



# **Occupational Exposure Limit Values, AFS 2011:18**

**The Swedish Work Environment Authority's provisions and  
general recommendations on occupational exposure limit  
values**

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# The Swedish Work Environment Authority's Statute Book



The Swedish Work Environment Authority's provisions and general recommendations on occupational exposure limit values;

**AFS 2011:18**  
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The following Provisions<sup>1</sup> are issued by the Swedish Work Environment Authority pursuant to Section 18 of the Work Environment Ordinance (1977:1166) and the following general recommendations are adopted.

## Aim and areas of application

**1 §** The aim of these provisions is to prevent ill health resulting from exposure to the agents listed herein.

These provisions apply to all activities where air contaminants occur or are formed.

<sup>1</sup> cf. the following directives:

- Council Directive 94/42/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16 (1) of directive 89/391/EEC) (EGT L 131, 5.5.1998, p. 11, Celex 31998L0024).
- Directive 2004/37/EEC of the European Parliament and of the Council of 29 April 2004 on the protection of workers from the risks related to exposure to carcinogens or mutagens at work (Sixth individual Directive within the meaning of Article 16(1) of Council Directive 89/391/EEC) (EUT L 158, 30.4.2004, p. 50, Celex 32004L0037).
- Directive 2009/148/EC of the European Parliament and of the Council of 30 November 2009 on the protection of workers from the risks related to exposure to asbestos at work (EUT L 330, 16.12.2009, p. 28, Celex 32009L0148).
- Commission Directive 91/322/EEC of 29 May 1991 on establishing indicative limit values by implementing Council Directive 80/1107/EEG on the protection of workers from the risks related to exposure to chemical, physical and biological agents at work. (EGT L 177, 5.7.1991, p. 24, Celex 31991L0322).
- Commission Directive 2000/39/EC of 8 June 2000 establishing a first list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work. (EGT L 142, 16.6.2000, p. 47, Celex 32000L0039).
- Commission Directive 2006/15/EC of 7 February 2006 establishing a second list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Directives 91/322/EEC and 2000/39/EC. (EUT L 38, 9.2.2006, p. 36, Celex 32006L0015).
- Commission Directive 2009/161/EU of 17 December 2009 establishing a third list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Commission Directive 2000/39/EC (EUT L 338, 19.12.2009, p. 87, Celex 32009L0161).

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*General recommendations:* Air contaminants can contain elements of chemical, microbiological and other organic air contaminants. Organic air contaminants can be, for example, flour dust or epithelial skin from animals.

When workers are exposed to several types of air contaminants, the following provisions of the Swedish Work Environment Authority apply at one and the same time:

- occupational exposure limit values
- chemical work environment risks,
- microbiological work environment risks – infection, toxigenic effect, hypersensitivity.

## Definitions

2 § Within the provisions, the following terms and definitions apply.

Air contaminant	A substance or a mixture of substances present in air which, if over a certain level, can cause ill health.
Occupational exposure	The highest acceptable average content level of an air contaminant in air which is to be inhaled, calculated as a time weighted average. A hygienic limit value is either a level limit value or a ceiling value.
Level limit value	An occupational exposure limit value for exposure during a working day, normally 8 hours.
Ceiling limit value	An occupational exposure limit value for exposure during a reference period of 15 minutes. For ammonium, monoisocyanates and diisocyanates a 5 minute reference period applies.
Short term value	A recommended highest value for exposure calculated as time weighted average over a reference period of 15 minutes. Short term values are the recommended values. They serve as a guideline in protection work and are used in the assessment of exposure conditions.

## **When assessing and measuring the content of air contaminants**

3 § The content level of air contaminants in inhaled air shall be acceptable according to the limit values described in Appendix 1.

To ensure that content levels are acceptable, they shall be tested through an assessment of exposure, in accordance with section 9 of the provisions regarding chemical hazards in the working environment and, if necessary, through measurement of exposure, in accordance with sections 4-7 of these provisions.

*General recommendations:* It may be necessary to carry out measurements when, for example, new equipment is first used or when changes in work activities could result in air contamination.

When there is a choice of more than one limit value for a substance or air contaminant, the lower value shall apply, as exposure must be acceptable with respect to all limit values.

## **How the content of air contaminants shall be measured**

4 § The person measuring air contaminants shall have undergone education which provides both theoretical and practical knowledge of

- how measurements are planned and carried out,
- how measurement data shall be treated,
- how results should be interpreted,
- how these can be shown in a measurement report according to Appendix 2.

*General recommendations:* It is important that the person carrying out the measurements has the requisite knowledge of current measurement methods, how measurements should be carried out, measurement uncertainty, measurement error sources and is familiar with the instruments to be used. It is also important that this person has good insight into the prevalent conditions in the workplace concerned.

How measurements can be carried out and used for the assessment of exposure is described in the standard Workplace atmospheres – Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy (SS-EN 689).

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5 § Measurements shall be planned in co-operation between employers and concerned employees, in addition to safety representatives, if such should exist.

The analytic methods and the equipment to be used should be suitable for the agents which are to be measured. Particular attention should be paid to the specific properties of the measuring equipment and the duration of exposure.

*General recommendations:* When measuring, samples are collected which will later be analyzed in a laboratory. The measurement equipment being used may mean that pumps are required and these must be calibrated before use. Other equipment may require the use of direct reading instruments, which saves all the measurement data which is later to be evaluated.

6 § Measurements shall be carried out in a breathing zone on as many people as possible, so that exposure can be assessed for all involved. Measurements shall refer to normal operating conditions. They shall also, where required, illustrate exposure under other conditions.

*General recommendations:* The purpose of the measurement is to acquire as accurate a picture of the exposure as possible. There is often a connection between exposure levels and the way in which various people carry out their work. This means that measurement of exposure, especially on the first occasion, may need to involve a number of those who are subject to exposure in the workplace. However, at workplaces where several persons are judged to have a similar level of exposure, measurement of every fifth person is sufficient.

The measurement positioning measurement or test equipment as close as possible to the nose and mouth, i.e. the distance should not exceed the 0.3 m breathing zone.

In cases where there is still a high content level in the air, despite measures taken in accordance with the provisions on chemical hazards in the working environment, measurements can be taken from inside a protective mask or visor. Low exposure levels inside the mask may still mean that measures are required to reduce exposure in the surrounding area.

For the possibility to calculate the exposure when breathing masks are used and when measurements are performed outside of these, the level of protection provided by the mask must be known; this should be evident from the mask's directions for use. Another factor which can affect the function of the protective device is leakage, where the mask does not fit tightly enough to the face due to hair growth, or where the breathing mask



fits poorly or is the wrong size, or where the protective equipment has been poorly maintained.

7 § The measurement shall be carried out over a period long enough to ensure reliability and so that results can be compared with a level limit value. The portion of the working hours included in the measurement shall be representative of the exposure. If exposure only occurs during a certain part of the day, then it is sufficient to carry out measurements at that time.

If the work is carried out in shifts, measurements shall be taken during the various shifts, according to the manner in which the work differs from shift to shift.

The measurement shall cover the time period to which the ceiling value refers and be carried out at those times when exposure can be assumed to be at its highest, so that the results of the measurement can be compared with a ceiling value.

When there is reason to suspect a high level of transient air contaminants, and there is no ceiling value, exposure can be compared with the short term value. A sampling such as this should be carried out for a period of 15 minutes. When someone is exposed to agents with synergistic effects and similar mechanisms of action, the combined effect of the agents shall be assessed.

*General recommendations:* The average content level, i.e. the time weighted average of an air contaminant, is acceptable if the limit value is not exceeded. Isolated transgressions can be tolerated if the average value for several measurements lies under the limit value. The objective should be that the quality of air to be inhaled is such that the average content level of the air contaminants does not exceed the limit value, even for short periods during part of a working day. A working day normally comprises eight hours and, as a rule, measurement should be carried out for at least 75 % of the working hours. It is not acceptable that a part-time employee be exposed to higher levels of air contaminants due to their shorter total exposure time. In the event of longer working periods, 12 hours for example, a standard referencing method may be employed. The method involves reducing the limit value proportionately through the multiplication of a factor of  $8/X$ , where  $X$  is the length of the working day, in hours. In the 12 hour example, the limit value would be multiplied by a factor of  $8/12$ .

Exposure equivalent to a 15 minute ceiling value should not occur for more than 15 minutes per hour. Exposure equivalent to a 5 minute ceiling value should not occur more than once every 20 minutes.

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*Time weighted average:* The measured average concentration of the air contamination shall be calculated as a time weighted average. With full-time sampling, this value is produced directly from measurement. With part-time sampling, the time weighted average value  $C_m$  is calculated using the following formula:

$$C_m = \frac{C_1xt_1 + C_2xt_2 + C_3xt_3 + \dots + C_nxt_n}{t_1 + t_2 + t_3 + \dots + t_n}$$

where  $C_1, C_2, C_3$  etc. is the measured content for each part-time sample, and  $t_1, t_2, t_3$  etc. is the sampling time for each part-time sample. An example of the calculation of the average content level of a substance can be found in Appendix 3.

In order to achieve sufficient certainty in the measurement results, 75% of working hours should be measured, as a rule. If exposure varies a great deal during the course of a normal working day, it may be necessary to carry out measurements throughout the whole working day.

*Hygienic effect:* For substances with synergistic effects and similar effect mechanisms, the combined effect of the substances shall be assessed. This is done through the calculation of the hygienic effect which is equivalent to the sum of the quotients between the measured content for each substance and their hygienic limit value. Exposure is usually considered to be acceptable if the hygienic effect is 1, at the highest.

The combined, additive, hygienic effect can be summarized in the following formula:

$$HE = \frac{C_1}{G_1} + \frac{C_2}{G_2} + \frac{C_3}{G_3} + \dots + \frac{C_n}{G_n}$$

where  $C_1, C_2, C_3$  etc. are measured content levels for the substances 1, 2, 3 etc. and  $G_1, G_2, G_3$  etc. are the limit values for these substances, expressed as the same unit. An example of the calculation of hygienic effect can be found in Appendix 3. The narcotic, intoxicating or anaesthetic effects which organic solvents have on the central nervous system are one example of an instance when the effects of different substances should be combined.

For solvents whose hygienic limit value is established with consideration for effects other than those which affect the central nervous system, e.g., benzene, a separate assessment shall be made. For benzene, the limit value is set based on its carcinogenic effect and, in terms of the limit value

level, benzene contributes only very slightly to the general effects of the solvent.

### **How the results shall be documented**

8 § The measurement results shall be documented in a measurement report. The documentation shall contain all necessary information so that the exposure to air contaminants can be assessed. The information found in Appendix 2 shall always be accounted for in the measurement report.

*General recommendations:* A particular protocol is followed when measurements are carried out. When the measurement results are complete, a measurement report is produced. Sufficient information is required, in order for the exposure to air contaminants to be assessed. It is therefore important that the measurement report fully describes the conditions which prevailed at the time the measurements were carried out, i.e. the quantities, the number of manufactured units per day, etc. and that the report states any deviations from the norm. Please refer to Appendix 2 of these provisions for further details. The measurement report can provide information regarding the efficiency of any measures taken. Furthermore, the report can form the basis for later assessments, should further exposure measurements need to be carried out. The measurement report can also be an important source of information for other surveys of exposure levels.

Section 3 of the Work Environment Ordinance states that measurement reports resulting from professional hygienic measurements shall be available for at least 5 years. If activities are transferred, then the measurement reports shall be assigned to the new operator.

### **Measures to take when limit values are exceeded**

9 § If a measurement of air contaminants shows that the hygienic limit values, according to these provisions, have been exceeded, actions shall be taken to lower exposure and reduce the risks.

Recommendations on the measures to be considered can be found in section 16 of the Swedish Work Environment Authority's provisions on chemical hazards in the working environment.

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### **Entry into force and transitional stipulations**

1. This statute enter into force on 1 July 2012 and at the same time the Swedish Work Environment Authority's provisions (AFS 2005:17) on hygienic limit values and measures against air contaminants are repealed.

2. As far as the limit value for bisphenol A in Appendix 1 is concerned, this statute comes into force on 18 December 2011.

3. Authorizations granted according to the repealed provisions, shall apply in accordance with the Swedish Work Environment Authority's provisions (AFS 2011:19) on chemical hazards in the working environment.

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## Appendix 1

**List of limit values****Explanations of the terms used in the list**

Limit values exist for various types of air contaminants and also for groups of agents.

For agents with a dust limit value, the list states whether this applies to inhalable dust, total dust or respirable dust. The definitions for the various sorts of dust are described in note 2 to the list of limit values. The limit values for the various entities are given according to the table below.

Type of air contaminant	Unit
Gases, vapours	mg/m <sup>3</sup> ppm (ml/m <sup>3</sup> , cm <sup>3</sup> /m <sup>3</sup> )
Dust, smoke, haze, aerosol	mg/m <sup>3</sup>
Enzymes	glycin units/m <sup>3</sup>
Fibres	fibres/cm <sup>3</sup>
Radon	Bq/m <sup>3</sup>

For recalculation between ppm and mg/m<sup>3</sup>, the following formula has been used. This applies at 20 °C and 101,3 kPa (760 mm Hg). The values have been rounded off.

$$\text{Conc.}(mg / m^3) = \frac{\text{Molarweight}(g / mole)}{24,1(l / mole)} \times \text{Conc.}(ppm)$$

24.1 = molar volume at 20 °C and 101.3 kPa.

