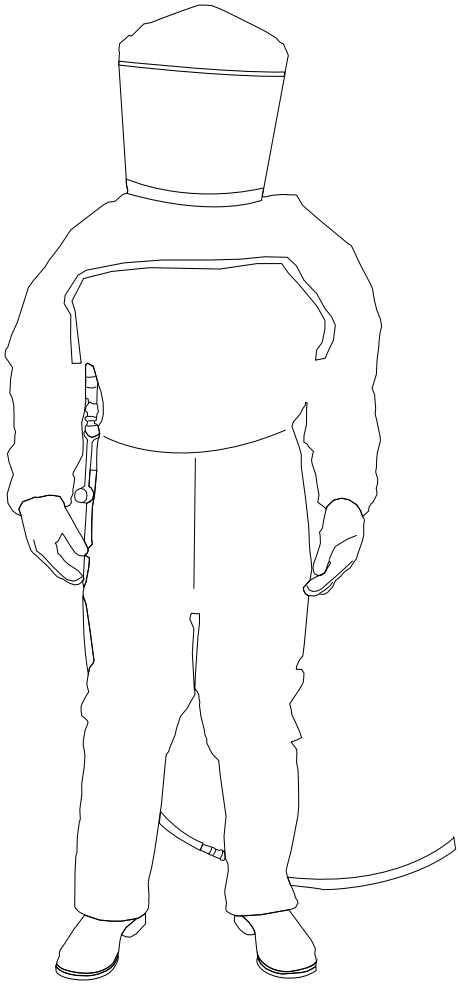
RESPIREX™



DEKRA Standard FRM 90.166.0

GLS 300 C
Air-fed
Chemical Protective Suit User Instructions

Gas-Tight to ISO17491-1:2012 Method 2 Test
Liquid jet tight to EN14605:2005+A1:2009
High level liquid spray tight to EN14605:2005+A1:2009
Low level liquid spray tight to EN13034:2005+A1:2009
Particle tight to EN13982-1:2004+A1:2010

BS\109\B\2017

Contents

General Information

The Respirex GLS 300 C is a one-piece single use chemical protective gas tight suit that is CE marked to indicate compliance with the basic safety requirements under article 10 and 11B of the European PPE Directive 89/686/EEC and the DEKRA Standard FRM 90.166.0. The DEKRA Standard FRM 90.166.0 specifies the performance requirements for the materials of construction (e.g. abrasion resistance, tear resistance etc.), and for the suit as a whole (e.g. resistance to penetration by liquids, resistance to outward leakage of gases etc.).

The GLS 300 C suit is manufactured from a high performance barrier laminate material engineered for use in chemical protective clothing. The combination of the barrier laminate and the polymer provide a particle-tight material with good resistance to penetration and permeation by many liquids and gases.

The barrier laminate offers protection in a wide range of applications including:

- Chemical handling
- Hazardous waste clean-up
- Paint spraying
- Pharmaceutical manufacturing and / or packaging
- Disease and disaster management
- Emergency response services, spill clean-up and accident interventions

Typical garment features include:

- Semi-rigid visor bonded to the suit.
- Four exhalation valves fitted to the rear of the suit.
- A 91cm (36") rubber/ textile combination Gas Tight zip fitted across the chest of the garment with a double overflap sealed by Velcro®.
- Integral bootees (sock like extension of the suit leg that encapsulates the entire foot) intended to be worn inside separate (i.e. not attached) ESD protective safety boots that provide protection against mechanical and electrostaic risks.
- Outer legs (splash guards) intended to prevent liquid entering the safety boots
- KCL Butoject gloves complying with EN374-1:2003, EN388:2003 & EN420:2003 permanently attached to the suit (for data specific to the use of KCL Butoject gloves please refer to the user information supplied).
- BartelsRieger Control Valve, attached to the hip of the suit, for connection to the air supply. Air supply pass through is attached to the rear of the suit.

