

## **Technical standard for hazardous substances**

### **Skin damage from work in wet environments (TRGS 531: wet work)**

The technical standards for hazardous substances (TRGS) reflect the currently achievable technical safety, occupational-medical, hygienic, and scientific standards for production, distribution and handling of hazardous substances. TRGSs are drawn up by the Committee on Hazardous Substances (AGS) and modified whenever developments make it necessary. TRGSs are published by the Federal Ministry of Economics and Labour in the Federal Occupational Newsletter.

An intact and healthy outer skin layer (stratum corneum) is an important condition for the protective function of the skin against outside exposures. Long-lasting or repeated contact with water, especially with the simultaneous effects of washing and cleaning substances, disinfectants, solvents, alkalis, and acids leads to the damage of the stratum corneum and the underlying skin layers (living epidermis). The damaged barrier function allows more pronounced effects from outside substances and the further loss of the living epidermal layers water and electrolytes (transepidermal water loss). Abrasive eczema can develop (clinical symptoms: redness, dryness, peeling, cuts, itching) that in the absence of skin protection (specialized skin protection, skin cleaning, skin care) can transform into chronic eczema from further exposure and from the effects of toxic substances. In this situation, potential allergens can enter the skin more easily and cause sensitization. The development of allergic contact dermatitis can be contributed to by abrasive eczema. At risk are occupational groups such as cleaning personnel, hairdressers, health care occupations, cooks/kitchen help, food manufacturers, and metal working occupations.

Under moisture resistant protective gloves (rubber, plastic), heat and moisture collect through the occlusion effect. The top layers of the stratum corneum and epidermis swell up. This can be seen in the maceration of the skin (cleaning woman's hands). The capacity of the skin to resist outside exposures is reduced. In addition, the material in protective gloves may contain various allergens (aging protection, vulcanization accelerators, natural latex, softening agents, dyes) that can cause sensitization and result in allergic contact dermatitis.

People with pronounced dry skin (seborrhea) and/or a tendency towards atopic skin diseases (atopic skin diathesis) are more at risk of skin damage from work in wet environments.

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### 1. Scope of application

The present TRGS regulates activities during which employees

- spend a large part of their work time, that is, more than 1/4 of the daily shift (2 hrs) with their hands in wet environments, or
- spend a corresponding amount of time wearing moisture-proof protective gloves, or
- must frequently clean their hands,

whether or not work includes substances or preparations that must be classified [according to the German Chemicals Act (§ 3a ChemG)]. The appendix contains more rules and regulations for the prevention of skin diseases. These rules also provide exact definitions that refer to specific substances and industries.

### 2. Testing of substitutes

(1) When in addition to wet work, a worker is exposed to skin-damaging substances and preparations [according to § 4a hazardous substance ordinance (GefStoffV)], the employer must verify whether such substances can be replaced by less harmful substances. If the use of these substitutes seems reasonable to the employer, he should use only these (§ 16 GefStoffV).

(2) Preparations and substances are considered damaging to the skin if they are classified according to the "R"-phrases as R34, R35, R38, or R43, or if they have properties that make them otherwise chronically harmful to the skin according to § 19 Abs 2 Chem G and § 4 Abs 2 GefStoffV (without necessarily meeting the criteria of the mentioned "R"-phrases) (such as detergents, degreasing solvents, and various cooling lubricants).

### 3. General protective measures

(1) Technical and organizational protective measures have priority over personal protective measures. (§ 19 GefStoffV). To avoid wet work, all technical and organizational possibilities should be explored.

(2) If the employer has to make personal protective equipment available, he must give an ear to the employee in selection and use (§ 21 GefStoffV). The regulations about the rights of determination of the advisory (workers) council remain unchanged.

### 4. Technical and organizational protective measures

(1) The employer should reduce wet work as much as possible through technical measures such as machine enclosure, use of automated cleaning, automation, etc.

