

868 E

BGI/GUV-I 868 E



Information

Chemical protective gloves

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„Personal Protective Equipment“ Expert Committee of the DGUV

June 2009 issue

The BGI/GUV-I 868 E brochure can be obtained from your competent accident insurance provider. The addresses can be found at www.dguv.de

Chemical protective gloves

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Information



Information includes directions and recommendations intended to facilitate the practical application of rules to a specific subject or situation.

Information is aimed primarily at the entrepreneur and is intended to assist him/her in implementing his/her obligations from legal occupational safety and accident prevention regulations as well as to point out ways to avoid workplace accidents, occupational diseases and work-related health hazards.

The entrepreneur may assume that, by duly taking into account the recommendations contained in the information, he/she has taken appropriate measures to prevent workplace accidents, occupational diseases and work-related health hazards. If, for the implementation of legal health and safety regulations, the technical committees convened to this purpose have established technical rules, the latter shall be given priority.

Whenever information brochures reproduce binding contents of legal workplace health and safety regulations or accident prevention regulations, these are marked by printing in **Boldface** or compiled in the Annex. Explanations, in particular exemplary solutions, are basically indicated by appropriate notes in *Italics*.

1 Why are chemical protective gloves needed?

Chemical protective gloves protect against damage to health and against injury. The danger of injury or damage to health must not be underestimated, since in the modern workshop or production facility chemicals at the workplace are virtually a part of everyday life. Many hazardous substances can be recognized already from outside as being dangerous. Thus, for example, toxic substances are labelled with the „skull“ icon, or corrosive substances are labelled with the „test tube“ icon.

Identification:	Substance	Hazard	
 Harmful	Xylene (Aromatic hydrocarbon, e.g. in paints, varnishes)	Degreasing	
 corrosive	Sulphuric acid (inorganic mineral acid, e.g. battery acid) Sodium hydroxide (inorganic base, for example in basic cleaners)	Chemical burn	
 highly flammable	Solvent (e.g. in brake cleaners, detergents)	combustible	
  oxidizing corrosive	Hydrogen peroxide (Peroxide, for example in detergents, bleaching agents)	Burns	
 explosion promoting	 irritant	Dibenzoyl peroxide (peroxide, e.g. as starting reagent for polymerization)	Irritation, burning

Table 1 Examples for the labelling of hazardous substances

Why are chemical protective gloves needed?

On the other hand, for a large number of substances the danger cannot be seen immediately, e.g. if they are not labelled but a hazardous substance is released in the course of the activities.

Even more difficult it is, for example, in refurbishment areas where it is not always known what kinds of hazardous materials are to be expected in the first place.

As there is no such thing as the universally applicable chemical protective glove, the glove must „match“ the hazard. The correct selection of chemical protective gloves is based on the risk assessment (see Section 3, Annex 1).

In any case, first it must be attempted to minimize the risk by using a substitute or an alternative procedure. If in addition to the prioritized cluster of technical and, if possible, organizational protection measures personal protective measures are the only way to protect the skin, suitable protective gloves and any other personal protective equipment as required must be selected by the entrepreneur and provided to the employees.

- S** Substitution (substance replacement, procedure replacement)
- T** Technical protection measures
- O** Organizational protection measures
- P** Personal protection measures

2 What kinds of chemical protective gloves are there?

There is a wide variety of different chemical protective gloves available, but not just any glove is suitable for any purpose, and there is no single chemical protective glove suitable for all activities with all chemicals.

2.1 Types of chemical protective gloves

Chemical protective gloves may consist of a variety of materials, such as rubber, polyvinyl chloride, polyethylene or chemically refined rubber, and therefore provide different features and capabilities. For example, the following materials may be used for protective gloves:

Material:	Example	Properties
Latex (Natural Rubber - NR)		This material is elastic, but to a lesser degree resistant to chemicals and ageing. The good stretchability provides for high wearing comfort, maintaining the dexterity.
Nitrile rubber (nitrile-butyl rubber - NBR)		This material has very good abrasion, puncture, cut and tear resistance. Protective gloves made of nitrile rubber are offered from thin and sensitive to strong variants. The coatings of the individual manufacturers are proprietary developments and thus have differing properties.
Polyvinyl chloride (PVC)		The material has low flexibility; therefore plasticizers are added during production. The contact of PVC material with solvents leads to elutriation of the plasticizer, and the gloves become brittle. Usually the colour of these gloves will change if they have been in contact with solvents.
Polychloroprene, neoprene		Protective gloves of polychloroprene have good physical properties (abrasion, tear propagation resistance) and are more resistant to weather and ageing than gloves made of other materials.