# New substances or substances with retested limit values in relation to the Swedish Work Environment Authority's provisions on hygienic limit values and measures against air contaminants (AFS 2005:17) are marked with a #.

**CAS no.** is the agent's identification number according to Chemical Abstract Service. A list of the CAS numbers of the agents in the list of limit values can be found in Appendix 4. The list also contains agents which are forbidden or for which authorization is required (A and B agents, respec-

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tively), please refer to the provisions on chemical hazards in the working environment.

\* For group limit values', only one CAS number is given. For copper and inorganic compounds, the CAS number for copper is given. In these cases, the CAS number is marked with a \*.

**Year** The year when the substance was introduced into the list, or when the limit value for a certain substance was last retested, is stated in the table.

In the column marked **remarks** it is stated whether the substance belongs to one of the categories below with the following symbols:

**B =** Exposure for certain chemical substances approaching existing professional hygienic limit values and simultaneous exposure to noise levels approaching the action value of 80 dB can cause damage to hearing.

**C =** The substance is carcinogenic.  
There is a cancer risk even with an exposure other than inhalation. For certain carcinogenic substances which do not have limit values, prohibition may apply or authorization may be required, in accordance with the provisions on chemical hazards in the working environment.

**H =** The substance can easily be absorbed through the skin.  
The prescribed limit value is deemed to provide sufficient protection only on the condition that the skin is protected against exposure to the substance in question.

**M =** Medical supervision may be required for handling of this substance.  
Please refer to the provisions on occupational medical supervision. For certain substances, medical control is required only when the substance is used as a thermosetting plastic component. Please refer to the provisions on thermosetting plastics.

**R =** The substance may impair fertility.  
This refers to substances which are considered to cause damaging effects to reproductive capacity or to the development of offspring. Please refer also to the provisions on chemical hazards in the working environment and on pregnant and breastfeeding employees.

**S =** The substance is sensitizing.  
Sensitizing substances can lead to allergies or other hypersensitivity. Hypersensitivity problems mainly affect the skin or respiratory organs. Hypersensitivity means that persons react upon contact with substances which do not normally cause problems. Allergies are a

subgroup of hypersensitivity; they are caused by reactions within the body's immune system. Particularly low limit values have been set for substances with more pronounced respiratory passage-sensitizing properties.

Some substances with strong sensitizing properties may only be handled following authorization from the Swedish Work Environment Authority; please refer to the provisions on chemical hazards in the working environment. These substances have no limit values.

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Acetaldehyde	1990	75-07-0	25	45	–	–	50	90	C	
Acetamide	1993	60-35-5	10	25	–	–	25	60	C	
Acetic acid	1990	64-19-7	5	13	–	–	10	25		
2-Acetamidofluorene		53-96-3							C	1
Acetic anhydride	1974	108-24-7	–	–	5	20	–	–		
Acetone	1993	67-64-1	250	600	–	–	500	1200		
Acetonitrile	1993	75-05-8	30	50	–	–	60	100		
Acrolein	1974	107-02-8	0,1	0,2	–	–	0,3	0,7		
Acrylamide	1993	79-06-1	–	0,03	–	–	–	0,1	H, C, M	
Acrylic acid	1987	79-10-7	10	30	–	–	15	45		
Acrylonitrile	1993	107-13-1	2	4,5	–	–	6	13	H, C	
Allyl alcohol	1993	107-18-6	2	5	–	–	6	14	H	
Allylamine	1984	107-11-9	2	5	–	–	6	14	H	
Allyl chloride	1993	107-05-1	1	3	–	–	3	9	H	
Aluminium, soluble compounds (as Al)	1996									2
- total dust			–	1	–	–	–	–		
Aluminium* and oxide (as Al)	1996	7429-90-5*								2
- total dust			–	5	–	–	–	–		
- respirable dust	–	–	–	2	–	–	–	–		
# Ammonia	2011	7664-41-7	20	14	50	36	–	–		4
Amylacetate										
See: <i>Pentylacetates</i>										



Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Aniline	1993	62-53-3	1	4	-	-	2	8	H, C	
# Antimony* and comp. (as Sb) except Antimony trihydride	2011	7440-36-0*								2
- inhaleble dust			-	0,25	-	-	-	-		
Antimony trioxide		1309-64-4								
Antimony trihydride	1974	7803-52-3	0,05	0,3	-	-	-	-		
Arsenic* and inorganic compounds except arsenic trihydride (as As)	2005	7440-38-2*							C	2
- total dust			-	0,01	-	-	-	-		
Arsenic trihydride	1990	7784-42-1	0,02	0,05	-	-	-	-		
Asbestos										
<i>See: Fibres, natural crystalline other than erionite (an A-substance)</i>										
Attapulgit										
<i>See: Fibres, natural crystalline - Other</i>										
Auramine (4,4'-(Imidocarbonyl)-bis(N,N-dimethylaniline)		492-80-8							C	3
Barium, soluble compounds (as Ba)	1990									2
- total dust			-	0,5	-	-	-	-		
Benzene	1990	71-43-2	0,5	1,5	-	-	3	9	H, C	
Benzo(a)pyrene	1993	50-32-8	-	0,002	-	-	-	0,02	H, C, R	11

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
p-Benzoquinone	1978	106-51-4	0,1	0,4	–	–	0,3	1,3		10
Bensotrichloride		98-07-7							C	3
Benzidine		92-87-5								1
Benzyl butyl phthalate	1987	85-68-7	–	3	–	–	–	5	R	12
Benzyl chloride	1978	100-44-7	1	5	–	–	2	11	C	
Beryllium* and compounds (as Be)	1987	7440-41-7*							C, S	2
- total dust			–	0,002	–	–	–	–		
Biphenyl	1974	92-52-4	0,2	1,3	–	–	0,4	2,5		
# Bisfenol A		80-05-7								19
Bromine	1974	7726-95-6	0,1	0,7	–	–	0,3	2		
2-Bromo-1,1,1-trifluoro-2-chloroethane										
See: <i>Halothane</i>										
1,3-Butadiene	1993	106-99-0	0,5	1	–	–	5	10	C	
n-Butanol	1989	71-36-3	15	45	30	90	–	–	H	
sec-Butanol	1987	78-92-2	50	150	–	–	75	250	H	
iso-Butanol	1987	78-83-1	50	150	–	–	75	250	H	
tert-Butanol	1987	75-65-0	50	150	–	–	75	250	H	
2-Butoxyethanol										
See: <i>Ethylene glycol monobutyl ether</i>										
2-Butoxyethyl acetate										
See: <i>Ethylene glycol monobutyl ether acetate</i>										
Butyl acetate	2000		100	500	–	–	150	700		
n-Butyl acetate		123-86-4								

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
iso-Butyl acetate		110-19-0								
sec-Butyl acetate		105-46-4								
tert-Butyl acetate		540-88-5								
Butyl acrylate	1987	141-32-2	10	50	–	–	15	80	S	
Butylamine	1984		–	–	5	15	–	–	H	
n-Butylamine		109-73-9								
sec-Butylamine		13952-84-6								
iso-Butylamine		78-81-9								
tert-Butylamine		75-64-9								
n-Butyl glycidyl ether	1981	2426-08-6	10	50	–	–	15	80	S, M	
Butyl lactate	1996	138-22-7	5	30	–	–	10	60		14
n-Butyl methacrylate	1987	97-88-1	50	300	–	–	75	450	S	
β-Butyrolactone		3068-88-0							C	3
Cadmium* and inorganic compounds (as Cd)	2005	7440-43-9*							C, M	13
- total dust			–	0,02	–	–	–	–		
- respirable dust	2004		–	0,005	–	–	–	–	C, M	12
Cadmium dichloride		10108-64-2							C, M, R	
Cadmium difluoride		7790-79-6							C, M, R	
Calcium hydroxide	2005	1305-62-0								2
- inhalable dust			–	3	–	–	–	6		
Calcium oxide	2005	1305-78-8								2
- inhalable dust			–	1	–	–	–	2,5		
Caprolactam	1993	105-60-2	–	5	–	–	–	10		

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
(dust + vapour)										
Carbon dioxide	1974	124-38-9	5000	9000	–	–	10 000	18 000		35
Carbon disulfide	1978	75-15-0	5	16	–	–	8	25	B, H, R	
Carbon dust incl. carbon black										
<i>See: Dust carbon incl. carbon black</i>										
Carbon monoxide	1974	630-08-0	35	40	–	–	100	120	B, R	
<i>See also Exhaust fumes</i>										
Carbon tetrachloride	1978	56-23-5	2	13	–	–	3	19	H, C	
Carbonyl dichloride										
<i>See: Phosgene</i>										
3-Carene (cf. terpenes)	1990	13466-78-9	25	150	–	–	50	300	S	34
Catechol	1993	120-80-9	5	20	–	–	10	40	H	
CFC 11	1984	75-69-4	500	3000	–	–	750	4500		
CFC 12	1984	75-71-8	500	2500	–	–	750	4000		
CFC 113	1981	76-13-1	500	4000	–	–	750	6000		
Chlorine	1978	7782-50-5	0,5	1,5	1	3	–	–		
Chlorine dioxide	1996	10049-04-4	0,1	0,3	0,3	0,8	–	–		
2-Chloro-1,3-butadiene	1990	126-99-8	1	3,5	–	–	5	18	H	
4-Chloro-3-cresole	1993	59-50-7	–	3	–	–	–	6	S	
Chlorodifluoromethane										
<i>See: HCFC22</i>										
2-Chloroethanol	1981	107-07-3	–	–	1	3,5	–	–	H	23
Chloroform	1978	67-66-3	2	10	–	–	5	25	C	

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Chlorophenols and salts (as chlorophenol) <i>See also Trichlorophenol</i> <i>See also Tetrachlorophenol</i> <i>See also Pentachlorophenol</i>	1990		–	0,5	–	–	–	1,5	H	
Chloroprene <i>See: 2-Chloro-1,3-butadiene</i>										
Chromium* and its inorganic (II, III)-compounds (as Cr) - total dust	2005	7440-47-3*	–	0,5	–	–	–	–		2
Chromium(VI)-compounds (as Cr) - total dust	2005		–	0,005	–	–	–	0,015	C, S	2
Chromic acid		7738-94-5								
Chromium trioxide		1333-82-0								
Lead chromate		7758-97-6								
Potassium chromate		7789-00-6								
Potassium dichromate		7778-50-9								
Sodium chromate		7775-11-3								
Sodium dichromate		10588-01-9								
Strontium chromate		7789-06-2								
Zink chromate		13530-65-9								

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
# Cobalt* and inorganic compounds (as Co)	2011	7440-48-4*	-	0,02	-	-	-	-	C, H, S	2
- total dust										
Cobalt dichloride		7646-79-9							C, H, R, S	
Cobalt sulphate		10124-43-3							C, H, R, S	
Copper* and inorganic compounds (as Cu)	1978	7440-50-8*								2
- total dust			-	1	-	-	-	-		
- respirable dust			-	0,2	-	-	-	-		
Cotton dust (raw cotton)										
<i>See: Dust, cotton</i>										
Cresol	2000	1319-77-3	1	4,5	-	-	2	9	H	
o-Cresol		95-48-7								
m-Cresol		108-39-4								
p-Cresol		106-44-5								
p-Cresyl glycidyl ether	1981	2186-24-5	10	70	-	-	15	100	S, M	
Cristobalite	1996	14464-46-1							C, M	2
- respirable dust			-	0,05	-	-	-	-		
Cumene										
<i>See: Isopropylbenzene</i>										
Cyanamide	2000	420-04-2	-	2	-	-	-	4	S	
# Cyanides, (as CN)	2011								H	2
- inhalable dust			-	2	-	4	-	-		
Potassium cyanide		151-50-8								

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Sodium cyanide		143-33-9								
Cyanogen chloride	1978	506-77-4	0.1	0.3	–	–	0.3	0.8		
Cyclohexane	1987	110-82-7	300	1000	–	–	370	1300		
Cyclohexanol	1978	108-93-0	50	200	–	–	75	300		
Cyclohexanone	2005	108-94-1	10	41	–	–	20	81	H	
Cyclohexylamine	1993	108-91-8	5	20	–	–	10	40		
Cymene										
<i>See: Isopropyl-4-methylbenzene</i>										
Decahydrate of sodium tetraborate										
<i>See: Borax</i>										
Decanes and other higher aliphatic hydrocarbons	1989		–	350	–	–	–	500		18
Desflurane	2000	57041-67-5	10	70	–	–	20	140		
Diacetone alcohol										
<i>See: 4-Hydroxy-4-methyl-2-pentanone</i>										
4,4'-Diamino-3,3'-dichloro diphenylmethane		101-14-4							C	3
2,4-Diamino-1-methoxybenzene		615-05-4							C	3
2,4-Diaminotoluene		95-80-7							C, S	3
Dianizidine		119-90-4							C	3
Diazomethane		334-88-3							C	3
Dibenzyl phthalate	1987	523-31-9	–	3	–	–	–	5		12
Dibutyl phthalate	1987	84-74-2	–	3	–	–	–	5	R	12

