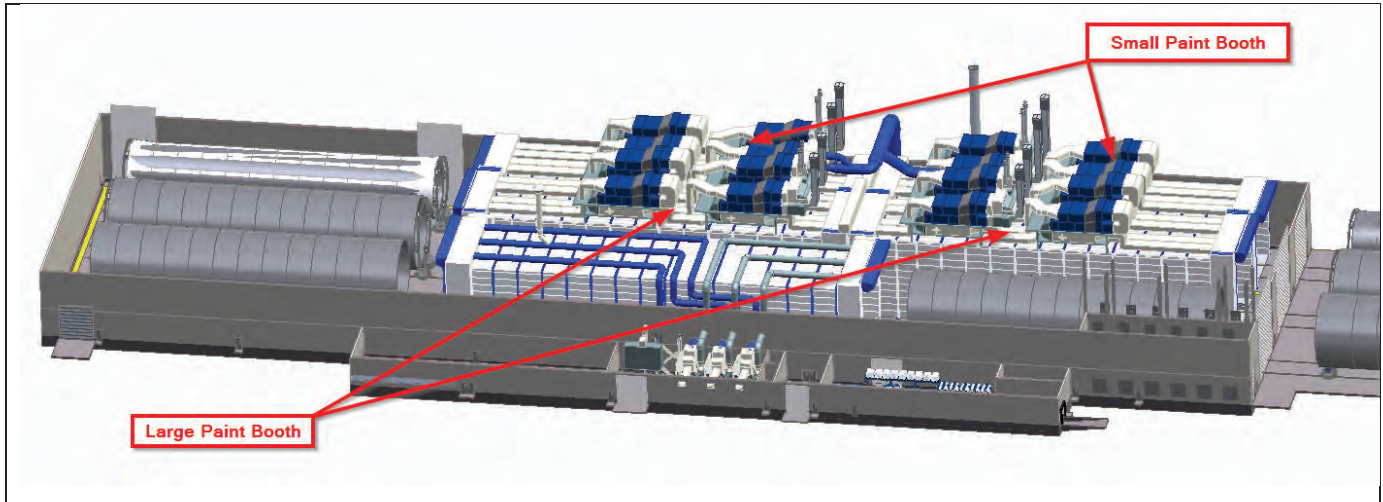
Filter:

- Filter cartridges Donaldson Ultra-Web Flame Retardant, see data sheet

Metalizing process:

- Flange spraying: Manual, 1 Thermion Precision Arc 5.0 with 1/8" zinc wire @ 80lbs/hr
- Inside spraying: Manual, 1 Thermion Precision Arc 5.0 with 1/8" zinc wire @ 80lbs/hr
- Outside spraying: Automated, 3 Thermion Precision Arc 5.0 with 1/8" zinc wire @ 80lbs/hr each
- Abrasive: zinc metalizing wire, see data sheet
- Duty cycle: 3 hours by day
- Zinc consumption: 15 000lbs by week

6 PAINT BOOTH

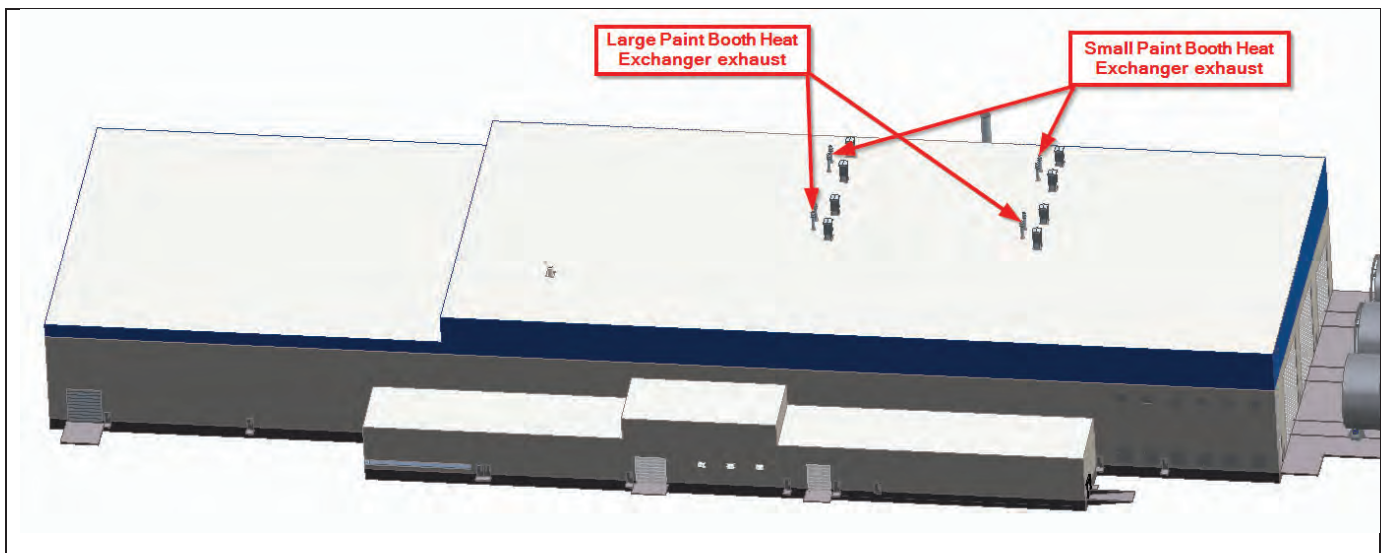


Equipment:

Two Booths with two-zone, horizontal ventilation, zones work independently:

- Small one 36' wide x 38' high x 400' long separated in tow zones 200' each, Sciteex DIANA PB-DB 1201111
- Large one 43' wide x 45' high x 400' long separated in tow zones 200' each, Sciteex DIANA PB-DB 1201313

Exhaust:



The interior chamber air exhaust are directed to the VOC treatment system. The roof exhaust only exhaust clean air heated by a heat exchanger:

- Small Paint Booth:
 - Quantity of emitters: 4 pcs
 - Vertical discharge, no rain cap
 - Height of emitters from floor level: 90 feet
 - Efficiency of emitters: 4 x 4 100 cfm (7 000 m³/h)
 - Diameter of the emitters: dia 19 5/8" (500 mm)
 - Speed of exhaust air: 1970 fpm (10 m/s)
 - Stack exhaust exit temperature: about 113°F (45°C)
- Large Paint Booth:
 - Quantity of emitters: 4 pcs
 - Vertical discharge, no rain cap
 - Height of emitters from floor level: 88 feet
 - Efficiency of emitters: 4 x 6 000 cfm (10 200 m³/h)
 - Diameter of the emitters: dia 19 5/8" (500 mm)
 - Speed of exhaust air: 2835 fpm (14.4 m/s)
 - Stack exhaust exit temperature: about 113°F (45°C)

Filter:

- Filtration level: Carton inertial G3 + M3 cartridge filter
 - End accurate filter: Pocket M5
 - Exhaust Caissons inside booth: Andreae The original
 - Pre-filter in AHU: Paintstop
 - Pre-filter in AHU: VNF 290

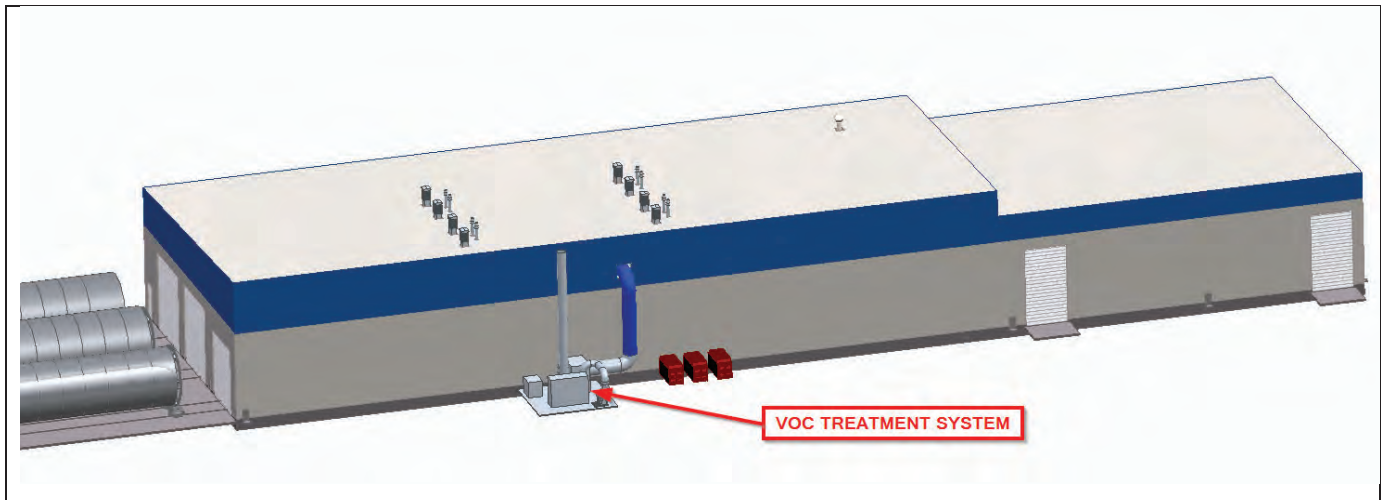
Painting Process:

- Painting sequence: Five coats in total
 - 1st coat outside
 - 1st coat inside
 - 2nd coat outside
 - 2nd coat inside
 - 3rd coat outside
- Total spray time: 10-15 hours per part

- Inside spraying: Manual, 2 Graco XTR Airless Spray Gun with 621 tip @ 0.47 gpm
- Outside spraying: Automated, 3 Graco AL Automatic Airless Spray Gun with 619 tip @ 0.39 gpm
- Duty cycle: 28-30 hours for paint/cure
- Curing: 100% cure not required. Just enough to get parts out of the booth
- Cure temperature: Up to 130F
- Paint products in each booth:
 - Outside:
 - Hempadur AvantGuard 750: 2h @ 21gal/h
 - Hempadur 4774D: 2h @ 43gal/h
 - Hempthane 55610: 2h @ 19gal/h

 - Inside:
 - Hempadur AvantGuard 750: 2h @ 21gal/h
 - Hempadur 4774D: 2h @ 43gal/h

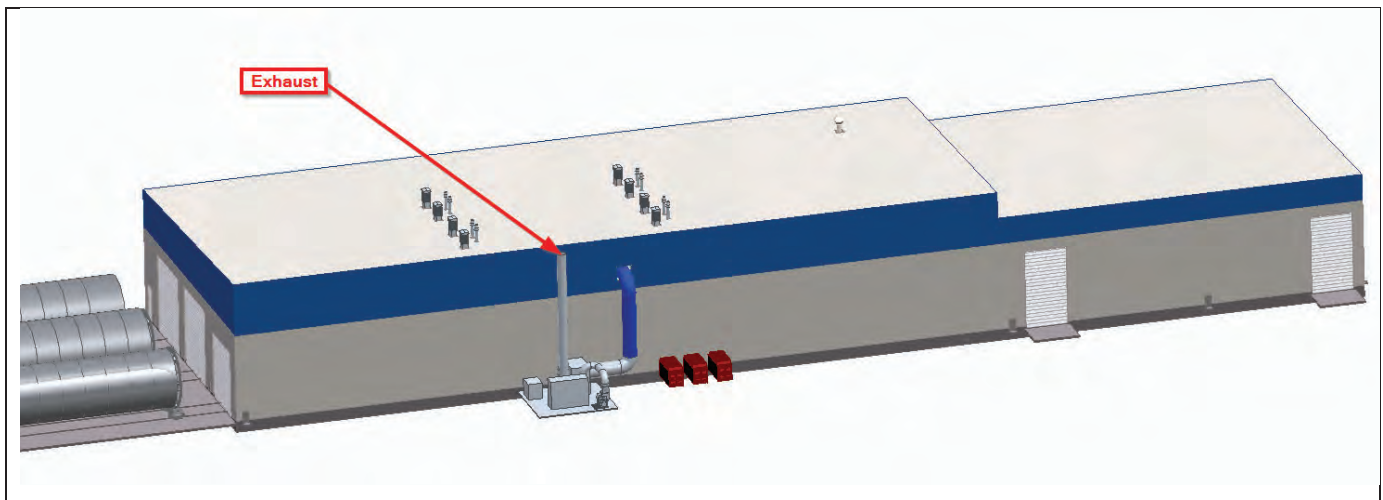
7 VOC TREATMENT SYSTEM



Technology:

Hydrophobic Zeolite rotary concentrator combined with regenerative thermal oxidizer, see data sheet

Exhaust:



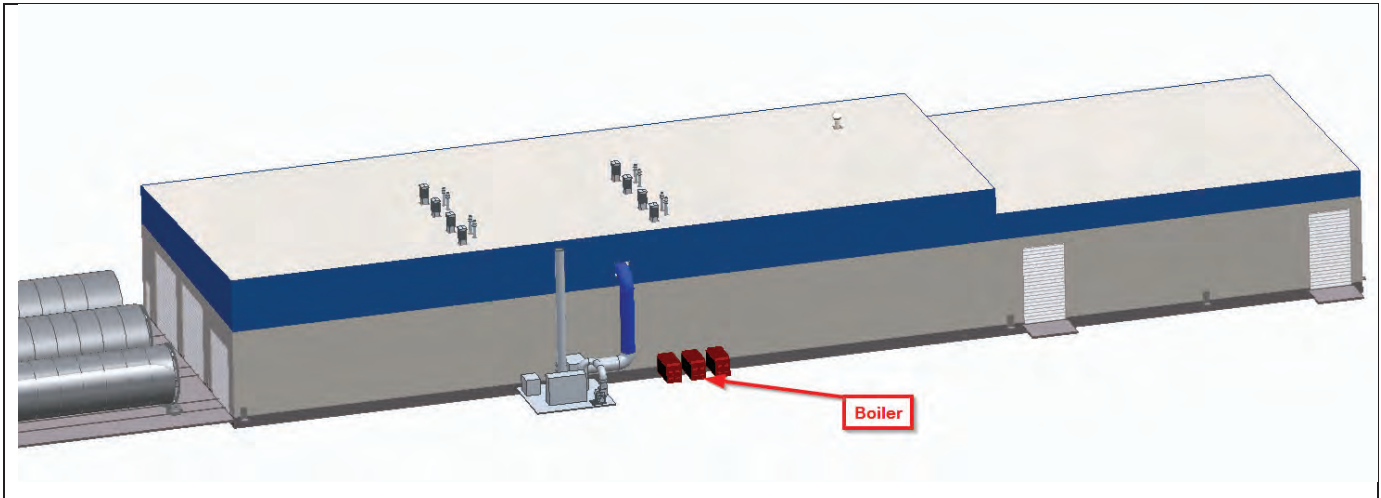
- Quantity of emitters: 1 pcs
- Vertical discharge no rain cap
- Height of emitters from floor level: 85 feet
- Efficiency of emitters: 89 200 cfm
- Diameter of the emitters: dia 74"
- Speed of exhaust air: 3000 feet/min

- Stack exhaust exit temperature: 115°F

Natural gas consumption:

- Max : 7 000 CFH
- Annual: 7 500 000 CF

8 BOILER



Function:

Paint booth ventilation systems thermal power, see data sheet

Equipment:

- 2 boiler 2680hp (2000kW), see data sheet
- 1 boiler 1340hp (1000kW), see data sheet

Natural gas consumption:

- Max 2000kW : 8360 CFH
- Max 1000kW: 4120 CFH
- Max total: 12600 CFH
- Annual: 15 000 000 CF



Quote 638-21-0004-1

Quote Date / Date of Expiry
17.05.2021 / 15.08.2021

Salesman

J.P. Dillon

Phone Number

416-985-3158

Email

jpdillon@esab.com

ESAB Welding & Cutting - 2800 Airport Road - Denton, TX 76207 - USA

Marmen Inc.

Gabriel J. Rodriguez-Artigas

557 rue des Erables

G8T 8Y8 Trois Rivieres

Canada

638-26121a41-f191-4eec-9290-cb6ac705d63c-170521

USA
ESAB Welding & Cutting
2800 Airport Road
Denton, TX 76207

Product information and support
Phone: 1-800-372-2123
www.esabna.com

CANADA
ESAB Welding & Cutting Products
6200 Cantay Road, Unit 20
Mississauga, Ontario L5R 3Y9

Head Office
Phone: +1 (905) 670-0220
www.esab.ca

MEXICO
ESAB Mexico SA de CV
Diego Díaz de Berlanga No. 130
Col. Nogalar CP 66480
San Nicolás de los Garza, N.L.

Planta y oficinas corporativas
Phone: +52 (81) 8305-3700
www.esab.com.mx

USA/CAN/MEX
ESAB Automated Solution

Product Support
Robson Alves
Phone: +1 (940) 381-1319
email: ralves@esab.com



SUMMARY 638-21-0004-1

Marmen Inc.
Gabriel J. Rodriguez-Artigas
557 rue des Erables
G8T 8Y8 Trois Rivieres
Canada

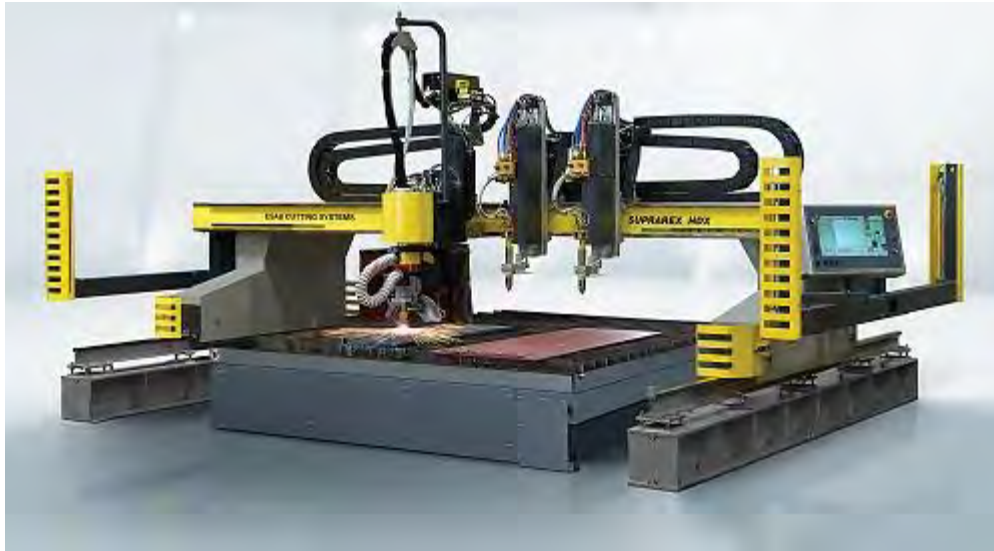
Quote Date / Date of Expiry
17.05.2021 / 15.08.2021

Salesman
J.P. Dillon

Phone Number
416-985-3158

Email
jpdillon@esab.com

SUPRAREX™ HD 11500 with controller VISION™ T5
for oxy-fuel bevel cutting
for vertical plasma cutting and marking with ESAB Plasma system iSeries 200i



BASIC MACHINE DATA

Machine size
Track width : 11500 mm (approx. 37.7 ft)
Track length : 40000 mm (approx. 131.23 ft)*
***NXB style track
Workpiece support height: 700 mm (approx. 28 in)

Working area
Common working width, max. 8000 mm (approx. 26 ft)
Working length, max. 35000 mm (approx. 115 ft)
The given max. working area applies for the table position acc. to machine layout drawing

Plate size
Max. plate width : 8000 mm (approx. 26 ft)
Max. plate length : 35000 mm (approx. 115 ft)

Recommended exhaust table dimensions
(for informational purposes only)
Table width : 9500 mm (approx. 31.2 ft)
Table length : 37000 mm (approx. 121.4 ft)
Table height 700mm (27.56in)

Tool Stations
Number of tools on the machine : 3
Number of transverse drives : 2
Standard plate cutting

2x Oxy-fuel
Cutting mode : Bevel cutting with Oxy-Fuel IR-VBA (20-50 deg)
Number of oxy-fuel bevel cutting modules : 2

USA
ESAB Welding & Cutting
2800 Airport Road
Denton, TX 76207

Product information and support
Phone: 1-800-372-2123
www.esabna.com

CANADA
ESAB Welding & Cutting Products
6200 Cantay Road, Unit 20
Mississauga, Ontario L5R 3Y9

Head Office
Phone: +1 (905) 670-0220
www.esab.ca

MEXICO
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USA/CAN/MEX
ESAB Automated Solution

Product Support
Robson Alves
Phone: +1 (940) 381-1319
email: rvalves@esab.com



Vertical cutting thickness with 3-torch-module, max. 110 mm
Bevel cutting thickness with 3-torch-module, max. 75 mm /50°

1x Plasma
Vertical cutting
Number of vertical plasma cutting torches : 1
Vertical cutting range (Carbon Steel) : 0.125 - 1/2 in. (3 - 12 mm)

Marking
Marking with Plasma system iSeries 100i

SCOPE OF SUPPLY

SUPRAREX™ HD 11500 Heavy Duty Gantry Shape Cutting Machine

The SUPRAREX HDX is a large gantry CNC shape cutting machine. It is built around a reinforced main beam featuring high-stiffness and linear guide ways, that provide outstanding accuracy. The gantry motion is guided by precision machined railway style tracks. The SUPRAREX is equipped with an advanced drive system using digital AC drives with brushless motors and precision gearboxes on dual-linear way drive mounts. The entire gantry is designed to provide smooth, accurate, responsive motion, regardless of machine size.

Standard equipment of the basic machine:

- High performance gantry design for low mounted rail system. The main beam design incorporates two reinforced square tubes with front mounted transverse guide ways and two side carriages in a welded box construction with integrated/swiveable drive systems. Fixed/adjustable track side rollers on the main side carriage guarantee precise alignment on the machine rail.
- Dual side longitudinal drive systems with powerful AC motors, precision gear-boxes and gantry control through the Vision CNC.
- Transverse drive system with motorized carriage, precision rack & pinion, AC motor, and precision gearbox.
- Axis limit switches, gantry reference and gantry control, and safety protection switches for the machine rail.
- Dust-tight electrical cabinet for drive system and power distribution circuits.

40000 mm Heavy Duty NXB style Rail System

- Heavy-duty, precision machined crane rail system
- Machined top and side surfaces
- Machined rack mounting groove for precise rack alignment
- Precision drive rack mounted directly to machined surface
- Fully adjustable mounting pads for adjusting height, level, straightness
- Rail axis powertrack carrier system
- Hose and cable input system for basic gantry

Note:

Unless otherwise specified, power track inlet is at center of rail system. If utilities and power supplies cannot be located in this area, longer hoses and cables must be quoted.

All power track chain support constructions are the responsibility of the customer.

Position of cable chain : High on the right side

Including
fixed connection between one triple torch unit and the plasma carriage
Light curtain safety device
Air condition for the Main Electrical Cabinet
heat protection (metal sheet) under the beam
air dryer

Controller VISION™ T5
Next Generation Cutting Machine Controller

USA
ESAB Welding & Cutting
2800 Airport Road
Denton, TX 76207

Product information and support
Phone: 1-800-372-2123
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Mississauga, Ontario L5R 3Y9

Head Office
Phone: +1 (905) 670-0220
www.esab.ca

MEXICO
ESAB Mexico SA de CV
Diego Díaz de Berlanga No. 130
Col. Nogalar CP 66480
San Nicolás de los Garza, N.L.

Planta y oficinas corporativas
Phone: +52 (81) 8305-3700
www.esab.com.mx

USA/CAN/MEX
ESAB Automated Solution

Product Support
Robson Alves
Phone: +1 (940) 381-1319
email: ralves@esab.com



- New Operating Wizard cuts training time in half
- New Process Selector reduces setup time
- Bright, wide, touch-screen
- Increased processing power for faster operation

The Vision T5 is a powerful, yet easy-to-use, CNC designed specifically for shape cutting machines. Simplicity and ease of operation are the core principles guiding the development of the new VISION T5 touch-screen based control. From power-up to cut part, the new OpWizard guides users with clear, step-by-step instructions. New operators can be productive quickly by following simple prompts with limited choices that lead from file selection to starting the cut. Always have instant access to the controls you need for faster, easier operation. The Built-In Process Database simplifies cutting tool setup by automatically setting parameters such as cutting speed, kerf offset, and timers based on material thickness, material type and cut quality desired.

- Windows 10 Enterprise IoT LTSCB
- Advanced Touch-Screen Interface for easier operation
- Built-In Process Database simplifies cutting tool setup
- Bright, wide touch screen
- True multi-tasking increases productivity
- The ergonomic panel layout means reduced operator stress
- Controls the most complex process tools
- Dual front panel mounted USB ports
- EasyShape Part Program Generator with 88 Shape Library
- Easily generate parts from DXF /DWG files
- Remote Diagnostics allows real-time testing & troubleshooting
- 18.5" "Wide-Screen" Format Color LCD Touch-Screen
- Intel Quad Core i5 embedded processor
- 8GB RAM
- 60GB SSD
- 8 Position Joystick
- Speed Potentiometer
- Standard toggle switches for station up/down
- Integrated Ethernet (LAN) Port
(Optional Wireless LAN Adaptor available)
- Built-in Software PLC
- CAN Bus I/O Controller
- Integrated Emergency-stop pushbutton
- Integrated Safety Key Switch for optional Safety Lockouts
- Controls up to 12 stations without add-on panels
- Operator Panel industrial protection rating IP54

Position of NC : Right, on the machine

Character Generator "BUGE"

For use with single point marking devices, such as scribes or plasma markers. Allows machine to write characters on the plate without having to program the motion for each character. Characters to be marked are programmed in plain text, and can be easily edited by the machine operator prior to marking

Character type : Latin

Air Condition for control panel

Includes a thermostatically controlled cooling device for the main electrical cabinet

Oxy-fuel cutting



More economical and precise than ever. Oxyfuel cutting with gas-oxygen flame generally achieves good results when cutting all low-alloy steels.

The Oxy-Fuel IR-VBA

The Global Oxy-Fuel IR-VBA is an automated system for cutting bevels to prepare mild steel plate for welding. Tilt angles and torch offsets are fully programmable and changeable on-the-fly, allowing the system to quickly adjust to cut multiple different bevels on the same part. Accurate bevel cutting is achieved using a precision tactile sensor that follows the plate surface.

This rugged system includes heat shields and air cooling to protect against the extreme heat generated by thick plate bevelling. The cutting sequence is fully automated with automatic ignition, automatic height control, individual torch solenoid valves, and automatic infinite rotation.

- Motorised, programmable tilt angles and torch offsets
- Automatic, infinite rotation
- Accurate tactile sensing height control
- Easily cut accurate bevelled edges on mild steel from 20 to 50 deg.
- Achieves I, V, X, Y, and K cuts
- Digital AC drives and planetary gearboxes for rotation and Z-axis
- Straight cutting up to 110 mm material thickness
- Bevel cutting up to 75 mm / 50 deg.

Gas type oxy-fuel : Methane / Natural gas***

Material : Standard Mild Steel

Vertical Plasma cutting



Plasma cutting offers an unbeatable cost-performance ratio, high cutting speeds and extremely precise cut edge quality. ESABs plasma solutions are efficient, easy to use and economical.

ESAB High Precision Plasma Cutting System iSeries 100i



ESAB iSeries technology provides the next generation of higher productivity, increased flexibility and confidence in high precision plasma cutting. Delivers outstanding performance on mild steel, and superior cutting results on non-ferrous metals. The iSeries systems utilize StepUp™ modular power technology so units are easily upgraded.

Provides the following capabilities:

- Plasma marking and cutting with the same torch
- Can cut stainless steel and Aluminium WMS Technology (Water Mist as Shield, N₂H₂O, H-35/N₂ or Air/Air)

Includes the following:

- Power Supply with integrated Water Cooler/Recirculator
- Automatic Gas Control Provides electronically controlled plasma gas flow, start gas flow, and shield gas flow. All parameters are adjusted through the Vision CNC, allowing full process automation through the built-in Process Database.
- High-precision, dual-gas, water cooled torch with SpeedLok™ for fastest consumable change over, and "leakless" head design
- Start-Up Kit for the torch, including set of consumables for system startup testing
- Input Bundle including power/ground cables and all applicable hoses and cables required with the system

The Automatic Gas Control supports the following gas combinations:

- Oxygen Cut Gas /Air Shield or Oxygen for thinner gauge material
- Air Cut Gas /Air Shield
- Nitrogen Cut Gas /Water Shield (WMS)
- H35 Cut Gas /Nitrogen Shield
- Plasma Marking with Argon gas input

Note: Power supply requires three phase input power.

1x ESAB Plasma power supply iSeries 100i
iSeries Torch Set

Plasma gases : Air, O₂, Ar-H₂, N₂ @ 120 psi (8.3 bar) and Ar for marking with DFC 3000
Material : Mild steel

1x Set of plasma wear parts for vertical cutting of Mild Steel

Central ON /OFF switch for the plasma system

Coolant for plasma system for temperatures up to max. -11°C

Plasma Marking



Plasma marking uses a low-current, constricted arc to create lines or text on the plate surface. It offers the advantages of speed and versatility with variable line width and depth. Plasma can mark on wet, oily or rusted surfaces, and is an excellent method of marking text on mild steel or stainless steel.

Optical-Manual Plate Alignment Camera



This system offers the fastest and easiest way to do a manual plate alignment, even on large plates. Video from a downward pointed camera is displayed on screen at the Vision T5, with an alignment cross-hair superimposed on the image. The operator can easily jog the machine to points along the plate edge in order to perform the plate alignment procedure, without having to leave the operator station for a better view.

Important note regarding programming

The suitability of the existing COLUMBUS system for the use with the quoted equipment is subject to ESABs approval.

Cutting table type : Exhaust table

Cutting table (customer responsibility)

Recommended exhaust table dimensions (for informational purposes only)

Table width : 9500 mm (approx. 31.2 ft.)

Table length : 37000 mm (approx. 121.4 ft.)

Table height : 700mm (27.56In)

Important note

The supply of the cutting table is in full responsibility of the customer.

ESAB is not liable for any issues which might occur in connection with unsuitable table.

Important note

The supply of the exhaust system is in full responsibility of the customer.

ESAB is not liable for any issues which might occur in connection with unsuitable filter equipment

Machine acceptance

Factory acceptance test (FAT) is acc. to S standard

Documentation

Customer specific layout drawing

1 set of labels and operating instructions in English

Technical documentation in English

Country of machine operation : USA

Packing, freight, installation

Including packing in wooden box /seaworthy packing

ESAB will provide one factory trained Field Service Engineer to supervise customer personnel during installation, and to provide on-site operation and maintenance training. Travel and living expenses are included during this period (see Terms and Conditions Exceptions Page for explanation) Installation pertains only to the machine. Customer is responsible for initial installation of the rails. Any peripheral equipment such

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as water tables, fume and smoke removal systems, etc. will be quoted separately.

Delivery time

Please note that estimated delivery time is quoted as 20 weeks after receipt of written Purchase Order, Down Payment, and signed Order Confirmation is returned to Project Management. Delivery subject to factory backlog at the time the order is entered. Actual delivery date will be confirmed after order entry is completed.

Payment

35% upon order confirmation / 60% prior to delivery upon notification of readiness for dispatch / 5% with machine acceptance, not later than 30 days after machine shipment
See attached Terms and Conditions of Sale

Defects liability period

12 months from the Final Acceptance Date set out in the Acceptance Certificate, but not later than 14 months after delivery

Note: Prior to shipment ESAB will execute its standard Quality Process Check. Special runoff requirements will be reviewed at or prior to date of order.

Machine required to be shipped by Air Ride Flatbed Dedicated Truck unless otherwise specified.

Taxes, Excise Or Other Governmental Charges

The Buyer shall be responsible for all taxes, excises or other governmental charges that ESAB Cutting may be required to pay with respect to the production, sale or transportation of any goods delivered hereunder, where no other reference has been made.

*PLEASE NOTE: For TAX EXEMPT buyers, a SALES EXEMPTION/RESALE CERTIFICATE OR DIRECT PAY PERMIT must be provided for the State(s) in which ESAB will be shipping product on your behalf. If an EXEMPTION /RESALE CERTIFICATE OR DIRECT PAY PERMIT is not received the buyer will be held responsible for all applicable sales & use taxes.

The sale of the goods described above shall be governed by the standard Terms and Conditions of Sale of The ESAB Group, Inc. ("ESAB"), which are incorporated herein by reference and made a part hereof. Please note that ESABs standard Terms and Conditions of Sale govern both domestic and international sales of goods by ESAB to its customers. If a copy of the standard Terms and Conditions of Sale is not attached hereto, a copy may be obtained by calling 1-800-ESAB-123 or referenced on ESABs website at www.esabna.com/terms. For the avoidance of doubt, all prices for the goods described above shall be paid in the currency of the United States of America ("U.S.").

Also, for the avoidance of doubt, please note that diversion by you of the goods described above contrary to U.S. law is prohibited, and you hereby agree and acknowledge that you will not supply, tranship or re-export any of the goods described above to any country currently subject to embargo under the laws of the U.S., including Cuba, Iran, Sudan, Syria and Burma (Myanmar).

Note: The machine is built to standard engineering practices which may or may not cover local legislature requirements. It is the customers responsibility to provide ESAB with these specific requirements such as CSA, so this can be quoted.

Global Trade Compliance

Seller is providing this quote/response without the ability to complete full due diligence under our trade compliance program. Buyer acknowledges that the Items (i.e. goods, software, services, and /or technology) involved in this quote/response may be subject to export control, trade sanctions, or other export laws and regulations, including authorizations and licenses of the United States, EU and its member states, and/or other countries ("Export Control Regulations"). Buyer agrees to comply with the Export Control Regulations as well as any other applicable country's Import laws and regulations and not to do anything which could cause the Seller to be in breach of Export Control Regulations and Import laws and regulations. No order shall be placed pursuant to this quote/response unless Seller is satisfied that the Items and any related services can be supplied in compliance with the Export Control Regulations and in the event that any applicable Export Control Regulations prohibit or make impracticable Seller's performance hereunder, Seller will be released from all and any performance related to this quote/response or any related order placed but not accepted. The Buyer agrees to provide the Seller timeously with reasonable assistance and information to enable the Seller to determine whether fulfilment of any order would be in compliance with Export Control Regulations, including but not limited to complete details of applicable End-User and End-Use, and End Destination. Additionally, if a Government Export Authorization is required, please be aware that lead-times may need to be extended to accommodate the export authorization application process.

Note: Company Policy and/or applicable Export Control Regulations do not permit any business involving our products with economic sanctioned countries under the Export Control Regulations directly or indirectly. Additionally, defense end-users and/or uses, directly or indirectly, involving China, Russia and Venezuela are not permitted. Diversion or re-export of any product(s) is strictly prohibited.

The ESAB STANDARD CUTTING CONDITIONS OF SALE apply except to the extent amended by this quotation form.

This quotation is subject to change without notice.

The products may vary from those pictured.

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Quote 641-21-0015-4

Quote Date / Date of Expiry
18.05.2021 / 16.08.2021

Salesman
Jeffrey Defalco

Phone Number
(843) 229-1050

Email
jdefalco@esab.com

ESAB Welding & Cutting - 2800 Airport Road - Denton, TX 76207 - USA

Marmen Inc.
557 rue des Erables
G8T 8Y8 Trois Rivieres
Canada

NEEDS CRITERIA (Lists future objectives and slated application specs):

- a. Bevel cutting for max. plate size - 3 meter x 82'. Includes edge preparation on both sides and ends
- b. Edge preparation including "V", "Y", "X", and "K" edge preparation profiles from 15 to 45 degrees
- c. Max plate thickness: 120 mm (~5")
- d. Plate alloy - Mild steel
- e. Plasma marking. Also provides plasma cutting up to 1/2"
- f. Includes Columbus software modules that is used in conjunction with other ESAB machines
- g. Replace laser pointer with Camera Alignment system

641-98504557-c19e-4c68-9d2d-8dad6bf68892-180521

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SUMMARY 641-21-0015-4

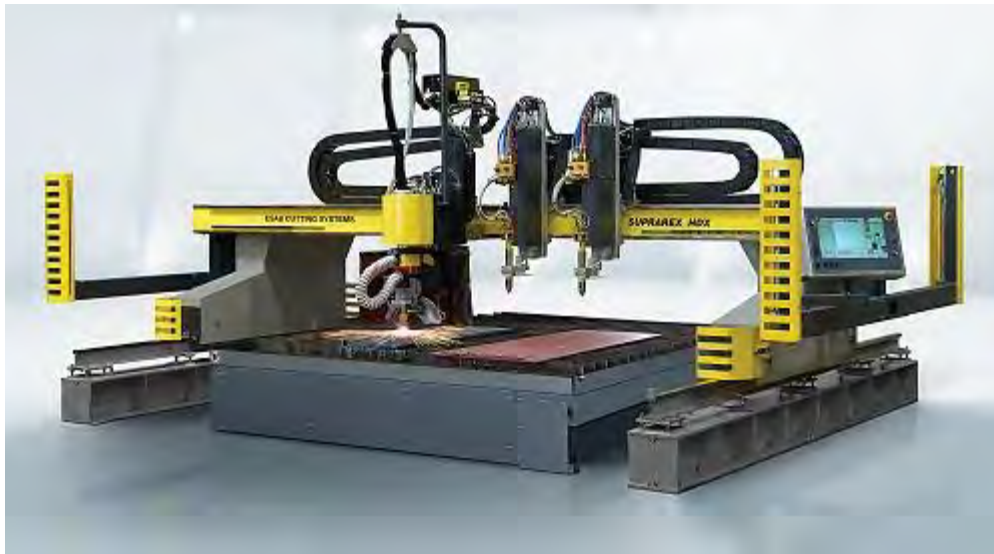
Quote Date / Date of Expiry
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Salesman
Jeffrey Defalco

Phone Number
(843) 229-1050

Email
jdefalco@esab.com

SUPRAREX™ HD 6500 with controller VISION™ T5
for oxy-fuel bevel cutting
for vertical plasma cutting and marking with ESAB Plasma system iSeries 100i
Including Programming system COLUMBUS



BASIC MACHINE DATA

Machine size
Track width : 6500 mm (approx. 21 ft.)
Track length : 30000 mm (approx. 98 ft.)
Workpiece support height : 700 mm (approx. 28 in)

Working area
Common working width, max. 3048 mm (approx. 10 ft.)
Working length, max. 25000 mm (approx. 89 ft.)
The given max. working area applies for the table position acc. to machine layout drawing

Plate size
Max. plate width : 3048 mm (approx. 10 ft.)
Max. plate length : 25000 mm (approx. 82 ft.)

Recommended exhaust table dimensions
(for informational purposes only)
Table width : 4900 mm (approx. 16 ft.)
Table length : 27000 mm (approx. 88.6 ft.)
Table height : 700 mm (approx. 27.56 in)

Tool Stations
Number of tools on the machine : 3
Number of transverse drives : 2
Standard plate cutting

2x Oxy-fuel
Cutting mode : Bevel cutting with Oxy-Fuel Global IR-VBA (15-45 deg)
Number of oxy-fuel bevel cutting modules : 2

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Vertical cutting thickness with 3-torch-module, max. 150 mm
Bevel cutting thickness with 3-torch-module, max. 100 mm /45°

1x Plasma
Vertical cutting
Number of vertical plasma cutting torches : 1
Vertical cutting range (Carbon Steel) : 0.125 - 1/2 in. (3 - 12 mm)

Marking
Marking with Plasma system iSeries 100i

SCOPE OF SUPPLY

SUPRAREX™ HD 6500 Heavy Duty Gantry Shape Cutting Machine

The SUPRAREX HDX is a large gantry CNC shape cutting machine. It is built around a reinforced main beam featuring high-stiffness and linear guide ways, that provide outstanding accuracy. The gantry motion is guided by precision machined railway style tracks. The SUPRAREX is equipped with an advanced drive system using digital AC drives with brushless motors and precision gearboxes on dual-linear way drive mounts. The entire gantry is designed to provide smooth, accurate, responsive motion, regardless of machine size.

Standard equipment of the basic machine:

- High performance gantry design for low mounted rail system. The main beam design incorporates two reinforced square tubes with front mounted transverse guide ways and two side carriages in a welded box construction with integrated/swiveable drive systems. Fixed/adjustable track side rollers on the main side carriage guarantee precise alignment on the machine rail.
- Dual side longitudinal drive systems with powerful AC motors, precision gear-boxes and gantry control through the Vision CNC.
- Transverse drive system with motorized carriage, precision rack & pinion, AC motor, and precision gearbox.
- Axis limit switches, gantry reference and gantry control, and safety protection switches for the machine rail.
- Dust-tight electrical cabinet for drive system and power distribution circuits.

30000 mm Heavy Duty Rail System

- Heavy-duty, precision machined crane rail system
- Machined top and side surfaces
- Machined rack mounting groove for precise rack alignment
- Precision drive rack mounted directly to machined surface
- Fully adjustable mounting pads for adjusting height, level, straightness
- Rail axis powertrack carrier system
- Hose and cable input system for basic gantry

Note:

Unless otherwise specified, power track inlet is at center of rail system. If utilities and power supplies cannot be located in this area, longer hoses and cables must be quoted.

All power track chain support constructions are the responsibility of the customer.

Supply of track accessories : Foundation drawings only

Position of cable chain : High on the left side

Including

fixed connection between one triple torch unit and the plasma carriage
Light curtain safety device
Air condition for the Main Electrical Cabinet
heat protection (metal sheet) under the beam
air dryer

Controller VISION™ T5

Next Generation Cutting Machine Controller

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Position of NC : Left, on the machine

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Character type : Latin

WiFi Adaptor for Vision T5

Quickly and easily connect the Vision T5 to your shop's wireless network

Air Condition for control panel

Includes a thermostatically controlled cooling device for the main electrical cabinet

Oxy-fuel cutting



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- Motorised, programmable tilt angles and torch offsets
- Automatic, infinite rotation
- Accurate tactile sensing height control
- Easily cut accurate bevelled edges on mild steel from 15 to 45 deg.
- Achieves I, V, X, Y, and K cuts
- Digital AC drives and planetary gearboxes for rotation and Z-axis
- Straight cutting up to 150 mm material thickness
- Bevel cutting up to 100 mm / 45 deg.

Gas type oxy-fuel : Methane / Natural gas

Material : Standard Mild Steel / Natural gas

Material : Standard Mild Steel

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- High-precision, dual-gas, water cooled torch with SpeedLok™ for fastest consumable change over, and "leakless" head design
- Start-Up Kit for the torch, including set of consumables for system startup testing
- Input Bundle including power/ground cables and all applicable hoses and cables required with the system

The Automatic Gas Control supports the following gas combinations:

- Oxygen Cut Gas /Air Shield or Oxygen for thinner gauge material
- Air Cut Gas /Air Shield
- Nitrogen Cut Gas /Water Shield (WMS)
- H35 Cut Gas /Nitrogen Shield
- Plasma Marking with Argon gas input

Note: Power supply requires three phase input power.

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iSeries Torch Set

Plasma gases : Air, O₂, Ar-H₂, N₂ @ 120 psi (8.3 bar) and Ar for marking with DFC 3000

Material : Mild steel

Central ON /OFF switch for the plasma system

Coolant for plasma system for temperatures up to max. -11°C

Plasma Marking



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Programming Columbus™



Columbus™ III is our latest software which makes it easy for you to programme your cutting requirements as well as your labelling and marking processes. Intelligent wizards contribute to intuitive operation so you can perform simple and highly complex cuts, labelling and nesting jobs quickly and easily.

Number of Licences : 1

Including

Layout Designer

with all needed functions necessary for generating a nesting and/or NC programs (straight line).

- Secure data handling is ensured with an SQL database
- Integrated CAD program is available for 2D part construction
- Geometry import interface for the DXF/DWG data format

Automatic Nesting

Fully automated nesting of any geometry, even on remnants.

Plate management

Rectangular plates as well as remnants are managed and defined here.

Production Data

Calculation of process related production data based on parts and layouts containing distances, weights, times, areas, spare parts wear and consumption.

Bevel Cutting

For programming of bevel aggregates: V upper bevel, V lower bevel, Y upper bevel, Y lower bevel, X bevel, K bevel and individually defined bevels up to fivefold cutting of a contour.

License Manager

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Col. Nogalar CP 66480
San Nicolás de los Garza, N.L.

Planta y oficinas corporativas
Phone: +52 (81) 8305-3700
www.esab.com.mx

USA/CAN/MEX
ESAB Automated Solution

Product Support
Robson Alves
Phone: +1 (940) 381-1319
email: ralves@esab.com



Manages multiple user network access to Columbus licenses. Allows many users to share a few licenses. Number of concurrent users is limited to actual number of licenses purchased. All Licenses must have the same options. Requires Windows TCP/IP-Network.

1 year Technical Support and Maintenance

Technical Support and Software Maintenance is available after training has been completed. Remote Servicing is possible if the customer has internet access from the computer on which Columbus is installed.

NOTES

+ Complete Columbus Documentation is provided on the Columbus CD-ROM

Cutting table type : Exhaust table

Cutting table (customer responsibility)

Recommended exhaust table dimensions (for informational purposes only)

(for informational purposes only)

Table width : 4900 mm (approx. 16 ft)

Table length : 27000 mm (approx. 88.6 ft)

Table height : 700 mm (approx. 27.56 int)

Cutting table control : mechanical

Important note

The supply of the cutting table is in full responsibility of the customer.

ESAB is not liable for any issues which might occur in connection with unsuitable table.

Important note

The supply of the exhaust system is in full responsibility of the customer.

ESAB is not liable for any issues which might occur in connection with unsuitable filter equipment

Machine acceptance

Factory acceptance test (FAT) is acc. to Standard

Documentation

Customer specific layout drawing

1 set of labels and operating instructions in English

Technical documentation in English

Country of machine operation : USA

Packing, freight, installation

Including packing in wooden box / seaworthy packing

ESAB will provide one factory trained Field Service Engineer to supervise customer personnel during installation, and to provide on-site operation and maintenance training. Travel and living expenses are included during this period (see Terms and Conditions Exceptions Page for explanation) Installation pertains only to the machine. Customer is responsible for initial installation of the rails. Any peripheral equipment such as water tables, fume and smoke removal systems, etc. will be quoted separately.

Delivery time

Please note that estimated delivery time is quoted as 18 - 20 weeks after receipt of written Purchase Order, Down Payment, and signed Order Confirmation is returned to Project Management Delivery subject to factory backlog at the time the order is entered. Actual delivery date will be confirmed after order entry is completed.

Payment

35% upon order confirmation / 60% prior to delivery upon notification of readiness for dispatch / 5% with machine acceptance, not later than 30 days after machine shipment

See attached Terms and Conditions of Sale

Defects liability period

12 months from the Final Acceptance Date set out in the Acceptance Certificate, but not later than 14 months after delivery

Note: Prior to shipment ESAB will execute its standard Quality Process Check. Special runoff requirements will be reviewed at or prior to date of order.

Machine required to be shipped by Air Ride Flatbed Dedicated Truck unless otherwise specified.

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2800 Airport Road
Denton, TX 76207

Product information and support
Phone: 1-800-372-2123
www.esabna.com

CANADA
ESAB Welding & Cutting Products
6200 Cantay Road, Unit 20
Mississauga, Ontario L5R 3Y9

Head Office
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**Taxes, Excise Or Other Governmental Charges**

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*PLEASE NOTE: For TAX EXEMPT buyers, a SALES EXEMPTION/RESALE CERTIFICATE OR DIRECT PAY PERMIT must be provided for the State(s) in which ESAB will be shipping product on your behalf. If an EXEMPTION /RESALE CERTIFICATE OR DIRECT PAY PERMIT is not received the buyer will be held responsible for all applicable sales & use taxes.

The sale of the goods described above shall be governed by the standard Terms and Conditions of Sale of The ESAB Group, Inc. ("ESAB"), which are incorporated herein by reference and made a part hereof. Please note that ESABs standard Terms and Conditions of Sale govern both domestic and international sales of goods by ESAB to its customers. If a copy of the standard Terms and Conditions of Sale is not attached hereto, a copy may be obtained by calling 1-800-ESAB-123 or referenced on ESABs website at www.esabna.com/terms. For the avoidance of doubt, all prices for the goods described above shall be paid in the currency of the United States of America ("U.S.").

Also, for the avoidance of doubt, please note that diversion by you of the goods described above contrary to U.S. law is prohibited, and you hereby agree and acknowledge that you will not supply, tranship or re-export any of the goods described above to any country currently subject to embargo under the laws of the U.S., including Cuba, Iran, Sudan, Syria and Burma (Myanmar).

Note: The machine is built to standard engineering practices which may or may not cover local legislature requirements. It is the customers responsibility to provide ESAB with these specific requirements such as CSA, so this can be quoted.

Global Trade Compliance

Seller is providing this quote/response without the ability to complete full due diligence under our trade compliance program. Buyer acknowledges that the Items (i.e. goods, software, services, and /or technology) involved in this quote/response may be subject to export control, trade sanctions, or other export laws and regulations, including authorizations and licenses of the United States, EU and its member states, and/or other countries ("Export Control Regulations"). Buyer agrees to comply with the Export Control Regulations as well as any other applicable country's Import laws and regulations and not to do anything which could cause the Seller to be in breach of Export Control Regulations and Import laws and regulations. No order shall be placed pursuant to this quote/response unless Seller is satisfied that the Items and any related services can be supplied in compliance with the Export Control Regulations and in the event that any applicable Export Control Regulations prohibit or make impracticable Seller's performance hereunder, Seller will be released from all and any performance related to this quote/response or any related order placed but not accepted. The Buyer agrees to provide the Seller timeously with reasonable assistance and information to enable the Seller to determine whether fulfilment of any order would be in compliance with Export Control Regulations, including but not limited to complete details of applicable End-User and End-Use, and End Destination. Additionally, if a Government Export Authorization is required, please be aware that lead-times may need to be extended to accommodate the export authorization application process.

Note: Company Policy and/or applicable Export Control Regulations do not permit any business involving our products with economic sanctioned countries under the Export Control Regulations directly or indirectly. Additionally, defense end-users and/or uses, directly or indirectly, involving China, Russia and Venezuela are not permitted. Diversion or re-export of any product(s) is strictly prohibited.

The ESAB STANDARD CUTTING CONDITIONS OF SALE apply except to the extent amended by this quotation form.

This quotation is subject to change without notice.

The products may vary from those pictured.

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Quote 641-21-0016-3

Quote Date / Date of Expiry
18.05.2021 / 16.08.2021

Salesman
Jeffrey Defalco

Phone Number
(843) 229-1050

Email
jdefalco@esab.com

ESAB Welding & Cutting - 2800 Airport Road - Denton, TX 76207 - USA

Marmen Inc.
557 rue des Erables
G8T 8Y8 Trois Rivieres
Canada

NEEDS CRITERIA (Lists future objectives and slated application specs):

- a. Bevel cutting for max. plate size - 3 meter x 114'. Includes edge preparation on both sides and ends
- b. Edge preparation including "V", "Y", "X", and "K" edge preparation profiles from 15 to 45 degrees
- c. Max plate thickness: 120 mm (~5")
- d. Plate alloy - Mild steel
- e. Plasma marking. Also provides plasma cutting up to 1/2"
- f. Uses Columbus software contained within Machine #1 scope of supply
- g. Replace laser pointer for Plate Alignment Camera

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SUMMARY 641-21-0016-3

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18.05.2021 / 16.08.2021

Salesman
Jeffrey Defalco

Phone Number
(843) 229-1050

Email
jdefalco@esab.com

SUPRAREX™ HD 6500 with controller VISION™ T5
for oxy-fuel bevel cutting
for vertical plasma cutting and marking with ESAB Plasma system iSeries 100i
Including Programming system COLUMBUS



BASIC MACHINE DATA

Machine size

Track width : 6500 mm (approx. 21 ft.)
Track length : 40000 mm (approx. 98 ft.)
Workpiece support height : 700 mm (approx. 28 in)

Working area

Common working width, max. 3048 mm (approx. 10 ft.)
Working length, max. 34742 mm (approx. 114 ft.)
The given max. working area applies for the table position acc. to machine layout drawing

Plate size

Max. plate width : 3048 mm (approx. 10 ft.)
Max. plate length : 34742 mm (approx. 114 ft.)