What kinds of chemical protective gloves are there?

Material:	Example	Properties
Butyl rubber (polyisobutylene rubber - IIR, IBR)		Butyl rubber gloves are usually manufactured from relatively thick layers of material and are therefore quite heavy. They are often used in conjunction with heavy chemical protective suits.
Fluororubber (fluoroelastomers, FKM)		Protective gloves made of fluororubber have a broad application range. They are produced in a complex process so that they are relatively expensive.
Polyvinyl alcohol (PVA)		Protective gloves made of PVA have a limited scope of applicability, since the glove material is water soluble. For anhydrous solvents, temporally limited protection can be expected.
Double material mixtures		Beyond the forms of chemical protective gloves listed above, there are lots of protection gloves made of material combinations. These are often used for situations of very high stress (e.g. mixtures of chemicals).
Multi-layer gloves (laminates)		These gloves are manufactured by welding together several layers of different materials. The welding seams may tear; mobility is often limited and wearing comfort rather low.

Table 2 Materials for protective gloves

3 Which chemical protective glove is suitable?

The basic prerequisite for the correct selection of chemical protective gloves is the exact knowledge of all possible hazards in the workplace. However, this includes not only all information about the risks, both directly in the workplace and during the work process, but also about the hazards from possible work-related disturbances.

- Identify hazards
- Assess risks
- Define measures
- Verify effectiveness



Identification of hazards and exposures is already a difficult task, but without it the entrepreneur's fiduciary duty to provide appropriate protective gloves will not be possible.

No less difficult is the next step, namely the actual selection of the appropriate protective gloves from among the large number of models available on the market.

3.1 Approach

The choice of protective gloves is based on the workplace and the activities. Here, in addition to the protective effect, performance characteristics and wearing characteristics must be paid attention to: Maximum possible protection against any occurring hazards (chemical, physical, microbiological, thermal, etc.), skin-compatibility (allergens), easy to clean, fit (size), comfort (sweat absorption capacity), gripping ability (gripping wet or oily objects), tactile sensitivity (fine mechanical work), low encumbrance at work, etc.

3.1.1 Identifying workplace hazards

For making the best choice, several factors must be considered. These include

- the protective effect, taking into account the penetration (permeation) of the products used or hazardous substances;
- workplace conditions (interaction of chemicals, heat, cold, UV radiation, dust);
- the personal predisposition (possible existence of any allergy or sensitivity of the skin) of the glove wearer.

Which chemical protective glove is suitable?

Furthermore it has to be taken into consideration

- that a glove material which offers good protection against one chemical may provide very poor protection against other substances;
 - that mixtures (preparations) may have properties different from what might be expected from the knowledge of the characteristics of the individual components;
- and
- how long a chemical protective glove must be worn at the same workplace (briefly or full shift?).

3.1.2 Information from the material safety data sheet (MSDS)

First, the MSDS of the chemical used ought to comprise, in section 8 (personal protective equipment), an indication of suitable protective gloves or the suitable material with a minimum thickness of the gloves.

Details about appropriate gloves may also be enquired from the glove producer or the manufacturer of the substance to be handled. Manufacturers can usually suggest suitable protective gloves when the products / hazardous substances to be handled are clearly identified, or when the intended conditions of use and work procedures are named (e.g. using the completed check-list in Annex 1).

Information can also be found in the GISBAU glove database. Here on the basis of the product codes / GISCODEs definite wearing time recommendations by the manufacturers are listed, e.g. for paints, varnishes, wood preservatives, or cleaning and care agents for a variety of procedures. (<http://www.wingisonline.de/handschuhe/frmStart.aspx>).

3.2 How long may a chemical protective glove be worn?

The time for which a glove may be worn under conditions of actual usage without being permeated by the chemical agent is called the wearing time.