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
o-Dichlorobenzene	2000	95-50-1	25	150	50	300	–	–		
p-Dichlorobenzene	2000	106-46-7	10	60	–	–	20	120		
3,3'-Dichlorobenzidine		92-94-1							C, S	3
2,2'-Dichlorodiethyl ether		111-44-4							C	3
2,2'-Dichlorodiethyl-sulfide (mustard gas)		506-60-2								3
Dichlorodifluoromethane										
See: CFC 12										
1,1'-Dichlorodimethyl ether		542-88-1							C	1
1,1-Dichloroethane		75-34-3								19
1,2-Dichloroethane	1981	107-06-2	1	4	–	–	5	20	H, C	
1,1-Dichloroethene	1981	75-35-4	5	20	–	–	10	40		
Diethanolamine	1993	111-42-2	3	5	–	–	6	30	H	
Diethylamine	1984	109-89-7	10	30	–	–	15	45	H	
2-Diethylaminoethanol	1996	100-37-8	2	10	–	–	10	50	H	
Diethylene glycol	1993	111-46-6	10	45	–	–	20	90	H	
Diethylene glycol mono-butyl ether	1996	112-34-5	15	100	–	–	30	200		
Diethylene glycol mono-butyl ether acetate	1996	124-17-4	15	130	–	–	30	250		
Diethylene glycol monoethyl ether	2000	111-90-0	15	80	–	–	30	170	H	



Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Diethylene glycol monoethyl ether acetate # Dietylenglykolmono-metyleter	2000	112-15-2	15	110	–	–	30	220	H	19
Diethylene triamine	1996	111-40-0	1	4,5	–	–	2	10	H, S	
Diethyl ether	1996	60-29-7	300	900	–	–	400	1200		
Di-(2-ethylhexyl)phthalate	1987	117-81-7	–	3	–	–	–	5	R	12
Diethyl phthalate	1987	84-66-2	–	3	–	–	–	5		12
Diglycidylether	1981	2238-07-5	–	–	0,2	1,1	–	–	S, M	
Diisocyanates	2005		0,002	–	0,005	–	–	–	S, M	4, 20
Hexamethylene diisocyanate		822-06-0	0,002	0,02	0,005	0,03	–	–	S, M	4, 20
Isophorone diisocyanate		4098-71-9	0,002	0,018	0,005	0,046	–	–	S, M	4, 20
4,4'-Methylenediphenyl diisocyanate		101-68-8	0,002	0,03	0,005	0,05	–	–	S, M	4, 20
1,5-Naphthalene diisocyanate		3173-72-6	0,002	0,017	0,005	0,044	–	–	S, M	4, 20
Toluene diisocyanate		26471-62-5	0,002	0,014	0,005	0,04	–	–	C, S, M	4, 20
2,4-Toluene diisocyanate		584-84-9								
2,6-Toluenediisocyanate		91-08-7								
Trimethylhexamethylene diisocyanate		28679-16-5	0,002	0,017	0,005	0,044	–	–	S, M	4, 20

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
2,2,4-Trimethylhexamethylene diisocyanate		16938-22-0								
2,4,4-Trimethylhexamethylene diisocyanate		15646-96-5								
Diisodecyl phthalate	1987	26761-40-0	–	3	–	–	–	5		12
Diisopropyl amine	1993	108-18-9	5	20	–	–	10	40	H	
2,6-Diisopropylphenyl isocyanate	1993	28178-42-9	0,005	0,04	0,01	0,08	–	–	S, M	4
N,N-Dimethylacetamide	1996	127-19-5	10	35	–	–	20	70	H, R	21
Dimethyl adipate	2005	627-93-0	5	36	–	–	–	–		
Dimethylamine	2000	124-40-3	2	3,5	–	–	5	9		
N,N-Dimethyl-4-aminoazobenzene		60-11-7							C	1
S-(2-(Dimethylamino)ethyl)-pseudotiourea dihydro chloride (PBA1)									S	3
N,N-Dimethylaniline	1993	121-69-7	1	5	–	–	2	10	H	
3,3'-Dimethylbenzidine									C	3
Dimethyl disulfide	1993	624-92-0	1	–	–	–	–	–		22
Dimethyl ether	1996	115-10-6	500	950	–	–	800	1500		
Dimethyl ethylamine	1993	598-56-1	2	6	–	–	5	15		
Dimethyl formamide	1987	68-12-2	10	30	–	–	15	45	H, R	23
Dimethyl glutarate	2005	1119-40-0	5	33	–	–	–	–		
1,1'-Dimethyl hydrazine		57-14-7							C	3
1,2'-Dimethyl hydrazine		540-73-8							C	3

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Dimethyl phthalate	1987	131-11-3	–	3	–	–	–	5		12
Dimethyl succinate	2005	106-65-0	5	30	–	–	–	–		
Dimethyl sulphate		77-78-1							C	3
Dimethyl sulphide	1993	75-18-3	1	–	–	–	–	–		22
Dimethyl sulfoxide	1993	67-68-5	50	150	–	–	150	500	H	
Dinitrobenzene	1978	25154-54-5	0,15	1	–	–	0,3	2	H	
1,2-Dinitrobenzene		528-29-0								
1,3-Dinitrobenzene		99-65-0								
1,4-Dinitrobenzene		100-25-4								
Dinitrogen oxide	1981	10024-97-2	100	180	–	–	500	900		
Dinitrotoluene	1993	25321-14-6	–	0,15	–	–	–	0,3	H, C	
2,4-Dinitrotoluene		121-14-2								
2,6-Dinitrotoluene		606-20-2								
Dioctyl phthalate										
<i>See: Di-(2-ethylhexyl)phthalate</i>										
Dioxane	1996	123-91-1	10	35	–	–	25	90	H, C	
N,N-Diphenylamine	1996	122-39-4	–	4	–	–	–	12		
Diphosphorous pentasulfide		1314-80-3								19
Dipropylene glycol monomethyl ether	1993	34590-94-8	50	300	–	–	75	450	H	
Disulfiram	1993	97-77-8	–	1	–	–	–	2	S	
Dust, inorganic inhalable dust	2005		–	10	–	–	–	–		2
respirable dust	1974		–	5	–	–	–	–		

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Dust and mist, organic total dust	1974		-	5	-	-	-	-		2, 15
Dust carbon (carbon black included)	1978		-	3	-	-	-	-		2
Dust, cotton (raw cotton)	1974		-	0.5	-	-	-	-		2
Dust, flour -inhalable dust	2000		-	3	-	-	-	-	S	2
Dust, graphite -total dust	1978		-	5	-	-	-	-		2
Dust, paper - total dust	1993		-	2	-	-	-	-		2
Dust, PVC - total dust	1996	9002-86-2	-	1	-	-	-	-		2
- respirable dust			-	0.5	-	-	-	-		
Dust, textile - total dust	1993		-	1	-	-	-	-		2
Dust, thermosetting plastics -total dust	1978		-	3	-	-	-	-		2, 16
Dust, wood - inhalable dust	2005		-	2	-	-	-	-	C	2, 17
Enflurane	1981	13838-16-9	10	80	-	-	20	150		
Enzymes, subtilisins	1996	1395-21-7, 9014-01-1	1	glycine unit/m <sup>3</sup>	3	glycine units/m <sup>3</sup>			S	24

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Epichlorohydrin	1978	106-89-8	0,5	1,9	–	–	1	4	H, C, S	
Erionit		66733-21-9 12510-42-8							C	1
Ethanol	1993	64-17-5	500	1000	–	–	1000	1900		
Ethanolamine	1993	141-43-5	3	8	–	–	6	15	H	
Ethene	2000	74-85-1	250	330	–	–	1000	1200		
Ether										
<i>See: Diethyl ether</i>										
2-Ethoxyethanol										
<i>See: Ethylene glycol monoethyl ether</i>										
2-Ethoxyethyl acetate										
<i>See: Ethylene glycol ethylether acetate</i>										
Ethyl acetate	1993	141-78-6	150	500	–	–	300	1100		
Ethyl acrylate	1987	140-88-5	5	20	–	–	10	40	H, S	
Ethylamine	1984	75-04-7	10	18	–	–	15	30	H	
Ethylbenzene	1987	100-41-4	50	200	–	–	100	450		
Ethylbutyl ketone										
<i>See: 3-Heptanone</i>										
Ethyl chloride	1993	75-00-3	500	1300	–	–	700	1900		
Ethyl-2-cyanoacrylate	2000	7085-85-0	2	10	–	–	4	20	S, M	
Ethylenediamine	1978	107-15-3	10	25	–	–	15	35	S	
Ethylene glycol	1993	107-21-1	10	25	–	–	20	50	H	25
Ethylene glycol dinitrate	1990	628-96-6	0,03	0,2	–	–	0,1	0,6	H	

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Ethylene glycol isopropyl ether acetate	1996	19234-20-9	10	60	–	–	20	120	H	
Ethylene glycol monobutyl ether	1993	111-76-2	10	50	–	–	20	100	H	
Ethylene glycol monobutyl ether acetate	1993	112-07-2	10	70	–	–	20	140	H	
Ethylene glycol monoethyl ether	2000	110-80-5	5	19	–	–	10	40	H, R	26
Ethylene glycol monoethyl ether acetate	2000	111-15-9	5	30	–	–	10	50	H, R	26
Ethylene glycol monoisopropyl ether	1996	109-59-1	10	45	–	–	20	90	H	
Ethylene glycol monoisopropyl ether acetate	1996	19234-20-9	10	60	–	–	20	120	H	
Ethylene glycol monomethylether		109-86-4							R	3
Ethylene glycol monomethylether acetate		110-49-6							R	3
Ethylene glycol mono-propyl ether	1996	2807-30-9	10	45	–	–	20	90	H	
Ethylene imine		151-56-4							C	3
Ethylene oxide	1989	75-21-8	1	2	–	–	5	9	H, C	
Ethylene thiourea									R	3
2-Ethylhexyl lactate	1996	6283-86-9	5	40	–	–	10	80		14

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
2-Ethylcarbamate									C	3
Ethyl chloride	1993	75-00-3	500	1300	–	–	700	1900		
Ethyl lactate	1996	97-64-3	5	25	–	–	10	50		14
Ethyl methacrylate	1987	97-63-2	50	250	–	–	75	350	S	
Ethyl methane sulphonate									C	3
N-Ethyl morpholine	1984	100-74-3	5	25	–	–	10	50	H	
Exhaust fumes	1990									
as carbon monoxide	1990	630-08-0	20	25						5
as nitrogen dioxide	2005	10102-44-0	1	2	–	–	–	–		5
Fibres, man made inorganic crystalline fibres	2005		0,2 fibre/cm <sup>3</sup>		–	–	–	–	M	27
Graphite fibres	2005		0,2 fibre/cm <sup>3</sup>						M	27
Silicon carbide fibres	2005		0,2 fibre/cm <sup>3</sup>						C, M	27
Fibres, man made vitreous (amorphous) fibres										
Refractory ceramic fibres	2005		0,2 fibre/cm <sup>3</sup>		–	–	–	–	C, M	27 29
Special purpose fibres	2005		0,2 fibre/cm <sup>3</sup>		–	–	–	–	C, M	27
Other fibres	2005		1 fibre/cm <sup>3</sup>							27
Fibres, natural crystalline other than erionite (an A-substance)										
#Asbestos	2005		0,1 fibre/cm <sup>3</sup>						C, M	27
Actinolite		77536-66-4							C, M	27

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Amosite		12172-73-5							C, M	27
Anthophyllite		77536-67-5							C, M	27
Chrysotile		12001-29-5							C, M	27
Crocidolite		12001-28-4							C, M	27
Tremolite		77536-68-6							C, M	27
Other fibres	1990		0,5 fibre/cm <sup>3</sup>							27, 28
Flour dust										
<i>See: Dust, flour</i>										
Fluorides (as F)	1978		–	2	–	–	–	–		30
Fluorine	1974	7782-41-4	0,1	0,2	–	–	0,3	0,5		
# Formaldehyde	2011	50-00-0	0,3	0,37	0,6	0,74	–	–	C,H, S, M	
Formamide	1993	75-12-7	10	20	–	–	15	30	H, R	
Formic acid	1990	64-18-6	3	5	–	–	5	9		
Furfural	1990	98-01-1	2	8	–	–	5	20	H	
Furfuryl alcohol	1990	98-00-0	5	20	–	–	10	40	H	
Gasoline, aviation, motor, wide cut jet fuel and chainsaw										6
Gasoline, industrial, hexane type			50	180	–	–	75	250		7, 8
Gasoline, industrial, heptane type			200	800		300	1200			7, 8, 9
Gasoline, industrial, octane type			200	900		300	1400			7, 8
Glass wool										
<i>See: Fibres man made vitreous (amorphous) fibres- Others</i>										



Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
# Glutaraldehyde	2011	111-30-8	–	–	0,1	0,4	–	–	S	
Glycerol trinitrate										
<i>See: Nitroglycerine</i>										
Glycol										
<i>See: Ethylene glycol</i>										
Glycol dinitrate										
<i>See: Ethylene glycol dinitrate</i>										
Graphite dust										
<i>See: Dust, graphite</i>										
Graphite fibres										
<i>See: Fibres, man made inorganic crystalline fibres</i>										
Halloysite										
<i>See: Fibres, natural crystalline - Other</i>										
Halothane	1990	151-67-7	5	40	–	–	10	80		
HCFC 22	1984	75-45-6	500	1800	–	–	750	2500		
HDI										
<i>See: Diisocyanates</i>										
HFC 134a	1996	811-97-2	500	2000	–	–	750	3000		
n-Heptane and other heptanes	1989	142-82-5	200	800	–	–	300	1200		
2-Heptanone	1993	110-43-0	25	120	–	–	50	250		
3-Heptanone	1993	106-35-4	25	120	–	–	50	250		
# Hexahydrophthalic anhydride	2011	85-42-7 13149-00-3							S, M	3

