Protective gloves

The right glove should not just fit – it should also be easy to change and above all, provide reliable protection against hazardous substances. In accordance with the relevant regulations in the EU, the employer is required to provide his employees with **suitable protective gloves** of the correct category when handling dangerous materials. Berner International offers certified gloves of premium quality - safe and comfortable. Therefore you should pay attention to the quality of your personal protective equipment.

Your safety is at stake.

You would like further details?
To access more information using your smartphone or tablet
www.berner-safety.de/gloves

COMPLETE DOCUMENTATION

For the GMP-compliant manufacturing of e.g. cytotoxic drugs sterile single use protective gloves which are suitable for cleanroom use are an absolute must. On request Berner International can automatically send you the appropriate sterility certificates for every batch.

PROTECTION AGAINST CHEMICALS AND CMR DRUGS

Permeation tests were carried out in Europe in line with the directive 89/686 / EEC (PPE) for many years in accordance to EN 374-3. In 2015, the EN 374-3 standard was replaced by standards EN 16523-1 and EN 16523-2. A new version of EN 374-1 came into the market in 2017, which also has an effect on the permeation tests. Why is this important? The standardised European standards form the standard and should ensure comparability of the protection function for you as a user. However, there are always products on the market which have been tested either according to the American standard ASTM F 739 or ASTM D 6978, or only to the directive for medical gloves (EN 455). Whether these gloves provide protection against hazardous substances must be examined in each individual case; legally the European standards are binding.

PROTECTION AGAINST VIRUSES AND BIOLOGICAL AGENTS

Penetration tests (breakthrough through microholes) are tested throughout the EU in accordance to EN 374-2. Unfortunately the test to EN 374-2 does not include a virus test. For this reason, Berner International always makes sure that all protective gloves are additionally tested to the American standard ASTM F 1671. There is now a new standard, EN 374-5. This additional European standard for protective gloves against dangerous chemicals and microorganisms also contains a viral protection test like ISO 16604 which is similar to the ASTM F 1671 test.

Expert knowledge - glove materials

MATERIALS FOR SINGLE USE GLOVES

LATEX

Latex has been **the** material for disposable gloves, for medical as well as protective gloves. In the fifteenth century Spanish conquerer brought natural latex from South America to Europe. For a long time no one saw the great potential in the juice of the rubber tree Hevea brasiliensis, until Charles Goodyear in 1839 developed vulcanization by chance. Since 1890 examination gloves made of latex have been used in medicine. The material is elastic, comfortable to wear and resistant to chemicals- but unfortunately causes allergies in about 1% of the population.

Fig. 1: Charles Goodyear

The latex allergy (allergy type I = immediate type), which became known in the 1990s, is primarily due to latex proteins. It has been reinforced with the use of powdered gloves. The powder in the form of corn starch particles prevented the gluing together of gloves and ensured easy donning and doffing.

During the handling of the gloves, the powder and thus the latex proteins passed through the air into the mucous membranes and the respiratory tract.

The allergic reaction usually occurs within a few seconds to 30 minutes.

According to TRGS 401: To protect against this allergy, no powdered latex gloves may be used for many years. Furthermore, the protein content in latex gloves can be significantly reduced by complex, technical washing processes. A latex glove is considered to be low in protein when it contains no more than 30 mg of latex proteins per g of glove material.

A second type of allergy is the type IV allergy (= late type). The user reacts allergic to manufacturing by-products such as mercaptobenzothiazole (MBT), thiurame or carbamate. High-quality latex or neoprene gloves only contain carbamates whose allergic potential is the lowest. These accompanying substances are also reduced by complex processes down to the detection limits. Allergic reactions of this type often do not occur until about 6-8 hours sometimes not until 72 hours.

The third type of allergy is the so-called pseudo-latex allergy. In this case, the user reacts to the damp-warm environment, while wearing a glove. This type of allergy is independent of the latex material and occurs in other materials such as neoprene or nitrile.

Despite the allergy problem, latex protective gloves are still very popular today. The reason for this is especially the wearing comfort and the good protection against certain chemicals (for example, acids and alkalis, but also many cytostatics) contribute to this success. However, latex gloves should not be the first choice for handling oils and solvents.

INFO

NEOPRENE

Polychloroprene is a high-quality synthetic rubber, which was manufactured by Arnold Collins for the first time in an economical emulsion process. The material, also known under the brand name neoprene, is used for a variety of applications. In addition to protective gloves and the basis for adhesives, the vulcanized variety has become known as a diving and swimming suit.

