Chemical exposure Limits

For airborne exposures, there are three types of limits in common use:

- the time-weighted average (TWA) exposure limit - the maximum average concentration of a chemical in air for a normal 8-hour working day and 40-hour week;
- the short-term exposure limit (STEL) - the maximum average concentration to which workers can be exposed for a short period (usually 15 minutes);
- the ceiling value - the concentration that should not be exceeded at any time.

In addition, biological exposure indices (BEIs) represent the concentration of chemicals in the body that would correspond to inhalation exposure at a specific concentration in air.

The following texts provide information on the agency responsible for the establishment and publication of exposure limits in each country with an Internet link to a table or database containing the exposure limit values.

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**Argentina**


**Australia**

Exposure standards are available on the Hazardous Substances Information System (HSIS) database of Safe Work Australia.

Information is provided on substances that have been classified in accordance with the Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(2004)] 3rd Edition and/or have National Exposure Standards declared under the NOHSC Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003(1995)] or subsequent updates.

The HSIS provides access to two data sets, one for hazardous substance information and the other for exposure standard information. Data for substances that are common to both data sets are linked. Both data sets can be searched using a range of search criteria. Search results (including the full data sets) can be printed or saved electronically.

**Austria**

Austrian occupational exposure limits are based on international and national sources such as the American Conference of Governmental Industrial Hygienists and the German MAK-Commission. The limits are
Belgium

Occupational exposure limits (valeurs limites d'exposition professionnelle) are issued by the Ministry of Employment, Work and Social Dialogue and are listed in Annex 1 of the Arrêté royal du 11 mars 2002 relatif à la protection de la santé et de la sécurité des travailleurs contre les risques liés à des agents chimiques sur le lieu de travail.

Brazil

Exposure limits in Brazil are given in the Tabela de Limites de Tolerância in Annex No.11 of Regulatory Standard NR N-15. They are issued under the authority of Decree (Portaria) No.3214 of 8 June 1978, as amended subsequently.

Bulgaria

Exposure limits are listed (in Bulgarian) in Decree No.13 of 30 December 2003 on the protection of workers against the risks of exposure to chemical agents at work.

Canada

Occupational exposure limits in Canada are regulated within each Province.

In Alberta, exposure limits are listed in the Chemical Hazards Regulation (Alberta Regulation 393/88).

In British Columbia, exposure limits are generally determined with reference to the Threshold Limit Values (TLVs) adopted by the American Conference of Governmental Industrial Hygienists (ACGIH). An explanation of the procedure for ensuring that adopted exposure limits are appropriate for workers in British Columbia is provided.

In Ontario, exposure limits are listed in Regulation 833, R.R.O. 1990 - Control of Exposure to Biological or Chemical Agents.

In Québec, exposure limits are listed in Annexe I of the Règlement sur la santé et la sécurité du travail.

Chile

Exposure limits are given (in Spanish) in the Reglamento sobre condiciones sanitarias y ambientales básicas en los lugares de trabajo (Decreto N°594, 1999), published in the Diario Oficial of 29 Apr. 2000.

Colombia

Colombia adopted the ACGIH exposure limits through Resolución 2400 de 1979 of the Ministerio de Trabajo y Seguridad Social.

Cyprus

Exposure limits for Cyprus are listed (in Greek) in the Safety and Health at Work (Chemical Agents) Regulations of 2001.
Denmark
Exposure limits are listed in Danish in *Grænseværdier for stoffer og materialer*.

Estonia
In Estonia, occupational exposure limits are prepared and endorsed by the Ministry of Social Affairs. The limits are set with reference to current European Union and Swedish occupational exposure limits and are listed (in Estonian) the 2001 legal instrument *Töökeskkonna keemiliste ohutegurite piirnormid*.

European Union
The legal basis for the preparation of occupational exposure limits and biological limits in the European Union is contained in Directive 98/24/EC on chemical agents and Directive 2004/37/EC on carcinogens and mutagens. Indicative Occupational Exposure Limit Values (IOELVs) are adopted through Commission Directives while Binding Occupational Exposure Limit Values (BOELVs) are adopted through Council and European Parliament Directives.


Finland
Concentrations of impurities in workplace air known to be hazardous and corresponding limit values for biological exposure indicators are published by the Finnish Ministry of Social Affairs and Health.

France
Occupational exposure limits are published in the *Order of 30 June 2004* (modified by the *Order of 9 February 2006*) establishing a list of indicative occupational exposure limits and in *Decree No. 2006-133* of 9 February 2006 fixing binding occupational exposure limits for certain chemical agents in workplace air.

The values are also published by the Institut National de Recherche et de Sécurité (INRS) in *Valeurs limites d'exposition professionnelle aux agents chimiques en France, Aide-mémoire technique ED 984*.

Germany
Rules for limiting exposure to hazardous substances in the workplace and a list of occupational exposure limits are published in Germany by the Federal Institute for Occupational Safety and Health (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin - BAuA) in Technical Rules for Hazardous Substances (Technische Regeln für Gefahrstoffe) *TRGS 900: Occupational exposure limits (Arbeitsplatzgrenzwerte)*. This document was reissued in January 2006 with significant changes to the list of substances for which occupational exposure limits have been assigned. In addition, the publication removed the previous MAK and TRK designations from substances. The current list is divided into Category I and II substances:

Category I: substances for which the local effect has an assigned OEL or substances with a respiratory sensitizing effect.

