

VKIS - VSI – IGM – BGHM

List of Substances for Metal Working Fluids according to DIN 51385 for metalworking



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1 General

This list of substances is intended to support environmental and occupational health and safety compatible and process oriented handling of substances and preparations. It will be reviewed by representatives from the Verbraucherkreis Industrieschmierstoffe (VKIS), the Verband Schmierstoff-Industrie e. V. (VSI), the Industriegewerkschaft Metall (IGM) under moderation of the Fachbereich Holz und Metall (FBHM) of the Deutsche gesetzliche Unfallversicherung (DGUV), represented by the Berufsgenossenschaft Fachbereich Holz und Metall (BGHM) in a working group upon up-to-dateness and will be revised if needed. It is complementary to the VKIS-Data- and Inspection sheets and points to the suppliers' and users' responsibility to comply with effective German law, edicts and *technical* regulations. This does not exclude, that this substance list can be applied outside Germany with regard to environmental and industrial safe as well as process oriented handling of substances and mixtures, in consideration of the respective applicable rules there.

This list of substances comprises specific requirements for the following preparations according DIN 51385:

- Water miscible (wm) and water-mixed (wg) coolants
- Non-water miscible (nw) coolants
and analogously for
- Additives, added to the coolant before and during its use. This includes e. g. defoamers, biocides (for pre and re-conservation), disinfection cleaners, stabilizers, emulsifiers, corrosion inhibitor add-ons, high pressure add-ons.

DIN 51385 comprises information beyond MWF on products for MQL (minimum quantity lubrication), multifunctional oils and deformation lubricants. There is no claim on completeness for denomination of specific ingredients in such products.

Disclaimer

This list of substances has been composed and reviewed to the best knowledge and belief. It is considered as accurate and reliable, where there is a possibility, that it is not complete and/or it is not suitable for all existing or occurring conditions or situations. Furthermore classification of substances and legislation are subject to rapid change, which may not find an immediate reflection in the list.

Hence no explanation, warranty or assurance regarding accuracy and completeness of said information, limits, processes, methods and recommendations are given. Any liability is excluded, that application or use of the information will prevent danger, accidents, and losses, damages to people or goods of any kind. The reader must consider assuring oneself of the suitability of said information, specifications, processes, methods and recommendations for the intended purpose prior to its use

In general metal working fluids contain several substances and are “mixtures” in terms of EG-regulation (EG) no 1907/2006 (REACH). If the metal working fluid meets the criteria of article 31 of the REACH regulation, the supplier must make available an EG Safety Data Sheet according Appendix II to the buyer of the coolant. Classification and labeling of the metal working fluid is according regulation (EG) No. 1272/2008 (CLP) and is listed in section 2 of the safety data sheet. In addition to the classification and labeling the EG safety data sheet for the hazard assessment will contribute to an improvement of occupational health and safety.

Particularly for small and midsize enterprises

- the Technical Bulletin
- the EC-Safety Data Sheet and
- the VKIS-VSI-IGM-BGHM-list of substances

do form the basis for occupational health and safety provisions. The respective departments of the Metal Working Fluid user plant should receive the a.m. datasheets with every new coolant sample.

Recommended practice handling control is communicated by DGUV-Regel 109-003 (previous BGR/GUV-R 143).

The metal working fluid assessment-standard of the DGUV-Regel 109-003 of 10 mg/m³ is based on technically, not sanitary justified. The assessment criteria (TRGS 900, MAK DFG, etc.) of the individual substances must always be complied with.

It should always be aspired to minimize the metal working fluid exposition. The technical state of the art standard as described in DGUV Regel 109-003 must be applied. A project has been launched by DGUV to examine, if sanitary based assessment-standards for metalworking fluids can be generated. Not all limits given in DGUV-Regel 109-003 are up-to-date. This standard is under review currently. The limits for individual substances can be found in TRGS 900 and in this list.

EG-CLP-regulation (Classification, Labeling & Packaging) for the implementation of GHS (Globaly Harmonized System) has become effective on January 20th 2009. It must be applied for substances since December 1st 2010, for mixtures it is mandatory since June 1st 2015. In GHS some threshold values for labeling and pictograms have been changed, R-phrases have been substituted by H-phrases (H=“Hazard”) and S-phrases by P-phrases (P=“Precautionary”). There was a transition period for labeling of mixtures according to the previous system until June 1st 2017 for goods packed before June 1st 2015. There is no obligation to re-label. A transfer list for old labeling can be found in the glossary.

The respective current version of this list can be found on the homepages of:

- VSI : www.vsi-schmierstoffe.de
- IGM: www.igmetall.de
- DGUV:
 Fachbereich Holz und Metall: <http://www.dguv.de/fb-holzundmetall/index.jsp> ;
 Themenfeld KSS und Gefahrstoffe: http://www.dguv.de/fb-holzundmetall/sg/sg_maf/kss/index.jsp

From the 11th edition onward there is a current translation in English available. Decisive however are the contents of the version in German language.

2 Requirements to inclusion of substances

The substances listed below have been adopted for occupational health, toxicological, environmental or process oriented reasons.

The list contains in sections 3.1 – 3.4, Appendix I and Appendix IIa, IIb as basic principle only substances, which are considered “relevant for usage (in MWF)”. In addition also substances may be listed for transparency reasons,

- which are considered relevant for usage in European countries,
- which have been relevant for usage in previous years and for which therefore over the next years current health-related information should be available in this list,
- which are listed in the DFG-MAK-list in section Xc as MWF constituents and which have a MAK-threshold or a limit according TRGS 900
- for which on an individual case base an inclusion into the list has been decided within the working group

The relevance for usage is ascertained by the technical committee of MWF formulators within VSI; supplementary information from VKIS, IGM and BGHM, which suggest relevance for usage in MWF, is taken into account. Completeness of all relevant MWF ingredients cannot be assured. Substances, for which relevance of usage is not known, for which however there is an indication for a relevance of usage, will be reviewed based on simultaneously existing relevance to human health and/or relevance to the environment by the technical committee of the MWF formulators within VSI upon relevance for usage; and if there is confirmed relevance for usage they will be included into the list (or - where appropriate – into appendices I, IIa, IIb of the list).

As indicator for relevance of usage in general are considered an inclusion in the PC25 list in the REACH registration and/or inclusion into the list in section IIb (MWF components in DFG-MAK-list, currently no MAK- threshold deducible however). Other indicators for relevance of usage may be considered case-by-case.

Relevance on human health is assumed in general, if a substance is classified with one or more of the following H-phrases:

- H300; H301; H304; H310; H311; H314; H317; H318; H319; H330; H331; H334; H335; H340 H350; H351; H360; H361; H362; H370; H372 (classification by registrant or harmonized classification according to CLP) or
- if a substance has a national or international occupational limit value (e. g. from TRGS 900, MAK-list, SCOEL-assessment, ACGIH-limit value list etc.) or a DNEL (worker, chronic) of $\leq 1 \text{ mg/m}^3$.

So, if following criteria apply

1. Indicator for relevance of usage
2. Relevance for human health (as demonstrated by regulatory values as limits or classification) and
3. Confirmed relevance of usage, and
4. The working group have assessed afore mentioned relevancies, e. g. in view of the conditions of use, e. g. under conditions of dilution

the respective substance will in general be included into the list inclusive of its appendices. Additionally the relevance for the environment can be a criterion for the inclusion of substances into the list (H400; H410; H411).

So the list cannot warrant completeness for all MWF ingredients. It is recommended that interested persons, who cannot find a particular MWF ingredient in the list, obtain information regarding classification, limit values and toxicological information from:

- European Chemicals Agency (ECHA)
<https://echa.europa.eu/de/information-on-chemicals/registered-substances>
- Deutsche Forschungsgemeinschaft (DFG), Rationales of MAK-values
<https://onlinelibrary.wiley.com/doi/book/10.1002/3527600418>

- Institut für Arbeitsschutz der Deutschen gesetzlichen Unfallversicherung (IFA), GESTIS Stoffdatenbank (Gefahrstoffinformationssystem) [*GESTIS substances data base (dangerous substances information system)*]
<https://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index.jsp>
- Institut für Arbeitsschutz der Deutschen gesetzlichen Unfallversicherung (IFA), national and international limit values
<https://www.dguv.de/ifa/gestis/gestis-wissenschaftliche-begrundungen/herkunft-deutscher-luftgrenzwerte/auslaendische-luftgrenzwerte/index.jsp>

The threshold values for a ban of use listed in 3.1a are valid for non-water-miscible MWF and water-miscible MWF in condition as delivered.

When evaluating a substitution the customary application and use of the product must be implied. For substances labeled according CLP-regulation 1272/2008/EG as carcinogenic, mutagenic, reproduction toxic class 1A or class 1B, toxic class 1 to 3, bio-accumulative, persistent or aqua toxic, particular attention must be paid during hazard evaluation, if remaining hazards are kept as low as possible.

All substances contained in mixtures, which are regulated in the dangerous substances and environmental legislation (e.g. GefStoffV (Regulation for recasting of the Hazardous substances regulation and for amendments to the explosives act), Wasserrecht (Water Act)) or demanding further caution during handling, must be declared.

The threshold values listed in 3.2 are valid for non-water-miscible MWF and water-miscible MWF in condition as delivered, for water-mixed MWF after new preparation.

Furthermore substances w/o final occupational health and toxicological assessment are listed in Appendix I. For such substances it is aspired to review them within the next 2 years.

The handling of biocides (biocidal substances and biocidal products) is dealt with in Appendices IIa till IIc.

If coolants are further subject to dangerous goods transportation regulations the compulsory procedure for packaging, labeling, declaration and transportation must be adhered to. Regulations in the German Waste Avoidance, Recycling and Disposal Act (Kreislaufwirtschafts- und Abfallgesetz) shall be observed.

The H-phrases (Hazard statements) quoted in this list are based on the harmonized classifications of the substances concerned in appendix VI of the CLP regulation (EG) 1272/2008 and /or self-assessments of the manufacturers according appendix I of the CLP regulation.

In appendix VI of the CLP regulation there is quite often no complete assessment of a substance available but only certain assessments have been harmonized. Therefore the binding classification per appendix VI as well as complimentary classifications of the manufacturers – where applicable – must be considered for each substance.

As there may be several self-assessments from manufacturers of a single substance this list aims to quote such assessments which are practical, e. g. based on most numerous self-assessments in REACH-registration dossiers.