Warnings & Limitations

- Before selecting appropriate protective clothing a detailed assessment of the nature of the hazard and the working environment should be undertaken. There are different factors such as concentration, temperature, pressure and other environmental influences that have significant influence on the barrier properties of the GLS 300 C suit.
- Only for use by trained competent personnel.
- Exposure to certain very fine particles, intensive liquid sprays and splashes of hazardous substances may require protective clothing of higher mechanical strength and barrier properties than those offered by the GLS 300 C suit.
- The GLS 300 C suit is designed for SINGLE USE only, Respirex cannot guarantee the integrity or performance characteristics of a suit that has seen multiple cycles of usage.
- Stored in its normal packaging the GLS 300 C suit has a maximum shelf-life of 5 years.
- GLS 300 C suits should not be used in environments where there is a high risk of puncture occurring.
- If the suit is heavily contaminated or mechanically damaged in any way it MUST NOT be used and MUST be disposed of.
- Never modify or alter this product.
- Please ensure that you have chosen suitable PPE for your application. The user shall be the sole judge for the correct combination of full body protective coverall and ancillary equipment (gloves, boots, respiratory equipment etc) and how long a GLS 300 C suit can be worn on a specific application with respect to its protective performance, wear comfort or heat stress.

- Materials making up the GLS 300 C suit that may come into contact with the wearer's skin are not known to cause allergic reactions to the majority of individuals (please see glove user instructions). These products contain no components made from natural rubber latex.
- Airline pressure must be set between 3.5 bar and 4.5 bar.
- The wearer should leave the contaminated zone IMMEDIATELY when the high pitch of the Low Flow warning whistle sounds. The wearer must immediately undergo decontamination and removal of suit.
- Continuous contact with certain chemicals can adversely effect the field of vision and protection offered by the visor. If the end-user notices any discolouration of the visor the suit MUST NOT be used.
- The GLS 300 C suit DOES NOT provide protection against heat or flame, it should therefore not be worn in potentially flammable or unassessed explosive environments. It is not to be used in the handling of explosives.
- To achieve proper electrostatic dissipative performance, the person wearing the suit shall be properly earthed. The resistance between the person and the earth shall be less than $10^8\Omega$, e.g. by wearing adequate footwear.
- Electrostatic dissipative clothing should not be worn in oxygen enriched atmospheres without prior approval by a responsible safety engineer.
- The electrostatic dissipative performance of the suit can be affected by wear and tear and possible contamination.
- When selecting boots it is recommended that consideration be given to their compatibility with the electrostatic properties of the suit.
- Barrier Laminate material does not breathe. The wearer's body temperature will rise whilst wearing the suit and care should be taken not to lose too much body fluid. The wearer should leave the work area and remove the suit before becoming distressed.

For any enquiries please contact the Respirex customer services department on

Tel : +44 (0)1737 778600 or Fax : +44 (0)1737 779441.

Email: http://www.respirexinternational.com/en/about-us/contact-us/

Storage

Respirex GLS 300 C suits should be stored under the following conditions:

In dry conditions above ground level; away from direct sunlight and in an environment free from harmful gases and vapours.

Temperature range of -5°C* to +30°C, < 90% humidity.

*Care should be taken when storing the suits at extreme temperatures. At sub-zero temperatures the flexibility of the material may be reduced, resulting in a potential lowering of the protection offered.

Only remove the single-use GLS 300 C suit from its original packaging when intending to use.

DO NOT fold or crease the visor, this will help to keep its natural shape.

Pre-checks

1. Visually inspect the suit for any damage that may impair the correct working of the garment together with the gloves.
2. The zip operates correctly and the slider is in good condition.
3. The suit materials are free from tears and holes. Pay particular attention to the seam areas.
4. Check vision through the visor is not impaired by scratches or heavy scuff marks.
5. Connect the BartelsRieger control valve into the connector with the black Low Flow Warning Whistle pointing towards the under arm of the suit and the male airline connection pointing towards the feet. Stretch the rubber band over the black warning whistle first, then stretch the second rubber band over the male airline connection to secure the valve.