Protective gloves made of neoprene are 100% latex-free and are an alternative for people who are allergic to latex an alternative with similar comfort. Depending on the composition of the material, protective gloves made of polychloroprene provide relatively good protection against organic solvents, many cytotatics and standard chemicals.

Further materials

Polyisoprene is a relatively new and currently very expensive material. The latex material is almost molecularly accurate and therefore has the same good stretching and wearing properties. At the same time, however, it is free of allergenic substances.

Vinyl actually means the material polyvinyl-chloride (PVC) and is an inexpensive glove material which, however, has only low mechanical strength and low protection against biological agents. Chemical resistance is limited. For the production of vinyl gloves, plasticizers (phthalic esters in various forms) are added. These are fat-soluble and can be easily absorbed through the skin and accumulated in the body when they come into contact with greasy or oily substances.

NITRILE

Nitrile rubber, actually acrylonitrile-butadiene rubber, consists of acrylonitrile and 1,3-butadiene. The material was developed in 1930 by the I.G. Colors has evolved and is now one of the most important glove materials. The good resistance of nitrile against oils, fuels, solvents and many cytostatics is very dependent on the mixing ratio between acrylonitrile and 1,3 butadiene. For this reason the permeation lists of nitrile protective gloves should always be studied carefully.

Fig. 2: Determination of glove size
The dimensions of the hand are determined by the length and circumference of the hand