Recommended exhaust table dimensions (for informational purposes only)

Table width : 4900 mm (approx. 16 ft.)
Table length : 37000 mm (approx. 121.4 ft.)
Table height : 700 mm (approx. 27.56 in)

Tool Stations

Number of tools on the machine : 3
Number of transverse drives : 2
Standard plate cutting

2x Oxy-fuel

Cutting mode : Bevel cutting with Oxy-Fuel Global IR-VBA (15-45 deg)

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Number of oxy-fuel bevel cutting modules : 2
Vertical cutting thickness with 3-torch-module, max. 150 mm
Bevel cutting thickness with 3-torch-module, max. 100 mm /45°

1x Plasma
Vertical cutting
Number of vertical plasma cutting torches : 1
Vertical cutting range (Carbon Steel) : 0.125 - 1/2 in. (3 - 12 mm)

1x Marking tool carriage
Marking with Plasma system iSeries 100i

SCOPE OF SUPPLY

SUPRAREX™ HD 6500 Heavy Duty Gantry Shape Cutting Machine

The SUPRAREX HDX is a large gantry CNC shape cutting machine. It is built around a reinforced main beam featuring high-stiffness and linear guide ways, that provide outstanding accuracy. The gantry motion is guided by precision machined railway style tracks. The SUPRAREX is equipped with an advanced drive system using digital AC drives with brushless motors and precision gearboxes on dual-linear way drive mounts. The entire gantry is designed to provide smooth, accurate, responsive motion, regardless of machine size.

Standard equipment of the basic machine:

- High performance gantry design for low mounted rail system. The main beam design incorporates two reinforced square tubes with front mounted transverse guide ways and two side carriages in a welded box construction with integrated/swiveable drive systems. Fixed/adjustable track side rollers on the main side carriage guarantee precise alignment on the machine rail.
- Dual side longitudinal drive systems with powerful AC motors, precision gear-boxes and gantry control through the Vision CNC.
- Transverse drive system with motorized carriage, precision rack & pinion, AC motor, and precision gearbox.
- Axis limit switches, gantry reference and gantry control, and safety protection switches for the machine rail.
- Dust-tight electrical cabinet for drive system and power distribution circuits.

40000 mm Heavy Duty Rail System

- Heavy-duty, precision machined crane rail system
- Machined top and side surfaces
- Machined rack mounting groove for precise rack alignment
- Precision drive rack mounted directly to machined surface
- Fully adjustable mounting pads for adjusting height, level, straightness
- Rail axis powertrack carrier system
- Hose and cable input system for basic gantry

Note:

Unless otherwise specified, power track inlet is at center of rail system. If utilities and power supplies cannot be located in this area, longer hoses and cables must be quoted.

All power track chain support constructions are the responsibility of the customer.

Position of cable chain : High on the left side

Including

fixed connection between one triple torch unit and the plasma carriage
Light curtain safety device
Air condition for the Main Electrical Cabinet
heat protection (metal sheet) under the beam
air dryer

Controller VISION™ T5

Next Generation Cutting Machine Controller

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- New Operating Wizard cuts training time in half
- New Process Selector reduces setup time
- Bright, wide, touch-screen
- Increased processing power for faster operation

The Vision T5 is a powerful, yet easy-to-use, CNC designed specifically for shape cutting machines. Simplicity and ease of operation are the core principles guiding the development of the new VISION T5 touch-screen based control. From power-up to cut part, the new OpWizard guides users with clear, step-by-step instructions. New operators can be productive quickly by following simple prompts with limited choices that lead from file selection to starting the cut. Always have Instant access to the controls you need for faster, easier operation. The Built-In Process Database simplifies cutting tool setup by automatically setting parameters such as cutting speed, kerf offset, and timers based on material thickness, material type and cut quality desired.

- Windows 10 Enterprise IoT LTSC
- Advanced Touch-Screen Interface for easier operation
- Built-In Process Database simplifies cutting tool setup
- Bright, wide touch screen
- True multi-tasking increases productivity
- The ergonomic panel layout means reduced operator stress
- Controls the most complex process tools
- Dual front panel mounted USB ports
- EasyShape Part Program Generator with 88 Shape Library
- Easily generate parts from DXF /DWG files
- Remote Diagnostics allows real-time testing & troubleshooting
- 18.5" "Wide-Screen" Format Color LCD Touch-Screen
- Intel Quad Core i5 embedded processor
- 8GB RAM
- 60GB SSD
- 8 Position Joystick
- Speed Potentiometer
- Standard toggle switches for station up/down
- Integrated Ethernet (LAN) Port
- Built-in Software PLC
- CAN Bus I/O Controller
- Integrated Emergency-stop pushbutton
- Integrated Safety Key Switch for optional Safety Lockouts
- Controls up to 12 stations without add-on panels
- Operator Panel industrial protection rating IP54

Position of NC : Left, on the machine

Character Generator "BUGE"

For use with single point marking devices, such as scribes or plasma markers. Allows machine to write characters on the plate without having to program the motion for each character. Characters to be marked are programmed in plain text, and can be easily edited by the machine operator prior to marking

Character type : Latin

WiFi Adaptor for Vision T5

Quickly and easily connect the Vision T5 to your shop's wireless network

Air Condition for control panel

Includes a thermostatically controlled cooling device for the main electrical cabinet

Oxy-fuel cutting



More economical and precise than ever. Oxyfuel cutting with gas-oxygen flame generally achieves good results when cutting all low-alloy steels.

The Oxy-Fuel IR-VBA

The Global Oxy-Fuel IR-VBA is a fully automated system for cutting bevels to prepare mild steel plate for welding. Tilt angles and torch offsets are fully programmable and changeable on-the-fly, allowing the system to quickly adjust to cut multiple different bevels on the same part. Accurate bevel cutting is achieved using a precision tactile sensor that follows the plate surface.

This rugged system includes heat shields and air cooling to protect against the extreme heat generated by thick plate bevelling. The cutting sequence is fully automated with automatic ignition, automatic height control, individual torch solenoid valves, and automatic infinite rotation.

- Motorised, programmable tilt angles and torch offsets
- Automatic, infinite rotation
- Accurate tactile sensing height control
- Easily cut accurate bevelled edges on mild steel from 15 to 45 deg.
- Achieves I, V, X, Y, and K cuts
- Digital AC drives and planetary gearboxes for rotation and Z-axis
- Straight cutting up to 150 mm material thickness
- Bevel cutting up to 100 mm / 45 deg.

Gas type oxy-fuel : Methane / Natural gas
Material : Standard Mild Steel

Including Gas support panel for oxy-fuel cutting

Vertical Plasma cutting



Plasma cutting offers an unbeatable cost-performance ratio, high cutting speeds and extremely precise cut edge quality. ESAB's plasma solutions are efficient, easy to use and economical.

ESAB High Precision Plasma Cutting System iSeries 100i

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ESAB iSeries technology provides the next generation of higher productivity, increased flexibility and confidence in high precision plasma cutting. Delivers outstanding performance on mild steel, and superior cutting results on non-ferrous metals. The iSeries systems utilize StepUp™ modular power technology so units are easily upgraded.

Provides the following capabilities:

- Plasma marking and cutting with the same torch
- Can cut stainless steel and Aluminium WMS Technology (Water Mist as Shield, N₂H₂O, H-35/N₂ or Air/Air)

Includes the following:

- Power Supply with integrated Water Cooler/Recirculator
- Automatic Gas Control Provides electronically controlled plasma gas flow, start gas flow, and shield gas flow. All parameters are adjusted through the Vision CNC, allowing full process automation through the built-in Process Database.
- High-precision, dual-gas, water cooled torch with SpeedLok™ for fastest consumable change over, and "leakless" head design
- Start-Up Kit for the torch, including set of consumables for system startup testing
- Input Bundle including power/ground cables and all applicable hoses and cables required with the system

The Automatic Gas Control supports the following gas combinations:

- Oxygen Cut Gas /Air Shield or Oxygen for thinner gauge material
- Air Cut Gas /Air Shield
- Nitrogen Cut Gas /Water Shield (WMS)
- H35 Cut Gas /Nitrogen Shield
- Plasma Marking with Argon gas input

Note: Power supply requires three phase input power.

1x ESAB Plasma power supply iSeries 100i
iSeries Torch Set

Plasma gases : Air, O₂, Ar-H₂, N₂ @ 120 psi (8.3 bar) and Ar for marking with DFC 3000
Material : Mild steel

1x Set of plasma wear parts for vertical cutting of Mild Steel

Central ON /OFF switch for the plasma system

Coolant for plasma system for temperatures up to max. -11°C

Plasma Marking



Plasma marking uses a low-current, constricted arc to create lines or text on the plate surface. It offers the advantages of speed and versatility with variable line width and depth. Plasma can mark on wet, oily or rusted surfaces, and is an excellent method of marking text on mild steel or stainless steel.

Optical-Manual Plate Alignment Camera



This system offers the fastest and easiest way to do a manual plate alignment, even on large plates. Video from a downward pointed camera is displayed on screen at the Vision T5, with an alignment cross-hair superimposed on the image. The operator can easily jog the machine to points along the plate edge in order to perform the plate alignment procedure, without having to leave the operator station for a better view.

Programming Columbus™. Included with Machine #1



Columbus™ III is our latest software which makes it easy for you to programme your cutting requirements as well as your labelling and marking processes. Intelligent wizards contribute to intuitive operation so you can perform simple and highly complex cuts, labelling and nesting jobs quickly and easily.

Number of Licences : 1

Including

Layout Designer

with all needed functions necessary for generating a nesting and/or NC programs (straight line).

- Secure data handling is ensured with an SQL database
- Integrated CAD program is available for 2D part construction
- Geometry import interface for the DXF/DWG data format

Automatic Nesting

Fully automated nesting of any geometry, even on remnants.

Plate management

Rectangular plates as well as remnants are managed and defined here.

Production Data

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Calculation of process related production data based on parts and layouts containing distances, weights, times, areas, spare parts wear and consumption.

Bevel Cutting

For programming of bevel aggregates: V upper bevel, V lower bevel, Y upper bevel, Y lower bevel, X bevel, K bevel and individually defined bevels up to fivefold cutting of a contour.

License Manager

Manages multiple user network access to Columbus licenses. Allows many users to share a few licenses. Number of concurrent users is limited to actual number of licenses purchased. All Licenses must have the same options. Requires Windows TCP/IP-Network.

1 year Technical Support and Maintenance

Technical Support and Software Maintenance is available after training has been completed. Remote Servicing is possible if the customer has internet access from the computer on which Columbus is installed.

NOTES

+ Complete Columbus Documentation is provided on the Columbus CD-ROM

Cutting table type : Exhaust table

Cutting table (customer responsibility)

Recommended exhaust table dimensions (for informational purposes only)

Table width : 4900 mm (approx. 16 ft.)

Table length : 37000 mm (approx. 121.4 ft.)

Table height : 700 mm (approx. 27.56 int.)

Cutting table control : mechanical

Important note

The supply of the cutting table is in full responsibility of the customer.

ESAB is not liable for any issues which might occur in connection with unsuitable table.

Important note

The supply of the exhaust system is in full responsibility of the customer.

ESAB is not liable for any issues which might occur in connection with unsuitable filter equipment.

Machine acceptance

Factory acceptance test (FAT) is acc. to Standard

Documentation

Customer specific layout drawing

1 set of labels and operating instructions in English

Technical documentation in English

Country of machine operation : USA

Packing, freight, installation

Including packing in wooden box /seaworthy packing

ESAB will provide one factory trained Field Service Engineer to supervise customer personnel during installation, and to provide on-site operation and maintenance training. Travel and living expenses are included during this period (see Terms and Conditions Exceptions Page for explanation) Installation pertains only to the machine. Customer is responsible for initial installation of the rails. Any peripheral equipment such as water tables, fume and smoke removal systems, etc. will be quoted separately.

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Note: Prior to shipment ESAB will execute its standard Quality Process Check. Special runoff requirements will be reviewed at or prior to date of order.

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Note: The machine is built to standard engineering practices which may or may not cover local legislature requirements. It is the customers responsibility to provide ESAB with these specific requirements such as CSA, so this can be quoted.

Global Trade Compliance

Seller is providing this quote/response without the ability to complete full due diligence under our trade compliance program. Buyer acknowledges that the Items (i.e. goods, software, services, and /or technology) involved in this quote/response may be subject to export control, trade sanctions, or other export laws and regulations, including authorizations and licenses of the United States, EU and its member states, and/or other countries ("Export Control Regulations"). Buyer agrees to comply with the Export Control Regulations as well as any other applicable country's Import laws and regulations and not to do anything which could cause the Seller to be in breach of Export Control Regulations and Import laws and regulations. No order shall be placed pursuant to this quote/response unless Seller is satisfied that the Items and any related services can be supplied in compliance with the Export Control Regulations and in the event that any applicable Export Control Regulations prohibit or make impracticable Seller's performance hereunder, Seller will be released from all and any performance related to this quote/response or any related order placed but not accepted. The Buyer agrees to provide the Seller timeously with reasonable assistance and information to enable the Seller to determine whether fulfilment of any order would be in compliance with Export Control Regulations, including but not limited to complete details of applicable End-User and End-Use, and End Destination. Additionally, if a Government Export Authorization is required, please be aware that lead-times may need to be extended to accommodate the export authorization application process.

Note: Company Policy and/or applicable Export Control Regulations do not permit any business involving our products with economic sanctioned countries under the Export Control Regulations directly or indirectly. Additionally, defense end-users and/or uses, directly or indirectly, involving China, Russia and Venezuela are not permitted. Diversion or re-export of any product(s) is strictly prohibited.

The ESAB STANDARD CUTTING CONDITIONS OF SALE apply except to the extent amended by this quotation form.

This quotation is subject to change without notice.

The products may vary from those pictured.

USA
ESAB Welding & Cutting
2800 Airport Road
Denton, TX 76207

Product information and support
Phone: 1-800-372-2123
www.esabna.com

CANADA
ESAB Welding & Cutting Products
6200 Cantay Road, Unit 20
Mississauga, Ontario L5R 3Y9


Head Office
Phone: +1 (905) 670-0220
www.esab.ca

MEXICO
ESAB Mexico SA de CV
Diego Díaz de Berlanga No. 130
Col. Nogalar CP 66480
San Nicolás de los Garza, N.L.

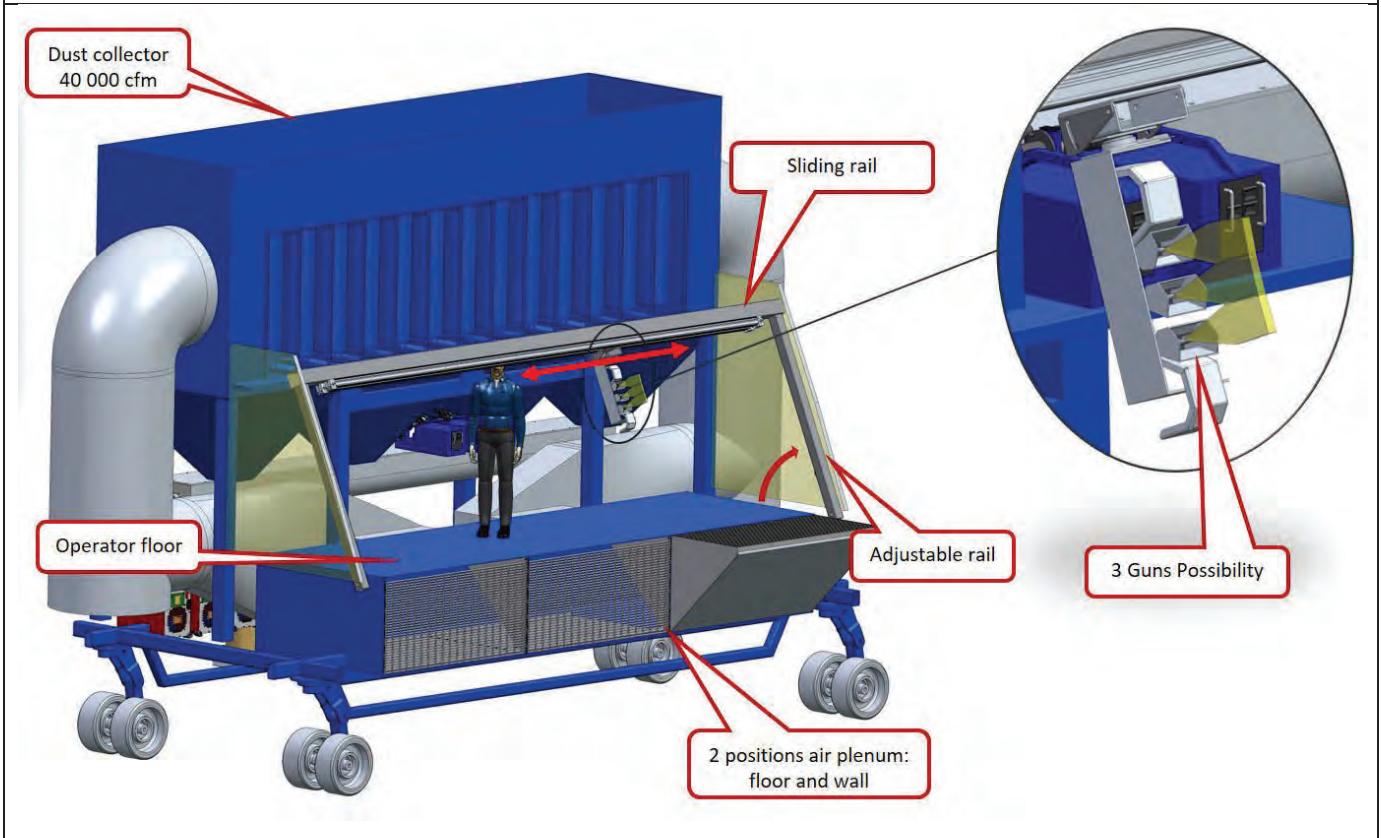
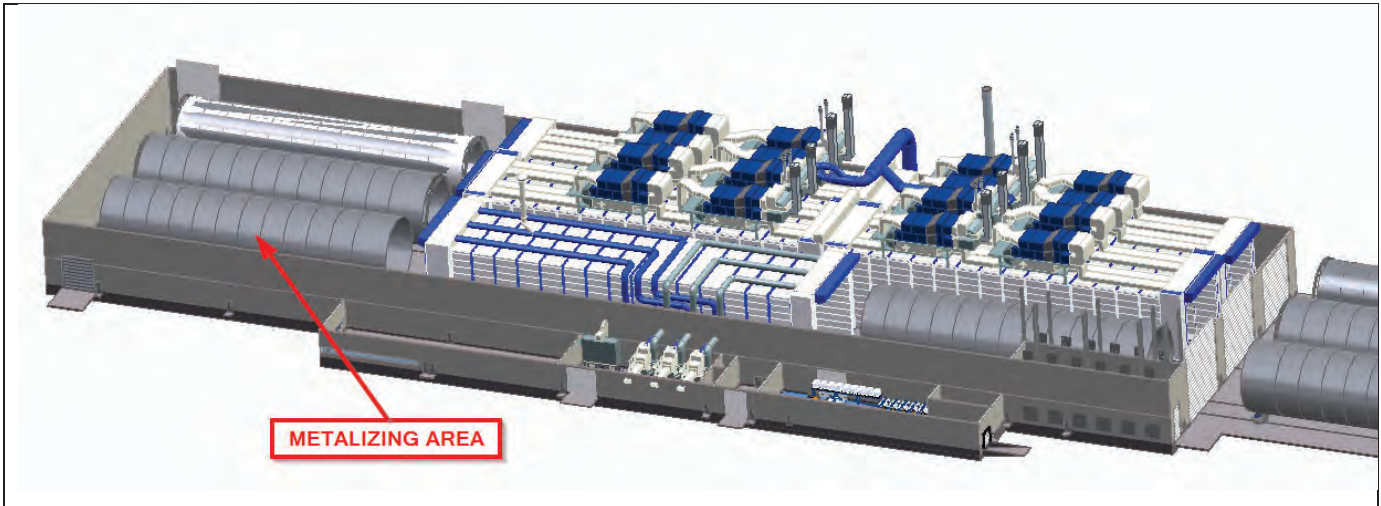
Planta y oficinas corporativas
Phone: +52 (81) 8305-3700
www.esab.com.mx

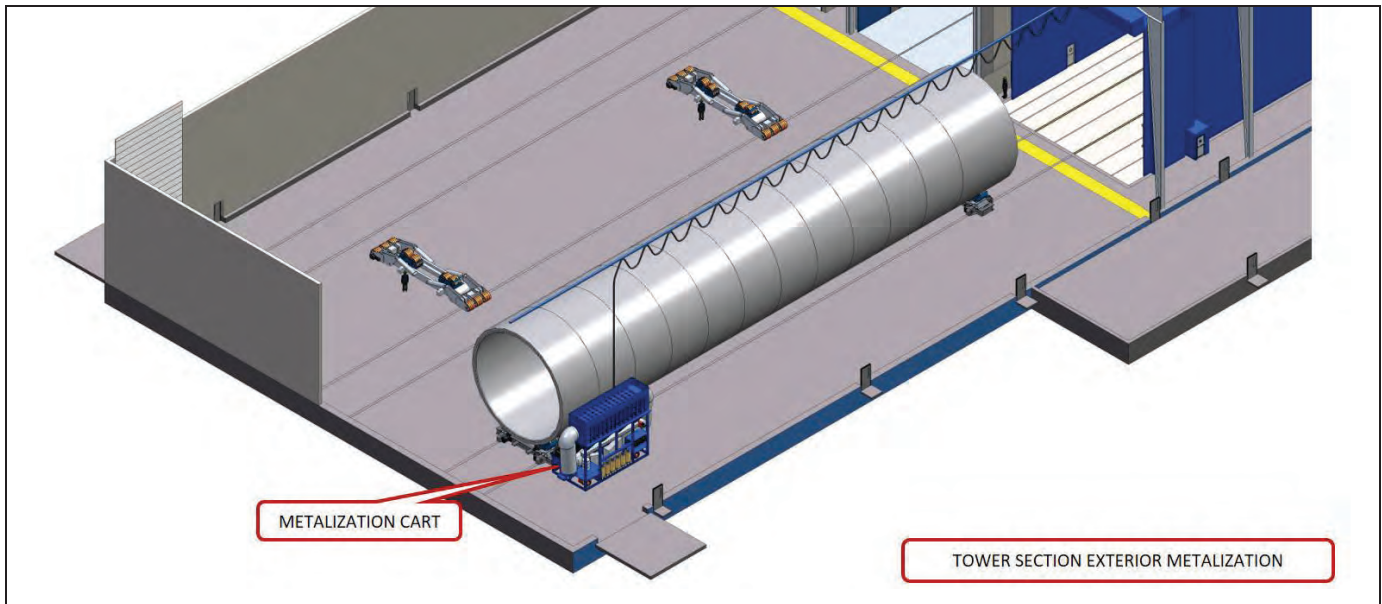
USA/CAN/MEX
ESAB Automated Solution

Product Support
Robson Alves
Phone: +1 (940) 381-1319
email: rvalves@esab.com

Revision	Description of changes	Date	Prepared by	Approved by
00	Document creation	06-04-2022	J. Doucet ing.	 J. Doucet ing. 2022-04-11

5 METALIZATION





Equipment:

- 3 Thermion Precision Arc 5.0, see data sheet
- Dust collector, Sciteex DM-FC 96/70, see data sheet

Filter:

- Filter cartridges Donaldson Ultra-Web Flame Retardant, see data sheet

Metalizing process:

- Flange spraying: Manual, 1 Thermion Precision Arc 5.0 with 1/8" zinc wire @ 80lbs/hr
- Inside spraying: Manual, 1 Thermion Precision Arc 5.0 with 1/8" zinc wire @ 80lbs/hr
- Outside spraying: Automated, 3 Thermion Precision Arc 5.0 with 1/8" zinc wire @ 80lbs/hr each
- Abrasive: zinc metalizing wire, see data sheet
- Duty cycle: 3 hours by day
- Zinc consumption: 15 000lbs by week

NFT Zinc Wire

Safety Data Sheet

1. Product and company identification

Product name	Zinc wire
Material uses	Thermal spray
Supplier	Non-Ferrous Traders, Inc 1890 Palmer Avenue, Suite 206 Larchmont, NY 10538 Phone (914) 834-3143 Weekdays 10:00 am – 5:00 pm ET Emergency telephone (914) 834-3143
Product type	Solid wire

2. Hazards identification

Emergency overview

Physical state	Solid wire
Color	Gray
Odor	Odorless
Signal word	CAUTION
Hazard statements	These warnings pertain to the by-products produced during thermal spray. May cause eye and skin irritation.
Precautionary measures	Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.
OSHA/HCS status	While this material is not considered hazardous by OSHA Hazard Communication Standard (29 CFR 1910:1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product. By-products generated during the thermal spray process are considered hazardous by the OSHA Hazard Communication Standard.

The health hazards described in this SDS pertain to the by-products generated during thermal spray.

Potential acute health effects

Inhalation	None known
Ingestion	None known

NFT Zinc Wire

Safety Data Sheet

Skin	Slightly irritating to the skin
Eyes	Slightly irritating to the eyes
<u>Potential chronic health effects</u>	
Chronic effects	No known significant effects or critical hazards.
Carcinogenicity	None known
Mutagenicity	None known
Teratogenicity	None known
Developmental effects	None known
Fertility effects	None known
Target organs	Contains material that may cause damage to following organs: skin.

Over-exposure signs/symptoms

Inhalation	Inhalation of zinc fumes may cause metal fume fever. Other effects such as difficulty in breathing, sneezing and coughing may occur.
Ingestion	No specific data
Skin	Adverse symptoms may include the following: Irritation Redness
Eyes	Adverse symptoms may include the following: Irritation Watering Redness
Medical conditions	
Aggravated by over-Exposure	None known.

3. Composition/information on ingredients

This section applies primarily to the wire as supplied.

United States and Canada

Name	CAS No.	%
Zinc	7440-66-6	99.9

Mexico

Name	CAS No.	UN No.	%	IDLH	H	F	R	Special
Zinc	7440-66-6	Not Regulated	99.9	-	1	0	0	-

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

NFT Zinc Wire

Safety Data Sheet

4. First-aid measures

These measures apply primarily to the by-products produced during thermal spray.

Eye contact	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
Skin contact	in case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
Inhalation	Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately. Inhalation of zinc fumes may cause metal fume fever. Other effects such as difficulty in breathing, sneezing and coughing may occur.
Ingestion	DO NOT INGEST Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Protection of first-aiders	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
Notes to physician	No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

This section applies primarily to the wire as supplied.

Fire hazards in the presence of various substances

As supplied, this product is non-flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and shocks and mechanical impacts.

NFT Zinc Wire

Safety Data Sheet

These measures apply to the by-products produced during thermal spray.

Extinguishing media

Suitable

Use fire fighting methods and materials that are suited for surrounding fire. Use a Class D extinguishing agent on metal fires.

Not suitable

Water, foam or carbon dioxide.

Special exposure hazards

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Unusual fire

& explosion hazards

Fine zinc dust dispersed in the air in sufficient concentrations and in the presence of an ignition source is a potential DUST EXPLOSION hazard.

Special protective equipment

For fire-fighters

Inhalation of zinc fumes may cause metal fume fever. Fire-fighters must wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Hazardous thermal

Decomposition products

Decomposition products may include the following materials:
Metal oxides/oxides

6. Accidental release measures

These measures apply to the by-products produced during thermal spray.

Personal precautions

No action shall be taken involving any personal risk or without suitable training.
Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate protective equipment (see Section 8).

Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

NFT Zinc Wire

Safety Data Sheet

Small spill	Move containers from spill area. Vacuum or sweep up material and place in labeled waste container. Dispose of via a licensed waste disposal contractor.
Large spill	Move containers from spill area. Prevent spilled material from entering into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a labeled waste container. Dispose of via a licensed waste disposal contractor.

7. Handling and storage

This section applies primarily to the wire as supplied.

Handling	Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not ingest. Avoid contact with eyes, skin and clothing. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Do not reuse container.
Storage	Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright. Do not store in unlabeled containers.

8. Exposure controls/personal protection

This section contains information which applies during the thermal spray process.

Consult local authorities for acceptable exposure limits.

NFT Zinc Wire

Safety Data Sheet

Substance	CAS No.	OSHA PEL	NIOSH Up to 10-hour TWA (ST) STEL (C) Ceiling	ACGIH 8-hour TWA (ST) STEL (C) Ceiling
Zinc	1314-13-2	mg/m ³		
Zinc oxide fume		5	5 mg/m ³ (ST) 10 mg/m ³	5 mg/m ³ (ST) 10 mg/m ³
Total dust		15	5 mg/m ³ (C) 15 mg/m ³	
Respirable fraction		5	5 mg/m ³	2 mg/m ³ (ST) 10 mg/m ³

CAS No. = Chemical Abstract Service Number
 ST = Short Term Exposure Limit
 TLV = Threshold Limit Values
 TWA = Time weighted average

ACGIH = American Conference of Governmental Industrial Hygienists
 NIOSH = National Institute of Occupational Safety and Health

SOURCE: OSHA Annotated Table Z-1^(a)

Recommended monitoring Procedures

Personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance document for methods for the determination of hazardous substances will also be required.

Engineering measures

Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

Hygiene measures

Wash hands, forearms and face thoroughly after handling and before eating, smoking and using the lavatory and at

NFT Zinc Wire

Safety Data Sheet

the end of the working period. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes

Safety glasses or goggles are recommended when handling this material. During the thermal spray process, safety goggles and dark lenses MUST be worn.

Skin

Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands

During the thermal spray process, heat insulated gloves are recommended.

Hearing Protection

Hearing protection that meets local standards MUST be used. During the thermal spray process, the operator and other personnel close to the spray operation must be protected from excessive noise.

Protective Clothing (Pictograms)

Environmental exposure Controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

This section applies primarily to the wire as supplied

Physical state	Solid wire
Color	Gray
Odor	Odorless
Boiling point	906° C (1663° F)
Melting point:	420° C (788° F)

NFT Zinc Wire

Safety Data Sheet

VOC content	0 g/l (0 lb/gal)
Explosive properties	Thermal spray products: Fine dust clouds may form explosive mixtures with air.
Solubility	Insoluble in the following materials: Cold water and hot water.

10. Stability and reactivity

This information applies to the wire as supplied and the by-products produced during thermal spray.

Chemical stability	The product is stable under normal storage conditions.
Conditions to avoid	Store in a cool dry place away from incompatible materials.
Incompatible materials	Strong acids.
Hazardous decomposition Products	During the thermal spray process, gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by radiation during arc spray.
Reactivity	Reacts with oxidants e.g. ammonium nitrate, nitric acid, potassium chlorate. Zinc dust liberates hydrogen gas in contact with oxygen and water. Zinc forms "white rust" in humid air.
Chemical stability	Zinc may form "white rust" in humid air.
Possibility of hazardous Reactions	Zinc dust, including overspray, liberates hydrogen gas in contact with oxygen and water.
Conditions to avoid	Finely pulverized substances mixed with air may cause dust explosion. Finely divided zinc, overspray, reacts with oxidants e.g. ammonium nitrate, nitric acid, potassium chlorate. Zinc dust liberates hydrogen gas in contact with oxygen and water. Zinc forms "white rust" in humid air.
Incompatible materials	Oxidants e.g. ammonium nitrate, nitric acid, potassium chlorate, acids, water.

11. Toxicological information

This information applies to the wire as supplied and the by-products produced during thermal spray.

NFT Zinc Wire

Safety Data Sheet

United States – Canada – Mexico

Acute toxicity

Conclusion/Summary Not available

Chronic toxicity

Conclusion/Summary Not available

Irritation/Corrosion

Conclusion/Summary Mild skin irritant

Sensitizer

Conclusion/Summary Not available

Carcinogenicity

Conclusion/Summary No known significant effects or critical hazards.

Mutagenicity

Conclusion/Summary Not available

Teratogenicity

Conclusion/Summary Not available

Reproductive toxicity

Conclusion/Summary Not available

12. Ecological information

This information applies to the wire as supplied.

Ecotoxicity

No known significant effects or critical hazards.

Aquatic Ecotoxicity

Conclusion/Summary

Persistence/degradability Not available

This information applies to the wire as supplied and the by-products produced during thermal spray.

Conclusion/Summary

Other adverse effects

This substance in pulverized form (overspray) is very toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

13. Disposal considerations

This information applies to the wire as supplied and the by-products produced during thermal spray.

Disposal should be in accordance with applicable regional, national and local laws and regulations. Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE

NFT Zinc Wire

Safety Data Sheet

CONTROL/PERSONAL PROTECTION for additional handling information and protection of employees.

Waste disposal

Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protections and waste disposal legislation and any regional authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

14. Transport information

This section applies primarily to the wire as supplied

Regulatory Information	UN number	Proper shipping name	Classes	Packaging Group	Label	Additional Information
DOT Classification	Not regulated	-	-	-	-	-
TDG Classification	Not regulated	-	-	-	-	-
Mexico Classification	Not regulated	-	-	-	-	-
ADR/RID Class	Not regulated	-	-	-	-	-
IMDG Class	Not regulated	-	-	-	-	-
IATA-DGR Class	Not regulated	-	-	-	-	-

15. Regulatory information

This section applies primarily to the wire as supplied

NFT Zinc Wire

Safety Data Sheet

United States

HCS Classification

Not regulated

By-products generated during the thermal spray process are also considered hazardous by the OSHA Hazard Communication Standard. The health hazards described in this section pertain to the by-products generated during thermal spray.

U.S. Federal regulations

TSCA 8(a) CDR Exempt/Partial exemption: Not regulated
United States inventory (TSCA 8b): All components are listed or exempted.

SARA 302/304: No products were found.

SARA 311/312 Hazards identification: Not regulated.

Clean Water Act (CWA 307): Zinc

Clean Air Act Section

112(b) Hazardous Air Pollutants (HAPs)

Not listed.

Clean Air Act Section

602 Class I Substances

Not listed.

Clean Air Act Section

602 Class II Substances

Not listed.

DEA List I Chemicals

(Precursor Chemicals)

Not listed.

DEA List II Chemicals

(Essential Chemicals)

Not listed.

SARA 313

	Product name	CAS number	Concentration
Form R – Reporting Requirements	Zinc	7440-66-6	99.9
Supplier notification	Zinc	7440-66-6	99.9

SARA 313 notification must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations

Massachusetts

The following components are listed: ZINC

New York

The following components are listed: ZINC

New Jersey

The following components are listed: ZINC

Pennsylvania

The following components are listed: ZINC

NFT Zinc Wire

Safety Data Sheet

United States Inventory (TSCA 8b)	The following components are listed: ZINC
<u>Canada</u>	
WHMIS (Canada)	Not controlled under WHMIS (Canada).
<u>Canadian lists</u>	
Canadian NPRI	The following components are listed: ZINC
CEPA Toxic substances	None of the components are listed.
Canada inventory	All components are listed or exempted.
<u>Mexico</u>	
Classification	
Chemical Weapons Convention List Schedule I Chemicals	Not listed
Chemical Weapons Convention List Schedule II Chemicals	Not listed
Chemical Weapons Convention List Schedule III Chemicals	Not listed

16. Other information



CAUTION

MAY CAUSE EYE AND SKIN IRRITATION.

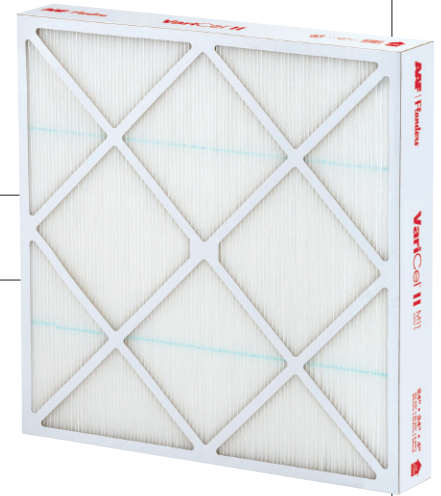
THESE WARNINGS PERTAIN PRIMARILY TO THE BY-PRODUCTS PRODUCED DURING THERMAL SPRAY.

Disclaimer The information provided in this document is intended for informational purposes only. The seller assumes no responsibility or liability in connection with this information even if reasonable safety measures are followed. Safe operation rests with the user of this material.

Non-Ferrous Traders, Inc. makes no warranty of any kind for any specific use either expressed or implied based on the use of the information presented here.

VariCel® II

EXTENDED SURFACE MINI-PLEAT FILTERS



- True high efficiency filters – only 4" thick media pack
- Slim line, mini-pleat design lowers operating costs
- Engineered for a variety of applications
- Easy disposal
- Available with antimicrobial
- Available in three efficiencies – MERV 14, MERV 13, and MERV 11

Designed for high performance under both normal and difficult operating conditions, VariCel II filters are appropriate for general HVAC and applications operating with variable air volume, turbulent airflow, and high humidity. The combination of durable construction and high efficiency also makes VariCel II filters ideal for specialized systems, such as diffusion filters in paint booths and prefilters in cleanrooms.

Heavy Duty Construction— High Performance in Tough Operating Conditions

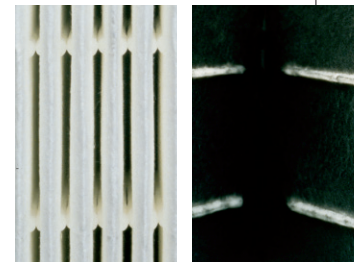
The frame is made with a 2-piece die cut constructed from high wet-strength beverage board. Two mating die cut boxes are bonded together, forming a double wall around the perimeter of the filter. The mini-pleat media pack is bonded inside the double wall. The double-walled frame prevents leakage and increases rigidity.

Available with Antimicrobial

VariCel II filters with antimicrobial are available in MERV 14 and MERV 11 efficiencies. Antimicrobial acts as a preservative to ensure the integrity of the media throughout the life of the filter. EPA-registered and environmentally safe, antimicrobial inhibits the growth of microorganisms documented to affect IAQ.

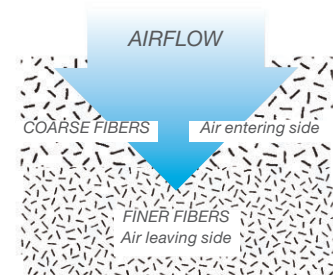
Slim-Line Design

The slim-line design of the VariCel II filters provides minimum resistance and maximum dust loading capacity while lowering operating costs. Rows of adhesive beads are used to maintain even pleat spacing and provide maximum airflow with minimal resistance. The consistent pleat spacing of the media allows higher dust holding capacity and full use of the entire depth of the media.



Dual-Density Media Increases Dust Holding Capacity

VariCel II filters use microglass paper media with a water repellent binder. The fibers are formed with dual-density construction, consisting of coarser fibers on the air entering side and finer fibers on the air leaving side. This design allows for collection of particulate throughout the full thickness of the media, substantially increasing dust holding capacity. The media is water repellent and can withstand intermittent exposure to water without affecting performance.



VariCel® II Filters

Product Information

(1) Rated Filter Face Velocity (FPM)	(2) Nominal Size (Inches) (W x H x D)	(2) Actual Size (Inches) (W x H x D)	(3) Rated Airflow Capacity (CFM)	(3) Rated Initial Resistance (in. w.g.)	(4) Recommended Final Resistance (in. w.g.)	Gross Media Area (Sq.Ft.)	Shipping Weight (Lbs. Per Carton)
(3) MERV 14 – Available with Antimicrobial							
500	24 x 24 x 4	23 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	2000	.63	1.5	119	26
500	20 x 25 x 4	19 ⁹ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1750	.63	1.5	103	22
500	20 x 24 x 4	19 ⁹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1650	.63	1.5	99	21
500	20 x 20 x 4	19 ⁹ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1400	.63	1.5	82	18
500	18 x 24 x 4	17 ⁷ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1500	.63	1.5	88	19
500	16 x 25 x 4	15 ⁵ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1400	.63	1.5	82	18
500	16 x 20 x 4	15 ⁵ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1100	.63	1.5	65	14
500	12 x 24 x 4	11 ¹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1000	.63	1.5	58	13
500	12 x 12 x 4	11 ¹ / ₈ x 11 ¹ / ₈ x 3 ³ / ₄	500	.63	1.5	28	7
(3) MERV 13							
500	24 x 24 x 4	23 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	2000	.58	1.5	119	26
500	20 x 25 x 4	19 ⁹ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1750	.58	1.5	103	22
500	20 x 24 x 4	19 ⁹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1650	.58	1.5	99	21
500	20 x 20 x 4	19 ⁹ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1400	.58	1.5	82	18
500	18 x 24 x 4	17 ⁷ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1500	.58	1.5	88	19
500	16 x 25 x 4	15 ⁵ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1400	.58	1.5	82	18
500	16 x 20 x 4	15 ⁵ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1100	.58	1.5	65	14
500	12 x 24 x 4	11 ¹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1000	.58	1.5	58	13
500	12 x 12 x 4	11 ¹ / ₈ x 11 ¹ / ₈ x 3 ³ / ₄	500	.58	1.5	28	7
(3) MERV 11 – Available with Antimicrobial							
500	24 x 24 x 4	23 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	2000	.47	1.5	119	26
500	20 x 25 x 4	19 ⁹ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1750	.47	1.5	103	22
500	20 x 24 x 4	19 ⁹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1650	.47	1.5	99	21
500	20 x 20 x 4	19 ⁹ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1400	.47	1.5	82	18
500	18 x 24 x 4	17 ⁷ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1500	.47	1.5	88	19
500	16 x 25 x 4	15 ⁵ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1400	.47	1.5	82	18
500	16 x 20 x 4	15 ⁵ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1100	.47	1.5	65	14
500	12 x 24 x 4	11 ¹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1000	.47	1.5	58	13
500	12 x 12 x 4	11 ¹ / ₈ x 11 ¹ / ₈ x 3 ³ / ₄	500	.47	1.5	28	7

(1) Filters can be operated up to 125% of rated face velocity.

(2) Width and height dimensions are interchangeable. VariCel II filters may be installed with the pleats either vertical or horizontal.

(3) All performance data based on ASHRAE Standard 52.2. Performance tolerances conform to Section 7.4 of ARI Standard 850-93. For maximum service life, VariCel II filters should always be operated with a prefilter.

(4) The final operating resistance shown is typical of systems currently in operation.

Filters can be operated to a higher or lower final resistance without materially affecting filter efficiency; however, dust holding capacity will be reduced if the filters are changed at a lower final resistance.

(5) VariCel II filters are shipped four per carton.

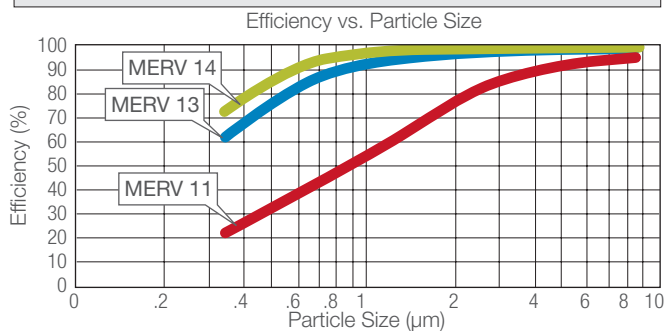
Underwriters Laboratories Classification: All VariCel II filters are UL Classified. Testing was performed according to UL Standard 900 and ULC-S111.

Continuous Operating Temperature Limits: 150°F (66°C)

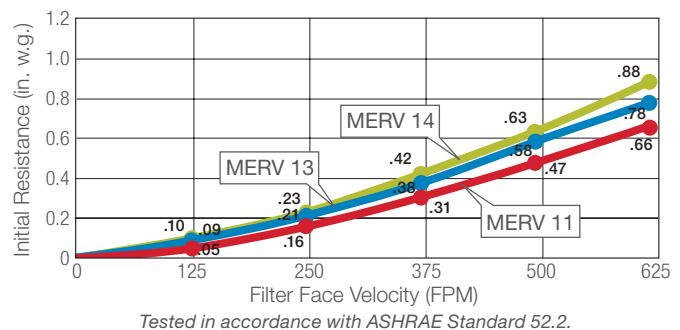
For product information on VariCel II MH filters, request bulletin AFP-1-239.

Performance Data

Composite Minimum Efficiency Curve



Initial Resistance vs. Filter Face Velocity



VariCel® is a registered trademark of AAF International in the U.S. and other countries.

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AFP-1-237Y 08/22

BioCel® I

HIGH-EFFICIENCY EXTENDED SURFACE AIR FILTERS



The BioCel I filter was designed primarily to remove airborne biological contaminants in hospital critical areas and food and pharmaceutical processing plants. It has also been engineered to meet the exacting requirements of precision manufacturing operations and laboratories, where very high efficiency filtration of fine particulate matter is necessary.

BioCel® M-Pak Filter— A New Alternative

The BioCel M-Pak filter offers the same media area and pressure drop as the BioCel I filter in a 6" deep, high impact polystyrene cell side.

The BioCel M-Pak filter offers several advantages in comparison to the BioCel I filter.

- Lighter – half the weight
- Requires less storage space
- Reduces disposal costs
- Easier handling
- Fully Incinerable

For more information on the BioCel® M-Pak filter, see brochure AFP-1-117.



High Efficiency— Low Resistance

Rated at 95% efficiency on 0.3 micrometer challenge aerosol and a MERV 16 per ASHRAE Standard 52.2, the BioCel I filter has the advantage of much lower pressure drop than a typical HEPA filter (0.4" versus 1.0" w.g. at 250 FPM). BioCel I filters fill the gap between ASHRAE grade high efficiency filters and ultra-high efficiency HEPAs at half the weight and pressure drop.

This compact, lightweight filter will withstand operating temperatures to 350°F, if recommended final resistance is not exceeded.

To maximize filter life, use BioCel I filters with high quality AAF Flanders prefilters.

Construction

BioCel I filters consist of a pleated media pack enclosed in a galvanized steel frame assembly. The media is made of ultra-fine fiberglass formed into a series of pleats. Corrugated aluminum separators maintain uniform spacing between each pleat to allow unrestricted airflow through the filter. Bar braces are installed on both sides of the filter for extra reinforcement of the media pack. A flattened, expanded metal faceguard installed on both sides of the filter is available as an option.

BioCel I filters have a single piece galvanized steel header on the air entering side that is interlocked to the cell sides in a patented fashion that prevents leakage and forms a totally rigid construction.

Ideal for Variable Volume Systems

Due to the rigid all metal construction and water resistant media in a supported pleat type configuration, BioCel I filters can be used in systems with difficult operating conditions:

- Variable air volume
- Turbulent airflow
- Repeated fan shutdown
- High temperature
- High humidity
- Intermittent exposure to water, such as sea coast installations

BioCel® I Filters

Product Information

Nominal Size (Inches) (W x H x D)	Actual Size (Inches) (W x H x D)	Rated Airflow Capacity (CFM)			Rated Initial Resistance (in. w.g.)			Media Area (sq. ft.)	Gross Filters Per Carton	Shipping Weight (lbs.)
		125 FPM	250 FPM	500 FPM	125 FPM	250 FPM	500 FPM			
95% Initial Efficiency (0.3µm Particles)										
24 x 24 x 12	23 $\frac{3}{8}$ x 23 $\frac{3}{8}$ x 11 $\frac{1}{2}$	500	1000	2000	.26	.44	1.0	156	1	20.0
^(a) 24 x 24 x 12	24 x 24 x 11 $\frac{1}{2}$	500	1000	2000	.26	.44	1.0	165	1	21.5
24 x 20 x 12	23 $\frac{3}{8}$ x 19 $\frac{3}{8}$ x 11 $\frac{1}{2}$	413	825	1650	.26	.44	1.0	127	1	17.0
^(a) 20 x 24 x 12	19 $\frac{3}{8}$ x 23 $\frac{3}{8}$ x 11 $\frac{1}{2}$	413	825	1650	.26	.44	1.0	127	1	18.5
12 x 24 x 12	11 $\frac{3}{8}$ x 23 $\frac{3}{8}$ x 11 $\frac{1}{2}$	250	500	1000	.26	.44	1.0	72	1	12.0
Recommended Final Resistance 2.0 in. w.g.										
24 x 24 x 6	23 $\frac{3}{8}$ x 23 $\frac{3}{8}$ x 5 $\frac{7}{8}$	500	1000	–	.30	.60	–	93	2	22.0
^(a) 24 x 24 x 6	24 x 24 x 5 $\frac{7}{8}$	500	1000	–	.30	.60	–	98	2	24.0
24 x 20 x 6	23 $\frac{3}{8}$ x 19 $\frac{3}{8}$ x 5 $\frac{7}{8}$	413	825	–	.30	.60	–	93	2	22.0
^(a) 20 x 24 x 6	19 $\frac{3}{8}$ x 23 $\frac{3}{8}$ x 5 $\frac{7}{8}$	413	825	–	.30	.60	–	96	2	21.5
12 x 24 x 6	11 $\frac{3}{8}$ x 23 $\frac{3}{8}$ x 5 $\frac{7}{8}$	250	500	–	.30	.60	–	42	2	14.0
Recommended Final Resistance 1.5 in. w.g.										

(a) Available in double header construction only.

Performance Data

Composite Minimum Efficiency Curve



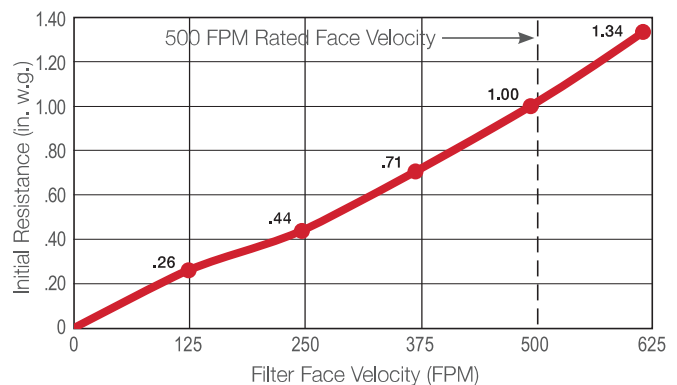
Initial Efficiency vs. Particle Diameter

At rated airflow, the BioCel I filter has an efficiency of 95% on 0.3 micron particles and is a MERV 16 in accordance with ASHRAE Standard 52.2.

Underwriters Laboratories Classification

BioCel I filters are UL Classified. Testing was performed in accordance with UL Standard 900.

Initial Resistance vs. Filter Face Velocity



Options

- Double header construction is available for installation into other manufacturers' framing systems.
- 6" or 12" depths available.
- HEPA filter construction available. See Brochure AFP-1-110.