(2) The employer should ensure through organizational measures that wet work should be distributed as equally as possible among all employees to reduce overall exposure for each individual. The employer should strive for alternating between work in dry and work in wet environments, with the wet work

being kept to a minimum (§ 19 Abs. 2 Nr. 4e ChemG)

(3) The length of time for wearing moisture-resistant gloves should be limited. Employers should strive for appropriate change between activities with and without gloves. The maximum continual time for wearing gloves should not exceed 4 hours.

## **5. Skin protection plan**

A skin protection plan should be posted in a visible place in the work area (such as near the hand washing station). The required protection, cleaning, and care procedures as well as work activities that may harm the skin should be written in a clear and easy-to-read format. (see for example TRGS 530 and ZH 1/708).

## **6. Personal protective equipment**

(1) The following are given as examples of activities for which the employer is obliged to provide protective gloves that the employees are obliged to wear:

- wet or dry cleaning of work tools, equipment, and work areas
- disinfection of work tools, equipment, and work areas
- contact with solvents
- contact with monomers of epoxy resins and tacky surfaces (?) / hardening agents (such as glue and epoxy resins)
- use of preparations containing soaps, detergents, and disinfectants

(2) Consider the following criteria when choosing and using protective gloves (see also ZH 1/706, DIN EN 420 and DIN EN 374)

- They must be resistant and sufficiently impermeable to the material being worked with to last for the whole shift.
- They must be durable enough to not become damaged during normal work activities
- They must correspond to the size and shape of the worker's hands. That means, that the protective gloves must be made available in various sizes.
- They must be elastic and thin enough not to block out the sense of touch
- They should be, if possible, powder- and allergen-free and lined or flocked
- They should only be worn on clean, dry skin (if possible over a liner)

(3) Skin protection should be made available. This includes special skin protective products, that should be applied to clean skin before the beginning of work and also after breaks. Further included are proper skin cleaning and care products that should be applied to dry hands at the end of the workday (see also ZH 1/708)

## **7. Hygiene**

(1) The employees must have a wash station available (preferably one with water temperature control)

as well as suitable towels.

- (2) The hand cleansers should be mild; and the hands should be carefully dried afterwards.
- (3) Employees should not wear jewelry on their hands or wrist while at work. Reactions or skin diseases can develop from chemicals or the moisture that collects under the jewelry.
- (4) Separate, distinguishable towels should be used for cleaning machines and for hands. Harmful residue can damage the hands; metal and other chips can also cause mechanical damage.
- (5) Water-based solvents, that contain substances or preparations that can damage the skin, should not be allowed to dry on the hand. They should be washed off so that the evaporation of the water does not increase the concentration of the harmful substance on the hand.
- 6) Clothing soaked with oil or harmful substances must be changed immediately.

## **8. Employee directives (written workers instructions)**

The employer must develop employee directives (written workers instruction) that include skin hazards from wet work, as well as the required protective measures and work practices. These directives should be written in an understandable form in the language of the employee and posted in a visible location in the workplace (§ 20 GefStoffV, TRGS 555). An example of such a directive is available in the appendix.

## **9. Training**

- (1) Employees that work in wet environments must, according to the directive, be trained about hazards they may be exposed to and available protective measures. Training must be conducted orally and workplace related by the company before beginning of the work and further at least once a year. The content and time of the training should be in writing and confirmed with signatures (GefStoffV).
- (2) Training for wet work should be applicable to the workplace and the activities carried out. It should include information about work activities that are hazardous to the skin, protective measures to take, and general appropriate wet work practices.
- (3) In addition to the (at least) yearly training, the employer should supervise the appropriate use of protective, cleaning, and care measures.
- (4) The employer should encourage employees to report skin hazards and recommend protective measures.

## **10. Provisions for occupational medicine**

Employees who work in wet environments should be advised and (in case) examined by an occupational medicine doctor. This is especially useful to clarify personal risks and for advice on personal protective measures that correspond to the skin constitution of each employee. The examination should concentrate on the individual, optimal selection and use of skin protection (special skin protection, skin cleaning, skin care), which will help with the early recognition of skin damage. BG Principle G 24 gives the main points of the scope of the investigation.