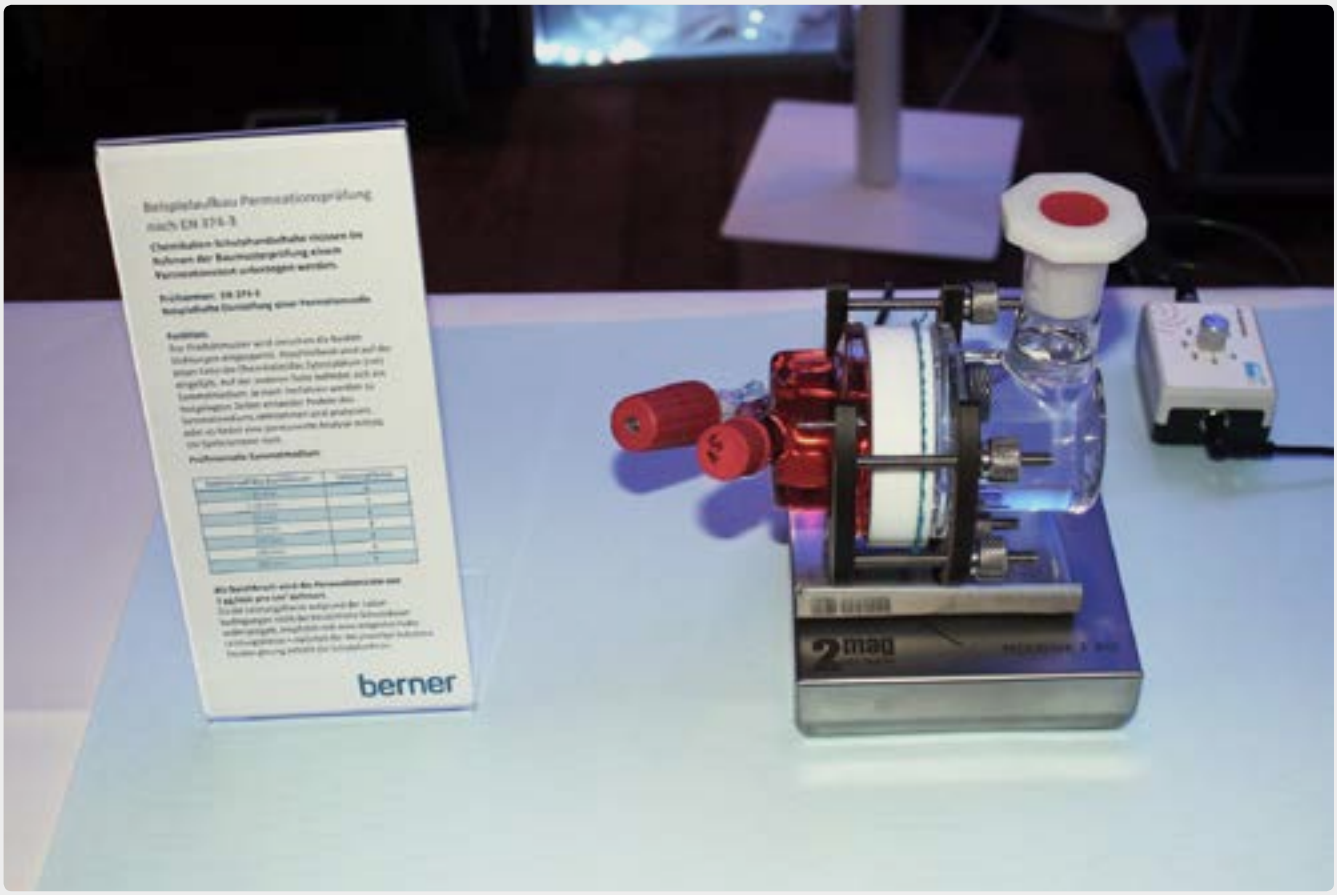


Fig. 3: An example of a test cell

How do medical gloves differ from protective gloves?

Medical gloves are primarily used for hygiene and to avoid infections during the doctor-patient contact. This type of disposable gloves are tested according to EN standard 455 (single use medical gloves). These include a leak test, an examination of the physical properties, a biological evaluation of the gloves (protein content, endotoxin content, ...) and minimum requirements. Chemical protection gloves, on the other hand, are intended to protect the user from hazardous chemicals. For this reason, protective gloves are subjected to a series of stringent standard tests.

Basics for testing protective gloves

Protective gloves must first meet the requirements of EN 420 (protective gloves). This standard describes the requirements for all types of protective gloves (e.g. protective gloves for forest workers) and covers the harmlessness of protective gloves, minimum sizes (depending on the size of the glove), different performance levels for dexterity. The detailed print is obligatory to prevent any confusion.

INFO

Penetration testing of chemical protective gloves

Chemical protective gloves must continue to comply with the EN 374 standard (protective gloves against chemicals and micro-organisms). In the penetration test in Part 2, the glove is examined by filling with air or water on micro-holes.

The result of this test is reflected as an AQL value (AQL = Acceptable Quality Level). In general, for AQL: the smaller the value, the better the quality of the glove. However, the values of the water test cannot be compared with the results of the air test.

Permeation testing of protective gloves

During the permeation test (penetration of chemicals at the molecular level) according to EN 374-1 and EN 16523-1 (formerly EN 374-3), the time is measured until a precisely defined minute quantity of the test chemical has penetrated the glove material. Here, according to the new standard, there are three different types of protective gloves. A selection of 18 standard chemicals is available for the test. If at least 6 of these substances pass the test for at least 30 minutes, it is declared as type A. If the protective glove holds only 3 substances for at least 30 minutes, it is a type B. Protective gloves which retain only one substance for at least 10 minutes are referred to as type C. All tested chemical protective gloves are marked with the symbol of the Erlenmeyer flask and the specification of the respective type. The beaker icon will not be used in the future.

Mechanical risks

Furthermore, protective gloves according to EN 388 (protective gloves against mechanical risks) are still tested for abrasion resistance, cutting strength, tear strength and puncture force. Only after all these examinations have been successfully passed, the glove may be called "protective glove against chemicals and microorganisms".

Protective gloves and category III personal protective equipment

In the case of protective gloves sold as part of a "personal protective equipment of category III", all tests, documentation and the product itself has to be tested by an official certification body (known as "Notified Body". In addition, the manufacturer must have a quality management system (monitored in accordance with Article 11B of the PPE directive) or a continuous quality assurance for the final product in accordance with Article 11A of the PPE directive with appropriate controls. It is only when this last test has been successfully passed that the protective glove receives the certificate for "personal protective equipment of category III"- the highest level for your personal safety.

PPE of categories II and III are recognizable by the CE symbol with a four-digit number. The number of the notified body.
But beware: The term PPE must also be on the packaging, as there are also medical products with a four-digit number below the CE mark.

Dermagrip Ultra LT*

Protective glove with innovative SafeDon-dispensing system

Short nitrile protective glove for working in non-sterile areas (e.g. preparatory work in the cytostatic laboratory, biology laboratory, oncology ward, veterinary practice, etc.). With the new SafeDon dispenser system contaminations have been shown to be greatly reduced. At the same time the size of the packaging has been reduced. Available as a 200 dispenser box (suitable dispensing system available) or 50 dispenser box for mobile applications.