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
		14166-21-3								
Hexamethylenetetramine	1984	100-97-0	–	3	–	–	–	5	S	
Hexamethyl phosphor triamide		680-31-9							C	1
n-Hexane	1989	110-54-3	25	90	–	–	50	180		
Hexanes, except n-hexane	1989		200	700	–	–	300	1100		
2-Methylpentane		107-83-5								
3-Methylpentane		96-14-0								
2,2-Dimethylbutane		75-83-2								
2,3-Dimethylbutane		79-29-8								
2-Hexanone	1993	591-78-6	1	4	–	–	2	8	H	
Hexylene glycol										
<i>See: 2-Methyl-2,4-pentandiol</i>										
Hydrazine		302-01-2							C	3
Hydrogen bromide	2000	10035-10-6	1	3,5	2	7	–	–		
Hydrogen chloride	1974	7647-01-0	–	–	5	8	–	–		
# Hydrogen cyanide (as CN)	2011	74-90-8	1,8	2	3,6	4	–	–	H	
Hydrogen fluoride	1987	7664-39-3	–	–	2	1,7	–	–		30
Hydrogen peroxide	1990	7722-84-1	1	1,4	2	3	–	–		
Hydrogen selenide	1990	7783-07-5	0,01	0,03	–	–	0,05	0,2		
Hydrogen sulphide	1987	7783-06-4	10	14	15	20	–	–		
Hydroquinone	1993	123-31-9	–	0,5	–	–	–	1,5	S	10

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
2-Hydroxyethyl acrylate	1981	818-61-1	1	5	–	–	2	10	H, S, M	
4-Hydroxy-4-methyl-2-pentanone	1993	123-42-2	25	120	–	–	50	240		
Indium* and inorganic compounds (as In)	1996	7440-74-6*								
- total dust			–	0,1	–	–	–	–		2
Iodine	1974	7553-56-2	–	–	0,1	1	–	–		
Iron oxide (as Fe)	1978	1309-37-1	–	3,5	–	–	–	–		2
- respirable dust										
Isobutyl methacrylate	1987	97-86-9	50	300	–	–	75	450	S	
Isocyanates										32
<i>See : Diisocyanates and Monoisocyanates</i>										
Isocyanic acid	2005	75-13-8	0,01	0,018	0,02	0,036	–	–	M	4, 33
Isoflurane	1990	26675-46-7	10	80	–	–	20	150		
Isophorone	1993	78-59-1	–	–	5	30	–	–		
Isopropanol	1989	67-63-0	150	350	–	–	250	600		
2-Isopropoxyethanol										
<i>See: Ethylene glycol monoisopropyl ether</i>										
2-Isopropoxy ethyl acetate										
<i>See: Ethylene glycol isopropylether acetate</i>										
Isopropylamine	1993	75-31-0	5	12	–	–	10	25		
Isopropylbenzene	1984	98-82-8	25	120	–	–	35	170	H	
Isopropyl nitrate	1978	1712-64-7	10	45	–	–	15	70		
Kerosene, aviation, motor										6

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Laughing gas <i>See: Dinitrogen oxide</i>										
# Lead* and inorganic compounds (as Pb)	2011	7439-92-1*							B, R, M	2, 13
- inhalable dust			-	0,1	-	-	-	-		
- respirable dust			-	0,5	-	-	-	-		
Lead monoxide		1317-36-8								
Limonene (cf. terpenes)	1990	138-86-3	25	150	-	-	50	300	S	34
# Lithium* and comp. (as Li)	2011	7439-96-5*								2
- inhaleble dust			-	-	-	0,02	-	-		
Litium hydride		7580-67-8								
# Maleic anhydride	2011	108-31-6	0,05	0,2	0,1	0,4	---		S, M	
Manganese* and inorganic compounds (as Mn)	2005	7439-96-5*								2
- total dust			-	0,2	-	-	-	-		
- respirable dust	2005		-	0,1	-	-	-	-		
MDI <i>See: Diisocyanates</i>										
MEK <i>See: Methyl ethyl ketone</i>										
Mercury, org. compounds (as Hg)	1993		-	0,01	-	-	-	-	B, H	

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Mercury* and inorganic compounds (as Hg)	1993	7439-97-6*	–	0,03	–	–	–	–	B, H	
Methacrylic acid	1987	79-41-4	20	70	–	–	30	100		
Methanol	1990	67-56-1	200	250	–	–	250	350	H	
1-Methoxy-2-propanol	1990	107-98-2	50	190	–	–	75	300	H	
1-Methoxy-2-propyl acetate	1990	108-65-6	50	250	–	–	75	400	H	
Methyl acetate	1993	79-20-9	150	450	–	–	300	900		
Methyl acrylate	1987	96-33-3	10	35	–	–	15	50	H, M S	
Methylamine	1984	74-89-5	10	13	–	–	20	25	H	
Methyl amyl alcohol <i>See: 4-Methyl-2-pentanol</i>										
Methyl amyl ketone <i>See: 2-Heptanone</i>										
Methyl bromide	1990	74-83-9	5	19	–	–	10	40	H	
Methyl-n-butyl ketone <i>See: 2-Hexanone</i>										
Methyl chloride	1996	74-87-3	10	20	–	–	20	40		
Methyl chloroform <i>See: 1,1,1-Trichloroethane</i>										
Methylchlorometyl ether		107-30-2						C	1	
20-Methylcholantrene		56-49-5						C	1	
Methyl-2-cyanoacrylate	2000	137-05-3	2	9	–	–	4	18	S, M	

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Methylene chloride	1989	75-09-2	35	120	–	–	70	250	H, C	37
4,4'-Methylene dianiline		101-77-9							C	3
Methyl ethyl ketone	1987	78-93-3	50	150	–	–	100	300		
Methyl ethyl ketone peroxide	1981	1338-23-4	–	–	0,2	1,5	–	–	M	
Methyl formate	1993	107-31-3	100	250	–	–	150	350		
5-Methyl-3-heptanone	1993	541-85-5	25	130	–	–	50	250		
# Methylhexahydro phtalic anhydride	2011	25550-51-0 19438-60-9 48122-14-1 57110-29-9							S, M	3
5-Methyl-2-hexanone	2005	110-12-3	25	120	–	–	50	250		
Methyl isoamyl ketone										
<i>See: 5-Methyl-2-hexanone</i>										
Methyl isobutyl ketone	1989	108-10-1	25	100	–	–	50	200		
Methyl isocyanate	2005	624-83-9	0,01	0,024	0,02	0,047	–	–	M	4, 33
Methyl iodide	1981	74-88-4	1	6	–	–	5	30	H, C	
4-Methyl-isopropyl-benzene	1984	99-87-6	25	140	–	–	35	190		
Methyl mercaptan	1993	74-93-1	1	–	–	–	–	–		22
Methyl methacrylate	1987	80-62-6	50	200	–	–	150	600	H, S	
Methyl methanesulfonate		66-27-3							C	3
N-Methylmorpholine	1984	109-02-4	5	20	–	–	10	40	H	
N-Methyl-N-nitrosourea		684-93-5							C	1

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
2-Methyl-2,4-pentanediol	1996	107-41-5	–	–	25	120	–	–		
4-Methyl-2-pentanol	1996	108-11-2	25	110	–	–	40	170	H	
N-Methyl-2-pyrrolidone	1990	872-50-4	50	200	–	–	75	300		
α-Methylstyrene	2005	98-83-9	20	98			50	245	M	
Methyl tert-butyl ether	2000	1634-04-4	30	110	–	–	60	220		
# Methyltetrahydrophthalic anhydride	2011	26590-20-5 11070-44-3 34090-76-1 1694-82-2 3425-89-6 5333-84-6 42498-58-8							S, M	3
Mineral wool										
<i>See: Fibres, man made vitreous (amorphous) fibres - Other</i>										
Molybdenum, highly soluble compounds (as Mo)	1984									2
- total dust			–	5	–	–	–	–		
Molybdenum* sparingly soluble compounds (as Mo)	1984	7439-98-7*								2
- total dust			–	10	–	–	–	–		
- respirable dust			–	5	–	–	–	–		
Monochloroacetic acid	1993	79-11-8	1	4	–	–	2	8	H	
# Monochlorobenzene	2011	108-90-7	5	23	–	–	15	70		

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Monoisocyanates										
<i>See: 2,6-Diisopropyl-phenylisocyanate</i>										
<i>Phenylisocyanate</i>										
<i>Isocyanic acid</i>										
<i>Methylisocyanate</i>										
Monomethyl hydrazine		60-34-4							C	3
Morpholine	2000	110-91-8	10	35	–	–	15	50	H	
MTBE										
<i>See: Methyl tert-butyl ether</i>										
Naphtha										
<i>See: Petroleum naphtha</i>										
Naphthalene	2000	91-20-3	10	50			15	80		
α-Naftylamin		134-32-7							C	3
β-Naftylamin		91-59-8							C	1
Naphthalenes, chlorinated	1978	1321-65-9	–	0,2	–	–	–	0,6	H	
NDI										
<i>See: 1,5-Naphthalene diisocyanate</i>										
Nickel	1978	7440-02-0							S	2
- total dust			–	0,5	–	–	–	–		
Nickel carbonyl	1974	13463-39-3	0,001	0,007	–	–	–	–	C, R	



Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Nickel compounds (as Ni), except nickel carbonyl and trinickel disulfide - total dust	1978		–	0,1	–	–	–	–	C, S	2
Nickel subsulfide <i>See: Trinickel disulfide</i>										
# Nicotine	2011	54-11-5	–	0,1	–	–	–	–	H	
Nitric acid	1974	7697-37-2	2	5	–	–	5	13		
Nitric oxide	1990	10102-43-9	25	30	–	–	50	60		
Nitrobenzene	1974	98-95-3	1	5	–	–	2	10	H	
Nitrodiphenyl		92-93-3							C	1
Nitroethane	1993	79-24-3	20	60	–	–	50	150		
Nitrogen dioxide <i>See also Exhaust fumes</i>	1990	10102-44-0	2	4	5	10	–	–		
Nitroglycerine	1990	55-63-0	0,03	0,3	–	–	0,1	0,9	H	
Nitroglycol <i>See: Ethylene glycol dinitrate</i>										
Nitromethane	1993	75-52-5	20	50	–	–	50	130		
1-Nitropropane	1990	108-03-2	5	18	10	35	–	–		
2-Nitropropane	1996	79-46-9	2	7	6	20	–	–	C	
N-Nitrosodimethylamine		62-75-9							C	3
Nitrotoluene	1993	1321-12-6	1	6	–	–	2	11	H, C, R	
2-Nitrotoluene		88-72-2								
3-Nitrotoluene		99-08-1								

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
4-Nitrotoluene		99-99-0							H	
Nonanes	1989		150	800	–	–	200	1100		
Octanes	1989		200	900	–	–	300	1400		
Oil mist, incl. oil fumes	1990		–	1	–	–	–	3		38, 39
Oxalic acid	1990	144-62-7	–	1	–	–	–	2		
Ozone	1990	10028-15-6	0,1	0,2	0,3	0,6	–	–		
PAH										
<i>See: Benzo(a)pyrene</i>										
PCB (polychlorinated biphenyls)	1978		–	0,01	–	–	–	0,03	H, C	
# Penicillium - inhaleble dust	2011		–	0,1	–	–	–	–	S	2
PVC-dust										
<i>See: Dust, PVC</i>										
Pentachlorophenol and salts (as pentachlorophenol)	1974	87-86-5	–	0,5	–	–	–	1,5	H	
1,1,1,2,2-Pentafluoroethane	2005	354-33-6	500	2500	–	–	750	3750		
Pentanes	1978		600	1800	–	–	750	2000		
iso-Pentane		78-78-4								
n-Pentane		109-66-0								
tert.Pentane		463-82-1								

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
# Pentylacetate	2011		50	270	–	–	100	540		
n-Pentyl acetate		628-63-7								
1,1-Dimethyl propyl acetate		625-16-1								
1-Methylbutyl acetate		626-38-0								
2-Methylbutyl acetate		624-41-9								
3-Methylbutyl acetate		123-92-2								
3-Pentyl acetate		620-11-1								
Petroleum-based fuels										6
Petroleum naphtha										40
Phenol	1987	108-95-2	1	4	–	–	2	8	H, M	21
Phenyl glycidyl ether	1981	122-60-1	10	60	–	–	15	90	C, S, M	
Phenyl isocyanate	1984	103-71-9	0,005	0,02	0,01	0,05	–	–	S, M	4
Phenyl-β-naphtyl amine									C	3
Phosgene	1974	75-44-5	–	–	0,05	0,2	–	–		
Phosphoric acid	1974	7664-38-2	–	1	–	–	–	3		
Phosphorous pentachloride	2005	10026-13-8	–	1	–	–	–	2		
Phosphorous pentoxide	2000	1314-56-3	–	1	–	–	–	5		
Phosphorous trichloride	2005	7719-12-2	0,2	1,2	–	–	0,4	2,4		
Phosphorous trihydride	1974	7803-51-2	0,3	0,4	–	–	1	1,4		
Phosphoryl chloride	2005	10025-87-3	0,1	0,6	–	–	0,2	1,2		
Phthalates	1987		–	3	–	–	–	5		12, 31
# Phthalic anhydride	2011	85-44-9	0,03	0,2	0,06	0,4	–	–	S, M	