The wearing time is not the same as the breakthrough time, which is determined under standard conditions according to DIN EN 374-3.

The wearing time to be expected upon contact with a hazardous material should be taken from the MSDS of the respective chemical substance, or it is to be determined individually in cooperation with the product manufacturer and the glove manufacturer (see also glove database at www.gisbau.de).

The characteristics of the typical glove materials (see Section 2.1) depend on the composition of the raw materials and on the production process. As a result, gloves by different manufacturers made of seemingly identical material may yet have different protective effects („nitrile“ is not the same as „nitrile“).

Many factors determined by the workplace and activities effect the wearing time.

In particular, consider:

- Glove material and thickness
- Work process / activity
- Type of wetting (chemical splashes or full contact)
- Duration and intensity of contact
- Chemicals, individual substances or preparations used and their processing temperature
- Heating of the glove material, thermal stress
- Mechanical stress on the glove
- Ageing, storage and cleaning.

Essentially, in case of contact with a chemical substance/preparation a protective glove may not be used beyond the time span stated by the manufacturer, meaning that even for the highest class 6 (corresponds to > 480 min) reuse after eight hours cannot be recommended.

If it is determined during the risk assessment that in an optimized workflow only splashes of liquids are to be expected, gloves with lower performance than specified in the MSDS may also be used, if found suitable. In this case it must be ensured that the gloves are changed quickly after any contact with chemicals. Such gloves should reach at least protection index class 1 (> 10 min) against the chemical substance / preparation used.

Which chemical protective glove is suitable?

3.2.1 Identifying problems from wearing protective gloves

Apart from the desired protective effect when wearing gloves, undesirable side effects may also occur (see Annex 6). These include, for example, skin softening (maceration) or allergic skin reactions.

- **Skin softening (maceration)**

Liquid-tight chemical protective gloves prevent perspiration to the outside, so the skin softens and swells with increasing wearing time, thereby decreasing its barrier effect. This pre-damage to the skin facilitates penetration of irritants, substances potentially acting as allergens (sensitizing) or infectious agents.

- **Allergens**

In the manufacture of protective gloves, among other things excipients, ageing inhibitors and vulcanization products are used. If any employee has acquired a contact allergy to any such production excipient, he must be provided with a glove that does not comprise the relevant allergen.

At <http://www.gisbau.de/service/sonstiges/allergene/Start.html> a list can be found; the excipients used in the individual production are given there. The list is intended to facilitate the selection of suitable protective gloves that do not contain the individual known allergen. For selection, wearing time etc., the company physician should be involved into the decision.

3.2.2 Organizing and defining use, care, storage, disposal

Because of the possibility of skin softening, a pair of protective gloves should be worn without interruption only until the inner lining is saturated with sweat.

In practice, it is expedient to provide several pairs of protective gloves per employee and working day, to use cotton under-gloves or to organize the activities so that in between also activities can be performed in which no protective gloves need to be worn.

When storing unused chemical protective gloves, make sure that this is done properly according to the manufacturer's instruction; this may include storage in a dark, dry place.

For the cleaning or disposal of chemical protective gloves, pay attention to the manufacturer's information and, if applicable, also to the environmental regulations, since after contact with chemicals it may be necessary to dispose of the gloves as hazardous waste.

3.2.3 Protective measures belong into the operating instructions

For the wearing of protective gloves, the entrepreneur must have a workplace- and activity-based operating instruction created. A sample for such an operation is to be found in Annex 5 and also on the „WINGIS“ CD. The sample must be supplemented with operational data.

The insured persons shall be informed about the measures during an instruction session.

During this instruction session, the superior should also consider the advice given by the insured persons, e.g. if gloves should prove a practical failure. Lasting success can be expected only if there is good collaboration in the actual implementation of protective measures as well.

4 What are the requirements for chemical protective gloves, and how are they labelled?

Prior to the marketing of personal protective equipment (PPE), a manufacturer must observe certain conditions.

4.1 Categories

Personal protective equipment is generally classified into one of the categories I, II or III and must principally be provided with the CE marking, otherwise they must not be marketed as PPE. By applying the CE marking the manufacturer certifies that the personal protective equipment complies with the defined „Essential health and safety requirements“ of the applicable EU directives.