It must be pointed out, that the information regarding assessments via H-phrases may only be a selection out of all manufacturers' self-assessments. Is there a harmonized assessment of a substance according appendix VI of the CLP regulation this will always be considered, but also amended based on manufacturers' self-assessments. A complete evaluation with regards to content could however not be conducted.

The user of this list must read up on the entity of the registered assessments according to REACH based on information provided by the manufacturer in the safety data sheet and if applicable additionally in the data base of the European Chemical Agency (ECHA).

<https://echa.europa.eu/de/information-on-chemicals/registered-substances>

3 Lists of Substances

3.1a Prohibited substances

The substances listed must not be used in metal working fluids due to statutory provisions. The substances listed are prohibited substances or substances with restricted use in accordance with

EC dangerous substances and environmental legislation as well as in accordance with German law and directives and sub-legal regulations (TRGS).

The quoted limits for the prohibition of use apply to nwm MWF and wm MWF at their conditions at delivery.

The omnipresent concentration of 10 ppm indicated for some prohibited substances must not be a result of admixture.

3.1b Substances with restrictions of use or undesirable substances

Despite their use is not prohibited by law these substances may be used only up to the respective concentration limit and/or in agreement with the user. There will also be substances included which may cause non-justifiable technical risks during application.

3.2 Substances with threshold values / concentration limits

Beside the threshold values for air according to TRGS 900, List 3.2 also contains the following threshold values in the column "metal working fluids":

- Threshold values from the waste oil regulation (Altölverordnung)
- Concentration limits according to ATP (EU Adaptation Directives to the technical progress according to Annex VI of EU Directive 1272/2008), however only if the individual concentration limit for a substance deviates from the standard concentration limit
- Substances with labeling H 334 (may cause allergy or asthma symptoms or breathing difficulties if inhaled) must strictly be reported.
- Concentration limits according manufacturers' specification
- Biocidal substances can be found in Appendix IIa

Any deviating threshold values of the Senate Commission on the Investigation of Health Hazards of Chemical Compounds in the Work Area of the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) (MAK Commission) are indicated in the "Comments" column.

3.3 Declarable substances (with occupational medicine/toxicology or ecological relevance)

Regarding list 3.3 it must be noted that according to this list manufacturers' specifications are reported, which might be of occupational medicine/toxicology or ecological relevance.

All products (preparations, mixtures) containing sensitizing substances with R 43 (H 317) with a concentration above 0,1 % must according to the supplemental labelling element EUH 208 contain a reference on the label

"Contains (name of sensitizing substance). May cause allergic reactions."

3.4 Declarable substances (due to process related reasons)

According to List 3.4, metal working fluid manufacturers will provide information on substances of significance for the process technology.

Appendices

Appendix I Substances with no final occupational medicine/toxicology or technical assessment

In this appendix constituents which have not been finally assessed scientifically regarding their classification/labeling and/or air threshold value have been registered.

Regulation (EC) No. 1907/2006 of the European Parliament and the Council on Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) stipulates that certain minimum data on toxicity and environmental behaviour of chemicals must be provided for the assessment

of their hazards. Preempting these requirements, important metal working fluid constituents are included in the Annex with existing data gaps.

As benchmark, 6 minimum requirement tests are defined as basis (acute toxicity, irritation of the mucous membrane, skin irritation, mutagenicity, skin sensitization, repeated application), whereby alternatively other findings from the fields of toxicology or occupational medicine are taken into consideration to decide whether a substance should be included. The designation of a substance in this list does not imply a declaration duty at present and is intended for information only.

Substances listed in the Appendix will be regularly reviewed to that extent if they will be transferred to lists 3.1, 3.2 or 3.3 or may not be transferred. Reasons for such decisions will be provided.

**Appendix IIa Biocidal substances for metalworking fluids (“Article 95 list”)
- information gathering
Classification acc. CLP regulation EC No. 790/2009, annex VI**

Appendix IIb Biocidal products for metalworking fluids

List IIb is represented by the classification of biocidal products for PA 13 (metal working fluids), which are approved for use by national authorities (in Germany: BAuA).

Appendix IIc Biocides for metalworking fluids – “use, application and details”

This table summarizes application related data and expert knowledge on biocides. Unless not explicitly reported otherwise it is assumed that the standard classification limits according to CLP (regulation (EC) No. 1272/2008) must be applied. When selecting a biocide a trade-off between effectiveness, stability and hazard potential must be made.

An important question of the biocide user relates to classification and labeling of the water mixed MWF, if there are several biocidal active substances contained. With no exception the CLP regulation must be applied, if the active substances have specific classification limits. In the specific case of formaldehyde depots the contents of formaldehyde must be calculated and added or the total formaldehyde concentration must be determined analytically.

Pre-mixture of biocide concentrates is also to be avoided. For example most of the N-formals must not be mixed with CMI/MI (different pH-values lead to neutralization combined with an intense chemical reaction).

Should you require up-to-date information, please contact:

Für den VKIS:

Dr. Reinhard Baumgärtner

Reinhard.Baumgaertner@ps.rolls-royce.com

Für den VSI:

Dr. Stephan Baumgärtel

www.vsi-schmierstoffe.de

stephan.baumgaertel@vsi-schmierstoffe.de

Für die IG Metall:

ags@igmetall.de

Für den FB HM:

Dr. Jens Manikowski

www.dguv.de/fb-holzundmetall

jens.manikowski@bghm.de

List 3.1a: Prohibited substances (Processing fluids acc. to DIN 51385)

| Component (CAS-No.) | Air limit value TRGS 900 <i>Schwanger- schaftsgruppe</i> | Concentration limit MWF | Legal foundations, sources, notes | Comments |
|---|--|--|---|---|
| Amines, secondary, forming carcinogenic N-nitrosamines of category 1B | | ≤ 0,2 % (wm) | TRGS 611 | |
| Compounds, splitting off secondary Amines (e.g. Amides) → Amines, secondary | | | TRGS 611 | |
| Barium salts, with the exception of barium sulphate | | ≤ 10 ppm (wm) ≤ 2 ppm (wg) | AbwV annex 40 Waste water regulation | |
| Benzo-(a)-pyrene (BaP) (50-32-8), as indicator for polycyclic aromatic hydrocarbon (PAH/PAK) | Accepted Con- centration: 70 ng/m ³ Tolerated Con- centration: 700 ng/m ³ (TRGS 910) | ≤ 50 ppm BaP ≤ 3 % DMSO-extract for the base oil (PAH/PAK) | TRGS 910 TRGS 905 TRGS 551 | Method: IP 346 C1B, M1B, R1B |
| Bis-(2-ethylhexyl)-phthalate (DEHP) (117-81-7) | 2 mg/m ³ Y | ≤ 0,5 % | SVHC-substances list candi- date (REACH annex XIV) | R1B Duty of declaration from 0,1% |
| Chlorinated paraffin, short-chain (C ₁₀ -C ₁₃ , SCCPs) (85535-84-8) | | | EG2019/1021 annex I (POP- regulation) | PBT-substance, not registered under REACH; CLP: H351 |
| Diethanolamine (2,2'-Iminodiethanol) (111-42-2) | 0,5 mg/m ³ Y | ≤ 0,2 % (wm) | TRGS 611 | |
| 2-methylamino-2-methyl-1-propanol (MAMP, secondary amine) (27646-80-6) | | ≤ 0,2 % (wm) | TRGS 611 | Contamination in 2-Amino-2- methyl-1-propanol (AMP) (124-68-5), → AMP see below |
| Morpholine (110-91-8) and morpholine releasing compounds (e.g. Methylene-bis-morpholine / Bis-morpholino-methane) (5625-90-1) | 18 mg/m ³ Y | ≤ 0,2 % (wm) | TRGS 611 | |

| Component (CAS-No.) | Air limit value TRGS 900 <i>Schwanger- schaftsgruppe</i> | Concentration limit MWF | Legal foundations, sources, notes | Comments |
|--|--|--|--|-------------------------------------|
| Nitrite releasing compounds (e.g. Nitrite, 4-(2-nitrobutyl)-morpholine (2224-44-4), 2-bromo-2-nitro-1,3-propanediol (52-51-7), Tri-hydroxymethylnitromethane) (126-11-4) | | Prohibition (wm) ≤ 20 mg/l nitrite (wg) | GefStoffV § 16 Annex II Nr. 4 TRGS 611 | Refer to table 3.1b |
| Nonylphenol (25154-52-3), Nonylphenol, ethoxylated (9016-45-9) | | ≤ 0,1 % | EU-Water Framework Directive 2000/60/EG REACH annex XVII | REACH annex XIV |
| Polychlorobiphenyles - PCB (1336-36-3) | 0,003 mg/m ³ <i>Z</i> | ≤ 20 mg/kg | Waste oil regulation (AltöIV) PCB/PCT waste regulation | C2, R1A |
| Sum „TEQ“ Polychlorodibenzodioxins and polychlorodibenzofurans; lead component 2,3,7,8-TCDD „Dioxin“ (1746-01-6) | | ≤ 2 ppb in raw materials | TRGS 905, TRGS 557 | (MAK of DFG: 10 pg/m ³) |
| Terphenyl, chlorinated – PCT (61788-33-8) | | ≤ 20 mg/kg | Waste oil regulation (AltöIV) | |