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Picric acid		88-89-1							19	
α-Pinene (cf. Terpenes)	1990	80-56-8	25	150	–	–	50	300		34
β-Pinene (cf. Terpenes)	1990	127-91-3	25	150	–	–	50	300		34
Piperazine* and salts (as piperazine)	1987	110-85-0*	0,1	0,3	–	–	0,3	1	S	
Platinum*, and sparingly soluble compounds (as Pt)	2000	7440-06-4*								2
- total dust			–	1	–	–	–	–		
Platinum, soluble com- pounds (as Pt)	2000								S	2
- total dust			–	0,002	–	–	–	–		
Polychlorinated biphenyls <i>See: PCB</i>										
Potassium aluminium - tetrafluoride	2005	60304-36-1								2
- inhalable dust			–	0,4	–	–	–	–		
Potassium hydroxide - inhalable dust	2005	1310-58-3	–	1	–	2	–	–		2
n-Propanol	1989	71-23-8	150	350	–	–	250	600		
2-Propanol <i>See: Isopropanol</i>										
Propene	1996	115-07-1	500	900	–	–	–	–		
β-Propiolactone		57-57-8							C	3

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Propionic acid	1990	79-09-4	10	30	–	–	15	45		
2-Propoxyethanol <i>See: Ethylene glycol monopropyl ether</i>										
Propyl acetate	1996	109-60-4	100	400	–	–	200	800		
1,2-Propylene glycol dinitrate	1987	6423-43-4	0,1	0,7	–	–	0,3	2	H	
Propyleneglycol methyl ether acetate <i>See: 1-Metoxo-2-propyl acetate</i>										
Propylene glycol monomethyl ether, isomer mixture <i>See also 1-Metoxo-2-propanol</i>	1990	1320-67-8	50	190	–	–	75	300	H	
1,2-Propylene imine		75-55-8							C	3
Propylene oxide	1993	75-56-9	2	5	–	–	10	25	C	
Pyrethrum		8003-34-7								19
Pyridine	1996	110-86-1	2	7	–	–	3	10		
Quartz - respirable dust <i>See also Cristobalite and Tridymite</i>	1996	14808-60-7	–	0,1	–	–	–	–	C, M	1
Quinone <i>See: p-Benzoquinone</i>										

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
# Radon – underground work	2011	10043-92-2	–	–	–	–	–	–	C	41
# Radon – other work	2011	10043-92-2	–	–	–	–	–	–	C	42
Resorcinol	1993	108-46-3	10	45	–	–	–	–	H, M	
Selenium and inorganic compounds other than hydrogen selenide (as Se)	1990	7782-49-2								2
- total dust			–	0,1	–	–	–	–		
Sepiolite <i>See: Fibres, natural crystalline- Other fibres</i>										
Sevoflurane	2000	28523-86-6	10	80	–	–	20	170		
Silicon carbide fibres <i>See: Fibres man made inorganic crystalline fibres</i>										
Silver, soluble compounds (as Ag)	1990									2
- total dust			–	0,01	–	–	–	–		
Silver* and sparingly soluble compounds (as Ag)	1990	7440-22-4*								2
- total dust			–	0,1	–	–	–	–		
Sodium azide		26628-22-8								19
Sodium hydroxide	2005	1310-73-2								
- inhalable dust			–	1	–	2	–	–		

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Sodium tetraborate decahydrate	1978	1303-96-4	–	2	–	–	–	5	H	2
Stearates - total dust	1996		–	5	–	–	–	–		2, 43, 44
# Styrene	2011	100-42-5	10	43	–	–	20	86	B, H, M	
Sulfides (sum total of dimethyl disulfide, dimethyl sulfide and methyl mercaptan)	1993		1	–	–	–	–	–		
Sulfotep		3689-24-5								19
Sulfur dioxide	1987	7446-09-5	2	5	5	13	–	–		
Sulfur hexafluoride	1993	2551-62-4	1000	6000	–	–	–	–		
# Sulfuric acid	2011	7664-93-9	–	0,1	–	–	–	0,2	C	
Sulfur tetrafluoride	1993	7783-60-0	–	–	0,1	0,4	–	–		
Synthetic inorganic fibres										
<i>See: Fibres, man-made inorganic crystalline fibres</i>										
Talc	1996	14807-96-6								2
- total dust			–	2	–	–	–	–		
- respirable dust			–	1	–	–	–	–		
TDI										
<i>See: Diisocyanates</i>										
Tellurium* and compounds (as Te)	1981	13494-80-9*								2
- total dust			–	0,1	–	–	–	–		

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Terpenes	1990		25	150	–	–	50	300		34
1,1,2,2-Tetrabromoethane	1993	79-27-6	1	14	–	–	2	30		
Tetrachloroethylene	1989	127-18-4	10	70	–	–	25	170	C	
Tetrachlorophenol and salts	1990	25167-83-3	–	0,5	–	–	–	1,5	H	
(as tetrachlorophenol)										
2,3,4,5-Tetrachloro phenol		4901-51-3								
2,3,4,6- Tetrachloro phenol		58-90-2								
2,3,5,6- Tetrachloro phenol		935-95-5								
# Tetrachlorophtalic anhydride		117-08-8							S, M	3
Tetraethyl lead (as Pb)	1981	78-00-2	–	0,05	–	–	–	0,2	H, R	
1,1,1,2-Tetrafluoroethane										
<i>See: HFC 134a</i>										
Tetrahydrofuran	1993	109-99-9	50	150	–	–	80	250		
# Tetrahydrophthalic-anhydride	2011	85-43-8 935-79-5							S, M	3
Tetramethyl lead (as Pb)	1981	75-74-1	–	0,05	–	–	–	0,2	H, R	
Tetranitromethane	1993	509-14-8	0,05	0,4	–	–	0,1	0,8		
Textile dust										
<i>See: Dust, textile</i>										



Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Thioacetamide		62-55-5							C	3
Thioglycolic acid	1996	68-11-1	1	4	–	–	2	8	H	
Thiram	1993	137-26-8	–	1	–	–	–	2	S	
# Tin* and inorg. comp - inhalable dust	2011	7440-31-5*	–	2	–	–	–	–		2
Tin organic compounds (as Sn)	1978								H	1
- total dust			–	0,1	–	–	–	0,2		
Titanium dioxide	1990	13463-67-7								2
- total dust			–	5	–	–	–	–		
# Toluene	2011	108-88-3	50	192	–	–	100	384	B, H	
o-Toluidin		119-93-7							C	3
1,2,4-Trichlorobenzene		120-82-1								19
1,1,1-Trichloroethane	1989	71-55-6	50	300	–	–	90	500		
1,1,2-Trichloroethylene	1989	79-01-6	10	50	–	–	25	140	C	37 45
Trichlorophenol and salts (as trichlorophenol)	1990	25167-82-2	–	0,5	–	–	–	1,5	H, C	
2,3,4- Trichlorophenol		15950-66-0								
2,3,5- Trichlorophenol		933-78-8								
2,3,6- Trichlorophenol		933-75-5								
2,4,5- Trichlorophenol		95-95-4								
2,4,6- Trichlorophenol		88-06-2								
3,4,5- Trichlorophenol		609-19-8								

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Trichlorofluoromethane										
<i>See: CFC 11</i>										
1,1,2-Trichloro-1,2,2-trifluoroethane										
<i>See: CFC 113</i>										
# Triethanol amine	2011	102-71-6	0,8	5	–	–	1,6	10	H	
Triethylamine	1989	121-44-8	2	8	–	–	10	40		
Triethylenetetramine	1984	112-24-3	1	6	–	–	2	12	S	
1,1,2-Trifluoro-2-chloroethyldifluoromethyl ether										
<i>See: Enflurane</i>										
2,2,2-Trifluoro-1-chloroethyldifluoromethyl ether										
<i>See: Isoflurane</i>										
1,1,1-Trifluoroethane	2005	420-46-2	500	1750	–	–	750	2625		
# Trimellitic anhydride	2011	552-30-7	0,002	0,02	0,005	0,04	–	–	S, M	
Trimethyl benzene	1989	25551-13-7	25	120	–	–	35	170		46
1,2,3-Trimethyl benzene		526-73-8								
1,2,4-Trimethyl benzene		95-63-6								
1,3,5-Trimethyl benzene		108-67-8								
1,1,1-Trimethylolpropane	1996	77-99-6	–	5	–	–	–	–		2
Trinickel disulfide (as Ni)	1978	12035-72-2							C, S	2
- total dust			–	0,01	–	–	–	–		

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
2,4,6-Trinitrotoluene	1993	118-96-7	–	0,1	–	–	–	0,2	H	
Tungsten, highly soluble compounds (as W) total dust	1981		–	1	–	–	–	–		2
Tungsten, and sparsely soluble compounds (as W) total dust	1981	7440-33-7	–	5	–	–	–	–		2
Turpentine	1990	8006-64-2	25	150	–	–	50	300	H, S	34
Vanadium pentoxide (as V) - total dust - respirable dust	1987	1314-62-1	–	0,2	–	–	–	–		2
			–	–	–	0,05	–	–		
Vinyl acetate	1993	108-05-4	5	18	–	–	10	35		
Vinyl chloride	1974	75-01-4	1	2,5	–	–	5	13	H, C	
Vinylidene chloride <i>See: 1,1-Dichloroethene</i>										
Vinyl toluene	1993	25013-15-4	10	50	–	–	30	150	H	
# White spirit 2-25% aromatic comp. Dearomatized white spirit (<2% aromatic)	2011		30	175	–	–	60	350	H	36
			50	300			100	600	H	
Wollastonite <i>See: Fibres, natural crystalline - Other</i>										

Substance	Year	CAS-no	Level limit value (LLV)		Ceiling limit value (CLV)		Short-term value (STV)		Notes	Notes
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>		
Wood dust										
<i>See: Dust, wood</i>										
# Xylene	2011	1330-20-7	50	221	–	–	100	442	H	
o-Xylene		95-47-6								
m-Xylene		108-38-3								
p-Xylene		106-42-3								
Zink chloride	1974	7646-85-7								1
- respirable dust			–	1	–	–	–	–		
Zink oxide	1974	1314-13-2								1
- total dust			–	5	–	–	–	–		
Ziram	1993	137-30-4	–	1	–	–	–	2	S	

### Notes concerning the list of limit values

- 1) The substance may not be handled. Certain exceptions exist however. For further information, please see sections 45-46 in the provisions on chemical hazards in the working environment, regarding the prohibitions and authorizations applicable to substances belonging to group A, please see Appendix 1.

- 2) **Inhalable** dust refers to the dust fraction defined in the Swedish standard SS-EN 481, Work Atmospheres – Size fraction definition for measurement of airborne particles, Edition 1, 1993, point 2.3 and which has a sampling characteristic in accordance with point 5.1.

**Respirable** dust refers to that dust fraction which is defined in the Swedish standard SS-EN 481, Work Atmospheres – Size fraction definition for measurement of airborne particles, Edition 1, 1993, point 2.11 and which a sampling characteristic in accordance with point 5.3.

**Total dust** refers to particles (aerosols) which fasten to a filter in the proof stick as described in The Method Series, Sampling of total dust and respirable dust, Method no. 1010, the National Board of Occupational Safety and Health, now known as the Swedish Work Environment Authority. The filter diameter is normally 37 mm, but it can also be 25 mm. Despite its name, this method does not sample the total quantity of airborne particles.

Please also refer to the Comments regarding note 2 on the list of limit values on page 59.

- 3) Handling of this substance requires authorization from the Swedish Work Environment Authority. For further information please see sections 47-48 in the provisions on chemical hazards in the working environment and, regarding the prohibitions and authorizations applicable to substances belonging to group B, please see Appendix 1.
- 4) The ceiling value refers to a 5 minute period.
- 5) The table's specific limit values for nitrogen dioxide and carbon monoxide are intended to take into consideration the combined effect of those substances occurring in exhaust fumes, including carcinogenic substances. These substances are therefore used as indicator substances. Exposure shall be acceptable with respect to both values. It is likely that the size of the carbon monoxide value is based upon exposure to exhaust fumes from petrol and gas-driven engines, whilst the nitrogen dioxide value represents the equivalent for diesel engines. On the other hand, the hygienic effect between carbon monoxide and nitrogen dioxide should not be taken into consideration.
- 6) Gasoline, diesel oil, jet fuel, domestic fuel/heating oil and other petroleum-based fuels have no set limit values because they are composite blends of a large number of substances whose content levels are often not known in detail. Furthermore, they vary depending on the fuel type. What is stated here are approximated values which can be used in preventative safety work and in assessments made of a work site. The values represent the highest acceptable total content level of hydrocarbons in the air. They are used in the same way as the values in the list of limit values.

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Product	Maximum accept total content level of hydrocarbons in the air, mg/m <sup>3</sup> (time weighted average for a working day)
Aviation gasoline	350
Engine gasoline	250
Alkylate gasoline <sup>1</sup>	900
Jet fuel <sup>2</sup>	250
Diesel Mk 1 <sup>3</sup>	350
Heating oil	250

- 1) Special gasoline for engine-driven work equipment (Swedish standard SS 155461) e.g., chainsaws.
- 2) Also known as Jet A-1, aviation kerosene, etc.
- 3) Diesel (Mk 2 and Mk 3) with higher aromatic hydrocarbon content (max 20 and 25 %) also exists but it has a limited market.  
  