6. Connect the air supply hose to the BartelsRieger control valve as shown in Figure 1 and Figure 2. Reduce the pressure until the Low Flow Warning Whistle starts, then increase the pressure to the normal working pressure (3.5 bar to 4.5 bar). Make sure there is constant air flow in the hood of the suit.

Fig. 1

Fig. 2

Dressing Procedure

Entry to the suit is made via an opening at the front that is sealed by a gas tight zip fastener protected by double overlapping Velcro sealed flaps.

It is good practice for an assistant to help the wearer don and doff the suit. This makes the process easier and quicker, and will help the wearer to avoid stumbling or tripping which may result in personal injury or damage to the suit.

Follow these steps in donning the suit:

1. Unfasten the zipper by pulling the slider approximately 6 cm (2.4") at a time, keeping the zip straight with one hand as you pull the slider with the other in line with the zip. Repeat this exercise for the whole length of the zip. **FAILURE TO FOLLOW THIS PROCEDURE MAY RESULT IN THE ZIP SPLITTING**.
2. Remove all personal affects which may result in damage to the suit (e.g. watches, badges, jewellery etc.).
3. Remove shoes or boots. The integral bootees are not designed to accommodate footwear.
4. Tuck trousers into socks to make donning of suit legs and bootees easier.
5. While seated, place both legs into the suit then fold the outer legs (splash guards) upwards over the knees (see Fig. 3 and Fig. 4).

Fig. 3

Fig. 4

6. Don safety boots. It is strongly recommended that you wear a larger size of boot than normal (ideally at least one size larger), not only to accommodate the surplus fabric of the integral bootee, but also to ease in the donning process (see Fig. 5 and Fig. 6).

Fig. 5

Fig. 6

7. Carefully fold down the outer legs of the suit over the exterior of the safety boots. Once folded down it is important to ensure that the seam where the outer leg joins the suit is flat and does not form a 'channel' where liquid could collect. Liquid will not be able to enter the boots once the outer leg is fully folded down (see Fig. 7).

Fig. 7

8. Stand up and pull the suit to waist level. Attach and adjust the belt securely around your waist (see Fig. 8 and Fig. 9).

Fig. 8

Fig. 9

9. Lift the suit and place one arm at a time into the sleeves until the hands are placed comfortably into the attached KCL Butoject gloves (it is recommended that cotton gloves are worn inside the Butyl gloves attached to the suit (see Fig. 10 and Fig. 11).

Fig. 10

Fig. 11

10. The wearer should lift the hood of the suit and place his or her head inside (see Fig. 12 and Fig. 13). **NB** If necessary the wearer may don a peakless, size adjustable 52 - 64 cm, helmet conforming to EN 397 before placing the hood over their head. After the hood has been placed over their head, while wearing the helmet, it may be necessary to re-adjust the straps of the helmet for comfort and better fitting. Ensure the knitted neck seal sits evenly around the wearer's neck.

Fig. 12

Fig. 13

11. The dressing assistant should fasten the zipper carefully following the reverse of the procedure outlined in stage 1, keeping the zip straight with one hand as you pull the slider with the other in line with the zip. Seal down the outer flaps. Ensure that both halves of the Velcro are firmly and evenly joined together, leaving no gaps or ridges for possible fluid ingress (See Fig. 14 and Fig. 15).

Fig. 14

Fig. 15

12. When fully donned, the suit should appear as in Fig. 16, Fig. 17, Fig. 18 and Fig. 19.

Fig. 16

Fig. 17

Fig. 18

Fig. 19

Decontamination for removal of suit

Because the GLS 300 C suit is designed primarily as a SINGLE USE garment, the end-user will be the sole judge for how long it can be worn on a specific task.

Preliminary washing by means of a high pressure shower will remove most of the contaminant from the outer surfaces of the suit sufficient to allow the wearer to undress from the garment.

Should you not have access to a high pressure shower, the suit can be sprayed with copious quantities of water and a suitable detergent and neutralizer for a minimum period of 5 minutes.