List 3.1b: Substances with restrictions of use (Processing fluids acc. to DIN 51385)

| Component (CAS-No.) | Air limit value TRGS 900 <i>Schwanger- schaftsgruppe</i> | Concentration limit MWF | Legal foundations, sources, notes | Comments |
|--|--|----------------------------|---|---|
| (benzyloxy)methanol (14548-60-8) | | | Ruling of the commission (EU) 2023/458 | Prohibited from use as biocidal active substance for product type 13 based on missing dossier acc. to EC-Biocidal Products Regulation |
| 1,3-Bis-(hydroxymethyl)-urea (140-95-4) | | | Ruling of the commission 2008/809/EC | Prohibited from use as biocidal active substance for product type 13 based on missing dossier acc. to EC-Biocidal Products Regulation |
| Carbendazim (2-(Methoxycarbonylamino)-benzimidazole) (10605-21-7) | 10 mg/m ³ <i>Z</i> | | Ruling of the commission 2008/809/EC | Prohibited from use as biocidal active substance for product type 13 based on missing dossier acc. to EC-Biocidal Products Regulation |
| N-cyclohexyl-hydroxydiazene-1-oxide, potassium salt (N-cyclohexyl-N-nitroso-hydroxylamine, potassium salt) (K-HDO) (66603-10-9) | 10 mg/m ³ | | Ruling of the commission 2012/78/EC Hazardous substances regulation | Prohibited from use as biocidal active substance for product type 13 based on missing dossier acc. to EC-Biocidal Products Regulation |
| 2,2-dibromo-2-cyanoacetamide (10222-01-2) | | | Ruling of the commission (EU) 2021/1283 | Prohibited from use as biocidal active substance for product type 13 based on missing dossier acc. to EC-Biocidal Products Regulation |
| cis-1-(3-chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride (cis CTAC) (51229-78-8) | | | Ruling of the commission (EU) 2023/458 | Prohibited from use as biocidal active substance for product type 13 based on missing dossier acc. to EC-Biocidal Products Regulation |
| 7a-ethylidihydro-1H,3H,5H-oxazolo[3,4-c]oxazole (7747-35-5) | | | Ruling of the commission (EU) 2023/458 | Prohibited from use as biocidal active substance for product type 13 based on missing dossier acc. to EC-Biocidal Products Regulation |
| Ethylenediaminetetraacetic acid and its salts (EDTA) (60-00-4) | | see comment | Waste water regulation annex 40 | Must not enter sewage Recommendation: don't use at all |

| Component (CAS-No.) | Air limit value TRGS 900 <i>Schwangerschaftsgruppe</i> | Concentration limit MWF | Legal foundations, sources, notes | Comments |
|--|--|----------------------------|--|---|
| Formaldehyde (50-00-0) (as impurity or by release from formaldehyde depot compounds) | 0,37 mg/m ³ | 0,1 % | Decision of the commission 2008/681/EC 7. ATP of CLP | Prohibited from use as biocidal active substance for product type 13 based on missing dossier acc. to EC-Biocidal Products Regulation From January 1, 2016: C1B, M2 As release from formaldehyde depot compounds refer to DGUV FB HM-29 |
| Glutardialdehyde (111-30-8) | 0,2 mg/m ³ Y | | Cannot be registered due to H334 (May cause allergy or asthma symptoms or breathing difficulties if inhaled) | Prohibited from use as biocidal active substance for product type 13 based on missing dossier acc. to EC-Biocidal Products Regulation |
| Methenamine 3-chloroallylochloride (4080-31-3) | | | Ruling of the commission (EU) 2023/458 | Prohibited from use as biocidal active substance for product type 13 based on missing dossier acc. to EC-Biocidal Products Regulation |
| 1,3,5-Tris-(2-hydroxypropyl)-hexahydro-1,3,5-triazine(HPT) (25254-50-6) | | | Skin Sens. 1 H317 | Single substance not registered for product type 13; may still be used in a mixture of a biocidal preparation |
| 4-(2-Nitrobutyl)-morpholine (2224-44-4) | | | Decision of the commission 2013/85/EU | Prohibited from use as biocidal active substance for product type 13 based on missing dossier acc. to EC-Biocidal Products Regulation Nitrosating Agent |
| 1-phenoxy-2-propanol (770-35-4) 2-Phenoxy-1-propanol (4169-04-4) (Mixture or single components) | | | Ruling of the commission 2008/809/EC | Prohibited from use as biocidal active substance for product type 13 based on missing dossier acc. to EC-Biocidal Products Regulation |
| Silicon oils (Polydimethylsiloxanes, PDMS) (63148-62-9) | | see comment | | May cause technical problems if surface treatment succeeds, e.g. washing, crack testing, nitriding, painting, plating, adhesive bonding. Recommendation: don't use at all |
| Thiabendazol (2-(thiazole-4-yl)benzimidazole) (148-79-8) | 20 mg/m ³ Y | | Ruling of the commission 2011/391/EC | Prohibited from use as biocidal active substance for product type 13 based on missing dossier acc. to EC-Biocidal Products Regulation |

List 3.2: Substances with limit values / concentration limits
(Processing fluids acc. to DIN 51385); Biocides see Appendix IIa

| Component (CAS-No.) | Air limit value TRGS 900 <i>Schwangerschaftsgruppe</i> | Concentration limit MWF | Legal foundations, sources, notes | Comments |
|--|---|-------------------------|---|---|
| 2-Amino-1-butanol (96-20-8) | 3,7 mg/m ³ <i>Z</i> | | | May be absorbed through skin (H) |
| 2-aminoethanol (Monoethanolamine) (141-43-5) | 0,5 mg/m ³ <i>Y</i> | | | May be absorbed through skin (H), May cause skin sensitisation (Sh) Recommended inhibitor according TRGS 611. CoRAP concluded without further changes |
| 2-(2-aminoethoxy)-ethanol (Diglycolamine) (929-06-6) | 0,87 mg/m ³ | | | May be absorbed through skin (H), may cause skin sensitisation (Sh) |
| 2-amino-2-methyl-1-propanol (AMP) (124-68-5) | 3,7 mg/m ³ <i>Y</i> | | | May be absorbed through skin (H) Check for absence of 2-Methylamino-2-methyl-1-propanol (MAMP) (27646-80-6), there is also a version with < 0,8 % MAMP available |
| 1-aminopropan-2-ol (Isopropanolamine) (78-96-6) | 5,8 mg/m ³ | | | |
| Boric acid [1] (10043-35-3) Orthoboric acid, Sodium salt [2] (13840-56-7) Sodiumtetraborates [3] [4] [5] (1330-43-4, 12179-04-3, 1303-96-4) | 0,5 mg/m ³ (E) boron (= 2,6 mg/m ³ boric acid) <i>Y</i> | 0,3 % | Ruling of the commission 2008/809/EC | Use of the MAK of DFG 1,8 mg/m ³ boron, Schwangerschaftsgruppe B is not recommended. More information see guidance document DGUV FB HM-030 Duty of declaration above 0,1% (REACH SVHC - candidate list) |
| 2-butoxyethanol (Butyl glycol) (111-76-2) | 49 mg/m ³ <i>Y</i> | | | May be absorbed through skin (H) |
| 2-(2-butoxyethoxy)-ethanol (Butyl diglycol) (112-34-5) | 67 mg/m ³ <i>Y</i> | | | May be absorbed through skin (H) Restriction acc. Appendix XVII for spray application in spray paints and cleaner sprays, not applicable here |
| Chlorinated paraffin, medium chain (C ₁₄ -C ₁₇ , MCCPs) (85535-85-9) | 6 mg/m ³ (E) <i>Y</i> | | | May be absorbed through skin (H) Application only if technically necessary (e.g. deformation of stainless steel) and upon agreement Proposal for limitation because of vPvB properties |
| Distillates (petroleum), hydrotreated light (64742-47-8) | <i>Y</i> | | (1) | MAK: 5 mg/m ³ (E), measured as respirable aerosol proportion respectively 350 mg/m ³ (vapor) |

| Component (CAS-No.) | Air limit value TRGS 900 Schwangerschaftsgruppe | Concentration limit MWF | Legal foundations, sources, notes | Comments |
|---|---|-------------------------------|---|--|
| Distillates (petroleum), hydrotreated heavy (64742-48-9) | | | | MAK: 300 mg/m ³ |
| 2,6-di-tert-butyl-p-cresol (Butylhydroxytoluol (BHT)) (128-37-0) | 10 mg/m ³ (E) Y | | | |
| Dicyclohexylamine (101-83-7) | 5 mg/m ³ Y | | | May be absorbed through skin (H) More information see guidance document DGUV FB HM-031 "Dicyclohexylamine – DCHA - guid- ance document for risk assessment" |
| Diethylene glycol (2,2'-oxydiethanol) (111-46-6) | 44 mg/m ³ (E) Y | | | |
| 1,1'-Dimethyldiethylene glycol (1,1'-oxydipropan- 2-ol) (110-98-5) | 100 mg/m ³ (E) Y | | | |
| Dipropylene glycol (Oxydipropanol, mixture of isomers) (25265-71-8) | 100 mg/m ³ (E) Y | | | |
| 2-ethylhexyl oleate (26399-02-0) | 5 mg/m ³ (A) | | | |
| Glycerol (56-81-5) | 200 mg/m ³ (E) Y | | | |
| 2-piperidinoethanol_ (3040-44-6) | 11 mg/m ³ | | H302 Acute Tox. 4 H312 Acute Tox. 4 H314 Skin Corr. 1 H317 Skin Sens.1B H318 Eye Dam. 1 H412 Aqu. Chron. 3 | skin sensitizing (Sh) |
| Isotridecan-1-ol (27458-92-0) | 21 mg/m ³ Y | | | |
| Coconut oil (8001-31-8) | 5 mg/m ³ (A) Y | | | |
| Benzothiazole-2-thiol_ (149-30-4) | 4 mg/m ³ (E) Y | | H317 Skin Sens. 1 H400 Aqu. Acute 1 H410 Aqu. Chron. 1 | skin sensitizing (Sh) |
| N-methyldiethanolamine (2,2'- methyliminodiethanol) (105-59-9) | | | | MAK: 2 mg/m ³ |
| 2-methylpentane-2,4-diol (Hexylene glycol) (107-41-5) | | | | MAK: 49 mg/m ³ |