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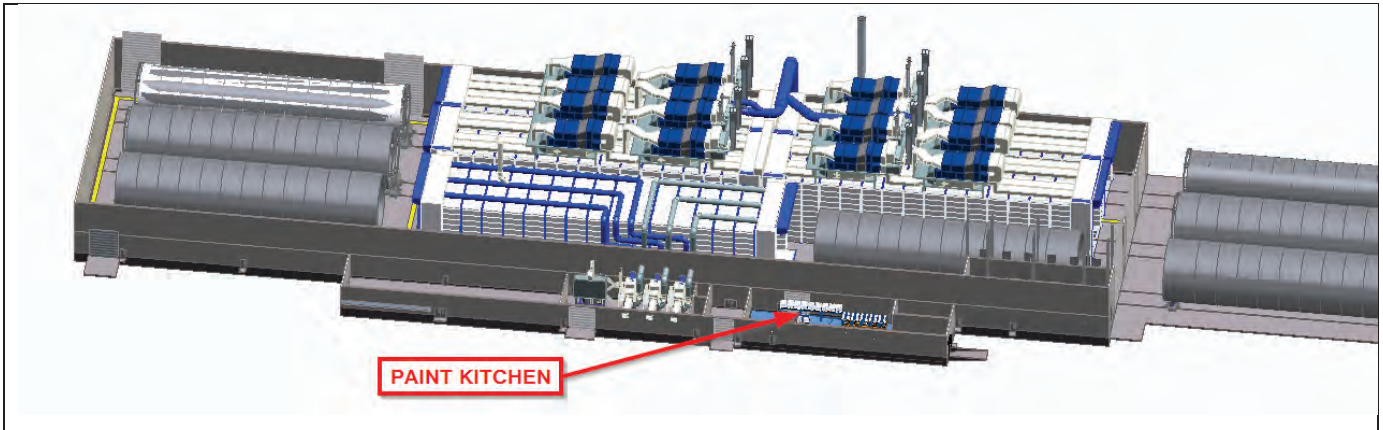
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AFP-1-116X 01/17

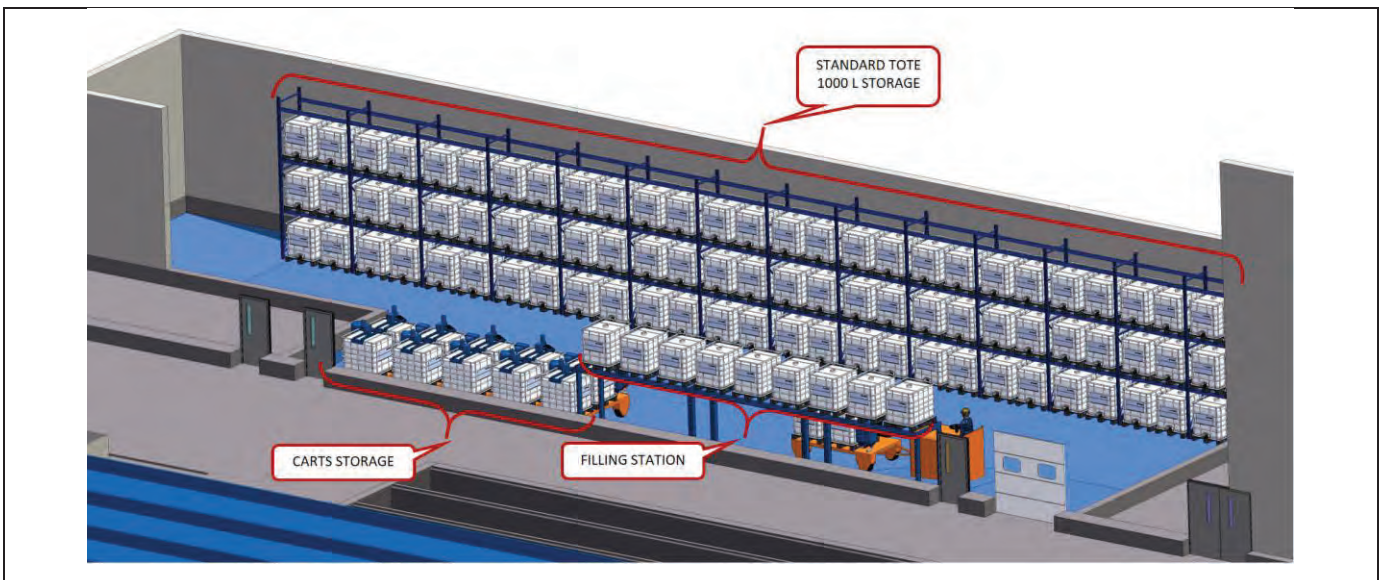
Revision	Description of changes	Date	Prepared by	Approved by
00	Document creation	06-04-2022	J. Doucet ing.	 J. Doucet ing. 2022-04-11

3 PAINT KITCHEN



Operation:

Paint storage, cleaning and refilling of paint carts



Storage capacity:

- 25 000 gallons

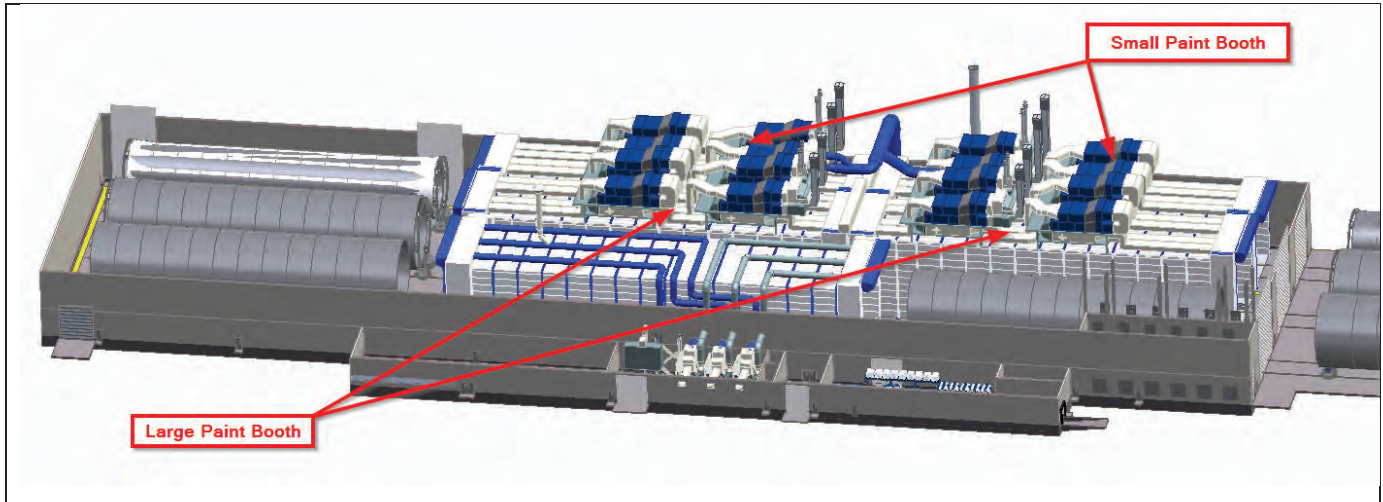
Product in storage:

- Paint, (Base and Agent) see data sheet
- Solvent, see data sheet

Equipment:

- Paint cart
- Solvent recycler SR180, see data sheet

6 PAINT BOOTH

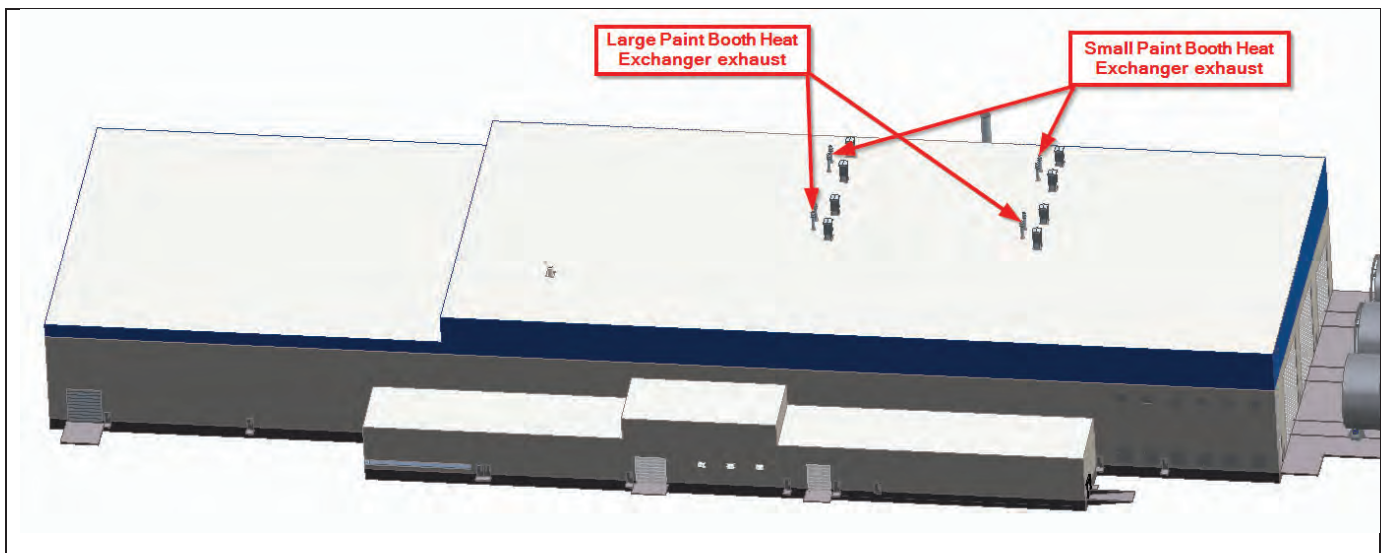


Equipment:

Two Booths with two-zone, horizontal ventilation, zones work independently:

- Small one 36' wide x 38' high x 400' long separated in tow zones 200' each, Sciteex DIANA PB-DB 1201111
- Large one 43' wide x 45' high x 400' long separated in tow zones 200' each, Sciteex DIANA PB-DB 1201313

Exhaust:



The interior chamber air exhaust are directed to the VOC treatment system. The roof exhaust only exhaust clean air heated by a heat exchanger:

- Small Paint Booth:
 - Quantity of emitters: 4 pcs
 - Vertical discharge, no rain cap
 - Height of emitters from floor level: 90 feet
 - Efficiency of emitters: 4 x 4 100 cfm (7 000 m³/h)
 - Diameter of the emitters: dia 19 5/8" (500 mm)
 - Speed of exhaust air: 1970 fpm (10 m/s)
 - Stack exhaust exit temperature: about 113°F (45°C)
- Large Paint Booth:
 - Quantity of emitters: 4 pcs
 - Vertical discharge, no rain cap
 - Height of emitters from floor level: 88 feet
 - Efficiency of emitters: 4 x 6 000 cfm (10 200 m³/h)
 - Diameter of the emitters: dia 19 5/8" (500 mm)
 - Speed of exhaust air: 2835 fpm (14.4 m/s)
 - Stack exhaust exit temperature: about 113°F (45°C)

Filter:

- Filtration level: Carton inertial G3 + M3 cartridge filter
 - End accurate filter: Pocket M5
 - Exhaust Caissons inside booth: Andreae The original
 - Pre-filter in AHU: Paintstop
 - Pre-filter in AHU: VNF 290

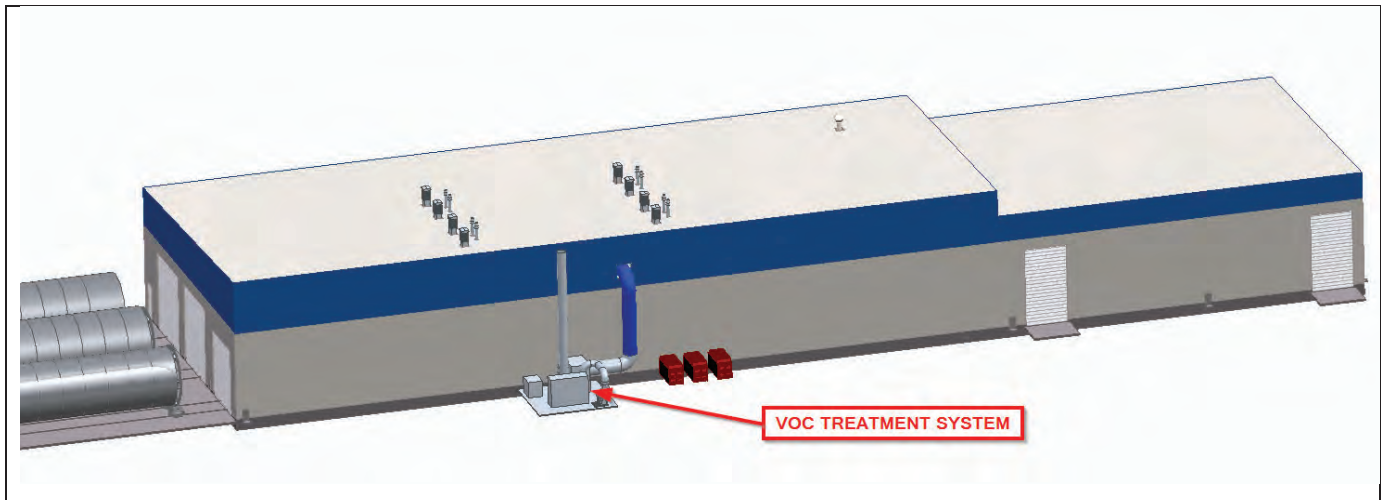
Painting Process:

- Painting sequence: Five coats in total
 - 1st coat outside
 - 1st coat inside
 - 2nd coat outside
 - 2nd coat inside
 - 3rd coat outside
- Total spray time: 10-15 hours per part

- Inside spraying: Manual, 2 Graco XTR Airless Spray Gun with 621 tip @ 0.47 gpm
- Outside spraying: Automated, 3 Graco AL Automatic Airless Spray Gun with 619 tip @ 0.39 gpm
- Duty cycle: 28-30 hours for paint/cure
- Curing: 100% cure not required. Just enough to get parts out of the booth
- Cure temperature: Up to 130F
- Paint products in each booth:
 - Outside:
 - Hempadur AvantGuard 750: 2h @ 21gal/h
 - Hempadur 4774D: 2h @ 43gal/h
 - Hemptane 55610: 2h @ 19gal/h

 - Inside:
 - Hempadur AvantGuard 750: 2h @ 21gal/h
 - Hempadur 4774D: 2h @ 43gal/h

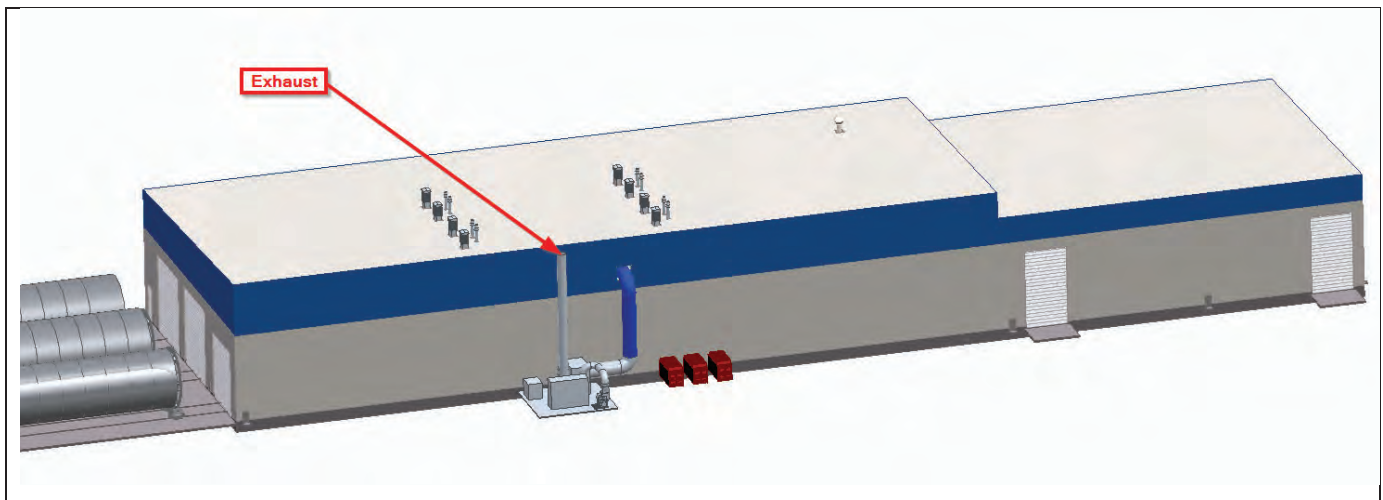
7 VOC TREATMENT SYSTEM



Technology:

Hydrophobic Zeolite rotary concentrator combined with regenerative thermal oxidizer, see data sheet

Exhaust:



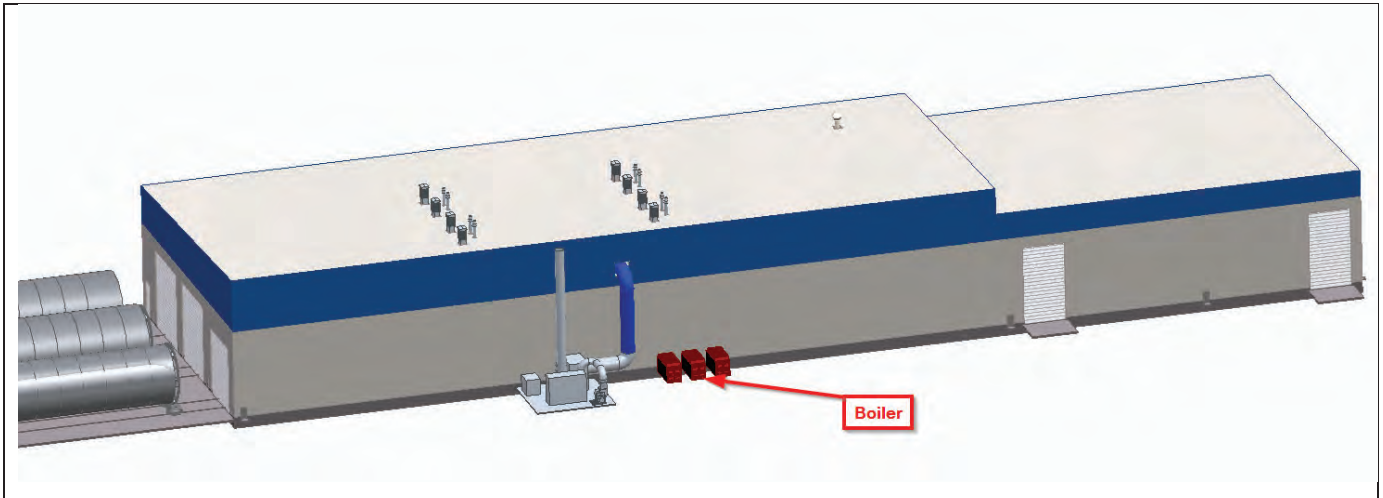
- Quantity of emitters: 1 pcs
- Vertical discharge no rain cap
- Height of emitters from floor level: 85 feet
- Efficiency of emitters: 89 200 cfm
- Diameter of the emitters: dia 74"
- Speed of exhaust air: 3000 feet/min

- Stack exhaust exit temperature: 115°F

Natural gas consumption:

- Max : 7 000 CFH
- Annual: 7 500 000 CF

8 BOILER



Function:

Paint booth ventilation systems thermal power, see data sheet

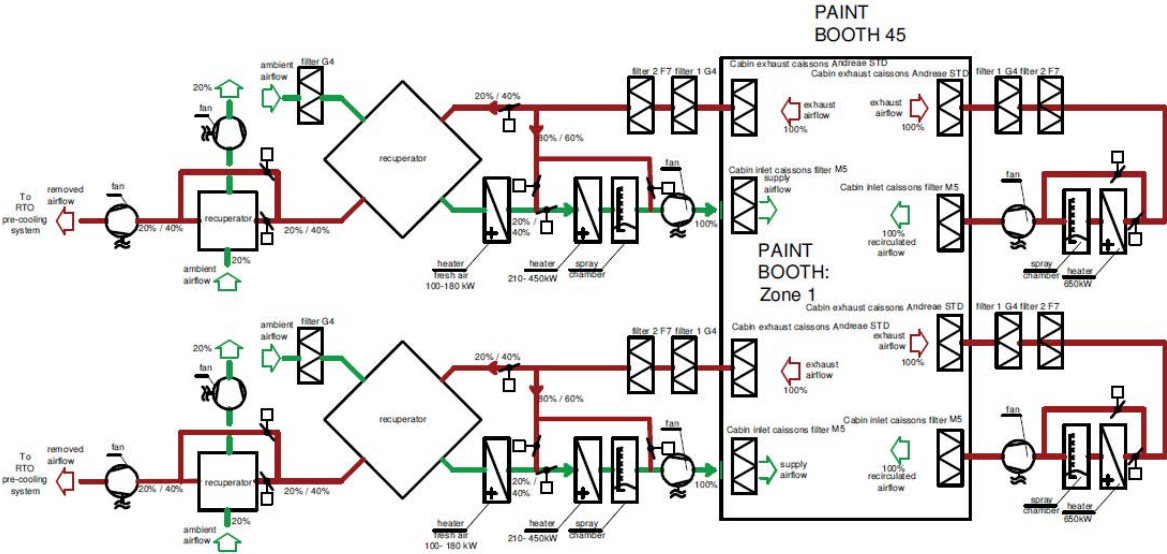
Equipment:

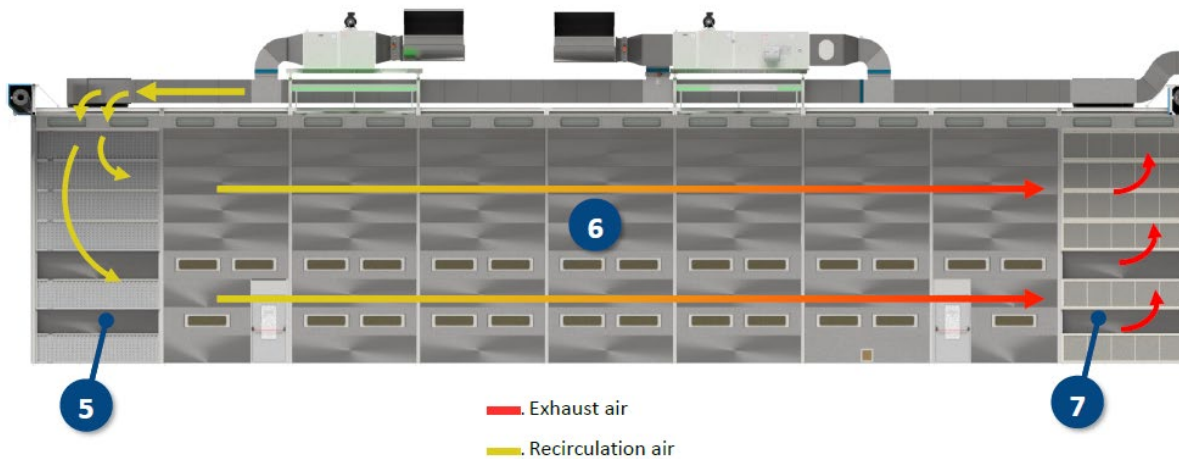
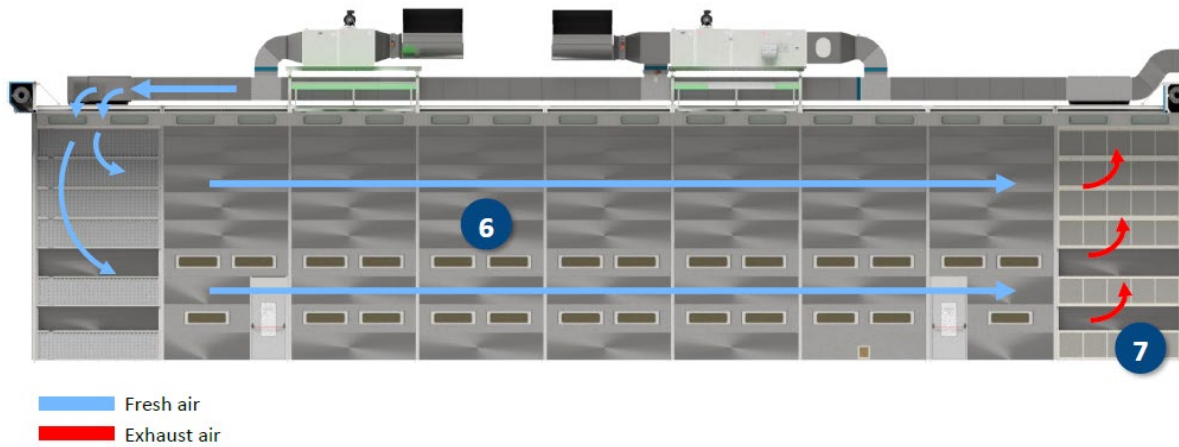
- 2 boiler 2680hp (2000kW), see data sheet
- 1 boiler 1340hp (1000kW), see data sheet

Natural gas consumption:

- Max 2000kW : 8360 CFH
- Max 1000kW: 4120 CFH
- Max total: 12600 CFH
- Annual: 15 000 000 CF

Paint Booth (U-BOOTH) Exhaust/Filtration System Data





Per data provided by Marmen (in the document “MW-202103-C00D-E03 ENVIRONMENTAL DATA” April 2022, R00), the paint booth filtration media will collectively consist of the following:

- **Carton inertial G3 + M3 cartridge filter**
- **End accurate filter: Pocket M5**
- **Exhaust Caissons inside booth: Andreae The original**
- **Pre-filter in AHU: Paintstop**
- **Pre-filter in AHU: VNF 290**
- **Secondary two-stage filters (AA VariCell II + BioCel I) upstream of the RTO.**

At the end of the paint booth filtration system, level ISO 16890 F7 is achieved.

After, the air will pass through the 2-stage filter box of the VOC treatment system to go at the level MERV* 16.

Filter box enclosure -	<ul style="list-style-type: none"> • The main filter box is designed to handle full design flow. • Manufactured of galvanized steel construction with framework designed for high pressure application.
Stage-1 filters -	<ul style="list-style-type: none"> • <u>Stage 1</u> will be VariCell II or equal, 60 - 65% (ASHRAE 5.2 - Merv 11) efficient, extended surface mini-pleat filters. VariCell II filters are designed for high performance under difficult operating conditions with variable air volume, turbulent airflow, and high humidity. Filters will consist of foil laminated fiberboard, double wall construction, frame-to-frame adhesive, media pack adhesive, retainer-to-pleat adhesive, adhesive bead separator, dual density media, and a media pack support retainer. Filter media is made of microglass paper with a water repellent binder.
Stage-2 filters -	<ul style="list-style-type: none"> • <u>Stage 2</u> will be a Biocel I or equal, 90-95% (ASHRAE 5.2 Merv 16) efficient, fine particulate biological filters. Biocel I filters consist of a pleated media pack enclosed in a galvanized steel frame assembly. The media is a ultra-fine fiberglass formed into a series of pleats. Corrugated aluminum separators maintain uniform spacing between each pleat to allow unrestricted airflow. Bar braces are installed on both sides of the filter for extra reinforcement of the media pack. A single piece galvanized header on the air entering side that is interlocked to the cell sides in a patented fashion prevents leakage and forms a totally rigid construction. Biocel I filters are specifically designed for extreme operating conditions such as variable air volumes, turbulent airflow, high temperature, high humidity, and intermittent exposure to water.



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Phone: 04 28 27 04 76
Website: www.condorchem.com



The CMM Group

2071-C Lawrence Drive, P.O. Box 5903
De Pere, WI 54115-5903
Phone: 920-336-9800 · Fax: 920-336-9797
Website: www.thecmmgroup.com

Proposal No. 2021760 Rev C

March 4, 2022

Submitted to:



MARMEN INC.

557, rue des Érables

Trois-Rivières (Québec) G8T 8Y8

marmeninc.com

Proposal for:

- **Model RC-90000-RTO-10000-M-97-2C Regenerative Thermal Oxidizer**
 - **Start-Up Service**
 - **Installation Supervision**

Prepared by:

Daniel Vildoza — Condorchem Group

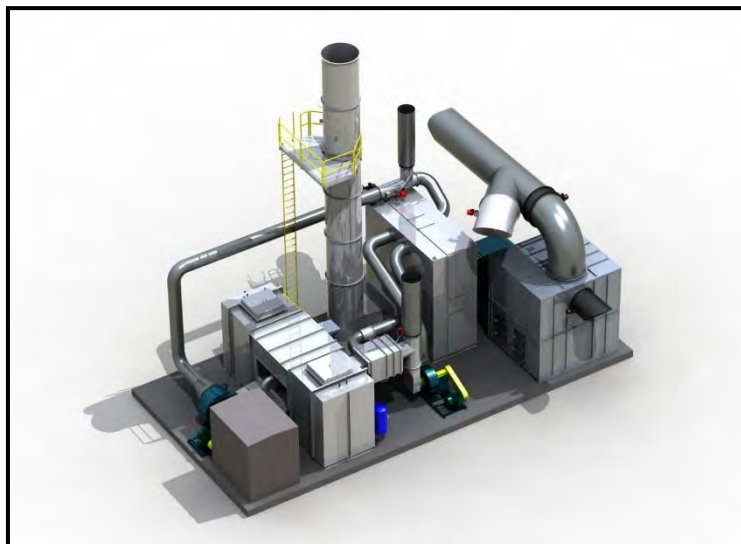
Matthew Kittell — The CMM Group

Willie Sims — The CMM Group

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1. CMM and Condorchem Envitech Partnership:

Condorchem Envitech is an environmental engineering firm providing water, effluent, and air emissions treatment solutions for a wide range of industrial activities for over 25 years from our facility in Lyon - France, Condorchem Envitech carries out the design, engineering, manufacturing, installation, commissioning and servicing of a large range of products worldwide.

Over the past 20 years, The CMM Group has developed customized solutions to a variety of equipment needs including Regenerative Thermal Oxidizers, Energy Recovery Systems, in order to control harmful and regulated volatile organic compounds (VOCs), hazardous air pollutants (HAPS) and process odors. The result is over 200 new installations around the world and 1,300 completed maintenance parts and service jobs.

Through the partnership of CMM and Condorchem Envitech, equipment for a wide range of markets can be provided across the globe



Authorized service technicians -	<ul style="list-style-type: none"> • Barcelona, Spain • Lyon, France • De Pere, Wisconsin • Boston, Massachusetts • Los Angeles, California • Shanghai, China • Istanbul, Turkey • Suwon, South Korea • Mexico, DF.
Major industries served -	<ul style="list-style-type: none"> • Printing (flexo, roto, heat-set) • Web drying, coating & laminating • Chemical & paint manufacturing • Food baking & manufacturing • FRP / composites manufacturing
Fortune 500 customers -	<ul style="list-style-type: none"> • Sherwin-Williams, P&G, 3M-Cuno, ITW, Schwan's, Sara-Lee, Praxair
Company strengths -	<ul style="list-style-type: none"> • Dedication to customer's needs • Attention to detail • Quality components • Custom design & fabrication • Competitive pricing • Flexible payment terms • Expedited & on-time deliveries
Products -	<ul style="list-style-type: none"> • Air pollution control systems <ul style="list-style-type: none"> -Regenerative thermal oxidizers -Rotary concentrator systems -Catalytic & thermal oxidizers • Dust collection systems, Custom Ovens and Dryers • Heat recovery systems
Value added services -	<ul style="list-style-type: none"> • Turnkey installation services • Retrofits & rebuilds • Service contracts & PM inspections • 24/7 service & parts availability

2. Project Summary & Design Specifications:

Project Summary:	Marmen has requested a formal proposal for the supply and start-up of a Rotary Concentrator / Oxidizer system to be installed in Albany, New York.
Processes to be controlled:	Wind Tower Painting Total process
Exhaust rate:	89,200 SCFM (160,000 Nm ³ /h), 100°F
Estimated exhaust temperature:	~100°F (combined)
Hours of operation:	Up to 24 hour / 7 days per week
Equipment design volume:	Zeolite Rotary Concentrator: 89,200 SCFM Oxidizer: 10,000 SCFM
VOC/HAP destruction efficiency:	95% by design as tested by USEPA Method 25A
VOC/HAP to be controlled:	Butanol, Ethyl Benzene, Xylene and Petroleum
VOC/HAP heat value:	14,626 BTU/lb
VOC/HAP loading:	165 lb/hr — no hot side bypass required
Physical installation location:	To be outdoors on concrete
Installation services:	Not included at this time but can be provided as an option by CMM / Condorchem as described on page 19.

3. Rotary Concentrator / Oxidizer Operating Description:

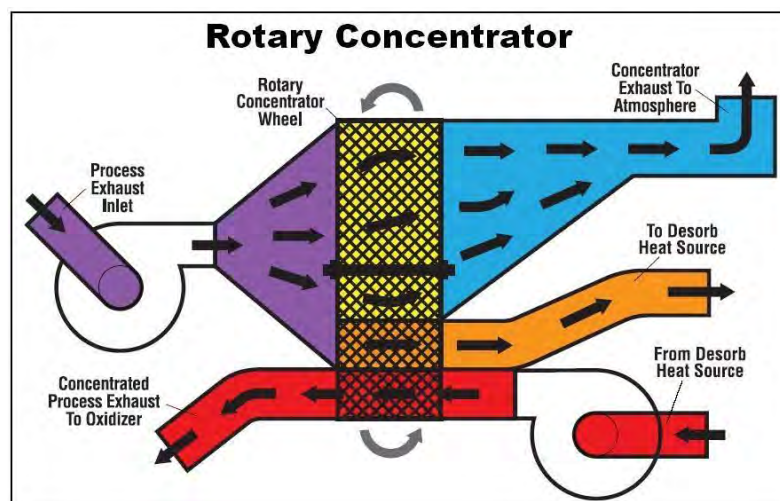
A Rotary Concentrator/Oxidizer System is a hybrid air pollution control system designed to efficiently remove and destroy Volatile Organic Compound/Hazardous Air Pollutant (VOC/HAP) from a process exhaust air stream. Application of this technology is limited to exhaust air streams at or near ambient temperature. The system requires a two-(2) step process as follows:

- 1.) Removal of the VOC/HAP from the air stream using a hydrophobic Zeolite rotating wheel.
- 2.) Destruction of the concentrated VOC/HAP using an Oxidizer.

In operation, VOC/HAP emissions captured from the process via a ductwork collection system are typically passed through a multi-stage high efficiency filter box as particulate can damage the concentrator wheel media. Once filtered the solvent laden air (SLA) passes through the slowly rotating concentrator wheel where VOC/HAP's are adsorbed onto the adsorbent hydrophobic Zeolite media. A slip stream (approximately 10%) of this air is routed through a cooling plenum. The remainder of this air is discharged directly to atmosphere with a VOC/HAP removal efficiency of up to 96%.

The rotor itself is manufactured from a corrugated mineral fiber substrate to which the manufacturer permanently bonds a proprietary mixture of hydrophobic zeolite and inorganic materials. The hydrophobic zeolite rotor is inorganic, completely inert and has rigidity, physical integrity and the ability to withstand thermal stress. Zeolite was discovered in 1756 as a natural mineral that is now mined in many parts of the world and used in numerous commercial applications. In nature, Zeolites are three-dimensional, micro porous, crystalline solids with well-defined structures that have void space (cavities or channels) that can host cations, water, or other molecules. Because of their regular and reproducible structure, they behave in a predictable fashion. Zeolites are used to adsorb a variety of materials. This includes applications in drying, purification, and separation. In this application they remove VOC/HAP from the manufacturing process exhaust air stream as it passes through the rotor.

The concentrator wheel rotates at a speed of 2-8 revolutions per hour, continuously passing a sector of the wheel with adsorbed VOC/HAP through a desorption plenum for removal by a heated air stream; thus continuously returning a regenerated (or clean) sector back into the main housing for further adsorption. Desorption is automated as the slip stream of air that was routed through the cooling plenum is sent through a supplemental desorption heater where it is elevated to desorption temperature (typically ~350°F) and returned to the concentrator housing. This heated desorption air is directed back through the wheel via a plenum where the concentrated VOC/HAP's are removed. The concentrated SLA stream is then routed to the RTO for thermal destruction.



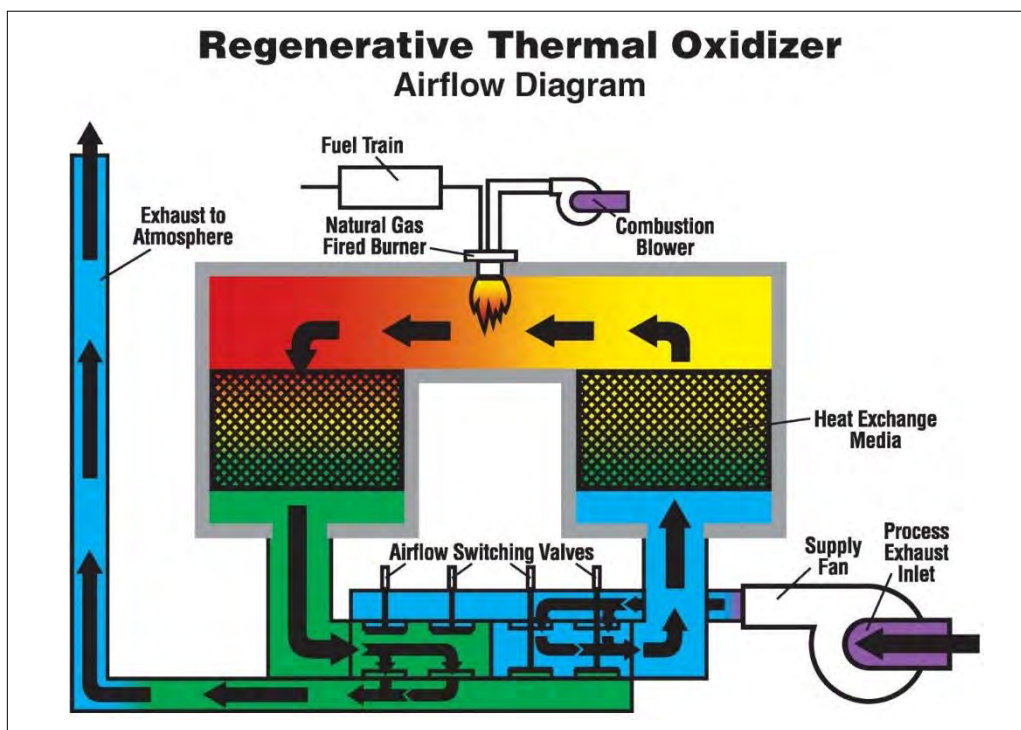
3. Rotary Concentrator / Regenerative Thermal Oxidizer (RTO) Operating Description (continued):

To achieve VOC/HAP destruction, the SLA from the desorption plenum is directed to the RTO and directed into one of the energy recovery canisters by use of inlet control (switching) valves. The polluted air passes from the valve assembly vertically upward through the first of the two-heat exchanger canisters where it adsorbs heat from the ceramic media (thus cooling the media and preheating the air). The preheated air then enters into the combustion chamber (typically at a temperature very close to the temperature required for oxidation) where it is heated to 1,500°F (if necessary) and held at this oxidation temperature for a period of time (minimum 0.5 seconds) sufficient to achieve a high VOC/HAP destruction efficiency. VOC/HAP destruction takes place in the combustion chamber where auxiliary fuel is introduced if necessary.

The clean (hot) air then passes from the combustion chamber vertically downward through the second energy recovery canister. Heat generated during VOC oxidation is then adsorbed by the ceramic media (thus heating the media). The clean (cooled) air is routed to atmosphere through outlet control (switching) valves, exhaust manifold and exhaust stack. To maximize the heat exchange, switching valves alternate the airflow path between the canisters to continuously regenerate the heat stored within the ceramic media.

When destructed, the VOC's in the exhaust stream become fuel for the oxidizer. As the VOC load to the oxidizer changes, the temperature in the oxidizer will rise or fall accordingly. The temperature controller will automatically signal the fuel gas control valve to increase or decrease the fuel input as required. This allows the oxidizer to hold oxidation set-point temperature for a wide range of flow and VOC levels while maintaining peak fuel efficiency.

Volumetric control through the system is automatically adjusted by using A.C. variable frequency drives on all fans/blowers. These drive units control fan speed by sensing and monitoring system collection ductwork pressure.



4. Rotary Concentrator System Scope of Supply:

A. Two-Stage Filtration System

Condorchem / CMM will provide filtration prior to the concentrator wheel by use of a 2-stage filter box designed to prevent process particulate from contaminating the system.

Filter box enclosure -	<ul style="list-style-type: none"> The main filter box is designed to handle full design flow. Manufactured of galvanized steel construction with framework designed for high pressure application.
Stage-1 filters -	<ul style="list-style-type: none"> <u>Stage 1</u> will be VariCell II or equal, 60 - 65% (ASHRAE 5.2 - Merv 11) efficient, extended surface mini-pleat filters. VariCell II filters are designed for high performance under difficult operating conditions with variable air volume, turbulent airflow, and high humidity. Filters will consist of foil laminated fiberboard, double wall construction, frame-to-frame adhesive, media pack adhesive, retainer-to-pleat adhesive, adhesive bead separator, dual density media, and a media pack support retainer. Filter media is made of microglass paper with a water repellent binder.
Stage-2 filters -	<ul style="list-style-type: none"> <u>Stage 2</u> will be a Biocel I or equal, 90-95% (ASHRAE 5.2 Merv 16) efficient, fine particulate biological filters. Biocel I filters consist of a pleated media pack enclosed in a galvanized steel frame assembly. The media is a ultra-fine fiberglass formed into a series of pleats. Corrugated aluminum separators maintain uniform spacing between each pleat to allow unrestricted airflow. Bar braces are installed on both sides of the filter for extra reinforcement of the media pack. A single piece galvanized header on the air entering side that is interlocked to the cell sides in a patented fashion prevents leakage and forms a totally rigid construction. Biocel I filters are specifically designed for extreme operating conditions such as variable air volumes, turbulent airflow, high temperature, high humidity, and intermittent exposure to water.
Pressure monitoring -	<ul style="list-style-type: none"> A pressure transmitter is included to monitor filter conditions for predictive maintenance.
Access doors -	<ul style="list-style-type: none"> Access doors with pressure relief latches for inspection and maintenance.



4. Rotary Concentrator System Scope of Supply (continued):

B. Concentrator Wheel Assembly

<p>Condorchem / CMM will provide a rotary concentrator wheel assembly to collect and concentrate VOC laden process air.</p>	
<p>Adsorption wheel-</p>	<ul style="list-style-type: none"> • A Seibu-Giken or equal, vertical Zeolite adsorption wheel assembly with 10:1 concentration. • Adsorption wheel assembly will be contained within a carbon steel casing and mounted on a structural steel skid with lift lugs for ease of installation.
<p>Plenums -</p>	<ul style="list-style-type: none"> • Plenums of heavy gauge aluminized steel and skid mounted.
<p>Access doors -</p>	<ul style="list-style-type: none"> • Access doors are to be provided at pertinent locations.
<p>Drive system -</p>	<ul style="list-style-type: none"> • Adsorbent wheel will rotate via an electric drive system. • The drive system will have an explosion proof 460 volt, 3-phase, 60-hertz, 1 HP electric motor operated with a variable frequency drive. • The wheel will have the capability of turning at up to 8 revolutions per hour.
<p>Supply fan -</p>	<ul style="list-style-type: none"> • A Twin City or equal, supply fan. With AM-CA "C" spark resistant construction. • Fan motor to be Marathon or equal TEFC "premium efficiency". • Access doors and drain plugs included. • OSHA type belt guard included. • Extended lube line through shaft and bearing guard included.
<p>Atmospheric bypass tee-damper (system bypass is not included)</p>	<ul style="list-style-type: none"> • Atmospheric bypass tee-damper assemblies with electric actuator is included (APCS Only). Bypass dampers required by code for each natural gas fired source being exhausted to the APCS and allows operational flexibility.



4. Rotary Concentrator System Scope of Supply (continued):

C. Supplemental Desorption Heat System

Condorchem / CMM will provide a desorption heat system to provide clean heat-ed air to the concentrator wheel for removal of VOC/HAP.

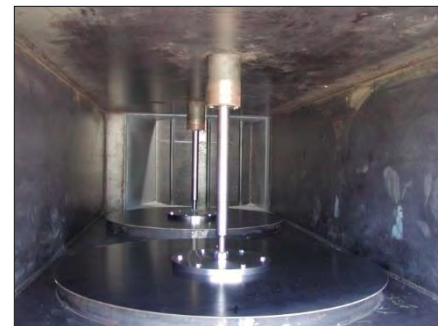
Desorption heater -	<ul style="list-style-type: none"> • An Access Combustion, Eclipse, or equal, Low NOx natural gas or waste propellant fired nozzle mix burner capable of firing at a rate sufficient to bring the unit to operating temperature in minimal time. A flame rod is used for flame safety. The burner and fuel train assembly is capable of a 40:1 turndown. The fuel train designed to NFPA and FM standards
Desorption loop damper -	<ul style="list-style-type: none"> • A carbon steel tee damper. • Electric actuator with limit switches. • Damper directs air to stack during heat-up and cool-down sequence, to RTO during VOC processing.
Concentrator fan trim damper -	<ul style="list-style-type: none"> • A carbon steel single blade damper. • Electric actuator with limit switches. • Trims flow through wheel during heat-up and cool-down sequence, forces air to be drawn through desrption loop.
Temperature and flow controls -	<ul style="list-style-type: none"> • PLC controlled temperature via thermocouple mounted in the air stream (modulates electric heater). • PLC controlled flow rate via pressure transmitter mounted in the air stream (modulates RTO fan speed). • Heater thermocouple hardwired to high temperature limit switch.



4. Rotary Concentrator System Scope of Supply (continued):

D. Regenerative Thermal Oxidizer

<p>Oxidizer construction -</p>	<ul style="list-style-type: none"> The RTO is fabricated and fully assembled in an ultra modern facility using state-of-the-art lasers, etc. The heat exchanger towers, combustion chamber, and air valve switching chamber are manufactured of heavy plate steel with minimal seams by design to insure superior strength and long life. All welds are die checked as part of the quality control process. The RTO exterior is primed and finish painted steel gray.
<p>Internal insulation -</p>	<ul style="list-style-type: none"> 6" thick Thermal Ceramics Superwool insulation modules are fastened to the RTO's internal walls to minimize heat loss and external shell temperatures.
<p>Access doors & panels -</p>	<ul style="list-style-type: none"> Large access doors and panels are provided and offer easy access for inspections and maintenance on all critical internal components and chambers.
<p>Heat exchange airflow switch valves -</p>	<ul style="list-style-type: none"> Reliable poppet valve assemblies are used to direct/alternate the airflow path through the heat recovery canisters. Heavy duty air cylinders by Parker, or equal, are installed with self lubricating linear bearings and self-alignment couplings. To ensure proper sealing and long life operation, the poppet valves are designed with a metal-to-metal contact. The poppet valve disc is manufactured of 7 gauge carbon steel plate, the seat is manufactured of rolled carbon steel and is blanchard ground to produce a positive seal. Compressed air is used to seal & cool the poppet valve shaft assembly. The poppet valve assembly is designed for a minimum of 1 million cycles before rebuild.
<p>Heat recovery media -</p>	<ul style="list-style-type: none"> Low pressure drop, shock-resistant structured ceramic media is packed into the two heat exchange canisters. 97% thermal efficiency (nominal) is achieved from the heat exchange media.



4. Rotary Concentrator System Scope of Supply (continued):

D. Regenerative Thermal Oxidizer

<p>Purge-idle fresh-air damper (Included)-</p>	<ul style="list-style-type: none"> An automated fresh-air damper assembly with electric actuator allows the system to operate during purge, start-up and idle with a fresh air supply.
<p>Supply fan (carbon steel, -2" WC inlet pressure) -</p>	<ul style="list-style-type: none"> A Twin City Fan, or equal, main supply fan with AMCA "C" and a TEFC high-efficiency motor with a service factor of 1.15 or higher. The fan will be balanced in accordance with ISO 1940 G 6.3 specifications. Expansion joints are provided at the inlet and outlet of the fan. On fans of 150 HP or greater bearing temperature and vibration are monitored/alarmed on the HMI.
<p>Volumetric control -</p>	<ul style="list-style-type: none"> An automated variable speed A.C. drive unit with integrated static pressure control loop will provide constant volumetric control. The RTO will have a minimum turndown rate of 5:1.
<p>Burner/ fuel system -</p>	<ul style="list-style-type: none"> An Access Combustion, Eclipse, or equal, Low NOx natural gas fired nozzle mix burner capable of firing at a rate sufficient to bring the unit to operating temperature in minimal time. A self-checking UV scanner is used for flame safety. The burner and fuel train assembly is rated at 50:1 turndown. The fuel train designed to NFPA and FM standards.
<p>On-machine wiring and piping -</p>	<ul style="list-style-type: none"> On machine components are prewired to junction boxes with instruments pre-piped to reduce site assembly and start-up time.



4. Rotary Concentrator System Scope of Supply (continued):

D. Regenerative Thermal Oxidizer

<p>Combustion blower -</p>	<ul style="list-style-type: none"> • A Twin City Fan, or equal, high pressure combustion fan equipped with a TEFC high efficiency motor with a service factor of 1.15 or higher. The fan will be balanced in accordance with ISO 1940 G 6.3 specifications. To quiet the fan a filter/silencer is included.
<p>Hot-side bypass system – (Not required)</p> <p>VOC Loading over 195 lbs/hr will require hot-side bypass</p>	<ul style="list-style-type: none"> • An integrated automated temperature controlled hot-side heat exchanger bypass system to handle high VOC loads (and/or spikes) is not included. This system incorporates a refractory lined damper (with stainless steel blade), an internally insulated mix box and a temperature controlled pneumatic actuator. Top section of exhaust stack will be stainless steel. • Provisions for HSBP are included. Insulated panel on combustion chamber and exhaust stack flange included
<p>Paint Specification -</p>	<ul style="list-style-type: none"> • All process equipment, electrical cabinets, piping, and dampers as follows: • Primer type: Flame Control Hi-Temp No. 850 heat resistant primer or equivalent. • Paint type: Flame Control Hi-Temp No. 850 Series heat resistant coating. • Surface preparation: Surface will be sand-blasted or mechanically wire brushed to remove rust, mill scale, grease and oil. • Prime coat: Film thickness 1.1 Mils dry. • Top coat: Film thickness 1.2 Mils dry. • Reference colors: Equipment bodies, frames, combustion piping, dampers, electrical cabinets: No. 16 Steel. • Natural gas piping (epoxy): Safety Yellow • Air piping and tanks (epoxy): Safety Blue
<p>Spare parts -</p>	<ul style="list-style-type: none"> • Supply fan belts (if required) • 2- Type K thermocouples • 3- Air pressure switches • UV scanner • Ignition transformer • 1- Spark igniter • 2- Gas pressure switches • Pilot solenoid valve • 4-Cylinder rebuild kits • 4-Proximity switch • 8-Assorted fuses • 50'- Door gasket material



5. Electrical Control Enclosure (Control House):

Control House-	<ul style="list-style-type: none"> • Fire resistant painted steel construction • Painted diamond plate floor • Sound attenuating internal walls galvanized perforated steel • Outdoor rated • Insulated walls and floor (4" mineral wool) for environmental control • Lockable door with window
HVAC unit -	<ul style="list-style-type: none"> • Bard or equivalent, 240/1/60 • Heating and air conditioning • 3 ton cooling, 8 KW heating • Thermostatically controlled
Power distribution -	<ul style="list-style-type: none"> • 460/3/60 main breaker/panel • 460/3/60 component breakers (VFDs, motor starters, transformer, etc.) • 240/120 main breaker/panel • 240/120 component breakers (control cabinets, lighting, HVAC, etc.) • 460/120 transformer
Electrical wiring -	<ul style="list-style-type: none"> • Control cabinet prewired to 240/120 volt breaker panel for power. • VFDs prewired to 460 volt breaker panel for power. • Florescent or LED lighting. • 120 volt convenience outlets. • 240 volt outlet for compliance testing (exterior). • A/C prewired to breaker panel for power and to a thermostat.
Computer station (optional) -	<ul style="list-style-type: none"> • A Dell or equal desktop PC • Allen Bradley RS view software and programming to trend and record data to the local hard drive (as space allows). • Can be located in control house or inside facility and connected via Ethernet.



