

Summaries of the TRGS 600 - 619, which are dealing with restrictions on use, substitutes and substitution of processes or technology

<https://www.baua.de/EN/Service/Legislative-texts-and-technical-rules/Rules/TRGS/TRGS-600-619.html>

For many substances, substitution recommendations were formulated long before regulation under REACH. The knowledge about possible substitutes is still helpful.

For the current EU regulation relevant for the substances see:

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

The basic procedure for substitution (TRGS 600) was updated in 2020 with only minor changes to structure and content.

TRGS 600 (July 2020) Substitution	2
TRGS 608 (April 1991) Substitutes, substitution of working methods and restrictions on use for hydrazine in water- and vapour systems	3
TRGS 610 (January 2011) Substitutes, substitution of working methods for solvent based primer and adhesives for floorings	4
TRGS 611 (May 2007) Restrictions on the use of water-miscible or water-mixed cooling lubricants whose use can result in the formation of N-nitrosamines	5
TRGS 614 (March 2001) Restrictions on use for azodyes, which may release aromatic amines classified as carcinogens	6
TRGS 615 (May 2007) Restrictions on the use of anticorrosion agents whose use can lead to the formation of N-nitrosamines	7
TRGS 617 (February 2017) Substitutes and substitution of working methods for solvent based surface treatment agents for parquet and other wood floorings	8
TRGS 619 (May 2013) Substitute materials for aluminium silicate wool products	9

TRGS 600 (July 2020)

Substitution

An inofficial English version is available; mandatory is the current German version <https://www.baua.de/EN/Service/Legislative-texts-and-technical-rules/Rules/TRGS/TRGS-600.html>.

Scope

- (1) Within the framework of the information gathering and risk assessment according to § 6 of the Ordinance on Hazardous Substances, the employer must also assess the hazards identified as relevant from the point of view of the possibilities of substitution. The employer has the obligation to determine and assess the substitution possibilities, to carry out substitution tests and to document them.
- (2) This TRGS is intended to support the employer in this,
 1. To avoid activities involving hazardous substances,
 2. to replace hazardous substances by substances, mixtures or processes which, under the conditions of use in question, present no risk or a lesser risk to workers, or
 3. to replace dangerous procedures with less dangerous procedures.
- (3) If the employer has established within the scope of the risk assessment that there is a low risk according to the criteria of § 6 para. 13 GefStoffV in conjunction with section 6.2 para. 6 and 7 of TRGS 400 "Risk assessment for activities involving hazardous substances", a substitution test can be dispensed with.
- (4) The aim of substitution is to eliminate or reduce to a minimum the hazards associated with all activities involving hazardous substances, including maintenance, operating and monitoring activities. As a priority measure for the protection of employees working with hazardous substances, the employer must examine the possibilities of substitution within the framework of information gathering and risk assessment in accordance with the Ordinance on Hazardous Substances (§ 6 GefStoffV, see also TRGS 400) and implement them in accordance with the requirements described in more detail in this TRGS.
- (5) The substitution test in accordance with the requirements of these TRGS must also be applied if the use of new substances and processes is planned for economic or technological reasons.
- (6) This TRGS does not describe the requirements that are set out in Regulation (EC) No 1907/2006 (REACH Regulation) for the evaluation of substitution solutions in the context of authorisation and restriction procedures. If an operational and process-related authorisation for the use of a substance has been granted under the REACH Regulation, reference can be made to the REACH documentation when examining the possibilities of substitution.
- (7) Annex 1 contains a flowchart with the individual steps to be followed in the determination and implementation of substitution solutions. Annex 1 also contains a simplified case study of this procedure as an illustration. Annex 2 contains a comparative assessment of the health and safety hazards (column model).