| Component (CAS-No.) | Air limit value TRGS 900 Schwanger- schaftsgruppe | Concentration limit MWF | Legal foundations, sources, notes | Comments |
|---|--|-------------------------------|--------------------------------------|--|
| 4-methyl-1,3-dioxolan-2-one (108-32-7) | 8,5 mg/m ³ Y | | H319 Eye Irrit.2 | |
| 4,4'-methylene bis(dibutyldithiocarbamate) (10254-57-6) | 5 mg/m ³ (A) 20 mg/m ³ (E) | | | |
| Mineral oil (Crude), severely refined (92062-35-6, 72623-83-7, 92045-45-9, 92045-44-8) | 5 mg/m ³ Y | | | Very rarely used in MWF; potential presence to be checked via SDS |
| N-1-naphthylaniline (90-30-2) | 2 mg/m ³ (E) | | | may cause skin sensitisation (Sh) |
| 4-(1,1,3,3-tetramethylbutyl)phenol ; (octylphenol) (140-66-9) | 4 mg/m ³ | | | Sum of vapor and aerosols. Ecological aspects (biological degradability, fish toxicity). Nonylphenol ethoxylates shall not be replaced by Octylphenol ethoxylates (UBA recommendation) |
| Petroleum sulphonate, calcium salts (61789-86-4) | 5 mg/m ³ (A) | | H317 Skin Sens.1B | Substance has not been finally evaluated regarding Sh-properties |
| Polyethylene glycols (medium molar mass 200- 600) (25322-68-3) | 200 mg/m ³ Y | | | |
| Poly- α -olefins (e. g. 68649-12-7) | 5 mg/m ³ Y | | | |
| Polytetrafluorethylene (9002-84-0) | | | | MAK: 0,3 mg/m ³ (A) multiplied by density of material; 4 mg/m ³ (E). Relevance for lubricating oils only, not for MWF! |
| Silver (7440-22-4) | 0,1 mg/m ³ (E) | | | |
| Silver compounds, inorganic | 0,01 mg/m ³ (E) | | | Related to silver content |
| Thiodiethylene bis[3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionate] (41484-35-9) | 2 mg/m ³ (E) | | | |
| Triglycerides (lard oil, palm oil, rapeseed oil, soybean oil) | 5 mg/m ³ (A) Y | | | |
| Triethylen glycol (2,2'-(ethylenedioxy)diethanol) (112-27-6) | 1000 mg/m ³ (E) Y | | | |
| Triethanolamine (2,2',2''-nitrilotriethanol) (102-71-6) | 1 mg/m ³ (E) Y | | | |
| O,O,O-triphenyl phosphorothioate_ (597-82-0) | 20 mg/m ³ (E) | | | |
| Triphenyl phosphate_ (115-86-6) | 12,5 mg/m ³ (E) Y | | | |

- (1) According to remark P of CLP regulation the harmonized classification as carcinogen or germ cell mutagen for distillates, except it can be proven, that the substance contains less than 0.1percent weight benzene (Einecs-No. 200-753-7); in such case also an classification for this hazard class must be conducted according title II of the CLP regulation.

List 3.3: Declarable substances (with occupational medicine/toxicology or ecological relevance)
(Processing fluids acc. to DIN 51385)

| Component (CAS-No.) | Legal foundations, sources, notes | Comments |
|---|---|---|
| Adsorbable organic halogen compounds (AOX) | AbwV annex 40 | Waste water limit value 1 mg/l |
| Amines, secondary, which do not form carcinogenic N-nitrosamines category 1 or 2 (e.g. dicyclohexylamine (101-83-7)) | TRGS 552, 611 | |
| 1-(N,N-bis(2-ethylhexyl)aminomethyl)-1,2,4-triazole (91273-04-0) | H314 Skin Corr. 1B H317 Skin Sens. 1 H318 Eye Dam. 1 H411 Aqu. Chron. 1 | DNEL: 1,76 mg/m ³ |
| Calcium bis(dinonylnaphthalenesulphonate) (57855-77-3) | H315 Skin Irrit. 2 H317 Skin Sens. 1 H319 Eye Irrit. 2 | |
| Chlorinated paraffin, medium and long chain (MCCP, LCCP and vLCCP) (85535-85-9, 85535-86-0) | AltIV ≤ 0,2 % | Application only if technically necessary (e.g. deformation of stainless steel) and upon agreement. Limit for disposal as used oil; otherwise as "dangerous waste for elimination" DNEL: 6,7 mg/m ³ (85535-85-9) |
| Fragrances (masking products) | TRGS 401 | Skin sensitizing effects of some fragrances / masking products |
| 2-ethylhexanoic acid (149-57-5) | H360D Repr. 1B | Not a MWF component. As precursor of chemicals potentially trace substance. |
| 1-hydroxyethane-1,1-diphosphonic acid and its sodium and potassium salts, HEDP (2809-21-4, 7414-83-7) | | up to now no AGW and no MAK and BAT limits |
| 3-iodo-2-propynyl-n-butylcarbamate (IPBC) (55406-53-6) | | DIN EN ISO 9562 method for AOX determination should be revised as in presence of IPBC too high results (regarding Cl and Br) are pretended. Biocidal active substance. The classification with H331 applies for the active substance as powder. In MWF (and biocidal products) there is the dissolved active compound only. More: see list of biocidal substances. |
| (4-nonylphenoxy)acetic acid (3115-49-9) | MAK IIb H302 Acute Tox. 4 H314 Skin Corr. 1B H317 Skin Sens. 1A H318 Eye Dam. 1 H400 Aqu. Acute 1 H410 Aqu. Chronic 1 | DNEL 1,76 mg/m ³ |

| Component (CAS-No.) | Legal foundations, sources, notes | Comments |
|---|--|---|
| N-2-naphthylaniline (135-88-6) | H315 Skin Irrit. 2 H317 Skin Sens. 1 H319 Eye Irrit. 2 H351 Carc. 2 Aqu. Chronic 2 | MAK: May be absorbed through skin (H); skin sensitizing (Sh) |
| Octylphenol (140-66-9), Octylphenol ethoxylates | | Ecological aspects (biological degradability, fish toxicity) Nonylphenol ethoxylates shall not be replaced by Octylphenol ethoxylates (UBA recommendation) |
| Phenols | | Ecological aspects (biological degradability, fish toxicity) |
| Heavy metals and heavy metal compounds | AbwV annex 40 | Consider waste water limit value for heavy metals Ecological aspects (fish toxicity, bacteria toxicity). e. g. Cu: waste water limit value 0,5 mg/l. Causes corrosion via local cell |
| Tall oil distillates (distilled tall oil, DTO) (8002-26-4) | | Formation of skin sensitizing oxidation products |

List 3.4: Declarable substances (due to process-related reasons)
(Processing fluids acc. to DIN 51385)

| Component (CAS-No.) | Legal foundations, sources | Comments |
|---|----------------------------|--|
| Boron compounds, organic | | May lead to bonding in single cases Residues may remain despite degreasing with organic solvents |
| Dipropylene glycol (110-98-5) | | May impair ultra-filterability |
| Dyes | | Potentially unintended discoloration of product, equipment and sewage |
| Complexing agents, relevant for waste water treatment (except EDTA) | | Complexing agents with relevance to waste water treatment may impair precipitation of heavy metals and dissolve heavy metals from sludge. For EDTA pls. refer to list 3.1.b |
| Organomodified Siloxanes | | Application only upon consultation with user; may modify wettability of surfaces |
| Yellow metal inhibitors: Benzotriazole, Tolyltriazole | | In order to reduce the release into the environment use appropriate treatment processes (e. g. distillation process, activated carbon adsorption). Refer to Appendix I. |

Appendix I: Substances with no final occupational medicine/toxicology or technical assessment (specified DNEL refer to the chronic inhalational exposition)

| Component (CAS-No.) | Legal foundations, sources | Comments |
|---|--|-------------------------------|
| Alkanolamine salts (primary/tertiary) of carboxylic acids and boric acid (Boric acid with mono- and triethanol amine) (68512-53-8) | H315 Skin Irrit. 2 H319 Eye Irrit. 2 | |
| Alkylamine-mono/diphosphate (Amines, C ₁₁₋₁₄ branched alkyl, monohexyl and dihexyl phosphates) (80939-62-4) | H315 Skin Irrit. 2 H319 Eye Irrit. 2 H411 Aqu. Chron. 2 | DNEL 200 µg/m ³ |
| 2-amino-2-ethyl-1,3-propandiol (AEPD) (115-70-8) | H318 Eye Dam. 1 | DNEL 58,8 mg/m ³ |
| 3-Aminooctan-4-ol (1001354-72-8) | H302 Acute Tox. 4 H314 Skin Corr. 1C H318 Eye Dam. 1 | DNEL 29 mg/m ³ |
| Azelaic acid (Nonandiacid, 1,7-heptandicarbon acid) (123-99-9) | MAK IIb H315 Skin Irrit. 2 H319 Eye Irrit. 2 | DNEL 17,632 mg/m ³ |
| Benzotriazole (95-14-7) | MAK: Canc. Cat 3B May be absorbed through skin (H) H302 Acute Tox. 4 H315 Skin Irrit. 2 H319 Eye Irrit. 2 H411 Aqu. Chron. 2 | DNEL 19 mg/m ³ |
| Benzotriazoles, substituted (e. g. 6-methylbenzotriazole) (136-85-6) | H314 Skin Corr. 1B H318 Eye Dam. 1 | |
| 2,2'-(cyclohexylimino)bisethanol (4500-29-2) | H302 Acute Tox. 4 H314 Skin Corr. 1C H373 STOT RE 2 | DNEL 2,2 mg/m ²³ |
| 2-dibutylaminoethanol (102-81-8) | H302 Acute Tox. 4 H312 Acute Tox. 4 H314 Skin Corr. 1C H318 Eye Dam. 1 H335 STOT SE 3 | DNEL 2,22 mg/m ³ |

| Component (CAS-No.) | Legal foundations, sources | Comments |
|--|---|---|
| Dibutyl hydrogen phosphate (107-66-4) | MAK IIb H318 Eye Dam. 1 H314 Skin. Corr. 1B H351 Carc. 2 | DNEL 1.25 mg/m ³ (carc.) DNEL 1 mg/m ³ (irritation resp.) |
| 2-dimethylaminoethanol (108-01-0) | H226 Flam. Liq. 3 H302 Acute Tox. 4 H312 Acute Tox. 4 H314 Skin Corr. 1B H318 Eye Dam. 1 H332 Acute Tox. 4 H335 STOT SE 3 | DNEL 1,76 mg/m ³ H335 STOT SE 3; C ≥ 5% |
| 1-(dimethylamino)propan-2-ol (108-16-7) | H226 Flam. Liq. 3 H302 Acute Tox. 4 H312 Acute Tox. 4 H314 Skin Corr. 1B H318 Eye Dam. | DNEL 2 mg/m ³ |
| Fatty alcohols, C ₁₂₋₁₈ (67762-25-8) | H315 Skin Irrit. 2 H319 Eye Irrit. 2 | |
| Fatty alcohol ethoxylates (Alcohols, C16-18 and C18-unsatd., ethoxylated_; 1 - 2.5 moles ethoxylated (68920-66-1)) | H315 Skin Irrit. 2 H411 Aqu. Chron. 2 | DNEL 294 mg/m ³ |
| Isononanoic acid (26896-18-4, Mixture) 3,5,5-trimethylhexanoic acid, (3302-10-1, Main constituent) | MAK IIb H302 Acute Tox. 4 H315 Skin Irrit. 2 H318 Eye Dam. 1 | DNEL 10,6 mg/m ³ DNEL: 7mg/m ³ (3302-10-1) 3302-10-1 currently in CoRAP process (suspected R) |
| N-cyclohexyl-N-methylcyclohexylamine (7560-83-0) | H301 Acute Tox. 3 H311 Acute Tox. 3 H314 Skin Corr. 1A H318 Eye Dam. 1 H411 Aqu. Chron. 1 | DNEL 0,7 mg/m ³ |
| Octylamine (111-86-4) | H226 Flam. Liq. 3 H301 Acute Tox. 3 H302 Acute Tox. 4 H311 Acute Tox. 3 H314 Skin Corr. 1A H318 Eye Dam. 1 H332 Acute Tox 4 H335 STOT SE 3 H411 Aqu. Chron. 1 H412 Aqu. Chron. 3 | DNEL 4,6 mg/m ³ |