6. Electrical Controls and Interface (HMI):

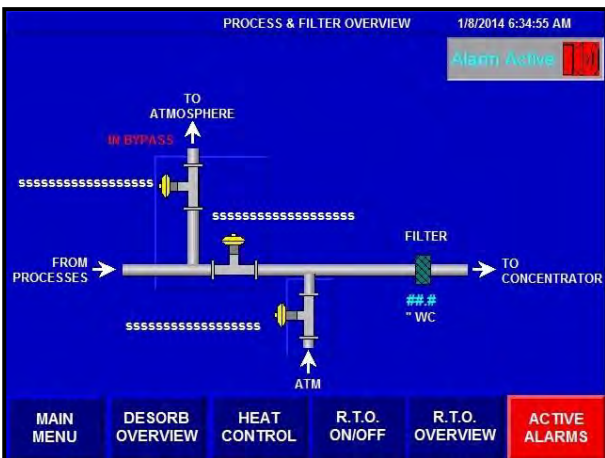
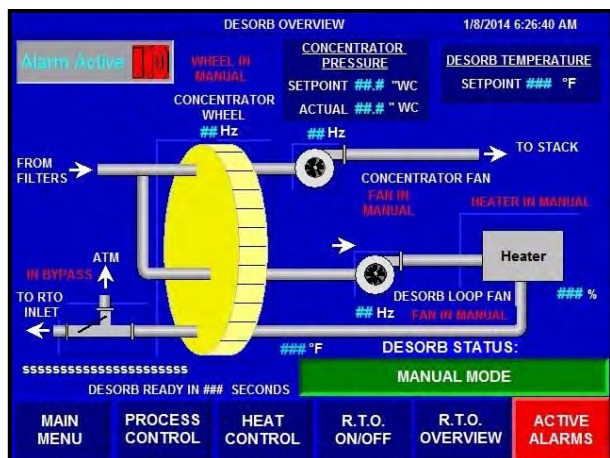
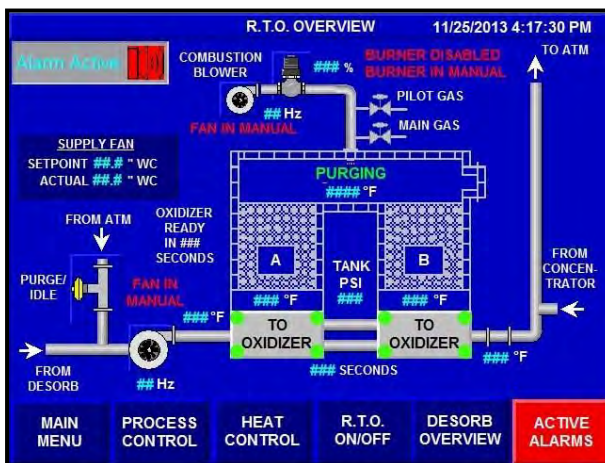
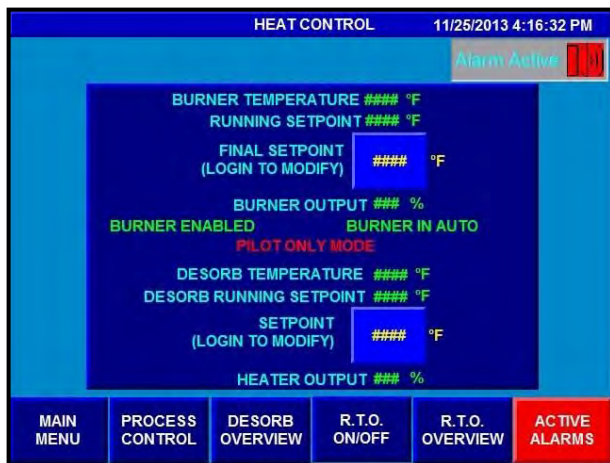
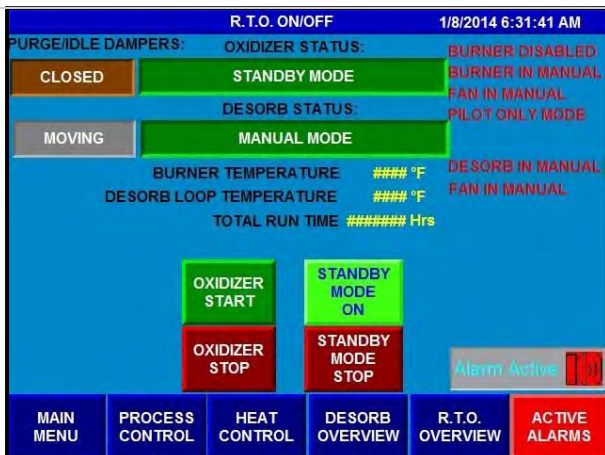
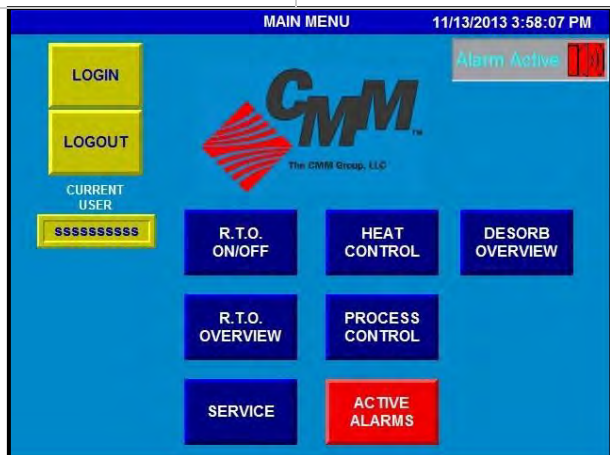
Control cabinet -	<ul style="list-style-type: none"> • NEMA-12 (indoor rated) • Carbon steel, painted construction • Mounted inside control house
Programmable logic controller -	<ul style="list-style-type: none"> • An Allen Bradley Compact Logix PLC will provide the oxidizer's primary electrical control. Set point temperature is controlled by the PLC with PID based algorithm tuning.
Burner safeguard & flame management-	<ul style="list-style-type: none"> • A self-checking UV scanner and a relay module provide continuous flame monitoring.
Safety & control components -	<ul style="list-style-type: none"> • Lockable main disconnect • E-stop button • Lighted control power button • High temperature limit switch • Safety and standard relays • Breakers/fuses • Power supplies • Purge timer • Ethernet switch • Exterior outlet and Ethernet connection • Alarm horn and stack lights (warning)
Data logger -	<ul style="list-style-type: none"> • A four-(4) pen data logger records inlet, combustion chamber, exhaust stack and desorption temperatures. • Up to 9-month storage on internal drive. • Data transfer by USB memory stick.
Remote communication -	<ul style="list-style-type: none"> • An Internet modem is included for remote access and troubleshooting (connection and monthly service by customer).
Variable frequency AC drives -	<ul style="list-style-type: none"> • Yaskawa A.C. variable frequency drives are used for all fan motors. • Drives are NEMA 1 enclosure, which will require indoor wall mounting. • Hard wired communication with PLC.



6. Electrical Controls and Interface (HMI) continued:

Human-machine interface -

- An Allen Bradley PanelView 1000 254mm HMI (Human-Machine-Interface) color touch screen provides the operator with simple control interface.
- Control screens are user friendly with minimal interaction required for normal system operation.
- Maintenance screens are available to select staff with proper login authority.
- Alarm annunciation banner with error codes.



7. Equipment Specifications:

Model number:	RC-90000-RTO-10000-M-97-2C
General Design:	
-Foundation dimensions:	TBD
-Maximum operating airflow:	89,200 SCFM @165 LBS/HR VOC
-Volumetric turn down:	10:1
-Volumetric control:	By pressure control interlocked to variable frequency A.C. drive
-Electrical utilities:	~612 FLA 460/3/60
-Natural gas required:	7,000 cfh @ 5 psig (start-up only)
-Compressed air required:	60 cfm @ 90 PSIG (clean, dry air)
-Fuel train designs:	To NFPA & FM Global specifications, fuel control by ratio regulator
-Burner designs:	High efficiency natural gas fired low NOx nozzle mix burner
Concentrator:	
-Exhaust fan HP:	300 HP
-Wheel type:	Zeolite
-Concentration ratio:	10:1
-Wheel speed:	~6.1 revolutions per hour
-Wheel drive HP:	1 HP
-VOC/HAP capture efficiency:	97% at 100°F and 40% R.H. (max)
Desorption system:	
-Heater/Burner/HX:	4,000,000 Btu/hr
-Loop Fan HP:	75 HP
-Heater Fan HP:	25 HP
RTO:	
-Operating temperature:	1500°F (fluctuating average)
- Thermal heat recovery:	97%
-Heat exchanger design:	Two canisters packed w/low pressure drop shock resistant ceramic structured monolith media.
-Supply fan HP:	75 HP
-Combustion blower HP:	7.5 HP
-Burner sizing:	3,000,000 BTUH
-VOC destruction efficiency:	98% at 1500°F

8. Standard Component List:

As a custom machine manufacturer CMM is capable of modifying our design to utilize component name brands that may be preferred by and/or common to your facility. This list is intended to show-case commonly used brands of equipment, and does not represent a scope of supply. Please discuss any brand alternates that you may desire with your Condorchem representative.

Controls:	
Enclosures & J-boxes -	Hoffman, Saginaw,
Circuit Breakers -	Allen Bradley, ABB, Square D
PLC -	Allen Bradley CompactLogix
Operator Interface -	Allen Bradley Panel View Plus color touch screen
Ethernet switch -	Automation Direct
Motor starter/protectors -	Allen Bradley
Chart recorder -	Eurotherm data logger
Transformer -	Acme
External purge timer -	ATC
High temperature limit switch -	Honeywell
Modem -	Spectrum
Remote Monitoring Services-	Ei3 hardware (software and subscription not included)
Fuses -	Buss
Relays -	Allen Bradley, IDEC
Air conditioner -	Ice Qube (control panel), Bard (control house)
Instrumentation:	
Pressure switches -	Dungs, Festo
Transmitters -	Ashcroft, Dwyer
Thermocouples -	Vulcan Electric, TEMPCO
Vibration detection -	IMI Sensors
Proximity switches -	Turck
Flame safety system:	
Flame safeguard -	Honeywell, Siemens
UV scanner -	Honeywell, Siemens self-checking
Electric Motors/Drives:	
Motors -	Marathon, Westinghouse, Reliance
Variable Frequency Drives -	Allen Bradley, Yaskawa, Parker

8. Standard Component List - (continued):

Pneumatics:	
Cylinders -	PCC, Parker
Solenoids -	AAA
Filters -	Festo, Parker
Reservoir tank -	60 gallon ASME code pressure vessel
Fuel train:	
Burner -	Access Combustion, Eclipse ThermJet
Blocking valves -	Dungs, Siemens
Regulators -	Sensus, Maxitrol, Bryan Donkin
Pressure switches -	Dungs
Ratio regulator -	Dungs
Pilot solenoids -	ASCO
Control valves -	Eclipse, Siemens
Control valve actuator -	Honeywell
Fans:	
Supply fan -	Twin City, New York Blower, Industrial Air Products
Combustion blower -	Twin City, New York Blower
Dampers/Valves:	
Electric actuator -	Remote Control RCEL series, Dresser MAR series
Pneumatic cylinder -	Remote Control RCI series
Refractory lined dampers -	Control Equipment, Kel-Air
Insulation:	
Internal insulation (where applicable)-	Thermal Ceramics Pyro-Bloc Y or Superwool modules
External insulation (between cladding)-	Kaowool, Johns-Manville HTB
Heat Exchange Media:	
Structured-	Bocent, LANTEC, Ceram, Applied Ceramics
Loose fill-	Cellstone

9. Equipment Installation Services:

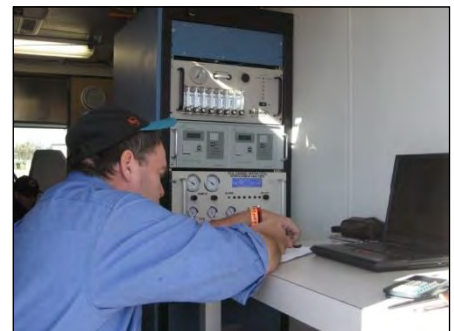
Installation services are not included but can be provided as follows:	
Drawings -	<ul style="list-style-type: none"> Detailed installation drawings as required for local permits and proper recordkeeping.
Equipment foundation -	<ul style="list-style-type: none"> Suitable concrete pad or structural steel platform can be provided.
Crane & rentals -	<ul style="list-style-type: none"> All equipment rentals and rigging labor as required for turnkey installation can be provided.
Collection ductwork -	<ul style="list-style-type: none"> Ductwork will be designed to handle a minimum (+/-) 15" w.c pressure. Ductwork is to be fabricated of heavy-duty spiral-wound galvanized steel with flanged and gasketed joints. Duct will be installed outdoors above the roof on suitable support stands. Test ports will be provided as required.
Exhaust stack (Included)-	<ul style="list-style-type: none"> 74" diameter 82' tall exhaust stack with two-(2) EPA standard 4" test ports. Free-standing stack or guy wired to the equipment foundation.
Balancing dampers -	<ul style="list-style-type: none"> Manual airflow balancing dampers with locking quadrant handle assembly for all exhaust sources as required.
Penetrations -	<ul style="list-style-type: none"> Roof and/or wall penetrations for bypass stacks, etc. can be quoted.
Plumbing -	<ul style="list-style-type: none"> New gas piping can be connected to the system. Gas piping to be painted safety yellow.
Electrical wiring -	<ul style="list-style-type: none"> Power and control wiring from cabinet and VFD's to system components can be included. All conduit of galvanized rigid and sized in accordance with NEC. Electrical control interlocks from process cabinets to new system cabinet can be included.



10. Compliance Testing Services:

Condorchem / CMM is experienced in providing complete turnkey systems to our customers including the completion of performance and/or regulatory compliance testing. If interested in these services following is a brief description of an optional scope of supply.

Test purpose -	<ul style="list-style-type: none"> The purpose of the testing is to demonstrate compliance for both total VOC destruction and VOC capture with the source-testing limitations of the applicable operating permits issued by the local regulator.
Testing certification -	<ul style="list-style-type: none"> The test company contracted by CMM is experienced within your industry and fully suited to conduct emission testing pursuant to the regulatory requirements.
Test protocol and report -	<ul style="list-style-type: none"> A test protocol as required by regulation would be developed jointly by CMM, the Customer and the testing firm and submitted in a timely manner. After test completion, a draft report would be submitted within 25 days of the emission tests for review. Four bound copies of each final testreport will then be published and submitted within five days of receipt of all draft comments.
Emission test parameters and methods -	<ul style="list-style-type: none"> See chart below.



EMISSION TEST PARAMETERS AND METHODS			
Testing Parameter	REFERENCE METHOD	Analytical APPROACH	DETECTION Limit
O ₂	EPA 3A	Paramagnetism	< 2% of full scale
CO ₂	EPA 3A	Non-dispersive infrared	< 2% of full scale
THC VOC	EPA 25A EPA 18	Flame ionization detection Gas chromatograph / FID	< 2% of full scale < 0.1 ppm
Permanent Total Enclosure	EPA 204	--	--
Volumetric flow	1, 2	Pitot / temperature traverse	--
Moisture content	EPA 4	Wet impingement	--

11. Equipment Warranty & Performance Guarantee:

· **Equipment Warranty:**

Components	Warranty Period	Parts	Labor	Expenses
CMM designed & fabricated components such as: -Oxidizer body -Dampers -Platforms, handrails, etc. -Exhaust stack -Ductwork	Twelve-(12) months from shipment	Included	Included for first three-(3) months of operation	Included for first three-(3) months of operation
CMM purchased components such as: -AC drives -Actuators -Burners & fuel train -Electrical components -Concentrator wheel -Fans/blowers -Heat exchangers -Insulation	Minimum twelve-(12) months from shipment by CMM. Longer warranties provided to CMM by our suppliers are extended to our customers. Example: Marathon electric motors are covered for 36-months from CMM's receipt.	Included	Included for first three-(3) months of operation	Included for first three-(3) months of operation

Added warranty conditions:

- Equipment must be operated and maintained in accordance with manufacturer's instructions.
- For any warranty to extend beyond the standard twelve-(12) month period the customer must complete and document semi-annual PM inspections per manufacturers instructions.
- Wearable/consumable items are not covered such as: fuses, light bulbs, spark igniters, fan belts, bearings, seals, O-rings and gaskets.

· **VOC Destruction Efficiency Performance Guarantee:**

Subject to the general provisions below, CMM guarantees that the Rotary Concentrator/Oxidizer System as proposed herein will destroy a minimum of 95% of the incoming vaporous, non-methane VOC when averaged during each one-(1) hour performance test.

This destruction efficiency guarantee is conditional on the following general provisions:

1. The equipment is operated and maintained as described within the manuals provided.
2. The equipment is to be operated and tested within the parameters of the design data below.
3. The process conditions are as described by customer and listed herein as section 2.
4. Compliance testing will be performed at the maximum inlet process conditions that can be achieved and be completed within 90 days of shipment.
5. VOC concentration and flow are to be measured at locations at the inlet and outlet of the control system that comply with EPA stack measurement Methods 1 to 4.
6. The test methods are by EPA approved Method 25A, and Method 18 as necessary to determine non-methane VOC.

12. Maintenance Requirements:

Maintenance requirements and a detailed PM Checklist specific to the Customer Rotary Concentrator system will be provided within CMM's operating and maintenance manual, which is to be supplied at start-up commissioning and prior to operator and maintenance training. Following is a summary of the expected requirements.

Daily Maintenance Checks (No downtime/ no bypass):

1. Verify that all safety devices are in place and properly secured.
2. Verify that all control panels, lights and alarms are in working order.
3. Verify that all doors and access panels are closed and latched.
4. Verify that there are no leaks or loose hardware left around the system.

Weekly Maintenance Checks (No downtime/ no bypass):

1. Check and clean air intakes and the idle/purge damper inlet screen if required.
2. Check the control panel for burned out indicator lights.
3. Check fans for vibration, abnormal sounds or increased noise levels.

Monthly Maintenance Checks (No downtime/ no bypass):

1. Check pressure differential in two-stage filter box and change filters as necessary.
2. Check gas burner linkages and external burner components for wear or signs of slippage.
3. Inspect equipment instrument tubing to ensure that tubing is clear and dry.
4. Check fan/motor drains weep holes for debris and cleaned as necessary.

Six-Month Maintenance Checks (8-12 hours of downtime required):

1. Inspect the interior of the three-stage filter box and the rotary concentrator housing for particulate and/or visible damage. Vacuum particulate, change filters as necessary.
2. Inspect rotary concentrator seals and adjust/replace as necessary.
3. Inspect rotor chain and adjust chain tensioner if necessary.
4. Inspect all ductwork and fan expansion joints and repair/replace as necessary.
5. Inspect all dampers and linkage for proper operation and grease as necessary.
6. Check/adjust fan drive belts for correct alignment, tension and wear.
7. Grease all fan/motor and rotor bearings.
8. Replace the combustion blower filter as necessary.
9. Leak test fuel train and fuel train components and repair as necessary.
10. Clean or replace the burner spark igniters.
11. Remove the UV scanner and clean the view lens with a lint free cloth.
12. Remove lower access doors on RTO and check cylinder shafts for unusual wear.
13. Check poppet valve disc sealing surfaces for unusual gaps and adjust if necessary.
14. Inspect door gaskets before closure, replace or repair as necessary to maintain a leak free seal.
15. Check poppet valve air cylinder filters and replace as required.
16. Inspect and tighten system hardware as required.
17. Test all system safeties and interlocks.
18. Check all electrical junction boxes and connections for moisture and repair as necessary.
19. Check burner flame length and color and balance as necessary.
20. Check exterior of oxidizer for excessive heat and report discrepancies to manufacturer.
21. Inspect internals of dust collector unit and replace bags as necessary.

12. Maintenance Requirements (continued):

Annual Maintenance Checks (~36 hours of downtime required):

1. Calibrate gauges, thermal couples and instrumentation as required.
2. Enter RTO through top-side access doors and inspect.
3. Inspect insulation modules for signs of deterioration, damage or gaps between modules and repair as necessary.
4. Check heat exchanger media for buildup of particulate or residue and visible damage or cracking and report deficiencies to the manufacturer.
5. Inspect gas burner nozzle and burner block.
6. Clean the inner lens of the burner view port with a soft, dry cloth.
7. Inspect/clean thermocouples inside unit.

It is recommended that you contract The CMM Group to assist staff maintenance personnel in performing the six-month and annual maintenance inspections as feasible. Upon completion of these inspections all items checked will be documented and a detailed report provided.

Non-Scheduled Maintenance:

Potential Component Failure	Maintenance Required	Bypass Time
Control relay	Troubleshoot and replace with spare parts on hand	<1 hour
Fuse	Troubleshoot and replace with spare parts on hand	<1 hour
Airflow pressure switch	Troubleshoot and replace with spare parts on hand	<1 hour
Pressure transmitter	Troubleshoot and replace with spare parts on hand	<1 hour
Limit switch	Troubleshoot and replace with spare parts on hand	<1 hour
Thermocouple	Troubleshoot and replace with spare parts on hand	<1 hour
Gas pressure switch	Troubleshoot and replace with spare parts on hand	<1 hour
UV scanner	Troubleshoot and replace with spare parts on hand	<1 hour
Ignition transformer	Troubleshoot and replace with spare parts on hand	<1 hour
Spark igniter	Troubleshoot and replace with spare parts on hand	<1 hour
Solenoid valve	Troubleshoot and replace with spare parts on hand	<1 hour
Proximity switch	Troubleshoot and replace with spare parts on hand	<1 hour
Damper actuator	Troubleshoot and replace with spare parts on hand	1-2 hours
Fan belts	Troubleshoot and replace with spare parts on hand	1-2 hours
Rotor drive chain	Troubleshoot and replace with spare parts on hand	1-2 hours
Rotor air seals	Troubleshoot and replace with spare parts on hand	1-2 hours
Pneumatic cylinder	Troubleshoot and rebuild with spare parts on hand	4-6 hours
Electric motor	Troubleshoot and expedite part from local supplier	4-6 hours
Programmable controller	Troubleshoot and expedite part from manufacturer	12-24 hours
A.C. drive unit	Troubleshoot and expedite part from manufacturer	12-24 hours

13. Operating System Alarms & Actions:

A detailed list of all operational system alarms will be developed and included in the operating manual. Following is an initial list of faults that will cause atmospheric bypass and/or system shutdown.

Alarm Message/ Faults	Automated Actions/ Consequence
E-Stop/Outputs Disabled	Bypass open, dampers fail-to-safe, APCS shutdown
Fan Pressure Switch Failures	Bypass open, APCS offline
Fan Motor Starter Failures	Bypass open, APCS offline
A.C. Drive Faults	Bypass open, APCS offline
High Duct Negative Pressure	Bypass open, APCS offline
Low Gas Pressure Fault	Bypass open, APCS offline
High Gas Pressure Fault	Bypass open, APCS offline
Flame Failure	Bypass open, APCS offline
Purge/Idle Damper Failure	Bypass open, APCS offline
Compressed Air Pressure Low	Bypass open, APCS offline
Chamber Hi-Temp Limit Fault	Bypass open, APCS offline
Cold Face A,B Overtemp	Bypass open, APCS offline
Chamber A,B Overtemp	Bypass open, APCS offline
Thermocouple Failures	Bypass open, APCS offline
Poppet Valve Failed	Bypass open, APCS offline
Fire Detection	Bypass open, close isolation dampers, APCS to idle

14. Zeolite Concentrator Contaminants:

Various compounds could be present in a manufacturers exhaust air stream that may cause damage to the zeolite rotor and/or reduce the systems overall efficiency. Compounds that could damage the zeolite rotary concentrator wheel over time or reduce overall efficiency are as listed below. If it is expected that this may be an issue for your facility please contact CMM.

Particulates (filtration is required at 95% at <1 micron)

Ammonia (should be <10 ppm)

Strong acids (such as)

Sulfuric acids

Nitric acids

Oxyacids

Hydro

Strong bases (such as)

Sodium hydroxide

Calcium hydroxide

HAP/VOC's that contribute to a decrease in removal efficiency:

Gases (such as)

Methane

Ethane

Butane

Chlorofluorocarbons

Isopentane

1,3 Butadiene

Vinyl chloride

Hydrogen sulfide

Acetaldehyde

Demethyl sulfide

Methanol

Methylene chloride

Cyclohexane

Benzene

17. Administrative Items:

Company stability -	<ul style="list-style-type: none"> • Maya Holdings, LLC d/b/a The CMM Group • Profitable private company with no debt and investment capital available • Clear history with strong financials and credit worthiness
Banking contact / wire transfer info -	<ul style="list-style-type: none"> • Nicolet Bank • Contact: Todd Healy - # 920-430-1400 • 111 North Washington Road, Green Bay, WI 54305 • Routing and account numbers available at order placement
Business I.D. no's:	<ul style="list-style-type: none"> • Federal Employer I.D. #: 85-3653639 • WI State Sellers Permit #: 456-1030526586-0
Insurance coverage -	<ul style="list-style-type: none"> • No Loss Claims since Company founded • Commercial General Liability Coverage \$2,000,000 • Product Liability Coverage \$2,000,000 • Personal Injury Coverage \$2,000,000 • Error & Omissions Liability Coverage \$2,000,000 • Hired and Non-Owned Auto Coverage \$1,000,000 • Worker's Compensation/Employer's Liability Coverage \$1,000,000 per • Excess Liability Coverage \$5,000,000
Safety -	<ul style="list-style-type: none"> • Strict adherence to OSHA guidelines with Contractor's review and safety seminars conducted with all workers prior to beginning any work onsite. • Safety program & training via J.J. Keller Safety Management Suite
Codes & regulations -	<p>As a minimum, The CMM Group will adhere to the latest editions of the following codes and regulations as they apply to the design and fabrication of this project:</p> <ul style="list-style-type: none"> • Factory Mutual (FM) • National Fire Protection Association (NFPA), Section 86 • National Electrical Manufacturers Association (NEMA) • National Electric Code (NEC) • Sheet Metal Association of Contractors North America (SMACNA)
Manual & drawings -	<p>Operating and maintenance manuals with project specific vendor component documentation is included in both a hard copy literature and a digital format. Three-(3) complete sets of manufacturer's "as built" drawings are to be provided in a timely manner after project completion.</p>
Design changes after order placement -	<p>Changes to the design and fabrication of equipment and/or installation due to customer modifications to process specifications and/or customer requests after order placement may affect price and delivery. A formal change order document will be initiated by CMM for customer approval for any changes in cost or delivery.</p>
Safe operation -	<p>Proper and safe operation and maintenance of the system is the sole responsibility of the customer.</p>
Payment delay -	<p>Delays in receiving payment milestones may affect delivery schedule.</p>

18. Start-Up & Training/ Service Rate Schedule:

Start-up service and operator training are included within this proposal (one 5 day trip). It is recommended that plant maintenance personnel work closely with CMM during this process so that they become familiar with the system components and operation. Upon completion of start-up CMM will provide operator and maintenance training sessions for shift personnel as scheduled. If interferences and/ or delays occur at the jobsite (at no fault of CMM) which delay the work of onsite CMM personnel, the customer will be invoiced for the additional time based on the rates described below.

Upon acceptance of the system a customer issued purchase order will be required to initiate all future field service calls. A not-to-exceed cost estimate will be provided upon request. Depending upon the type of field service call required the following hourly rates apply.

Preventative Maintenance Rates:

Hourly rates for a "Mechanical Engineer" to perform scheduled preventative maintenance inspections with a twenty-one-(21) day advance order are as follows:

Straight Time: \$ 125.00/hour

Equipment Start-Up & Operator Training Rates:

Hourly rates for a "Service Technician" to perform start-up services, installation supervision, and/or operator training are as follows:

Straight Time: \$ 135.00/hour

Emergency Service/Troubleshooting Rates:

Hourly rates for an "Electrical Engineer" for troubleshooting and PLC programming are as follows:

Straight Time: \$145.00/hour

Added Billing Items:

A "straight time" rate applies for up to eight-(8) hours per day, Monday through Friday.

A "time & one half" rate applies for over eight-(8) hours and up to twelve-(12) hours, Monday through Friday and up to eight-(8) hours on Saturday.

A "premium" double-time time rate applies for Sundays and Holidays, over twelve-(12) hours Monday through Friday and over eight-(8) hours on Saturday.

All weekday travel time will be invoiced as straight time. Any weekend travel requested by the customer will be invoiced as time and one half.

Travel expenses will be invoiced at cost plus 10%. This will include airfare, car rental, lodging, etc.

Layovers will be invoiced at \$640.00/day plus responsible expenses during the layover.

All service calls are subject to a four-(4) hour minimum billing, plus travel expenses.

Rates are subject to change without notice.

19. Items Not Included:

1. Freight to jobsite.
2. Installation services of any kind; including labor for loading media as required.
3. Crane rentals and crane operators.
4. Concrete equipment foundation.
5. Main circuit breaker per local code and power feeds of 480 volts to be connected by other to the equipment VFD's and a 120 volt power feed connected to the electrical control cabinet. The AC drives and control cabinet are to be mounted indoors ~50' of the equipment battery limits.
6. Internet connection to allow for remote inspection and troubleshooting.
7. Remote ethernet connection, monitoring software and subscription.
8. Clean, dry (-40 °F dew point) air supply at 90 PSI to the RTO tank inlet.
9. A natural gas supply of 7,000 cfh at 5 PSI to the RTO fuel train inlet.
10. Modifications to the process (LFL monitors, recirculation, capture hoods, PTE's, etc.)
11. Any component or service not specifically mentioned in this proposal.
12. Union labor as may be desired.
13. Costs of applying for and/or securing permits as necessary to install and/or operate the oxidizer.
14. Local, state or federal sales, use, value added, excise or any other taxes.

20. Price. Payment Terms. Shipment/ Installation Schedule:

• **Budgetary Price:**

One-(1) RC-90000-RTO-10000-M-97-2C as described herein EXW..... \$ 1,863,750
Budgetary installation services as described herein \$ 400,000

**Value-Added Options:
One (1) Year Service Plan:**

- Annual subscription for cloud based data collection of RTO system parameters:
 - Operating Temperatures (RTO and Concentrator)
 - Media Bed Temperatures and Pressures
 - Concentrator Filter Pressures
 - System Fan Temperatures and Vibration Monitoring
 - CMM will provide a monthly summary report with data trends of operating data
 - Marmen will have access to data dashboard. This dashboard is available via internet connection using username and password.
 - This connection can also be used by CMM personnel for system service
 - Note: This plan requires an ethernet connection

Value of Remote Monitoring Plan.....\$6,950

This service will be included in the purchase price of the equipment at no additional cost.

Preventive Maintenance Service:

- One (1) Preventive Maintenance service visit to be scheduled after first year of system operation:
 - Internal inspection of both rotary concentrator and RTO
 - CMM will collect and test core sample from rotary concentrator
 - Verify system safeties and interlocks with process.
 - CMM will provide all recommended parts for first PM service
 - Training refresher with Marmen maintenance personnel
 - Travel, service labor, and expenses for non-holiday weekday service. PM is estimated to take three days.

Value of Annual Preventive Maintenance Service/Parts/Core Testing.....\$11,650

This service will be included in the purchase price of the equipment at no additional cost.

Hot-Side Bypass Provisions:

CMM will include an insulated combustion chamber cover and exhaust stack transition with cover for future hot-side bypass damper installation at no additional cost. Please note that hot side bypass damper and connecting ductwork is not included at this time.

Note: This proposal was based on material and freight pricing in effect as of the date herein. If, during the performance of this contract, the cost of materials or freight significantly increases, through no fault of CMM, the contract price shall be equitably adjusted by an amount reasonably necessary to cover any such cost increases.

- **Payment Terms:**

- (10%) Ten-percent due at order placement as down payment (due immediately, in March)
- (15%) Fifteen-percent due as progress payment by December 20, 2022
- (20%) Twenty-percent due as progress payment by January 6, 2023
- (20%) Twenty-percent due upon completion of factory acceptance visit, not to exceed April 28, 2023.
- (15%) Fifteen-percent due as seven days prior to shipment with Bill of Lading documentation, not to exceed May 27, 2023
- (10%) Ten-percent due up successful CMM equipment start-up (ready to receive customer process exhaust) at Marmen facility. Not to exceed sixty days from shipment or offer to ship, unless delays in start-up are caused by CMM. Invoice Due Net 30 days.
- (10%) Ten-percent due upon completion of on-site training of maintenance and operators. Training to take place at time of equipment start-up and will be performed by CMM personnel that are on-site for equipment start-up. Not to exceed sixty days from shipment unless delays in start-up are caused by CMM. Invoice Due Net 30 days.

- **Shipment/ Installation Schedule:**

Without customer delay, the equipment described herein will be designed, fabricated, inspected and shipped within 26-28 weeks after receipt of formal purchase order and down payment. If an expedited schedule is required, please contact Condorchem / CMM Group for discussion.

See above payment terms that includes projected project schedule.

Maya Holdings LLC (d/b/a The CMM Group), STANDARD TERMS AND CONDITIONS OF SALE

1. ACCEPTANCE BY BUYER: Maya Holdings LLC (d/b/a The CMM Group) ("Seller") hereby offers to sell to the addressee named on the face hereof (the "Buyer") the equipment listed on the face hereof (the "Equipment") for the price(s) indicated, on the express condition that the Buyer agrees to accept and be bound by all the terms and conditions herein. Unless withdrawn or modified by Seller this offer may be accepted by Buyer by any of the following: (a) written, telephonic, telegraphic, email or facsimile acceptance received by Seller within 30 days (unless otherwise specified), or (b) shipment by Seller and Buyer's acceptance of or payment for, all or any of the Equipment. A response by Buyer in any of the foregoing manners shall constitute acceptance by Buyer of all terms and conditions hereof. Seller objects to and rejects any terms in any purchase order, acceptance or other document submitted by or on behalf of Buyer that are in conflict with any of the terms and conditions of these Standard Terms and Conditions of Sale unless Seller has signed an agreement identifying with particularity each provision and paragraph of these Standard Terms and Conditions that is modified or waived.

2. SALES AGREEMENT: The agreement between Seller and Buyer (the "Sales Agreement") with respect to the Equipment shall consist of the terms and conditions contained herein, together with any modifications or additions thereto agreed to in writing by Seller and Buyer. The Sales Agreement, as modified or supplemented as provided herein, shall constitute the entire agreement of Seller and Buyer with respect to the transaction contemplated hereby. No prior to contemporaneous courses of dealing or written or verbal agreements, to the extent that they differ in any way from the written terms and conditions of the Sales Agreement, shall be binding on the Seller or be construed to alter, repeal or invalidate the Sales Agreement. In the event of a conflict between these terms and conditions any other, specific, written, agreed to terms included within any other Sales Agreement, such other terms shall only govern such other Sales Agreement.

3. PAYMENT AND CREDIT: Terms of payment (unless otherwise provided on the face hereof): 30% due with purchase order as down payment, 30% due at midpoint of order to ship date, 30% due 10 days prior to shipment, balance due upon the earlier of start-up or 30 days following receipt by Buyer. A discount of one half of one percent (0.50%) is allowed for payment in full on or before 10 days after the date of shipment. If, in the exclusive judgment of Seller, the financial condition of the Buyer at the time does not justify the commencement or continuance of production or shipment on the terms specified herein, Seller may, in addition to all other remedies it may have at law or in equity, make a written demand for full or partial payment in advance, suspend its performance until such payment is made, and cancel the Buyer's order if such payment is not received by Seller within thirty (30) days after the mailing of demand by Seller.

If Buyer and Seller agree that the payment of any part of the price of the Equipment received by Seller before the commencement of production, the Seller shall be under no obligation to commence production unless and until such payment is received, and in any event may cancel this Sales Agreement if such payment is not received within 30 days of the date hereof.

If Buyer and Seller agree that all or a portion of the price of the Equipment is to be paid to Seller before delivery of the Equipment to the carrier, as provided in Section 5 below, whether by way of deposit, prepayment, progress payment or otherwise, Buyer expressly acknowledges and agrees as follows: (a) notwithstanding such payment and identification of the Equipment that is to be sold to Buyer, title to the Equipment will pass to Buyer only upon Seller's actual receipt of the entire purchase price and all installments thereof (notwithstanding receipt of the Equipment by Buyer), and not before; (b) any and all such payments shall constitute loans to the Seller, which will be deemed discharged by Seller upon delivery of the Equipment to the carrier; (c) Buyer waives any and all rights it may have as a "buyer in the ordinary course" for purposes of the applicable Uniform Commercial Code until delivery of the Equipment to the carrier; and (d) to the extent that, notwithstanding the foregoing clauses (a), (b) and (c), the Buyer has an interest in the Equipment or in any deposit, prepayment, progress payment or other payment to Seller prior to the delivery of the Equipment to the carrier, such interest shall be subordinate in right to any inventory financier or other secured creditor of Seller. As to any amounts due Seller by Buyer hereunder, Buyer hereby grants to Seller a purchase money security interest in the Equipment (and all accessories, attachments or other goods sold to Buyer by Seller hereunder) manufactured or supplied by Seller. The purpose of the security interest granted hereunder is to secure Buyer's full payment on all obligations due and owing to Seller. Seller, in its discretion, may file a UCC-1 Financing Statement or such other instruments, certificates and/or documents necessary to perfect Seller's senior lien in the Equipment; Buyer shall cooperate in good faith to affect same. Buyer shall execute and deliver such additional documents as the Seller may reasonably request to perfect its security interest and/or liens evidencing such security interest.

Unless otherwise indicated on the face hereof delivery terms are FCA. Seller's selected manufacturing facility (Incoterms 2010).

Remittance should be forwarded to Maya Holdings LLC, at the address indicated on the billing invoice.

If shipments are delayed by or at the request of the Buyer, payment shall become due from the date when Seller is prepared to make shipment. Any equipment held for the Buyer because of such delay on delivery shall be at the sole risk and expense of the Buyer.

If more than one shipment is made, each may be invoiced separately.

Invoiced payments past due are subject to late charges of one and one half percent (1-1/2%) per month of any unpaid invoice balance. Buyer shall not set off against or deduct from any amounts due hereunder all or any part of any damages which it may have sustained or alleged to have sustained arising out of any breach of the Sales Agreement by Seller or any other claim Buyer may have against Seller.

4. TAXES: All prices quoted herein do not include sales, use, value added, excise and other taxes or other governmental charges in respect of the production, sale, distribution or delivery of any Equipment or service related thereto. Buyer agrees to indemnify Seller against the imposition of, or increase in, any such taxes or charges after the date hereof, which Seller may be required to pay.

5. SHIPMENTS AND DELIVERY: Risk of loss or damage to goods shall pass from Seller to Buyer upon delivery of the Equipment. Delivery dates are approximate, not guaranteed, and based on prompt receipt of the down payment and all necessary information by Seller.

6. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL INDIRECT, MULTIPLE OR PUNITIVE LOSS, DAMAGE, EXPENSE OR INJURY OF ANY KIND ON ANY CLAIM ARISING OUT OF OR IN CONNECTION WITH THE SALES AGREEMENT WHETHER BASED ON BREACH OF CONTRACT, BREACH OF WARRANTY, TORT OR ANY OTHER THEORY IN WAR OR IN EQUITY.

7. SAFETY REQUIREMENTS: Buyer shall notify Seller in writing of any safety devices for the Equipment that are not specifically included in the description of the Equipment and that may be required by state or local law, rule or regulation. Notice by Buyer shall be in good time before the estimated date of delivery to permit installation by Seller of the required safety devices on the Equipment, if such safety devices are available and are approved by Seller as provided herein. Buyer agrees to indemnify and hold Seller harmless from and against all liability, loss, cost, damage or expense attributable to any claim against Seller for personal injury or property damage arising out of the installation, maintenance or operation of the Equipment by Buyer or others, whatever the cause or alleged cause of the personal injury or property damage may be.

8. EQUIPMENT WARRANTY: Seller warrants, to the original Buyer only, that every part of the Equipment covered by this proposal manufactured by it will be of proper materials and workmanship and that when delivered the Equipment will be designed and manufactured to perform the mechanical functions expressly stated in the Sales Agreement provided the Equipment is maintained and operated under proper conditions by competent trained personnel. In the Seller's discharge of this warranty, the Buyer's sole and exclusive remedy against the Seller shall be for the repair, modification or replacement, but not installation, of any such part that proves defective in material, workmanship, or warranted performance within the earlier of thirteen months from the date of the delivery of the Equipment to Buyer or twelve months after installation of the Equipment, provided Buyer immediately gives Seller written notice of such alleged defects and, if requested, returns the defective part to Seller's place of business at the address indicated on the face hereof, freight prepaid, for inspection. Seller shall not be responsible for repair or replacement of any such parts unless affected by it or in accordance with written authority from it. Component materials and parts not manufactured by Seller are not included in the foregoing warranty but are subject only to the warranties of their respective manufacturers.

In no event shall Seller's limited warranty with regard to freedom from defects extend to any Equipment in any way caused or allowed to be installed, operated or used in a negligent or improper manner, or so as to be subject or exposed to conditions of abrasion, erosion, corrosion, excessive heat or other abuse or accident. Inasmuch as no alloys, materials, coatings or forms of construction are known to us which will successfully resist all abrasion, erosion, corrosion, or deterioration from excessive heat, Seller cannot make any guarantee as to the life of equipment purchased by Buyer when subject to conditions which cause such damages.

EXCEPT AS SET FORTH IN PARAGRAPH 8, AND VARYING ONLY AS SET FORTH IN PARAGRAPH 9, THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. NO IMPLIED WARRANTY OF MERCHANTABILITY, NO IMPLIED WARRANTY OF FITNESS FOR ANY PURPOSE, AND NO WARRANTY ARISING BY USAGE OF TRADE, COURSE OF DEALING, OR COURSE OF PERFORMANCE IS GIVEN BY SELLER OR SHALL ARISE BY OR IN CONNECTION WITH THE SALES AGREEMENT AND/OR THE SELLER'S AND/OR BUYER'S CONDUCT IN RELATION THERETO OR TO EACH OTHER, AND IN NO EVENT SHALL SELLER BE LIABLE ON ANY SUCH WARRANTY WITH RESPECT TO ANY EQUIPMENT, INCLUDING THE WARRANTY SET FORTH IN PARAGRAPH 8. ANY MODEL, SAMPLE, DRAWING OR OTHER ARTIFACT OR REPRESENTATION OF ANY KIND OF ANY EQUIPMENT SHOWN OR FURNISHED TO BUYER BY SELLER, IF ANY, WAS FOR ILLUSTRATIVE PURPOSES EXCLUSIVELY AND NEITHER DID NOR DOES CONSTITUTE ANY REPRESENTATION OR WARRANTY OF SELLER THAT ANY EQUIPMENT WOULD OR WILL CONFORM THERETO.

SELLER SHALL NOT BE REQUIRED TO HONOR THE FOREGOING WARRANTY IF BUYER HAS FAILED TO MAKE FULL AND TIMELY PAYMENT TO SELLER OF THE FULL AMOUNT INVOICED BY SELLER TO BUYER FOR THE EQUIPMENT AS REQUIRED UNDER PARAGRAPH 3 ABOVE.

If Seller is unable to modify, repair or replace as provided above to meet its warranty obligations stated above, including compliance with any acceptance criteria contained in this Agreement, Buyer's sole remedy shall be to pay and Seller's sole liability shall be to accept a mutually agreed price reduction reflecting the difference between the value of the Equipment delivered and the value the Equipment would have had if it had been as warranted. In the event that the parties fail to agree on a price reduction, Seller's sole liability shall be to repay any portion of the purchase price paid for the Equipment upon Buyer's returning it to Seller FCA Buyer's plant (Incoterms 2010).

9. CATALYST WARRANTY (if applicable): Seller strictly for the period stated, warrants subject to all terms and conditions herein, that the catalyst furnished hereunder, when operated in accordance with the inlet conditions stated, shall provide minimum contaminant removal/destruction efficiency or not exceed maximum allowable unconverted contaminant concentration in the stack gas, as presented, whichever is less stringent. The term "contaminant removal/destruction efficiency" shall be defined as that percentage of incoming hydrocarbon content oxidized to form carbon dioxide. Performance tests, if required, conducted at Buyer's expense. Catalyst shall be considered accepted if tests show performance warranty has been fulfilled.

In the event the catalyst fails to perform as described above, Seller shall have the option of either, a) replacing FCA shipping point (Incoterms 2010), the non-performing catalyst, b) providing FCA shipping point, additional catalyst, c) make whatever repairs or modifications to the catalyst configuration it considers necessary to enable the catalyst to meet guarantees. Costs of installing modifications shall be borne by Buyer.

In the event Seller chooses to provide a replacement charge of catalyst, Buyer agrees to provide field installation for the new catalyst, return the original catalyst to Seller and accept

replacement catalyst as fulfillment of all obligations borne by Seller and agrees to make no further demands.

The maximum liability of Seller under this warranty shall not exceed the catalyst purchase price. Seller, in no event shall be liable for production losses or indirect or consequential damages resulting from failure of catalyst to meet warranty. The following contaminants are known catalyst deactivators and contribute to shortened catalyst life: heavy and base metals such as lead, mercury, arsenic, antimony, zinc, copper, tin, iron, nickel and chrome, sulfur and phosphorous. Hence the total content of these element(s) analyzed on the catalyst by quantitative methods must not exceed 10 grams/ft³ with the exceptions shown below. Contaminants in excess of these amounts shall void the warranty unless failure is due solely to defects in the equipment.

Chlorinated compounds in the exhaust not to exceed 10 ppm as Cl. Silicon compounds in the exhaust are not to be present. Contaminants in excess of these amounts shall void the warranty. Periodic cleaning of particulates, etc., may be found necessary to maintain catalyst activity. If required, this shall not be construed as evidence of catalyst nonperformance. Buyer shall conduct catalyst cleaning in strict accordance with Seller's procedure during warranty period.

If a separate Component Warranty is attached to this Sales Agreement, the terms of that Component Warranty are incorporated herein and limited according to the terms of Paragraph 8, except as specifically provided in the Component Warranty. If a separate Destruction Warranty is attached to this Sales Agreement, the terms of that Destruction Warranty are incorporated herein and limited according to the terms of Paragraph 8, except as specifically provided in the Component Warranty.

10. INSTALLATION AND SERVICE: Seller shall not be required to install, service, or provide any on-site engineering and/or site preparation for any of the Equipment except as may be agreed upon in writing by Seller Buyer.

11. INTELLECTUAL PROPERTY: Buyer shall indemnify and hold harmless Seller against all liabilities or expenses arising from claims of infringement of patent, trademark or other registered mark or design with respect to all Equipment manufactured to Buyer's specifications. Seller is not responsible for any uses to which any of the Equipment may be put as a part of any mechanism or any process subject to any patent or other registered mark held by others. Seller warrants that none of the other Equipment designed, manufactured, or sold by it infringes any U.S. patent trademark or copyright provided that Buyer will (a) forthwith upon receipt forward to Seller any communication charging infringement, (b) forthwith forward to Seller all process, pleadings and other papers served in any action charging infringement, (c) give Seller the sole right to defend any such actions at Seller's expense, and

(d) give Seller the option at any time up to or after judgment at Seller's expense to minimize Buyer's damage or liability (i) by altering the Equipment to make it non-infringing, (ii) by exchanging a non-infringing part which will fulfill substantially the same function for the infringing part which in that case becomes the Seller's property, (iii) by obtaining a license permitting Buyer's use of any infringing part, or (iv) by repurchasing the infringing Equipment at Buyer straight line depreciated cost. Seller's maximum liability under this warranty shall be (a) to indemnify Buyer for any money judgment recovered against Buyer in a court of competent jurisdiction plus Buyer's reasonable counsel fees if Seller does not undertake the defense and (b) to repurchase at Buyer's straight line depreciated cost any part held by such a court to be infringing which Buyer cannot use by reason of adverse judgment, all liability of Seller's part hereunder subject to due performance by Buyer of the above conditions and the limitations of Paragraph 6 hereof.

12. TRADEMARKS: Unless otherwise agreed, Seller reserves the right to have its name or trademark appear on each product sold hereunder, and to use such products or illustrations of the same for display or advertising purposes.

13. BUYER SPECIFICATIONS/DISCLOSURES: Buyer has provided all information required for Seller to manufacture the Equipment to Seller's specifications. Buyer has advised Seller of all conditions that may affect the performance and suitability of the Equipment. Without limitation, Buyer has advised Seller in writing of the level of silicone or other particulates present in the environment in which the Equipment will be installed or located. Seller shall have no responsibility for any failure of performance of the Equipment based in whole or in part on a failure of Buyer to provide full and accurate information to Seller.

14. DRAWINGS AND SPECIFICATIONS: Any drawings, prints or other information furnished by Seller in connection with the order are strictly confidential and shall not be used for any purpose other than in connection with Seller's products and equipment; all rights of Seller thereto are reserved and no drawing, print or other information shall be copied or distributed in whole or in part without prior permission from Seller. All copyrights in drawings, prints, schematics or other pictorial representations provided by Seller vest solely in Seller and are Seller's sole and exclusive property. No equipment may be manufactured by Buyer or for Buyer by third parties from Seller's prints or designs (whether or not furnished to Buyer by Seller) without the prior consent of Seller. Buyer shall not reverse engineer any of the Equipment or facilitate reverse engineering of the Equipment by any third party, nor shall Buyer purchase equipment that appears to have been reverse engineered by third parties.

15. INSPECTION BY BUYER: CLAIMS FOR DAMAGES IN TRANSIT: Buyer shall carefully examine and check all deliveries of Equipment made hereunder as they are received and to report within seven days to Seller any alleged error, shortage or defect or non-conformity of any such Equipment; any failure by Buyer so to examine and report shall constitute a waiver by Buyer of any claim or right of Buyer against Seller arising hereunder or by law with respect to any such error, shortage, defect or non-conformity reasonably discoverable by such an examination and check. All claims by Buyer for damage or loss in transit shall be made by Buyer against the carrier.

16. PERFORMANCE TESTING: Any tests conducted to prove the performance of the Equipment complies with a test procedure that has been agreed between Buyer and Seller shall be completed no later than ninety (90) days after the Equipment has been installed. Unless otherwise stated, the price(s) set forth on the face hereof do not include the cost of any tests. The results of any tests so conducted shall be accepted by Buyer as final and binding as to the performance or other specifications of Equipment so tested.