If the garment has been used in acid the recommended neutralizer is a solution of bicarbonate of soda and water (6% bicarbonate of soda w/v). Water will neutralize alkali contamination.

Undressing Procedure

It is essential that the suit is decontaminated sufficiently to safely remove the wearer from the garment. It will be necessary for the dressing assistant to aid the wearer to remove the suit (it is essential that the dressing assistant wears suitable protective clothing).

1. With the wearer's arms in an outstretched position the dressing assistant should break the velcro seal on the zip flaps and fully open the gas tight zip across the chest.
2. The wearer should now withdraw their arms from the sleeves of the suit and unfasten both the waist belt attached to the BartelsRieger unit and the chin strap of the peak-less safety helmet (if worn). After unfastening the waist belt, the wearer's arms should be crossed over the chest.
3. The wearer should duck forwards so that the dressing assistant can lift the hood of the suit up and over the wearer's head (following the reverse of the procedure outlined in the dressing instructions), keeping the outer surface of the suit away from the wearer at all times. NOTE: It is likely that if a safety helmet is being worn this will automatically come away from the wearer's head space of the suit. The helmet can be recovered from the suit on completion of the doffing procedure.
4. The dressing assistant should carefully fold the suit down to the top of the boots so that the wearer can step out of the suit.
5. The dressing assistant should now fully close the BartelsRieger control valve and disconnect the air supply hose.

Note: Extreme care should always be taken when handling contaminated suits

Disposal

Contaminated garments should be handled as contaminated waste in accordance with local and national regulations.

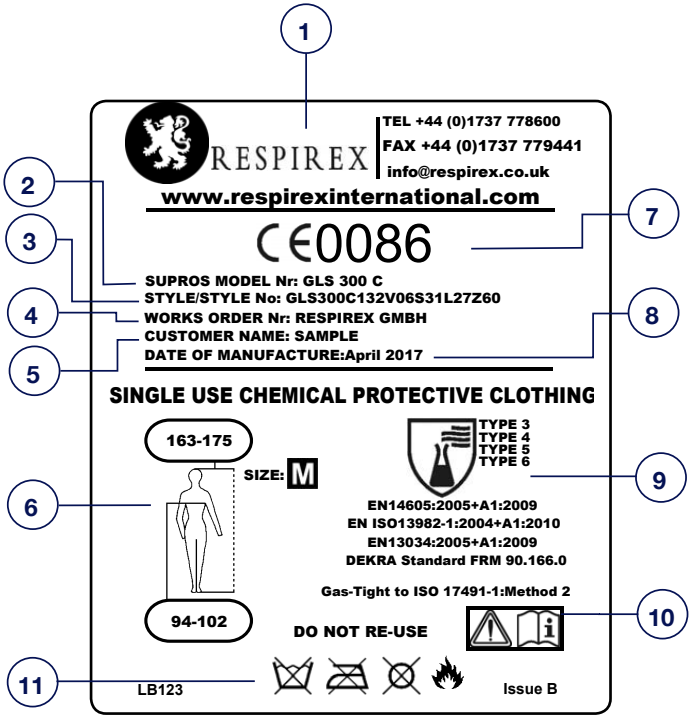
Incineration is acceptable as no halogens are present or used in manufacture of Chemprotex**™300**. The calorific value is the same as oil; however uncontrolled combustion can lead to noxious fumes and un-burnt hydrocarbons. All components are thermoplastic and can be recycled as mixed polyolefin where facilities exist.

Chemprotex**™300** is comprised mainly from ethylene gas which is a by-product of oil production and refining which was once flared. No formal carbon footprint has been made on Chemprotex**™300**, however provided it is not incinerated overall carbon dioxide release to the atmosphere during production and disposal will be low.

Product labelling

1. Manufacturer of garment;
   Respirex International Ltd.
2. Manufacturer's Model number
3. Material of Manufacture.
4. Manufacturer's Order No.
5. Customer Name.
6. Garment Size.