| Component (CAS-No.) | Legal foundations, sources | Comments |
|--|--|------------------------------|
| 2,2'-(octylimino)bisethanol (15520-05-5) | H302 Acute Tox. 4 H315 Skin Irrit. 2 H318 Eye Dam. 1 H412 Aqu. Chron. 3 | DNEL 61,7 mg/m ³ |
| Poly- and perfluorated organic compounds (PFAS) | | suspected vPvB |
| N,N,N',N'-tetramethylhexamethylenediamine (111-18-2) | H301 Acute Tox. 3 H311 Acute Tox. 3 H314 Skin Corr. 1A H318 Eye Dam. 1 H331 Acute Tox. 3 H373 STOT RE 2 H411 Aqu. Chron. 2 | DNEL 1,11 mg/m ³ |
| 6-[[4-methylphenyl]sulphonyl]amino]hexanoic acid (78521-39-8) | MAK IIb | DNEL 7 mg/m ³ |
| Petroleum sulphonate, sodium salt (68608-26-4) | H319 Eye Irrit. 2 | DNEL: 0,66 mg/m ³ |
| Polybutene (9003-29-6) | MAK IIb H225 Flam. Liq. 2 H315 Skin Irrit. 2 H304 Asp. Tox. 1 H413 Aqu. Chron. 4 | |
| Tolyltriazole, sodium salt (64665-57-2) | H302 Acute Tox. 4 H314 Skin Corr. 1B H318 Eye Dam. 1 H411 Aqu. Chron. 2 | DNEL: 8,8 mg/m ³ |

Appendix II a: Biocidal substances usable in Germany for metalworking fluids ("Article 95 list" acc. BPR) – information gathering
Classification acc. CLP regulation EC No. 790/2009 appendix VI

| Substance name | | | | Classification | | Labelling | | | Specific Concentration limits, M-factors | Air threshold limit TRGS 900 mg/m ³ ÜF(Kat) |
|------------------------|------------------|---|---|--|--|--------------------------------|--|--|--|--|
| Active substance class | Abbreviation | Chemical identification (active substance) | CAS-No. EC-No. | Hazard class and category code(s) | Hazard statement code(s) | Pictogram, signal word code(s) | Hazard statement code(s) | Supplementary hazard statement code(s) | | |
| Isothiazolinones | CIT/MIT (CMI/MI) | 5-Chlor-2-methyl-isothiazolin-3-one and 2-Methyl-isothiazolin-3-one, mixture in ratio 3:1 | 55965-84-9 613-167-00-5 (mixture) 247-500-7 / 220-239-6 (single substances) | Acute Tox. 2 Acute Tox. 3 Skin Corr. 1C Eye Dam. 1 Skin Sens. 1A Acute Tox. 2 Aquatic Acute 1 Aquatic Chronic 1 | H310 H301 H314 H318 H317 H330 H400 H410 | GHS06 GHS05 GHS09 Dgr | H310 H301 H314 H317 H330 H410 | | Eye Dam. 1; H318: C ≥ 0,6 % Eye Irrit. 2; H319: 0,06 % ≤ C < 0,6 % Skin Corr.1C; H314: C ≥ 0,6 % Skin Irrit. 2; H315: 0,06 % ≤ C < 0,6 % Skin Sens. 1A; H317: C ≥ ,0015 % M = 100 (acute) M = 100 (chronic) | MAK: 0,2 (E) 2 (I) Sh |
| | MIT (MI) | 2-Methyl-isothiazolin-3-one | 2682-20-4 220-239-6 | Acute Tox. 3 Acute Tox. 2 Skin Corr. 1B Eye Dam. 1 Skin Sens. 1A Aquatic Acute 1 Aquatic Chronic 1 | H301/311 H330 H314 H318 H317 H400 H410 | GHS06 GHS05 GHS09 Dgr | H301/311 H330 H314 H317 H410 | | Skin Sens. 1 ; H317 : C ≥ 0,0015 % M = 10 (acute) M = 1 (chronic) | |
| | OIT | 2-Octyl-2H-isothiazolin-3-one | 26530-20-1 247-761-7 | Acute Tox. 3 Skin Corr. 1 Eye Dam. 1 Skin Sens. 1A Acute Tox. 2 Aquatic Acute 1 Aquatic Chronic 1 | H301/311 H314 H318 H317 H330 H400 H410 | GHS06 GHS05 GHS09 Dgr | H301/H311 H314 H317 H330 H410 | EUH 071 | Skin Sens. 1A; H317: C ≥ 0,0015 % M = 100 M =100 (chronic) inhalation: ATE = 0.27 mg/L (dusts/mists) dermal: ATE = 311 mg/kg (-) oral: ATE = 125 mg/kg (-) | 0,05 E 2 (I) H Sh |

| Substance name | | | | Classification | | Labelling | | | Specific Concentration limits, M-factors | Air threshold limit TRGS 900 mg/m ³ ÜF(Kat) | |
|------------------------------|--------------|---|--------------------------------------|---|--|---|--|--|--|--|--|
| Active substance class | Abbreviation | Chemical identification (active substance) | CAS-No. EC-No. | Hazard class and category code(s) | Hazard statement code(s) | Pictogram, signal word code(s) | Hazard statement code(s) | Supplementary hazard statement code(s) | | | |
| Isothiazolinones | BIT | 1,2-Benzisothiazolin-3-(2H)-one | 2634-33-5 220-120-9 | Acute Tox. 4 Skin Irrit 2 Eye Dam. 1 Skin Sens. 1 Aquatic Acute 1 | H302 H315 H318 H317 H400 | GHS05 GHS07 GHS09 Dgr | H302 H315 H318 H317 H400 | | Skin Sens. 1 H 317: C ≥ 0,05 % | | |
| | BBIT | n-Butyl-1,2-benzisothiazolin-3-one | 4299-07-4 420-590-7 | Skin Corr. 1B Skin Sens. 1 Aquatic Acute 1 Aquatic Chronic 1 | H314 H317 H400 H410 | GHS06 GHS05 GHS09 Dgr | H314 H317 H410 | | | | |
| Formaldehyde depot compounds | EGForm. EDDM | Reaction products of ethylene glycol and paraformaldehyde ((Ethylenedioxy)dimethanol, 1,6-Dihydroxy-2,5-dioxahexane ((Ethylenedioxy)dimethanol) | 3586-55-8 222-720-6 | Acute Tox. 4 Skin Irrit 2 Eye Dam. 1 | H302 H315 H318 | GHS05 GHS07 Dgr | H302 H315 H318 | | | MAK 0,76 2(I) | |
| | HHT | 1,3,5-Tris-(2-hydroxyethyl)-hexahydro-1,3,5-triazine (2,2',2''-(Hexahydro-1,3,5-triazine-1,3,5-triyl)-triethanol) | 4719-04-4 225-208-0 | Acute Tox. 4 (*) Skin Sens. 1 | H302 H317 | GHS07 Wng | H302 H317 | | Skin Sens. 1 H 317: C ≥ 0,1 % | | |
| | (MBO) | Reaction product of paraformaldehyde and 2-hydroxypropylamine (3:2) (formerly 3,3'-Methylen-bis-(5-methyloxazolidine), MBO) | 66204-44-2 266-235-8 | Acute Tox 4 Acute Tox 3 Skin Corr. 1B Skin Sens. 1A Eye Dam. 1 Muta. 2 Carc. 1B (2) STOT RE 2 Aquatic Chronic 3 | H302/332 H311 H314 H317 H318 H341 H350 H373 H412 | GHS05 GHS06 GHS08 GHS09 Dgr | H302/332 H311 H314 H317 H318 H341 H350 H373 H412 | EUH 071 | | | |
| | TMAD | Tetrahydro-1,3,4,6-tetrakis(hydroxymethyl)imidazo[4,5-d]imidazole-2,5(1H,3H)-dione | 5395-50-6 226-408-0 | Skin Sens. 1 Carc. 1B (2) Aquatic Chronic 2 | H317 H350 H411 | GHS09 GHS08 GHS07 Dgr | H317 H350 H411 | | | 0,5 E 2(I) Sh Y | |
| | DMDMH | 1,3-Bis-(hydroxymethyl)-5,5-dimethyl-imid-azolidine-2,4-dione | 6440-58-0 229-222-8 | Acute Toc. 4 | H302 | GHS07 Wng | H302 | | | | |