17. BUYER PROCESS: Unless otherwise agreed, Seller does not guarantee Buyer process performance with respect to raw materials, final product, production speeds, efficiencies and energy consumption. Seller shall not be obligated to make any modifications to the Equipment if requested after the date hereof by Buyer for process or experimental reasons discovered by Buyer, or due to the discovery of new technology by Buyer after the date hereof, or to meet specifications of Buyer not described to Seller on the date hereof.

18. MODIFICATIONS AND CANCELLATIONS: Except as expressly provided herein, the terms and conditions (whether as to the performance or safety of the Equipment, or otherwise) of the Sales Agreement may not be modified, terminated, or repudiated, in whole or in part, except by a writing signed by Seller and Buyer. Seller may, at its sole option, treat any attempted modification, termination or repudiation to which it does not agree in writing as a breach of the entire Sales Agreement and recover from Buyer all Seller's damages, including without limitation special, indirect, consequential and incidental damages, resulting there from or arising in connection therewith. Seller may specify an increase in the price(s) set forth on the face hereof as a condition of its agreement to any modification of the Sales Agreement requested by Buyer. Upon any breach by Buyer or failure by Buyer to comply with any of the terms and conditions hereof, or if Buyer becomes unable to conduct its normal business operations (including inability to meet its obligations as they mature) or becomes the subject of any proceedings under state or federal law for the benefit of creditors or relief of debtor or makes any assignment for the benefit of creditors, Seller shall have the right immediately to cancel or terminate the Sales Agreement, in whole or in such part as Seller in its sole judgment shall deem expedient, and recover from Buyer all damages, including without limitation special, indirect, consequential and incidental damages, suffered by the Seller as a result of, or arising in connection with such termination. If the Sales Agreement, or any part thereof, is modified or terminated by written agreement of the parties or otherwise as provided herein, unless otherwise agreed, buyer shall pay and be liable for modification or termination charges including (if applicable) without limitation, the following: (a) the price of any and all Equipment the manufacture of which by Seller is or was either completed or in process at the time of such written agreement or termination, plus

(b) any and all expenditures made or incurred by Seller (including, without limitation, any such expenditures or liabilities for raw materials, components, labor, engineering and start-up expenses) in connection with the entire Sales Agreement (including, without limitation, the uncompleted or modified portion if Buyer's order in connection therewith), plus (c) a reasonable estimated profit.

19. SECURITY INTEREST: In order to provide collateral security for performance of all of the obligations of Buyer under this Sales Agreement, Buyer hereby grants a purchase money security interest in the Equipment, all acccessions thereto and all and replacements for, and all proceeds, supporting obligations and products of the foregoing ("Collateral"), wherever located. Buyer grants Seller the right to file financing statements in the state of Buyer's organization and in any other state or office that may be required to perfect the security interest granted herein. Buyer further grants Seller the right to give notice to any party holding a security interest in like collateral advising of the security interest granted herein. Seller shall have all of the rights and remedies of a perfected secured party under the Uniform Commercial Code as adopted in the State of Wisconsin.

20. REMEDIES: No remedy of Seller provided herein shall be exclusive of any other remedy of Seller provided herein or allowed by law. Seller's liabilities and Buyer's remedies are limited to those contained in the Sale Agreement.

21. ASSIGNMENT: No rights, benefits or duties under the Sales Agreement, including the benefits of the warranty contained in Section 8 hereof, shall be assignable by Buyer without the prior written consent of Seller.

22. GOVERNING LAW: The Sales Agreement shall in all respects be governed by, and construed in accordance with, the laws of the State of Wisconsin. The parties exclude the application of the 1980 United Nations Convention on Contracts for the International Sale of Goods if it would otherwise be applicable.

23. VENUE. THE EXCLUSIVE VENUE FOR ANY LEGAL PROCEEDINGS INVOLVING THE INTERPRETATION OR ENFORCEMENT OF THE SALES AGREEMENT OR ANY OTHER AGREEMENT BETWEEN BUYER AND SELLER SHALL BE THE CIRCUIT COURT FOR BROWN COUNTY, WISCONSIN. BUYER WAIVES ALL CLAIMS OF LACK OR PERSONAL JURISDICTION BY SUCH COURT OVERBUYER, ANY RIGHT TO REMOVE ANY SUCH PROCEEDING TO FEDERAL COURT AND ALL CLAIMS OF FORUM NON CONVENIENS.

24. COLLECTION COSTS AND ATTORNEY FEES. If Seller hires the services of any third party, including any collection agency or attorney, to collect any sums Seller has failed to pay as required according to these terms and conditions, Buyer shall reimburse Seller for all costs and fees, including actual attorney fees charged by every such third party in relation to such collection efforts, whether the same have been incurred before the initiation of legal proceedings, during such proceedings or after the entry of a judgment or award.

25. LIMITATION OF ACTIONS. The parties hereto covenant and agree that if either acquires any right or rights to bring any action, suit or proceeding against the other for or as a result of any breach of this Agreement, except for non-payment of the purchase price, the party acquiring such right or rights shall be conclusively deemed to have waived and relinquished the same unless such action, suit or proceeding is commenced within one year after such right or rights arose.

26. LIMITATION OF DAMAGES. In addition to any other limitations of damages contained in these terms and conditions, under no circumstances shall Seller be liable in damages to Buyer in an amount greater than the purchase price of the Equipment.

27. HEADINGS. Headings and captions set forth herein are for convenience or reference only and are not intended to, nor do they, alter the meaning, content or enforceability of any Article hereof.

28. SEVERABILITY. If any provision of this document is determined to be illegal, invalid, or unenforceable, the validity and enforceability of the remaining provisions will not be affected and, in lieu of such illegal, invalid, or unenforceable provision, there will be added as part of this document one or more provisions as similar in terms as may be legal, valid and enforceable under applicable law.

29. EXPORT CONTROL: The Buyer shall not (i) export, re-export or transfer any Equipment without first obtaining any licenses and authorizations required under applicable Export Regulations, (ii) export, re-export or transfer any parts, or authorize or permit any third party to export, re-export or transfer any Equipment to a country that is subject to comprehensive sanctions or embargoes imposed the United Nations, the United States, the UK or the European Union, including the Democratic People's Republic of Korea (North Korea), Cuba, the region of Crimea, Iran, and Syria, or to any customer or end-user that is subject to sanctions or other export prohibitions or restrictions under applicable Export Regulations or (iii) use the Supplies in connection with the development or production of chemical, biological or nuclear weapons or their delivery systems. Buyer agrees to indemnify Seller against any liability caused by reason of Buyer's failure to comply with the foregoing.

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D

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A

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C

B

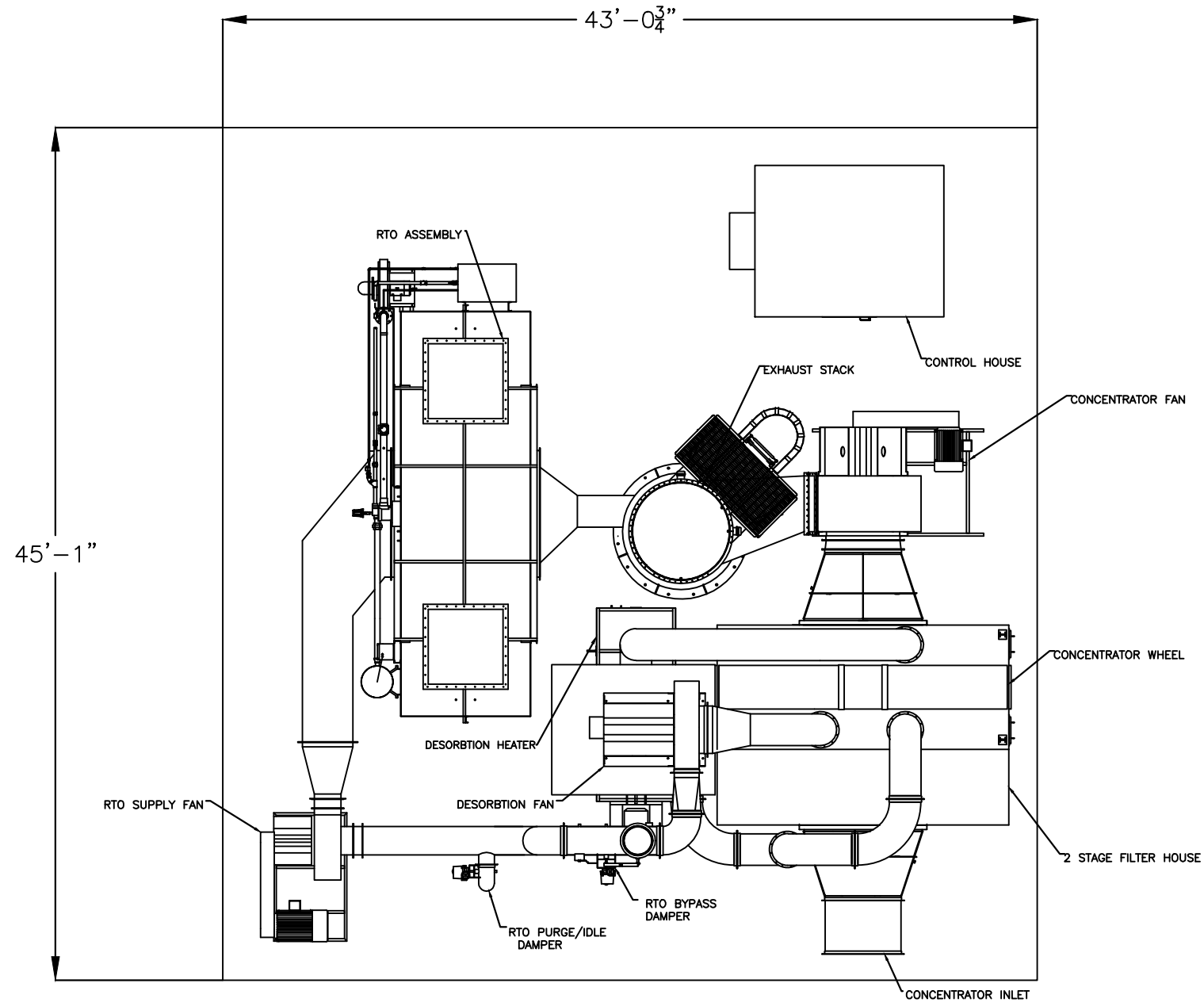
A

FUEL: NATURAL GAS @ 1000 BTU/CU FT.
 RTO BURNER CAPACITY: 3,000,000 BTU/HR
 RTO FUEL REQUIRED: 3,000 CFH TOTAL(COLD START-UP)
 @ 5 PSI @ OXIDIZER GAS TRAIN
 RTO AIR FLOW CAPACITY: 10,000 SCFM


DESORB BURNER CAPACITY: 4,000,000 BTU/HR
 DESORB FUEL REQUIRED: 4,000 CFH TOTAL(COLD START-UP)
 @ 5 PSI @ OXIDIZER GAS TRAIN
 CONCENTRATOR AIR FLOW CAPACITY: 100,000 SCFM

CONCENTRATOR FAN HP: 300 HP
 DESORB LOOP FAN HP: 75 HP
 DESORB HEATER FAN HP: 25 HP
 PLANT VOLTAGE: 460/3/60

PAINT: GRAY



PRELIMINARY
 ALL DIMENSIONS, WEIGHTS
 AND HORSEPOWER SUBJECT
 TO FINAL ENGINEERING

	THE CMM GROUP 2071-C LAWRENCE DR P.O. BOX 5903 DE PERE WI 54115 PHONE:920.336.9800 FAX:920.336.9797 WWW.THECMMGROUP.COM	
	FILE NAME 2021760-0005-A CONTRACT NO - DRAWN 01/21/22D. WARSZAWA CHECK APPR. ISSUED	RC-100000-RTO-10000-M-95-2C MARMEN INC CONCENTRATOR SYSTEM GENERAL ARRANGEMENT
THIS DRAWING IS THE PROPERTY OF THE CMM GROUP. IT SHALL NOT BE REPRODUCED IN ANY PART OR SHOWN TO ANY OUTSIDE PARTY. IT SHALL BE USED ONLY IN REFERENCE TO WORK UNDER CONTRACT OR FOR PROPOSALS.		DWG NO 2021760-0005 REV A SHEET

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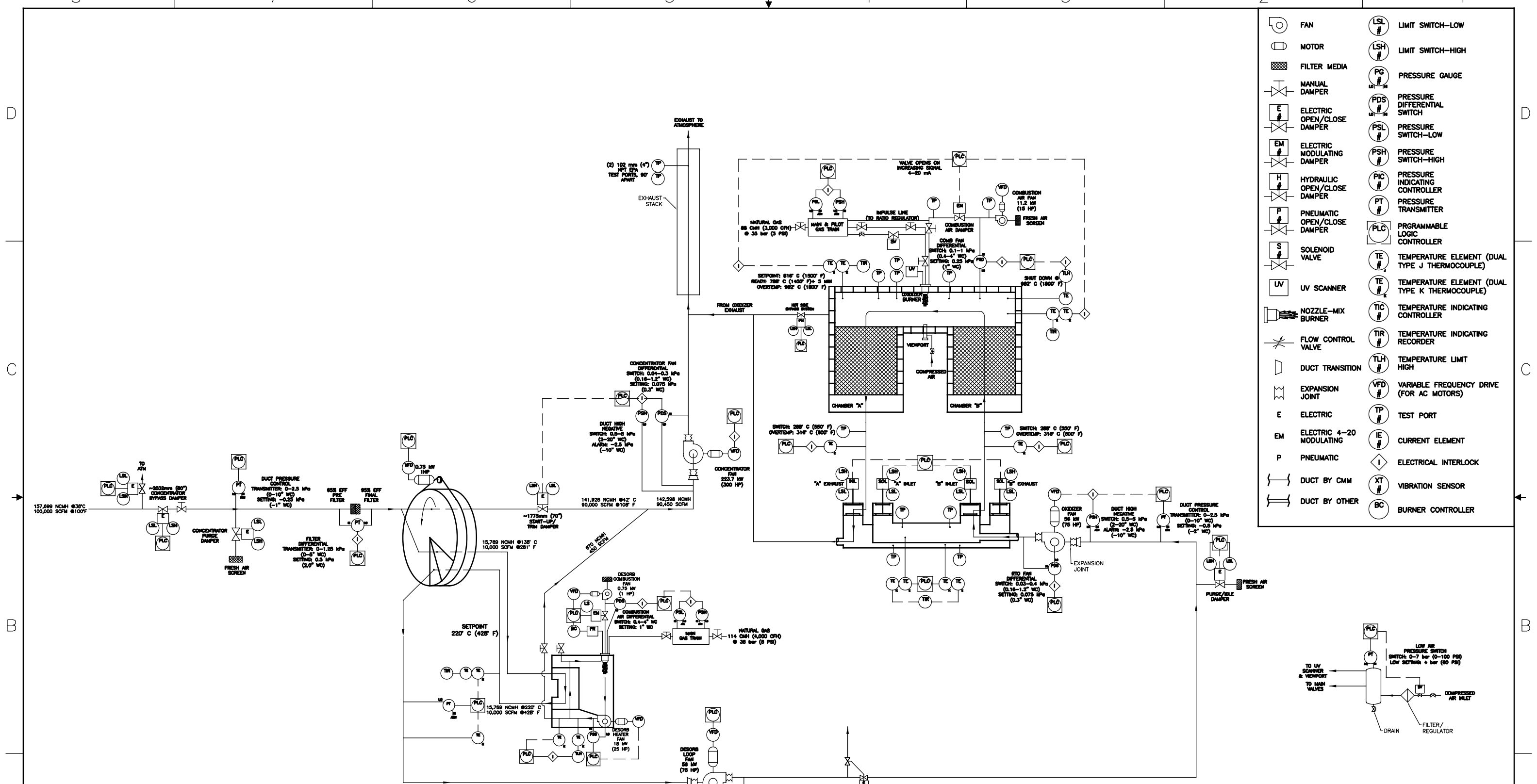
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1



	FAN		LIMIT SWITCH-LOW
	MOTOR		LIMIT SWITCH-HIGH
	FILTER MEDIA		PRESSURE GAUGE
	MANUAL DAMPER		PRESSURE DIFFERENTIAL SWITCH
	ELECTRIC OPEN/CLOSE DAMPER		PRESSURE SWITCH-LOW
	ELECTRIC MODULATING DAMPER		PRESSURE SWITCH-HIGH
	HYDRAULIC OPEN/CLOSE DAMPER		PRESSURE INDICATING CONTROLLER
	PNEUMATIC OPEN/CLOSE DAMPER		PRESSURE TRANSMITTER
	SOLENOID VALVE		PROGRAMMABLE LOGIC CONTROLLER
	UV SCANNER		TEMPERATURE ELEMENT (DUAL TYPE J THERMOCOUPLE)
	NOZZLE-MIX BURNER		TEMPERATURE ELEMENT (DUAL TYPE K THERMOCOUPLE)
	FLOW CONTROL VALVE		TEMPERATURE INDICATING CONTROLLER
	DUCT TRANSITION		TEMPERATURE INDICATING RECORDER
	EXPANSION JOINT		TEMPERATURE LIMIT HIGH
	ELECTRIC		VARIABLE FREQUENCY DRIVE (FOR AC MOTORS)
	ELECTRIC 4-20 MODULATING		TEST PORT
	PNEUMATIC		CURRENT ELEMENT
	DUCT BY CMM		ELECTRICAL INTERLOCK
	DUCT BY OTHER		VIBRATION SENSOR
			BURNER CONTROLLER

MODE CHART					
COMPONENT	MAIN	COMBUSTION	BURNER	PURGE/IDLE	TEE
STATUS	FAN	BLOWER	BURNER	DAMPER	DAMPERS
OFF	OFF	OFF	OFF	OPEN	TO ATM
PURGE	25 HZ	ON	OFF	OPEN	TO ATM
HEAT-UP	25 HZ	ON	RAMP	OPEN	TO ATM
IDLE	15 HZ	ON	SETPOINT	OPEN	TO ATM
OPERATING	PRESSURE CONTROL	ON	SETPOINT	CLOSED	TO OX
SELF-SUSTAIN	PRESSURE CONTROL	ON	PILOT ONLY	CLOSED	TO OX
LOW FLOW (BLEED-IN)	PRESSURE CONTROL	ON	SETPOINT	MODULATING	TO OX
NORMAL	25 HZ TO	ON TO	OFF	OPEN	TO ATM
SHUT-DOWN	93°C (200°F)	93°C (200°F)	OFF	OPEN	TO ATM
E-STOP	OFF	N/A	OFF	LAST POSITION	LAST POSITION

- NOTES:
- OXIDIZER MINIMUM FLOW 20%
 - FOR BEST RESULTS, LOCATE TEST PORTS 7.5 DIAMETERS DOWNSTREAM AND 1.5 DIAMETERS UPSTREAM OF FLOW DISTURBANCES (ELBOWS, TRANSITIONS, ETC.)
 - CUSTOMER MUST SUPPLY THE REQUIRED AMOUNT OF GAS AT THE REQUIRED PRESSURE FOR CORRECT BURNER OPERATION. GAS VOLUME BASED ON 1000 BTU/SCF HEATING VALUE.
 - ALL DATA ON THIS SHEET IS FOR DESIGN PURPOSES AND IS NOT GUARANTEED PERFORMANCE.
 - EXHAUST STACK MAY BE MOUNTED TO THE OXIDIZER. REFER TO GENERAL ARRANGEMENT FOR OXIDIZER LAYOUT/SCOPE OF SUPPLY.

PRELIMINARY
ALL DIMENSIONS, WEIGHTS AND HORSEPOWER SUBJECT TO FINAL ENGINEERING

CMM

THE CMM GROUP
2071-C LAWRENCE DR
P.O. BOX 5903
DE PERE WI 54115
PHONE: 920.336.9800
FAX: 920.336.9797
WWW.THECMMGROUP.COM

FILE NAME: 2021760-002
CONTRACT NO: -
DRAWN 1/20/22 M.KITTELL
CHECK APPR.
ISSUED

RC-100000-RTO-10000-M-97-2C
MARMEN, INC.
RTO/CONCENTRATOR SYSTEM

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SIZE: FSCM NO. DWG NO. 2021760-0002
SCALE: 1"=10" SHEET 1

ZEOLITE ROTOR CONCENTRATOR SYSTEMS



Munters ZEOL
Innovative solutions for VOC abatement





Leading the World in VOC Abatement

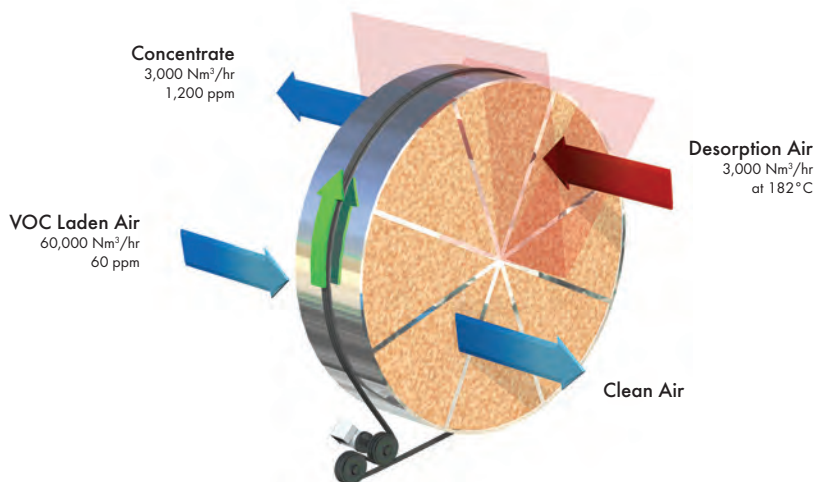
There are many industrial processes that produce exhaust vapors with volatile organic compounds (VOCs) or odorous emissions that can be harmful to human health and the environment. Global environmental laws are imposed to require treatment of VOCs and odors before they can be released to the atmosphere. Environmental sustainability means meeting regulations at the lowest lifetime cost while minimizing energy consumption and secondary pollutants. Munters offers the most energy-efficient VOC abatement technology which allows efficient removal of exhaust organic contaminants, reduces energy consumption and ensures high equipment reliability (see illustration below).

Decades of Excellence and Innovation
 Continuous research and engineering has lead Munters to its position as worldwide market leader in air treatment technologies. Munters is an air treatment technology company, founded by inventor Carl Munters, and headquartered in Sweden. Munters pioneered the commercial use of zeolite for adsorption of VOCs. With the combination of breakthrough zeolite research and time-tested Munters rotor technology, Munters Zeolite Rotor Concentrator Systems are the leading technology for cost-effective abatement of VOCs. With hundreds of systems currently in service, Munters installed base includes some of the world's most respected

companies in semiconductor manufacturing, automotive and aerospace industries. Munters systems are known for their cost-effectiveness, reliability, maintenance-free design and durability.

ISO Certified Quality Manufacturing
 Systems are engineered, manufactured and tested in Munters ISO 9001:2008 Certified Massachusetts manufacturing center, the only facility in the world that controls all aspects of manufacturing including the HoneyCombe® rotor structure and assembly of complete VOC abatement systems. Munters R&D group continuously works on product improvements and advancements in zeolite adsorption technology. Shipped worldwide, Zeol systems are supported by our international service organization.

Low Cost of Ownership
 Munters concentrator systems have lower operating costs than regenerative thermal oxidizers (RTOs), recuperative thermal oxidizers and catalytic oxidizers. Less natural gas is required, and the low pressure drop across the system equates to smaller fans and lower electrical costs. Munters systems are engineered to operate continuously. Maintenance downtime is one day per year allowing customers to maximize production while taking advantage of minimal gas and electricity consumption.



Design Criteria

The following design guidelines apply for a typical zeolite concentrator application:

- Process exhaust air temperature less than 120°F
- Relative humidity less than 90%
- Solvent concentration of less than 1000 ppm
- Solvents (VOCs) with boiling points greater than 100°F

Integrated Zeol Systems (IZS)

Rotor Model	Rotor Diameter	Flow Capacity (SCFM)	Footprint*	Weight (lb)
IZS-1100-TH	1100 mm	1,000 - 6,000	25'L x 6'4"W x 8'3"H	15,000
IZS-1500-TH	1500 mm	3,000 - 10,000	40'L x 8'W x 12'H	20,000
IZS-2190-TH	2190 mm	4,800 - 17,000	44'L x 9'W x 12'H	28,000
IZS-2446-TH	2446 mm	9,500 - 28,000	48'L x 9'4"W x 12'8"H	30,000
IZS-2946-TH	2946 mm	14,500 - 40,000	52'L x 9'4"W x 13'9"H	46,000
IZS-3546-TH	3546 mm	24,000 - 60,000	54'L x 12'8"W x 15'6"H	48,000
IZS-4200-RTO	4200 mm	41,200 - 90,000	35'L x 35'W x 20'H	55,000

*Includes process fans and bypass. Munters can provide alternate arrangements to reduce length. 3'-4' maintenance access space required around perimeter.



Rotor Systems (RS)

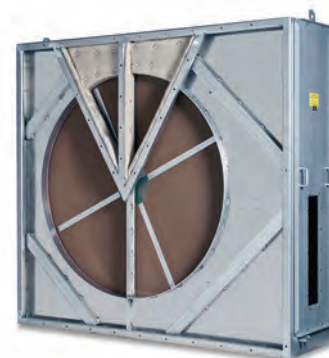
Rotor Model	Rotor Diameter	Flow Capacity (SCFM)	Footprint	Weight (lb)
RS-1100	1100 mm	1,000 - 6,000	11'L x 5'8"W x 5'6"H	2000
RS-1500	1500 mm	3,000 - 10,000	11'L x 7'W x 6'8"H	2300
RS-2190	2190 mm	4,800 - 17,000	13'L x 8'W x 8'2"H	3720
RS-2446	2446 mm	9,500 - 28,000	13'L x 9'2"W x 8'10"H	5550
RS-2946	2946 mm	14,500 - 40,000	13'L x 10'7"W x 10'4"H	7200
RS-3546	3546 mm	24,000 - 60,000	15'L x 12'6"W x 12'2"H	9000
RS-4200	4200 mm	41,200 - 90,000	15'L x 14'8"W x 14'4"H	9800



Basic Units (BU)

Rotor Model	Rotor Diameter	Flow Capacity (SCFM)	Footprint	Weight (lb)
BU-1500	1500 mm	3,000 - 10,000	2'L x 6'6"W x 6'8"H	600
BU-2190	2190 mm	4,800 - 17,000	3'L x 8'W x 8'2"H	2400
BU-2446	2446 mm	9,500 - 28,000	3'L x 9'2"W x 8'10"H	2800
BU-2946	2946 mm	14,500 - 40,000	3'L x 10'7"W x 10'4"H	3600
BU-3546	3546 mm	24,000 - 60,000	3'L x 12'6"W x 12'2"H	6000
BU-4200	4200 mm	41,200 - 90,000	3'L x 14'8"W x 14'4"H	6400

*1 SCFM = 1.58 Nm³/hr



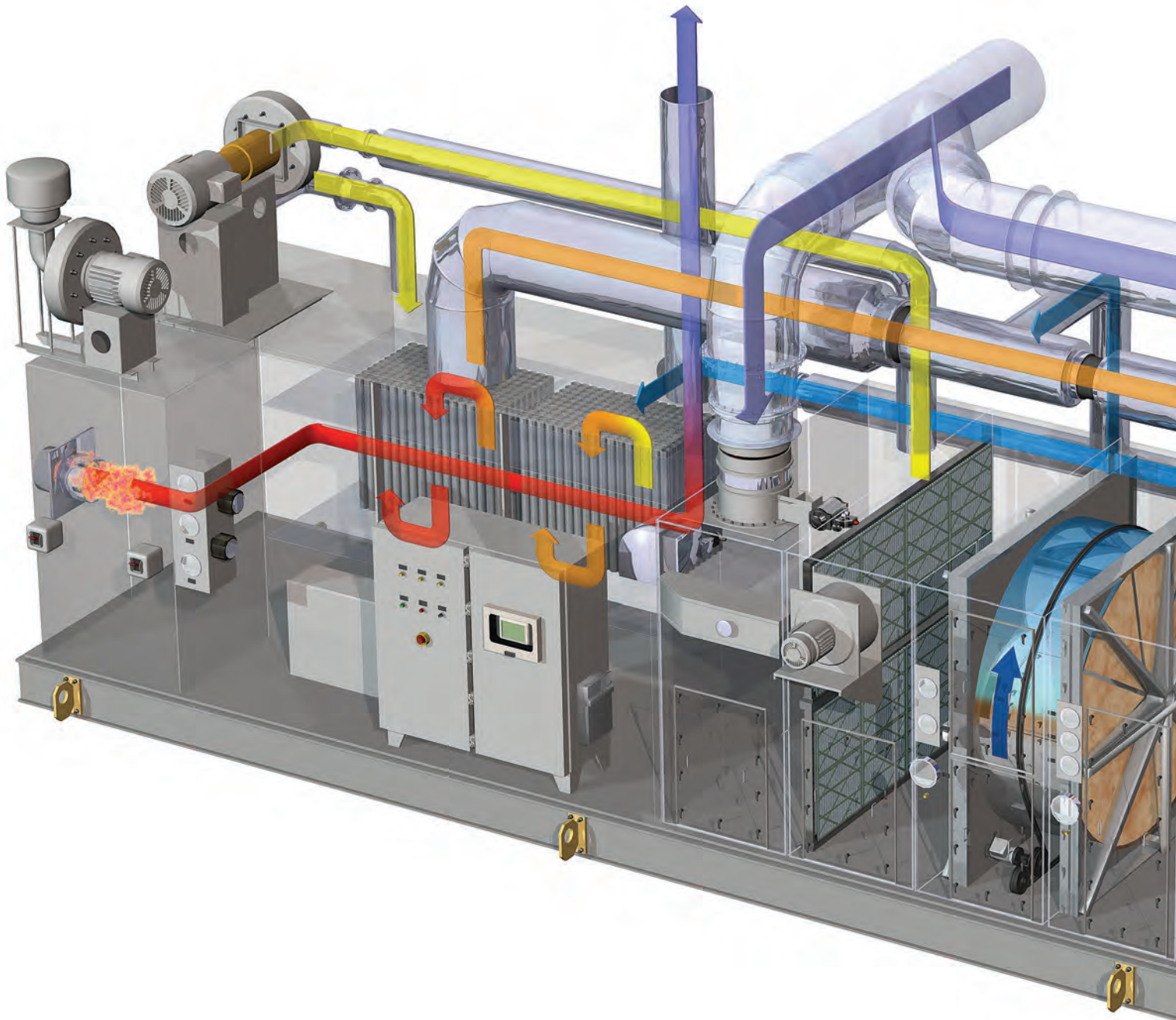
How the System Works

Solvent laden air is drawn through the HoneyCombe® rotor where VOCs are removed from the airstream by adsorption onto the hydrophobic zeolite. After passing through the rotor, the cleaned air is discharged into the atmosphere. The Zeolite rotor turns continuously (1-6 rph) transporting adsorbed VOCs into a regeneration zone. There, the VOCs are removed

by a small heated air stream that is 5-10% of the process air volume. The regenerated zeolite is then rotated back into the process air stream.

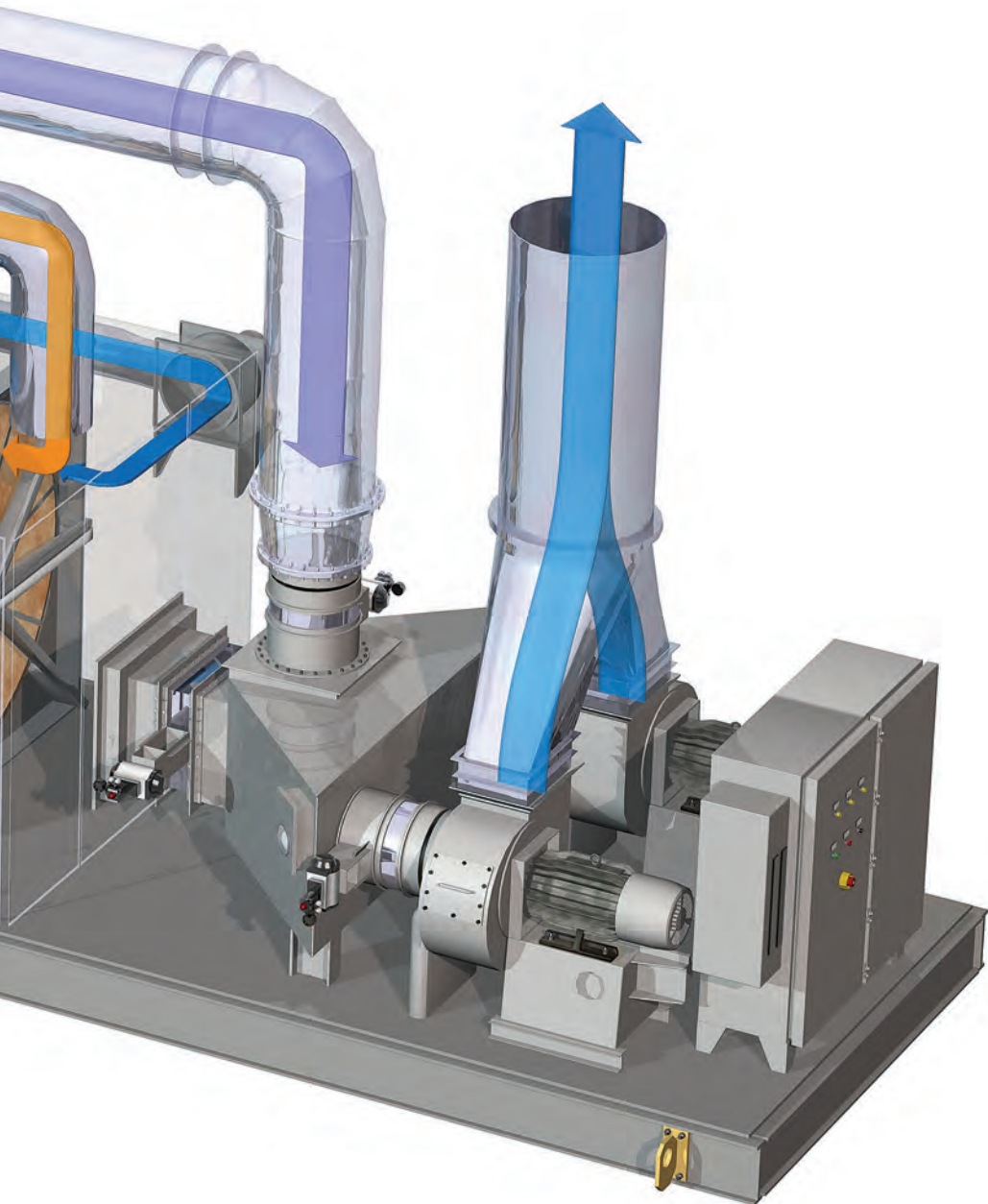
Care is taken in the design to ensure that the maximum VOC concentration does not exceed safety limits (i.e., 20-25% of LEL). The concentrate is typically sent to a small oxidizer where the VOCs are converted to water vapor and CO₂.

The energy content of the VOCs contributes to the oxidation process, further reducing the fuel requirement. Multiple heat exchangers are used to provide heat recovery on the oxidizer and to desorb the rotor and create additional fuel efficiency. Munters Zeolite Concentrators can achieve destruction and removal (DRE) efficiencies up to 99%.

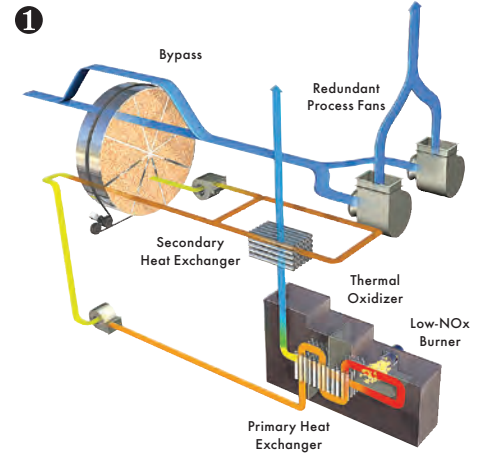


Typical VOCs Removed by Zeol Concentrators

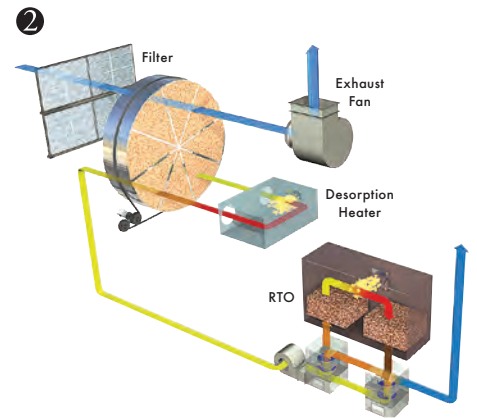
Xylene	Butyl Acetate	Methyl Ethyl Ketone
Toluene	Ethyl Acetate	Methyl Amyl Ketone
Benzene	Isopropanol	Methyl Isobutyl Ketone
Acetone	Trimethyl benzene	Propylene Glycol Monomethyl Ether (PGME)
Butanol	Trimethyl amine	Propylene Glycol Monomethyl Ether Acetate (PGMEA)
Ethanol	Ethanolamine	N-Methylpyrillidone (NMP)
Ethyl Lactate	Cyclohexanone	Dimethyl Sulfoxide (DMSO)



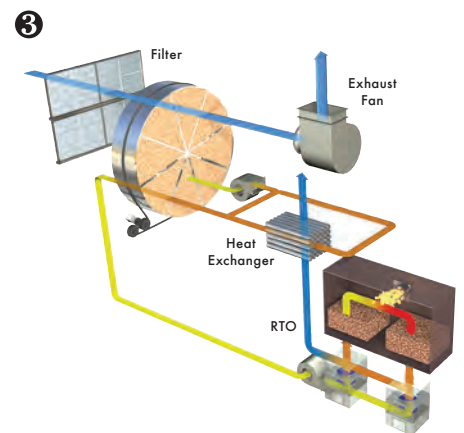
Configurations



1 Rotor with recuperative thermal oxidizer, redundant process fans, and exhaust bypass.



2 Rotor with RTO, desorption heater and particulate filtration.



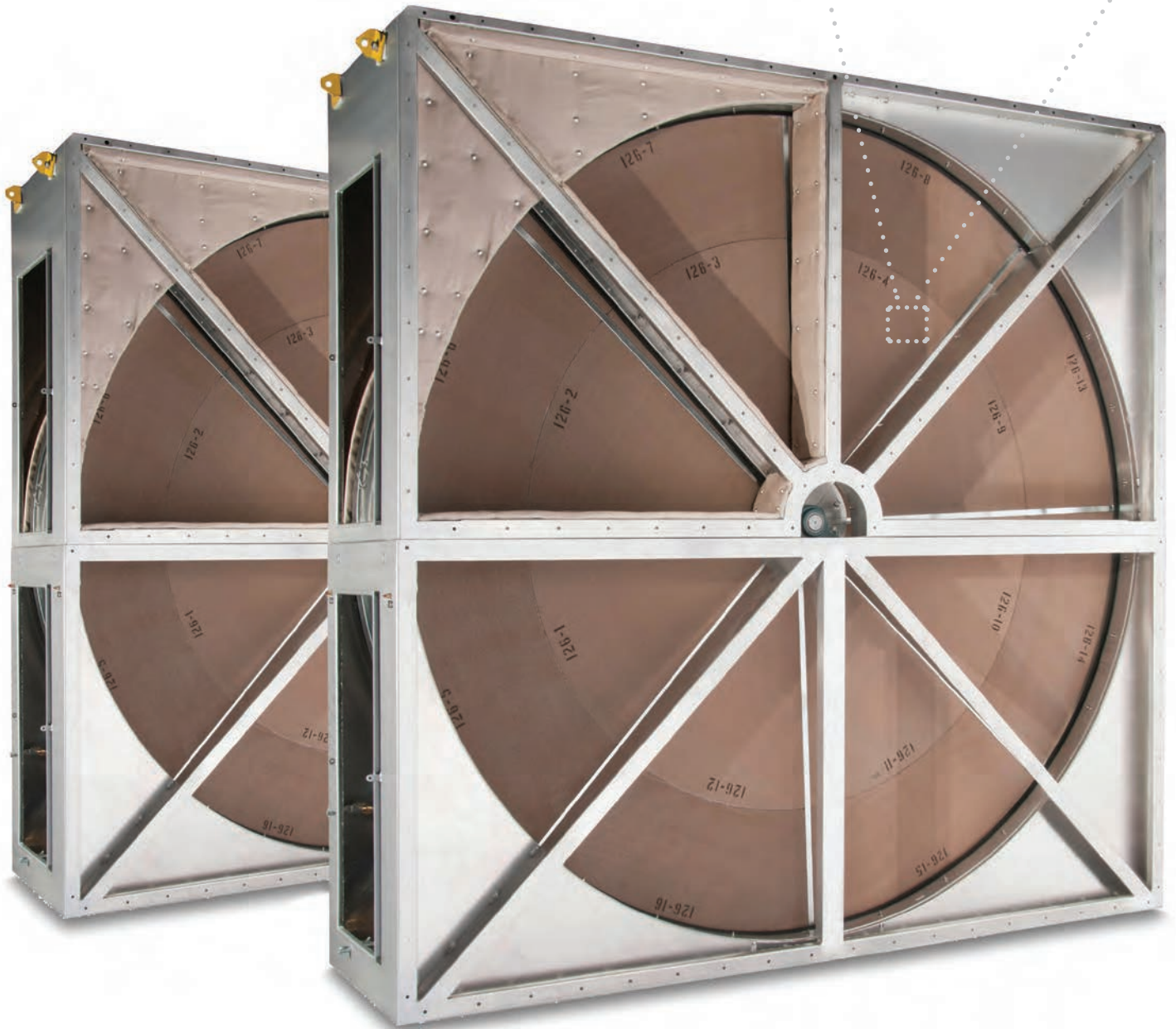
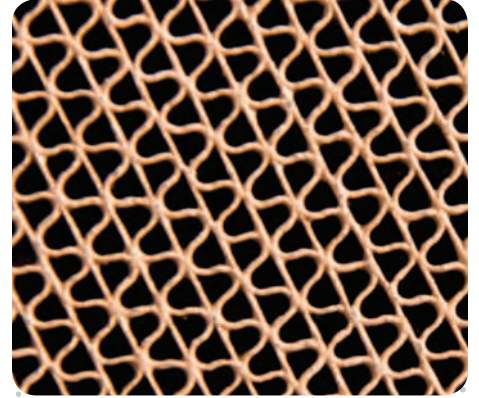
3 Rotor with RTO and heat exchanger for applications with high VOC load.

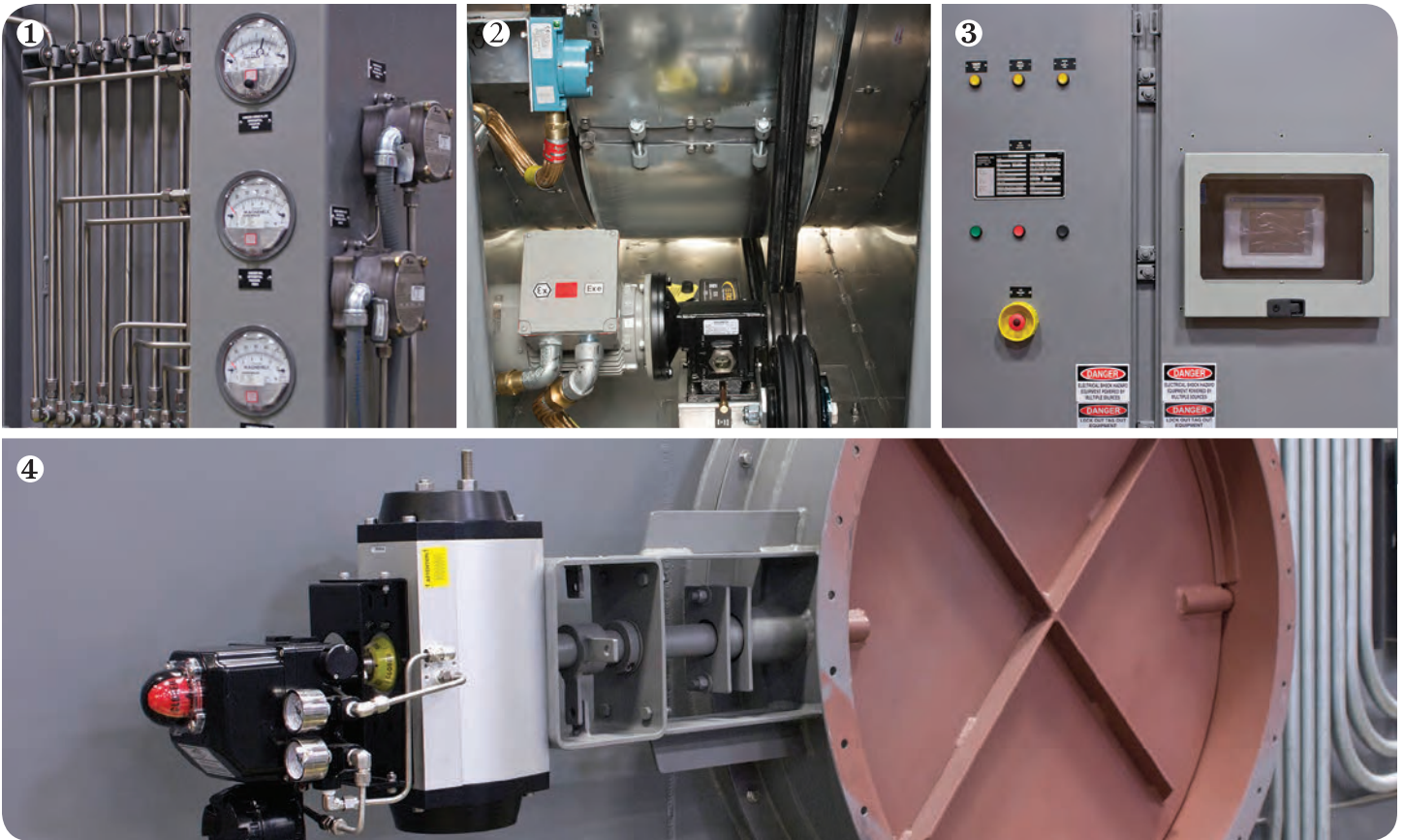
Maintenance-free, Self-Cleaning Zeolite Rotor

Munters proprietary zeolite is hydrophobic (does not adsorb water), so it uses all of its pores to attract and hold VOC molecules and is not impacted by high humidity. It is an inert, non-flammable, stable inorganic crystal, so it eliminates the fire risk associated with carbon adsorbers. Munters' zeolite HoneyCombe® rotors are manufactured from a corrugated mineral fiber substrate treated with proprietary zeolite and other inorganic materials to provide physical integrity, rigidity and enough flexibility to withstand thermal and mechanical stress. Air flow through the flutes is uniform and of low

velocity, resulting in very low pressure drop (less than 1.5" w.c.).

The rotor has few moving parts and low friction contact seals to prevent leakage. With decades of expertise, Munters engineers optimize each system for maintenance-free design including a "self-cleaning" feature that ensures 100% zeolite regeneration and zero buildup of VOC on the rotor during every revolution. High performance efficiency is maintained for the life of the rotor without the need for nuisance maintenance activities like water washing and high temperature bake-outs.





(1) Static pressure and temperature gauges provide continuous monitoring of system operation. (2) Explosion proof drive motor, inverter duty, UL listed (NEMA or IEC) with speed controller. (3) Allen Bradley controls system with touchscreen interface provided for operators. (4) Heavy duty low-leakage dampers with pneumatic actuators.

Worldwide Service

Munters manufactures engineered products that can economically control humidity and temperature, provide energy recovery, treat air emissions and/or utilize direct or indirect evaporative cooling for comfort, process and environmental protection. Munters offers a wide variety of options to meet specific climate, application and budget requirements. Munters has net sales approaching \$1 billion USD with more than 20 manufacturing facilities across the globe and sales offices in over 30 countries. Munters employs approximately 2,900 people worldwide.

24 Hour Emergency Service 1-800-843-5360

Munters can dispatch emergency service crews, provide troubleshooting by phone, or run remote diagnostics.

ServiceCaire Maintenance Programs

Field experience has repeatedly shown that customers who employ planned maintenance

can substantially extend their equipment life. By eliminating failures before they can occur, customers maximize both the utilization of Munters equipment and also lower the overall cost of ownership. The program includes a pre-determined number of visits and defined scope of work for specified equipment, or custom programs can be tailored to specific needs.

Parts

Replacement parts are inventoried at Munters Massachusetts manufacturing facility. In most cases, parts will ship out together the same day you call. Convenient spare part kits provide exact parts & intervals for guided self-service or service contracts to provide all PMs.

Startup Programs

Munters Startup service ensures that equipment has been installed properly and is commissioned to operate according to specifications. It allows the customer to receive appropriate

maintenance guidance and training for their particular installation. Munters can also provide re-assembly supervision, performance testing support, project management and turnkey installation services.

Engineered Retrofits

Munters can retrofit your existing system to increase capacity, improve performance, extend unit life and greatly reduce energy consumption. Munters also custom fabricates zeolite blocks for replacement of all zeolite and carbon rotor systems.



