Chemical Guide

For Use Exclusively with Esco Ascent™ Ductless Fume Hoods and Nanocarb™ Activated Carbon Filters

ESCO
WORLD CLASS. WORLDWIDE.

Introduction

Esco Ascent Ductless Fume Cabinets provide protection to both laboratory personnel and the environment from toxic fumes and are quickly becoming a viable alternative to conventional fume hoods.

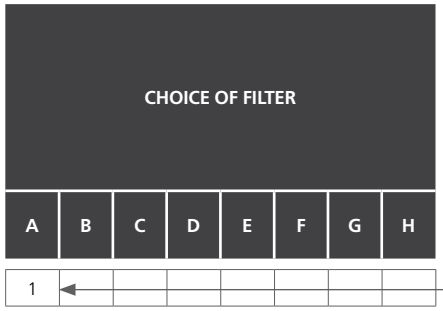
Unlike conventional fume hoods, these cabinets filter out chemical fumes and recycle air directly back to the laboratory, in turn providing energy savings, personnel and environmental protection, convenience as you do not have to deal with complicated ducting systems and mobility as ductless cabinets are free-standing systems which do not require connection to the ductwork.

You might have concerns over which filters to choose for specific chemicals, as there are hundreds of different types of activated carbon in the world, each made for different specific applications. Esco has therefore come up with this Chemical Guide to help you make the right choice. This Chemical Guide, combined with our Filtracheck Online Survey Form (***http://www.escoglobal.com/ductless/filtraform.php***), will ensure that you are using the right filter for your application.

Nanocarb™ Filter Options

CODE	NAME	SUITABLE APPLICATIONS
A	Standard Filter	All common laboratory chemicals, especially with organics. When no specific requirements are present, or when more than one type of chemical is used.
B	Acid Filter	Applications involving sulphur dioxide, hydroflouric acid fumes. Removes inorganic / organic acid vapors and fumes
C	Mercury Compounds Filter	Highly effective for removal of mercury vapor and compounds. (Stable, non-volatile mercuric sulphide filter media).
D	Sulphur Compounds Filter	Removal of sulphur compounds.
E	Halogen Compounds Filter	Removal of halogen compounds like Chlorine, Flourine, Iodine, Bromine, Astatine etc.
F	Aldehyde Filter	Formaldehyde applications or when aldehydes are present. Hospital pathology and endoscopy applications.
G	Ammonia / Amines Filter	High performance removal of ammonia/amines by chemisorption.
H	Ethers and Chloroform	Special impregnated carbon for ethers and chloroform
Optional HEPA Filter		HEPA filter with a typical efficiency of 99.99% removes particulates and aerosols. Ductless fume hoods with HEPA filters are suitable for cleanroom applications, or may be used as a Class I Biological Safety Cabinet.
Optional Secondary Backup Carbon Filter		When installed, hood complies with the requirements of ANSI/AIHA Z9.5-2003.

Instructions for Use



1	Suitable for use
2	Moderate adsorption, need frequent monitoring
!	Toxic/ explosive/ not suitable for use in ductless
Esco	Consult us
HP	HEPA Filter

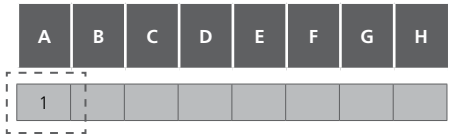
Here are some examples to illustrate how to optimize the use of this guide:

EXAMPLE 1

1. Identify the chemicals you will most commonly use for your applications
   Eg: 1. Acetone - 2. Allyl Alcohol
2. Check Chemical Listing Booklet for most suitable filter

Acetone - Check page 8 →

Allyl Alcohol - Check page 8 →



Conclusion: Purchase Esco Ascent Ductless Cabinet with **Code A** carbon filter

EXAMPLE 2

1. Identify the chemicals you will most commonly use for your applications
   Eg: 1. Acetylene
2. Check Chemical Listing Booklet for most suitable filter

Acetylene - Check page 8 →

Conclusion: Contact Esco or your Sales Representative for more information

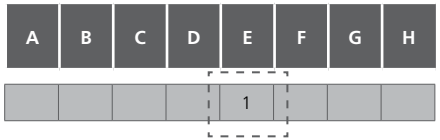
EXAMPLE 3

1. Identify the chemicals you will most commonly use for your applications
   Eg: 1. Acetone - 2. Acetic Acid - 3. Bromine
2. Check Chemical Listing Booklet for most suitable filter

Acetone - Check page 8 →

Acetic Acid - Check page 8 →

Bromine - Check page 10 →



Conclusion: For mixture of different types of chemicals, more information is required Fill up Filtracheck Online Questionaire (http://escoglobal.com/ductless/filtraform.php) and Esco will get back to you with the best recommendation.

Filtra CHECK® Questionaire can be found on page 59

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EXAMPLE 4

1. Identify the chemicals you will most commonly use for your applications
   Eg: 1. Arsine

2. Check Chemical Listing Booklet for most suitable filter

Arsine - Check page 10 →

A	B	C	D	E	F	G	H
!							

Conclusion: As long as 1 chemical leads you to the **!** sign, it means that ductless fume cabinets are NOT suitable for your application. Please contact local Esco distributor for information on Esco Fume Hood.

EXAMPLE 5

1. Identify the chemicals you will most commonly use for your applications
   Eg: 1. Acetone - 2. Calcium Carbonate - 3. Allyl Alcohol

2. Check Chemical Listing Booklet for most suitable filter

Acetone - Check page 8 →

A	B	C	D	E	F	G	H
1							

Calcium Carbonate - Check page 14 →

A	B	C	D	E	F	G	H
HP							

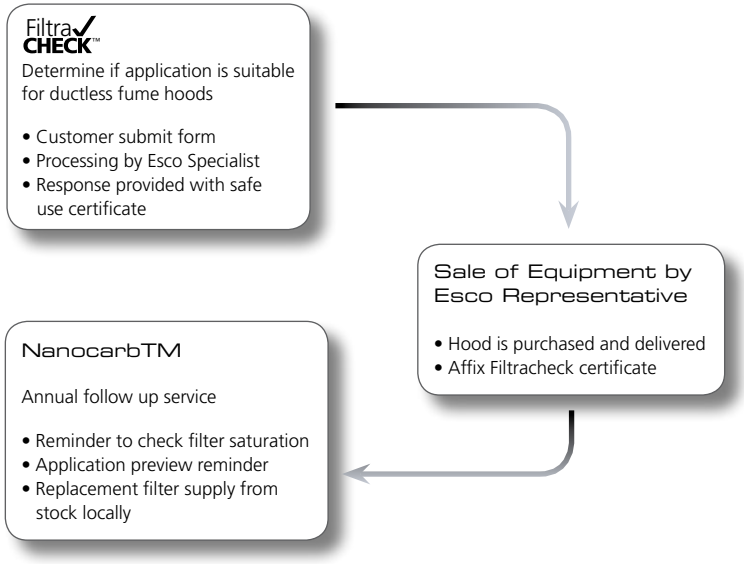
Allyl Alcohol - Check page 8 →

A	B	C	D	E	F	G	H
1							

Conclusion: Purchase Esco Ascent MAX Ductless Fume cabinet with standard Code A carbon filter and secondary backup HEPA filter (ADC-_**E**_)

ABBREVIATION	DEFINITION
CAS	Chemical Abstracts Service. Unique number for each chemical.
MW	Molecular Weight
Bp	Boiling Point
Mp	Melting Point
TLV	Threshold Limit Value (USA). The airborne limits of permitted concentrations of hazardous chemicals represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect.
TWA	Time Weighted Average (USA). A time-weighted average concentration for a normal 8-hour working day and a 40-hour working week, to which nearly all workers may be repeatedly exposed day after day, without adverse effect.
FR VME	Average Exposure Value (France). Limit Value in France.
MAK TRK	Maximum Arbeitsplatz Konzentration (Germany). Maximum permissible concentration of a chemical compound present in the air within a working area.
Olf.	Olfactory detection threshold. To determine if smell can be used to detect a danger. This value has to be compared with the limit value.
C	Ceiling limit. Threshold limit not to be exceeded.

Esco Ductless Fume Hoods - Total Lifecycle Service



CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT	OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
									ppm					mg/m³											
			MW			Debye	Bp °C	Mp °C	TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
A																									
2-ACETYLAMINOFLUORENE	53-96-3	$C_{15}H_{13}NO$	223.3					107.85								1									
2-AMINO PYRIDINE	504-29-0	$C_5H_6N_2$	94				211		0.5	0.5	0.5		0.5		2	1									
ACETAMIDE	60-35-5	C_2H_5NO					223				50					1									
ACETALDEHYDE	75-07-0	C_2H_4O	44	0.79			20		100	100	50	0.05									2				
ACETIC ACID	64-19-7	$C_2H_4O_2$	60	1.05	<0.1		118	16,5	10		10	0.05	10		25	1	1								
ACETIC ANHYDRIDE	108-24-7	$C_4H_6O_3$	102	1.08			140		5	5	5	0.13	C5		C20	1									
ACETONE	67-64-1	C_3H_6O	58	0.79	7	29,1	56.5	-94,9	500	750	500	13	250		590	1									
ACETONE CYANOHYDRIN AS CN	75-86-5	C_4H_7NO	85	0.93			82	-20					C1		C4	2									
ACETONITRILE	75-05-8	C_2H_3N	41	0.78			82		40	40	40	170	20		34	1									
ACETOPHENONE	98-86-2	C_8H_8O	120				201.7	10								1									
ACETYLENE	74-86-2	C_2H_2	26	0.001092			-84									1									
ACETYLSALICYLIC ACID	50-78-2	$C_9H_8O_4$	180	1.35				135								1									
ACETYLENE TETRABROMIDE	79-27-6	$C_2H_2Br_4$	346	2.97			239		1	1	1					2									
ACROLEIN	107-02-8	C_3H_4O	56	0.84			53		0.1		0.1	0.16	0.1		0	!									EFA
ACRYLAMIDE	79-06-1	C_3H_5NO	71	1.12				84.5		0.1					0.	1									
ACRYLIC ACID	79-10-7	$C_3H_4O_2$	72	1.05			142		2	10		0.09	2		6	1									
ACRYLONITRILE	107-13-1	C_3H_3N	53	0.81	5.5-7.5		77		2	2	3	17	1		2	2									
ADIPIC ACID	124-04-9	$C_6H_{10}O_4$	146	1,36	3.2		152	337,5						5		HEPA									
ADIPONITRILE	111-69-3	$C_6H_8N_2$	108	0.97			295		2				4		18	1									EFA
ALDICARB	116-06-3	$C_7H_{14}O_2N_2S$					190	100								2									EFA
ALDRIN	309-00-2	$C_{12}H_8C_{16}$	365	1.60				105						0.25	0	1									
ALGINIC ACID	9005-32-7	$(C_6H_8O_6)n$	10,000 - 600,000	1.601	1.5-3.5											2									
ALLYL ALCOHOL	107-18-6	C_3H_6O	58	0.85			97		0.5	2	2	1.1	2		5	1									
ALLYL CHLORIDE	107-05-1	C_3H_5Cl	77	0.94			44.5		1	1	1	1.2	1		3	1									
ALLYL GLYCIDYL ETHER	106-92-3	$C_6H_{10}O_2$	114	0.97			154		1	5			5		22	1									
ALLYL PROPYL DISULFIDE	2179-59-1	$C_6H_{12}S_2$	148	0.93					2	2			2		12				2						
ALPHA-ALUMINA	1344-28-1	Al_2O_3	101.9	4			5122	3358					15			HEPA									
ALPHA-TERPINEOL	98-55-5	$C_{10}H_{18}O$	154.25	0.9338			219	39								1									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING BT
			MW			Debye	Bp °C	Mp °C
ALUMINIUM (Metal & Oxide)	7429-90-5	Al & Al_2O_3		2.7 / 4.0				660/2050
ALUMINIUM (Pyro powders & Welding fume)								
AMITROLE	61-82-5	$C_2H_4N_4$	84	1.14				159
AMMONIA	7664-41-7	NH_3	17	0.00072	11	1,42	-33	-78
n-AMYL ACETATE	628-63-7	$C_7H_{14}O_2$	130	0.88			148	
Sec-AMYL ACETATE	626-38-0	$C_7H_{14}O_2$	130	0.57			123	
n-AMYL ALCOHOL	71-41-0	$C_5H_{12}O$	88				138	
AMMONIUM ACETATE	631-61-8	$C_2H_3O_2NH_4$	77	1.17			Decomp	114
AMMONIUM CHLORIDE FUME	12125-02-9	NH_4Cl	53.5	1.53				338 (Sublimes)
AMMONIUM HYDROXIDE	1336-21-6	NH_4OH	35.04	0.91			37.7	–57.5
ANILINE	62-53-3	$C_6H_5NH_2$	93	1.02			184	
Ortho & Para ANISIDINE		C_7H_9ON	123	1.10			225	
ANTIMONY	7440-36-0	Sb	121.8	6.69			2701	892
ARSENIC PENTOXIDE	1303-28-2	As_2O_5	230	4.32				315
ARSINE	7784-42-1	AsH_3	78	4,93		0,20	-62.5	-117
ASPHALT FUMES	8052-42-4							
B								
1- BUTYNE	107-00-6	C_4H_6	54.091	0.6783			8.08	–125.7
1-BROMO-3-CHLOROPROPANE		C_3H_6BrCl	157.44	1.59			143	-59
BARIUM & SOLUBLE CPDS		Ba	137				1640	
BARIUM CHLORIDE (AS BA)	10361-37-2	$BaCl_2$	208.2	3.86			2566	1491
BARIUM HYDROXIDE	17194-00-2	$Ba(OH)_2$	171.34	3.743			780	78
BARIUM NITRATE (AS BA)	10022-31-8	$Ba(NO_3)_2$	261,37	3,24				
BARIUM SULFATE	7727-43-7	$BaSO_4$	233	4.25 – 4.5			1600 decomp	1580
BENZENE	71-43-2	C_6H_6	78	0.88			80	
BENOMYL	17804-35-2	$C_{14}H_{18}N_4O_3$	290					>298