Category III applies to PPE which is intended to protect against mortal danger or serious and irreversible health damage. This highest category includes, among other things, also chemical protective gloves. Only in Category III in addition to the CE-marking a 4-digit number must be shown that corresponds to the detection number of the authority monitoring manufacturing / production.

4.2 Labelling according to standard

Icons on the glove serve to make the right choice. The relevant standards define the necessary properties of protective gloves by icons.

4.3 Possible labelling schemes of chemical protective gloves

There are basically two different performance levels for chemical protective gloves. They are identified by the „beaker“ and „flask“ icons on the glove.



▷ **Protective glove with „test beaker“ label**

EN 374



Protection against penetration according to EN 374-2:
Protection index class 1-3 (higher is better); in the test, at least **Class 1** must be achieved.

▷ **Protective glove with „Erlenmeyer flask“ label**

EN 374



Protection against chemical risks according to DIN EN 374, EN 374-3 for protection against permeation: Protection index class 1-6 (higher is better); in the test, at least **Class 2** must be achieved with three of the defined test substances. See Annex 7.

A chemical protective glove labelled with a beaker icon is airtight and waterproof. It may be used for a limited time, if necessary, for protection against specific chemicals that are listed in the manufacturer's information.

A chemical protective glove labelled with an Erlenmeyer flask was tested against three substances from a list (see Annex 7). The appropriate letters of the chemical substances form a part of the label. It may be used for a limited time for activities with the substances named in the manufacturer's information.



▷ **Protective glove with „bacteriological contamination“ label**

EN 374



Protection against penetration according to EN 374-2:
Protection index class 1-3 (higher is better); in the test, at least **Class 2** must be achieved.

A chemical protective glove may be additionally marked with the icon for „bacteriological contamination“. Currently it is assumed that gloves that upon testing resist penetration will provide effective protection against bacteria and fungal spores. This assumption does not apply to protection against viruses, because viruses are much smaller than bacteria and fungal spores.

What are the requirements for chemical protective gloves, and how are they labelled?

▷ Protective glove with „hammer“ label

EN 388	Test methods	Performance class	Maximum performance class
 2120	Abrasion resistance	2	4
	Resistance to cutting	1	5
	Tear propagation	2	4
	Puncture resistance	0	4

For chemical protective gloves there are no minimum requirements with regard to mechanical protection. As a part of the certification, however, these tests are generally carried out, and the results are listed in the manufacturer's information. In the context of this icon you will find the performance levels again.

The labels, icons and letter combinations are intended to facilitate the selection, yet it is still mandatory to learn further details from the manufacturer's information.

▷ Protective glove with label „manufacturer's information“



The pictogram representing an open book points out that important data, such as resistance to individual chemicals or preparations, must be looked up in the manufacturer's information.

Only there the performance levels are listed which the glove has reached in the tests against the pure chemicals or preparations. Moreover, the manufacturer's information also comprises data relating to dexterity and the available sizes. The manufacturers also specify whether in the production of the gloves substances were used that are known to cause allergies.

5 Where to find further information?

Basic support is offered by:

- TRGS 401 (hazard by skin contact - detection, assessment, measures)
- the individually applicable MSDS
- the rule „Use of Protective Gloves“ (BGR/GUV-R 195)
- Annex 1 to the present information (check list for procurement according to BGR/GUV-R 195).
- the website of the Expert Committee of DGUV „Personal protective equipment (PPE)“ (www.dguv.de/psa)
and
- www.arbeit-und-gesundheit.de.

5.1 Databases

Substance-specific information on appropriate glove materials are to be found in the GESTIS substance database at <http://www.dguv.de> (Webcode d11892) and in the GISBAU glove database at <http://www.wingis-online.de/wingisonline>, the GisChem database at <http://www.gischem.de>, the BASIS - Business And Safety Information - System under <http://www.basis-dp.de/als> .
Information on gloves is found at <http://www.mapa-professionnel.com>, <http://www.kcl.de>, <http://www.ansell.com> and in other databases.