Industrial Applications

With hundreds of successful installations in many different industrial applications, Munters designs abatement systems to meet the individual needs of our customers. Extensive experience allows Munters to design optimal solutions for any application including, but not limited to:

- Spray paint finishing (automotive, aerospace, industrial)
- Coating operations
- Wood finishing
- Paint manufacturing
- Semiconductor manufacturing
- LCD/TFT flat panel display manufacturing
- Printing
- Flexible packaging
- Styrene/composites
- Pharmaceutical manufacturing
- Ground water remediation
- Investment casting



Custom Options

Munters is the industry leader in zeolite rotor concentrator systems having over several hundred installed systems worldwide. Munters will optimize each system for local permit requirements and required destruction efficiency. Each system is custom designed to meet customer specific requirements. Options include:

- Modular design with flexible configurations
- Automatic system bypass to continue air exhaust during equipment shutdowns
- Redundant fans/VFDs for 100% up-time exhaust reliability
- Variable flow rates to reduce energy use
- Particulate pre-filters
- Heat exchangers for maximum fuel efficiency
- Pre-conditioning process air (i.e., temperature, humidity)
- Pressure control
- Flexible control packages with pre-programmed flatscreen interface (UL/CSA/CE)
- Remote monitoring
- Seismic restraints
- Vibration isolation
- Emission testing
- Exhaust stacks
- Carbon adsorption bypass
- Thermal Recuperative or Regenerative Oxidizers (RTOs)
- RTO hot gas bypass for high LELs can help further reduce energy consumption
- Acid gas scrubber for halogenated VOCs
- Commissioning, training, project management, turnkey installation

Australia Phone +61 2 8843 1580, serviceairt@munters.com.au Austria Phone +43 1 6164298-0, service.dh@munters.at Belgium & Luxembourg Phone +32 2 240 6868, service.dh@muntersnv.be Brazil Phone +55 41 3317 5050, munters@com.br Canada Phone +1 905 858 5894, dhinfo@munters.com China Phone +86 10 8041 8000, serviceairt@munters.cn Czech Republic Phone +420 544 211 434, servicecz@munters.de Denmark Phone +45 4495 3355, service.dh@munters.dk Finland Phone +358 40 186 3074, service.dh@munters.fi France Phone +33 1 3411 5757, service.dh@munters.fr Germany Phone +49 40 87 96 90-0, service.dh@munters.de India Phone +91 20 6681 8900, serviceairt@munters.in Italy Phone +39 0183 521 377, service.dh@munters.it Japan Phone +91 3 5970 0021, serviceairt@munters.jp Korea +82 2 761 8701, serviceairt@munters.co.kr Mexico Phone +52 722 270 4029, servicedhmx@munters.com Netherlands Phone +31 172 43 32 31, service@munters.nl Poland Phone +48 58 305 35 17, service.dh@munters.pl Singapore Phone +65 6744 6828, serviceairt@munters.com.sg South Africa Phone +27 11 971 9700, info@munters.co.za Spain & Portugal Phone +34 91 640 09 02, service.dh@munters.es Sweden & Norway Phone +46 8 626 6300, service.dh@munters.se Switzerland Phone +41 52 3438886, service.dh@munters.ch Thailand Phone +66 2 6422 6703, serviceairt@munters.com.sg Turkey Phone +90 216 548 1444, serviceairt@munters.com.tr UAE +971 4881 3026, middle.east@munters.com United Kingdom & Ireland Phone +44 1480 432243, service.dh@munters.co.uk USA Phone +1 978 241 1100, dhservice@munters.com Vietnam Phone +84 8 3825 6838, vietnam@muntersasia.com

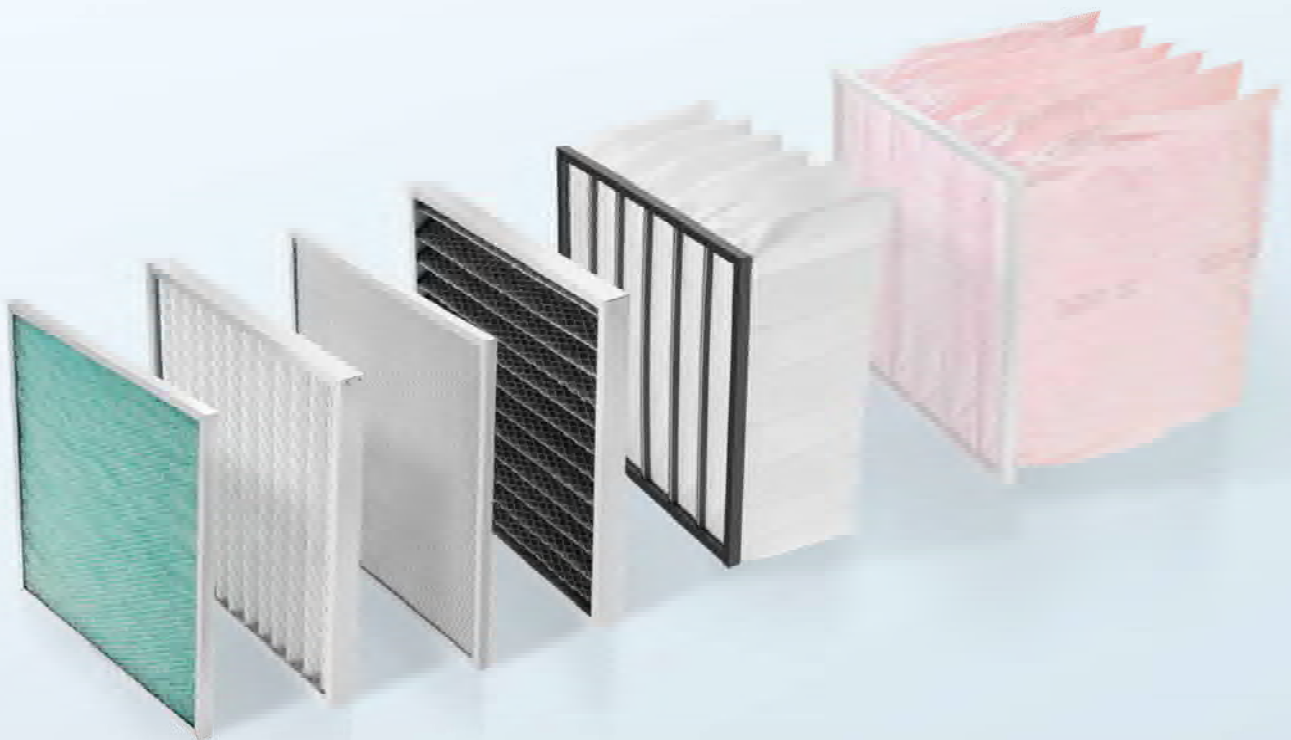


Munters Corporation

Tel: (800) 843-5360 E-mail: dhinfo@munters.com
www.munters.us

Air conditioning filters

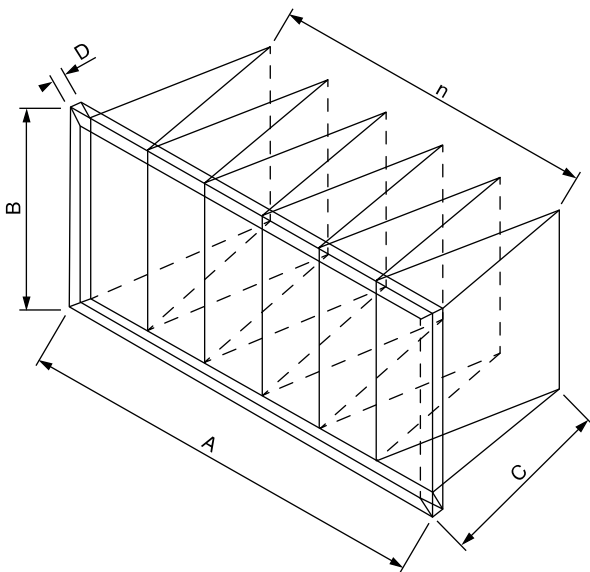
Filter solutions for general and
custom ventilation



Pocket filters

The most frequently used filtering element in ventilation systems

Filter pockets are produced in a metal or synthetic frame. The number of pockets depends on the technical aspects of ventilation systems. The raw materials used in the production process, filter medium and production technology guarantee proper filtration properties and feature a long service life (as desired by customers).



POCKET FILTERS AxBxC, n

Dimensions:

A [mm] - length

B [mm] - width

C [mm] - pocket length with frame

D [mm] - frame thickness

n [pcs] - quantity of pockets

STANDARDS

Pocket filters are manufactured to standards:

- ISO 16890
- PN EN 779:2012

Fire rating:

- F1 wg DIN 53438

MATERIALS

The arrangement of polyester or polypropylene fibres with a progressive structure guarantees a minimum ratio between filter efficiency and resistance.

CONSTRUCTION

Pocket filters in metal frames

A filter frame made of galvanised sheet steel guarantees long-term corrosion resistance. Filtering pockets stitched with industrial sewing machines ensure a long-term bond. Mounted in the frame on steel wires glued to the frame with temperature-resistant adhesive. Depending on the dimensions, the in-curved edge of the wire ensures proper adherence to the frame and prevents it from slipping off and coming unglued. The sides of pocket packages are stuck to the frame and sealed with technical foam which guarantees a proper sealing.

Pocket filters in plastic frames

The filter frame is made from black plastic. Pockets are joined together with a specially designed profile made from plastic using a pneumatic machine or sewing machines. Both of them provide suitable adhesion and fitting in the filter frame. The sides of pocket packages are stuck to the frame and sealed with technical foam, which guarantees proper sealing.

STANDARD DIMENSIONS

Frame sizes in pocket filters are fully standardized.
The most popular are:

- 592 x 592 mm
- 490 x 592 mm
- 287 x 592 mm
- 287 x 287 mm

Frame thickness:

- 20 mm, 25 mm

Pocket length:

- 200 mm, 300 mm, 360 mm, 500 mm, 600 mm

BWF Envirotec produces non-standard dimensions upon request or according to a sent format.

APPLICATION

- **G2, G3, G4** – in ventilation and air-conditioning installations of rooms with average air purity requirements, e.g. hotels, office buildings, shopping centres, etc.
- **M5, M6, F7, F8, F9** – in ventilation and air-conditioning installations of rooms with high air purity requirements, e.g. hospitals, food and electronics industries, etc.



TECHNICAL DATA POCKET FILTERS

CLASSIFICATION ACCORDING TO THE STANDARDS OF PN – EN 779:2012		G3	G4	M5	M6	F7	F8	F9
FILTRATION EFFECTIVENESS ACCORDING TO ISO 16890	%	COARSE	COARSE	ePM10 35-70	ePM10 60-80	ePM1 40-65	ePM1 65-90	ePM1 80-90
		final results are given in the offer or when ordering						
Frame dimension	mm	592 x 592						
Airflow	m ³ /h	3400	3400	3400	3400	3400	3400	3400
Initial pressure drop	Pa	18-55	22-65	45-65	55-95	90-140	95-175	110-195
Recommended final pressure drop	Pa	250	250	450	450	450	450	450
Max. permissible operating temperature	°C	plastic frame 80, metal frame 100						
Pocket length	mm	200, 300, 360, 500, 600						
Number of pockets	pcs	6 or 8						



ORIGINAL FILTERS

www.andreaefilters.com

AEREM[®]
TO FILTER & PROTECT

Produced by Aerem
www.aerem.com

Summary

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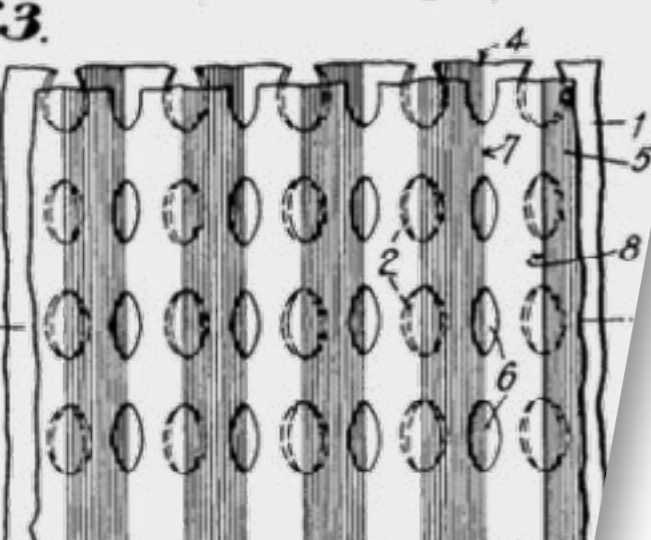
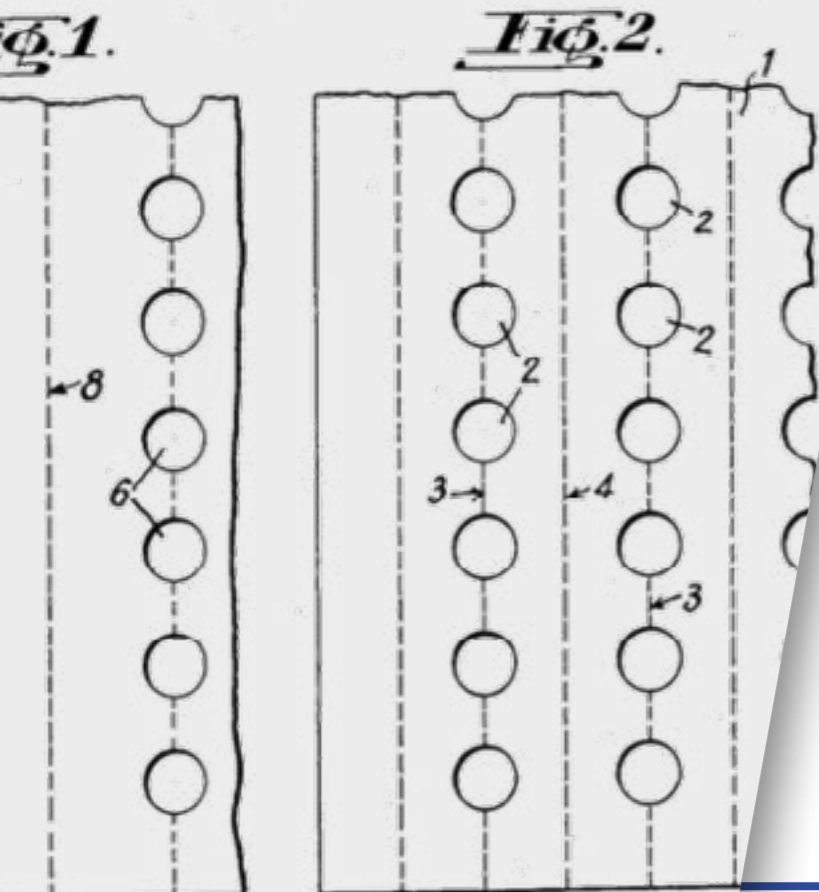
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Andreae Filters

Inventors since 1963

Mr. Erhard Charles Andreae, 55 years old, an independent mechanical engineer in the field of surface treatment for 25 years, patents a particle filter for paint booths, collapsible, disposable, made of cardboard and operating on the principle of inertia separation.

Andreae Filters is founded. The manufacture is done by hand in a garage with a worker at a rate of 6 m2 per day. E-C. Andreae sells door to door in Switzerland.

Mr. Robert Andreae purchases Andreae Filters. The production tool of Andreae Filters is modernized and the internal organization improved.

Extension of the Andreae Standard and HE+ filter range with the introduction of a high capacity filter (HC) and a high productivity filter (HP).

Installation of an Andreae production line in Ardmore.

Andreae Filters becomes an AEREM brand.

1963



1984-1986

1997



2019



1967

The Binks Manufacturing Company (Binks), a US and World No. 1 paint booth manufacturer, buys Bullows Ltd. UK and is interested in the Andreae filter.

Exclusivity is granted to Binks for all of its subsidiaries around the world, which will give Andreae filters a lot of notoriety as Binks starts producing a line of spray booths under the "Binks-Andreae" brand.



1989-1990

Andreae Filters patents a high efficiency filter (HE+).

Acquisition of the customers and production lines of 2 copiers, in Denmark and Sweden who are granted with exclusivity for Denmark and Sweden respectively.

2013

The invention of the «Andreae» filter and the company celebrate their 50th birthday.



Separation by Inertia How does it work?

Filtration is not restricted to capturing particles with a succession of wider to smaller meshed apertures. Our ingenious filters use another principle: separation by inertia.

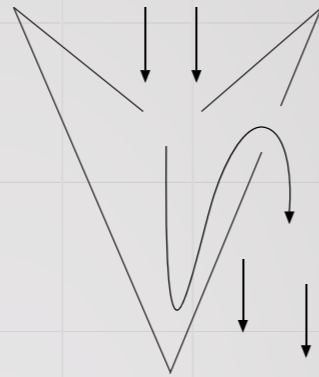
The migration phenomenon is common when slow-drying coatings are used in combination with mesh or fiberglass filters. This happens when the airflow pulls out particles previously trapped in the mesh or fiberglass. Consequently, the once deposited particles will again migrate throughout the system. However, with the Andreae Filter Separation by Inertia principle, the paint particles stay trapped in the retention pocket outside of the airstream.

Airflow loaded with paint particles (overspray) will suffer several radical changes in direction. These paint particles, heavier than air, follow tangent trajectories within the airflow. Thus paint particles will accumulate in the retention pockets, outside of the air stream, allowing the airflow to exit the filter virtually free of any overspray. As a result, our renowned high holding capacity filters hold up to 5 times more than common mesh filters.

Consequently, the static pressure within the booth increases slowly. This has two main advantages; the spray booth stays cleaner longer and the airflow around the coated parts stays uniform throughout the life of the filters.

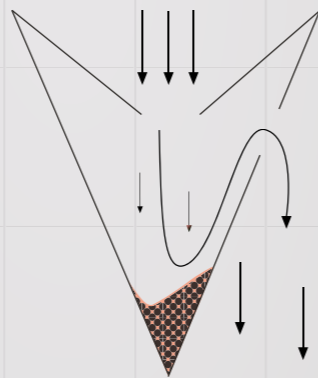
1 Airflow

Airflow enters the retention pockets and travels all the way through the twists and turns of the unique design of our accordion filter.



2 Overspray

The paint particles which are heavier than air, follow tangent trajectories within the airflow and gradually accumulate in the retention pockets outside of the airflow. This eliminates the migration phenomenon inherent to fiberglass and mesh type filters.



3 Paint deposit

The paint deposits accumulate in voluminous retention pockets, as well as on the side and front of the filter.



Why choose Andreae Filters?



Polyester



Flat Polyester



Fiberglass



Fiberglass High Quality



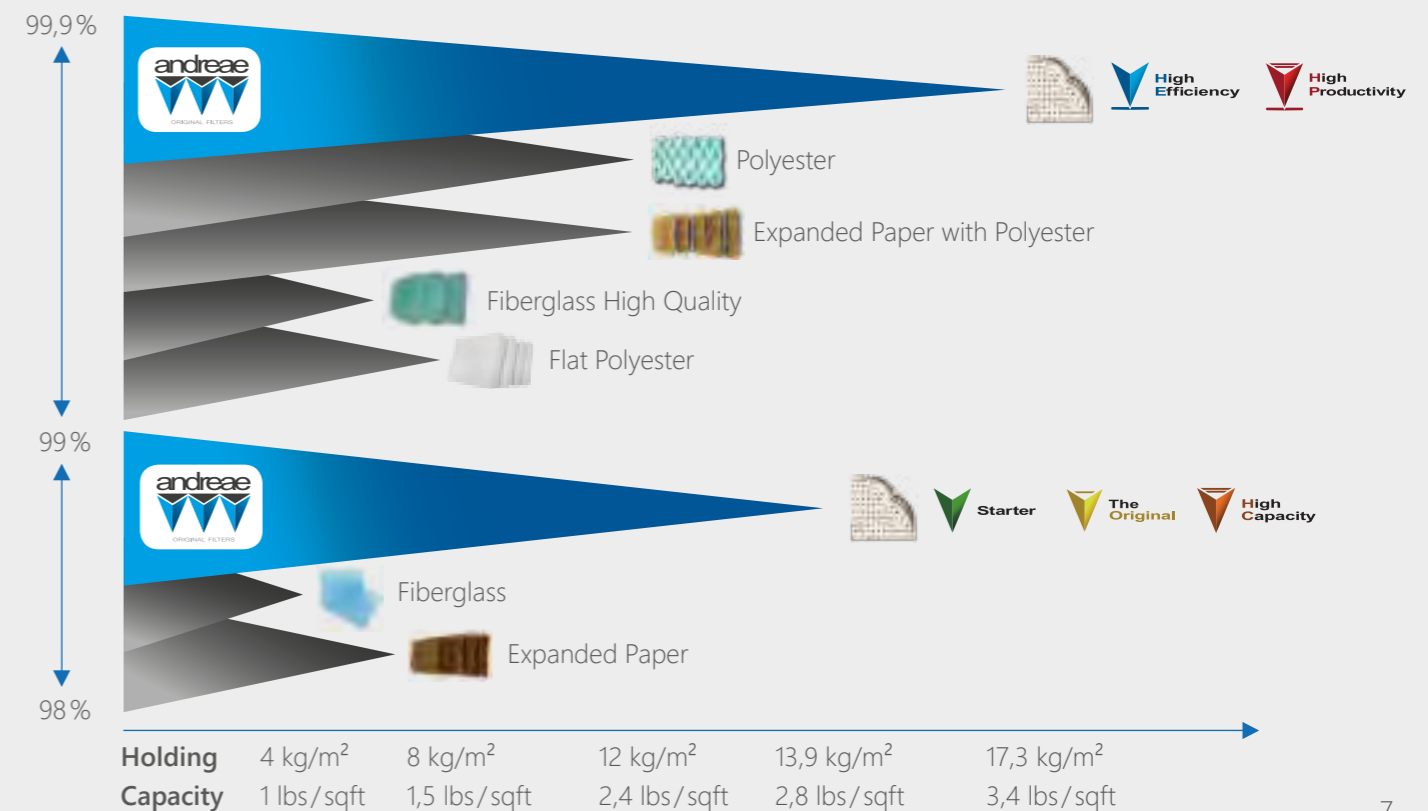
Expanded Paper



Expanded Paper with Polyester

	Andreae	Polyester	Flat Polyester	Fiberglass	Fiberglass High Quality	Expanded Paper	Expanded Paper with Polyester
Cost/Rendement	Best	Moderate	Moderate	Low	Low	Low	High
Holding Capacity	Best	High	Low	Low	Low	Moderate	High
Easy Storage	✓	✗	✗	✗	✗	✗	✗
Environmental friendly	✓	✓	✓	✗	✗	✓	✓
Healthy	✓	✓	✓	✗	✗	✓	✓

Filtration Efficiency %





Which Filter is the Best for your Application ?

	Adhesives	Air-dry enamels	Air-dry primers	Asphalts	Back-dry enamels	Clear coats	Epoxies	Fiberglass	Frit	Gel Coat	High solid enamels	Nitrocellulose Lacquers	Sealers	Stains	Tar-like coatings	Teflon	Urethanes	Vinyls	
Starter	▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼
The Original	▼▼	▼▼▼	▼▼▼	▼▼	▼▼	▼▼	▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼	▼▼▼	▼▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼
High Capacity	▼▼	▼▼▼	▼▼▼	▼▼	▼▼	▼▼	▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼	▼▼▼	▼▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼
High Efficiency	▼▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼	▼▼▼	▼▼	▼▼	▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼
High Holding	▼▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼
High Productivity	▼▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼▼	▼▼	▼▼▼	▼▼▼	▼▼	▼▼	▼▼	▼▼	▼▼	▼▼



Starter



Andreae Design

The Andreae Starter is a low intensity filter intended for least demanding spray booth operations. Developed with the same expectation level as the Original Andreae filters, the Starter is made with 2 layers of "kraft" paper, punched, pleated and glued together. This product is ideal for a casual use of the spray booth and a great way to start with the Andreae filters range.



Performances

Load	Efficiency	
▼▼▼▼▼	▼▼▼▼▼	lacquers
▼▼▼▼▼	▼▼▼▼▼	High solids
▼▼▼▼▼	▼▼▼▼▼	Polyester Bi-Components

Load [kg/m²] [lbs/sqft]

Lacquers	High Solids	Polyester
10kg/m² 2lbs/sqft	12kg/m² 2,4lbs/sqft	13kg/m² 2,5lbs/sqft

Efficiency [%]

Lacquers	High Solids	Polyester
93.10%	98.20%	97.80%

Recommended Air Velocity:

0.5 to 1 m/s

Pressure drop at/by:

0.5 m/s	0.75 m/s	1.0 m/s
20 pa	30 pa	40 pa

Max. recommended pressure drop:

128 pa (possible up to 256)



The Original



Rigid Structure



Extension Limiter



Reference Filter

Since over 50 years now, the Andreae Original has been the reference filter on the market. It remains the most universal and common filter in use. Our Original is made with 2 layers of heavy "kraft" paper, punched, pleated and glued together with 2 built-in extension limiters. Thanks to these limiters, the maximum load capacity is guaranteed. The Original is the filter for all paint types.



Performances

Load	Efficiency	
▼▼▼▼▼	▼▼▼▼▼	lacquers
▼▼▼▼▼	▼▼▼▼▼	High solids
▼▼▼▼▼	▼▼▼▼▼	Polyester Bi-Components

Load [kg/m²] [lbs/sqft]

Lacquers	High Solids	Polyester
10kg/m² 2lbs/sqft	12kg/m² 2,4lbs/sqft	13kg/m² 2,5lbs/sqft

Efficiency [%]

Lacquers	High Solids	Polyester
93.10%	98.20%	97.80%

Recommended Air Velocity:

0.5 to 1 m/s

Pressure drop at/by:

0.5 m/s	0.75 m/s	1.0 m/s
20 pa	30 pa	40 pa

Max. recommended pressure drop:

128 pa (possible up to 256)



High Capacity



Rigid Structure



Capacity Strips



High Capacity

The Andreae HC Original Filter has a loading capacity up to 5 times higher than any other filter type on the market. Its unique structure allows for more paint deposit areas and a more even and in depth paint loading. The HC is made with 2 layers of heavy "kraft" paper, punched, pleated and glued together with additional large paper strips on the front to offer a higher load capacity.



Performances

Load	Efficiency	
▼▼▼▼▼	▼▼▼▼▼	lacquers
▼▼▼▼▼	▼▼▼▼▼	High solids
▼▼▼▼▼	▼▼▼▼▼	Polyester Bi-Components

Load [kg/m²] [lbs/sqft]

Lacquers	High Solids	Polyester
13,7kg/m ² 2,7lbs/sqft	14,7kg/m ² 2,9lbs/sqft	13,9kg/m ² 2,8lbs/sqft

Efficiency [%]

Lacquers	High Solids	Polyester
93.90%	98.30%	98.20%

Recommended Air Velocity:

0.5 to 1 m/s

Pressure drop at/by:

0.5 m/s	0.75 m/s	1.0 m/s
21 pa	32 pa	42 pa

Max. recommended pressure drop:

128 pa (possible up to 256)



High Efficiency



Rigid Structure



Polyester Layer



High Efficiency

The Andreae HE Original Filter will bring a filtration efficiency near 100% while keeping the high loading capacity of the Andreae Original filter. The HE is made with 2 layers of heavy "kraft" paper, punched, pleated and glued together completed with a polyester layer on its back increasing its filtration efficiency.



Performances

Load	Efficiency	
▼▼▼▼▼	▼▼▼▼▼	lacquers
▼▼▼▼▼	▼▼▼▼▼	High solids
▼▼▼▼▼	▼▼▼▼▼	Polyester Bi-Components

Load [kg/m²] [lbs/sqft]

Lacquers	High Solids	Polyester
9kg/m ² 1,85lbs/sqft	12,2kg/m ² 2,4lbs/sqft	14,7kg/m ² 2,9lbs/sqft

Efficiency [%]

Lacquers	High Solids	Polyester
97.90%	99%	99.40%

Recommended Air Velocity:

0.5 to 1 m/s

Pressure drop at/by:

0.5 m/s	0.75 m/s	1.0 m/s
21 pa	32 pa	42 pa

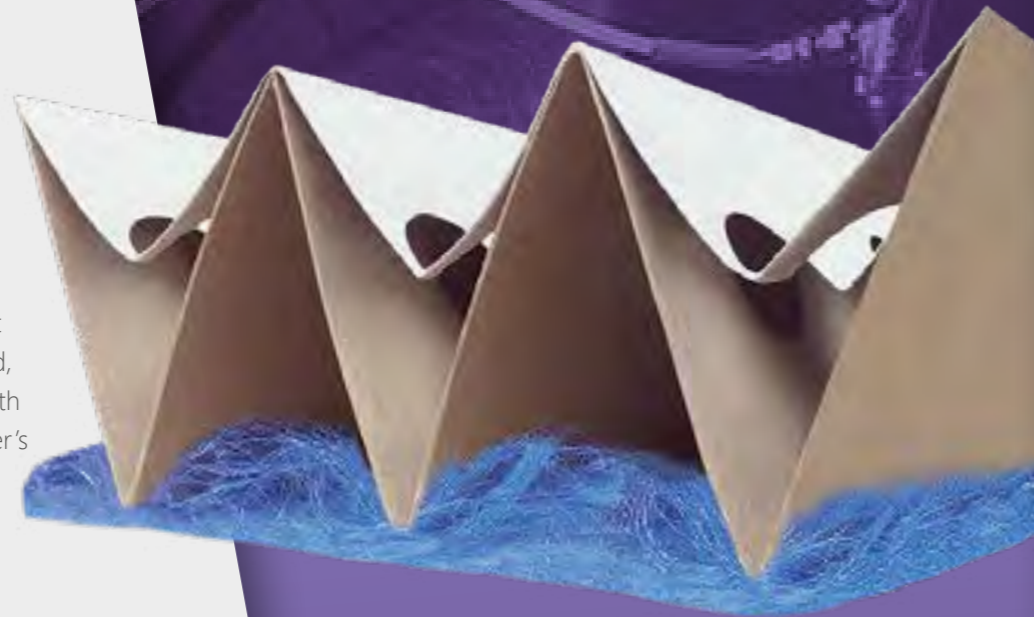
Max. recommended pressure drop:

128 pa (possible up to 256)



Rigid Structure Fiberglass Layer Efficiency

The Andreae HH Original filter has a higher filtration efficiency while keeping low airflow resistance. This means the filter lasts longer, ensuring a reduction in maintenance costs. The HH is made out of 2 layers of heavy "kraft" paper punched, pleated and glued together, completed with a fiberglass layer increasing both the filter's holding capacity and filtration efficiency.



Performances

Load	Efficiency	
▼▼▼▼▼	▼▼▼▼▼	lacquers
▼▼▼▼▼	▼▼▼▼▼	High solids
▼▼▼▼▼	▼▼▼▼▼	Polyester Bi-Components

Load [kg/m ²] [lbs/sqft]		
Lacquers 11kg/m ² 2,2lbs/sqft	High Solids 13kg/m ² 4,7lbs/sqft	Polyester 15kg/m ² 5,4lbs/sqft
Efficiency [%]		
Lacquers 97%	High Solids 98.50%	Polyester 98.50%
Recommended Air Velocity:		
0.5 to 1 m/s		
Pressure drop at/by:		
0.5 m/s 20 pa	0.75 m/s 30 pa	1.0 m/s 40 pa
Max. recommended pressure drop:		
128 pa (possible up to 256)		



Rigid Structure Capacity Strips Top Capacity Polyester Layer Top Efficiency

The Andreae HP Original filter combines the performances of the High Capacity and the High Efficiency filters. The HP is made with 2 layers of heavy "kraft" paper punched, pleated and glued together, completed with a polyester layer and additional large paper strips. It is the best-in-class choice for demanding spray booth operations.



Performances

Load	Efficiency	
▼▼▼▼▼	▼▼▼▼▼	lacquers
▼▼▼▼▼	▼▼▼▼▼	High solids
▼▼▼▼▼	▼▼▼▼▼	Polyester Bi-Components

Load [kg/m ²] [lbs/sqft]		
Lacquers 13,7kg/m ² 2,7lbs/sqft	High Solids 16,2kg/m ² 3,2lbs/sqft	Polyester 17,3kg/m ² 3,4lbs/sqft
Efficiency [%]		
Lacquers 98.50%	High Solids 98.80%	Polyester 99.70%
Recommended Air Velocity:		
0.5 to 1 m/s		
Pressure drop at/by:		
0.5 m/s 21 pa	0.75 m/s 32 pa	1.0 m/s 42 pa
Max. recommended pressure drop:		
128 pa (possible up to 256)		

Which Filter is available in your region?



	Model	Height		Length		Surface		
		cm	inch	m	feet	m ²	sqft	pleats
Brown	AF101	100	40	10	32' 6"	10	108	260
	AF701	75	29 1/2"	13,5	43' 9"	10	108	350
	AF801	90	36	9,24	30	8,35	90	240
	AF901	90	36	11,20	36' 1/2"	10	108	290
White	AF103	100	40	10	32' 6"	10	108	260
	AF703	75	29 1/2"	13,5	43' 9"	10	108	350
	AF803	90	36	9,24	30	8,35	90	240
	AF903	90	36	11,20	36' 1/2"	10	108	290
Ignifuge	AF102	100	40	10	32' 6"	10	108	260
	AF702	75	29 1/2"	13,5	43' 9"	10	108	350
	AF802	90	36	9,24	30	8,35	90	240
	AF902	90	36	9,144	30	10	108	290



Brown	AF111	100	40	10	32' 6"	10	108	260
	AF711	75	29 1/2"	13,5	43' 9"	10	108	350
	AF811	90	36	9,24	30	8,35	90	240
	AF911	90	36	11,15	36' 1/2"	10	108	290
White	AF113	100	40	10	32' 6"	10	108	260
	AF713	75	29 1/2"	13,5	43' 9"	10	108	350
	AF813	90	36	9,24	30	8,35	90	240
	AF913	90	36	11,15	36' 1/2"	10	108	290
	Pads: AF213	50	20	50cm	20"	0,25	2,8	13
Pads: AF413	50	20	63cm	25"	0,3	3,5	16	
Ignifuge	AF112	100	40	10	32' 6"	10	108	260
	AF712	75	29 1/2"	13,5	43' 9"	10	108	350
	AF812	90	36	9,24	30	8,35	90	240
	AF912	90	36	11,15	36' 1/2"	10	108	290



Brown	AF121	100	40	8	26' 1/4"	8	86	210
	AF721	75	29 1/2"	10,75	35' 1/4"	8	86	280
	AF921	90	36	9,14	30	8,35	90	240
White	AF123	100	40	8	26' 1/4"	8	86	210
	AF723	75	29 1/2"	10,75	35' 1/4"	8	86	280
	AF923	90	36	9,14	30	8,35	90	240
	Pads: AF223	50	20	50cm	20"	0,25	2,8	13
	Pads: AF423	50	20	63cm	25"	0,3	3,5	16



White	AF133	100	40	8	26' 1/4"	8	86	210
	AF733	75	29 1/2"	10,75	35' 1/4"	8	86	280
	AF933	90	36	9,14	30	8,35	90	240



White	AF143	100	40	8	26' 1/4"	8	86	210
	AF743	75	29 1/2"	10,75	35' 1/4"	8	86	280
	AF943	90	36	9,14	30	8,35	90	240



White	AF153	100	40	8	26' 1/4"	8	86	210
	AF753	75	29 1/2"	10,75	35' 1/4"	8	86	280
	AF953	90	36	9,14	30	8,35	90	240

	Model	Eastern Europe	Western Europe	North America	South America	Apac/mea
Brown	AF101	▼	▼	▼	▼	▼
	AF701	▼	▼	▼	▼	▼
	AF801	▼	▼	▼	▼	▼
	AF901	▼	▼	▼	▼	▼
White	AF103	▼	▼	▼	▼	▼
	AF703	▼	▼	▼	▼	▼
	AF803	▼	▼	▼	▼	▼
	AF903	▼	▼	▼	▼	▼
Ignifuge	AF102		▼	▼	▼	▼
	AF702		▼	▼	▼	▼
	AF802		▼	▼	▼	▼
	AF902		▼	▼	▼	▼
Filters per Pallet		60	60	60	60	

Brown	AF111	▼	▼	▼	▼	▼
	AF711	▼	▼	▼	▼	▼
	AF811	▼	▼	▼	▼	▼
	AF911	▼	▼	▼	▼	▼
White	AF113	▼	▼	▼	▼	▼
	AF713	▼	▼	▼	▼	▼
	AF813	▼	▼	▼	▼	▼
	AF913	▼	▼	▼	▼	▼
	Pads: AF213		▼	▼	▼	▼
Pads: AF413		▼	▼	▼	▼	
Ignifuge	AF112		▼	▼	▼	▼
	AF712		▼	▼	▼	▼
	AF812		▼	▼	▼	▼
	AF912		▼	▼	▼	▼
Filters per Pallet		60	60	60/56	60	60 (pads: 56)

Brown	AF121	▼	▼	▼	▼	▼
	AF721	▼	▼	▼	▼	▼
	AF921	▼	▼	▼	▼	▼
White	AF123	▼	▼	▼	▼	▼
	AF723	▼	▼	▼	▼	▼
	AF923	▼	▼	▼	▼	▼
	Pads: AF223		▼	▼	▼	▼
	Pads: AF423		▼	▼	▼	▼
Filters per Pallet		56	56	56	56	56

White	AF133	▼	▼	▼	▼	▼
	AF733	▼	▼	▼	▼	▼
	AF933	▼	▼	▼	▼	▼
Filters per Pallet		60	60	60	60	60

White	AF143	▼	▼	▼	▼	▼
	AF743	▼	▼	▼	▼	▼
	AF943	▼	▼	▼	▼	▼
Filters per Pallet		60	56	56	56	56

White	AF153	▼	▼	▼	▼	▼
	AF753	▼	▼	▼	▼	▼
	AF953	▼	▼	▼	▼	▼
Filters per Pallet		52	56	56	52	52

Channel Frame Installation



① Cut filter length to fit frame opening:

Count marks to length the frame opening and cut. (i.e. 10 ft wide frame opening, count 10 marks and cut on the 10th mark; i.e. 3m wide frame opening, count 9 marks and 6 pleats, then cut).

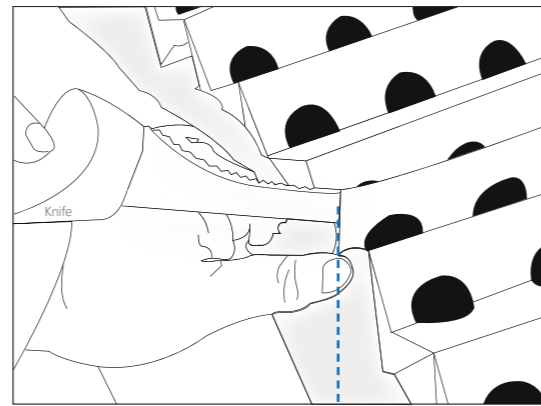
To cut, slide knife under pleat (and polyester if cutting the HE). After knife is in position, firmly grasp the filter and lift knife.

② Gather filter:

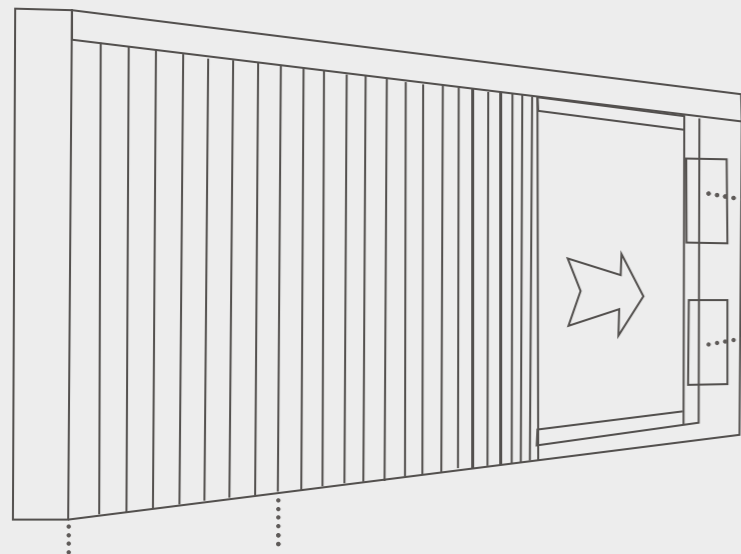
Gather filter into a tight accordion for easy transport. Slide filter into frame, white side facing toward spray gun. Release.

③ Tuck first and last pleats:

Behind clips on each end of exhaust frame.



You will cut through two paper layers (plus synthetic material in the High range). Pinch the pleats on either side beneath the knife for additional control while cutting.



8 pleats/foot
26 pleats/meter



Option A
L-shape clip

The filter is held by the clip.
This example is option A L-Shape clip



Option B
S-shape clip

Do not over-extend the filter.
Over-extension reduces arrestance efficiency and filter life.

Exhaust frame construction



Three simple elements constitute the Andreae Filter frame:

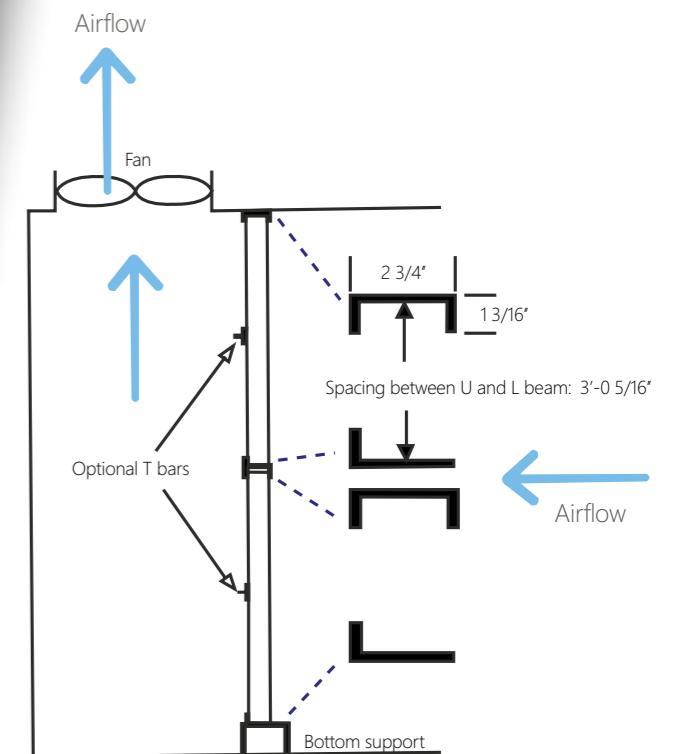
- ① An L-shaped channel is positioned at the side and bottom of the frame to create the filter stand support.

Dimensions:
Outside height 1 1/2 (3,81 cm) width 3" (7,62 cm), Length as required. Inside 2 13/16" (7,14 cm)

- ② The side clips secure the first and last filter pleat in place and seal the exhaust wall

- ③ A U-shaped channel is positioned upside down to create the upper part of the frame. This seals the top of the filter and prevents the filter from falling forward when the ventilation is turned off.

Dimensions:
Outside height 1 1/2 (3,81 cm) width 3" (7,62 cm), Length as required. Inside width 2 5/8" (6,66 cm)



Andreae Filters are held in place by an inverted U-beam on top and an L-beam on bottom. If the booth has several rows of filters, each row is installed on top of the adjoining beam.

The inner dimensions between the U and L beams must be sized ~0.2" more than the actual filter height to allow room for the filter to slide into the frame.

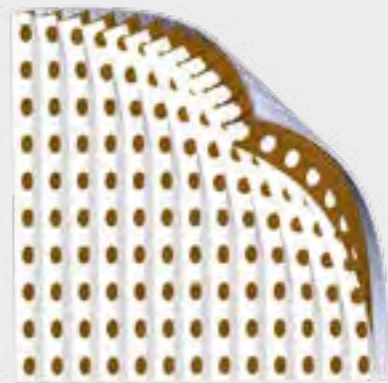
The Pad Frame Installation



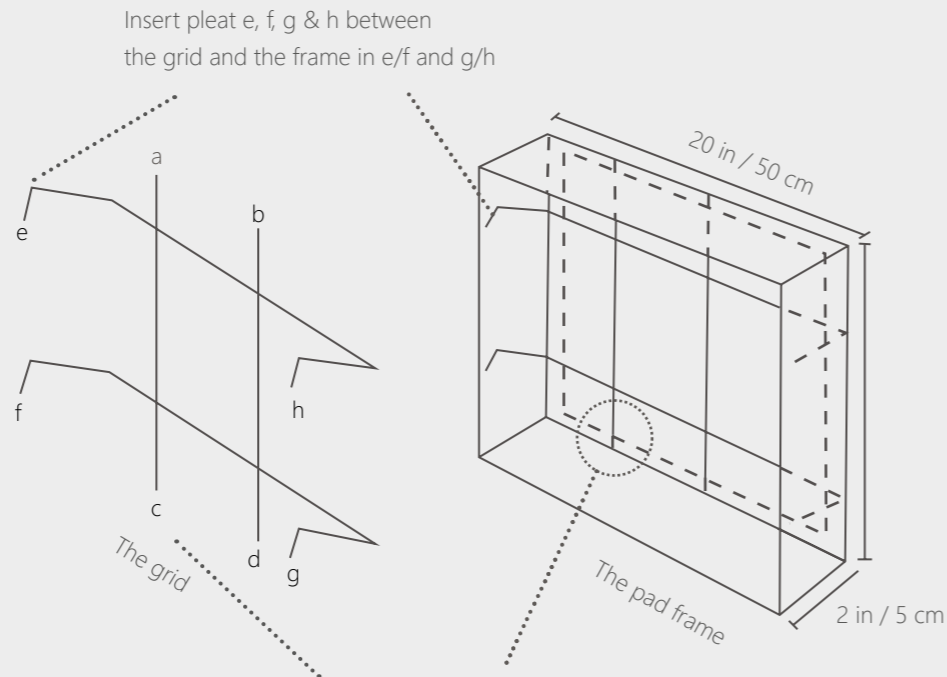
Andreae Wire Supports is necessary for the installation of Andreae pad size filters: 20 x 20 inch and 20 x 25 inch (50 x 50 cm and 50 x 63.5 cm).

An initial adjustment of the wire supports is required for proper fit. Over bend wires to allow 1/8 in (0.32 cm) gap between wire support arm and frame wall.

The pad is already cut



Example of 20 x 20 inch (50 x 50 cm) pad (14 pleats)



Tines a,b,c & d go behind the back of the frame to secure wire support while removing loaded filter

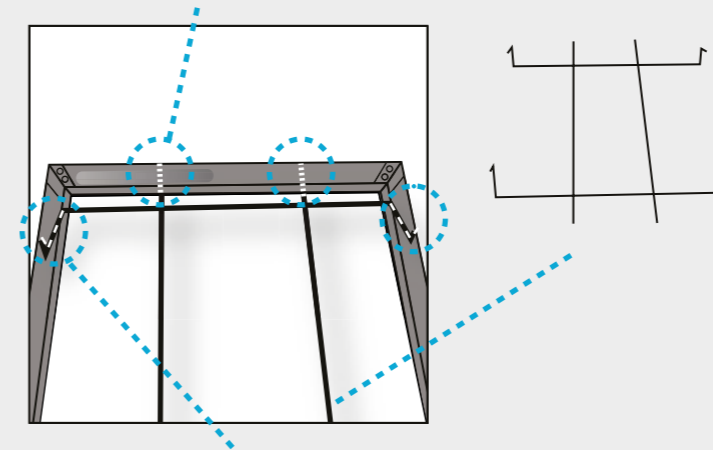
One time installation

If you are changing from other media, we will provide Andreae Filter Supports free of charge.

The pad filter support Installation

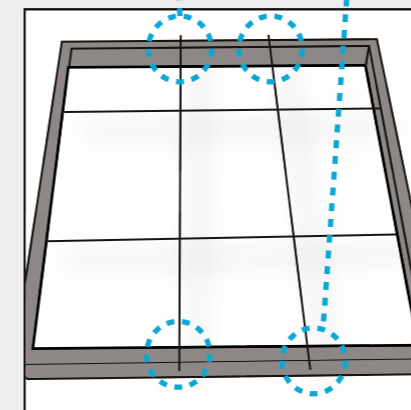


Front view cell frame
Straight tines behind the filter frame

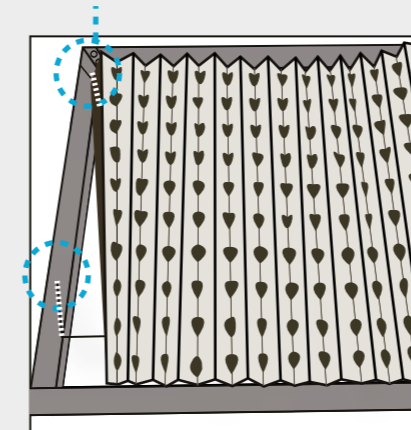


Wire support grid into filter frame

Back view cell frame
Four straight tines positioned behind the filter frame



Front view cell frame
Filter is held between the bent tines and the filter frame.



- 1 Insert two straight tines behind the filter frame. (Frame shown depicts a cell opening in an existing spray booth exhaust bank.) The straight tines must run vertically in order to be able to extend properly the Andreae Filter from side to side.

You may insert either the top or bottom pair, it does not matter which end is inserted first.

- 2 Push the wire support grid into filter frame, sliding grid up or down so that the remaining two straight tines can also be positioned behind the filter frame.

- 3 Once all four straight tines are behind the frame, slide the support to center it within the frame. It is not necessary to position the support perfectly.

Rear view of filter frame showing all four straight tines positioned behind the filter frame. These may overhang the frame more on one end or the other, depending on how well the support is centered within the frame.

It is not necessary to perfectly center the wire support.

- 4 Secure Andreae Filter within frame: tuck first rear pleat of the filter between bent tines and filter frame.

The tines will puncture the polyester backing of the filter when installing the Andreae High Efficiency Filter, but this does not affect the filter's performance.

AEREM[®]

TO FILTER & PROTECT

OUR MISSION

AEREM focuses on its customers and partners needs in the finishing industry. Every relationship is a privileged partnership based on professionalism, dialog and trust. Delivering the best service with performant, environmentally friendly quality products easy to dispose of is our commitment since 1963.

Our mission is to develop, manufacture and supply high performant filtration and protection products for spray booths that aim to keep a clean and safe working environment while enhancing the spray booths productivity.

OUR VISION

AEREMs ambition is to affirm its position by becoming an international multi-brand company focused on the global finishing industry with a wide variety of renowned and innovative filtration and protection products.

OUR VALUES

AEREM is above all a work of men and women united around the world for the success of the Group. They all share the same values in a solidarity and caring climate.

ENVIRONMENT

Protecting the environment is the responsibility of everyone. AEREM uses recycled raw materials in all of its products. Our sharply tuned and performant production processes results in low waste and low energy consumption.

PROTECTION

We seriously consider the need to protect the operator and provide a secure working environment through our products and services. This is why our filters are free of polluting or toxic products. They can be stored, handled and incinerated or landfilled safely.

CUSTOMER CARE

Because all our customers are important, our priority is to support them in their projects, build and maintain a long-term partnership to be able to bring the answers adapted to each need. Over 900 distributors around the world trust us.

MULTICULTURALISM

Aerem is a selfie of multiculturalism and diversity. Our teams are made of men and women of different languages, cultures and origins. It is in this spirit of openness and diversity that we seek to build a partnership with you.

RESPECT & INTEGRITY

We treat others with respect and comply with all internal and external norms and regulations. We strive to always act with transparency and honesty.

Please, visit the toolbox section on our website for all your technical questions:
www.andreaefilters.com

AEREM LOCATIONS WORLDWIDE



AMERICAS



CANADA

5000 Rue Hickmore
Saint-Laurent, QC H4T 1K6
Tel: +1 514-375-7100
Customers.ame@aerem.com



USA

422 2nd Ave NW
Ardmore, OK 73401
Tel: +1 866 263 7323
Customers.ame@aerem.com

EUROPE



SWITZERLAND

Rue du Jeu de L'Arc 15
CH - 1207 Genève
Tel: +41 21 869 93 63
Customers.eur@aerem.com



POLAND

ul. Lubczyńska 6 F
PL - 70-895 Szczecin
Tel: +48 91 884 90 00
Customers.eur@aerem.com

ASIA-PACIFIC



SINGAPORE

22 Gemmill Lane #03-01
Singapore 069257
Tel: +65 6922 7800
Customers.api@aerem.com



HONK-KONG

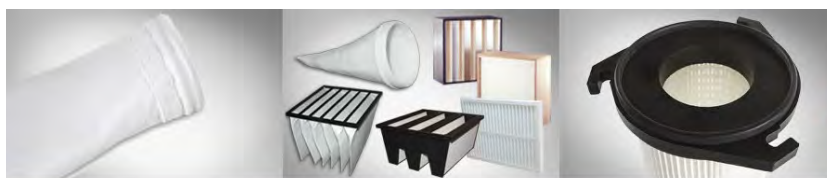
20th Floor, Euro Trade Center
21-23 Des Voeux Road Central
Tel: +852 2824 8156
Customers.api@aerem.com

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Data sheet - Paint Stop

Composition	Glass fibers
Width [m]	2
Bonding	Chemical by binders
Area Weight [g/m²]	220
Thickness (before packaging) [mm.]	50
Face Velocity [m/s]	0.7 - 1.75
Initial resistance [Pa]	6 - 30
Recomended final resistance [Pa]	80
Air flow per m² [m³/h]	2.500 - 6.300
Paint spraying retaining capacity [g/m²]	3.500
Paint overspray Arrestance [%]	90 - 95
Temperature Limits [°C]	From -15 to +80
Media colour	Green tint air leaving side

Technical parameters are checked during actual processing and are subject to usual tolerances. This information does not express or imply any guarantee and the right is reserved to make any modifications without notice.