Category II: substances with a resorptive effect.

BAT values (Biologische Arbeitsstofftoleranzwerte - Biological Tolerance Values) are listed in *TRGS 903*.
Hungary

Exposure limits are listed in A munkahelyek kémiai biztonságáról szóló 25/2000. (IX. 30.) EüM-SZCSM rendelet [Ordinance No.25/2000, of 30 Sept., concerning the chemical safety of workplaces].

Ireland


Japan

Occupational exposure limits for chemical substances are recommended by the Japan Society for Occupational Health (JSOH). Current values are listed in the Journal of Occupational Health.

Luxembourg

Exposure limits in Luxembourg are listed in Regulations concerning the protection of the health and safety of workers against the hazards of chemical agents, carcinogens and mutagens in the workplace, July 2002.

Malaysia

Permissible Exposure Limits are provided in Schedule 1 of the Occupational Safety and Health (Use and Standards of Exposure of Chemicals Hazardous to Health Regulations 2000), issued under the Occupational Safety and Health Act 1994.

Mexico

Maximum permissible exposure limits (Limites máximos permisibles de exposición) are listed in the Official Mexican Standard (NORMA Oficial Mexicana) NOM-010-STPS-1999, issued by the Secretaría del Trabajo y Previsión Social.

Netherlands

Occupational Exposure Limits in the Netherlands are set by the Deputy Minister for Social Affairs and Employment. Exposure limit values and information on their status and revision may be found in the OEL Database of the Social and Economic Council of the Netherlands (SER). The current, modified, system was introduced on 1 Jan. 2007.

New Zealand

Exposure limits, available in Workplace Exposure Standards effective from Dec. 2010, and related topics are published by the Department of Labour.

Values are provided for workplace exposure standards for atmospheric contaminants and biological exposure indices.

Norway
Administrative standards for contaminants in workplace air (Veiledning om administrative normer for forurensning i arbeidsatmosfære) are available from the Norwegian Labour Inspection Directorate (Arbeidstilsynet).

Poland

Occupational Exposure Limits for Airborne Toxic Substances are given in English in a consolidated version of the Ordinance of the Minister of Labour and Social Policy on the Maximum Admissible Concentrations and Intensities of Harmful to Health Agents in the Working Environment (based on the official versions published in Dziennik Ustaw 2002, No. 217, item 1833, as modified subsequently in Dziennik Ustaw 2005, No. 212, item 1769; Dziennik Ustaw 2007, No. 161, item 1142; Dziennik Ustaw 2009, No.105, item 873; and Dziennik Ustaw 2010, No.141, item 950). There is also an English-language commentary on the establishment of exposure limits in Poland.

Singapore

Permissible Exposure Limits (PELs) of Toxic Substances are listed in the First Schedule of the Workplace Safety and Health (General Provisions) Regulations 2006, issued under the Workplace Safety and Health Act 2006 (Act 7 of 2006).

Slovakia


South Africa


Spain

Occupational exposure limits are published by the National Institute for Occupational Safety and Health (Instituto Nacional de Seguridad e Higiene en el Trabajo, INSHT) in Limites de exposición profesional para agentes químicos en España (2008).

Sweden

Exposure limits are listed in Swedish in Hygieniska gränsvärden och åtgärder mot luftföröreningar (AFS 2005:17) and in English in Occupational Exposure Limit Values and Measures Against Air Contaminants (AFS 2005:17).

Switzerland

Swiss occupational exposure limits are published by the Swiss Accident Insurance Institute (SUVA) in SUVA - Valeurs limites d'exposition aux postes de travail, published annually. They are available in German (2011 version). The 2009 version is available in French.
**United Kingdom**

As from April 2005, the former Maximum Exposure Limits (MELs) and Occupational Exposure Standards (OESs) are replaced with a single type of limit - the Workplace Exposure Limit (WEL). Values are listed in the latest edition of the Health and Safety Executive (HSE) Guidance Note EH40 *Workplace exposure limits*.

This list is legally binding. It reproduces the list of workplace exposure limits (WELs) that have been approved by the Health and Safety Commission.

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**USA**

Recommended exposure limits are developed and periodically revised by the National Institute for Occupational Safety and Health (NIOSH). These recommendations are then published and transmitted to the Occupational Safety and Health Administration (OSHA) for use in promulgating legal standards.


Permissible exposure limits and NIOSH recommended exposure limits are also available in the NIOSH *Pocket Guide to Chemical Hazards*.

Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs) are also issued by the American Conference of Governmental Industrial Hygienists (ACGIH). Information on the determination and use of these values and their availability may be found on the ACGIH website (the actual TLV and BEI lists are priced documents).

Some states in the US also have their own exposure limits, for example:

In **California**, permissible exposure limits for chemical contaminants are listed in the California Code of Regulations, *Control of Hazardous Substances Order*.

In **Michigan**, permissible exposure limits for air contaminants are listed in the Occupational Health Standards published by the Department of Consumer and Industry Services.

In **Minnesota**, the Minnesota Department of Labor and Industry publishes a list of hazardous substances coded for indications of where to find appropriate legal or advised exposure limits.

In **Oregon**, the Oregon Department of Consumer and Business Services/Occupational Safety and Health Division (OR-OSHA) has adopted stricter exposure limits for certain substances than those made by the federal government. Exposure limits applied in the state are listed in the Oregon Rules for Air Contaminants.