5.2 General information

Deutsche Gesetzliche Unfallversicherung (DGUV) www.dguv.de,

Product testing and certification: Personal Protective Equipment (PPE) „The road to CE marking“ (Webcode: d14465)

Various informative documents, e.g. brochure „Protective Gloves“
at www.bvh.de,

Work and health online at www.arbeit-gesundheit.de.

Where to find further information?

5.3 Technical rules for hazardous substances (TRGS)

TRGS 401 Dangers by Skin Contact • Identification, Evaluation, Measures,
„Announcement 220 MSDS“, September 2007 issue
(www.baua.de).

5.4 Standards

DIN EN 420: 2003 Protective gloves - General requirements and tests, DIN EN 388: 2003
Protective gloves against mechanical risks

DIN EN 374: 2003-1 Protective gloves against chemicals and micro-organisms;
terminology and performance requirements,

DIN EN 374: 2003-2 Protective gloves against chemicals and micro-organisms,
determination of resistance to penetration,

DIN EN 374: 2003-3 Protective gloves against chemicals and micro-organisms,
determination of resistance to penetration of chemicals.

5.5 Literature

PPE Manual: „Handschutz“, 2007 edition

Hand protection: „Hand drauf“, June 2004 edition.

5.6 Media

Movie: DGUV „Geschützte Hände“ at <http://www.dguv.de> (Webcode d10613)

Movie: BG BAU „Hand in Hand“, media catalogue

Annex 1

Check list for the procurement of protective gloves (according to BGR/GUV-R 195)

Type of business:

Scope of work:

Workplace:

Job description:

Hazards:	Further data:	
1. Chemical agents solid: <input type="checkbox"/> liquid: <input type="checkbox"/> gaseous: <input type="checkbox"/> MSDS available: <input type="checkbox"/>	a) Nature of chemical product Trade name: _____ _____ chemical name, CAS-No.: _____ _____ _____	
	b) Working conditions Type of contact: _____ Splashing <input type="checkbox"/> Immersion <input type="checkbox"/> permanent contact <input type="checkbox"/> irregular contact <input type="checkbox"/> maximum contact time [min]: _____ work rhythm [n / t]: _____ temperature [°C]: _____ potentially explosive atmospheres <input type="checkbox"/> (dissipative gloves required, electrostatics) work in medical sectors <input type="checkbox"/> other comments: _____ _____	
2. Biological agents solid: <input type="checkbox"/> liquid: <input type="checkbox"/> aerosol: <input type="checkbox"/>	a) Type of biological material: Name: _____ _____ RG* 1: <input type="checkbox"/> RG 2: <input type="checkbox"/> RG 3: <input type="checkbox"/> RG 4: <input type="checkbox"/>	

* RG = risk group according to Ordinance on Biological Substances

Check list for the procurement of protective gloves

	<p>b) Working conditions</p> <p>Type of contact: _____</p> <p>Splashing <input type="checkbox"/></p> <p>Immersion <input type="checkbox"/></p> <p>permanent contact <input type="checkbox"/></p> <p>irregular contact <input type="checkbox"/></p> <p>maximum contact time [min]: _____</p> <p>work rhythm [n / t]: _____</p> <p>temperature [° C]: _____</p> <p>potentially explosive atmospheres <input type="checkbox"/></p> <p>(dissipative gloves required, electrostatics) <input type="checkbox"/></p> <p>work in medical sectors <input type="checkbox"/></p> <p>other comments:</p> <p>_____</p> <p>_____</p>	
<p>3. Physical influences</p> <p>Cuts:</p> <p>Puncture:</p> <p>Moving parts:</p> <p>Heat:</p> <p>Cold:</p>	<p>Procedures:</p> <p><input type="checkbox"/> Processing of: _____</p> <p><input type="checkbox"/> _____</p> <p><input type="checkbox"/> Transport of: _____</p> <p><input type="checkbox"/> _____</p> <p><input type="checkbox"/> Cutting: _____</p> <p>_____</p> <p>Blasting operations: _____</p> <p>_____</p> <p>Other working methods: _____</p> <p>_____</p>	
<p>4. Other requirements</p> <p>previous sensitization:</p> <p>Comfort requirements:</p> <p>Requirements for free movement of fingers:</p>	<p>Allergen: _____</p> <p><input type="checkbox"/> _____</p> <p><input type="checkbox"/> _____</p> <p><input type="checkbox"/> _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	

Please provide workplace descriptions as detailed as possible!