TRGS 608 (April 1991)**Substitutes, substitution of working methods and restrictions on use for hydrazine in water- and vapour systems**

No English version. The German text is available under:

<https://www.baua.de/DE/Angebote/Rechtstexte-und-Technische-Regeln/Regelwerk/TRGS/TRGS-608.html>

Substance and use categories to be replaced	Substitutes
Oxygen binding agent and corrosion inhibitor in water- and vapour systems , except nuclear technical plants	Substitute substances <ul style="list-style-type: none"> - ascorbates - sulfites und hyposulfites (dithionites) - diethylhydroxylamine, hydrochinone, methylethylketoxime and tannines
oxygen-elimination in water- and vapour systems corrosion inhibitor in water- and vapour systems , except nuclear technical plants	Substitution of process or technology <p>physical methods</p> <ul style="list-style-type: none"> - thermal degassing with overpressure - vacuum degassing <p>catalytic reduction</p> <p>pH-value increase via alkalisation agents, such as ammonia, sodium hydroxide or trinatriumphosphate</p>

Restrictions on use – acceptable process technology

Closed pump- and filling stations as described in detail in Statutory Insurance Informations (BGG 907, former ZH 1/109) shall be used, if the mentioned substitutes and substitution of working methods can't be adopted

TRGS 610 (January 2011)**Substitutes, substitution of working methods for solvent based primer and adhesives for floorings**

No English version. The German text is available under:

<https://www.baua.de/DE/Angebote/Rechtstexte-und-Technische-Regeln/Regelwerk/TRGS/TRGS-610.html>

Substance and use categories to be replaced	Substitutes
floorings, parquet and other wood floorings (GISCODE S 1 – S 6)	<p>Substitute substances</p> <ul style="list-style-type: none"> - solvent-free dispersion adhesives (GISCODE D 1), - SMP (silanemodified polymere)-adhesives (GISCODE RS 10) or - solvent-free polyurethane (PU)-adhesives (GISCODE RU 0,5 and RU 1) <p>GISCODEs are Product-Codes, see https://www.wingisonline.de/giscodes.aspx</p>
	<p>Substitution of process or technology</p> <ul style="list-style-type: none"> - loose laying - floating floors (parquet and special other wood floorings) - nailing or screwing up floors

Restrictions on use (recommendations)

- use of solvent-poor or –free primer and adhesives for floorings in the industrial and non-industrial area
- in case solvent based primer and adhesives are indispensable, products with the GISCODE S 0,5 should be used.
- use of toluene-free products
- use of emission-free products

TRGS 611 (May 2007)**Restrictions on the use of water-miscible or water-mixed cooling lubricants whose use can result in the formation of N-nitrosamines**

An unofficial English version is available; mandatory is the current German version

<https://www.baua.de/EN/Service/Legislative-texts-and-technical-rules/Rules/TRGS/TRGS-611.html>.

N-nitrosamines can be formed under certain conditions via nitrosification of secondary amines when using certain water-mixed cooling lubricants.

The following restrictions on use aim to reduce the development of N-nitrosamines by avoiding nitrosification agents and their precursors and using appropriate substitutes for secondary amines. In addition a process to monitor and control the formation of nitrosamines is described

Substance and use	restrictions on use
use of water-miscible cooling lubricant (concentrates) in the metal forming industry	<u>requirements for water-miscible cooling lubricants in the delivery form</u> <ul style="list-style-type: none"> - absence of nitrosification agents and their precursors (nitrites or nitrite-releasing substances) - concentration of secondary amines is restricted to < 0,2 mass %; in case of higher concentrations inhibitors must be added substitutes: <ul style="list-style-type: none"> - primary amines and primary alkanol amines - tertiary amines with high purity - amine-free cooling lubricants - pH-value constancy is important - use of inhibitors is recommended
use of water-mixed cooling lubricant (emulsions and solutions) in the metal forming industry	<u>required protective- and monitoring measures</u> <ul style="list-style-type: none"> - avoid skin contact - nitrate concentration in the added water < 50 mg/l - monitoring the nitrite content (replacement of the water-mixed cooling lubricants or addition of inhibitors, if the concentration is higher than 20 mg nitrite/l) - N-nitrosamine concentration (N-nitroso-diethanolamine) in the water-mixed cooling lubricant < 0,0005 % (5 mg /kg) - extended monitoring in the special case of secondary amines containing cooling lubricants (and the necessary inhibitors) - avoiding the carry-over or formation of nitrosating agents - preventing the carry-over of secondary amines - temperature in the emulsion- / solution-system as low as possible (40°C for many material-removal operations and 60°C in the case of the hot-rolling of aluminium) - monitoring and compliance with pH-value constancy