For measurements of hydrocarbons, instruments or laboratory methods which provide the total content of the substances can be used. The instrument shall be calibrated against the fuel in question or, for example, pure octane.
- 7) The limit value refers to petrol containing less than 0.2 % benzene.
- 8) Industrial petroleum (special boiling point naphtha) is usually specified by stating specific boiling point intervals. Those types which are common in Sweden usually primarily contain either hexanes (c. 25–50 % n-hexane, boiling point interval c. 60–80 °C), heptanes (boiling point interval c. 80–110 °C) or octanes (boiling point interval c. 100–140 °C). Compare n-hexane, other hexanes, heptanes and octanes.
- 9) The limit value refers to petrol containing less than 5 % n-hexane.
- 10) p-Benzoquinone, quinone, can be transformed via a reduction process into hydroquinone. Hydroquinone can easily be transformed back into p-benzoquinone through oxidation by air. See also hydroquinone.
- 11) Benzo(a)pyrene can occur, amongst other polycyclic aromatic hydrocarbons (PAH), in smoke, dust or mist from i.e. tar and asphalt and in certain oils and combustible products.
- 12) The same limit values expressed in mg/m<sup>3</sup> shall also be applied for those phthalates for which no limit value have been defined.
- 13) There are biological limit values for lead and cadmium; please see the provisions on medical controls in working life.
- 14) The same limit values expressed in ppm shall be applied for those lactates for which no limit values have been defined.
- 15) For dust or mist from substances which have specific limit values, these values should be applied.

- 16) Refers to dust from fully cured or nearly fully cured epoxy resin, acrylates, polyurethane and ester plastics, bakelite or similar. Also included here is dust from uncured powder material of an epoxy-type, etc.
- 17) A limit value of 0.5 mg/m<sup>3</sup> should be applied for the assessment of dust from impregnated wood.
- 18) The limit value refers to aliphatic hydrocarbons in vapour form, i.e. up to 12 carbon atoms. Upon exposure to hydrocarbons with more than 12 carbon atoms, which occur in the form of aerosols, particles or drops of liquid, the limit value of organic dust and mist should be applied: 5 mg/m<sup>3</sup>. The limit value does not apply to dearomatized white spirit (<2% aromatic by weight) which has its own limit value; see note 36.
- 19) For substances which do not have an occupational exposure limit value in Sweden, it is recommended that the EU limit value be used as a guideline until the Swedish value has been introduced.

The following substances have no Swedish limit value but have guidance limit values in accordance with the European Commission's directives 91/322/EEC, 2000/39/EC, 2006/15/EC and 2009/161/EU.

Substances	CAS-no	Level Limit Value		Short term Value		Com
		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	
1,1-Dichloroethane	75-34-3	100	412	-	-	H
Bisphenol A	80-05-7	-	10	-	-	-
Diethyleneglycole monomethylether (2-(2-etoxyetoxy) etanol))	111-77-3	10	50	-	-	H
1,2,4-Trichloro- benzene	120-82-1	2	15	-	-	H
Diphosphorus pentasulfide	1314-80-3	-	1	-	-	-
Sulfotep	3689-24-5	-	0,1	-	-	H
Picricacid	88-89-1	-	0,1	-	-	-
Pyrethrum	8003-34-7	-	1	-	-	-
Sodium azide	26628-22-8	-	0,1	-	0,3	H

- 20) The same limit values expressed in ppm shall be applied to diisocyanates for which no limit values have been defined. The same applies to diisocyanates in dust or mist

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form and aerosols, including prepolymerized isocyanates and adducts. The equivalent values expressed in  $\text{mg}/\text{m}^3$  are different for the various substances.

- 21) In vapour form, the substance can be absorbed through the skin to a significant degree.
- 22) The level limit value 1 ppm applies for the sum of contents comprising dimethyl disulfide, dimethyl sulfide and methyl mercaptan.
- 23) Absorption of the substance in liquid form through the skin is so extensive that it can cause life-threatening injuries.
- 24) The limit value applies for subtilisin and similar proteolytic enzymes. A glycin unit corresponds to an activity which, from standard substrate under standard conditions, releases as many amino groups as are found in 1 mg of glycin.
- 25) The limit value applies to the combined concentration of vapour and aerosol.
- 26) With respect to the risk for injury to reproductive function and to the major absorption via the skin of liquids and vapours, it is particularly important that contact with the skin is avoided. In the event of simultaneous exposure to several solvents, the hygienic effect of reproduction-function-damaging ethylene glycol ethers and other solvents is calculated separately; please refer to the provisions chemical hazards in the working environment. The contribution by ethylene glycol ethers to other solvent effects than reproduction can be disregarded. Some of the ethylene glycol ethers require handling permission from the Swedish Work Environment Authority. For further information, please refer to the provisions on chemical hazards in the working environment.
- 27) The fibres to be taken into account for comparison with the limit value are respirable fibres which have a length-width relationship greater than 3:1, a diameter less than  $3\ \mu\text{m}$  and a length greater than  $5\ \mu\text{m}$ . The limit value assumes that fibre calculation is carried out with a phase contrast microscope. For exposure to dust containing fibres, the limit value for inorganic dust shall also apply.
- 28) Minerals which can occur as natural crystalline fibres include attapulgite, halloysite, sepiolite and wollastonite.
- 29) The most common refractory ceramic fibres are aluminium silicate fibres (CAS no: 142844-00-6).
- 30) For exposure to a mixture of fluorides and hydrogen fluorides, the level limit value for fluorides shall be applied.
- 31) The same limit values expressed in  $\text{mg}/\text{m}^3$  shall be applied to phthalates for which no limit values have been defined. The following phthalates have a damaging effect on reproductive function:

	CAS no
Di(2-methoxyethyl)phthalate	117-82-8
Di(2-ethylhexyl)phthalate	117-81-7
Dibutylphthalate	84-74-2
Benzylbutylphthalate	85-68-7
Diisobutylphthalate	84-69-5
- 32) The following isocyanates are included in the list of limit values:



Diisocyanates:	Monoisocyanates:
Hexamethylen diisocyanate, HDI	Diisopropylphenyl isocyanate
Isophorone diisocyanate, IPDI	Phenyl isocyanate
4,4-Methylene diphenyl diisocyanate, MDI	Isocyanic acid, ICA
Naphthalene diisocyanate, NDI	Methyl isocyanate, MIC
Toluen diisocyanate, TDI	

- 33) Methylisocyanate and isocyanic acid can be formed from hot work involving polyurethane and other carbon-based contaminants containing nitrogen. The requirement for medical control is only necessary when the substance is formed through the thermal degradation of plastics as described in the provisions regarding thermosetting plastics.
- 34) Turpentine from Scandinavian coniferous trees is skin-sensitizing. The sensitizing effect of specific turpentines has however not been scientifically confirmed, with the exception of 3-Carene.
- 35) Carbon dioxide is often used as an indicator substance in workplaces where air contaminants principally occur as a result of the people working there. Please see the specific rules regarding ventilation in the provisions on workplace design.
- 36) This refers to white spirits, i.e. petroleum spirits whose component parts can primarily be found in the area C<sub>7</sub> to C<sub>12</sub>, and which have less than 0.1 per cent by weight of benzene. Compare with note 40 on white spirits. The stated approximate value in ppm for petroleum spirits with 2-25 per cent aromatic hydrocarbons is calculated based on petroleum spirits with 22 per cent by weight of aromatic hydrocarbons. The stated approximate value in ppm for white spirits with < 2 per cent by weight aromatic hydrocarbons (dearomatized white spirit (<2% aromatic)) is calculated on petroleum spirits free of aromatic hydrocarbons with 50 % cyclic aliphates.
- 37) Methylene chloride and trichloroethylene are also regulated by the Swedish Chemicals Agency's legislation and by REACH legislation.
- 38) Certain oils can produce polycyclic aromatic hydrocarbons upon heating, which can be carcinogenic. Furthermore, mineral oils can themselves contain such substances.
- 39) For haze from water-based cutting fluid or similar, which can also include substances other than oil, the value for the total content of the water-free part is applied. For substances with lower individual limit values, these are applied.
- 40) White spirits consist of a mixture of petroleum hydrocarbons, which usually have a boiling point interval of 135 - 200 °C. Terms such as aromatic naphtha and aliphatic naphtha can be used for white spirits with almost 100% aromatic hydrocarbons or almost 100% aliphatic hydrocarbons. Petroleum spirit with 17-22 % aromatic hydrocarbons is a type of white spirit. Specific limit values apply for petroleum spirit (see note 36). The limit values for other types of white spirits are calculated based on the composition and limit values of their components.
- 41) For underground work, the limit value for has been given for total exposure over the course of a year and may not exceed  $2.1 \times 10^6$  Bq h/m<sup>3</sup> for work underground (annual working time = 1,600 hours). This value is equivalent to an exposure of approximately 1,300 Bq/m<sup>3</sup>. Underground work includes rock and mining work, building work or similar which is carried out underground.  
For other underground work, such as work in prepared and furnished rock shelters, facilities built into the rock, premises and similar, the radon content may not exceed  $0.72 \times 10^6$  Bq h/m<sup>3</sup>, (annual working time = 1,800 hours). This value is equivalent to an exposure of approximately 400 Bq/ m<sup>3</sup>. Determination of radon concentration

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should be carried out in accordance with the Swedish Radiation Safety Authority's method describing procedures for the measurement of radon in the workplace.

- 42) For other work, other than underground work, the limit value for radon gas has been given for total exposure over the course of a year and may not exceed  $0.36 \times 10^6$  Bq h/m<sup>3</sup> for work above ground (annual working time = 1,800 hours. This value is equivalent to an exposure of approximately 200 Bq/m<sup>3</sup>. Determination of radon concentration should be carried out in accordance with the Swedish Radiation Safety Authority's method describing procedures for the measurement of radon in the workplace.
- 43) This comprises stearates such as salts and esters, amongst others.

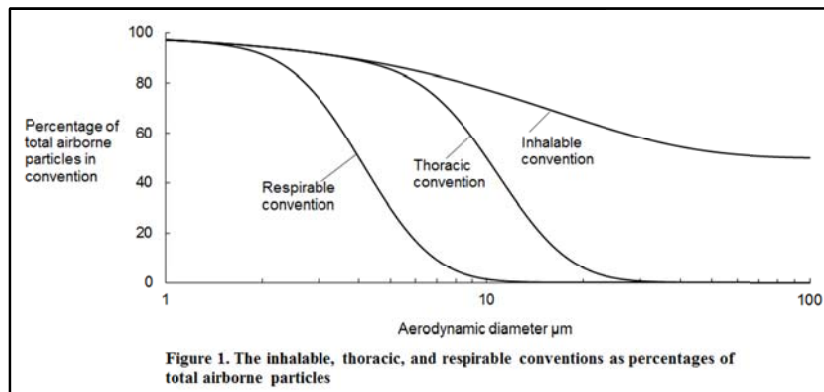
	CAS number
Aluminium monostearate	7047-84-9
Aluminium distearate	300-92-5
Aluminium tristearate	637-12-7
Ammonium stearate	1002-89-7
Butyl stearate	123-95-5
Diethylene glycol monostearate	106-11-6
Ethylene glycol monostearate	111-60-4
Glycerol monostearate	31566-31-1
Calcium stearate	1592-23-0
Potassium stearate	593-29-3
Lithium stearate	4485-12-5
Magnesium stearate	557-04-0
Sodium stearate	822-16-2
Zinc stearate	557-05-1

- 44) The limit value does not apply to those metal stearates which contain toxic metals, i.e. lead. In this case, the limit value for lead shall be used.
- 45) Trichloroethylene contains certain stabilizing substances. Trichloroethylene for use in particularly demanding technical purposes can, as an additive, contain low levels of specially constructed stabilizing substances which can contain, for example, epichlorohydrin.
- 46) The same limit value expressed in mg/m<sup>3</sup> shall also be applied for other polyalkylbenzenes.

## Comments regarding note 2 on the list of limit values

### *Dust definitions*

Health-related size fractions for airborne particles and aerosols are defined in the standard Workplace Atmospheres – Size fraction definitions for measurement of airborne particles (SS-EN 481). They are made up of inhalable, thoracic and respirable particle fractions. The inhalable fraction is the quantity of particles, out of the total number of particles in the air, which can be inhaled through the nose and mouth. The thoracic fraction is the part of the inhalable particles which passes through the larynx. The respirable fraction is the inhalable particles which progress furthest down into the airways, to the alveoli in the lungs. This is illustrated in diagram 1. The diagram shows that proof sticks for inhalable dust capture 50 % of particles with an aerodynamic diameter of 100  $\mu\text{m}$ , proof sticks for thoracic dust capture 50 % of the 10  $\mu\text{m}$  particles and proof sticks for respirable dust capture 50 % of the 4  $\mu\text{m}$  particles.



Smoke particles from welding, for example, are, as a rule, primarily of a magnitude of  $< 1 \mu\text{m}$ , which means that, according to the standard, these consist to a large extent of respirable particles. This implies that all smoke particles can be regarded as being respirable. Proof sticks with pre-separators are therefore not required for sampling where only smoke is concerned. Metallic smoke is generally formed through condensation and possible oxidation of metallic vapour. Welders often also carry out grinding or slagging, which is why even the airborne dust in a welder's breathing

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zone can consist of a high percentage of non-respirable dust. In Sweden, *testing cassettes* with a diameter of 25mm or 37 mm are used for the sampling of what is known as total dust. The term total dust should not be confused with the total quantity of airborne particles in the air, of which total dust is only one part.