Size	Chest (cms)
S	86-94
M	94-102
L	102-112
XL	109-124
XXL	122-135



7. CE Mark and notified Body code.
8. Date of manufacture; Day/Month/Year.
9. Protection against liquid chemicals
10. "Open Book Pictogram"; wearer must refer to the "Instructions for use" for further information.
11. Five care pictograms indicating that clothing is not suitable for cleaning and reuse.
    - Pictogram 1 Do not wash
    - Pictogram 2 Do not iron
    - Pictogram 3 Do not dry clean
    - Pictogram 4 Flammable

Chemical Permeation Testing At Respirex

Permeation is the process by which a chemical moves through protective clothing material on a molecular level. At its headquarters in Surrey, UK, Respirex operate a chemical permeation testing laboratory equipped with the latest technology. All testing is carried out by fully qualified chemists who are able to test Respirex's own materials against a wide range of chemical substances. In this way the customer can be advised and recommended the most suitable material to use against any challenging chemical encountered in the workplace.

Permeation tests can be carried out in accordance with EN374-3, EN ISO 6529 and ASTM 739. The clothing material is exposed to the challenging chemical in a permeation cell so that breakthrough times and permeation rates can be measured. Breakthrough time is the time taken for the chemical to permeate through the material after continuous contact with the outer surface of a chemical safety suit. Permeation rates, measured in µg (min. cm^2), are an indication of the amount of chemical reaching the wearer inside the suit after breakthrough occurs.

For advice on chemical permeation or decontamination contact the Respirex laboratory on Tel :+44 (0)1737 778600, Fax :+44 (0) 1737 779441 or Email: laboratory@respirex.co.uk, where our qualified staff will be happy to help you. Outside of normal working hours (9.00am-5.00pm Mon-Fri) please leave details of your enquiry on the answer phone service so that the laboratory staff can deal with your query with the minimum of delay.

Material Performance Data

Unless otherwise stated, all data shown indicates performance characteristics of the barrier laminate material in accordance with the requirements of EN14605:2005+A1:2009 and EN 14325:2004, plus additional standards.

Resistance to permeation by chemicals

Tests carried out under laboratory conditions by independent accredited laboratories in accordance with EN 374-3 or EN ISO 6529. Table shows average breakthrough times in minutes.

Chemical	Result Barrier laminate material	KCL Butoject Glove	Visor*	EN Class*
Sodium Hydroxide 40%	> 480 mins	> 480 mins	> 480 mins	6 of 6

Respirex's in-house laboratory can provide permeation data against other chemicals as required. * EN class specified by EN 14325:2004, the higher the class number the better the performance.

Repellency to liquid chemicals

Tests carried out under laboratory conditions by independent accredited laboratories in accordance with EN ISO 6530.

Chemical	Repellency index	EN Class*
Sulphuric acid 30%	> 95%	3 of 3
SodiumHydroxide10%	> 95%	3 of 3
o-Xylene 99.9%	> 95%	3 of 3
Butan-1-ol 99.9%	> 90%	2 of 3

* EN class specified by EN 14325:2004, the higher the class number the better the performance.

Resistance to penetration by liquid chemicals

Tests carried out under laboratory conditions by independent accredited laboratories in accordance with EN ISO 6530.

Chemical	Penetration index	EN Class*
Sulphuric acid 30%	< 1%	3 of 3
Sodium Hydroxide 10%	< 1%	3 of 3
o-Xylene 99.9%	< 1%	3 of 3
Butan-1-ol 99.9%	< 1%	3 of 3

* EN class specified by EN 14325:2004, the higher the class number the better the performance.

Physical Properties

Tests carried out under laboratory conditions by independent accredited laboratories.

Test Method	Property	EN Class*
EN 530 Meth 2	Abrasion resistance	6 of 6
EN ISO 7854 Meth B	Flex cracking resistance	1 of 6
EN ISO 7854 Meth B	Flex cracking resistance (-30°C)	2 of 6
EN ISO 9073-4	Trapezoidal tear resistance	4 of 6
EN ISO 13934-1	Tensile strength	3 of 6
EN 863	Puncture resistance	2 of 6
EN 13274-4 Meth 3	Resistance to ignition	Pass

* EN class specified by EN 14325:2004, the higher the class number the better the performance.

