European Commission

List of recommended health-based biological limit values (BLVs) and biological guidance values (BGVs)

Scientific Committee on Occupational Exposure Limits (SCOEL)

last update: June 2014

Employment, Social Affairs and Inclusion

Biological monitoring

Under certain circumstances biological monitoring offers advantages over air monitoring in assessing risk to health, e.g. for substances with a significant skin uptake. For such compounds, biological monitoring may be preferable, if suitable methods are available.

SCOEL evaluates the need to recommend biological monitoring for particular substances on a case-by-case basis and recommends biological values based on the currently available scientific data.

Health-based biological limit values (BLVs)

Biological limit values (BLVs) are reference values for evaluating potential health risks in the practice of occupational health. A BLV is a guideline for the control of such risks and should not be used for other purposes.

Due to biological variability, an individual's measurement may exceed the BLV without incurring an increased health risk. If, however, the biological levels persistently exceed the BLV, or if the majority of measurements obtained from a group of workers at the same workplace exceed the BLV, the cause of the excessive values must be investigated and proper action taken to reduce the exposure.

Exposure equivalent to the BLV generally do not affect the health adversely, when attained regularly under workplace conditions, except in cases of hypersensitivity.

In the first instance, BLVs represent the levels of determinants which are most likely to be observed in specimens collected from a worker exposed to the chemical in question exclusively by inhalation at the level of the occupational exposure limit (OEL).

Exceptions are BLVs for substances for which the OELs serve as protection against non-systemic effects (e.g. irritation or respiratory disorders) or for substances which require biological monitoring due to other routes of absorption, in particular the skin.

Biological guidance values (BGVs)

Where toxicological data cannot support a health-based BLV, a biological guidance value (BGV) might be established. This value represents the upper concentration of the substance or a metabolite of the substance in any appropriate biological medium corresponding to a certain percentile (generally 90 or 95 percentile) in a defined reference population. If background levels cannot be detected, the BGV may be equivalent to the detection limit of the biomonitoring method, which then is to be specified in the document.

A value exceeding the BGV might help to identify the need for an expert consideration of the working conditions. Unlike BLVs, BGVs are not health-based and therefore do not set a limit between absence or presence of adverse health effects.

For more information, see the SCOEL Methodology for the Derivation of Occupational Exposure Limits, version 7.

List of BLVs and BGVs recommended by SCOEL (last update: June 2014) [a]

SUM	Name	CAS-No.	BLV	BGV	Date of adoption
139	Acrylamide	79-06-1	-	Acrylamide haemoglobin adducts (AAVal Hb adducts): 80 pmol/g globin (for non-smokers)	December 2012
153	Aniline	62-53-3	30 mg *p*-aminophenol/l urine (0-2 h after exposure/shift)	-	August 2010
140	Benzene	71-43-2	28 µg benzene/l blood (immediately end of shift) 46 µg-phenylmercapturic acid/g creatinine in urine (end of exposure/shift)	-	February 2006
136	Cadmium	7440-43-9	2 µg Cd/g creatinine	-	February 2010
82	Carbon disulphide	75-15-0	1.5 mg 2-thiothiazolidine-4-carboxylic acid/g creatinine in urine (end of shift)	-	March 2008
121	*N,N*-Dimethylformamide	68-12-2	15 mg *N*-methylformamide/l urine (post-shift)	-	September 2006
60	4,6-Dinitro-*o*-cresol	534-52-1	10 µg/ml (10 mg/l) in whole blood (average value, end of shift)	-	October 2004
116	2-Ethoxyethanol and 2-ethoxyethyl acetate	110-80-5 111-15-9	50 mg 2-ethoxyacetic acid/l urine (40 mg 2-ethoxyacetic acid/g creatinine)	-	August 2007
56	Hydrogen fluoride Fluorine and inorganic fluorides	7664-39-3 7782-41-4	8 mg F/l in urine (end of shift)	-	December 1998
83	Lead and its inorganic compounds	7439-92-1	30 µg/100 ml	-	January 2002
117	Lead chromate	7758-97-6	30 µg Pb/100 ml blood (see SUM 83)	-	March 2004
84	Mercury and inorganic divalent mercury compounds	7439-97-6	10 µg Hg/l blood, 30 µg Hg/g creatinine in urine	-	May 2007
120	2-Methoxyethanol 2-Methoxyethyl acetate	109-86-4 110-49-6	8 mg methoxyacetic acid/g creatinine in urine (end of work-week after at least 2 weeks at work	-	September 2006

SUM	Name	CAS-No.	BLV	BGV	Date of adoption
174	4,4'-Methylene-bis-(2-chloro-aniline) (MOCA)	101-14-4	-	Detection limit of the method (end of shift) (see Annex to SCOEL/SUM/174)	March 2013
130	Methylene chloride	75-09-2	4 % COHb (see "Recommendation") 0.3 mg methylene chloride/l urine 1 mg methylene chloride/l blood	-	June 2009
107	4,4'-Methylenedianiline (MDA)	101-77-9	-	1 µg/l urine	March 2012
119	*N*-Methyl-2-pyrrolidone	872-50-4	20 mg/g creatinine of 2-hydroxy-*N*-methylsuccinimide in urine (morning-after-shift ; 18 hours) or 70 mg/g creatinine of 5-hydroxy-*N*-methyl-2-pyrrolidone in urine (2-4 hours after the end of exposure/shift)	-	August 2007
85	Nickel and nickel compounds	7440-02-0	-	3 µg/l urine	June 2011
16	Phenol	108-95-2	120 mg phenol/g creatinine in urine	-	January 2003
161	Propylene oxide	75-56-9	1.3 nmol *N*-(3-hydroxypropyl) valine/g globin in blood haemoglobin	-	August 2010
133	Tetrachloroethylene	127-18-4	0.4 mg tetrachloroethylene/l blood (prior to the last shift of a work-week) 3 ppm (0.435 mg/m^3) tetrachloroethylene in end-exhaled air (prior to the last shift of a work-week)	-	June 2009
142	Trichloroethylene	79-01-6	20 mg trichloroacetic acid/l urine (end of the last shift/work-week/shift period)	-	April 2009

[a] In the event of disagreement between the content of this list and the SCOEL Recommendations on which it is based, the Recommendations shall have priority.