OFFICIAL LIMIT VALUES								CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCT
ppm					mg/m³												
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA		A	B	C	D	E	F	G	H		
					10	10		HEPA									
					5	5		HEPA									
	0.06				0.2	0.2		ESCO									
25	25	50	5.2	25		18								1			
100	100	100	0.05	100		525		1									
125	125	100	0	125		650		1									
								1									
														1			
						10		HEPA									
														1			
2	2	2	1.1					1									
0.1	0.1	0.1				1		1									
						0.5		HEPA									
								!									EFA
0	0.05	0.05	0.5			C0.002		ESCO									
						5 mg/m [15min]		1									
								1									
								1									
					0.05	0.05										B(1) & HP(2)	
						0.5		HEPA									
								HEPA									
						10		HEPA									
					10	10										B(1) & HP(2)	
								1									
0.84	0.8							1									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING BT
			MW			Debye	Bp °C	Mp °C
BENZENETHOL	108-98-5	C_6H_5SH	110	1.08			62	
BENZIDINE	92-87-5	$C_{12}H_{12}N_2$	184	1.08			402	
BENZYL ACETATE	140-11-4	$C_6H_5CH_2OCOCH_3$	150	1.25			212	
BENZYL CHLORIDE	100-44-7	C_7H_7Cl	127	1.10			179	
BERYLLIUM & BERYLLIUM COMPOUNDS (AS BE)	7440-41-7	Be	9	1.85			4258	2075
BETA-CHLOROPRENE	126-99-8	C_4H_5Cl	88.5	0.96			-134	
BIPHENYL	92-52-4	$C_{12}H_{10}$	154	1.04			255	
BISMUTH TELLURIDE	1304-82-1	Bi_2Te_3	802	7.7				573
BORATES, TETRA, SODIUM SALTS (ANHYDROUS)	1330-43-4	$Na_2B_4O_7$	201.2	2.37				1092
BORIC ACID	10043-35-3	H_3BO_3	62		3.6-4			
BORON OXIDE	1303-86-2	B_2O_3	69.6	2.46			3106	568
BORON TRIBROMIDE	10294-33-4	BBr_3	250.5	2.64			194°F	
BORON TRIFLUORIDE	2095581	BF_3						
BROMINE	7726-95-6	Br_2	160	3.12			59	
BROMINE PENTAFLUORIDE	7789-30-2	BrF_5	175	2.48			40.5	
BUTYL CELLOSOVE	111-76-2	$C_6H_{14}O_2$	118.17	0.9			171	-77
BROMOETHANE	74-96-4	C_2H_5Br	113				38.5	
BROMOFORM	75-25-2	$CHBr_3$	253	2.89			149.5	
1-BROMONAPHTALENE	90-11-9		207				279	
2-Bromo-1-chloropropane		C_3H_6BrCl	157					
n-BUTANE	106-97-8	$C_{10}H_7Br$	58	0.002532			-12	
1,3-BUTADIENE	106-99-0	C_4H_{10}	54	0.65			-4.5	
2-BUTOXY ETHANOL	111-76-2	$C_6H_{14}O_2$	118	0.90			171	
2-BUTOXY ETHYL ACETATE	112-07-2	$C_8H_{16}O_3$	160	0.94				
n-BUTYL ACETATE	123-86-4	$C_6H_{12}O_2$	116	0.88			127	
Sec & Ter BUTYL ACETATE		$C_6H_{12}O_2$	116	0.86			96	
n-BUTYL ACRYLATE	141-32-2	$C_7H_{12}O_2$	128	0.89			146	

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
				C0.1		(0.5 mg/m)	1									
	0						1									
10								1								
1	1	1	0.04	C1		C5	1									
						C 0.0005	HEPA									
							1									
0.2	0.22	0.2		0.2		1		1								
					10	10		1								
						1	HEPA									
							HEPA									
						10.000	HEPA									
				C 1 ppm		10	HEPA									
							HEPA									
0.1		0.1	0.05	0.1		0.7					1					
0.1	0.1			0.1		0.7	2									
							1									
5	200		3.1				1									
0.5	0.5		1.3	0.5		5	2									
							1									
							1									
800	800	1000	2700	800		1900	2									
2		5	1.6				HEPA									
20	25	20	0.1	5		24	1									
		20		5	95	33	1									
150	150	100	0.39	150		710	1									
200	200	100		200		950	1									
2	10	2	0.03	10		55	1									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING BT
			MW			Debye	Bp °C	Mp °C
Sec-BUTYL ALCOHOL	78-92-2	$C_4H_{10}O$	74				99.5	
Ter-BUTYL ALCOHOL	75-65-0	$C_4H_{10}O$	74	0.79 (solid)			83	
n-BUTYL AMINE	109-73-9	$C_4H_9NH_2$	73	0.74	11.8		78	
Sec-BUTYL AMINE	13952-84-6	$C_4H_9NH_2$	73				63	
n-BUTYL CHLORIDE	109-69-3	C_4H_9Cl	92				78.5	
Sec-BUTYL CHLORIDE	78-86-4	C_4H_9Cl	92				68	
Ter-BUTYL CHROMATE as CrO_3	1189-85-1	$C_8H_{18}CrO_4$	230					-5
BUTYL ETHER	142-96-1	$C_8H_{18}O$	130				142	
BUTYLENE		C_4H_8						
BUTYRALDEHYDE	123-72-8	C_4H_8O	72.11	0.8			74.8	–99
BUTYRIC ACID	107-92-6	$C_4H_8O_2$	88.11	0.9595			163.5	–7.9
n-BUTYL GLYCIDYL ETHER	2426-08-6	$C_7H_{14}O_2$	118	0.91			164	
n-BUTYL LACTATE	138-22-7	$C_7H_{14}O_3$	146	0.98			188	
n-BUTYL MERCAPTAN	109-79-5	C_4H_10S	90	0.83			209	
n-BUTYL METHACRYLATE	97-88-1	$C_{18}H_{14}O_2$	142				164	
Ortho-sec-BUTYL PHENOL	89-72-5	$C_{10}H_{14}O$	150	0.89			226	
2,6 Di-Tert-BUTYL PHENOL	128-39-2	$C_{10}H_{14}O$	150				239	
Para-Tert-BUTYL TOLUENE	98-51-1	$C_{11}H_{16}$	148	0.86			193	
n-BUTYRIC ACID	107-92-6	$C_4H_8O_2$	88				163.5	
C								
2-CHLOROPROPANE	75-29-6	C_3H_7Cl	79	0.862			35.74	-117.18
CADMIUM Fume, Dust, Salts as Cd	7440-43-9	Cd, CdO	112 128	8.65 8.15/6.95			760/900 Decomp	
CALCIUM ARSENATE (as As)	7778-44-1	$Ca_3(AsO_4)_2$	398.1	3.62				
CALCIUM CARBONATE	471-34-1	$CaCO_3$	100	2.7 - 2.95	8 - 9		Decomp	
CALCIUM HYDOXIDE	1305-62-0	$Ca(OH)_2$	74	2.24	12.4			
CALCIUM OXIDE	1305-78-8	CaO	56	3.34			2850	
CALCIUM SULFATE	7778-18-9	$CaSO_4$	136	2.96				1450
CARBOFURAN	1563-66-2	$C_{12}H_{15}NO_3$	221	1.18				150

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
100	100	100	2.6	100		305	1									
100	100	100	47	100		300	1									
		5	1.8	C50		C15	2									
		5			15		2									
							1									
							1									
						0.001	HEPA									
							1									
							1									
												1				
							1									
25	25			C5.6		C30	1							1		
5	5		7	5		25	1									
				C0.5		1.8(15min)	2									
							1									
5	5			5		30	1									
		0.08					2									
1	10		5				2	1								
				10		60	1	1								
												2				
					0.01		HEPA									
				C0.002 [15-minute]			!									EFA
						10	HEPA									
					5	5	HEPA									
					2	2	HEPA									
					10	10	HEPA									
					0.1	0.1	1									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING BT
			MW			Debye	Bp °C	Mp °C
CAPROLACTAM	105-60-2	$C_2H_{11}NO$	113.2	1.01			515°F	156°F
CAPRYLIC ACID	124-07-2	$C_8H_{16}O_2$	144.21	0.91			237	16.7
CARBON BLACK	1333-86-4		12	1.8 - 2.1			sublimes	
CARBON DIOXIDE	124-38-9	CO_2	44	0.001836		0	sublimes	
CARBON DISULFIDE	75-15-0	CS_2	76	1.26			46	
CARBON TETRABROMIDE	558-13-4	CBr_4	332	3.42			189.5	
CARBON TETRACHLORIDE	56-23-5	CCl_4	154	1.59			77	
CELLOSOLVE								
CELLOSOLVE ACETATE								
CESIUM HYDROXIDE	21351-79-1	CeOH	150	3.68				272
CHLORINE	7785-50-5	Cl_2	70	0.002964		0	-34.5	
CHLORINE DIOXIDE	10049-04-4	ClO_2	68	0.002796			10	
CHLORINE TRIFLUORIDE	7790-91-2	ClF_3	93	0.003852			11.5	
CHLOROACETALDEHYDE sol.50%	107-20-0	C_2H_3OCl	82	1.19 (40%)	1.2		90/100	
CHLORO ACETONE		C_3H_5ClO	92				119	
2-CHLOROACETOPHENONE	532-27-4	C_8H_7OCl	154	1.32			247	
CHLOROACETYLCHLORIDE	79-04-9	$C_2H_2OCl_2$	112	1.42			105	
CHLOROBENZENE	108-90-7	C_6H_5Cl	113	1.11			133	
CHLOROBROMOMETHANE	74-97-5	CH_2BrCl	129	1.93			68	
2-CHLOROETHANOL	107-07-3	C_2H_5OCl	80				129	
CHLOROBUTADIENE	126-99-8	C_4H_5Cl	89	0.9598			59.4	59.4
CHLOROFORM	67-66-3	$CHCl_3$	119	1.48			61	
CHLOROMETHANE	74-87-3	CH_3Cl	50	2.22			-24.2	–97.7
1-CHLORO-1-NITROPROPANE	600-25-9	$C_3H_6NO_2Cl$	123	1.21			140	
CHLOROPENTAFLUOROETHANE	76-15-3	C_2F_5Cl	154	0.006660			-39	
CHLOROPICRIN	76-06-2	CNO_2Cl_3	163	1.6			112	
CHLOROPLATINIC ACID	16941-12-1	H_2PtCl_6	409.81	2.431				
CHLOROPRENE 3		C_3H_5Cl	76				45	