Whole Suit Performance

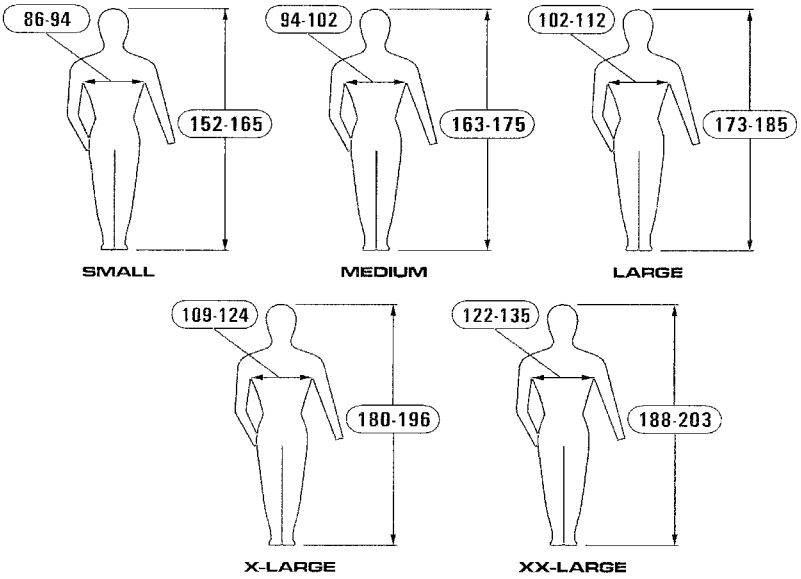
Tests carried out under laboratory conditions by independent accredited laboratories.

Performance	Test Method	Result
Type 3 Liquid jet test	EN ISO 17491-3:2008	Pass
Type 4 High level liquid spray test	EN ISO 17491-4:2008 Method B	Pass
Type 5 Inward leakage test	EN ISO 13982-2:2004	Pass
Type 6 Low level liquid spray test	EN ISO 17491-4:2008 Method A	Pass
Seam strength	EN ISO 13935-2:1999	Class 4*
Resistance to outward leakage of gases	ISO 17491-1:2012 Method 2	Pass

* EN class specified by EN 14325:2004, the higher the class number the better the performance.

Sizing

The following pictograms designate the range of height & chest sizes suitable for the GLS 300 C suit, check your body measurements to make sure you are suitable. Body measurements in cm.



Size	Height	Chest
S	152-165	86-94
M	163-175	94-102
L	173-185	102-112
XL	180-196	109-124
XXL	188-203	122-135

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Article 10 Type Examination By : DEKRA EXAM GmbH (0158),
Dinnendahlstrasse 9,
44809 Bochum
Germany

Notified Body No. 0158

Article 11B Type Examination By: BSI Product Services,
Kitemark Court,
Davy Avenue,
Knowhill,
Milton Keynes MK5 8PP, UK

Notified Body No. 0086

Glove User Instructions

GB **Information brochure according to Section 1.4 of Annex II to Directive 89/686/EEC for personal protective equipment in Category III, Chemical protective gloves Cat III**

Simplified declaration of conformity: Hereby, KCL GmbH declares that the personal protective equipments described correspond to the applicable requirements of EC Directive 89/686/EEC.
Protective Gloves conform to the EN 420. Approved to EN 374 and EN 388 according to Article 10 of Directive 89/686/EEC: IFA, Alte Heerstraße 111, D-53757 St. Augustin, Identification number: 0121. Inspection body according to Article 11 of Directive 89/686/EEC, chemical risks according to EN 374: TÜV Rheinland LGA Products GmbH, Tillystr. 2, D-90431 Nürnberg, Identification number: 0197.
The identification number for testing and certification centre for EC type testing and monitoring of quality assurance measures exclusively relates to the content of EN374-1: 2003 and the PPE Directive 89/686/EEC.