## **Rules and regulations for the prevention of skin diseases:**

### *Acts, Ordinances*

- Chemicals Act
- Hazardous substance ordinance
- Occupational diseases ordinance (§ 3)

### *Technical rules for hazardous substances*

- TRGS 530 "Hair dressing trade"
- TRGS 613 "Substitute material, substitute procedures, and usage limits for chromate-containing cements and chromate- and cement-containing mixtures"

### **Accident prevention regulations**

- General regulations (VBG 1)
- Processing of coating/plating materials (VBG 23)
- Processing of glue materials (VBG 81)
- Manufacturing of coating materials (VBG 86a)
- Manufacturing of cleaning and care products (VBG 86b)
- Work with liquid emitters (VBG 87)
- Personal protective equipment (VBG 101) - currently in draft form

### *Trade association rules (principles) for occupational medicine examinations*

- G 24 Skin diseases (except skin cancer)
- G 27 Isocyanates

### *Trade association rules, fact sheets, and other documents*

- Fact sheet: Formaldehyde (ZH1/296)
- Fact sheet: Solvents (ZH1/319)
- Fact sheet: phenol, cresol, xylenol (ZH1/314)
- Fact sheet: Polyester- and epoxy resin (ZH1/301)
- Fact sheet: Skin protection (ZH1/132)
- Fact sheet: cold cleaning agents (ZH1/425)
- Fact sheet: Polyurethane manufacturing/isocyanate (ZH1/34)
- Safe work in the lacquer/enamel/paint industry (ZH1/233)
- Fact sheet: cleaning of containers (ZH1/79)
- Fact sheet: painting rooms (ZH1/152)
- Rules for implementing skin protection (ZH1/708)
- Fact sheet: skin protection in the iron and metal industry (ZH1/467)
- Fact sheet: for BK-number 5101 Appendix 1 BK-Ordinance (BarbBl. 6/1996)
- Rules for implementing the use of protective gloves (ZH1/706)
- Rules for safety and health protection while working with cooling lubricants (ZH1/248)
- Fact sheet for industry doctors and procedures in case of skin diseases
- Safety instruction sheet for galvanizers (ZH1/100)
- Safety instruction sheet for lacquerers/painters (ZH1/103.2)

### *DIN-Standards*

- DIN EN 420 Protective gloves - general requirements
- DIN EN 374 Protective gloves against chemicals and microorganisms, parts 1-3
- DIN EN 455 Medical single-use gloves, parts 1-2

*Other*

- Toxicological evaluation of the BG Chemical: Diethanolamine rule no. 158, 1990.

**Appendix to TRGS 531**

**Example of industry directive (written workers instruction) for wet work**

**Hazardous activities**

Wet and damp cleaning of the hallway, break rooms, bathrooms, patient rooms

**Dangers for persons and the environment**

When the skin is in regular contact with water, its barrier capability is reduced and skin diseases can develop.

The additional use of disinfectants or cleaning products can harm the skin more and cause allergies.

*(Note: if other harmful substances are used, the notes and regulations should be expanded accordingly)*

**Protective measures, work practices**

- Use automated cleaning correctly
- Use the provided protective gloves
- Cover the lower part of the gloves so that water on the arms does not run into the gloves
- Dry and hang gloves after work
- As much as possible, alternate dry and wet work
- Before work and at least every three hours apply protective cream "....." (on the backs of hands, between fingers, palms under the arms)
- Clean hands with the cleaning product "....."
- Apply skin care cream "....." after work

**Procedures in case of emergency or illness**

At the first sign of skin damage (redness, scaling, itching, cuts) seek the attention of the occupational doctor (name) or a skin doctor

**First aid**

If the skin or eyes are splashed with undiluted cleaning product, rinse immediately with water and seek a doctor's attention

## **Proper disposal**

Diluted cleaning products can be poured into the sink