Annex 2

Chemical resistance list (reference values)

Permeation is the molecular penetration through the glove material. The time it takes the chemical to permeate is stated in terms of levels.

Level 1 > 10 min Level 2 > 30 min Level 3 > 60 min
 Level 4 > 120 min Level 5 > 240 min Level 6 > 480 min

Resistance List							
EN 374-1		Product					
Chemicals	Code-letters	Butyl-rubber	Polychloro-prene	Fluoro-rubber	Polyvinyl-chloride	Nitrile (NBR)	Latex
Methanol	A	+ 6	+ 3	+ 6	- 1-3	- 1-2	- x
Acetone	B	+ 6	- 2?	- x	- x	- x	- x
Acetonitrile	C	+ 6	- 2-3	- X	- 1-2	- X	- X
Dichlorome-thane	D	- 1	- X	+ 3	- X	- X	- X
Carbon disulfide	E	- 1-2	- X	+ 6	- ?	- X	- X
Toluene	F	- X	- X	+ 6	- 1-2	- 1-2	- X
Diethyla-mine	G	n/a 1-2	n/a x	n/a 3?	n/a 3	n/a 1-2	n/a x
Tetra-hydrofuran	H	- 1-2	- X	- X	- X	- X	- X
Ethyl acetate	I	+ 4	- 1-2	- X	- X	- 1-2	- X
n-heptane	J	- X	+ 2-4	+ 6	- 1-2	+ 6	- X
NaOH 40%	K	+ 6	+ 6	+ 6	+ 6	+ 6	+ 6
H ₂ SO ₄ 96%	L	+ 6	- 2-4	+ 6	- 1-3	- 3	- X

Suitability of the aforementioned glove materials for the chemicals listed according to GESTIS data:

+ = Suitable according to GESTIS

n/a = No data available in GESTIS

- = Not suitable according to GESTIS

x = Not suitable

? = Suitable only under special conditions

Annex 3a

Handling instructions (training materials/placard)

1. Disposable medical gloves and leather gloves are not suitable for handling chemicals; only chemical protective gloves are.
2. Before wearing, check gloves for damage.
3. Before putting on the gloves, clean hands thoroughly and dry them.
4. Long fingernails and jewellery may damage gloves.
5. For overhead work, the cuffs of the gloves are to be rolled up so that hazardous substances cannot run into the glove (drainpipe effect). Roll up the cuff.



6. Do not wear the same protective gloves for too long; change gloves or intersperse activities which do not require wearing of gloves.
7. Clean gloves before taking them off
 - When working with solvents, wipe with dry cloth.
 - When working with acids or alkaline-comprising products: Rinse protective gloves under the tap and dry with a clean cloth.



8. Taking gloves off without touching the outer surface with the bare hands
When taking off contaminated gloves, avoid touching the exterior surface of the gloves with bare hands.



9. After taking off the gloves, apply a skin cream if necessary; the skin protection plan must be followed.
10. Clean gloves only in accordance with the manufacturer's care instructions, store and use again if possible.
11. Before reuse, let gloves dry.
12. Reuse only fault-free protective gloves:
 - Gloves must not exhibit any peeling, flaking, fissures or holes.
 - Gloves must not be discoloured or brittle.
13. Contaminated gloves must be disposed of properly.
(Observe manufacturer's information as well as local disposal regulations.)



Annex 3b

Instructions for the use of gloves (placard)



Before putting on the gloves, the hands must be clean and dry.



Change gloves at the latest in case of mechanical damage or upon moisture penetration. In case of longer working time, use 2 pairs of gloves in turns, and if possible, wear cotton under-gloves.



When working with detergents, roll up the cuff to prevent the cleaning agent from running into the glove.



After use and before being taking off, rinse the gloves thoroughly with clean water.



Take gloves off without bringing the outer surface into contact with the bare skin: Turn cuff inside out and pull the glove while simultaneously turning it.



Before re-use of the gloves, turn inside out and let dry.



After removing the gloves, wash hands and apply a skin care cream.