| Substance name | | | | Classification | | Labelling | | | Specific Concentration limits, M-factors | Air threshold limit TRGS 900 mg/m ³ ÜF(Kat) |
|------------------------|--------------|---|---|--|--|---|--|--|--|--|
| Active substance class | Abbreviation | Chemical identification (active substance) | CAS-No. EC-No. | Hazard class and category code(s) | Hazard statement code(s) | Pictogram, signal word code(s) | Hazard statement code(s) | Supplementary hazard statement code(s) | | |
| | | Chlorocresol | 59-50-7 200-431-6 | Acute Tox. 4 Skin Sens. 1B Skin Corr. 1C Eye Dam. 1 STOT SE 3 Aquatic Acute 1 Aquatic Chronic 3 | H302 H317 H314 H318 H335 H400 H412 | GHS07 GHS09 GHS05 Dgr | H302 H317 H314 H318 H335 H400 H412 | | M = 1 | |
| | NaPy | Pyridin-2-thiol-1-oxid, Na-salt (Sodium-pyrithion) | 3811-73-2 15922-78-8 223-296-5 240-062-8 | Acute Tox. 4 Acute Tox. 3 Skin Irrit. 2 Skin Sens. 1 Eye Irrit. 2 Acute Tox. 3 STOT RE 1 Aquatic Acute 1 Aquatic Chronic 1 | H302 H311 H315 H317 H319 H331 H372 H400 H410 | GHS 06 GHS08 GHS 09 Dgr | H302 H311 H315 H317 H319 H372 H410 | EUH070 | M(chronic) = 10 M = 100 Inhalation: ATE = 0,5 mg/L (dusts or mists) Dermal: ATE = 790 mg/kg bw(-) Oral: ATE = 500 mg/kg bw (-) <i>Expert opinion on exposure of women in conjunction with the Maternity Protection Act regarding sodium pyrithion ¹⁾</i> | 0,2 E 2(II) Y H |
| | IPBC | 3-Iod-2-propinyl-butylcarbamate Guidance document: www.vsi-schmierstoffe.de | 55406-53-6 259-627-5 | Acute Tox. 4 STOT RE 1 (larynx) Eye Dam. 1 Skin Sens. 1 Acute Tox. 3 Aquatic Acute 1 Aquatic Chronic 1 | H302 H372 H318 H317 H331 H400 H410 | GHS06 GHS08 GHS05 GHS09 Dgr | H302 H372 H318 H317 H331 H410 | | M = 10 M(chronic) = 1 | 0,058 2(I) Y Sh |
| | EGPhE | 2-Phenoxyethanol (Ethylenglycol-phenylether) | 122-99-6 204-589-7 | Acute Tox. 4 Eye Dam. 1 STOT SE 3 | H 302 H 318 H335 | GHS 05 GHS07 Dgr | H302 H318 H335 | | oral: ATE = 1394 mg/kg | 5,7 1(I) Y |

| Substance name | | | | Classification | | Labelling | | | Specific Concentration limits, M-factors | Air threshold limit TRGS 900 mg/m ³ ÜF(Kat) |
|------------------------|--------------|---|-------------------------------|---|--------------------------------------|---|--------------------------------------|--|--|--|
| Active substance class | Abbreviation | Chemical identification (active substance) | CAS-No. EC-No. | Hazard class and category code(s) | Hazard statement code(s) | Pictogram, signal word code(s) | Hazard statement code(s) | Supplementary hazard statement code(s) | | |
| | OPP | O-phenylphenol (Biphenyl-2-ol, 2-Hydroxybiphenyl) | 90-43-7 201-993-5 | Skin Irrit. 2 Eye Dam. 1 STOT SE 3 Aquatic Acute 1 Aquatic Chronic 1. | H315 H318 H335 H400 H410 | GHS07 GHS09 Wng. | H315 H318 H335 H400 H410 | | | 5 E 1(I) Y |
| | | N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine | 2372-82-9 219-145-8 | Acute Tox. 3 Skin Corr. 1B STOT RE 2 (kidney) Aquatic Acute 1 Aquatic Chronic 1 | H301 H314 H373 H400 H410 | GHS09 GHS08G HS05 GHS06 Dgr | H301 H314 H373 H400 H410 | | M = 10 | 0,05 (E) 8 (I) Y |

The minimum classification regarding a category is marked with „*” in column „classification”. Manufacturer classifications.

- (1) http://www.dguv.de/fb-holzundmetall/sg/sg_maf/kss/index.jsp
- (2) Classification as carcinogen is not compulsory, if it can be proven, that the theoretical maximum concentration of released formaldehyde, independent of the source, is less than 0,1% in the mixture placed on the market
- (3) Classification as mutagenic is not compulsory, if it can be proven, that the theoretical maximum concentration of released formaldehyde, independent of the source, is less than 1% in the mixture placed on the market
- (4) The total formaldehyde content of the donator will be considered (MBO: 48% HCHO, MBM: 16,4 % total-HCHO)

Appendix II b: Biocidal products for metal working fluids

The list of approved biocidal products can be retrieved from:

[Datenbank der zugelassenen Biozidprodukte](#)

Concentration limits must be retrieved from CLP regulation.

Contact manufacturer for biocidal products, which have not yet been listed by BAuA.

Appendix II c: Biocides for metalworking fluids (selection) – use, application and details

| Use and application | | | | | | | Details | | |
|---------------------|----------|-------|-------|---|---------------------------------------|---|--|---|---|
| Active substance | Effect | | | Typical application with concentration of active substances [ppm] | | | Analytical method | Behaviour in MWF | Comments |
| | Bacteria | Fungi | Algae | Pre-conservation of concentrate | Preventive conservation wg-MWF | Shock conservation (* = emergencies) wg-MWF | | | |
| CIT/MIT | +++ | ++ | + | no | Possible 10 – 15 | 15 * 15-30 | HPLC | In case of infection 90% degradation of CIT within 72 h; chloride und nitrate contents increase, pH-value drops | Potential for sensitisation at >15 ppm. Do not use in areas where workers are sensitized already. Stabilises among other with magnesium nitrate and sodium nitrate, relevant nitrate source according TRGS 611. Commercially available as 12-14% product and 1,5% product; for post-dosing the 1,5% product is recommended. |
| MIT | ++ | - | - | no | 50-150 Preferred in combined products | - | HPLC | n. s. | Potential for sensitisation at >1000 ppm. Do not use in areas where workers are sensitized already. |
| OIT | - | +++ | ++ | possible 500 | 50-100 | 100 | HPLC | Can impair negatively on foam behaviour, poor solubility in fully synthetic systems | Potential for sensitisation at >500 ppm. Do not use in areas where workers are sensitized already. For post-dosing the <25% product is recommended. |
| BBIT | + | +++ | +++ | 1000-3000 | 70-100 | 100-200 | HPLC | Little application experience so far | Potential for sensitisation at >10000 ppm. Do not use in areas where workers are sensitized already. Main application as fungicide, also as bactericide in hot systems. |
| BIT | ++ | - | - | possible 500 | Preferred in combined products | | HPLC | n. s. | Potential for sensitisation at >500 ppm. Do not use in areas where workers are sensitized already. Also stable in hot systems. Weakness when used against pseudomonads. Combined product with other active substances enhances effect. |
| EDDM/EGForm | +++ | + | + | 1–3 % | Preferred in combined products | | Water steam distillation, Photometer, HPLC | Intensive smell | |
| HHT | +++ | - | - | 2-6% | 1500-2500 | 2000-3000 | Water steam distillation, Photometer, HPLC | Increases pH-value | Potential for sensitisation at >15 ppm. Do not use in areas where workers are sensitized already. Indications from practical applications suggest a weak allergenic potential of HHT. There is only little information on diseases at concentrations up to 3000 ppm available. Main application as bactericide. |

| Use and application | | | | | | | Details | | |
|---------------------|----------|-------|-------|---|--------------------------------|---|--|---|--|
| Active substance | Effect | | | Typical application with concentration of active substances [ppm] | | | Analytical method | Behaviour in MWF | Comments |
| | Bacteria | Fungi | Algae | Pre-conservation of concentrate | Preventive conservation wg-MWF | Shock conservation (* = emergencies) wg-MWF | | | |
| (MBO) | ++ | + | - | 2-3% | 1000-2000 | 1500-2500 | Water steam distillation, Photometer, GC, HPLC | Increases pH-value, intensive smell | Re-named into reaction product of paraformaldehyde and 2-hydroxypropylamine (3:2) |
| HPT | +++ | - | - | 2-3 % | 1500 | 3000 | Water steam distillation, Photometer, HPLC | Increases pH-value intensive smell | Single substance not registered for product type 13; may still be used in a mixture of a biocidal preparation Potential for sensitisation at > 1 %. Do not use in areas where workers are sensitized already. Main application as bactericide. |
| TMAD | + | - | - | 2-3 % | Preferred in combined products | | Water steam distillation, Photometer, HPLC | No smell, no foam | Potential for sensitisation at >10000 ppm. Do not use in areas where workers are sensitized already. Slower reactions than other N-formals, Use only in combined products. Determination of formaldehyde content simulates too high effectiveness. |
| DMDMH | ++ | - | n. s. | n. s. | 1500-5000 | n. s. | Water steam distillation, Photometer, HPLC | Lowers pH-value | |
| NaPy | - | ++ | - | 0,1-1% | 80-300 | 80-300 | HPLC | Forms with iron a hardly soluble black precipitation | Potential for sensitisation at >10000 ppm. Do not use in areas where workers are sensitized already. Discharge of active substance, may block filters. Combination with soft complexing agents necessary. Also suitable for oil-free systems. A new classification will become effective with the 18 th ATP to the CLP regulation on December 1, 2023 |
| IPBC | -- | +++ | - | 0,1-1% | 30-150 | 150 | HPLC Titration | Quick degradation at pH > 9 and bacterial attack possible | Potential for sensitisation at > 10.000 ppm. Do not use in areas where workers are sensitized already. Can simulate too high AOX and chloride values. Not suitable for oil-free systems (because of solubility). |
| EGPhe | + | - | - | 10 % | 0,5 - 1 % | no | GC, HPLC | Brown discolouration when machining cast iron | |
| OPP | + | ++ | - | 1,5-2 % | 600-900 | 800-1000 | Photometer, HPLC | Red discolouration from formation of iron complex, phenol smell | High affinity to oil, discharge via oil scummer. Separation from sewage when splitting emulsion. Too high ratio of non-ionic tensides can result in loss of effectiveness |

| Use and application | | | | | | | Details | | |
|--|----------|-------|-------|---|--------------------------------|---|-------------------|------------------|--|
| Active substance | Effect | | | Typical application with concentration of active substances [ppm] | | | Analytical method | Behaviour in MWF | Comments |
| | Bacteria | Fungi | Algae | Pre-conservation of concentrate | Preventive conservation wg-MWF | Shock conservation (* = emergencies) wg-MWF | | | |
| N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine | ++ | ++ | n. s. | 1-4 % | 500-2000 | n. s. | GC, HPLC | | Anionic substances can cause efficacy losses. Formation of foam possible. |

Glossar

Glossary

Abkürzungen und Begriffe :