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
				Vapor: 0.22		Dust: 1, Vapor: 1	1									
							1									
					3.5	3.5	HEPA									
5000		5000	74000	5000		9000	!									EFA
10	10	2	1.1	1		3				1						
0.1	0.1			0.1		1	1				1					
5	2	10	96				1				1					
							1									
							1									
					2	2	HEPA									
0.5		0.5	0.31	C0.5		C1.45					2					
0.1	0.1	0.1	9.4	0.1		0.3	!									EFA
		0.1		C0.1		C0.4	!									EFA
		1		C1		C3	1					1				
1							2									
0.05	0.05		0.04	0.05		0.3	1									
0.05	0.05			0.05		0.2	2									
10	10	10	0.68				1									
200	200	200	400	200		1050	2									
		1			3		1									
							1									
10	5	10	1.3											1		
							!									EFA
2	2	20		2		10	2									
1000	1000			1000		6320	ESCO									
0.1	0.1	0.1	0.78	0.1		0.7	1									
							1								A(1) &	
1	1	1	1.2				2									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING BT
			MW			Debye	Bp °C	Mp °C
Ortho-CHLOROSTYRENE	2039-87-4	C_8H_7Cl	138	1.10			189	
Ortho-CHLOROTOLUENE	95-49-8	C_7H_7Cl	126	1.08			159	
CHLOROTRIFLUOROMETHANE		$CClF_3$	105				81.4	
CHROMIUM Metal, Dust	7440-47-3	Cr		7.14				
CHROMIUM ANHYDRIDE	1333-82-0	CrO_3	100	2.70				196
CHROMYL CHLORIDE	14977-61-8	CrO_2Cl_2	154	1.91			116	
CITRIC ACID	77-92-9	$C_6H_8O_7$	192	1.665				
CLONIDINE	4205-90-7	$C_9H_9Cl_2N_3$	230					
CLOPIDOL	2971-90-6	$C_7H_7NOCl_2$	192					320
COBALT (Fume & dust)	7440-48-4	Co		8.92				
COBALT CARBONYL & HYDRO CARBONYL	10210-68-1	$CO_2(Co)_8$	342	1.87			5	-26
COKE (Pyrolysis products of organic materials)								
COPPER(II) ACETATE ANHYDROUS	142-71-2	$Cu(CH_3COO)_2$	182	1.88				
COPPER(II) ACETATE MONOHYDRATE	6046-93-1		22					
COPPER(II) NITRATE ANHYDROUS	3251-23-8	$Cu(NO_3)_2$	188					
COPPER(II) NITRATE TRIHYDRATE			242					
COPPER(II) SULFATE ANHYDROUS	7758-98-7	$CuSO_4$	160	3.603				
COPPER(II) SULFATE PENTAHYDRATE	7758-99-8		250	2.284				
CORTICOSTERONE	50-22-6	$C_{21}H_3OO_4$	347					
COTTON Dust, raw								
CREOSOTE								
CRESOL all isomers	108-39-4	C_7H_8O	108	1.03-1.05			191	
CROTONALDEHYDE	123-73-9	C_4H_6O	70	0.87			102	
CUMENE	98-82-8	C_9H_{12}	120	0.86			152	
Ortho-CUMIDINE		$C_9H_{11}NH_2$	135					225
CYANAMIDE	420-04-2	HCN : C : HCN or N : CNH_3	54	1.26			260	
CYANOGEN	460-19-5	C_2N_2	52	0.002184			-21	

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCT
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
50	50			50		285	1									
50	50		0.38	50		250	1									
		1000					ESCO									
					0.5	0.5	HEPA									
					0.05	0.001	HEPA									
					0.03	0	!									EFA
							1									
							2									
					10	10	HEPA									
					0.02	0.05	HEPA									
					0.1	0.1	!									EFA
						C0.2	ESCO									
							HEPA									
							HEPA									
							HEPA									
							HEPA									
							HEPA									
							HEPA									
							1									
					0.2	0.2	HEPA									
							1									
5	5	5		2.3		10	1									
	2	0.34	0.12	2		6						1				
50	50	50	0.09	50		245	1									
	2						ESCO									
					2	2	ESCO									
10	2	10		10		20	ESCO									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING BT	OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
									ppm					mg/m³											
			MW			Debye	Bp °C	Mp °C	TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
CYANOGEN BROMIDE	506-68-3	CNBr	106	0.002184			61									ESCO									
CYANOGEN CHLORIDE	506-77-4	CNCl	61	1.19												!									EFA
CYCLOHEXANAMINE	108-91-8	$C_6H_{13}N$	99.17	0.8647			134.5	'-17.7								1									
CYCLOHEXANE	110-82-7	C_6H_{12}	84	0.78			81		300	300	200	25	300		1050	1									
CYCLOHEXANOL	108-93-0	$C_6H_{12}O$	100	0.96			161.5		50	50	50	0.15	50		200	1									
CYCLOHEXANONE	108-94-1	$C_6H_{12}O$	98	0.95			157		25	25	20	0.88	25		100	1									
CYCLOHEXENE	110-83-8	C_6H_{10}	82	0.81			83		300	300	300	0.18	300		1015	1									
CYCLOHEXYLAMINE	108-91-8	$C_6H_{11}NH_2$	99	0.87			134.5		10	10	10	2.6	10		40	1									
CYCLOPENTADIENE	542-92-7	C_5H_6	66	0.80			42		7	75	75	1.9	75		200	1									
CYCLOPENTANE	287-92-3	C_5H_{10}	70	0.75			49		600	600			600		1720	1									
CYCLOSARIN		$C_7H_{14}FO_2P$	180.16	1.1278			239	'-30								1									
D																									
1,1-DIBROMOETHANE	557-91-5	$C_2H_4Br_2$	187.87	2.055																1					
1,1-DICHLOROETHENE	75-35-4	$C_2H_2Cl_2$	96.94	1.213		1.3 D	32	-122												1					
1,2-DIBROMOETHANE	106-93-4	$C_2H_4Br_2$	187.86	2.17			131-132													1					
1,2-DICHLOROETHENE	156-59-2 (cis)	$C_2H_2Cl_2$	96.95	cis: 1.28		cis: 1.9 D	cis: 60.3	cis: -81												1					
1,2-DICHLOROPROPANE	78-87-5	$C_3H_6Cl_2$	112.99	1.156			95-96	–100								1									
1,3-DICHLOROPROPENE (CIS, TRANS)	542-75-6	$C_3H_4Cl_2$	110	1.21			103		1		0.11		1		5	1									
2,4-D	94-75-7	$C_8H_6Cl_2O_3$	221	1.57			Decomp							10	10	ESCO									
DDT	50-29-3	$C_{14}H_9Cl_5$	355	0.99				109						1	0.5	HEPA									
DECABORANE	17702-41-9	$B_{10}H_{14}$	122	.94			213		0.05	0.05	0.05	0.25	0.05		0.3	!									EFA
DECANE	124-18-5	$C_{10}H_{22}$	142				174									1									
DEMETON (Systox)	8065-48-3	$C_8H_{19}O_3S_2P$	258	1.12			134		0.01	0.01	0.01				0.1	!									EFA
DIACETONE ALCOHOL	123-42-2	$C_6H_{12}O_2$	116	0.94			168		50	50	50	0.28	50		240	1									
DIAZOMETHANE	334-88-3	CH_2N_2	42	0.00174			-23		0.2				0.2		0.4	!									EFA
DIBORANE	19287-45-7	B_2H_6	28	0.001164			-92		0.1	0.1	0.1	2.5	0.1		0.1	!									EFA
DIBUTYL PHTHALATE	84-74-2	$C_{16}H_{22}O_4$	278.34	1.05			340	-35								1									
DIBUTYLAMINE	111-92-2	$C_8H_{19}N$	130	0.77			159.6	-62								1									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
DICHLOROACETYLENE	7572-29-4	C_2Cl_2	94.9	1.26			90°F	
2,6-DI-ter-BUTYL-p-CRESOL	128-37-0	$C_{15}H_{24}O$	220	1.05			265	
Ortho-DICHLOROBENZENE	95-50-1	$C_6H_4Cl_2$	146	1.30			180	
3,3-DICHLOROBENZIDINE and salts	91-94-1	$C_{12}H_{10}N_2Cl_2$	252				178	
Para-DICHLOROBENZENE	106-46-7	$C_6H_4Cl_2$	146	1.25			173	
DICHLORODIFLUOROMETHANE	75-71-8	CCl_2F_2	120	0.1			-29	
1,1-DICHLOROETHANE	75-34-3	$C_2H_4Cl_2$	98	1.18			57	
1,2-DICHLOROETHANE	107-06-2	$C_2H_4Cl_2$	98				83.5	
DICHLOROETHYLENE 1,2 sym	540-59-0	$C_2H_2Cl_2$	96	1.27			59	
DICHLOROETHYL ETHER	111-44-4	$C_4H_8OCl_2$	143	1.22			178.5	
DICHLORO MONOFLUOROMETHANE	75-43-4	$CHFCl_2$	103	0.00			9	
DICHLORO METHYL ETHER		$C_2H_4OCl_2$	114				105	
1,1-DICHLORONITROETHANE	594-72-9	$C_2H_3NO_2Cl_2$	143	1.43			124	
1,3-DICHLOROPROPENE (Cis, Trans)	542-75-6	$C_3H_4Cl_2$	110	1.21			103	
2,2-DICHLOROPROPANOIC ACID	75-99-0	$C_3H_4O_2Cl_2$	142	1.40			98	
DICHLOROTETRAFLUOROETHANE	76-14-2	$C_2F_4Cl_2$	171	0.007116			4.1	
DICHLORVOS	62-73-7	$C_4H_7Cl_2O_4P$	221	1.42			77	
DICROTOPHOS	141-66-2	$C_8H_{16}NO_5P$	237	1.22			400	
DICYCLOHEXYLMETHANE		$C_5H_{22}N_2O_2$	142				251	
DICYCLOPENTADIENE	77-73-6	$C_{10}H_{12}$	132	0.98			167	
DIELDRIN	60-57-1	$C_{12}H_8OCl_6$	381	1.75				175
DIETHANOLAMINE	111-42-2	$C_4H_{11}NO_2$	105	1.10	11.0		Decomp	
DIETHYLAMINE	109-89-7	$C_4H_{11}N$	73	0.71			55.5	
2-DIETHYLAMINOETHANOL	100-37-8	$C_4H_{13}NO$	117	0.89			162	
N-DIETHYLAMINOACETOCHLORIDE		$C_7H_{11}NOCl$	160					
DIETHYLENE TRIAMINE	111-40-0	$C_4H_{13}N_3$	103	0.96			207	
DIETHYL KETONE	96-22-0	$C_5H_{10}O$	86	0.81			102	
DIETHYL PHTHALATE	84-66-2	$C_{12}H_{14}O_4$	222	1.12			302	