TRGS 614 (March 2001)

Restrictions on use for azodyes, which may release aromatic amines classified as carcinogens

No English version. The German text is available under:

<https://www.baua.de/DE/Angebote/Rechtstexte-und-Technische-Regeln/Regelwerk/TRGS/TRGS-614.html>

Azo colourants have also been regulated by Commission Directive 2003/3/EC of 6 January 2003 L 4 12 9.1.2003, which amends Directive 77/769/EEC.

Restrictions on use

azodyes may not be used when particular articles of daily use are industrially produced and handled (see Foods and Other Commodities Act (LMBG)).

Furthermore,

- azodyes which, by reductive cleavage of one or more azo groups, may release particular aromatic amines
- and their preparations of these azo.dyes
- semi-finished- and finished products, coloured with these azocolourants respectively with their preparations

may not be used.

The TRGS also applies to coloured products and proposes substitution for azodyes, not mentioned in the Foods and Other Commodities Act (LMBG).

Exceptions (no substitutes proposed):

Special azodyes (Solvent Red, 24 85-83-6; Solvent Red 164, 92257-31-3; Solvent Red 215, 85203-90-3) used as markers for tax-favoured mineral oils.

TRGS 615 (May 2007)**Restrictions on the use of anticorrosion agents whose use can lead to the formation of N-nitrosamines**

An unofficial English version is available; mandatory is the current German version

<https://www.baua.de/EN/Service/Legislative-texts-and-technical-rules/Rules/TRGS/TRGS-615.html>.

This Technical Rule applies to the production and use of water-miscible, water-mixed and non-water-miscible anticorrosion agents, volatile corrosion inhibitors (VCI) and anticorrosion greases and waxes which are intended to provide temporary protection of metal objects.

Substance and use categories to be replaced	Substitutes
corrosion inhibitors containing secondary amines or nitrosification agents	Substitute substances corrosion inhibitors containing primary amines or primary amino alcohols
<p>restrictions on use</p> <p>corrosion inhibitors, containing free or disguised secondary amines and nitrosification agents or their pre-stages at the same time, may not be used (exceptions see TRGS 615).</p> <p><u>requirements for corrosion inhibitors containing free or disguised secondary amines (with exceptions):</u></p> <ul style="list-style-type: none"> - monitoring of N-nitrosamine concentration while using - threshold limit values for N-nitrosamines - in preparations or materials, the concentration limits for category 1 or 2 carcinogenic N-nitrosamines according to Technical Rule (TRGS) 905 Number 4 must be adhered to - tertiary and primary amines with high purity should be used - content of secondary amines in the finished product must not exceed <ul style="list-style-type: none"> - 0.02 % in the case of VCI packaging materials (with an active-substance content of up to 10 %), - 0.2 % in the case of all other anticorrosion agents and VCI materials; this content must not be achieved by targeted addition of secondary amines. - information about the purity of tertiary and primary amines resp. the concentration of secondary amines must be reported in the safety data sheet <p><u>requirements for corrosion inhibitors, containing nitrosification agents or their pre-stages:</u></p> <ul style="list-style-type: none"> - special monitoring measures are necessary when using VCI-materials (inclusive VCI-oils), anticorrosion greases and -waxes and water-immiscible anticorrosive liquids containing more than 1 % nitrite (measured as sodium nitrite) or more than 0,1 % of other nitrosification agents (e.g. nitrophenols, dinitrophenols or nitrosophenols) or their pre-stages - every effort should be made to reduce the nitrite content to below 0.5 %. - water-miscible and water-mixed corrosion inhibitors may not contain nitrite or other nitrosification agents or their pre-stages in the delivery form; the necessary information about the nitrite concentration must be reported in the safety data sheet 	