Abbreviations and terms & definitions:

| | |
|--------------------|---|
| AGS | Ausschuss für Gefahrstoffe |
| AGS | Committee on Hazardous Substances (AGS) |
| AGW | Arbeitsplatzgrenzwert (staatlich, TRGS 900) |
| AGW | Occupational Exposure Limit (OEL, acc. TRGS 900) |
| Akzeptanzgrenze | Schwellenwert für ein Risiko in Höhe von 4:10 000, unterhalb dessen ein Risiko akzeptiert und oberhalb dessen ein Risiko unter Einhaltung der im Maßnahmenkatalog spezifizierten Maßnahmen toleriert wird (TRGS 910). |
| Akzeptanzgrenze | Threshold for a risk in the order of 4:10 000, below which a risk will be accepted and above which a risk will be tolerated, provided measures specified in the measures catalogue will be adhered to (TR910). |
| ATE | ATE = Schätzwert akuter Toxizität [Acute Toxicity Estimate]: Werte der akuten Toxizität werden als (ungefähre) LD50 (oral, dermal) oder LC50 Werte (inhalativ) oder als ATE ausgedrückt.. |
| ATE | ATE [Acute Toxicity Estimate]: values of the acute toxicity are given as (approximate LD50 (oral, dermal) or LC50 values (inhalativ) or expressed as ATE. |
| ATP | Anpassungsrichtlinie an den technischen Fortschritt (Progress) |
| ATP | Adaptation to technical progress (ATP) |
| BAuA | Bundesanstalt für Arbeitsschutz und Arbeitsmedizin |
| BAuA | Federal Institute for Occupational Safety and Health (BAuA) |
| BekGS | Bekanntmachung Gefahrstoffe (des BMAS) |
| BekGS | Public notice on hazardous substances (of the Fed. Min. of Labour and social affairs) |
| Biozider Wirkstoff | Wirkstoff gemäß EG-Biozid-Verordnung, Artikel 2 |
| Biocidal substance | Substance acc. EC Biocidal Products Regulation (BPR), article 2 |
| BPR | Biocidal Products Regulation EU 528/2012 |
| CLP | Classification labelling and packaging |
| CORAP | Community rolling action plan |
| DFG | Deutsche Forschungsgemeinschaft |
| DFG | German Research Foundation |
| DGUV Information | Information der Unfallversicherungsträger, ehem. BGI/UV-I |
| DGUV-Information | Information of the German Statutory Accident Insurance Association, formerly BGI/GUV-I |
| DGUV Regel | Regel der Unfallversicherungsträger, ehem. BGR/GUV-R |
| DGUV Rule | German Statutory Accident Insurance Association standard, formerly BGR/GUV-R |
| DMSO | Dimethylsulfoxide (organic solvent) |
| DNEL | Derived no-effect level (air threshold limit according REACH) |
| Dgr | Danger („Gefahr“) |
| ECHA | European chemicals agency |
| FB HM | Fachbereich Holz und Metall |
| FB HM | Department Wood and Metal (of the German Statutory Accident Insurance Association) |
| FoBiG | Forschungs- und Beratungsinstitut Gefahrstoffe GmbH |
| FoBiG | Research and consultation institute for hazardous substances Ltd. |
| GHS | Globally harmonized system |

| | |
|-----------------|---|
| GMBI | Gemeinsames Ministerialblatt |
| GMBI | Joint ministerial release |
| H | hautresorptiv (TRGS 900, MAK) |
| H | may be absorbed through skin (TRGS 900, MAK) |
| IGM | Industriegewerkschaft Metall |
| IGM | Labour union „Metals“ |
| IVDK | Informationsverbund dermatologischer Kliniken |
| IVDK | Information network of dermatological clinics |
| IP 346 | Method 346, released by the Institute of Petroleum |
| KSS (= MWF) | Kühlschmierstoff |
| MWF (= KSS) | Metal working fluid (also: coolant) |
| wm | wassermischbar (Konzentrat) |
| wm | water miscible (concentrate) |
| wg | wassergemischt (Lösung, Emulsion) |
| wg | water mixed (e.g. solution, emulsion) |
| nw | nicht wassermischbar (Öl) |
| nw | non water miscible (neat oil) |
| KW | Kohlenwasserstoff |
| HC (= KW) | Hydrocarbon |
| MAK | Maximale Arbeitsplatzkonzentration (DFG) |
| MAC (= MAK) | Maximum allowable concentration (set by DFG) |
| PBT-Stoffe | persistente, bioakkumulierbare und toxische Stoffe |
| PBT substances | persistent bio-accumulative and toxic substances |
| PT13 | Product-types: Produktarten für Biozide in der Verordnung über Biozidprodukte. Produktart 13 sind die „Schutzmittel für Bearbeitungs- und Schneideflüssigkeiten |
| PT13 | Product-types of the Biocidal Products Regulation: : PT 13 lists working or cutting fluid preservatives |
| Sa | Gefahr der Sensibilisierung der Atemwege (TRGS 900, MAK) |
| Sa | Danger of skin sensitization (TRGS 900, MAK) |
| Sah | Gefahr der Sensibilisierung der Atemwege und der Haut (TRGS 900, MAK) |
| Sah | Danger of skin and respiratory sensitization (TRGS 900, MAK) |
| Sh | Gefahr der Sensibilisierung der Haut (TRGS 900, MAK) |
| Sh | Danger of skin sensitization (TRGS 900, MAK) |
| SVHC | Substances of very high concern (besonders besorgniserregende Stoffe nach REACH, Artikel 33) |
| SVHC | Substances of very high concern (REACH, article 33) |
| Toleranzgrenze | Schwellenwert für ein Risiko in Höhe von 4:1 000, oberhalb dessen ein Risiko nicht tolerabel ist (TRGS 910). |
| Toleranzgrenze | Threshold for a risk in the order of 4:1 000, above which a risk is not tolerable (TRGS 910). |
| TRGS | Technische Regel für Gefahrstoffe |
| TRGS | Technical Rules for Hazardous Substances (TRGS) |
| UBA | Umweltbundesamt |
| UBA (FEA) | Federal Environment Agency (Germany) |
| VKIS | Verbraucherkreis Industrieschmierstoffe |
| VKIS | Consumer network industrial lubricants |
| vPvB-Stoffe | sehr persistente und sehr bioakkumulierbare Stoffe |
| vPvB-substances | very persistent and very bio-accumulative substances |
| VSI | Verband Schmierstoff-Industrie e. V. |
| VSI | Lubricant manufacturers association |
| WGK | Wassergefährdungsklasse |
| WGK | water hazard class |
| Wng | Warning („Achtung“) |

| | |
|------------------------|--|
| Y | Ein Risiko der Fruchtschädigung ist bei Einhaltung des AGW oder des BGW nicht zu befürchten (TRGS 900, MAK) |
| Y | A risk of fetal damage is ceased to fear if AGW and BGW will be complied with (TRGS 900, MAK) |
| Z | Ein Risiko der Fruchtschädigung kann auch bei Einhaltung des AGW und des BGW nicht ausgeschlossen werden (TRGS 900) |
| Z | A risk of fetal damage cannot be eliminated even when AGW and BGW will be complied with (TRGS 900) |
| Schwangerschaftsgruppe | A rating system, introduced by the MAK Commission of DFG, allowing a conclusion whether or not there is a risk of fetal impairment, provided the concentration limits have been adhered to |

Regelwerk :
Regulations:

Europäische Gemeinschaft (EG) :
European Community (EC):

| | |
|--------------|---|
| EG 1907/2006 | Verordnung des europäischen Parlaments und des Rates zur Registrierung, Bewertung, Zulassung und Beschränkung chemischer Stoffe (REACH) (in der jeweils gültigen Fassung) ABI. EG L 396/1 vom 30.12.2006 zuletzt geändert durch EU-2022/586 vom 08.04.2022 |
| EC 1907/2006 | Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (in their current version) Off. Journal EC L 396/1 dated 2006-12-30, last amended by EU-2022/586 dated 2022-04-08 |
| EG 1272/2008 | Verordnung des europäischen Parlaments und des Rates über die Einstufung, Kennzeichnung und Verpackung von Stoffen und Gemischen (CLP/GHS) ABI. EG L 353/1 vom 31.12.2008 |
| EC 1272/2008 | Regulation of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures (CLP/GHS) Off. Journal EC L 353/1 dated 2008-12-31 |

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|-------------------------|---|
| 1. ATP-CLP | EU 790/2009 ABI. EU L 235/1 vom 05.09.2009 |
| 1 st ATP-CLP | EC Directive 790/2009 Off. Journal EC L 235/1 dated 2009-09-05 |
| 2. ATP-CLP | EU 286/2011 ABI. EU L 83/1 vom 30.03.2011 |
| 2 nd ATP-CLP | EC Directive 286/2011 Off. Journal EC L 83/1 dated 2011-03-30 |
| 3. ATP-CLP | EU 618/2012 ABI. EU L 179/3 vom 11.07.2012 |
| 3 rd ATP-CLP | EC Directive 618/2012 Off. Journal EC L 179/3 dated 2012-07-11 |
| 4. ATP CLP | EU 487/2013 ABI. EU L 149/1 vom 01.06.2013 |
| 4 th ATP-CLP | EC Directive 487/2013 Off. Journal EC 149/1 dated 2013-06-01 |
| 5. ATP CLP | EU 944/2013 ABI. EU L 261/5 vom 02.10.2013 |
| 5 th ATP-CLP | EC Directive 944/2013 |