EN 374, Full-protection protective gloves against chemicals
The protective index refers to the permeation time determined during uninterrupted contact with the test chemical under stable laboratory conditions. EN 374-3 = **Permeation**. A glove is resistant to chemicals, when a protection index is achieved at least Level 2 in three of the chemicals listed below. The chemicals which have passed the test are marked on the gloves with the letters A-L. (KB=classification letters.)

Penetration time in min.	Protection index
> 10	1
> 30	2
> 60	3
> 120	4
> 240	5
> 480	6

EN 374, Protection against bacteriological contamination
KCL chemical protective gloves have been penetration-tested to the highest performance level (3) set out in EN 374-2. This quality limit equates to an AQL < 0.65.

Article	Name	Size	EN 388	classification letter (KB) / Protection index		
898	Butoject®	8, 9, 10, 11	0010	B/6	C/6	I/4

EN 388, Mechanical risks

1st digit Abrasion resistance	(min. 0; max. 4)
2nd digit Cut resistance	(min. 0; max. 5)
3rd digit Tear strength resistance	(min. 0; max. 4)
4th digit Puncture resistance	(min. 0; max. 4)

KB	Chemical	CAS no.
B	Acetone	67-64-1
C	Acetonitrile	75-05-8
I	Ethylacetate	141-78-6

EN 421 (tested by IRSN - Institut de Radioprotection et de Sûreté Nucléaire, Identification number: 0073)
Article 898, approved against radioactive contamination.

Antistatic properties according to EN 16350
Articles fulfill the standard requirements: resistance RV < $1{,}0 \times 10^8 \Omega$
Testing atmosphere: air temperature (23 ± 1)°C,
relative humidity (25 ± 5) %
Approved by: STFI, Sächsisches Textilforschungsinstitut e.V., Annaberger Str. 240, 09125 Chemnitz, Identification number: 0516

WARNING!

Resistance to the chemicals listed was determined under laboratory conditions and may be adversely affected by changes to physical properties such as temperature, abrasion, stretching, etc. When using highly corrosive chemicals, degradation is the most important factor in the choice of protective gloves.

These protective gloves provide no protection against extreme cold (< - 5 °C), heat (> 50 °C), electricity.

Do not use in the vicinity of moving machine parts. Risk of being drawn into the machine.

Unusable when the gloves are cracked, porous and stiff.

Safety glove not approved for food contact.

The person wearing the electrostatic dissipative protective gloves shall be properly earthed e.g. by wearing adequate footwear.

Electrostatic dissipative protective gloves shall not be unpacked, opened, adjusted or removed whilst in flammable or explosive atmospheres or while handling flammable or explosive substances.

The electrostatic properties of the protective gloves might be adversely affected by ageing, wear, contamination and damage, and might not be sufficient for oxygen enriched flammable atmospheres where additional assessments are necessary.

Allergy Notice: Protective glove may contain traces of Mercaptobenzothiazol, thiuram dithiocarbamate, polycyclic aromatic, hydrocarbons (PAHs) and sulphenamides included.

Use: The protective gloves you wear must be of the correct size. Note that using undergloves may result in some usage restrictions. Check the protective gloves for damage before you use them. Damaged protective gloves must not be used under any circumstances. Prevent the penetration of pollutants over the edge of the glove. Prevent carryover of contaminants located on the glove and the cross-contamination when removing gloves.
Cleaning: The specified gloves are not washable.
Expiry date: If stored properly, no loss in performance is expected until the date indicated on the glove.
Storage/Transport: Flat, dry, dark, with no additional weight load in its original packaging, at a temperature of 5 °C - 25 °C. Protect from sunlight and ozone.
Disposal: If not contaminated with chemicals, gloves can be disposed of in the household waste. If the gloves have been exposed to chemicals, follow the disposal instructions of the manufacturer of the chemicals.