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
				C 0.1	0.4		ESCO									
					10	10	HEPA									
25		50	0.3	C50		C300	1									
		0					HEPA									
10	75	50	0.18				ESCO									
1000	1000	1000		1000		4950	1									
100	200	100	190	100		400	2				2					
10	10	5	88	1		4	2				2					
200		200	17	200		790	1				1					
5	5	10	0.05	5		30	2							1		
10	10	10		10		40	1									
														1		
2	2	10		2		10	2									
1		0.11		1		5	1									
1	1	1		1		6	1									
1000	1000	1000		1000		7000	1									
	0.1	0.1			0.9	1	1									
					0.25	0.25	2									
0.01							1									
5	5	0.5	0.01	5		30	1									
					0.25	0.25	2									
	3		0.27	3	2	15	1									
5		5	0.13	10		30	1									
2	10	5	0.01	10		50	1									
							1									
1	1			1		4	1									
200	200		2	200		705	1									
					5	5	1									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
DIETHYL SULFATE		$C_4H_{10}SO_4$					208	
DIFLUORODIBROMOMETHANE	75-61-6	CBr_2F_2	210	2.29			23	
DIGITOXIN		$C_{41}H_{64}O_{13}$	765					255
DIGLYCIDIL ETHER	2238-07-5	$C_6H_{10}O_3$	130	1.12			260	
DI-ISOBUTYL KETONE	108-83-8	$C_9H_{18}O$	142	0.81			160	
DI-ISOPROPYL AMINE	108-18-9	$C_6H_{15}N$	101	0.72			83	
DI-ISOPROPYL KETONE		$C_7H_{14}O$	114				124	
DIMETHOXYMETHANE	109-87-5	$C_3H_8O_2$	76				42.5	
N,N-DIMETHYLACETAMIDE	127-19-5	C_4H_9NO	87	0.94			165	
2,2 DIMETHYL BUTANE	75-83-2	C_6H_{14}	86				49.7	
DIMETHYLAMINE	124-40-3	C_2H_7N	45	0.001872			7	
DIETHYLENE GLYCOL	111-46-6	$C_4H_{10}O_3$	106	1.118			244–245	–10.45
DIMETHYL-1,2-DIBROMO-2,2-DICHLO-ROETHYLPHOSPHATE		$C_4H_7Br_2Cl_2P$	381				Decomp	
DIMETHYLETHOXYSILANE	14857-34-2	$C_4H_{12}OSi$		0,757			55	
N,N-DIMETHYLANILINE	121-69-7	$C_8H_{11}N$	121	0.96			193	
N,n-DIMETHYLETHYLAMINE	598-56-1	$C_4H_{11}N$	71				44	
DIMETHYLFORMAMIDE	68-12-2	C_3H_7NO	73	0.95	6-8		153	
1,1-DIMETHYLHYDRAZINE	57-14-7	$C_2H_8N_2$	60	0.79			63	
1,2-DIMETHYLHYDRAZINE	540-73-8	$C_2H_8N_2$	60				81	
DIMETHYLSULFATE	77-78-1	$C_2H_6SO_4$	126	1.33			188	
DINITROBENZENE all isomers		$C_6H_4N_2O_4$	168	1.57-1.63			299	
DINITRO-ortho-CRESOL	534-52-1	$C_7H_6N_2O_5$	198	1.1			312	
3,5-DINITRO-ortho-TOLUAMIDE	148-01-6	$C_8H_7N_2O_5$	225					177
DI-n-PROPYL KETONE	122-19-3	$C_7H_{14}O$	114				144	
1,4-DIOXANE	123-91-1	$C_4H_8O_2$	88	1.03			101	
DIOXATHION	78-34-2	$C_{12}H_{26}O_6P_2S_4$	456	1.26				-20
DIPHENYLAMINE	122-39-4	$C_{12}H_{11}N$	169	1.16			302	
DIPHENYLMETHANE DIISOCYANATE	101-68-8	$C_{15}H_{10}N_2O_2$	250					37

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
		0.03					2									
100	100	100		100		860	ESCO									
							1									
0.1	0.1	0.1		0.1		0.5	1							1		
25	25	50	0.11	25		150	1									
5	5		1.8	5		20	2									
50							1									
1000	1000	1000					1									
10	10	10	47	10		35	ESCO									
		200					ESCO									
5		2	0.34	10		18	2									
							1									
					3		!									EFA
0.5							!									EFA
5	5	5	0.13	5		25	1									
	5	25					2									
10	10	10	2.2	10		30	1									
0.01	0.1		1.7	C0.06		C0.15	!									EFA
							!									EFA
0.1	0.1	0.04		0.1		0.5	2									
0.15	0.15					1	1									
						0.2	1									
					5	5	1									
50	50						1									
20	10	20	24	C1		C3.6	1									
					0.2	0.2	!									EFA
		0			10	10	1									
0.01	0.01	0.01		0.001		0.05	!									EFA

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT	OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
									ppm					mg/m³											
			MW			Debye	Bp °C	Mp °C	TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
DIQUAT	85-00-7	$C_{12}H_{12}Br_2N_2$	344	1.22-1.27			Decomp							0.5	0.5		1								
DISULFIRAM	97-77-8	$C_{10}H_{20}N_2S_4$	296	1.30				72						2	2									G(1) & HEPA(2)	
DISULFOTON	298-04-4	$C_8H_{19}O_2PS_3$	274	1.14			62							0.1	0.1									G(1) & HEPA(2)	
DIURON	330-54-1	$C_9H_{10}Cl_2N_2O$	232					154						10	10	HEPA									
Diglyme	111-96-6	$C_6H_{14}O_3$	134.18	0.937			162	-64								1									
DIMETHYL SULFOXIDE	67-68-5	C_2H_6OS	78.13	1.1004			189	18.5								1			1						
DIPHENYL	92-52-4	$C_6H_5C_6H_5$	154.2	1.04			489°F	156°F					0.2		1.000	1									
DIPROPYLENE GLYCOL METHYL ETHER (DPGME)	34590-94-8	CH_3-$(OC_3H_6)_2$-OH	148.2	0.948			190	-83								1							1		
DISODIUM CITRATE	144-33-2	$C_6H_6Na_2O_7$	236.09													HEPA									
1,3-DIVINYL BENZENE	108-57-6	$C_{10}H_{10}$	130	0.93			195		10	10					50	1									
DIVINYL BENZENE	1321-74-0 (mixed	$C_{10}H_{10}$														1									
E																									
2-ETHOXY-1-PROPANOL	19089-47-5															2									
2-ETHYLHEXANOL	104-76-7	$C_8H_{18}O$	130.23				183-185									1									
EMERY	1302-74-5		102	4.0			2980							10		HEPA									
ENDOSULFAN	115-29-7	$C_9H_6Cl_6O_3S$	404	1.74										0.1	0.1	!									EFA
EPICHLOROHYDRIN	106-89-8	C_3H_5ClO	93	1.18			115		0.5		3					2									
ETHANE	74-84-0	C_2H_6	30				-89					1200				!									EFA
ETHANEDITHIOL		$C_2H_6S_2$	94				146									2									
ETHANOLAMINE	141-43-5	C_2H_7NO	61	1.02	12.1		170.5		3	3	2	2.6	3		8	2									
ETHION	563-12-2	$C_9H_{22}O_4P_2S_4$	384	1.22				-13						0.4	0.4	1									
2-Ethoxy-1-propanol	19089-47-5															2									
ETHYL ACETATE	141-78-6	$C_4H_8O_2$	88	0.90			77		400	400	400	3.9	400		1400	1									
ETHYL ACRYLATE	140-88-5	$C_5H_8O_2$	100.1	0.92			211°F									1									
ETHYL ALCOHOL	64-17-5	C_2H_6O	46	0.79			78		1000	1000	500	84	1000		1900	2									
ETHYLAMINE	75-04-7	C_2H_7N	45	0.001932			16.5		5	10	5	0.95	10		18	2									
ETHYLAMYL KETONE	541-85-5	$C_8H_{16}O$	138	0.82			157		25	25		6	25		130	1									
ETHYL BENZENE	100-41-4	C_8H_{10}	106	0.87			136		100	100	100	2.3	100		435	1									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
ETHYL BROMIDE	74-96-4	C_2H_5Br	108.97	1.47			38.4	-119
ETHYL BUTYL KETONE	106-35-4	$C_7H_{14}O$	114	0.82			148	
ETHYL CELLULOSE	9004-57-3							
ETHYL CHLORIDE	75-00-3	C_2H_5Cl	65	0.002676			12	
ETHYL CYANOACRYLATE		$C_6H_7NO_2$	125				Polymerize	
ETHYL ETHER	60-29-7	$C_4H_{10}O$	74	0.71			34.5	
ETHYLENE CHLOROHYDRIN	107-07-3	C_2H_5OCl	81	1.20			128.7	
ETHYLENE DIAMINE	107-15-3	$C_2H_8N_2$	60	0.91			117	
ETHYL FORMATE	109-94-4	$C_3H_6O_2$	74	0.92			49	
ETHYL MERCAPTAN	75-08-1	C_2H_6S	62	0.84			36	
ETHYL SILICATE	78-10-4	$SiC_8H_{20}O_4$	208.33	0.94			166-169	-77
ETHYLAMINE	75-04-7	C_2H_7N	45	0.001932			16.5	
ETHYLAMYL KETONE	541-85-5	$C_8H_{16}O$	138	0.82			157	
ETHYLENE	74-85-1	C_2H_4	28.05	1.178		zero	–103.7	–169.2
ETHYLENE DIAMINE	107-15-3	$C_2H_8N_2$	60	0.91			117	
ETHYLENE DIBROMIDE	106-93-4	$C_2H_4Br_2$	188	2.17			131	
ETHYLENE DICHLORIDE	107-06-2	$C_2H_4Cl_2$	98.96	1.253		1.80 D	84	-35
ETHYLENE GLYCOL (AEROSOL)	107-21-1	$C_2H_6O_2$	62	1.11			197.5	
ETHYLENE GLYCOL DINITRATE		$C_2H_4N_2O_6$	152	1.49			114	
ETHYLENE OXIDE	75-21-8	$C_2H_4OCl_2$	44	0.001788			11	
ETHYLENIMINE	151-56-4	C_2H_5N	43	0.83			55	
EUCALYPTOLE	470-82-6	$C_{10}H_{18}O$	154	0.9225			176–177	1.5
F								
FENAMIPHOS	22224-92-6	$C_{13}H_{22}NO_3PS$	303	1.14				49
FENSULFOTHION	115-90-2	$C_{11}H_{17}O_4PS_2$	308	1.2			141	
FENTHION	55-38-9	$C_{10}H_{15}O_3PS_2$	278	1.25			87	
FERBAM	14484-64-1	$C_9H_{18}N_3S_6Fe$	417					180
FERROVANADIUM DUST	12604-58-9	FeV	107					

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
											2					
50	50			50		230	2									
							1									
1000	1000	9	4.2				!									EFA
0.2							!									EFA
400	400	400	8.9											1		
1		1		C1		C3	1									
10	10	10	2.5	10		25	1									
100	100	100	31	100		300	2									
0.5	0.5	0.5	0	C0.5		C1.3	1									
							1									
5	10	5	0.95	10		18	2									
25	25		6	25		130	1									
							2									
10	10	10	2.5	10		25	1									
5		0.1		0.045			2									
							1									
39.4	50	10					1				1					
0.05		0.05					1									
1	1	1	430	0.1		0.18	ESCO									
0.5		0.5	1.5				!									EFA
							1									
					0.1	0.1	!									EFA
					0.1	0.1	!									EFA
					0.2		!									EFA
					10	10	1									
					1	1	HEPA									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
FLUORIDE CARBONYL	353-50-4	COF_2	66				-83	
FLUORIDES AEROSOLS, GAS, GASEOUS		F	19					
FLUORIDES PARTICULATES		F	19					
FLUORINE	7782-41-4	F_2	38	0.001572			-187	
FLUOROTRICHLOROMETHANE	75-69-4	CCl_3F	137	0.005688			24	
FONOFOS	944-22-9	$C_{10}H_{15}OPS_2$	230	1.15			100	
FORMALDEHYDE SOL.37%	50-00-0	CH_2O	30	1.08				
FORMAMIDE	75-12-7	CH_3NO	45	1.13			200	
FORMIC ACID	64-18-6	CH_2O_2	46	1.22	2.38		101	
FURFURAL	98-01-1	$C_5H_4O_2$	96	1.16			162	
FURFURYL ALCOHOL	98-00-0	$C_5H_6O_2$	98	1.13			170	
G								
GALLIC ACID		$C_7H_6O_5$	170					222
GASOLINE (50 – 100 octane)	8006-61-9			0.72 – 0.76			34	
GLUTARALDEHYDE sol.50%	111-30-8	$C_5H_8O_2$	100	1.10	3.1–4.5		187	
GLYCERIN MIST	56-81-5	$C_3H_8O_3$	92	1.26			290	
GLYCIDOL	556-52-5	$C_3H_6O_2$	74	1.12			Decomp	
GLYCOLONITRILE	107-16-4	C_2H_3NO	57.1	1.1			361°F	
GRAPHITE (Natural)	7782-42-5	C		2.0 – 2.25				
H								
2-HYDROXYPROPYL ACRYLATE	999-61-1	$CH2=CHCOOCH2CHOHCH3$	130.2	1.05			102.85	
HAFNIUM and Cpds	7440-58-6	HF		13.31			4602	
HALOTHANE	151-67-7	$C_2HBrClF_3$	197	1.87			50	
HEPES	7365-45-9	$C_8H_{18}N_2O_4S$	238.3					234-238
HEPTYLENE	68526-53-4							
Hex-3-yne	928-49-4	C_6H_{10}	82.14	0.723			81-82	-105
n-HEPTANE	142-82-5	C_7H_{16}	100	0.68			98.5	
HEXACHLOROBUTADIENE	87-68-3	C_4Cl_6	258	1.55			212	
HEXACHLORO CYCLOPENTADIENE	77-47-4	C_5Cl_6	270	1.71			239	

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
1		0.1	0.14	0.1		0.2	ESCO									
					2.5			1								
	2						HEPA									
1		0.1	0.14	0.1		0.2					2					
1000		1000	5	C1000		C5600					1					
					0.1	0.1	!									EFA
	0.5	0.5	0.83	0.02								1				
10	20			10		18.5	!									EFA
5		5	49	5		9	2	2								
2		0.1	0.08				1									
10	10	10	8	10		10	1									
							2									
300							1									
	0.1	0.1		C0.2		C0.8							1			
					10		1									
2	25	50		25		75	1									
				C 2 ppm		5.000	ESCO									
					2	2.5	HEPA									
				0.5		3.000	1									
					0.5	0.5	HEPA									
50		5	33	C2		C16.2	ESCO									
							HEPA									
							1									
							1									
400	400	500	150	85		350	1									
0.02				0.02		0.24	1									
0.01	0.01		0.03	0.01		0.1	1									

ESCO
WORLD CLASS. WORLDWIDE.