The dust convention for *inhalable dust* deviates so much from the older term of total dust that the content of air contaminants, and therefore also the limit values, cannot be directly compared with each other. Investigations carried out by the Swedish Work Environment Authority, among others, indicate that the quantity of inhalable dust can be two to three times greater than the quantity of total dust sampled in the same working environment. The difference also depends on the type of dust involved.

The Swedish Work Environment Authority, in their establishment of limit values, also use the term total dust as the definition of inhalable dust according to the standard SS-EN 481. Up to now, there is no stated limit value of thoracal dust.

*Appendix 2*

**Information to be included in a measurement report**

- The company's name, address and the location of the workplace.
- The business operation and the number of employees concerned with the air contamination for which the measurement is being carried out.
- The date of the measurement.
- Which substance(s) have been measured.
- The purpose of the measurement.
- Who has carried out the measurement.
- Production and ventilation information.
- Climate information, for measurements taken outside.
- A sketch or photographs of the workplace.
- Job rotation, if relevant to exposure.
- Personal protective equipment used, if any, and when.
- The average time spent on respective work tasks, over the course of a day, week and year, if this can be assessed.
- The total working time per day, start and stop, shift working, if applicable and details of longer breaks and rest periods.
- The occurrence of heavy, physically demanding work.
- The names of the people and the work tasks that the measuring concerns and at what times the measurements were carried out.
- Test sites and test times for each sample taken.
- Method of measurement and equipment used.
- Analytical results, analytical method and the analytic laboratory engaged.
- Compilation of measurement results with time weighted day averages and work tasks plus the applicable hygienic limit values.
- An assessment, with comments, comparisons and details of any earlier measurements, other investigations, etc., recommended actions and a conclusion.

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### Appendix 3

#### Example of the calculation of time weighted averages and hygienic effect

Four samples of solvent A have been taken with portable measurement equipment during one day, according to the following:

Sample 1	07.50 – 10.00	130 min	67 ppm
Sample 2	10.00 – 12.00	120 min	54 ppm
Sample 3	12.35 – 14.20	105 min	35 ppm
Sample 4	14.20 – 16.05	105 min	48 ppm

The time weighted average value, according to the formula in the commentary to section 7 will then be:

$$C_m = \frac{67 \times 130 + 54 \times 120 + 35 \times 105 + 48 \times 105}{130 + 120 + 105 + 105} = \frac{8710 + 6480 + 3675 + 5040}{460} = \frac{23905}{460} = 52$$

$C_m = 52$  ppm. The level limit value is 70 ppm. Exposure to solvent A therefore lies under the level limit value.

During the same time periods as above and in the same sampling, solvent B was also analyzed and the results for the contents of the samples were 12, 22, 7 and 16 ppm respectively.

$$C_m = \frac{12 \times 130 + 22 \times 120 + 7 \times 105 + 16 \times 105}{460} = \frac{1560 + 2640 + 735 + 1680}{460} = \frac{6615}{460} = 14$$

$C_m = 14$  ppm. The level limit value is 20 ppm.

The combined, additive, hygienic effect will be, according to the commentary in section 7:

$$HE = \frac{52}{70} + \frac{14}{20} = 0,7 + 0,7 = 1,4$$

When the hygienic effect is over 1 for simultaneous exposure to solvent A and solvent B, this means that the limit value has been exceeded.

*Appendix 4***CAS number index**

This index contains CAS numbers for the substances listed in the list of limit values (pages 16–52) and the substances found in the notes (pages 53–58). Substances which are forbidden (A) or require permission (B) according to the Swedish Work Environment Authority's provisions on chemical work environment risks are also included.

CAS no	Substance	Not
50-00-0	Formaldehyde	
50-32-8	Benzo(a)pyrene	
51-79-6	Carbamic acid ethylester	B
53-96-3	2-Acetamidofluorene	A
54-11-5	Nicotine	
55-63-0	Nitroglycerine	
56-23-5	Carbon tetrachloride	
56-49-5	20-Methylcholantrene (3-methylcholantrene)	A
57-14-7	1,1-Dimethylhydrazine	B
57-57-8	$\beta$ -Propiolactone	B
58-90-2	2,3,4,6-Tetrachlorophenol	
59-50-7	4-Chlorocresole	
60-09-3	p-Aminoazobenzene	B
60-11-7	N,N-Dimethyl-4- aminoazobenzene	A
60-29-7	Diethyl ether	
60-34-4	Monomethylhydrazine	B
60-35-5	Acetamide	

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<b>CAS no</b>	<b>Substance</b>	<b>Not</b>
62-50-0	Ethylmetansulfonate	B
62-53-3	Aniline	
62-55-5	Thioacetamide	B
62-75-9	N-Nitrosodimethylamine (N,N-dimethylnitroso amine)	B
64-17-5	Ethanol	
64-18-6	Formic acid	
64-19-7	Acetic acid	
64-67-5	Diethylsulfate	B
66-27-3	Methyl methanesulfonate	B
67-56-1	Methanol	
67-63-0	Isopropanol	
67-64-1	Acetone	
67-66-3	Chloroform	
67-68-5	Dimethyl sulfoxide	
68-11-1	Thioglycolic acid	
68-12-2	Dimethyl formamide	
71-23-8	n-Propanol	
71-36-3	n-Butanol	
71-43-2	Benzene	
71-55-6	1,1,1-Trichlorethan	
74-83-9	Methyl bromide	
74-85-1	Ethene	
74-87-3	Methyl chloride	



CAS no	Substance	Not
74-88-4	Methyl iodide	
74-89-5	Methylamine	
74-90-8	Hydrogen cyanide	
74-93-1	Methyl mercaptane	
75-00-3	Ethyl chloride	
75-01-4	Vinyl chloride	
75-04-7	Ethylamine	
75-05-8	Acetonitrile	
75-07-0	Acetaldehyde	
75-09-2	Methylene chloride	
75-12-7	Formamide	
75-13-8	Isocyanic acid	
75-15-0	Carbon disulfide	
75-18-3	Dimethyl sulfide	
75-21-8	Ethylene oxide	
75-31-0	Isopropylamine	
75-34-3	1,1-Dichloroethane	
75-35-4	1,1-Dichloroethene	
75-44-5	Phosgene	
75-45-6	HCFC 22 (Chloro difluoro methane)	
75-52-5	Nitromethane	
75-55-8	1,2-Propyleneimine	B
75-56-9	Propylene oxide	

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CAS no	Substance	Not
75-64-9	tert.-Butylamine	
75-65-0	tert.-Butanol	
75-69-4	CFC 11	
75-71-8	CFC 12	
75-74-1	Tetramethyl lead	
75-83-2	2,2-Dimethylbutane	
76-13-1	CFC 113	
77-78-1	Dimethylsulfate	B
77-99-6	1,1,1-Trimethylolpropane	
78-00-2	Tetraethyl lead	
78-59-1	Isoforone	
78-78-4	iso-Pentane	See pentanes
78-81-9	iso-Butylamine	
78-83-1	iso-Butanol	
78-92-2	sec.-Butanol	
78-93-3	Methylethylketone	
79-01-6	1,1,2-Trichloroethylene	
79-06-1	Acrylamide	
79-09-4	Propionic acid	
79-10-7	Acrylic acid	
79-11-8	Monochloro acetic acid	
79-20-9	Methylacetate	
79-24-3	Nitroethane	

CAS no	Substance	Not
79-27-6	1,1,2,2-Tetrabromoethane	
79-29-8	2,3-Dimethylbutane	
79-41-4	Metacrylic acid	
79-46-9	2-Nitropropane	
80-05-7	Bisfenol A	
80-56-8	$\alpha$ -Pinene	
80-62-6	Methylmetacrylate	
84-66-2	Diethylphtalate	
84-74-2	Dibutylphtalate	
85-42-7	Hexahydroptalic anhydride	B
85-43-8	Tetrahydroptalic anhydride	B
85-44-9	Phtalic anhydride	
85-68-7	Bensylbutylphtalate	
87-86-5	Pentachlorophenol	
88-06-2	2,4,6-Trichlorophenol	
88-72-2	2-Nitrotoluene	
88-89-1	Pikric acid	
91-08-7	2,6-Toluendiisocyanate	See diisocyanates
91-20-3	Naphtalene	
91-59-8	$\beta$ -Naphtylamine	A
91-94-1	3,3'-Dichlorobenzidine	B
92-52-4	Biphenyl	
92-67-1	4-Aminodiphenyl	A

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CAS no	Substance	Not
92-87-5	Benzidine	A
92-93-3	4-Nitrodiphenyl	A
95-47-6	o-Xylene	
95-48-7	o-Cresol	
95-50-1	o-Dichlorobenzene	
95-63-6	1,2,4-Trimethylbenzene	
95-80-7	2,4-Diaminotoluene	B
95-95-4	2,4,5-Trichlorophenol	
96-12-8	1,2-Dibrom-3-chloropropane	A
96-14-0	3-Methylpentane	
96-33-3	Methyl acrylate	
96-45-7	Ethylene thiourea	B
97-63-2	Ethyl metacrylate	
98-95-3	Nitrobenzene	
99-08-1	3-Nitrotoluene	
99-65-0	1,3-Dinitrobenzene	
99-87-6	4-Methylisopropylbenzene	
99-99-0	4-Nitrotoluene	
100-25-4	1,4-Dinitrobenzene	
100-37-8	2-Diethylaminoethanol	
100-41-4	Ethylbenzene	
100-42-5	Styrene	
100-44-7	Benzylchloride	

CAS no	Substance	Not
100-74-3	N-Ethylmorfoline	
100-97-0	Hexamethylene tetramine	
101-14-4	4,4'-Diamino-3,3'-dichlordiphenylmethane	B
101-68-8	4,4'-Methylene diphenyldisocyanate	See diisocyanates
101-77-9	4,4'-Methylene dianiline (4,4'-diaminodiphenylmethane)	B
102-71-6	Triethano lamine	
103-71-9	Phenylisocyanate	
105-46-4	sec.-Butylacetate	
105-60-2	Caprolaktam	
106-11-6	Diethyleneglycol monostearate	
106-35-4	3-Heptanone	
106-42-3	p-Xylene	
106-44-5	p-Cresol	
106-46-7	p-Dichlorobenzene	
106-51-4	p-Bensoquinone	
106-65-0	Dimethyl succinate	
106-89-8	Epichlorohydrin	
106-93-4	1,2-Dibromoethane	
106-99-0	1,3-Butadiene	
107-02-8	Acrolein	
107-05-1	Allyl chloride	

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CAS no	Substance	Not
107-06-2	1,2-Dichloro ethan	
107-07-3	2-Chlorethanol	
107-11-9	Allylamine	
107-13-1	Acrylonitrile	
107-15-3	Ethylene diamine	
107-18-6	Allylalcohol	
107-21-1	Ethylene glycol	
107-30-2	Methylchlorometyl ether	A
107-31-3	Metyl formate	
107-41-5	2-Methyl-2,4-pentandiol	
107-83-5	2-Methylpentane	
107-98-2	1-Methoxy-2-propanol	
108-03-2	1-Nitropropane	
108-05-4	Vinyl acetate	
108-10-1	Methyl isobutyl ketone	
108-11-2	4-Methyl-2-pentanol	
108-18-9	Diisopropylamine	
108-24-7	Acetic anhydride	
108-31-6	Maleic anhydride	
108-38-3	m-Xylene	
108-39-4	m-Cresol	
108-46-3	Resorcinol	
108-65-6	1-Metoxy-2-propylacetate	

CAS no	Substance	Not
108-67-8	1,3,5-Trimethylbenzene	
108-88-3	Toluene	
108-90-7	Chlorobenzene	
108-91-8	Cyklohexylamine	
108-93-0	Cyklohexanol	
108-94-1	Cyklohexanone	
108-95-2	Phenol	
109-02-4	N-Methylmorfoline	
109-59-1	Ethyleneglycol monoisopropyl ether	
109-60-4	Propyl acetate	
109-66-0	n-Pentane	See pentanes
109-73-9	n-Butylamine	
109-86-4	Ethyleneglycol Monomethyl ether	B
109-89-7	Diethylamine	
109-99-9	Tetrahydrofuran	
110-12-3	5-Methyl-2-hexanone	
110-19-0	iso-Butylacetate	
110-43-0	2-Heptanone	
110-49-6	Ethylene glycol monomethyl- ether acetat	B
110-54-3	n-Hexane	
110-80-5	Ethylen glycol monoethyl- ether	
110-82-7	Cyklohexane	

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CAS no	Substance	Not
110-85-0	Piperazine	
110-86-1	Pyridine	
110-91-8	Morpholine	
111-15-9	Ethylen glycol monoethyl- eteracetate	
111-30-8	Glutaraldehyde	
111-40-0	Diethylen triamine	
111-42-2	Diethanol amine	
111-44-4	2,2'-Dichloro diethylether	B
111-46-6	Diethylenglycol	
111-60-4	Ethylen glycol monostearate	
111-76-2	Ethylene glycol monobutyl ether	
111-77-3	Diethylene glycol mono- methyl ether (2-(2-methoxy etoxiethanol))	
111-90-0	Diethylene glycol monoethyl ether	
112-07-2	Ethylene glycol monobutyl- ether acetate	
112-15-2	Diethylene glycol monoethyl ether acetat	
112-24-3	Triethylene tetramine	
112-34-5	Diethylene glycol monobutyl ether	
115-07-1	Propene	
115-10-6	Dimetylether	
115-77-5	Pentaerytritol	
117-08-8	Tetraklorftalsyraanhydrid	



