

DNELs for workplaces

Inspection of the GESTIS DNEL Database



IFA

Institut für Arbeitsschutz der
Deutschen Gesetzlichen Unfallversicherung

Dr. M. Arnone, Dr. E. Nies

Institute for Occupational Safety and Health of the German Social Accident Insurance (IFA)

What are DNELs ?

REACH regulation:

"For each chemical substance levels of exposure have to be derived above which humans should not be exposed to"

→ **Derived No-Effect Level** ←
(DNEL)

Types of DNEL values

- A value is required for each **relevant population** (workers, consumers, population via the environment).
- DNELs must be derived for the most probable **exposure routes** (inhalative, dermal and oral) for **acute** or **long term** exposure.
- DNELs concern **local effects** (e.g. burnings, irritations) or **systemic effects** (e.g. remote organ damage after intoxication).
- **Relevant for OSH:** DNEL values for workers, local and/or systemic effects, inhalative long-term exposure

→ **Workplace-related DNEL values** ←

The DGUV DNEL Excel list

- Excel file with workplace-related DNEL values for approx. 3,250 substances including reaction mixtures, resins, fats and other items not precisely defined.

Name	Data Set	CAS Number	EG Number	DNEL Inhalation [mg/m³]	Source	Remarks	Link
				local/ systemic			
2-Acrylamido-2-methylpropanesulfonic acid	1	15214-69-8	239-268-0	1	Registr. Entry		Substance
Acrylic acid	1	79-10-7	201-177-9	30	Registr. Entry		
Acrylonitrile	1	107-13-1	203-466-5	1,8	Registr. Entry	carcinogenic	
cis-2-(Acryloyloxy)ethyl hydrogen	1		478-080-5	0,32	Registr. Entry		
cyhexane-1,2-dicarboxylate							
Activated Carbon - High Density Skeleton	1		931-328-0	3	Registr. Entry		Substance
Activated Carbon - Low Density Skeleton	1		931-334-3	2	Registr. Entry		Substance
Adipic acid	1	124-04-9	204-673-3	5	Registr. Entry		Substance
Adipic acid, compd. with 1,6-hexanediamine (1:1)	1	3323-53-3	222-037-3	10	Registr. Entry		Substance
Adipohydrazide	1	1071-93-8	213-999-5	8,6	Registr. Entry		Substance
Alanine	1	56-41-7	200-273-8	226,2	Registr. Entry		Substance
β-Alanine	1	338-69-2	206-418-1		Registr. Entry		
beta-Alanine, N-C6-18-alkyl derivs., monopotassium salts	1	107-95-9	203-536-5	23,509	Registr. Entry		
		90170-42-6	290-475-2	97,8	Registr. Entry		

Figure 1: Screenshot from the DNEL Excel list of the DGUV

The GESTIS DNEL database

- Searchable online database which provides workplace-related DNELs for about 2,400 chemically defined substances.

IFA Institut für Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung

GESTIS DNEL Database

SEARCH FORM RESULTS DOCUMENT

Fast substance search

Current substance

Usage advice

Legal aspects of usage

Contacts

Substance list

A B C D E F G H I J K L M N O P Q R S T

Suche

Substance name:

ZVG number:

CAS number:

EC number:

Index number:

Formula:

Substance group code:

Search Cancel Delete input

Figure 2: Search mask of the GESTIS DNEL Database

Substance datasheet from the GESTIS DNEL Database

- Substance datasheets with names and, synonyms, identification data and formula
- Quantitative comparison of the DNEL values with other limit values
- Information about legally binding German occupational exposure limits (AGW)
- Warning of carcinogenic substances
- Link to the GESTIS Substance Database

Acetonitrile

IDENTIFICATION

Acetonitrile
Methyl cyanide
Cyanomethane
Ethanitrile
Ethyl nitrile

Name and synonyms

ZVG No: 13660

CAS No: 75-05-8

INDEX No: 608-001-00-3

EC No: 200-835-2

Identification numbers

FORMULA

C2H3N

H₃C-C≡N

Structural formula

Molar mass: 41,05 g/mol

Conversion factor (gaseous phase) at 1013 mbar and 20 °C:
1 ml/m³ = 1,71 mg/m³

DNEL (Derived No-Effect Level)

Long-term exposure - inhalation - local effects
DNEL: 68 mg/m³

Long-term exposure - inhalation - systemic effects
DNEL: 68 mg/m³

Workplace-related DNEL values

Registration entry of the manufacturer/importer on the ECHA website

The local DNEL-value is higher than the German occupational exposure limit value (AGW) is higher than the MAK-value of the DFG corresponds to the EC occupational exposure limit value

The systemic DNEL-value is higher than the German occupational exposure limit value (AGW) is higher than the MAK-value of the DFG corresponds to the EC occupational exposure limit value

Comparison DNEL / limit values

Threshold limit value:
A mandatory exposure limit value is stipulated for this substance in Germany. This exposure limit is to comply.

TRGS 900 - German occupational exposure limit values
20 ml/m³
34 mg/m³

Complete information is presented in the GESTIS substance database.

Load this substance from the GESTIS Substance Database...