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
HEXAFLUOROACETONE	684-16-2	C_3F_6O	166	0.006912			-27	
HEXAMETHYLENE DIISOCYANATE	822-06-0	$C_8H_{12}N_2O_2$	168	1.04				
n-HEXANE	110-54-3	C_6H_{14}	86	0.66			69	
HEXACHLOROETHANE	67-72-1	C_2Cl_6	237					185
HEXACHLOROBUTADIENE	87-68-3	C_4Cl_6	C_4Cl_6	260.7	1.55		419°F	
HEXAMETHYLDISILOXANE (HMDS)	107-46-0	$C_6H_{18}OSi_2$	162.38	0.764			101	–59
HEXANAL	66-25-1	$C_6H_{12}O$	101	0.8			119-124	< -20
HEXYLENE								
HMX (OCTAHYDRO-1,3,5,7-TETRANITRO-1,3,5,7-TETRAZOCINE)	2691-41-0	$C_4H_8N_8O_8$		296	1.91			
N-HEXYLAMINE	111-26-2	$C_6H_{15}N$	101.19	0.77			131-132	-22.9
1,6-HEXANEDIAMINE		$C_6H_{16}N_2$	116				24	
1-HEXENE	592-41-6	C_6H_{12}	84				63.5	
SEC-HEXYL-ACETATE	108-84-9	$C_6H_{12}O_2$	144	0.86			146	
HEXYLENE GLYCOL	107-41-5	$C_6H_{14}O_2$	118	0.92			197	
HYDRAZINE	302-01-2	N_2H_4	34	1.01			113.5	
HYDROCHLORIC ACID	7647-01-0	HCl	36.5				20.2%	
HYDROFLUORIC ACID 40% AS F	7664-39-3	HF	20				38.2%	
HYDROGEN BROMIDE	10035-10-6	HBr	81	0.003372			-66.5	
HYDROGEN CHLORIDE	7647-01-0	HCl	37	0.001524	0.01	1.03	-85	
HYDROGEN CYANIDE	74-90-8	HCN	27	0.69	<2.0		26	
HYDROGEN FLUORIDE AS F	7664-39-3	HF	20	0.002232		1.38	19.5	
HYDROGEN IODIDE	10034-85-2	HI	128	2.85		0.38 D	–34.36	–50.80
HYDROGEN PEROXIDE 90%	7722-84-1	H_2O_2	34	1.39		1.03	152	
HYDROGEN SELENIDE	7783-07-5	H_2Se	81	0.00336			-41	
HYDROGEN SULFIDE	7783-06-4	H_2S	34	0.001428			-60	
HYDROQUINONE	123-31-9	$C_6H_6O_2$	110	1.30			287	172
HYPOCHLOROUS ACID	7790-92-3	HClO	110	1.33			286	

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
0.1	0.1			0.1		0.7	ESCO									
0.01	0.01	0.01		0.01		0.04	ESCO									
50	50	50	130	50		180	1									
1	1			1		10									A(1) & HP(2)	
				0.02		(0.24	1									
							!									EFA
							1									
							1									
276-286							1									EFI
							1									
0.5															A(1) & HP(2)	
30							2									
50	50	50		50		300	1									
25			50	C25		C125	!									EFA
0.01	0.1			C0.03		C0.04	!									EFA
		5	0.77					1								
		3	0.04					2								
		2	2	C3		C10		2								
5		5	0.8	C5		C7		1								
	2	10	0.58				ESCO									
	3	3	0.04	3		2.5		1								
							2									
1	1	1		1		1.4		1								
0.05	0.02	0.05	0.3	0.05		0.2	2									
10	5	10	0.01	C10		C15	2			D						
							1									
							!									EFA

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
I								
INDENE	95-13-6	C_9H_8	53	0.997			182	
INDIUM & CPDS	7440-74-6	In	116	7.31			2080	
INDOLE	120-72-9	C_8H_7N	117	1,175		2,11	254	52
IODINE	7553-56-2	I_2	117	4.93	5.4	0	185	
IODOFORM	75-47-8	CHI_3	393.73	4.008			217	123
IRON Soluble salts as Fe	7553-56-2		254					
IRON(II) SULFATE	7720-78-7	$FeSO_4$	152	2.84				
IRON(II) SULFATE HEPTAHYDRATE	7782-63-0	$FeSO_4.7(H_2O)$	278.05	1.898			300	64
IRON(II) SULFATE MONOHYDRATE	17375-41-6	$FeSO_4.H_2O$	169.92				330	
IRON(III) CHLORIDE	7705-08-0	$FeCl_3$	162.2	2.898			315	306
IRON(III) CHLORIDE HEXAHYDRATE	10025-77-1	$FeCl_3.6(H_2O)$	270.3				270.3	37
ISOAMYL ACETATE	123-92-2	$C_7H_{14}O_2$	130	0.87	7		142	
ISOAMYL ALCOHOL	123-51-3	$C_5H_{12}O$	88	0.81 – 0.82			132	-117.2
ISOAMYL ETHER		$C_{10}H_{22}O$	158				172	
ISOBUTANE	75-28-5	C_4H_{10}	58	0.002472			-11.73	
ISOBUTYL ACETATE	110-19-0	$C_6H_{12}O_2$	116	0.87			117	
ISOBUTYL ALCOHOL	78-83-1	$C_4H_{10}O$	74	0.8			108	
ISOBUTYLAMINE	78-81-9	$C_4H_{11}N$	73	0,74			66	-72
ISOBUTYRIC ACID	79-31-2	$C_4H_8O_2$	88	0,97			154	-74
ISOFLURANE	26675-46-7	$C_3H_2ClF_5O$	184.5	1.5			48.5	
ISOOCTANE	540-84-1	C_8H_{18}	114				99	
ISOOCTYL ALCOHOL		$C_8H_{18}O$	134	0.83			182	
ISOOCTYL ALCOHOL mixed isomers		$C_8H_{18}O$	134	0.83			182	
ISOPENTANE	78-78-4	C_5H_{12}	72				28	
ISOPHORONE	78-59-1	$C_9H_{14}O$	138	0.92			215	
ISOPHORONE DIISOCYANATE	4098-71-9	$C_{12}H_{18}N_2O_2$	222	1.06			158	
ISOPRENE	78-79-5	C_5H_8	68				34	
2-ISOPROPOXYETHANOL	109-59-1	$C_5H_{12}O_2$	104	0.90			139	

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
10	10		0.02	10		45	1									
					0.1	0.1	HEPA									
							ESCO									
			0.1	C0.1		C1					1					
							1				1					
					1	1	HEPA									
							HEPA									
							HEPA									
							HEPA									
							HEPA									
							HEPA									
100	100		0.03	100		525	1									
100	100	100	0.04	100		360	1									
							1							1		
		1000		800		1900	2									
150	150	100	0.64	150		700	1									
50	50	100	1.6	50		150	1									
		5					1									
							1									
							2									
							1									
50	50			50		270	1									
50	50			50		270	1									
		1000					1									
5		2	0.2	4		23	1									
0.01	0.01	0.01		0.01		0.05	!									EFA
							1									
25	25	5					1									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
ISOPROPYL ACETATE	108-21-4	$C_5H_{10}O_2$	102	0.87			88	
ISOPROPYL ALCOHOL	67-63-0	C_3H_8O	60	0.79			82.5	
ISOPROPYLAMINE	75-31-0	C_3H_8O	59	0.69	11.8		34	
N-ISOPROPYLANILINE	768-52-5	$C_9H_{13}N$	135	0.93			206	
ISOPROPYL ETHER	108-20-3	$C_6H_{14}O$	102	0.73			68.5	
ISOPROPYL GLYCIDYL ETHER	4016-14-2	$C_6H_{12}O_2$	116	0.92			127	
ISOVALERIC ACID		$C_5H_{10}O_2$	104				176	
K								
KEROSENE				0.78–0.8				
KETENE	463-51-4	C_2H_2O	42	0.00174			-56	
L								
LACTIC ACID	50-21-5	$C_3H_6O_3$	90				123	53
LEAD Inorganic Cpds	7439-92-1	Pb		11.34				
LEAD ARSENATE		$Pb_3(AsO_4)_2$						Decomp
LEAD CHROMATE (Basic)		Pb_2OCrO_4						844
LINDANE	58-89-9	$C_6H_6Cl_6$	288	1.85				
LITHIUM HYDRIDE	7580-67-8	LiH	8	0.78			Decomp	680
LITHIUM bis(trifluoromethanesulphonyl) imide Basic information	90076-65-6	$C_2F_6LiNO_4S_2$	1334				234-238	
LPG (Liquified Petroluem Gas)	68476-85-7		42	0.00174			-0.6	
M								
MAGNESITE	546-93-0	$MgCO_3$	84	2.96				
MAGNESIUM Oxide Fume	1309-48-4	MgO	40	3.58	10.3		3568	
MALEIC ANHYDRIDE	108-31-6	$C_4H_2O_3$	98	1.48			188	
MANGANESE and inorganic cpds	7439-96-5	Mn	55	7.20				
MANGANESE TETROXIDE	1317-35-7	Mn_3O_4	229	4.88				1564
MELAMINE	108-78-1	$C_3H_6N_6$	126.12	1.574			345	
MANGANESE CYCLOPENTALDIENYL TRICARBONYL	12079-65-1	$C_5H_5Mn(CO)_3$	203					
MERCAPTANS								

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
250	250	200	2.7				1									
400		200	22	400		980	2									
2	5	5	1.2				2						2			
2				2		10	1									
250	250	500	0.02	500		2100	2									
50	50			C50		C240	1							1		
							1									
							1									
0.5	0.5	0.5		0.5		0.9					ESCO					
							1									
					0.05	0.05					HEPA					
					0.15						HEPA					
					0.05						HEPA					
					0.5	0.5					ESCO					
					0.03	0.03					HEPA					
															A(1)& HEPA(2)	
1000				1000		1800					ESCO					
					10	10					HEPA					
					10						HEPA					
0.25		0.1	0.32	0.25		1					ESCO					
					0.2	1					HEPA					
											HEPA					
							1									
					0.1	0.1					HEPA					
							1									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
2-Mercaptoethanol	60-24-2	C_2H_6OS	78	1.11			157-158	-100
MENTHOL	89-78-1	$C_{10}H_{20}O$	156	0,89			212	43
2-Mercaptomethyl benzimidazole	4344-85-8							
1-Methoxy-2-Propanol	107-98-2	$C_4H_{10}O_2$	90.1	0.92			-96	120
MERCURY & Inorganic Cpds Cold	7439-97-6	Hg	201	13.6			342	
MERCURY & AlkylCpds Cold	7439-97-6	Hg	201	13.6			342	
MERCURY & Aryl Cpds Cold		Hg						
MESITYL OXIDE	141-79-7	$C_6H_{10}O$	98	0.86			130	-53
MERCURY(II) NITRATE	10045-94-0	$Hg(NO_3)_2$	324.7	4.3				79
MERCURY(II) NITRATE MONOHYDRATE	7783-34-8	$Hg(NO_3)_2.H_2O$	342.62	4.3				79
METHANE	74-82-8	CH_4	16				-162	
METHOMYL	16752-77-5	$C_5H_{10}N_2O_2S$	162	1.29				172°F
METHOXYPHENOL	150-76-5	$C_7H_8O_2$	124	1.55			246	
3-Methoxypropionitrile	110-67-8	C_4H_7NO	85	0.94				
METHYL ACETATE	79-20-9	$C_3H_6O_2$	74	0.93			58	
METHYL ACETYLENE	74-99-7	C_3H_4	40	0.001692			-23	
METHYL ACETYLENE PROPADIENE MIX	59355-75-8		40	0.001776			-34.5	
METHYL ACRYLATE	96-33-3	$C_4H_3O_2$	86	0.96			66	
METHYL ACRYLONITRILE	126-98-7	C_4H_3N	67	0.80			90	
METHYL ALCOHOL	67-56-1	CH_4O	32	0.79			65	
METHYLAMINE	74-98-5	CH_5N	31	0.001296			6.3	
N-METHYL ANILINE	100-61-8	C_7H_9N	107	0.99			194	
METHYL BROMIDE	74-83-9	CH_3Br	95	0.004032			3.6	
METHYL-tert-BUTYL ETHER	1634-04-4	$C_4H_{12}O$	88	0.74			55	-109
METHYL BUTYL KETONE	591-78-6	$C_6H_{12}O$	100	0.81			127	
METHYL CELLOSOLVE ACETATE	32718-56-2	$C_5H_{10}O_3$						
METHYL CELLOSOLVE	109-86-4	$C_3H_8O_2$	76	0.96			124.5	
METHYL CHLORIDE	74-87-3	CH_3Cl	51	0.002136			-24	