TRGS 617 (February 2017)**Substitutes and substitution of working methods for solvent based surface treatment agents for parquet and other wood floorings**

No English version. The German text is available under:

<https://www.baua.de/DE/Angebote/Rechtstexte-und-Technische-Regeln/Regelwerk/TRGS/TRGS-617.html>

Substance and use categories to be replaced	Substitutes
<p>surface treatment agents for parquet and other wood floorings</p>	<p>Substitute substances</p> <ul style="list-style-type: none"> - solvent-free water seals, - water seals with less than 5 % of organic solvent, N-Methylpyrrolidone-free and N-Ethylpyrrolidone-free - water seals with isocyanate-containing hardeners and with less than 5 % of organic solvent, N-Methylpyrrolidone-free and N-Ethylpyrrolidone-free - water seals with less than 15 % of organic solvent, N-Methylpyrrolidone-free and N-Ethylpyrrolidone-free - water seals with isocyanate-containing hardeners and with less than 15 % of organic solvent, N-Methylpyrrolidone-free and N-Ethylpyrrolidone-free - solvent-free resp. solvent-reduced waxes and oils - solvent-free resp. solvent-reduced waxes and oils, butanoxime-free - solvent-reduced waxes and oils, butanoxime-free and dearomatised. <p><u>exceptions:</u></p> <p>The use of solvent based surface treatment agents for parquet and other wood floorings can be necessary in special cases, e.g. to avoid the escape of wood-ingredients when grounding wood floorings.</p>

TRGS 619 (May 2013) Substitute materials for aluminium silicate wool products

An unofficial English version is available; mandatory is the current German version <https://www.baua.de/EN/Service/Legislative-texts-and-technical-rules/Rules/TRGS/TRGS-619.html>.

This TRGS includes criteria for determining substitutes for aluminium silicate wool products essentially used for thermal insulation in furnace and firing system construction, in heating installations and exhaust gas systems for motor vehicles, especially at application temperatures above 900°C. Substitutes for aluminium silicate wool products are already widely used in the following applications: domestic appliances, fire protection and automotive engineering.

Substance and use categories to be replaced	Substitute substances
aluminium silicate wool products	Substitutes with a lower health risk include both fibrous and fibre-free refractory products
for temperatures up to 300 °C	glass- and mineral wool
between 300 and 600 °C	mineral wool or Alkaline Earth Silicate Fibres (AES-Fibres)
between 600 and 900 °C	AES-Fibres
between 900 and 1100 °C	The possibility for using AES wool products is reduced owing to technological constraints.
above 1200 °C	AES wool products can no longer be used and the application of aluminium silicate wool products is also limited.
up to 1650 °C	Polycrystalline wool products (PCW)
between 600 and 1700 °C	Non-fibrous substitutes are refractory materials such as: <ul style="list-style-type: none"> - calcium silicate or vermiculite panels and mouldings, - thermal insulation bricks and concretes, - lightweight refractory bricks and concretes, - thermal insulation refractory compounds, - highly porous refractory materials containing e.g. aluminiumoxide, mullite and microporous calcium-hexaluminate - other non-fibrous products
	New non-fibrous refractory materials may contain quartz which can be released as respirable quartz dust during handling. When AES and aluminium silicate wools as well as microporous thermal insulation materials are used at temperatures > 900°C, quartz/cristobalite can form, which is released as silicogenic dust during maintenance and removal. Activities involving exposure to quartz/cristobalite are carcinogenic in accordance with TRGS 906. In these cases the TRGS 559 „Mineral Dust“ shall be observed.
	It is possible to determine whether a substitute for aluminium silicate wool is technically possible with the tables in Annex 1 -3 of the TRGS 619.