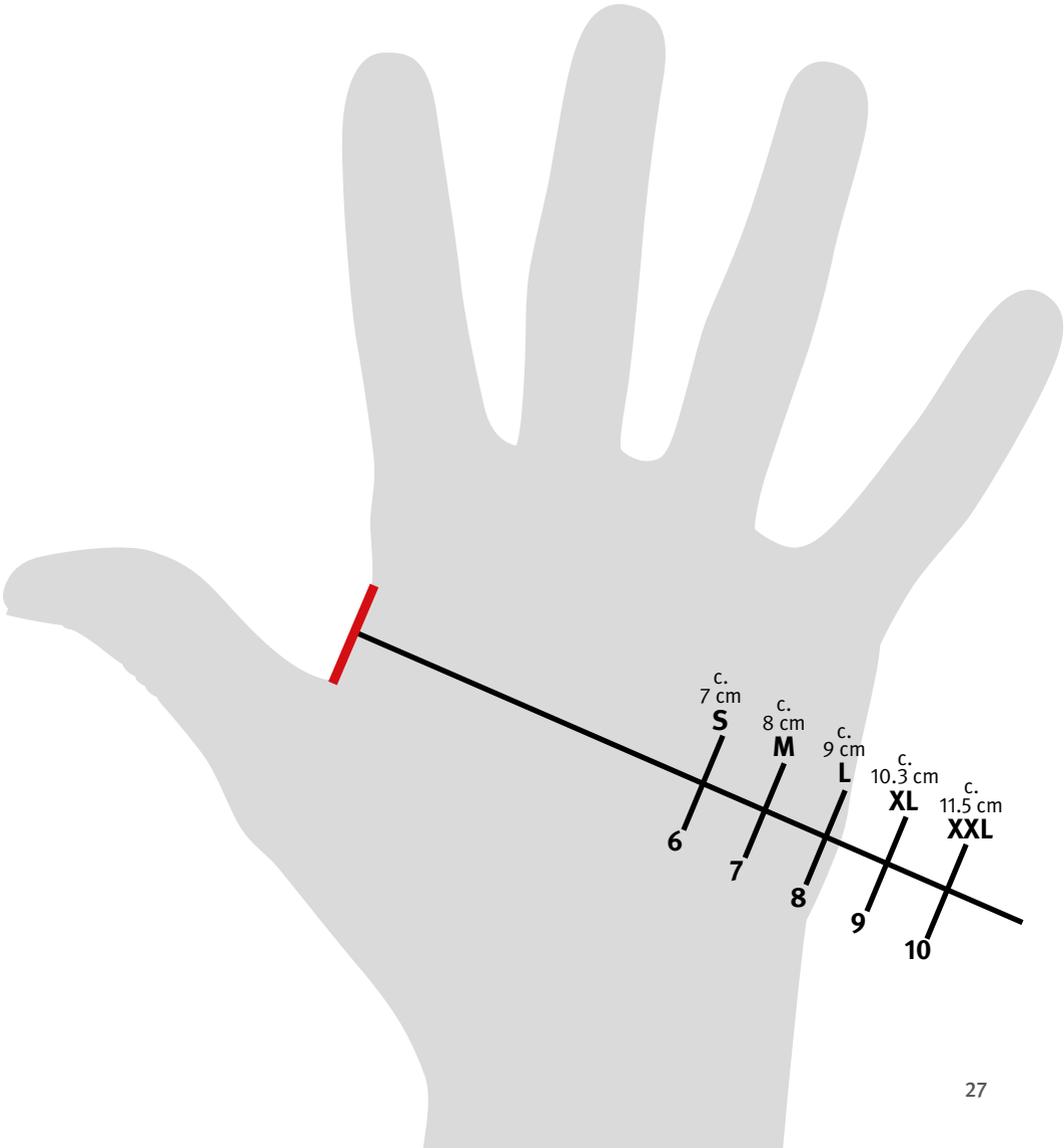


Replace gloves with holes or fissures by undamaged ones.

Annex 4

Template for determining glove size

For high wearing comfort and convenient working, the correct glove size is important! In order to determine the correct glove size, please apply a ruler between thumb and index finger as shown on the template and read the „cm“. Read the correct glove size on the template.