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
							1									
							1									
							1									
							1									
		0.01			0.03	0.05			1							
		0.01			0.03	0.05			1							
					0.1				1							
15	15	25	0.45	10		40	1									
									1							
									1							
							!									EFA
					2.5	2.5									A(1) & HP (2)	
					5	5	1									
							1									
200	200	200	4.6	200		610	2									
1000	1000	1000		1000		1650	2									
1000		1000		1000		1800	2									
2	10	2	0.05	10		35	2									
1	1		7	1		3	2									
200	200	200	100	200		260	2									
5		10	3.2	10		12	2									
0.5	0.5	0.5	1.7	0.5		1	1									
1	5						!									EFA
														1		
5	5	5	0.76	1		4	1									
							1									
5	5	5	2.3	0.1		0.3	1									
50	50	50	10				ESCO									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
METHYL CHLOROFORM	71-55-6	$C_2H_3Cl_3$	133	1.34			74	
METHYL CYCLOHEXANE	108-87-2	C_7H_{14}	98	0.77			100	
METHYL CYCLOHEXANOL	25639-42-3	$C_7H_{14}O$	114	0.92			155	
METHYL CYCLOHEXANONE	583-60-8	$C_7H_{12}O$	112	0.93			165	
METHYLENE CHLORIDE	75-09-2	CH_2Cl_2	85	1.33			40	
4,4'-METHYLENEBIS(2-CHLOROANILINE)	101-14-4	$C_{13}H_{12}Cl_2N_2$	266	1.44				110
METHYLCYCLOHEXYL ISOCYANATE								
METHYL ETHER	115-10-6	C_2H_6O	46				23	
METHYL ETHYL KETONE	78-93-3	C_4H_{80}	72	0.81			79.5	
METHYL ETHYL KETONE PEROXIDE	1338-23-4	$C_8H_{16}O_2$		1.12				
METHYL FORMATE	107-31-3	$C_2H_4O_2$	60	0.98			32	
METHYL IODIDE	74-88-4	CH_3I	142	2.28			42	
METHYL ISOAMYL KETONE	110-12-3	$C_7H_{14}O$	114	0.81			144	
METHYL ISOBUTYL CARBINOL	108-11-2	$C_6H_{14}O$	102	0.81			132	
METHYL ISOBUTYL KETONE	108-10-1	$C_6H_{12}O$	100	0.80			116	
METHYL ISOCYANATE	624-83-9	C_2H_3NO	57	0.96			39	
METHYL ISOPROPYL KETONE	563-80-4	$C_5H_{10}O$	86	0.81			93	
METHYL ISOTHIOCYANATE	551-61-6	C_2H_3NS	73				120	
METHYL MERCAPTAN	74-93-1	CH_4S	48	1.001992			6	
METHYL METHACRYLATE	80-62-6	$C_5H_8O_2$	100	0.94			101	
METHYL-n-AMYL KETONE	110-43-0	$C_7H_{14}O$	114	0.81			151.5	
1- METHYL-3-PROPYLIMIDAZOLIUM	119171-18-5	$C_7H_{13}O_2$	252					
2 & 3-METHYLPENTANE		C_6H_{14}	86				60	
1-METHYL-2-PYRROLIDINONE (Vapors)	872-50-4	C_5H_9NO	99				202	
METHYL SILICATE	681-84-5	$C_4H_{12}O_4Si$	152	1.02			121	
METHYL-2-CYANOACRYLATE	137-05-3	$C_5H_5NO_2$	111.1	1.1				
METHYLAMINE	74-98-5	CH_5N	31	0.001296			6.3	
METHYLCYCLOHEXYL ISOCYANATE								

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
350	300	200	120	C350		C1900	1									
400	400	500	630	400		1600	1									
50	50		500	50		235	1									
50	50	50		50		230	1									
50	100	100	250				ESCO									
0.01						0.003	1									
0.01							1									
		1000					2							1		
200	200	200	5.4	200		590	1									
0.2				C0.2		C1.5	ESCO									
100	100	50	600	100		250	2									
2		0.3		2		10					1					
50	50	20	0.01	50		240	ESCO									
25	25	25	0.07	25		100	1									
50	50	100	0.68	50		205	1									
0.02	0.02	0.02	2.1	0.02		0.05	!									EFA
200	200		1.9	200		705	1									
							!									EFA
0.5	0.5	0.5		C0.5		C1	1									
100	100	50		100		410	1									
50	50		0.35	100		465	1									
							2									
		200					ESCO									
		19					!									EFA
1	1			1		6	!									EFA
				2		8.000	!									EFA
5		10	3.2	10		12	2									
0.005							1									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
a-METHYL STYRENE	98-83-9	C_9H_{10}	118	0.91			152	
MEVINPHOS	7786-34-7	$C_7H_{13}O_6P$	224				106	
MICA	12001-26-2			2.6-3.2				
MOLYBDENUM insoluble cpds	7439-98-7	Mo		10.28				
MOLYBDENUM soluble cpds		Mo						
MONOCROTOPHOS	6923-22-4	$C_7H_{14}O_5PN$	223				125	
MONOCHLOROBENZENE	108-90-7	C_6H_5Cl	112.56	1.11			131	-45
MONOMETHYL HYDRAZINE	60-34-4	CH_6N_2	46	0.87			87.5	
MONOSODIUM CITRATE	18996-35-5	$C_6H_7NaO_7$	214.11					
N								
NAPHTALENE	91-20-3	$C_{10}H_8$	128	1.15			218	
NAPHTHA (COAL TAR)	8030-30-6		110 (approx)	0.89-0.97			320-428°F	
NAPHTHA (PETROLEUM)				0.6 - 0.8				
NAPHTHALENE	91-20-3	$C_{10}H_9$	128	1.15			218	
2-NAPHTHYLAMINE	91-59-8	$C_{10}H_9N$	143	1.06			603	
1,5-NAPHTHYLENE DIISOCYANATE	3173-72-6	$C_{12}H_6N_2O_2$	206					
NICKEL Metal & Dust	7440-02-0	Ni		8.90			2730	
NICKEL CARBONYL	13463-39-3	$Ni(CO)_4$	171	1.32			43	
NICKEL Inorganic insol. cpds		Ni						
NICKEL Soluble cpds								
NICKEL SUBSULFIDE as Ni	12035-72-2	Ni_3S_2	240					790
NICOTINE	54-11-5	$C_{10}H_{14}N_2$	162.26	1.01			247	-79
NITRIC ACID 68% cold/hot 6	7697-37-2	HNO_3	240	1.50	1.0		Ctc	2
NITRIC OXIDE		NO	30	0.001248			-152	
Para-NITROANILINE	10102-43-9	$C_6H_8N_2O_2$	138	1.42			332	
NITROBENZENE	98-95-3	$C_6H_5NO_2$	123	1.20			210	
NITROETHANE	79-24-3	$C_2H_5NO_2$	75	1.05			114	
NITROGEN DIOXIDE	10102-44-0	NO_2 / N_2O_4	46	0.003144			21	

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
50	50	100	0.29	50		240	1									
	0.01	0.01		0.01	0.09	0.1	1									
					3	3	HEPA									
					10		HEPA									
					5		HEPA									
					0.25	0.25	!									EFA
							1				1					
0.01	0.2		1.7	C0.04		C0.08	!									EFA
							HEPA									
10	10	10		10		50	1									
						400.000	1									
							1									
10	10	10	0.08	10		50	1									
							!									EFA
	0.01	0.01		0.01		0.04	!									EFA
					1.5	0.02	HEPA									
0.05	0.05		0.3			0.01	!									EFA
					0.2		!									EFA
					0.1		HEPA									
					0.1		HEPA									
							1									
2	2			2		5		2								
25	25			25		30	ESCO									
		1			3	3	ESCO									
1	1	1	0.02	1		5	1									
100	100	100	2.1	100		310	!									EFA
3		5	0.39				ESCO									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT	OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
									ppm					mg/m³											
			MW			Debye	Bp °C	Mp °C	TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
NITROGEN TRIFLUORIDE	7783-54-2	NF_3	71	0.002952			-129		10	10			10		29		2								
NITROGLYCERIN	55-63-0	$C_3H_5N_3O_9$	144	1.60			218		0.05	0.15	0.05					1									
NITROMETHANE	75-52-5	CH_3NO_2	61	1.14	6.12		101		20	100	100	3.5				!									EFA
NITROTOLUENE	88-72-2	$C_7H_7NO_2$	137					-9,3								1									
2-NITRONAPHTHALENE	581-89-5	$C_{10}H_7NO_2$									0.04					1									
2-NITROPROPANE	79-46-9	$C_3H_7NO_2$	89	0.99			120		25	25	25	11	25		90	!									EFA
NITROUS OXIDE	10024-97-2	N_2O	30	0.001836			-88.5		50				25		46	2									
n-NONANE all isomers	111-84-2	C_9H_20	128	0.72			151		200	200		47	200		1050	1									
O																									
OCTENE																1									
n-OCTANE all isomers	111-65-9	C_8H_{18}	114	0.70			126		300	300	500	48	75		350	1									
OSMIUM TETROXIDE	20816-12-0	OsO_4	254	5.10			Subl									!									EFA
OXALIC ACID	144-62-7	$C_2H_2O_4$	126	1.90			Subl							1	1	2									
OXYGEN DIFLUORIDE	7783-41-7	OF_2	54	0.002256			-145					0.1	C0.05		C0.1	!									EFA
OZONE	10028-15-6	O_3	48	2.144			–111.9	–192.5								1									
P																									
PALMITIC ACID	57-10-3	$C_{16}H_{32}O_2$	256.42	0.853			351-352	62.9								1									
PARADICHLOROBENZENE	106-46-7	$C_6H_4Cl_2$	147	1.25			174	53.5								1									
PARAFFINE WAX fume	8002-74-2			0.88-0.92				47						2	2									A(1) & HP (2)	
PARAFORMALDEHYDE	30525-89-4	OH(CH_2O)nH (n = 8 - 100)		0.88				120-170								2					1				
PARAQUAT (PARAQUAT DICHLORIDE)	1910-42-5	$C_{12}H_{14}C_{l2}N_2$	257.2	1.24				572°F							0.1									A(1) & HP (2)	
PARAQUAT respirable fraction 2 Cl	1910-42-5	$C_{12}H_{14}N_2$	246	1.24			Decomp	300						0.1	0.1									A(1) & HP (2)	
PARATHION	56-38-2	$C_{10}H_{14}NO_5PS$	291	1.27			375							0.1	0.05	HEPA									
Pent-1-yne	627-19-0	C_5H_8	68.12	0.691			40.2	–106 to–105								1									
Pent-2-yne	627-21-4	C_5H_8	68.12	0.71			56 to 57	–109								1									
PENTABORANE	19624-22-7	B_5H_9	63	0.62			60		0.01	0.01	0.01	0.9	0.01		0.01	1									
PENTACHLOROETHANE	76-01-7	C_2HCl_5	200	1.68			161				5					1				1					
PENTACHLORO NAPHTALENE	1321-64-8	$C_{10}H_3Cl_5$	301	1.67			326							0.5	0.5									A(1) & HP (2)	
PENTAERYTHRITOL TETRANITRATE	78-11-5	$C_5H_8N_4O_{12}$					180	141.3								HEPA									EFP