DESCRIPTION

The VNF media are synthetic fibre-based filters designed and manufactured at Filtrair's own high-tech media plant. The media are constructed from selected high performance, non-breakable fibres in a progressive density multi-layering technique to ensure high depth loading with and optimal low pressure drop, while achieving gravimetric arrestance and efficiency levels in accordance with EN779:2002 standards ratings.

The VNF series is thermally bonded in part and stiffened to ensure high dust holding capacity. The clean air sides are smoothed and imprinted for easy identification to ensure the correct installation in pads, roll or extended surface pocket format

The Filtrair media conforms to all EU and U.S. fire classification standards (e.g. DIN 53438-F1 and UL 900-class 2) and are self-extinguishing.

Constant quality is ensured by independent quality control testing according to EN779:2002 and the individual DIN logo and Filtrair registration number, which are imprinted on the media, together with the G3 classification and the FILTRAIR brand name

FEATURES

- Available as bulk media rolls, or pads cut to size
- Conforms to U.S and EU fire classification standards

- Graduated density
- High dust holding capacity
- Consistent media quality is ensured by independent quality control testing according to EN779:2002
- Washable media that can be serviced up to ten times
- 100% synthetic media.
- Low initial pressure drop
- Can be manufactured into cut pads, panel filters (including VF style) and extended surface pocket filters

APPLICATIONS

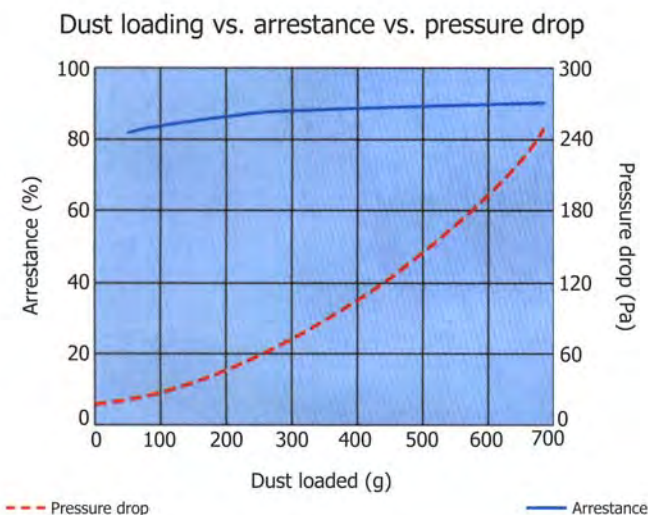
Filtrair's VNF 290 media is designed as an economical air filter media for use as prefiltration or coarse filtration in general ventilation and air handling systems installed in public buildings, offices, factories and equipment of all kinds. The VNF series combines a high dust holding capacity with a relatively low pressure drop and is therefore extremely cost effective with a long filter life.

SERVICE/MAINTENANCE

Service to all washable filters can be performed by simply washing in cold water and mild detergent up to 10 times, using an approved washing facility. This service can also be carried out by our trained service technicians if required (ask our representative about our competitive service/maintenance contracts).

Your Authorised Distributor:

FILTRATION TECHNICAL PERFORMANCE CHARACTERISTICS (according to EN779:2002, ANSI/ASHRAE 52.1-1992)



TECHNICAL DATA – VNF SERIES

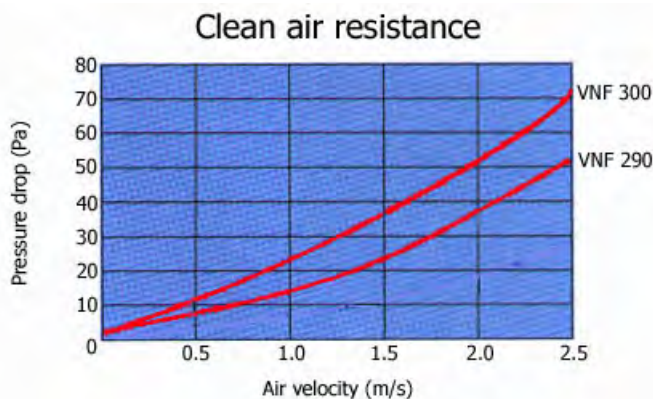
Filtrair air filter media	VNF 290
Average arrestance (acc. EN779:2002)	86%
Initial efficiency (dust spot)	<20%
Air velocity (m/s)	1.50
Rated air flow (m ³ /h/m ²)	5400
Initial pressure drop (Pa)	24
Final pressure drop (Pa)	250
Dust holding at tested final (g/m ²)	620
Class according to EN779:2002	G3

Temperature resistance, constant	Up to 100°C
Temperature resistance, short peaks	Up to 120°C
Nominal thickness (mm)	20
Relative humidity	Up to 100%
Standard roll size (m)	2.0 x 20
Regenerable / washable	yes

Application specialties

Particularly suited for:

- General air handling units
- Air conditioning systems
- Ventilation systems of all kinds
- Air intake prefiltration banks
- Window air conditioners
- Home furnace air heaters
- Railroad car ventilation
- Intake and exhaust air systems for heavy industry and chemical plants



All data given are average indicative values with usual accepted tolerances due to manufacturing variations and inherent testing tolerances. All specific performance data will require explicit written confirmation. FILTRAIR® is the registered trade mark of FILTRAIR b.v.



Your Authorised Distributor:

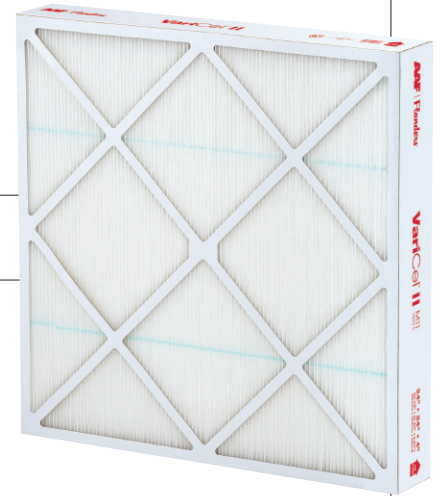


Peregrine Industries Pty. Ltd.

2/14 Dennis Street
 (PO Box 78 Somerton ... 3062)
 Campbellfield, Victoria ... 3061
 Phone: +61 3 9303 9888 Fax: +61 3 9303 9688
www.peregrineindustries.com.au

VariCel® II

EXTENDED SURFACE MINI-PLEAT FILTERS



- True high efficiency filters – only 4" thick media pack
- Slim line, mini-pleat design lowers operating costs
- Engineered for a variety of applications
- Easy disposal
- Available with antimicrobial
- Available in three efficiencies – MERV 14, MERV 13, and MERV 11

Designed for high performance under both normal and difficult operating conditions, VariCel II filters are appropriate for general HVAC and applications operating with variable air volume, turbulent airflow, and high humidity. The combination of durable construction and high efficiency also makes VariCel II filters ideal for specialized systems, such as diffusion filters in paint booths and prefilters in cleanrooms.

Heavy Duty Construction— High Performance in Tough Operating Conditions

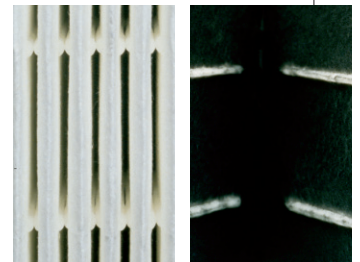
The frame is made with a 2-piece die cut constructed from high wet-strength beverage board. Two mating die cut boxes are bonded together, forming a double wall around the perimeter of the filter. The mini-pleat media pack is bonded inside the double wall. The double-walled frame prevents leakage and increases rigidity.

Available with Antimicrobial

VariCel II filters with antimicrobial are available in MERV 14 and MERV 11 efficiencies. Antimicrobial acts as a preservative to ensure the integrity of the media throughout the life of the filter. EPA-registered and environmentally safe, antimicrobial inhibits the growth of microorganisms documented to affect IAQ.

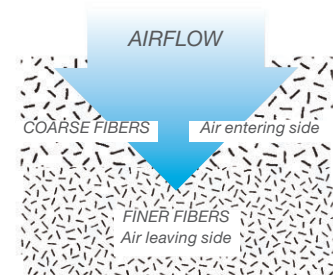
Slim-Line Design

The slim-line design of the VariCel II filters provides minimum resistance and maximum dust loading capacity while lowering operating costs. Rows of adhesive beads are used to maintain even pleat spacing and provide maximum airflow with minimal resistance. The consistent pleat spacing of the media allows higher dust holding capacity and full use of the entire depth of the media.



Dual-Density Media Increases Dust Holding Capacity

VariCel II filters use microglass paper media with a water repellent binder. The fibers are formed with dual-density construction, consisting of coarser fibers on the air entering side and finer fibers on the air leaving side. This design allows for collection of particulate throughout the full thickness of the media, substantially increasing dust holding capacity. The media is water repellent and can withstand intermittent exposure to water without affecting performance.



VariCel® II Filters

Product Information

(1) Rated Filter Face Velocity (FPM)	(2) Nominal Size (Inches) (W x H x D)	(2) Actual Size (Inches) (W x H x D)	(3) Rated Airflow Capacity (CFM)	(3) Rated Initial Resistance (in. w.g.)	(4) Recommended Final Resistance (in. w.g.)	Gross Media Area (Sq.Ft.)	Shipping Weight (Lbs. Per Carton)
(3) MERV 14 – Available with Antimicrobial							
500	24 x 24 x 4	23 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	2000	.63	1.5	119	26
500	20 x 25 x 4	19 ⁹ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1750	.63	1.5	103	22
500	20 x 24 x 4	19 ⁹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1650	.63	1.5	99	21
500	20 x 20 x 4	19 ⁹ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1400	.63	1.5	82	18
500	18 x 24 x 4	17 ⁷ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1500	.63	1.5	88	19
500	16 x 25 x 4	15 ⁵ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1400	.63	1.5	82	18
500	16 x 20 x 4	15 ⁵ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1100	.63	1.5	65	14
500	12 x 24 x 4	11 ¹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1000	.63	1.5	58	13
500	12 x 12 x 4	11 ¹ / ₈ x 11 ¹ / ₈ x 3 ³ / ₄	500	.63	1.5	28	7
(3) MERV 13							
500	24 x 24 x 4	23 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	2000	.58	1.5	119	26
500	20 x 25 x 4	19 ⁹ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1750	.58	1.5	103	22
500	20 x 24 x 4	19 ⁹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1650	.58	1.5	99	21
500	20 x 20 x 4	19 ⁹ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1400	.58	1.5	82	18
500	18 x 24 x 4	17 ⁷ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1500	.58	1.5	88	19
500	16 x 25 x 4	15 ⁵ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1400	.58	1.5	82	18
500	16 x 20 x 4	15 ⁵ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1100	.58	1.5	65	14
500	12 x 24 x 4	11 ¹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1000	.58	1.5	58	13
500	12 x 12 x 4	11 ¹ / ₈ x 11 ¹ / ₈ x 3 ³ / ₄	500	.58	1.5	28	7
(3) MERV 11 – Available with Antimicrobial							
500	24 x 24 x 4	23 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	2000	.47	1.5	119	26
500	20 x 25 x 4	19 ⁹ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1750	.47	1.5	103	22
500	20 x 24 x 4	19 ⁹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1650	.47	1.5	99	21
500	20 x 20 x 4	19 ⁹ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1400	.47	1.5	82	18
500	18 x 24 x 4	17 ⁷ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1500	.47	1.5	88	19
500	16 x 25 x 4	15 ⁵ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1400	.47	1.5	82	18
500	16 x 20 x 4	15 ⁵ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1100	.47	1.5	65	14
500	12 x 24 x 4	11 ¹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1000	.47	1.5	58	13
500	12 x 12 x 4	11 ¹ / ₈ x 11 ¹ / ₈ x 3 ³ / ₄	500	.47	1.5	28	7

(1) Filters can be operated up to 125% of rated face velocity.

(2) Width and height dimensions are interchangeable. VariCel II filters may be installed with the pleats either vertical or horizontal.

(3) All performance data based on ASHRAE Standard 52.2. Performance tolerances conform to Section 7.4 of ARI Standard 850-93. For maximum service life, VariCel II filters should always be operated with a prefilter.

(4) The final operating resistance shown is typical of systems currently in operation.

Filters can be operated to a higher or lower final resistance without materially affecting filter efficiency; however, dust holding capacity will be reduced if the filters are changed at a lower final resistance.

(5) VariCel II filters are shipped four per carton.

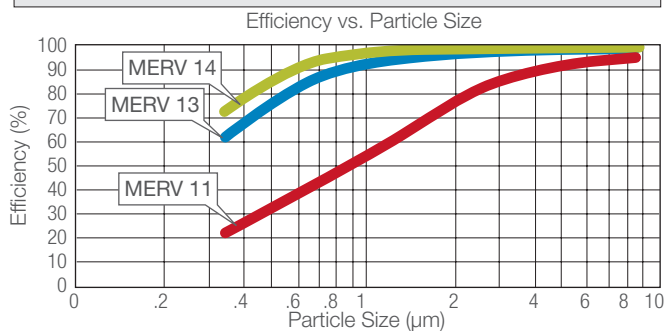
Underwriters Laboratories Classification: All VariCel II filters are UL Classified. Testing was performed according to UL Standard 900 and ULC-S111.

Continuous Operating Temperature Limits: 150°F (66°C)

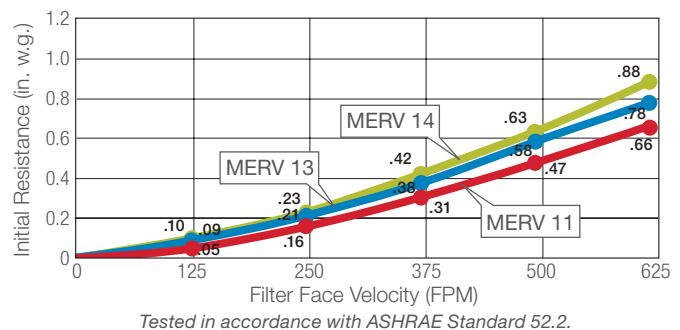
For product information on VariCel II MH filters, request bulletin AFP-1-239.

Performance Data

Composite Minimum Efficiency Curve



Initial Resistance vs. Filter Face Velocity



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Bringing clean air to life.®

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ISO Certified Firm

AFP-1-237Y 08/22

BioCel® I

HIGH-EFFICIENCY EXTENDED SURFACE AIR FILTERS



The BioCel I filter was designed primarily to remove airborne biological contaminants in hospital critical areas and food and pharmaceutical processing plants. It has also been engineered to meet the exacting requirements of precision manufacturing operations and laboratories, where very high efficiency filtration of fine particulate matter is necessary.

BioCel® M-Pak Filter— A New Alternative

The BioCel M-Pak filter offers the same media area and pressure drop as the BioCel I filter in a 6" deep, high impact polystyrene cell side.

The BioCel M-Pak filter offers several advantages in comparison to the BioCel I filter.

- Lighter – half the weight
- Requires less storage space
- Reduces disposal costs
- Easier handling
- Fully Incinerable

For more information on the BioCel® M-Pak filter, see brochure AFP-1-117.



High Efficiency— Low Resistance

Rated at 95% efficiency on 0.3 micrometer challenge aerosol and a MERV 16 per ASHRAE Standard 52.2, the BioCel I filter has the advantage of much lower pressure drop than a typical HEPA filter (0.4" versus 1.0" w.g. at 250 FPM). BioCel I filters fill the gap between ASHRAE grade high efficiency filters and ultra-high efficiency HEPAs at half the weight and pressure drop.

This compact, lightweight filter will withstand operating temperatures to 350°F, if recommended final resistance is not exceeded.

To maximize filter life, use BioCel I filters with high quality AAF Flanders prefilters.

Construction

BioCel I filters consist of a pleated media pack enclosed in a galvanized steel frame assembly. The media is made of ultra-fine fiberglass formed into a series of pleats. Corrugated aluminum separators maintain uniform spacing between each pleat to allow unrestricted airflow through the filter. Bar braces are installed on both sides of the filter for extra reinforcement of the media pack. A flattened, expanded metal faceguard installed on both sides of the filter is available as an option.

BioCel I filters have a single piece galvanized steel header on the air entering side that is interlocked to the cell sides in a patented fashion that prevents leakage and forms a totally rigid construction.

Ideal for Variable Volume Systems

Due to the rigid all metal construction and water resistant media in a supported pleat type configuration, BioCel I filters can be used in systems with difficult operating conditions:

- Variable air volume
- Turbulent airflow
- Repeated fan shutdown
- High temperature
- High humidity
- Intermittent exposure to water, such as sea coast installations

BioCel® I Filters

Product Information

Nominal Size (Inches) (W x H x D)	Actual Size (Inches) (W x H x D)	Rated Airflow Capacity (CFM)			Rated Initial Resistance (in. w.g.)			Media Area (sq. ft.)	Gross Filters Per Carton	Shipping Weight (lbs.)
		125 FPM	250 FPM	500 FPM	125 FPM	250 FPM	500 FPM			
95% Initial Efficiency (0.3µm Particles)										
24 x 24 x 12	23 ³ / ₈ x 23 ³ / ₈ x 11 ¹ / ₂	500	1000	2000	.26	.44	1.0	156	1	20.0
^(a) 24 x 24 x 12	24 x 24 x 11 ¹ / ₂	500	1000	2000	.26	.44	1.0	165	1	21.5
24 x 20 x 12	23 ³ / ₈ x 19 ³ / ₈ x 11 ¹ / ₂	413	825	1650	.26	.44	1.0	127	1	17.0
^(a) 20 x 24 x 12	19 ³ / ₈ x 23 ³ / ₈ x 11 ¹ / ₂	413	825	1650	.26	.44	1.0	127	1	18.5
12 x 24 x 12	11 ¹ / ₈ x 23 ³ / ₈ x 11 ¹ / ₂	250	500	1000	.26	.44	1.0	72	1	12.0
Recommended Final Resistance 2.0 in. w.g.										
24 x 24 x 6	23 ³ / ₈ x 23 ³ / ₈ x 5 ⁷ / ₈	500	1000	–	.30	.60	–	93	2	22.0
^(a) 24 x 24 x 6	24 x 24 x 5 ⁷ / ₈	500	1000	–	.30	.60	–	98	2	24.0
24 x 20 x 6	23 ³ / ₈ x 19 ³ / ₈ x 5 ⁷ / ₈	413	825	–	.30	.60	–	93	2	22.0
^(a) 20 x 24 x 6	19 ³ / ₈ x 23 ³ / ₈ x 5 ⁷ / ₈	413	825	–	.30	.60	–	96	2	21.5
12 x 24 x 6	11 ¹ / ₈ x 23 ³ / ₈ x 5 ⁷ / ₈	250	500	–	.30	.60	–	42	2	14.0
Recommended Final Resistance 1.5 in. w.g.										

(a) Available in double header construction only.

Performance Data

Composite Minimum Efficiency Curve



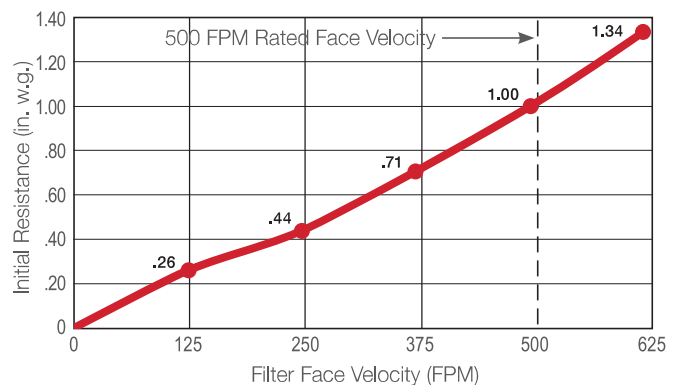
Initial Efficiency vs. Particle Diameter

At rated airflow, the BioCel I filter has an efficiency of 95% on 0.3 micron particles and is a MERV 16 in accordance with ASHRAE Standard 52.2.

Underwriters Laboratories Classification

BioCel I filters are UL Classified. Testing was performed in accordance with UL Standard 900.

Initial Resistance vs. Filter Face Velocity



Options

- Double header construction is available for installation into other manufacturers' framing systems.
- 6" or 12" depths available.
- HEPA filter construction available. See Brochure AFP-1-110.

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AFP-1-116X 01/17



AL Automatic

Airless Spray Gun



Increase Production Speeds and Finish Quality in General Metal Applications

- Lightweight and compact rounded gun design
- Capable of handling high production speeds
- Durable stainless steel construction handles the toughest materials
- Fewer parts means an overall lower cost of repair
- Wide range tip line for a variety of applications

PROVEN QUALITY. LEADING TECHNOLOGY.

Technical Specifications and Ordering Information

Ordering Information

288048 Airless Gun
Includes GGO precision spray tip of choice and internal filter

Manifolds (required for gun installation)

241161 Standard 1/4" npsm inlets
244930 High flow ambient manifold

ACCESSORIES

288171 Air Seal Repair Kit
239896 Fluid Seal Repair Kit
210500 In-Line Fluid Filter

Technical Specifications

Maximum fluid pressure 5000 psi (345 bar, 34.5 MPa)
Maximum working air pressure 100 psi (7 bar, 0.7 MPa)
Maximum cylinder air pressure 100 psi (7 bar, 0.7 MPa)
Minimum air cylinder actuating pressure 70 psi (4.9 bar, 0.5 MPa)
Maximum working fluid temperature 140°F (60°C)
Triggering speed 50-70 msec (fully open or close)
Wetted parts stainless steel, carbide, UHMWPE, acetal, PEEK, PTFE
Gun weight 1.2 lb (545 g)
Dimensions 5.2 in L x 3.0 in H x 2.0 in W (135 mm L x 76 mm H x 51 mm W)
Instruction manual 311053

GGO Tip Chart

Orifice Size in (mm)	*Fluid Output, gpm (lpm) at 600 psi (4.1 MPa, 41 bar)	Maximum Pattern Width at 12 in (300 mm)								
		2 to 2.5 (50)	4 to 4.5 (100)	6 to 6.5 (150)	8 to 8.5 (200)	10 to 10.5 (250)	12 to 13 (300)	14 to 15 (350)	16 to 17 (400)	18 to 19 (450)
0.007 (0.178)	0.053 (0.20)	107		307						
0.009 (0.229)	0.087 (0.33)	109	209	309						
0.011 (0.279)	0.13 (0.49)	111	211	311	411	511	611			
0.013 (0.330)	0.18 (0.69)		213	313	413	513	613	713		
0.015 (0.381)	0.24 (0.91)	115	215	315	415	515	615	715	815	
0.017 (0.432)	0.31 (1.17)	117	217	317	417	517	617		817	917
0.019 (0.483)	0.39 (1.47)		219	319	419	519	619	719	819	
0.021 (0.533)	0.47 (1.79)		221	321	421	521	621	721	821	921
0.023 (0.584)	0.57 (2.15)			323	423	523	623	723	823	923
0.025 (0.635)	0.67 (2.54)			325	425	525	625	725	825	925
0.027 (0.686)	0.78 (2.96)			327	427	527	627	727	827	927
0.029 (0.737)	0.90 (3.42)				429	529	629	729		
0.031 (0.787)	1.03 (3.90)			331	431	531	631	731		931
0.033 (0.838)	1.17 (4.42)			335	433	533	633	733		933
0.035 (0.889)	1.31 (4.98)				435	535	635	735		
0.037 (0.940)	1.47 (5.56)							737		
0.039 (0.991)	1.63 (6.18)					539	639			
0.041 (1.041)	1.80 (6.83)					541			841	
0.043 (1.092)	1.99 (7.51)					543	643			
0.045 (1.143)	2.17 (8.23)					545				
0.047 (1.197)	2.37 (8.98)					547				
0.049 (1.245)	2.58 (9.76)							749		
0.053 (1.35)	3.02 (11.4)					553				
0.055 (140)	3.25 (12.3)						655			

All written and visual data contained in this document are based on the latest product information available at the time of publication. Graco reserves the right to make changes at any time without notice.

Call today for product information or to request a demonstration.

877.84GRACO (1-877-844-7226) or visit us at www.graco.com/finishing





XTR™ Airless Spray Guns

Rugged Design to Handle the Toughest Protective Coatings



Built for Extreme Conditions

- Compact design allows for easy maneuverability
- XTR-5: maximum fluid pressure of 5000 (345 bar, 34.5 MPa)
- XTR-7: maximum fluid pressure of 7250 (500 bar, 50 MPa)
- Variety of handle and trigger options
- High quality materials and construction

PROVEN QUALITY. LEADING TECHNOLOGY.



Genuine Graco Fluid Hoses Make the Difference

Xtreme-Duty™ 4500 psi (310 bar) High Pressure Hose

Part #	Length	Hose Diameter	Female NPSM
H42503	3 ft (0.9 m)	1/4 in (6.4 mm)	1/4 in
H42506	6 ft (1.8 m)	1/4 in (6.4 mm)	1/4 in
H42510	10 ft (3.0 m)	1/4 in (6.4 mm)	1/4 in
H42525	25 ft (7.6 m)	1/4 in (6.4 mm)	1/4 in
H42550	50 ft (15.2 m)	1/4 in (6.4 mm)	1/4 in
H4251X	100 ft (30.5 m)	1/4 in (6.4 mm)	1/4 in
H43803	3 ft (0.9 m)	3/8 in (9.5 mm)	3/8 in
H43806	6 ft (1.8 m)	3/8 in (9.5 mm)	3/8 in
H43810	10 ft (3.0 m)	3/8 in (9.5 mm)	3/8 in
H43825	25 ft (7.6 m)	3/8 in (9.5 mm)	3/8 in
H43850	50 ft (15.2 m)	3/8 in (9.5 mm)	3/8 in
H4381X	100 ft (30.5 m)	3/8 in (9.5 mm)	3/8 in
H45010	10 ft (3.0 m)	1/2 in (12.7 mm)	1/2 in
H45025	25 ft (7.6 m)	1/2 in (12.7 mm)	1/2 in
H45050	50 ft (15.2 m)	1/2 in (12.7 mm)	1/2 in
H4501X	100 ft (30.5 m)	1/2 in (12.7 mm)	1/2 in

Xtreme-Duty 5600 psi (386 bar) High Pressure Hose

Part #	Length	Hose Diameter	Female NPSM
H52503	3 ft (0.9 m)	1/4 in (6.4 mm)	1/4 in
H52506	6 ft (1.8 m)	1/4 in (6.4 mm)	1/4 in
H52510	10 ft (3.0 m)	1/4 in (6.4 mm)	1/4 in
H52525	25 ft (7.6 m)	1/4 in (6.4 mm)	1/4 in
H52550	50 ft (15.2 m)	1/4 in (6.4 mm)	1/4 in
H5251X	100 ft (30.5 m)	1/4 in (6.4 mm)	1/4 in
H53803	3 ft (0.9 m)	3/8 in (9.5 mm)	3/8 in
H53806	6 ft (1.8 m)	3/8 in (9.5 mm)	3/8 in
H53810	10 ft (3.0 m)	3/8 in (9.5 mm)	3/8 in
H53825	25 ft (7.6 m)	3/8 in (9.5 mm)	3/8 in
H53850	50 ft (15.2 m)	3/8 in (9.5 mm)	3/8 in
H5381X	100 ft (30.5 m)	3/8 in (9.5 mm)	3/8 in
H55010	10 ft (3.0 m)	1/2 in (12.7 mm)	1/2 in
H55025	25 ft (7.6 m)	1/2 in (12.7 mm)	1/2 in
H55050	50 ft (15.2 m)	1/2 in (12.7 mm)	1/2 in
H5501X	100 ft (30.5 m)	1/2 in (12.7 mm)	1/2 in

Xtreme-Duty 7250 psi (500 bar) High Pressure Hose

Part #	Length	Hose Diameter	Female NPSM
H72503	3 ft (0.9 m)	1/4 in (6.4 mm)	1/4 in
H72506	6 ft (1.8 m)	1/4 in (6.4 mm)	1/4 in
H72510	10 ft (3.0 m)	1/4 in (6.4 mm)	1/4 in
H72525	25 ft (7.6 m)	1/4 in (6.4 mm)	1/4 in
H72550	50 ft (15.2 m)	1/4 in (6.4 mm)	1/4 in
H7251X	100 ft (30.5 m)	1/4 in (6.4 mm)	1/4 in
H73803	3 ft (0.9 m)	3/8 in (9.5 mm)	3/8 in
H73806	6 ft (1.8 m)	3/8 in (9.5 mm)	3/8 in
H73810	10 ft (3.0 m)	3/8 in (9.5 mm)	3/8 in
H73825	25 ft (7.6 m)	3/8 in (9.5 mm)	3/8 in
H73850	50 ft (15.2 m)	3/8 in (9.5 mm)	3/8 in
H7381X	100 ft (30.5 m)	3/8 in (9.5 mm)	3/8 in
H75010	10 ft (3.0 m)	1/2 in (12.7 mm)	1/2 in
H75025	25 ft (7.6 m)	1/2 in (12.7 mm)	1/2 in
H75050	50 ft (15.2 m)	1/2 in (12.7 mm)	1/2 in
H7501X	100 ft (30.5 m)	1/2 in (12.7 mm)	1/2 in

Lightweight and Ergonomic

Technical Specifications

Maximum fluid working pressure	XTR-5: 5000 psi (345 bar, 34.5 MPa) XTR-7: 7250 psi (500 bar, 50 MPa)
Fluid orifice	0.090 in (2.3 mm)
Fluid inlet	1/4 npsm
Maximum fluid temperature	160° F (71° C)
Sound pressure	84.3dB(A)*
Sound power	95.7dB(A)*
Dimensions	XTR-5: Weight 14.5 oz (411 g), Length 4.35 in (111 mm), Height 7.1 in (180 mm) XTR-7: Weight 24 oz (688 g), Length 4.35 in (111 mm), Height 7.1 in (180 mm)
Wetted parts	Aluminum, stainless steel, polyethylene, polyurethane, polypropylene, nylon, acetal, carbide, solvent-resistant O-rings
Instruction Manual	312145

* Results are maximum readings taken at 6000 psi (414 bar, 41 MPa), with GHD519 tip, using water. Sound power level was tested to ISO 9614-2.

Ordering Information

XTR-5 Airless Spray Gun

Maximum working pressure: 5000 psi (345 bar, 34.5 MPa)
XTR500 1" round handle, four-finger trigger, no tip
XTR501 1" round handle, four-finger trigger, flat tip*
XTR502 Oval insulated handle, four-finger trigger, XHD RAC tip*
XTR503 Oval insulated handle, two-finger trigger, XHD RAC tip*
XTR504 1" round handle, four-finger trigger, XHD RAC tip*
XTR505 1" round handle, two-finger trigger, XHD RAC tip*

XTR-7 Airless Spray Gun

Maximum working pressure: 7250 psi (500 bar, 50.0 MPa)
XTR700 Round handle, four-finger trigger, no tip
XTR701 Round handle, four-finger trigger, flat tip*
XTR702 Oval insulated handle, four-finger trigger, XHD RAC tip*
XTR703 Oval insulated handle, two-finger trigger, XHD RAC tip*
XTR704 Round handle, four-finger trigger, XHD RAC tip*
XTR705 Round handle, two-finger trigger, XHD RAC tip*

*Includes 519 tip

Accessories

287450 2-finger trigger kit	246297 180° spray nozzle, 7/8-14 UNC-2B, 7250 psi (500 bar, 50 MPa)
287449 4-finger round trigger kit	248837 Gun repair kit, includes gasket, needle and seat
287451 4-finger oval insulation trigger kit	XHD001 XHD RAC Guard
246294 10 in (254 mm) gun extension, 7250 psi (500 bar, 50 MPa)	287032 Filter, 60 mesh, included in every gun
246295 15 in (380 mm) gun extension, 7250 psi (500 bar, 50 MPa)	287033 Filter, 100 mesh
246296 18 in (457 mm) gun extension, 7250 psi (500 bar, 50 MPa)	287034 Filter, 60 and 100 mesh combination

Quality Features for Ultimate Coatings Results

Needle Assembly and XHD™ RAC® SwitchTip™

- Exceptional life, pattern and finish
- Great for high solids coatings
- Factory set needle needs no adjustments

Easy Out™ Gun Filter

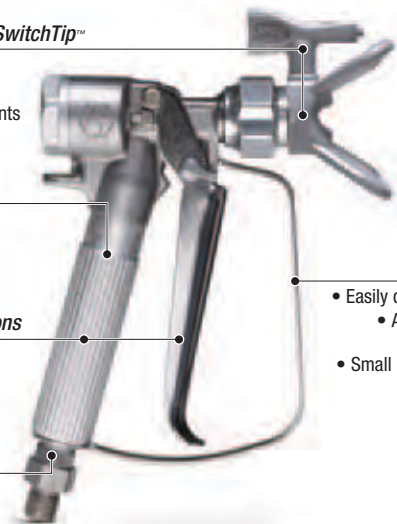
- Reduces tip plugs
- Eliminates collapsed filters
- Provides more filtration area

Variety of Handle and Trigger Options

- 2-and 4-finger trigger options
- Oval-insulated or round handle
- Lightweight trigger pull

EasyGlide™ Swivel

- Allows easier gun movement under high pressure



Trigger Guard

- Easily detaches for access to filter
- Acts as a wrench to remove filter from gun handle
- Small profile sprays in tight areas

Revision	Description of changes	Date	Prepared by	Approved by
00	Document creation	14-10-2021	JS Guilmette ing.	G. Pelletier ing.

1 PLATE BLAST PROCESS

Abrasive: Steel Shot S280
Duty cycle: 4 hours/day
Abrasive consumption: 600 lb per week

2 EXHAUST CHARACTERISTICS

Location: Outside of building A
Design flow rate: 9417 CFM
Exhaust dimensions: 4 ft x 4 ft
Discharge orientation: Horizontal
Rain cap: No
Exhaust release height: 30 ft

Prince Information No. 11502-21053/USA

II. ROLLER CONVEYOR WHEEL BLAST MACHINE

ROLLER CONVEYOR WHEEL BLAST MACHINE FOR STEEL PLATES

Model RS-RC 4220 [8T3.0@15](#) ST



Workpieces to be treated

Steel plates:

- min. length: 6 000 mm
- max. length: 25 000 mm
- max. width: **4 000 mm**
- max height: **120 mm**
- min height: 20 mm
- **max. loading capacity: 4000 kg/m/conveyor**

Location

In the existing building.

Reference piece :

- 10.000 mm x 3000 mm x 50 mm normal steel S235 JR G2
- rust and/or scale (max. grade B) dry, free of grease
- Operation speed (for grade B): up to 2,0m/min,
- Blast media : first quality steel shot low carbon \varnothing 1,0 - 1,8 mm (approx. 50 HRC)
- Finish after blasting: Sa 2,0 according to DIN-EN-ISO 8501-1

Operation speed (for grade B):

- plate: up to 2,0 m/min

BASIC TECHNICAL DATA

Machine

- Working pass-through width: 4 200 mm
- Working pass-through height: 200 mm
- Number of turbines: 8 pcs.
- Turbine type: AH 350,
- Diameter: 350 mm
- Turbine driving power: 15,0 kW / each
- Abrasive ejection speed: ca. 80 m/s
- Turbines nominal capacity: ca. 260 kg/min
- Number of blades per turbine: 8 pcs.
- Filter's efficiency: 26 000 m3/h
- Number of filter cartridges: 24
- Filtration surface area: 504 m2
- Static pressure: 2 200 Pa
- Power installed: 30 kW
- Compressed air consumption: ca. 250 l/min., pressure 6 – 7 bar
- Blow-off airflow; ca. 16 000 m3/h
- Blow-off total pressure; ca. 3000Pa
- Working speed: 0,5 – 2,2 m/min
- Transport speed: 0,5 – 3,5 m/min
- Reversing transport speed; up to 10m/min
- Abrasive cleaning system: air-operated cascade
- Internal roller conveyor length: ca. 7,3m
- Roller distance; ca. 609 mm
- Drive module roller conveyor 0,75 kW: 1 pcs.

- AUTOMATIC SYSTEM OF A NEW ABRASIVE REPLENISHMENT ADS
1.0

1 pcs.

Inlet rolling conveyor

- Length: about 25 m
- Workable height: 1000 mm
- Rollers pitch: about 800 mm
- Max. loading capacity: 4000 kg/m/conveyor
- Drive module: 1 pcs.

Outlet rolling conveyor

-Length: about 25 m
-Workable height: 1000 mm
-Rollers pitch: about 800 mm
-Max. loading capacity: 4000 kg/m/conveyor
-Drive module: 1 pcs.

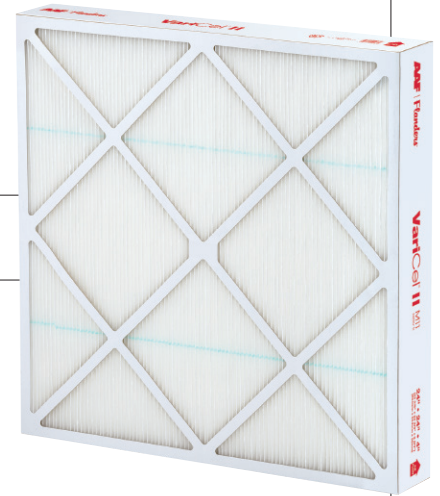
Silence package
Maintenance package

Included
Included

Power supply	3x 460 V, 60 Hz+N+Pe
Power installed	Approx. 240 kW (322 HP)
Approx. Maximum current	390 A
Power supply cable	Cu, 5 x 300 mm² , insulation PVC, Lmax = 100 m
Protection required	500 A , slow-blow fuse, characteristics gG

VariCel® II

EXTENDED SURFACE MINI-PLEAT FILTERS



- True high efficiency filters – only 4" thick media pack
- Slim line, mini-pleat design lowers operating costs
- Engineered for a variety of applications
- Easy disposal
- Available with antimicrobial
- Available in three efficiencies – MERV 14, MERV 13, and MERV 11

Designed for high performance under both normal and difficult operating conditions, VariCel II filters are appropriate for general HVAC and applications operating with variable air volume, turbulent airflow, and high humidity. The combination of durable construction and high efficiency also makes VariCel II filters ideal for specialized systems, such as diffusion filters in paint booths and prefilters in cleanrooms.

Heavy Duty Construction— High Performance in Tough Operating Conditions

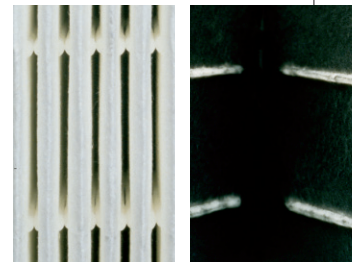
The frame is made with a 2-piece die cut constructed from high wet-strength beverage board. Two mating die cut boxes are bonded together, forming a double wall around the perimeter of the filter. The mini-pleat media pack is bonded inside the double wall. The double-walled frame prevents leakage and increases rigidity.

Available with Antimicrobial

VariCel II filters with antimicrobial are available in MERV 14 and MERV 11 efficiencies. Antimicrobial acts as a preservative to ensure the integrity of the media throughout the life of the filter. EPA-registered and environmentally safe, antimicrobial inhibits the growth of microorganisms documented to affect IAQ.

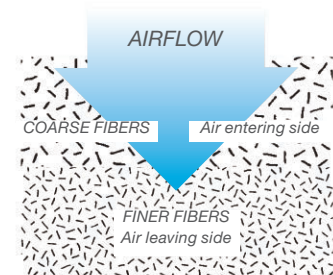
Slim-Line Design

The slim-line design of the VariCel II filters provides minimum resistance and maximum dust loading capacity while lowering operating costs. Rows of adhesive beads are used to maintain even pleat spacing and provide maximum airflow with minimal resistance. The consistent pleat spacing of the media allows higher dust holding capacity and full use of the entire depth of the media.



Dual-Density Media Increases Dust Holding Capacity

VariCel II filters use microglass paper media with a water repellent binder. The fibers are formed with dual-density construction, consisting of coarser fibers on the air entering side and finer fibers on the air leaving side. This design allows for collection of particulate throughout the full thickness of the media, substantially increasing dust holding capacity. The media is water repellent and can withstand intermittent exposure to water without affecting performance.



VariCel® II Filters

Product Information

(1) Rated Filter Face Velocity (FPM)	(2) Nominal Size (Inches) (W x H x D)	(2) Actual Size (Inches) (W x H x D)	(3) Rated Airflow Capacity (CFM)	(3) Rated Initial Resistance (in. w.g.)	(4) Recommended Final Resistance (in. w.g.)	Gross Media Area (Sq.Ft.)	Shipping Weight (Lbs. Per Carton)
(3) MERV 14 – Available with Antimicrobial							
500	24 x 24 x 4	23 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	2000	.63	1.5	119	26
500	20 x 25 x 4	19 ⁹ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1750	.63	1.5	103	22
500	20 x 24 x 4	19 ⁹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1650	.63	1.5	99	21
500	20 x 20 x 4	19 ⁹ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1400	.63	1.5	82	18
500	18 x 24 x 4	17 ⁷ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1500	.63	1.5	88	19
500	16 x 25 x 4	15 ⁵ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1400	.63	1.5	82	18
500	16 x 20 x 4	15 ⁵ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1100	.63	1.5	65	14
500	12 x 24 x 4	11 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1000	.63	1.5	58	13
500	12 x 12 x 4	11 ³ / ₈ x 11 ³ / ₈ x 3 ³ / ₄	500	.63	1.5	28	7
(3) MERV 13							
500	24 x 24 x 4	23 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	2000	.58	1.5	119	26
500	20 x 25 x 4	19 ⁹ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1750	.58	1.5	103	22
500	20 x 24 x 4	19 ⁹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1650	.58	1.5	99	21
500	20 x 20 x 4	19 ⁹ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1400	.58	1.5	82	18
500	18 x 24 x 4	17 ⁷ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1500	.58	1.5	88	19
500	16 x 25 x 4	15 ⁵ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1400	.58	1.5	82	18
500	16 x 20 x 4	15 ⁵ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1100	.58	1.5	65	14
500	12 x 24 x 4	11 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1000	.58	1.5	58	13
500	12 x 12 x 4	11 ³ / ₈ x 11 ³ / ₈ x 3 ³ / ₄	500	.58	1.5	28	7
(3) MERV 11 – Available with Antimicrobial							
500	24 x 24 x 4	23 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	2000	.47	1.5	119	26
500	20 x 25 x 4	19 ⁹ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1750	.47	1.5	103	22
500	20 x 24 x 4	19 ⁹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1650	.47	1.5	99	21
500	20 x 20 x 4	19 ⁹ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1400	.47	1.5	82	18
500	18 x 24 x 4	17 ⁷ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1500	.47	1.5	88	19
500	16 x 25 x 4	15 ⁵ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1400	.47	1.5	82	18
500	16 x 20 x 4	15 ⁵ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1100	.47	1.5	65	14
500	12 x 24 x 4	11 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1000	.47	1.5	58	13
500	12 x 12 x 4	11 ³ / ₈ x 11 ³ / ₈ x 3 ³ / ₄	500	.47	1.5	28	7

(1) Filters can be operated up to 125% of rated face velocity.

(2) Width and height dimensions are interchangeable. VariCel II filters may be installed with the pleats either vertical or horizontal.

(3) All performance data based on ASHRAE Standard 52.2. Performance tolerances conform to Section 7.4 of ARI Standard 850-93. For maximum service life, VariCel II filters should always be operated with a prefilter.

(4) The final operating resistance shown is typical of systems currently in operation.

Filters can be operated to a higher or lower final resistance without materially affecting filter efficiency; however, dust holding capacity will be reduced if the filters are changed at a lower final resistance.

(5) VariCel II filters are shipped four per carton.

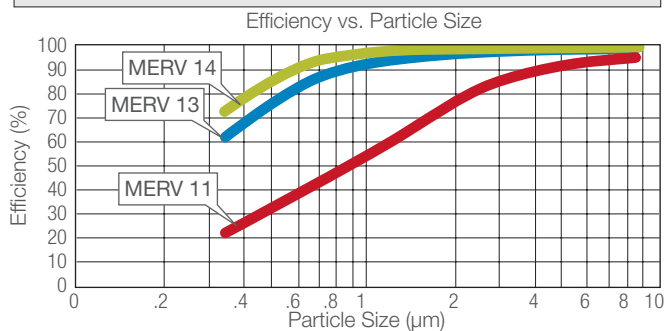
Underwriters Laboratories Classification: All VariCel II filters are UL Classified. Testing was performed according to UL Standard 900 and ULC-S111.

Continuous Operating Temperature Limits: 150°F (66°C)

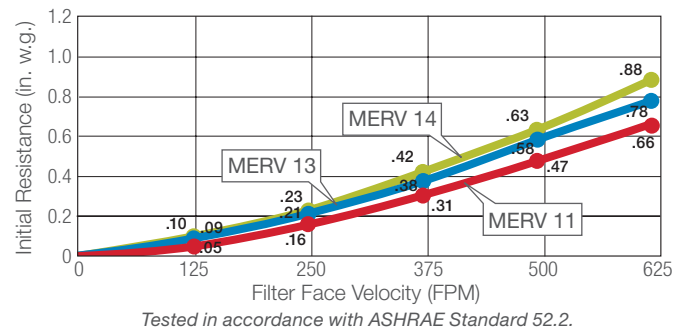
For product information on VariCel II MH filters, request bulletin AFP-1-239.

Performance Data

Composite Minimum Efficiency Curve



Initial Resistance vs. Filter Face Velocity



VariCel® is a registered trademark of AAF International in the U.S. and other countries.

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AAF Flanders has a policy of continuous product research and improvement. We reserve the right to change design and specifications without notice.

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ISO Certified Firm

AFP-1-237Y 08/22

BioCel® I

HIGH-EFFICIENCY EXTENDED SURFACE AIR FILTERS



The BioCel I filter was designed primarily to remove airborne biological contaminants in hospital critical areas and food and pharmaceutical processing plants. It has also been engineered to meet the exacting requirements of precision manufacturing operations and laboratories, where very high efficiency filtration of fine particulate matter is necessary.

BioCel® M-Pak Filter— A New Alternative

The BioCel M-Pak filter offers the same media area and pressure drop as the BioCel I filter in a 6" deep, high impact polystyrene cell side.

The BioCel M-Pak filter offers several advantages in comparison to the BioCel I filter.

- Lighter – half the weight
- Requires less storage space
- Reduces disposal costs
- Easier handling
- Fully Incinerable

For more information on the BioCel® M-Pak filter, see brochure AFP-1-117.



High Efficiency— Low Resistance

Rated at 95% efficiency on 0.3 micrometer challenge aerosol and a MERV 16 per ASHRAE Standard 52.2, the BioCel I filter has the advantage of much lower pressure drop than a typical HEPA filter (0.4" versus 1.0" w.g. at 250 FPM). BioCel I filters fill the gap between ASHRAE grade high efficiency filters and ultra-high efficiency HEPAs at half the weight and pressure drop.

This compact, lightweight filter will withstand operating temperatures to 350°F, if recommended final resistance is not exceeded.

To maximize filter life, use BioCel I filters with high quality AAF Flanders prefilters.

Construction

BioCel I filters consist of a pleated media pack enclosed in a galvanized steel frame assembly. The media is made of ultra-fine fiberglass formed into a series of pleats. Corrugated aluminum separators maintain uniform spacing between each pleat to allow unrestricted airflow through the filter. Bar braces are installed on both sides of the filter for extra reinforcement of the media pack. A flattened, expanded metal faceguard installed on both sides of the filter is available as an option.

BioCel I filters have a single piece galvanized steel header on the air entering side that is interlocked to the cell sides in a patented fashion that prevents leakage and forms a totally rigid construction.

Ideal for Variable Volume Systems

Due to the rigid all metal construction and water resistant media in a supported pleat type configuration, BioCel I filters can be used in systems with difficult operating conditions:

- Variable air volume
- Turbulent airflow
- Repeated fan shutdown
- High temperature
- High humidity
- Intermittent exposure to water, such as sea coast installations

BioCel® I Filters

Product Information

Nominal Size (Inches) (W x H x D)	Actual Size (Inches) (W x H x D)	Rated Airflow Capacity (CFM)			Rated Initial Resistance (in. w.g.)			Media Area (sq. ft.)	Gross Filters Per Carton	Shipping Weight (lbs.)
		125 FPM	250 FPM	500 FPM	125 FPM	250 FPM	500 FPM			
95% Initial Efficiency (0.3µm Particles)										
24 x 24 x 12	23 ³ / ₈ x 23 ³ / ₈ x 11 ¹ / ₂	500	1000	2000	.26	.44	1.0	156	1	20.0
^(a) 24 x 24 x 12	24 x 24 x 11 ¹ / ₂	500	1000	2000	.26	.44	1.0	165	1	21.5
24 x 20 x 12	23 ³ / ₈ x 19 ³ / ₈ x 11 ¹ / ₂	413	825	1650	.26	.44	1.0	127	1	17.0
^(a) 20 x 24 x 12	19 ³ / ₈ x 23 ³ / ₈ x 11 ¹ / ₂	413	825	1650	.26	.44	1.0	127	1	18.5
12 x 24 x 12	11 ¹ / ₈ x 23 ³ / ₈ x 11 ¹ / ₂	250	500	1000	.26	.44	1.0	72	1	12.0
Recommended Final Resistance 2.0 in. w.g.										
24 x 24 x 6	23 ³ / ₈ x 23 ³ / ₈ x 5 ⁷ / ₈	500	1000	–	.30	.60	–	93	2	22.0
^(a) 24 x 24 x 6	24 x 24 x 5 ⁷ / ₈	500	1000	–	.30	.60	–	98	2	24.0
24 x 20 x 6	23 ³ / ₈ x 19 ³ / ₈ x 5 ⁷ / ₈	413	825	–	.30	.60	–	93	2	22.0
^(a) 20 x 24 x 6	19 ³ / ₈ x 23 ³ / ₈ x 5 ⁷ / ₈	413	825	–	.30	.60	–	96	2	21.5
12 x 24 x 6	11 ¹ / ₈ x 23 ³ / ₈ x 5 ⁷ / ₈	250	500	–	.30	.60	–	42	2	14.0
Recommended Final Resistance 1.5 in. w.g.										

(a) Available in double header construction only.

Performance Data

Composite Minimum Efficiency Curve



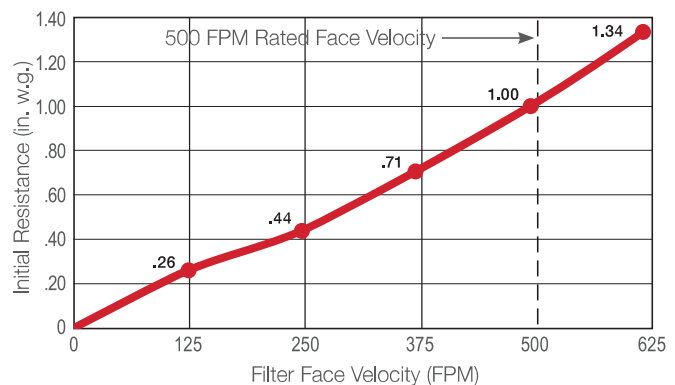
Initial Efficiency vs. Particle Diameter

At rated airflow, the BioCel I filter has an efficiency of 95% on 0.3 micron particles and is a MERV 16 in accordance with ASHRAE Standard 52.2.