CAS no	Substance	Not
117-81-7	Di-(2-ethylhexyl) phtalate	
118-96-7	2,4,6-Trinitrotoluene	
119-90-4	Dianisidine (3,3'-dimethoxy benzidine)	B
119-93-7	3,3'-dimethylbenzidine (o-Tolidine)	B
120-80-9	Catechol	
120-82-1	1,2,4-Trichlorobenzene	
121-14-2	2,4-Dinitrotoluene	
121-44-8	Triethylamine	
121-69-7	N,N-Dimethylaniline	
122-39-4	Diphenylamine	
122-60-1	Phenylglycidylether	
123-31-9	Hydroquinone	
123-42-2	4-Hydroxy-4-methyl-2-pentanone	
123-86-4	n-Butylacetate	
123-91-1	Dioxane	
123-92-2	3-Methylbutylacetate	See pentylacetates
123-95-5	n-Butylstearat	
124-17-4	Diethylenglycol monobutyl-ether acetate	
124-38-9	Carbon dioxide	
124-40-3	Dimethylamine	
126-72-7	Tris(2,3-dibromopropyl) phosphate	B
126-99-8	2-chloro-1,3-butadien	

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CAS no	Substance	Not
127-18-4	Tetrachloroethylene	
127-19-5	N,N-Dimethyl acetamid	
127-91-3	$\beta$ -Pinene	
131-11-3	Dimethylphtalate	
134-32-7	$\alpha$ -Naphtylamine	B
135-88-6	Phenyl- $\beta$ -naftylamine	B
137-05-3	Methyl-2-cyanoacrylate	
137-26-8	Thiram	
137-30-4	Ziram	
138-22-7	Butyllactate	
138-86-3	Limonene	
140-88-5	Ethyl acrylate	
141-32-2	Butyl acrylate	
141-43-5	Ethanolamine	
141-78-6	Ethyl acetate	
142-82-5	n-Heptane	
143-33-9	Sodium cyanide	See cyanides
144-62-7	Oxalic acid	
151-50-8	Potassium cyanide	See cyanides
151-56-4	Ethylene imine	B
151-67-7	Halothane	
300-92-5	Aluminium distearate	
302-01-2	Hydrazine	B

CAS no	Substance	Not
334-88-3	Diazomethane	
354-33-6	1,1,1,2,2-Pentafluorethane	
420-04-2	Cyan amide	
420-46-2	1,1,1-Trifluorethane	
463-82-1	tert.-Pentane	See pentanes
492-80-8	Auramine (4,4'-imidocarbonyl-bis- (N,N-dimethylaniline))	B
505-60-2	2,2'-Dichlorodiethylsulfide (mustard gas)	
506-77-4	Cyanogen chloride	
509-14-8	Tetranitromethane	
523-31-9	Dibenzylphthalate	
526-73-8	1,2,3-Trimethylbenzene	
528-29-0	1,2-Dinitrobenzene	
540-73-8	1,2-Dimethylhydrazine	B
540-88-5	tert.-Butylacetate	
541-85-5	5-Methyl-3-heptanone	
542-88-1	1,1'-Dichloro dimethyl ether	A
552-30-7	Trimellitic anhydride	
557-04-0	Magnesium stearate	
557-05-1	Zink stearate	
584-84-9	2,4-Toluendiisocyanate	See diisocyanates
591-78-6	2-Hexanone	
593-29-3	Potassium stearate	

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CAS no	Substance	Not
598-56-1	Dimethyl ethylamine	
606-20-2	2,6-Dinitrotoluene	
609-19-8	3,4,5-Trichlorophenol	
615-05-4	2,4-Diamino-1-methoxybenzene (2,4-diaminoanisole)	B
620-11-1	3-Pentylacetate	See pentylacetates
624-41-9	2-Methylbutylacetate	See pentylacetates
624-83-9	Metylisocyanat	
624-92-0	Dimetyldisulfid	
625-16-1	1,1-Dimethyl propylacetate	See pentylacetates
626-38-0	1-Methylbutylacetate	See pentylacetates
627-93-0	Dimethyl adipate	
628-63-7	n-Pentylacetate	
628-96-6	Ethyleneglycol dinitrate	
630-08-0	Carbonmonoxide	
637-12-7	Aluminium tristearate	
680-31-9	Hexamethylphosphortriamide (HMPA)	A
684-93-5	N-Methyl-N-nitrosourea	A
811-97-2	HFC 134 a	
818-61-1	2-Hydroxyethylacrylate	
822-06-0	Hexamethylene diisocyanate	See diisocyanates
822-16-2	Sodium stearate	
872-50-4	N-Methyl-2-pyrrolidone	

CAS no	Substance	Not
933-75-5	2,3,6-Trichlorophenol	
933-78-8	2,3,5-Trichlorophenol	
935-79-5	Tetrahydrophthalic anhydride	B
935-95-5	2,3,5,6-Tetrachlorophenol	
1002-89-7	Ammonium stearate	
1119-40-0	Dimethyl glutarat	
1120-71-4	1,3-Propane sultone	B
1303-96-4	Sodium tetraborate decahydrate	
1305-62-0	Calcium hydroxide	
1305-78-8	Calcium oxide	
1309-37-1	Iron oxide	
1309-64-4	Antimon trioxide	
1310-58-3	Potassium hydroxide	
1310-73-2	Sodium hydroxide	
1314-13-2	Zink oxide	
1314-56-3	Phosphorus pentoxide	
1314-62-1	Vanadium pentoxide	
1314-80-3	Diphosphorus pentasulfide	
1317-36-8	Lead monoxide	
1319-77-3	Cresol	
1320-67-8	Propylene glycol mono-methyl ether	
1321-12-6	Nitrotoluene	

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CAS no	Substance	Not
1321-65-9	Naphtalener, chlorinated	
1330-20-7	Xylene, mixture	
1333-82-0	Chromium trioxide	See Chromium(VI)
1338-23-4	Methyl ethyl ketone peroxide	
1395-21-7	Enzymes, subtilisines	
1464-53-5	1,2:3,4-Diepoxybutane	B
1592-23-0	Calcium stearate	
1634-04-4	Methyl tertiärbutyl ether	
1694-82-2	1,2,3,6-Tetrahydro-cis-4-methyl phtalic anhydride	B
1712-64-7	Isopropylnitrate	
2186-24-5	p-Cresylglycidyl ether	
2238-07-5	Diglycidyl ether	
2426-08-6	n-Butylglycidyl ether	
2551-62-4	Sulfur hexafluoride	
2807-30-9	Ethylenglykol monopropyl ether	
3068-88-0	β-Butyrolactone	B
3173-72-6	1,5-Naphtalen diisocyanate	See diisocyanates
3425-89-6	1,2,3,6-Tetrahydro-4-methyl phtalic anhydride	B
3689-24-5	Sulfotep	
4098-71-9	Isophoron diisocyanate	See diisocyanater
4485-12-5	Litium stearate	
4901-51-3	2,3,4,5-Tetrachorophenol	

CAS no	Substance	Not
5333-84-6	1,2,3,6-Tetrahydro-3-methyl phthalic anhydride	B
6283-86-9	2-Ethylhexyllactate	
6423-43-4	1,2-Propylenglycol dinitrate	
7047-84-9	Aluminium monostearate	
7085-85-0	Ethyl-2-cyanoacrylate	
7429-90-5	Aluminium	
7439-92-1	Lead	
7439-93-2	Litium	
7439-96-5	Manganese	
7439-97-6	Mercury	
7439-98-7	Molybdenum	
7440-02-0	Nickel	
7440-06-4	Platinum	
7440-22-4	Silver	
7440-31-5	Tinn	
7440-33-7	Tungsten	
7440-36-0	Antimony	
7440-38-2	Arsenic	
7440-41-7	Beryllium	
7440-43-9	Cadmium	
7440-47-3	Chromium	
7440-48-4	Cobalt	
7440-50-8	Copper	

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<b>CAS no</b>	<b>Substance</b>	<b>Not</b>
7440-74-6	Indium	
7446-09-5	Sulfur dioxide	
7553-56-2	Iodine	
7580-67-8	Litium hydride	
7646-79-9	Cobalt dichloride	
7646-85-7	Zink chloride	
7647-01-0	Hydrogen chloride	
7664-38-2	Phosphoric acid	
7664-39-3	Hydrogen fluoride	
7664-41-7	Ammonia	
7664-93-9	Sulfuric acid	
7697-37-2	Nitric acid	
7719-12-2	Phosphorus trichloride	
7722-84-1	Hydrogen peroxide	
7726-95-6	Bromine	
7758-97-6	Lead chromate	See Chromium(VI)
7778-50-9	Potassium dichromate	See Chromium(VI)
7782-41-4	Fluorine	
7782-49-2	Selenium	
7782-50-5	Chlorine	
7783-06-4	Hydrogen sulfide	
7783-07-5	Hydrogen selenide	
7783-60-0	Sulfur tetrafluoride	



CAS no	Substance	Not
7784-42-1	Arsenic trihydride	
7789-00-6	Potassium chromate	
7789-06-2	Strontium chromate	See Chromium(VI)
7790-79-6	Cadmium difluoride	
7803-51-2	Phosphorous trihydride	
7803-52-3	Antimony trihydride	
8003-34-7	Pyrethrum	
8006-64-2	Turpentine	
9002-86-2	Dust, PVC	
9014-01-1	Enzymes, subtilisines	
10024-97-2	Dinitrogen oxide	
10025-87-3	Phosphoryl chloride	
10026-13-8	Phosphorus pentachloride	
10026-24-1	Kobaltsulfate heptahydrate	
10028-15-6	Ozone	
10035-10-6	Hydrogen bromide	
10043-92-2	Radon	
10049-04-4	Chlorine dioxide	
10070-44-3	1,2,3,6-Tetrahydromethyl- phthalic anhydride	
10102-43-9	Nitrogen oxide	
10102-44-0	Nitrogen dioxide	
10108-64-2	Cadmium dichloride	
10588-01-9	Sodium dichromate	See Chromium (VI)

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CAS no	Substance	Not
11070-44-3	Methyl tetrahydro phtalic anhydride	
12001-28-4	Crocidolite	
12001-29-5	Crysotile	
12035-72-2	Trinickel disulfide	
12172-73-5	Amosite	
12510-42-8	Erionite	A
13149-00-3	cis-Hexahydro phtalic anhydride	B
13463-39-3	Nickel carbonyl	
13463-67-7	Titanium dioxide	
13466-78-9	3-Carene (cf. terpenes)	
13494-80-9	Tellurium	
13530-65-9	Zink chromate	See Chromium(VI)
13838-16-9	Enflurane	
13952-84-6	sec.-Butyl amine	
14166-21-3	trans-Hexahydro phtalic anhydride	B
14464-46-1	Cristobalite	
14807-96-6	Talc	
14808-60-7	Quartz	
15468-32-3	Tridymite	
15646-96-5	2,4,4-Trimethyl hexa methylene diisocyanate	See diisocyanates
15950-66-0	2,3,4-Trichlorophenol	
16111-27-6	S-[2-(Dimethylamino)ethyl]-pseudo thiourea dihydrochloride	B

CAS no	Substance	Not
	ride) (PBA 1	
16938-22-0	2,2,4-Trimethylhexamethylene diisocyanate	See diisocyanates
19234-20-9	Ethylene glycol monoisopropyl ether acetate	
19438-60-9	Hexahydro-4-methyl phtalic anhydride	B
25013-15-4	Vinyltoluene	
25154-54-5	Dinitrobenzene	
25167-82-2	Trichlorophenol	
25167-83-3	Tetrachlorophenol	
25321-14-6	Dinitrotoluene	
25550-51-0	Methylhexahydro phtalic anhydride	B
25551-13-7	Trimethylbenzene	
26471-62-5	Toluene diisocyanate	See diisocyanates
26590-20-5	1,2,3,6-tetrahydromethyl phtalic anhydride	B
26628-22-8	Sodium azide	
26675-46-7	Isoflurane	
26761-40-0	Diisodecyl phtalate	
28178-42-9	2,6-Diisopropylphenyl isocyanate	
28523-86-6	Sevoflurane	
28679-16-5	Trimethylhexamethylene diisocyanate	See diisocyanates
31566-31-1	Glycerol monostearate	
34090-76-1	Tetrahydro-4-methyl	

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CAS no	Substance	Not
phtalic anhydride	B	
34590-94-8	Dipropyleneglycol mono-methyl ether	
42498-58-8	2,3,5,6-Tetrahydro-2-methyl phtalic anhydride	B
48122-14-1	1-Methylhexahydroptalic anhydride	B
57041-67-5	Desflurane	
57110-29-9	Hexahydro-3-methylphtalic anhydride	B
60304-36-1	Potassium aluminium tetra-fluoride	
66733-21-9	Erionite	
77536-66-4	Actinolite	
77536-67-5	Anthophyllite	
77536-68-6	Tremolite	
142844-00-6	Aluminium silikatefibres	