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
PENTYLENE								
PERACETIC ACID	79-21-0	$C_2H_4O_3$	76.05	1.13			105	0.1
n-PENTANE all isomers	109-66-0	C_5H_{12}	72	0.63			36.1	
n-PENTANOIC ACID		$C_5H_{10}O_2$	102				185	
2-PENTANONE	107-87-9	$C_5H_{10}O$	86	0.81			102	
PERCHLORIC ACID sol.70% cold/hot	7601-90-3	$HClO_4$	100					
PERLITE 1% quartz	93763-70-3							
PHENIDONE	92-43-3	$C_9H_{10}N_2O$	162.19					121
PHENOL cold/hot	108-95-2	C_6H_6O	94	1.06	6		182	
2-PHENOXYETHANOL		$C_8H_{10}O_2$	102				245	
PHENOLPHTHALEIN	77-09-8	$C_{20}H_{14}O_4$	318.32	1.277				262.5
PHENYL ETHER-BIPHENYL mixture (vapor)	8004-13-5	$C_{24}H_{20}O$	166	1.06			495°F	
PHENYL ETHER vapor	101-84-8	$C_{12}H_{10}O$	170	1.08			259	
PHENYL GLYCIDYL ETHER cold/hot	122-60-1	$C_9H_{10}O_2$	150	1.11			245	
PHENYLHYDRAZINE	100-63-0	$C_6H_8N_2$	108	1.10			Decomp	
PHOSGENE	75-44-5	CCl_2O	99	0.004176			8.3	-118
PHOSPHINE	7803-51-2	PH_3	34	0.001416			-87.5	
PHOSPHORIC ACID	7664-38-2	H_3PO_4	98	1.87			276	
PHOSPHORUS PENTACHLORIDE	10026-13-8	Cl_5P	208	3.60			Subl	
PHOSPHORUS PENTASULFIDE	1314-80-3	P_2S_5 or P_4S_{10}	126	2.09			-85	
PHOSPHORUS TRICHLORIDE		PCl_3	137	1.58			76	
PHOSPHORUS yellow	7723-14-0	P_4	222	1.82			514	
PHTHALIC ANHYDRIDE	85-44-9	$C_8H_4O_3$	148	1.53 (Flake)			Subl	
PICRIC ACID	88-89-1	$C_6H_3N_3O_7$	223	1.76			300	
PIPERIDINE	110-89-4	$C_5H_{11}N$	85.15	0.862			106	–7
PITCH								
PLANT OILS								
PLATINUM	7440-06-4	Pt	195	21.45			3827	
PLATINUM Soluble salts		Pt						

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
							1									
							1									
600	600	1000	400	120		350	1									
							1									
200	200	200	11	150		530	1									
							!									EFI
					10	10	HEPA									
							1									
5	5	5	0.04	5		19	1									
		20					1									
							1									
				1		7.000	1							1		
1	1	1		1		7	1							1		
0.1	1	1		C1		C6	1							1		
0.1		5		C0.14		C0.6	1									
0.1		0.02	0.9	0.1		0.4	ESCO									
0.3	0.1	0.1	0.51	0.3		0.4	ESCO									
					1	1	HEPA									
0.1	0.1					1	ESCO									
					1	1	ESCO									
0.2	0.2	0.5					ESCO									
0.02		0.2				0.1	ESCO									
1			0.05	1		6	ESCO									
					0.1	0.1	!									EFA
							1						1			
							1									
							1									
					1	1	HEPA									
							HEPA									

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
POLY(Vinyl Acetate)	9003-20-7							
POLYACRYLONITRILE	25014-41-9							
POLYETHYLENE GLYCOL	25322-68-3	$C_2n+2H_4n+6On+244n+62$						
POLYSORBATE 20	1227.54	$C_{58}H_{114}O_{26}$	1227.54	1.1				
POLYVINYL ACETATE	9003-20-7	$(C_4H_6O_2)n$	86.09					
POLYVINYLPYRROLIDONE	9003-39-8	$(C_6H_9NO)n$	2.500 -2.5000.000	1,2			110 - 180	
POTASSIUM CYANIDE	151-50-8	KCN	65.12	1.52			1625	634.5
POTASSIUM HYDROXIDE	1310-58-3	KOH	56	2.04	13.5			405
POTASSIUM PERMANGANATE	7722-64-7	$KMnO_4$	158				Decomp	
POTASSIUM PERSULFATE	7727-21-1	$K_2S_2O_8H_2$	272				Decomp	
PROPANAL	123-38-6	C_3H_6O	58.08	0.81		2.52 D	46-50	–81
PROPANE	74-98-6	C_3H_8	44	0.00186			-42	
PROPARGYL ALCOHOL	107-19-7	C_3H_4O	56	0.97			114	
PROPENE	115-07-1	C_3H_6	42				-48	
PROPIONALDEHYDE	123-38-6	C_3H_6O	58.08	0.81		2.52 D	46-50	–81
PROPIONIC ACID	79-09-4	$C_3H_6O_2$	74	0.99			141	
2-PROPOXYETHANOL		$C_6H_{14}O_2$	118				150	
n-PROPYL ACETATE	109-60-4	$C_5H_{10}O_2$	102	0.84			102	
n-PROPYL ALCOHOL	71-23-8	C_3H_8O	60	0.81			97	
n-PROPYLAMINE	107-10-8	C_3H_9N	59		11.8		48	
PROPYL ETHER	111-43-3	$C_6H_{14}O$	102	0,73			88	-123
PROPYL MERCAPTAN	107-03-9						67	-113
PROPYLENE	115-07-1	C_3H_6	42.08	1.81		0.366 D	– 47.6	– 185.2
PROPYLENE DICHLORIDE	78-87-5	$C_3H_6Cl_2$	113	1.16			97	
PROPYLENE GLYCOL MONOMETHYL ETHER	107-98-2	$C_4H_{10}O_2$	90	0.96			120	
PROPYLENE IMINE	75-55-8	C_3H_7N	57	0.80			66	
PROPYLENE OXIDE	75-56-9	C_3H_6O	58	0.83			34	
n-PROPYL NITRATE	627-13-4	$C_3H_7NO_3$	105	1.07			110.5	

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
							1									
							1									
							1									
							1									
							1									
							1									
											HEPA					
						C2					HEPA					
											HEPA					
											HEPA					
							2					1				
2500		1000		1000		1800	1									
1	1	2		1		2	1									
			76								ESCO					
												2				
10	10	10		10		30	1									
		20					2									
200		200	0.67	200		840	1									
200	200		2.6				2									
							2									
							2							1		
							1									
							2									
75	75		0.25				1				1					
100		100	10	100		360	2							1		
2				2		5	2									
20	20	2.5	44				2									
25	25	25	50	25		105					ESCO					

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING BT	OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
									ppm					mg/m³											
			MW			Debye	Bp °C	Mp °C	TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
PROPYNE	74-99-7	C_3H_4	40	0.001692			-23.1		1000	1000	1000		1000		1650	2									
PUTRESCINE	110-60-1	$C_4H_{12}N_2$	88				158–160	27								1									
PYRIDINE	110-86-1	C_3H_5N	79	0.98	8.5		115		5		5	0.17	5		15	1									
Q																									
QUARTZ	14808-	SiO_2	60				2230							0.1	0.05				HEPA						
QUINONE	106-51-4	$C_6H_4O_2$	108	1.32			Subl	240°F	0.1	0.1	0.1		0.1		0.0.4									A(1) &	
R																									
RADON	10043-92-2	Rn	222				–61.85	71.15											!						EFI
RHODIUM insoluble salts		Rh												1	0.1				HEPA						
RHODIUM soluble salts		Rh												0.01					HEPA						
ROTENONE	83-79-4	$C_{23}H_{22}O_6$	394.4	1.27			330°F								5.000				HEPA						
S																									
Sarin	107-44-8	$C_4H_{10}FO_2P$	140	1.0887 at 25°C, 1.102 at 20°C			158	-56											!						EFI
SELENIUM and Cpds	7782-49-2	Se	79	4.28			690							0.2	0.2				HEPA						
SELENIUM HEXAFLUORIDE as Se	7783-79-1	SeF_6	193	0.00792			-34.5		0.05	0.05			0.05						!						EFA
SILICON Dust	7740-21-3	Si	28	2.33			2600							10	10				HEPA						
SILICON CARBIDE Dust	409-21-2	CSi	40	3.23			Subl							10	10				HEPA						
SILICON TETRAHYDRIDE	7803-62-5	SiH_4	32	0.00332			-112		5				5		7				ESCO						
SILVER Soluble Cpds		Ag												0.01	0.01				HEPA						
SILVER SULFATE	10294-26-5	Ag_2SO_4	312	5.45			1085	652											HEPA						
SKATOLE	83-34-1	C_9H_9N	132				265 °C	93-95								1									
SOAPSTONE respirable particulate	14807-96-6	$3MgO_4.SiO_2.H_2O$		2.7-2.8										3	6				HEPA						
SODIUM ACETATE	127-09-3	$C_2H_3NaO_2$	82.03	1.528 g/cm3			881.4 (anhydrous)	324 (anhydrous)											HEPA						
SODIUM ACETATE TRIHYDRATE	6131-90-4	$C_2H_3NaO_2.3H_2O$		1.45			122 (trihydrate)	58 (trihydrate)											HEPA						
SODIUM AZIDE POWDER	26628-22-8	NaN_3	65	1.85				275					C0.1											A(1) &	
Sodium Bicarbonate	144-55-8	$CHNaO_3$	84	CHNaO3				50-270											HEPA						
SODIUM BISULFITE	7631-90-5	$NaHSO_3$	104	1.48				Decomp						5	5				HEPA						
SODIUM FLUOROACETATE	62-74-8	$C_2H_2FO_2Na$	100				Decomp							0.05	0.05				HEPA						

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
SODIUM HYDROXIDE	1310-73-2	NaOH	40	2.13	14		1390	
SODIUM LAURYL SULFATE	151-21-3	$NaC_{12}H_{25}SO_4$	288.38	1.01				
SODIUM METABISULFITE	7681-57-4	$Na_2S_2O_5$	190	1.4			Decomp	
SODIUM PERIODATE	7790-28-5	$NaIO_4$	214	3.865				300
SODIUM SULFITE ANHYDROUS	7757-83-7	Na_2SO_3	126	2.6				33.4
SODIUM SULFITE HEPTAHYDRATE	7757-83-7	Na_2SO_3	126	1.56				500
SODIUM THIOSULFATE	7772-98-7 , 10102-17-7	$Na_2S_2O_3$	158	1.67			100 (pentahydrate,-5H2Odecomp)	48.3(pentahydrate)
SOMAN		$C_7H_{16}FO_2P$	182	1.02			198	-42
STARCH	9005-25-8	$(C_6H_{10}O5)n$		1.5				
STEARATES								
STIBINE	7803-52-3	SbH_3	125	0.005172			-18.4	
STODDARD SOLVENT	8052-41-3	85% Nonane		0.78			220	
STYRENE MONOMER	100-42-5	C_8H_8	104	0.91			146	
SU-8 PHOTORESIST								
SUCROSE	57-50-1	$C_{12}H_{22}O_{11}$	342.3	1.59				186 (decomp)
SULFAMIC ACID	5329-14-6	H_2NSO_3H	97	2.15				205 (decomp)
SULFUR DECAFLUORIDE	5714-22-7	$F_{10}S_2$	254	0.010524			29	
SULFUR DICHLORIDE		SCl_2	103				Decomp	
SULFUR DIOXIDE	7446-09-5	SO_2	64	0.002712			-10	
SULFUR HEXAFLUORIDE	2551-62-4	SF_6	146	0.006132			Subl	
SULFUR MONOXIDE	13827-32-2	OS						
SULFUR MUSTARD	505-60-2	$C_4H_8Cl_2S$	159	1.27			217 (decom-poses)	14.4
SULFUR TETRAFLUORIDE	7783-60-0	SF_4	108	0.004536			-40	
SULFURIC ACID cold, fuming or heated	7664-93-9	H_2SO_4	98	1.84			296	
SULFURYL FLUORIDE	2699-79-8	F_2O2_5	102	0.004464			-55	
T								
Tabun	77-81-6	$C_5H_{11}N_2O_2P$	162.13	1.0887 at 25 °C, 1.102 at 20 °C			247.5	-50
TALC containing no Abestos fibers	14807-96-6			2.70-2.80				

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
					2	C2				HEPA						
															A(1) &	
					5	5				HEPA						
										HEPA						
										HEPA						
										HEPA						
										HEPA						
										!						EFI
										HEPA						
					10					HEPA						
0.1	0.1	0.1		0.1		0.5				!						EFA
100						350	1									
20	50	20	0.32	50		215	1									
							1									
										HEPA						
								2								
0.01		0.03		C0.01		C0.1				ESCO						
1		1								ESCO						
2	2	0.5	1.1	2		5		2								
1000	1000	1000		100		6000		2								
										!						EFA
										ESCO						
				C0.1		C0.4				!						EFA
					1	1	2	2								
5	5			5		20				!						EFA
										!						EFI
					2	2				HEPA						