Annex 5

Operating instructions (exemplary placard)

MUSTER

SOP #: According to Item 6 of BGR 195	11/01
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Site / Activity: **Operating instructions for the wearing of chemical protective gloves**



There is no universal glove for all chemical agents used at work. For different chemicals, different gloves must be worn.

Pay attention to the operating instructions of the individual chemical agents!



Hazards during use

Never wear gloves in the vicinity of rotating machine parts or tools! When wearing unsuitable or damaged gloves, chemicals penetrate into the interior of the glove, thus hazards are increased. Increased danger of mechanical injury due to skin softening and increased perspiration caused by air-tightness of the glove. For manufacturing reasons, protective gloves of plastic may comprise substances that can induce allergies. If there should be allergies to any of these substances, other, appropriate gloves should be selected instead. Consult your company doctor!

Selection criteria

For questions regarding the protective effect of gloves or unclear conditions of use, it is essential to obtain advice from the entrepreneur or the company doctor! When handling chemicals, use only gloves with **CE** label including a four-digit identification number. Pay attention to icons! Disposable gloves are generally unsuitable! Use only well-fitting gloves of the correct size. For overhead or similar work, use gloves with cuff, roll up the cuffs! Never use gloves with obvious defects such as fissures, holes, discolourations or brittleness. Such gloves must be properly disposed of immediately. Do not reuse contaminated and heavily soiled gloves!

Guidelines for use

Protective gloves should always be used by the same person. Put on gloves only with clean and dry hands! Use gloves only when actually handling chemicals. When wearing gloves for extended periods of time (more than 2 hours), work with a second pair of gloves in turns. Organize activities so that work with and without gloves can be performed in alternating fashion! Beneath the chemical protective glove, cotton under-gloves or mittens with lining for sweat absorption are suitable. Clean hands after work and apply skin care cream!

Storage, cleaning and care

If reuse is intended, the gloves must be carefully cleaned prior to taking them off and be taken off so that the interior is not contaminated. Then store them in a well-ventilated place with the wristband open. Do not expose them to direct sunlight or place them on radiators! Store gloves in the original packaging and keep away from sunlight and heat!

Disposal:

Gloves can be disposed of together with other chemically contaminated materials such as cleaning cloths. Collect for disposal in:

Annex 6

Problems, effects and possible measures

Problems	Effects	Possible measures
An insured person has an allergy to a production excipient for gloves.	Allergic reactions!	Change gloves; examples at www.gisbau.de , glove database and list of allergens in protective gloves!
An insured person complains of excessive sweating.	Maceration (see Section 3.2.1)!	Use of cotton under-gloves, limitation of the wearing time of gloves, alternation of activities with and without protective gloves!
Gloves show wear quickly.	Gloves unsuitable for hazardous material!	Re-select suitable protective gloves!
Between protective gloves and chemical protective clothing there is no fixed connection.	The skin is unprotected and can be injured!	Use protective clothing with protective gloves permanently welded on! Use connective cuffs (adapters) between protective gloves and chemical protective clothing!
Further dangers add to those of the known hazardous materials.	Protective gloves are not suitable for the additional hazardous substances; hazard to the insured persons!	Re-select suitable gloves based on an extended hazard assessment!
Gloves are used for too long.	Gloves have material defects, jeopardizing the insured persons!	Instruct the insured persons once more about protection measures (as defined in the SOP)!
The material of the gloves is too stiff or too thick.	Fine activities cannot be properly executed; the gloves are not to be used!	Test whether the material thickness may be reduced (ask the manufacturer of the gloves); cooperate with the insured persons in selecting appropriate protective gloves!

Annex 7

Test chemicals according to DIN EN 374-1

Code letter	Test substance	Class
A	Methanol	Primary alcohol
B	Acetone	Ketone
C	Acetonitrile	Nitrile
D	Dichloromethane	Chlorinated paraffin
E	Carbon disulphide	Sulphur-comprising organic compound
F	Toluene	Aromatic hydrocarbon
G	Diethylamine	Amine
H	Tetrahydrofuran	Heterocycles and ether compounds
I	Ethyl acetate	Ester
J	n-heptane	Aliphatic hydrocarbon
K	Sodium hydroxyde 40%	Inorganic Base
L	Sulphuric acid 96%	Inorganic acid

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