Figure 3: Substance datasheet from the GESTIS DNEL Database

Nickel sulfate

Carcinogenic substance:
This substance is classified as carcinogenic category 1A or 1B, with H350 or H350i in appendix VI of CLP regulation (EU) 1272/2008 or by the manufacturer, or classified as carcinogenic category 1 or 2 in the German „list of carcinogenic ... substances“ (TRGS 905).
It is doubtful whether the observance of a DNEL for this substance protects against tumour diseases. For many carcinogenic substances no toxicological threshold and, hence, also no health-based DNEL can be derived. The decision on whether in this particular case a DNEL is reasonable requires detailed toxicological knowledge about the mode of action. Such a check is not carried out by the editorial team of the GESTIS DNEL Database.

Load this substance from the GESTIS Substance Database...

Figure 4: Warning of carcinogenic substances with a DNEL value

DNELs and limit values

- Comparison of DNEL values with the German AGW, MAK values of the DFG and IOELs of the European Commission

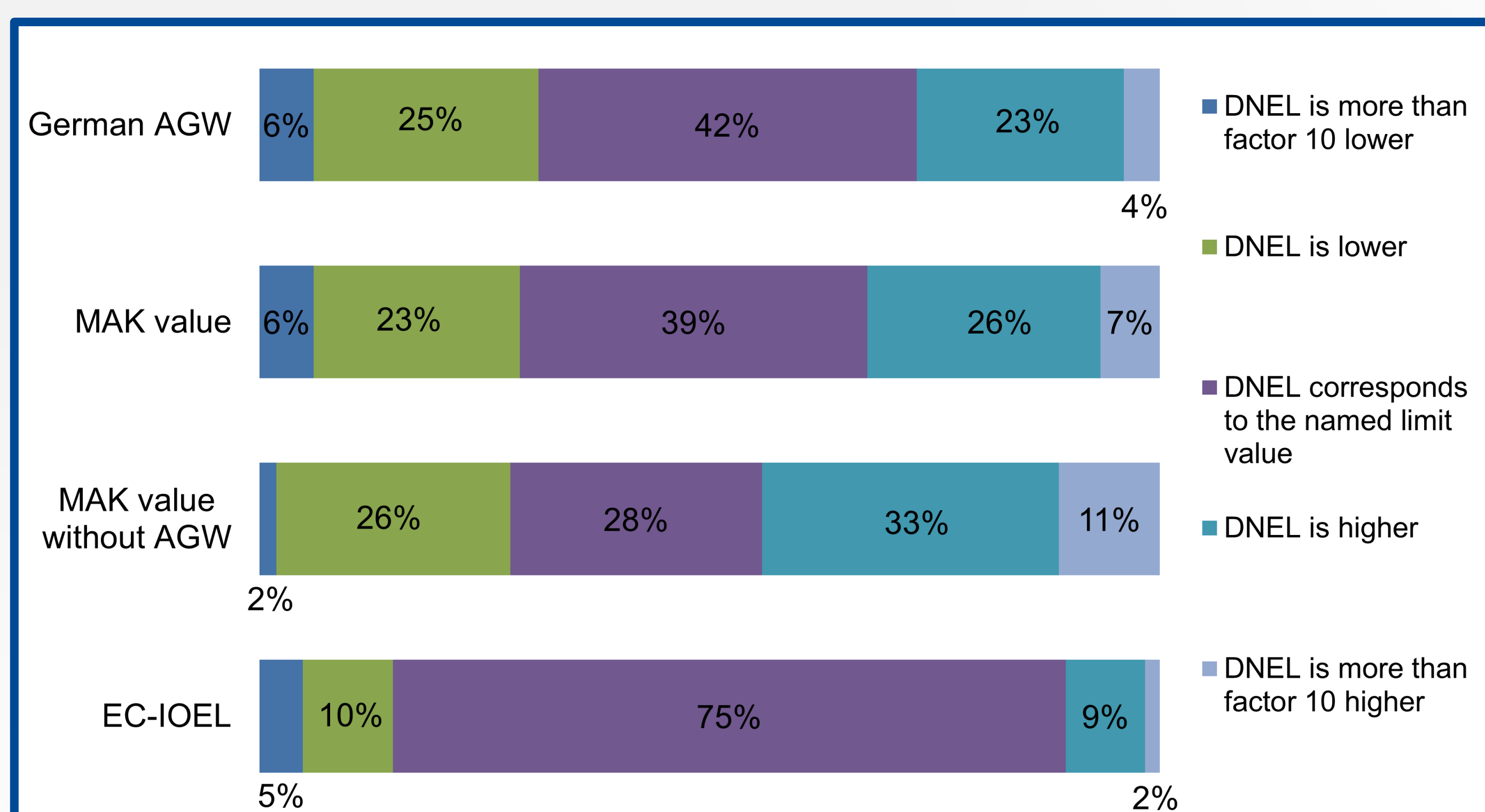


Figure 5: Degree of match between DNELs and German AGW or MAK values of the DFG (for all MAK substances or MAK substances that have no AGW) or the IOELs of the EC

DNELs for non classified substances

- Examples of very low DNEL values for substances not classified as hazardous to health

Substance	CAS number	DNEL [mg/m ³]
Benzoin	119-53-9	0,1
Aluminum fluoride	7784-18-1	0,047
Dodecane-12-lactam	947-04-6	0,88

Table 1: Substances with very low DNELs not classified as harmful

Acknowledgement

The GESTIS DNEL Database has been established at the initiative and with the support of the German Social Accident Insurance Institutions and the representatives of the German regional governments, the Federal Institute for Occupational Safety and Health (BAuA), the association of the German chemical industry (VCI) and the Austrian Workers' Compensation Board (AUVA).