Underwriters Laboratories Classification

BioCel I filters are UL Classified. Testing was performed in accordance with UL Standard 900.

Initial Resistance vs. Filter Face Velocity



Options

- Double header construction is available for installation into other manufacturers' framing systems.
- 6" or 12" depths available.
- HEPA filter construction available. See Brochure AFP-1-110.

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9920 Corporate Campus Drive, Suite 2200, Louisville, KY 40223-5690
888.223.2003 Fax 888.223.6500 | aafintl.com

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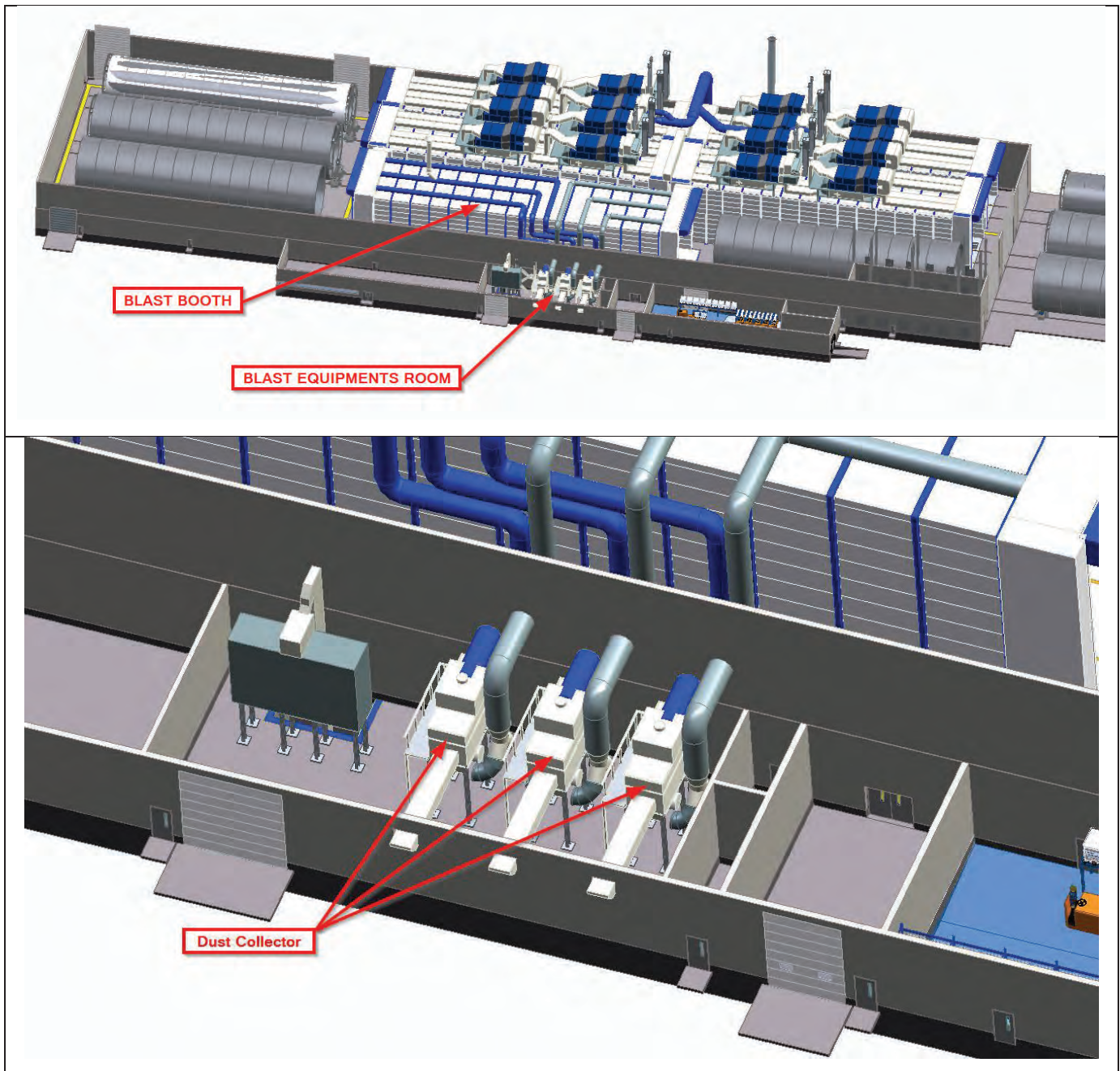
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ISO Certified Firm

AFP-1-116X 01/17

Revision	Description of changes	Date	Prepared by	Approved by
00	Document creation	06-04-2022	J. Doucet ing.	 J. Doucet ing. 2022-04-11

4 BLAST BOOTH

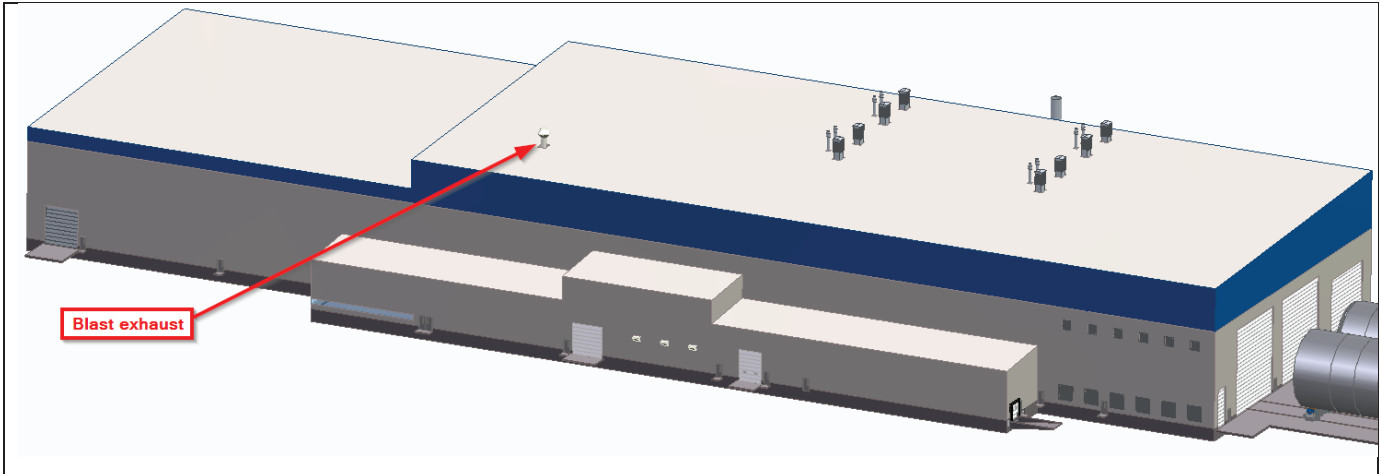


Equipment:

- One blast Booth 47' wide x 45' high x 220' long, Sciteex BLASTLUX PC-BL 671414
- 3 Dust collectors, Sciteex DM-FC 48/70, see data sheet
- Dust emission controller, install at the dust collectors outlet, see SciTeeX DEC data sheet

Exhaust:

20% of the air volume after filtration is evacuated outside to maintain a negative pressure in the booth



- Quantity of emitters: 1 pcs
- Vertical discharge no rain cap
- Height of emitters from floor level: 85 feet
- Efficiency of emitters: 24 720 cfm (42 000 m³/h)
- Diameter of the emitters: dia 35 ½" (900mm)
- Speed of exhaust air: 3545 feet/min (18.3m/s)
- Stack exhaust exit temperature: 75°F

Filter:

- Filter cartridges Donaldson Ultra-Web Flame Retardant, see data sheet

Blast process:

- Blast nozzle: 12 nozzle #10 @ 120 psi, 3500lbs abrasive lb/hr by nozzle
- Abrasive: Steel grid GH40, see data sheet
- Duty cycle: 8 hours by day
- Abrasive consumption: 2500lbs by week (abrasive reduce to dust)



GENERAL INFORMATION

The task of the filtration system is to ensure dust-free operation of the machine. The filter removes dust and dirt particles from the air flowing through the machine. Purified air is sucked into a high-performance exhaust air blower which discharges it to a ventilation system.

The whole system is integrated with the control of the rest of the machine in the HMI panel on the control cabinet. The cycle of switching on individual units of the machine makes it impossible to work in the machine without using the ventilation system. The tailored to spec ventilation system ensures effective removal of dust generated during the process and provides appropriate working conditions and visibility for the operator(s) After the work in the chamber is finished, the ventilation continues to operate for the time necessary to clean the air remaining in the machine.






A large chamber in the dirty section contains multiple filter cartridges to increase the total filtration surface of the unit. The inlet port at the bottom of the filter housing directs contaminated air to the pre-cleaning chamber. The air flow is slowed down, the transport force is reduced and large impurities fall gravitationally to the bottom of the filtration unit. Smaller dirt is collected in the filter cartridges.

The filter cartridges are cleaned sequentially with bursts of clean, dry compressed air. The correct pressure setting ensures high performance without damaging the cartridges. The system of automatic cleaning of filter cartridges enables continuous operation of the device whilst monitoring the cleanliness of the cartridges. The electronic, multiple-output filter controller (aka the sequencer), ensures constant control of filter cartridge contamination and controls their cleaning. This allows the device to maintain optimal operating parameters and extends the service life of the cartridges. The sequencer signals the user when the filters require replacing. Additionally a dust emission sensor monitors the cleanliness of the air after filtration to inform the user in the case of a damaged filter cartridge.

SPECIFICATION

<i>Dust Filter</i>	
Type	DM-FC 48/70
Number of filtering cartridges [pcs.]	48
Filtration surface of single filter cartridge [m ²]	31
Type of filters	Ultra web flame retardant
Total filtration surface [m ²]	1488
Fan unit efficiency [m ³ /h]	70 000
Optional features	Explosion relief panels
Waste container	Big bag
Waste container valve	Flap valve
Waste container volume [L]	200
Waste container weight capacity [kg]	500

HEALTH AND SAFETY

	Servicing the electrical components of the subassembly poses a risk of electrocution.
	When removing covers and panels of hidden parts of the subassembly it is important to mind any hidden edges that may be sharp and therefore pose a risk if cutting the skin.
	Long exposure to the noisy environment surrounding the filtration system during operation poses a risk of becoming fatigued and strained. Wear ear protection and avoid prolonged exposure.
	Never service the subassembly when personnel are inside the chamber of the machine. Opening any parts of the elevates the risk of explosion, potentially endangering the operators and servicemen as well as the machine itself.
	Protect the dust filtration system from open flames. Fire may cause uncontrolled explosions in the ventilation system that can result in injury and damage to the machine!



Always use personal safety equipment and pay special attention to maintenance and servicing work:

1. Avoid dusty air from entering the pressure inputs,
2. Always wear eye protection when service the filter unit, the unfiltered air in the ventilation ducts contains particles moving at high speeds and poses an elevated risk of eye injury,
3. Take all precautions consistent with the characteristics of the device (humidity, maximum pressure, etc.),
4. All operations on the device must be carried out by suitably qualified personnel.

OPERATIONAL RECOMMENDATIONS



Before using the device, the operator and service personnel must read this instruction manual.

SEQUENCER OPERATING MANUAL

EMC12 is a sequential controller that allows to control and monitor the dust extraction system. It is installed on the side of the main unit next to the pressure tank.



The device is equipped with a back and relative pressure gauge (pressure loss). The device has a *Timp* time (activation), *Tbn* time (rest), *Tne* time (rest between two cycles), *Tr* time, which performs the filter cleaning cycle if the sequential controller did not work on the basis of the time specified in hours, manual mode, control of an electrical fault, the ability to perform a preselected number of cycles when the fan is stopped.

The device is equipped with a relay output for transmitting information about a fault or alarm and with an *AUX* input (external independent force of a cycle before starting it). It has 12 connection outputs for solenoid valves.

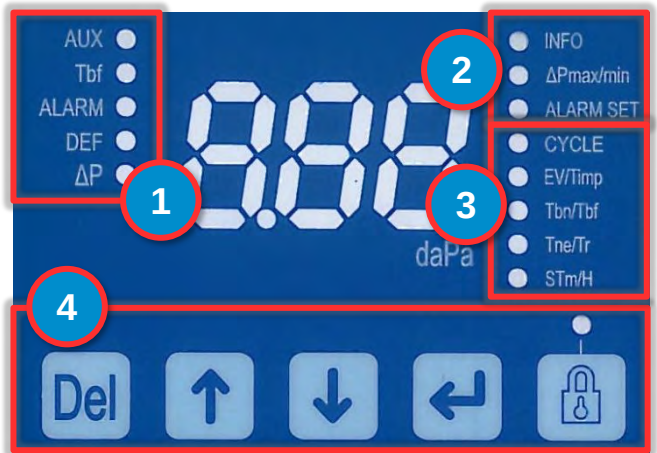
Optionally, the number of outputs can be increased to 100 by connecting to the network of expansion boxes (up to 15 expansion boxes), external modbus communication can be integrated in the device.

The device is equipped with automatic DP measurement control (2 thresholds), two DP alarms (high and low), DP threshold for accelerated mode, *Tbf* time (accelerated rest).

Optionally, the device can integrate a 4-20mA output to transfer the measurements at a distance.

All operating parameters can be set by means of touch keys located in the front panel of the controller. The value of each parameter and the pressure value are shown on the LED display.

SEQUENCER PANEL



1. Signals,
2. Pressure loss measurement settings,
3. Sequencer parameter settings,
4. Keyboard.

KEYBOARD

The keyboard consists of five touch keys.



Access to the **Del**, **↑**, **↓** and **←** buttons is blocked with the **🔒** button. To lock or unlock the keypad, hold the **🔒** button for more than three seconds. The light above the **🔒** button signals that the panel is locked. The keypad locks automatically when not in use for more than three minutes.

	<p>If the keys do not work as they should, wait about a minute before trying again. This time allows for the automatic recalibration of buttons.</p> <p>For better functioning of the keys, the screws fixing the cover should be tightened firmly.</p>
--	---

SETTINGS AND OPERATION

The following describes the light signals that the LEDs on the front panel of the filter show:



1. INFO
Solid - visualization of DP measurement,
Flashing - selection of automatic DP control system.
2. ΔPmax/min
Solid - maxi DP setting,
Flashing - mini DP setting.

3. ALARM SET
Solid - DP high alarm setting,
Flashing - low DP alarm setting,
Fast flash - setting the threshold for accelerated mode (*Tbf* threshold).
4. CYCLE
Solid - cycle visualization,
Flashing - stop type setting.
5. EV/Timp
Solid - number of inputs setting,
Flashing - Timp setting.
6. Tbn/Tbf
Fixed – Tbn,
Flashing - Tbf setting.
7. Tne/Tr
Solid - setting Tne,
Flashing - setting Tr.
8. STm/H
Solid - number of cycles at fan stop (STm),
Flashing - manual mode (H).

FRONT PANEL SIGNALING



1. AUX
On if AUX input is active (shorted),
2. Tbf
Indication of filter cleaning with *Tbf* frequency,
3. ALARM:
Fixed - in case of high DP alarm,
Flashing - in case of low DP alarm.
4. DEF
Activated in case of a fault (short circuit or break in the controller's outputs or configuration error),
5. ΔP
Lit in case of the control signal - indication of the cleaning cycle (only for AdP mode).

MAINTENANCE

PART	INSPECTION	PROCEDURE	FREQ.	IL*	SERVICE CRITERIUM
Waste container	Visual inspection	Control of the amount of dust in the waste container	Daily/8h	I	Empty if tank filled more than ¾ of its volume/replace in cases of leakage
Dust filtration system cartridges	Sequencer indication check	Check the indicator changes during operation of the machine	Weekly	I	Sequencer indications suggest filter change required
Fan unit	Visual and auditory inspection	Check for mechanical damage, overheating, loud operations	Every 3 months/200h	II	Regular overheating, mechanical damage, loud operations
Filter silo	Visual inspection	Check for dust deposits	Every 3 months/200h	II	Clean the inside of the silo from dust deposits that could lower the filter efficiency
Fan unit	Vibrations inspection	Check the level of vibrations	Every 6 months	III	Vibrations over 2,8mm/s
Fan unit drive	Visual and auditory inspection	Check for mechanical damage, overheating, leakage, loud operations Clean and lubricate bearings	Every year	III	Heavy wear, malfunctioning, mechanical damage, loud operations, leakage



*IL - INSPECTION LEVEL:

I – performed by the machine operator,

II – performed by the Client's maintenance department

III – performed by the machine manufacturer the or Client's maintenance department (in accordance with manufacturers advice),

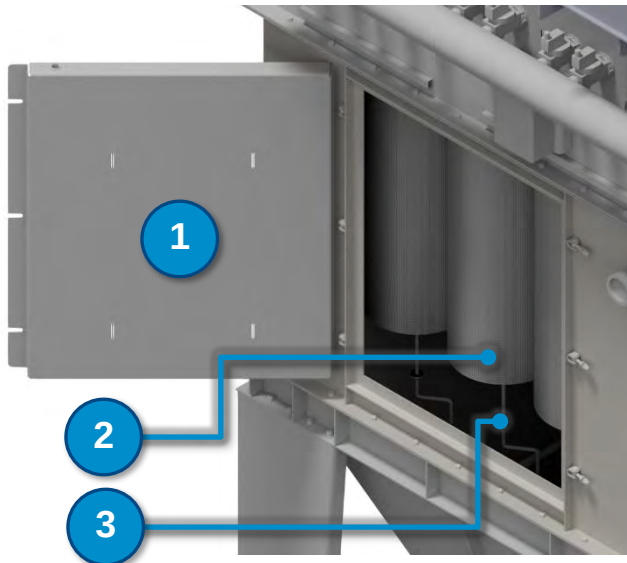
IV – performed by the machine manufacturer.

	Whenever any of the parts sealed with seals are removed the seals must be replaced to ensure further proper operation of the machine. This does not classify the seals as parts covered by the manufacturer's warranty.
	After all service work on the machine is completed, the correct functioning of the machine must be carefully checked. Disregarding this step may result in harm to the users and/or damage to the machine.

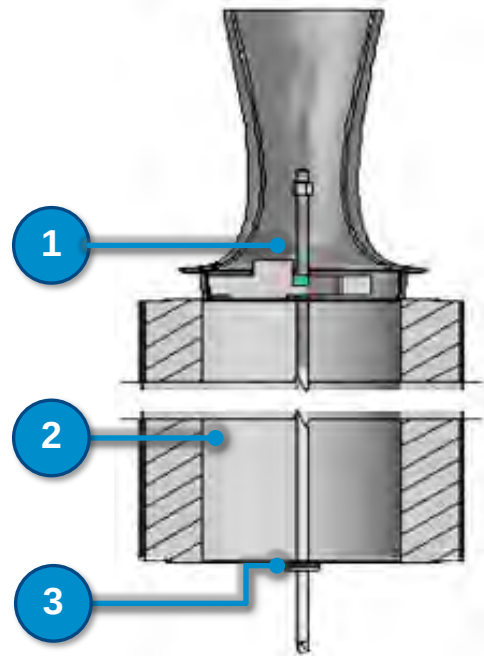
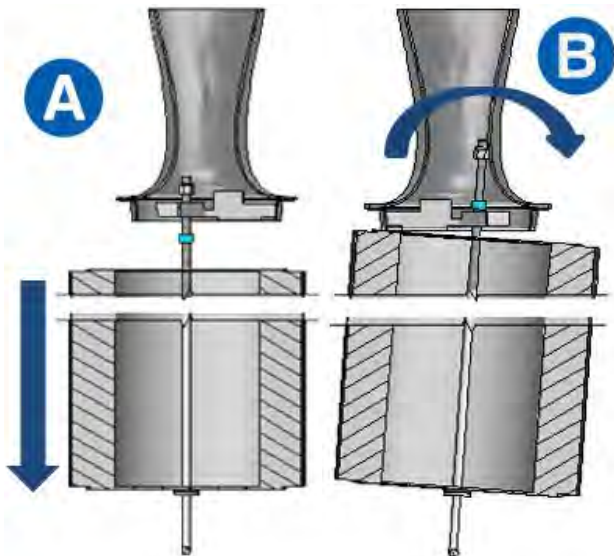
INSTRUCTIONS FOR REPLACEMENT OF FILTER CARTRIDGES OF DUST FILTER

1. Open the inspection flap,
2. Unscrew the crank to a height of approx. 30 mm to allow the filter element to be removed,
3. Slide the cartridge with the crank downwards (A),
4. Replace the used filter cartridge with a new one, screw the crank and the new cartridge on, keeping in mind that the gasket (B)* is fitted.

* in the case of metallization filter cartridges, a copper gasket must be fitted



1. Access cover,
2. Filter cartridge,
3. Crank.



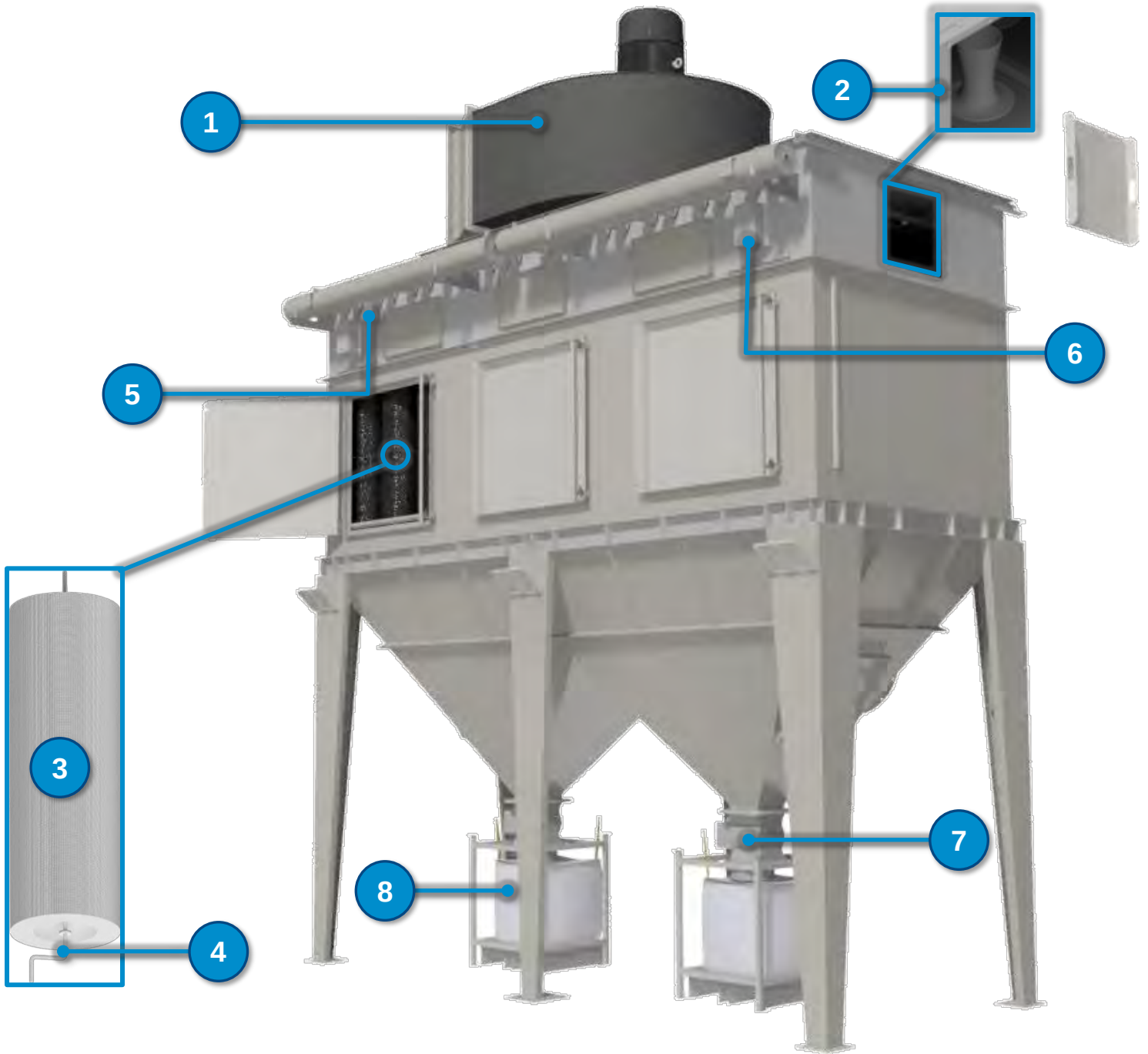
1. Crank,
2. Filter cartridge,
3. Gasket.

INSTRUCTIONS FOR REPLACEMENT OF FILTER CARTRIDGES OF VENTILATION OUTLET

1. Remove covers,
2. Slide the filter panels out of the housing,
3. Replace the used filter cartridge with a new one,
4. Reassemble the filter in the panels into the housing,
5. Reattach the filter covers.

	<p>Before returning the machine back to use, the system should be pressurized slowly to avoid any uncontrolled movements of its components.</p>
	<p>After all service work on the machine is completed, the correct functioning of the machine must be carefully checked. Disregarding this step may result in harm to the users and/or damage to the machine.</p>

SPARE PARTS



Nº	PART	REF. Nº	NW&T*
1	Fan unit	Contact SciTeeX	
2	Venturi nozzle	Contact SciTeeX	
3	Filter cartridge	Contact SciTeeX	X
4	Filter crank Filter crank steel washer	Contact SciTeeX	
5	FDP valve	Contact SciTeeX	
6	Sequential controller	Contact SciTeeX	
7	Flap valve	Contact SciTeeX	
8	Big bag	Contact SciTeeX	X

*NW&T - states parts of normal wear and tear.

TROUBLESHOOTING



In the event of any type of failure, a simple fault can occur, which can be located and rectified by using the table below.

SYMPTOMS	LIKELY CAUSE	SOLUTION
No fan speed	No power supply for the drive motor	Check thermal protection and motor power supply
	Rotor locked mechanically	Find and remove the reason for the blockage of the rotor Check the condition of the rotor bearings
Vibration and increased fan noise	Damage to rotor bearings	Replace the bearings
	Unbalanced impeller due to dust deposits on the impeller blades	Clean the impeller blades. The cause of the dust penetration into the rotor is the breakage of the filter element material. Replace the damaged cartridge, replace the cartridges periodically according to the operating instructions
The solenoid valves of the cartridge shredding system do not open	No power or sequencer control	Check the sequencer power supply and control supply from the control cabinet
	Incorrect setting of operating parameters of the dust extraction device	Correct incorrectly set parameters according to the values in the "Sequencer Parameter Table"
	Defective solenoid coils or solenoid valves	Replace defective coils or solenoid valves
Uncleaned air ejected from the fan	Cracking of the filter insert material	Replace defective cartridges, replace cartridges periodically in accordance with the operating instructions
Reduced fan performance	Excessively dirty filter cartridges	Replace worn inserts, replace inserts periodically according to the operating instructions
Dusting from the filter	Cracked filter	Replacing a cracked filter
Dust build-up in the clean zone of the filter (check after removal of the inspection flap)	Clean zone of the filter	Replacement of cracked filter cartridges, checking the tightness of the filter cartridge connection



Donaldson
FILTRATION SOLUTIONS

DATA SHEET

Filter Media

Ultra-Web® Flame Retardant

Ultra-Web® Flame Retardant	
Appearance	Blue tinted, corrugated
Use	Pleatable filter media
Composition	Cellulose substrate with nanofiber layer
Area weight (DIN 53884)	123 g/m ²
Thickness (DIN 53885)	0,30 mm
Air Permeability (DIN 53887)	420 m ³ /m ² .h at 200 Pa
Surface electrical resistance (DIN 54345)	4,5 x 10 ⁹ Ω
IFA/BIA certificate (DIN 660335-2-69)	M
	Test report Nr. 201420467/6210
Temperature (dry heat)	
Continuous	65° C
Peaks	80° C
Chemical resistance	
Hydrolysis	N/A
Acids	Poor
Alkalis	Fair
Oxidising agents	Poor
Organic solvents	Fair
Abrasion resistance	Good
Supports combustion	No
Application field	Premium performance on ambient, extremely fine and non-fibrous dust and some abrasive dust. High filtration efficiency on very fine particulate of < 1 micron. Typical applications include metallisation, laser cutting, pharmaceuticals, weld fume, shot blasting.

Humberstone Lane
Thurmaston
Leicester LE4 8HP
England
Tel +44 (0)116 269 6161
Fax +44 (0)116 269 3028
Email: IAF-uk@donaldson.com

Research Park Building No. 1303
Interleuvenlaan 1
B-3001 Leuven (Heverlee)
Belgium
Tel +32 (0)16 383 970
Fax +32 (0)16 383 938
Email: IAF-europe@donaldson.com

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www.DonaldsonToritDCE.com

Replacement Element Media

Ultra-Web®	
Appearance	Blue tinted, corrugated
Use	Pleatable filter media
Composition	Cellulose substrate with nanofiber layer
Area weight (DIN 53884)	114 g/m ²
Thickness (DIN 53885)	0,28 mm
Air Permeability (DIN53887)	400 m ³ /m ² .h at 200 Pa
Dimensional stability	N/A
Surface finish	N/A
Additional treatments	N/A
Surface electrical resistance (DIN 54345)	4,5 x 10 ⁹ Ohm
BIA Category (DIN 60335-2-69)	Class M Test report Nr. 200423074/6210
Temperature (dry heat)	
Continuous	65°C
Peaks	80°C
Chemical resistance	
Hydrolysis	N/A
Acids	Poor
Alkalis	Fair
Oxidising Agents	Poor
Organic Solvents	Fair
Abrasion Resistance	Good
Supports Combustion	Yes
Application field	Premium performance on ambient, extremely fine and non-fibrous dust and some abrasive dust. High filtration efficiency on very fine particulate of <1 micron. Typical applications include metallisation, laser cutting, pharmaceuticals, weld fume, shot blasting...

Replacement Element Media



www.donaldson.com

Humberstone Lane
Thurmaston
Leicester LE4 8HP
England

Tel +44 (0)116 269 6161
Fax +44 (0)116 269 3028

Email: IFS-uk@emea.donaldson.com

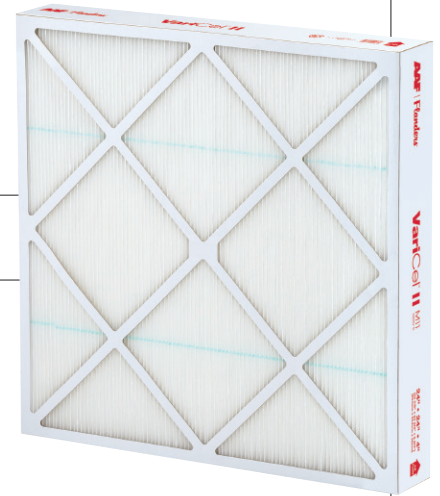
Research Park Zone 1
Interleuvenlaan 1
B-3001 Leuven (Heverlee)
Belgium

Tel +32 (0)16 383 970
Fax +32 (0)16 383 938

Email: IFS-europe@emea.donaldson.com

VariCel® II

EXTENDED SURFACE MINI-PLEAT FILTERS



- True high efficiency filters – only 4" thick media pack
- Slim line, mini-pleat design lowers operating costs
- Engineered for a variety of applications
- Easy disposal
- Available with antimicrobial
- Available in three efficiencies – MERV 14, MERV 13, and MERV 11

Designed for high performance under both normal and difficult operating conditions, VariCel II filters are appropriate for general HVAC and applications operating with variable air volume, turbulent airflow, and high humidity. The combination of durable construction and high efficiency also makes VariCel II filters ideal for specialized systems, such as diffusion filters in paint booths and prefilters in cleanrooms.

Heavy Duty Construction— High Performance in Tough Operating Conditions

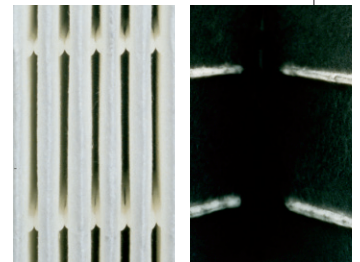
The frame is made with a 2-piece die cut constructed from high wet-strength beverage board. Two mating die cut boxes are bonded together, forming a double wall around the perimeter of the filter. The mini-pleat media pack is bonded inside the double wall. The double-walled frame prevents leakage and increases rigidity.

Available with Antimicrobial

VariCel II filters with antimicrobial are available in MERV 14 and MERV 11 efficiencies. Antimicrobial acts as a preservative to ensure the integrity of the media throughout the life of the filter. EPA-registered and environmentally safe, antimicrobial inhibits the growth of microorganisms documented to affect IAQ.

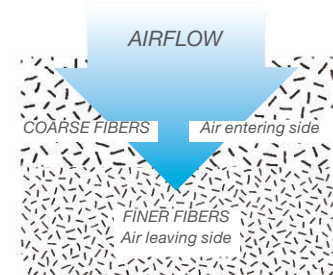
Slim-Line Design

The slim-line design of the VariCel II filters provides minimum resistance and maximum dust loading capacity while lowering operating costs. Rows of adhesive beads are used to maintain even pleat spacing and provide maximum airflow with minimal resistance. The consistent pleat spacing of the media allows higher dust holding capacity and full use of the entire depth of the media.



Dual-Density Media Increases Dust Holding Capacity

VariCel II filters use microglass paper media with a water repellent binder. The fibers are formed with dual-density construction, consisting of coarser fibers on the air entering side and finer fibers on the air leaving side. This design allows for collection of particulate throughout the full thickness of the media, substantially increasing dust holding capacity. The media is water repellent and can withstand intermittent exposure to water without affecting performance.



VariCel® II Filters

Product Information

(1) Rated Filter Face Velocity (FPM)	(2) Nominal Size (Inches) (W x H x D)	(2) Actual Size (Inches) (W x H x D)	(3) Rated Airflow Capacity (CFM)	(3) Rated Initial Resistance (in. w.g.)	(4) Recommended Final Resistance (in. w.g.)	Gross Media Area (Sq.Ft.)	Shipping Weight (Lbs. Per Carton)
(3) MERV 14 – Available with Antimicrobial							
500	24 x 24 x 4	23 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	2000	.63	1.5	119	26
500	20 x 25 x 4	19 ⁹ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1750	.63	1.5	103	22
500	20 x 24 x 4	19 ⁹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1650	.63	1.5	99	21
500	20 x 20 x 4	19 ⁹ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1400	.63	1.5	82	18
500	18 x 24 x 4	17 ⁷ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1500	.63	1.5	88	19
500	16 x 25 x 4	15 ⁵ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1400	.63	1.5	82	18
500	16 x 20 x 4	15 ⁵ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1100	.63	1.5	65	14
500	12 x 24 x 4	11 ¹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1000	.63	1.5	58	13
500	12 x 12 x 4	11 ¹ / ₈ x 11 ¹ / ₈ x 3 ³ / ₄	500	.63	1.5	28	7
(3) MERV 13							
500	24 x 24 x 4	23 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	2000	.58	1.5	119	26
500	20 x 25 x 4	19 ⁹ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1750	.58	1.5	103	22
500	20 x 24 x 4	19 ⁹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1650	.58	1.5	99	21
500	20 x 20 x 4	19 ⁹ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1400	.58	1.5	82	18
500	18 x 24 x 4	17 ⁷ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1500	.58	1.5	88	19
500	16 x 25 x 4	15 ⁵ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1400	.58	1.5	82	18
500	16 x 20 x 4	15 ⁵ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1100	.58	1.5	65	14
500	12 x 24 x 4	11 ¹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1000	.58	1.5	58	13
500	12 x 12 x 4	11 ¹ / ₈ x 11 ¹ / ₈ x 3 ³ / ₄	500	.58	1.5	28	7
(3) MERV 11 – Available with Antimicrobial							
500	24 x 24 x 4	23 ³ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	2000	.47	1.5	119	26
500	20 x 25 x 4	19 ⁹ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1750	.47	1.5	103	22
500	20 x 24 x 4	19 ⁹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1650	.47	1.5	99	21
500	20 x 20 x 4	19 ⁹ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1400	.47	1.5	82	18
500	18 x 24 x 4	17 ⁷ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1500	.47	1.5	88	19
500	16 x 25 x 4	15 ⁵ / ₈ x 24 ³ / ₈ x 3 ³ / ₄	1400	.47	1.5	82	18
500	16 x 20 x 4	15 ⁵ / ₈ x 19 ⁹ / ₈ x 3 ³ / ₄	1100	.47	1.5	65	14
500	12 x 24 x 4	11 ¹ / ₈ x 23 ³ / ₈ x 3 ³ / ₄	1000	.47	1.5	58	13
500	12 x 12 x 4	11 ¹ / ₈ x 11 ¹ / ₈ x 3 ³ / ₄	500	.47	1.5	28	7

(1) Filters can be operated up to 125% of rated face velocity.

(2) Width and height dimensions are interchangeable. VariCel II filters may be installed with the pleats either vertical or horizontal.

(3) All performance data based on ASHRAE Standard 52.2. Performance tolerances conform to Section 7.4 of ARI Standard 850-93. For maximum service life, VariCel II filters should always be operated with a prefilter.

(4) The final operating resistance shown is typical of systems currently in operation.

Filters can be operated to a higher or lower final resistance without materially affecting filter efficiency; however, dust holding capacity will be reduced if the filters are changed at a lower final resistance.

(5) VariCel II filters are shipped four per carton.

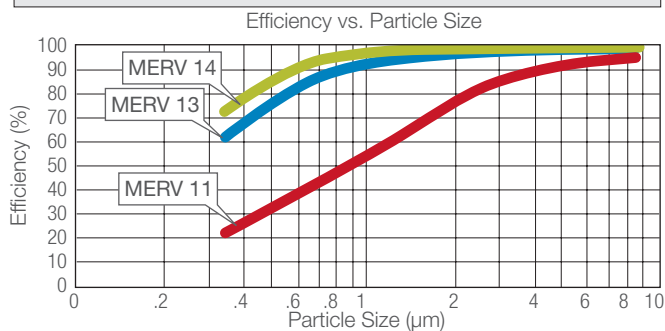
Underwriters Laboratories Classification: All VariCel II filters are UL Classified. Testing was performed according to UL Standard 900 and ULC-S111.

Continuous Operating Temperature Limits: 150°F (66°C)

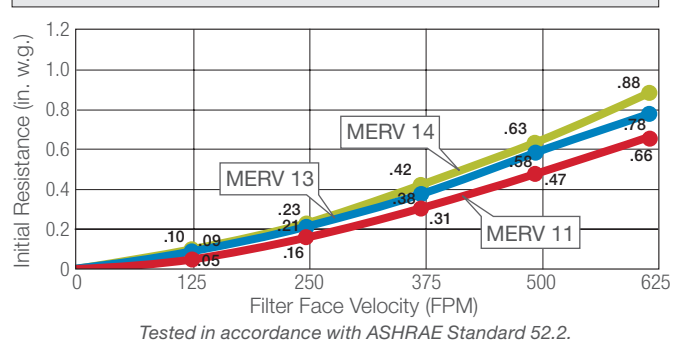
For product information on VariCel II MH filters, request bulletin AFP-1-239.

Performance Data

Composite Minimum Efficiency Curve



Initial Resistance vs. Filter Face Velocity



VariCel® is a registered trademark of AAF International in the U.S. and other countries.

AAF | Flanders®

Bringing clean air to life.®

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AFP-1-237Y 08/22

BioCel® I

HIGH-EFFICIENCY EXTENDED SURFACE AIR FILTERS



The BioCel I filter was designed primarily to remove airborne biological contaminants in hospital critical areas and food and pharmaceutical processing plants. It has also been engineered to meet the exacting requirements of precision manufacturing operations and laboratories, where very high efficiency filtration of fine particulate matter is necessary.

BioCel® M-Pak Filter— A New Alternative

The BioCel M-Pak filter offers the same media area and pressure drop as the BioCel I filter in a 6" deep, high impact polystyrene cell side.

The BioCel M-Pak filter offers several advantages in comparison to the BioCel I filter.

- Lighter – half the weight
- Requires less storage space
- Reduces disposal costs
- Easier handling
- Fully Incinerable

For more information on the BioCel® M-Pak filter, see brochure AFP-1-117.



High Efficiency— Low Resistance

Rated at 95% efficiency on 0.3 micrometer challenge aerosol and a MERV 16 per ASHRAE Standard 52.2, the BioCel I filter has the advantage of much lower pressure drop than a typical HEPA filter (0.4" versus 1.0" w.g. at 250 FPM). BioCel I filters fill the gap between ASHRAE grade high efficiency filters and ultra-high efficiency HEPAs at half the weight and pressure drop.

This compact, lightweight filter will withstand operating temperatures to 350°F, if recommended final resistance is not exceeded.

To maximize filter life, use BioCel I filters with high quality AAF Flanders prefilters.

Construction

BioCel I filters consist of a pleated media pack enclosed in a galvanized steel frame assembly. The media is made of ultra-fine fiberglass formed into a series of pleats. Corrugated aluminum separators maintain uniform spacing between each pleat to allow unrestricted airflow through the filter. Bar braces are installed on both sides of the filter for extra reinforcement of the media pack. A flattened, expanded metal faceguard installed on both sides of the filter is available as an option.

BioCel I filters have a single piece galvanized steel header on the air entering side that is interlocked to the cell sides in a patented fashion that prevents leakage and forms a totally rigid construction.

Ideal for Variable Volume Systems

Due to the rigid all metal construction and water resistant media in a supported pleat type configuration, BioCel I filters can be used in systems with difficult operating conditions:

- Variable air volume
- Turbulent airflow
- Repeated fan shutdown
- High temperature
- High humidity
- Intermittent exposure to water, such as sea coast installations

BioCel® I Filters

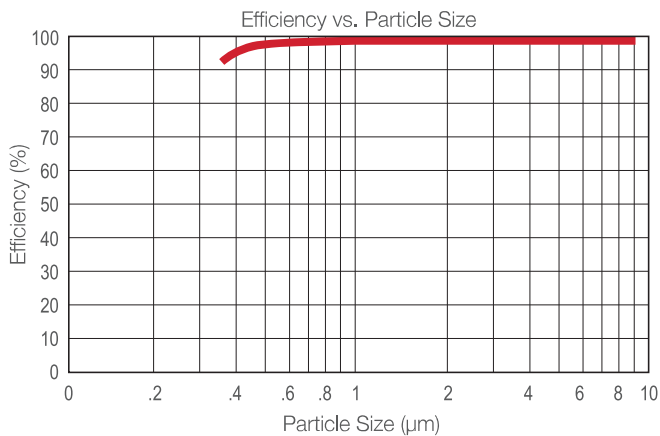
Product Information

Nominal Size (Inches) (W x H x D)	Actual Size (Inches) (W x H x D)	Rated Airflow Capacity (CFM)			Rated Initial Resistance (in. w.g.)			Media Area (sq. ft.)	Gross Filters Per Carton	Shipping Weight (lbs.)
		125 FPM	250 FPM	500 FPM	125 FPM	250 FPM	500 FPM			
95% Initial Efficiency (0.3µm Particles)										
24 x 24 x 12	23 ³ / ₈ x 23 ³ / ₈ x 11 ¹ / ₂	500	1000	2000	.26	.44	1.0	156	1	20.0
^(a) 24 x 24 x 12	24 x 24 x 11 ¹ / ₂	500	1000	2000	.26	.44	1.0	165	1	21.5
24 x 20 x 12	23 ³ / ₈ x 19 ³ / ₈ x 11 ¹ / ₂	413	825	1650	.26	.44	1.0	127	1	17.0
^(a) 20 x 24 x 12	19 ³ / ₈ x 23 ³ / ₈ x 11 ¹ / ₂	413	825	1650	.26	.44	1.0	127	1	18.5
12 x 24 x 12	11 ¹ / ₈ x 23 ³ / ₈ x 11 ¹ / ₂	250	500	1000	.26	.44	1.0	72	1	12.0
Recommended Final Resistance 2.0 in. w.g.										
24 x 24 x 6	23 ³ / ₈ x 23 ³ / ₈ x 5 ⁷ / ₈	500	1000	–	.30	.60	–	93	2	22.0
^(a) 24 x 24 x 6	24 x 24 x 5 ⁷ / ₈	500	1000	–	.30	.60	–	98	2	24.0
24 x 20 x 6	23 ³ / ₈ x 19 ³ / ₈ x 5 ⁷ / ₈	413	825	–	.30	.60	–	93	2	22.0
^(a) 20 x 24 x 6	19 ³ / ₈ x 23 ³ / ₈ x 5 ⁷ / ₈	413	825	–	.30	.60	–	96	2	21.5
12 x 24 x 6	11 ¹ / ₈ x 23 ³ / ₈ x 5 ⁷ / ₈	250	500	–	.30	.60	–	42	2	14.0
Recommended Final Resistance 1.5 in. w.g.										

(a) Available in double header construction only.

Performance Data

Composite Minimum Efficiency Curve



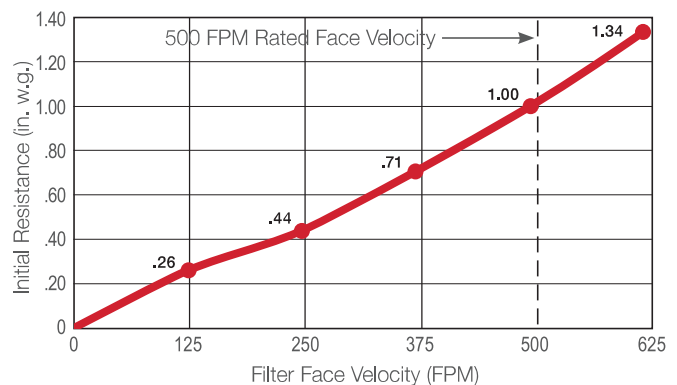
Initial Efficiency vs. Particle Diameter

At rated airflow, the BioCel I filter has an efficiency of 95% on 0.3 micron particles and is a MERV 16 in accordance with ASHRAE Standard 52.2.

Underwriters Laboratories Classification

BioCel I filters are UL Classified. Testing was performed in accordance with UL Standard 900.

Initial Resistance vs. Filter Face Velocity



Options

- Double header construction is available for installation into other manufacturers' framing systems.
- 6" or 12" depths available.
- HEPA filter construction available. See Brochure AFP-1-110.

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AFP-1-116X 01/17

ATTACHMENT H

Revised Climate Leadership and Community Protection Act (CLCPA) Analysis



March 13, 2023

Climate Leadership and Community Protection Act Response

Marmen, Inc. is committed to doing its part to help assure that statewide greenhouse gas (GHG) emissions limits established in the Climate Leadership and Community Protection Act (CLCPA) are attained. Section 7(2) of CLCPA requires NYSDEC (and other state agencies) to consider air permit (and other) authorizations for consistency with the goals of CLCPA. CLCPA targets include 85% reduction in GHG emissions by 2050, 100% zero-emission electricity by 2040, 70% renewable energy by 2030, 9,000 MW of offshore wind by 2035, 3,000 MW of energy storage by 2030, 6,000 MW of solar by 2025, and 22 million tons of carbon reduction through energy efficiency and electrification. This Project is the largest manufacturing facility of renewable offshore wind towers and transition pieces in the U.S., and will support New York State (NYS) in meeting CLCPA targets and goals.

Annual GHG emission calculations from this Project are summarized in Table 1 in accordance with the latest NYS procedures and guidance for calculating CO₂ equivalent (CO₂e) emissions. Direct emissions occur physically within the boundary of the Project, such as those emitted by burning natural gas. Upstream emissions are associated with the extraction, transmission, and use of fossil fuels or electricity imported into NYS. Indirect emissions are emissions that are a consequence of the activities of the reporting facility but may occur at sources owned or controlled by another entity. CO₂e emissions are calculated using the AR5 20-year Global Warming Potential (as opposed to the AR4 100-yr Global Warming Potential that EPA uses).

The total direct, upstream, and indirect CO₂e emissions from the Project's proposed combustion sources is 182,343 metric tons of CO₂e per year. The primary sources of GHG emissions are the machining, welding, grinding activities; paint spray booths (including boilers, recuperative thermal oxidizers (RTOs)); natural gas-fired comfort heating and cooling equipment; natural gas-fired emergency generators; diesel fire pumps; the upstream emissions associated with the extraction, production, and transmission of natural gas and diesel fuel to power these sources; and the indirect emissions from truck and boat traffic associated with the delivery of material and the shipment of final products to and from the facility. The opportunities for Marmen, Inc. to address CLCPA with respect to mitigating GHG emissions from these sources are primarily available through the selection of equipment. As such, the equipment used for this Project has been carefully selected to ensure that the facility can effectively operate using the most energy efficient and environmentally friendly technology available.

Table 1. CO₂e Emissions

Attribution	Source	CO₂e Emissions (metric tons/year)
Direct Emissions	Machining, Welding, Grinding Activities (Bldgs A, B)	30,518
	Paint Spray Booths (Including Boilers, RTOs)	12,840
	Natural Gas-Fired Comfort Heating and Cooling Equipment (Permit Exempt)	51,309
	Natural Gas-Fired Emergency Generators and Diesel Fire Pumps (Permit Exempt)	483
Upstream Emissions	Machining, Welding, Grinding Activities (Bldgs A, B)	24,458
	Paint Spray Booths (Including Boilers, RTOs)	10,291
	Natural Gas-Fired Comfort Heating and Cooling Equipment (Permit Exempt)	41,121
	Natural Gas-Fired Emergency Generators and Diesel Fire Pumps (Permit Exempt)	4,189
Indirect Emissions	Transportation and Distribution	7,134
Total:		182,343

Notes

1. AR5 Synthesis Report: Climate Change 2014 - IPCC, 20-year Global Warming Potential for calculating CO₂e. CO₂ = 1; CH₄ = 84; N₂O = 264.

2. NYSDEC (2022) Summary Report; 2022 NYS Statewide GHG Emissions Report; Appendix A. Emission Factors for Use by State Agencies and Applicants. Natural gas 20-year GWP CO₂e emission rate = 41,671 g/MMBtu. Diesel/ Distillate Fuel 20-year GWP CO₂e emission rate = 24,638 g/MMBtu.

Other relevant factors to consider are the Project's consistency with efforts to transition away from fossil fuel usage (e.g., 85% reduction in GHG emissions by 2050, 100% zero-emission electricity by 2040, 70% renewable energy by 2030, and 9,000 MW of offshore wind by 2035). The purpose of the facility is to manufacture wind towers and transition pieces for offshore renewable wind turbines for the U.S. market. Transition pieces, made up of heavy steel fabrication, are the lower support structures beneath offshore wind towers that connect the tower to the foundation. The operation of this highly automated facility will accelerate the growth of the U.S. offshore wind supply chain, and will offer offshore wind developers the opportunity to source their wind towers and transition pieces in NYS.

Marmen, Inc. is already one of the largest manufacturers of onshore wind towers in North America and is proud to have contributed to the growth and development of the wind industry. As the demands for offshore wind intensify, Marmen Inc. is prepared to serve as the largest manufacturer of renewable offshore wind towers in the U.S., and eager to help NYS transition away from fossil fuel usage and meet CLCPA targets and goals.