6. ATP CLP [Off. Journal EC L 261/5 dated 2013-10-02](#)
[EU 605/2014](#)
 ABI. EU L 167/36 vom 06.06.2014
- [6th ATP CLP](#) [EC Directive 605/2014](#)
[Off. Journal EC L 167/36 dated 2014- 06-06](#)
7. ATP CLP [EU 2015/1221](#)
 ABI EU L 197/10 vom 25.7.2015
- [7th ATP CLP](#) [EC Directive 2015/1221](#)
[Off. Journal EC L 197/10 dated 2015-07-25](#)
8. ATP CLP [EU 2015/1221](#)
 ABI. EU L 156/1 vom 14.06.2016
- [8th ATP CLP](#) [EC Directive 2015/1221](#)
[Off. Journal EC L 156/1 dated 2016- 06-14](#)
9. ATP CLP [EU 2015/1221](#)
 ABI EU L 195/11 vom 20.7.2016
- [9th ATP CLP](#) [EC Directive 2015/1221](#)
[Off. Journal EC L 195/11 dated 2016-07-20](#)
10. ATP CLP [EU 2017/776 –](#)
 ABI EU L 116/1 vom 05.05.2017
- [10th ATP CLP](#) [EC Directive 2017/776](#)
[Off. Journal EC L 116/1 dated 2017- 05-05](#)
11. ATP CLP [EU 2018/669 -](#)
 ABI. EU L 115/1 vom 16.04.2018
- [11th ATP CLP](#) [EC Directive 2018/669 -](#)
[Off. Journal L 115/1 dated 16.04.2018](#)
12. ATP CLP [EU 2019/521](#)
 ABI. EU L 86/1 vom 28.03.2019
- [12th ATP CLP](#) [EC Directive 2019/521](#)
[Off. Journal L 86/1 dated 28.03.2019](#)
13. ATP CLP [EU 2018/1480](#)
 ABI. EU L 251/1 vom 05.10.2018
- [13th ATP CLP](#) [EC Directive 2018/1480](#)
[Off. Journal L 251/1 dated 05.10.2018](#)
14. ATP CLP [EU 2020/217](#)
 ABI. EU L 44/1 vom 18.02.2020
- [14th ATP CLP](#) [EC Directive 2020/217](#)
[Off. Journal L 44/1 dated 18.02.2020](#)
15. ATP CLP [EU 2020/1182](#)
 ABI. EU L 261/2 vom 11.08.2020
- [15th ATP CLP](#) [EC Directive 2020/1182](#)
[Off. Journal L 261/2 dated 11.08.2020](#)
16. ATP CLP [EU 2021/643](#)
 ABI. EU L 133/5 vom 20.04.2021
- [16th ATP CLP](#) [EC Directive 2021/643](#)
[Off. Journal L 133/5 dated 20.04.2021](#)
17. ATP CLP [EU 2021/849](#)
 ABI. EU L 188/27 vom 28.05.2021
- [17th ATP CLP](#) [EC Directive 2021/849](#)
[Off. Journal L 188/27 dated 28.05.2021](#)
18. ATP CLP [EU 2022/692](#)
 ABI. EU L 129/1 vom 03.03.2022
- [18th ATP CLP](#) [EC Directive 2022/692](#)
[Off. Journal L 129/1 dated 03.03.2022](#)
19. ATP CLP [EU 2023/1434](#)
 ABI. EU L 176/3 vom 11.07.2023
- [19th ATP CLP](#) [EC Directive 2023/1434](#)
[Off. Journal L 176/3 dated 11.07.2023](#)

20. ATP CLP EU 2023/1435
 ABI. EU L 176/6 vom 11.07.2023
 20th ATP CLP EC Directive 2023/1435
 Off. Journal L 176/6 dated 11.07.2023

EU 528/2012 Verordnung des europäischen Parlament und des Rates über die Bereitstellung auf dem Markt und die Verwendung von Biozidprodukten
 ABI. EG L 167/1 vom 27.06.2012, zuletzt geändert durch EU 2021/807 vom 21.05.2021
 EU 528/2012 Regulation of the European Parliament and of the Council concerning the making available on the market and use of biocidal products
 Off. Journal EC L 167/1 dated 2012-06-27, last amended by EU 2021/807 dated 2021-05-21
 2000/60/EG Wasserrahmenrichtlinie WRRL
 ABI. EG L 327 vom 22.12.2000, zuletzt geändert durch EU 2014/101 vom 30.10.2014
 2000/60/EG Water Framework Directive
 Off. Journal EC L 327 dated 2000-12-22, last amended by EU 2014/101 dated 2014-10-30
 2013/39/EU Liste prioritärer Stoffe zur WRRL
 ABI. EU L 226/1 vom 12.08.2013
 2013/39/EU List of priority substances for Water Framework Directive
 Off. Journal EU L 226/1 dated 2013-08-12
 EU 2019/1021 Verordnung über persistente organische Schadstoffe (POP-Verordnung)
 ABI. EG L 169, S. 45 vom 20.06.2019, zuletzt geändert durch EU 2023/1608 vom 30.05.2023
 EU 2019/1021 Regulation (EU) 2019/1021 on persistent organic pollutants
 ABI. EC L 169, p. 45 dated 2019-06-20, last amended by EU 2023/1608 dated 2023-05-30.

Deutschland :
 Germany:

AbwV Anhang 40 Abwasser-Verordnung Anhang 40 : Metallverarbeitende Industrie
 BGBl. I 2004 S.1159
 AbwV Anhang 40 Waste water regulation annex 40: Metalworking Industry
 BGBl. I 2004 p.1159
 AltöIV Altölverordnung in der Fassung der Bekanntmachung vom 16. April 2002 (BGBl. I S. 1368), die zuletzt durch Artikel 1 der Verordnung vom 05.10.2020 (BGBl. I S. 2091) geändert worden ist
 AltöIV Waste oil regulation with the terms of the publication dated 16th April 2002 (BGBl. I S. 1368), which has last been amended by article 1 of the regulation on October 5th, 2020 (BGBl. I p. 2091)
 DGUV-Regel 109-003 Regel "Tätigkeiten mit Kühlschmierstoffen"
 Früher: BGR/GUV-R 143; Stand März 2011
 DGUV-Regel 109-003 BGR/GUV-Rule "Tätigkeiten mit Kühlschmierstoffen" („Activities involving metal working fluids“)
 Previous: BGR/GUV-R 143; Status March 2011
 DIN 51385 Bearbeitungsmedien für die Umformung und Zerspanung von Werkstoffen – Begriffe
 Beuth-Verlag, Berlin (11.2013)
 DIN 51385 Processing media for deformation and machining of materials - Terms

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|---|--|
| GefStoffV | Beuth-Verlag, Berlin (11.2013) Gefahrstoffverordnung zum Schutz vor Gefahrstoffen vom 26. November 2010 (BGBl. I S 1643, 1644), die zuletzt durch Artikel 2 der Verordnung vom 21. Juli 2021 (BGBl. I S. 3115) geändert worden ist. |
| GefStoffV | Gefahrstoffverordnung; Regulation on Hazardous substances dated 26th November 2010 (BGBl. I S 1643, 1644), which has last been amended by article 2 of the regulation on July 21st, 2021 (BGBl. I p. 3115) |
| MAK- und BAT-Liste MAK- und BAT-List TRGS 401 | 2023, 59. Mitteilung 2023, 59th notification Gefährdung durch Hautkontakt - Ermittlung, Beurteilung, Maßnahmen; Ausgabe Oktober 2022, GMBI 2022, S. 895-926 [Nr.40] vom 18.11.2022 – berichtigt GMBI 2023 S. 742742 [Nr.33-34] (05.06.2023) |
| TRGS 401 | Skin contact hazard – evaluation, assessment, provisions; issue October 2022 GMBI 2022,p.895-926 [Nr.40] dated 2022-11-18 – corrected GMBI 2023 p. 742 [Nr.33-34] (2023-06-05) |
| TRGS 552 | Krebserzeugende N-Nitrosamine der Kat 1A und 1B, Ausgabe September 2018; GMBI 2018 S. 913-934 [Nr.48] (v. 26.10.2018) |
| TRGS 552 | Carcinogenic N-Nitrosamines Cat 1A and 1B, issue September 2018; GMBI 2018 p. 913-934 [No. 48] (dated 26.10.2018) |
| TRGS 557 | Dioxine; Ausgabe August 2008 GMBI Nr. 46/47 S. 990-998 vom 22.09.2008 |
| TRGS 557 | Dioxines; Issue August 2008 GMBI Nr. 46/47 p. 990-998 dated 22.09.2008 |
| TRGS 611 | Verwendungsbeschränkungen für wassermischbare bzw. wassergemischte Kühlschmierstoffe, bei deren Einsatz N-Nitrosamine auftreten können; Ausgabe Mai 2007 GMBI Nr. 27/28 S. 564 (15.06.2007) |
| TRGS 611 | Restrictions in the use of water-miscible and water-mixed coolants which may give rise to N-nitrosamines during use; Issue May 2007 GMBI Nr. 27/28 p. 564 (15.06.2007) |
| TRGS 900 | Arbeitsplatzgrenzwerte; BArbBl. Heft 1/2006 S. 41-55, zuletzt geändert und ergänzt in GMBI 2023 S. 755-756 [Nr. 35] (v. 12.06.2023) |
| TRGS 900 | Occupational exposure limit values; BArbBl. issue 1/2006 p. 41-55, last edited and amended in GMBI 2023 p. 755-756 [No. 35] (dated 12.06.2023) |
| TRGS 905 | Verzeichnis krebserzeugender, keimzellmutagener oder reproduktionstoxischer Stoffe; Ausgabe März 2016 GMBI 2016 S. 378-390 [Nr. 19] vom 03.05.2016; zuletzt geändert und ergänzt: GMBI 2021, S. 899 [Nr. 41]vom 13.07.2021 |
| TRGS 905 | Register of substances classified as carcinogens, mutagens or toxic to reproduction; issue March 2016 GMBI 2016 p. 378-390 [No. 19] dated 03.05.2016; last edited and amended: GMBI 2021, p. 899 [No. 4] dated 13.07.2021 |
| TRGS 907 | Verzeichnis sensibilisierender Stoffe und von Tätigkeiten mit sensibilisierenden Stoffen; Ausgabe November 2011 GMBI S. 1019 [Nr. 49-51] vom 19.12.2011 |
| TRGS 907 | Register of sensitizing substances and occupations with sensitizing substances; issue November 2011 GMBI p. 1019 [No. 49-51] dated 19.12.2011 |
| TRGS 910 | Risikobezogenes Maßnahmenkonzept für Tätigkeiten mit krebserzeugenden Gefahrstoffen; Ausgabe März 2014 GMBI 2014 S. 258-270 vom 02.04.2014 [Nr. 12]; zuletzt geändert und ergänzt: GMBI 2023 S. 679 [Nr. 32] vom 03.05.2023 |

TRGS 910

Risk based workplace control scheme for activities with carcinogenic hazardous substances; issue March 2014
GMBI 2014 p. 258-270 of 02.04.2014 [No. 12], last edited and amended in GMBI 2023 p 679 [No. 32] dated. 03.05.2023