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
TCEP	51805-45-9	$C_9H_{15}O_6P$	250					
TEDP (sulfotep)	3689-24-5	$C_8H_{20}O_5P_2S_2$	322	1.20			136	
TEFLON Decomposition products		$(C_2F_4)n$						
TELLURIUM & Cpds	13494-80-9	Te	128	6.24			990	
TELLURIUM HEXAFLUORIDE as Te	7783-80-4	TeF_6	242	0.010008			Subl	
TERPHENYLS	92-06-8	$C_{18}H_{14}$	230	1.1 (o)			276	
1,1,2,2-TETRACHLORO-1, 2-DIFLUOROETHANE	76-12-0	$C_2Cl_4F_2$	204	1.65			92	
1,1,2,2- TETRACHLOROETHANE	79-34-5	$C_2H_2Cl_4$	168	1.59			146	
TETRACHLORONAPHTHALENE	1335-88-2	$C_{10}H_4Cl_4$	266	1.59-1.65			331	
TETRAETHYL LEAD as Pb	78-00-2	$C_8H_{20}Pb$	323	1.65			100	
TETRAETHYL SILOXONE		$C_8H_{20}O_3SiK$						
1,1,1,2-TETRAFLUOROETHANE	811-97-2	$C_2H_2F_4$						
TETRAHYDROFURAN	109-99-9	C_4H_8O	72	0.89			65	
TETRANITROMETHANE	509-14-8	CN_4O_8	196	1.62			126	
TETRYL	479-45-8	$C_7H_5N_5O_8$	287	1.57			187	
THALLIUM and soluble cpds		Tl	204				1457	
TETRAETHYL LEAD as Pb	78-00-2	$C_8H_{20}Pb$	323	1.65			100	
THIOGLYCOLIC ACID	68-11-1	$C_2H_4O_2S$						
THIOUREA	62-56-6	CH_4N_2S	76.12	1.405				182
4,4-THIO BIS (6-tert-BUTYL-meta-CRESOL)	96-69-5	$C_{22}H_{30}O_2S$	358	1.10				150
TIN inorganic cpds	7440-31-5	Sn	119	7.28			2507	
TIN organic cpds								
TITANIUM DIOXIDE	13463-67-7	TiO_2	80	4.6				1860
Titanium tetrachloride	7550-45-0	$TiCl_4$	190	1.726			136.4	-24.8
TOLUENE	108-88-3	C_7H_8	92	0.87			110	
TOLUIDINE all isomers		C_7H_9N	107	1.05(p), 1.01(o), 0.999(m)			200	
TOLUYLEN-2,4-DIISOCYANATE	584-84-9	$C_9H_6N_2O_2$	174	1.22			251	
TOLUYLEN-2,6-DIISOCYANATE		$C_9H_6N_2O_2$	174				251	

OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³											
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
							1									
		0.01			0.2	0.2	!									EFA
							!									EFA
					0.1	0.1	HEPA									
0.02	0.02			0.02		0.2	HEPA									
				C0.5		C5	1									
500	500	1000		500		4170	ESCO									
1	1	1	1.5	1		7	1									
					2	2	1									
					0.1	0.08	ESCO									
							ESCO									
		1000					ESCO									
200	200	50	2	200		590	1									
0.01	1	1		1		8	!									EFA
					1.5	1.5	!									EFA
					0.1	0.1	HEPA									
					0.1	0.08	ESCO									
							1									
							2									
					10	10	ESCO									
					2	2	HEPA									
					0.1	0.1	HEPA									
					10		HEPA									
							HEPA									
50	100	50	2.9	100		375	1									
2	2	0.01	0.02				1									
0.01	0.01	0.01	0.25				!									EFA
		0.01					!									EFA

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT	OFFICIAL LIMIT VALUES							CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
									ppm					mg/m³											
			MW			Debye	Bp °C	Mp °C	TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA	A	B	C	D	E	F	G	H		
1,2,4-TRICHLOROBENZENE	120-82-1	$C_6H_3Cl_3$	180	1.45			213			5	5	1.4	C5		C40				ESCO						
2,3,4-TRICHLORO-1-BUTENE		$C_4H_6Cl_3$	159								0.01								!						
1,1,2-TRICHLOROETHANE	79-00-5	$C_2H_3Cl_3$	132	1.44			114		10		10		10		45	1									
TRICHLOROETHYLENE	79-01-6	C_2HCl_3	130	1.46			86		50	75	50	28				1									
1,2,3-TRICHLOROPROPANE	96-18-4	$C_3H_5Cl_3$	147	1.39			142		10				10		60	1									
Tri-ortho-CRESYL PHOSPHATE	78-30-8	$C_{21}H_{21}O_4P$	368	1.20			410												ESCO						
TRIPHENYL AMINE	603-34-9	$C_{18}H_{15}N$	245	0.77			365												ESCO						
TRIETHANOLAMINE		$C_6H_{15}O_3N$	149				Decomp	21.2						5								1			
TRIETHYLAMINE	121-44-8	$C_6H_{15}N$	101	0.73			89.5		1		10	0.48										2			
TRIMELLITIC ANHYDRIDE Fumes	552-30-7	$C_9H_4O_5$	192							0.01			0.01		0.04				!						EFA
TRIMETHYLAMINE	75-50-3	C_3H_9N	59	0.002508			-4		5				10		24							2			
TRIMETHYLBENZENE	108-97-8	C_9H_{12}	120	0.86-0.89			176		25	25	20	0.55	25		125	1									
TRIMETHYLPHOSPHITE	121-45-9	$C_3H_9O_3P$	124	1.05			108		2	2			2		10				!						EFA
TRINITROTOLUENE	118-96-7	$C_7H_5N_3O_6$	227	1.65			Explo				0.01			0.1	0.5				!						EFA
TRIFLUOROACETIC ACID	76-05-1	$C_2HF_3O_2$	114.02	1.489			72.4	-15.4								1									
TRIMETHYLSILYL CHLORIDE	75-77-4	C_3H_9SiCl	109	0.856			57	–40								2									
TRIS	77-86-1	$C_4H_{11}NO_3$	121.14				121.14	175-176								1									
TRISODIUM CITRATE	68-04-2 , 6132-04-3 (dihydrate),	$Na_3C_6H_5O_7$	258.06	1.7			Decomposes	>300 hydrates lose water ca. 150 C											HEPA						
TUNGSTEN soluble cpds		W					5900							5	5				ESCO						
TUNGSTEN and insoluble cpds	7440-33-7	W		19.3										1	1				HEPA						
TURPENTINE	8006-64-2	$C_{10}H_{16}$	136	0.86			154		100	100	100		100		560	1									
U																									
UREA	57-13-6	CH_4N_2O	60	1.32	4.56 D		133–135									2							2		
URIC ACID		$C_5H_4O_3N_4$	168					Decomp								1									
V																									
VANADIUM Dust or fume	1314-62-1	V_2O_5	182	3.36										0.05	C0.05				HEPA						
VINYL ACETATE	108-05-4	$C_4H_6O_2$	86	0.93			73		10	10	10	0.5	C4		C15	1									
VINYL BROMIDE	593-60-2	C_2H_3Br	107	0.004548			16		0.5										ESCO						

CHEMICAL NAME	CAS No.	FORMULA	MOLECULAR WEIGHT	SPECIFIC GRAVITY	pH	DIPOLE MOMENT	BOILING PT	MELTING PT
			MW			Debye	Bp °C	Mp °C
VINYL BUTYL ETHER	111-34-2	$C_6H_{12}O$	100				94	
VINYL FLUORIDE	75-02-5	C_2H_3F	46	0.00192			-72	-160,5
VINYLIDENE CHLORIDE	75-35-4	$C_2H_2Cl_2$	96	1.21			37	
VINYLIDENE FLUORIDE	75-38-7	$C_2H_2F_2$	64	0.002652			-83	
VINYL TOLUENE	25013-15-4	C_9H_{10}	118	0.89			170	
VINYL CHLORIDE	75-01-4	C_2H_3Cl	63	0.002652			-14	
VALERIC ACID	109-52-4	$C_5H_{10}O_2$	102	0.93			186-187	-34.5
VM & NAPTHA	8032-32-4			0.73-0.76			80	
VX (nerve agent)	50782-69-9	$C_{11}H_{26}NO_2PS$		1.00			298	-50
W								
WAR FARIN	81-81-2	$C_{19}H_{16}O_4$	308					161
X								
m-XYLENE	108-38-3	C_8H_{10}	106	0.86			138	
o-XYLENE	95-47-6	C_8H_{10}	106	0.88			138	
p-XYLENE	106-42-3	C_8H_{10}	106	0.86			138	
XYLIDINE	1300-73-8	$C_8H_{11}N$	121	0.98			213	
Y								
YTTRIUM & cpds	7440-65-5	Y		4.47				
Z								
ZINC CHROMATE as Cr	13530-65-9	$ZnCrO_4 \cdot 7H_2O$	183					
ZINC OXIDE Fume	1314-13-2	ZnO	81					
ZINC OXIDE Dust	1314-13-2	ZnO	81	5.61				
ZIRCONIUM Cpds as Zr	7440-67-7	Zr		6.51				

V W X Y Z

OFFICIAL LIMIT VALUES								CHOICE OF FILTER								COMBINATION	NON DUCTLESS RECOMMENDED PRODUCTS
ppm					mg/m³												
TLV TWA	FR VME	MAK TRK	Olf.	NIOSH TWA	TLV TWA	NIOSH TWA		A	B	C	D	E	F	G	H		
								1							1		
1								ESCO									
5	5	2						ESCO									
500				1				ESCO									
50	50	100	10	100		480		1									
5			3000					2									
								1									
100						350		1									
								!									EFA
					0.1	0.1		ESCO									
100	100	100	1.1	100		435		1									
100	100	100	1.1	100		435		1									
100	100	100	1.1	100		435		1									
0.5	2	5	0.06	2		10		ESCO									
					1	1		HEPA									
					0.01			HEPA									
					5	5		HEPA									
					10	5		HEPA									
					5	5		HEPA									

Kindly fill out and return to us the following form in order for us to assess the compability of your application with Esco ductless fume cabinets. Refer to the next page for more details on the information that has been sought under the various columns.

Esco® FILTRACHECK™ FORM

Chemical			Container		Handling						
No.	Name	Dilution (%)	Type : e.g. Plate, Beaker etc.	Surface Area of Evaporation	Open or Covered	Type of work : e.g. Distillation, Transfer etc.	Temperature of handling	Frequency of Work *Per Day (pd) Per Week (pw) Per Month(pw)*	Quantity of chemical used (ml, or gm.)	Quantity of chemical evaporated (ml, or gm.)	Duration of handling (min. or hrs.)
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Any Additional comments ;

Any specific need or requirement

Name :
Company name :
Address :

Postal Code :
City :
Telephone :
Email :

I The name of the chemical used in the ductless fume cabinet e.g. Toluene

II The extent to which the chemical has been diluted (in %)

III Type of container used to hold the chemical e.g. Plate, beaker

IV Surface area through which the chemical can evaporate

V Mention whether the process is being carried out open or covered

VI Provide more details on the type or nature of the work / process being carried out e.g. Distillation, Transfer etc.

VII The temperature at which the work / process is being carried out. This is especially important in case the process requires the chemical to be heated.

VIII Mention how frequently the concerned work / process is carried out.

IX Quantity of chemical (in ml. or gm.) used during the process.

X Quantity of chemical (in ml. or gm.) evaporated during the process

XI Time required for carrying out the process.

Kindly provide as much information as possible for us to be able to make an accurate assessment. Fill out the first page and send it to us by fax or snail mail. We will reply to you after completing the assessment.

Since 1978, Esco has emerged as a leader in the development of controlled environment, laboratory and pharmaceutical equipment solutions. Products sold in more than 100 countries include biological safety cabinets, fume hoods, ductless fume hoods, laminar flow clean benches, animal containment workstations, cytotoxic cabinets, hospital pharmacy isolators, and PCR cabinets and instrumentation. With the most extensive product line in the industry, Esco has passed more tests, in more languages, for more certifications, throughout more countries than any biosafety cabinet manufacturer in the world. Esco remains dedicated to delivering innovative solutions for the clinical, life science, research and industrial laboratory community. www.escoglobal.com.

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