Permeation list: Tested for various substances.
Detailed information available at www.berner-safety.de/safedon_gb

Certified safety
+ AQL = 1.5 (water test)
+ Additionally tested as medical gloves according to 93/42/EEC (CE class 1) EN 455.

Material
+ Special nitrile mix
+ Non-sterile
+ No detectable allergens
+ Especially resistant against many chemicals

To order Dermagrip Ultra LT – Colour blue

Size	S (6)	M (7)	L (8)	XL (9)
Order No. (200 box)	100176	100177	100178	100179
Order No. (8 x 50 box)	5011	5016	5021	5026

Manu N

Nitrile protective glove – the marathon glove

N stands for nitrile, a synthetic copolymer with a special composition. To guarantee the highest level of protection of nitrile protective gloves, many years of experience and various permeation tests have been necessary. The Berner protective glove Manu N sets new standards when handling chemicals, CMR drugs (e.g.cytostatics) and biological agents.

A comprehensive permeation list: Tested for numerous substances.
Detailed information available at www.berner-safety.de/manu_n_gb

Certified safety
+ AQL = 1.5 (water test)
+ Ideal for e.g. the GMP-compliant production of cytostatics
+ Suitable for cleanrooms up to ISO class 5 to EN ISO 14644-1:1999
+ Sterile poly/poly bag packaging
+ Viral protection in accordance to ASTM F 1671

Material
+ Special nitrile mixture
+ Sterile and non-sterile
+ No detectable allergens
+ High resistance to many chemicals
+ Extra long: 300 mm
+ 15 cytostatics tested
+ Special stainless steel dispensing system available

To order Manu N – Colour light blue

Size	XS (6)	S (7)	M (8)	L (9)	XL (10)
Order No. (non-sterile)	3010	3015	3020	3025	3030
Order No. (sterile)	3011	3016	3021	3026	3031

Manu Prene XP

Latex-free neoprene glove – not just for allergy sufferers

Neoprene protective gloves made from especially high quality polychloroprene and protect the user from CMR substances e.g. cytostatics, various chemicals, biological agents and viruses. Due to the material composition these gloves are to be particularly recommended for existing latex allergies.

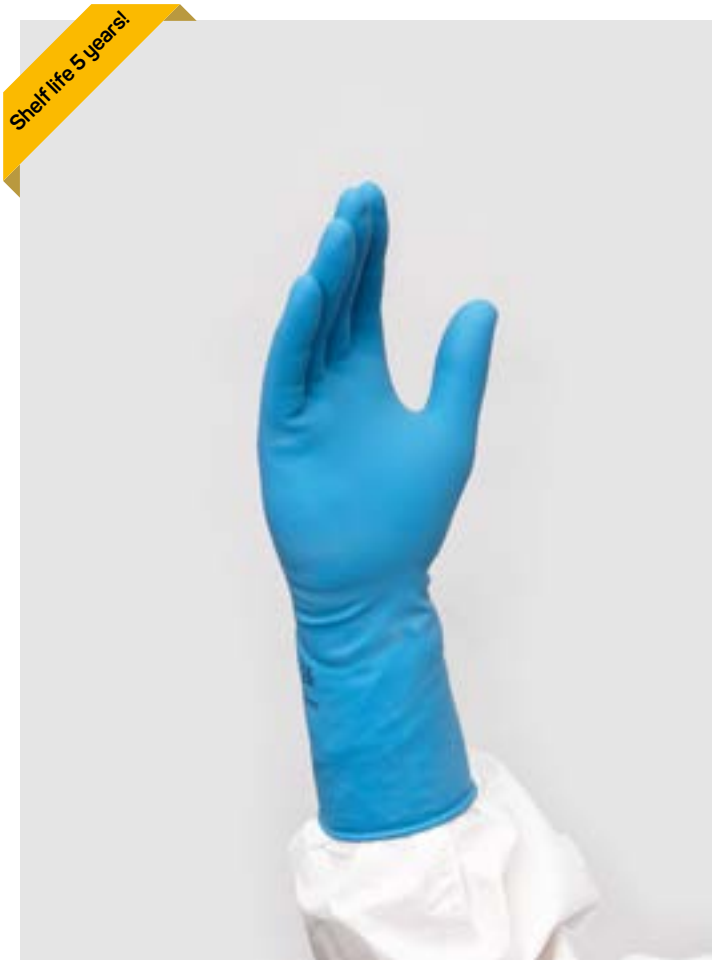
Comprehensive permeation list: Tested for numerous substances.
Detailed information available at www.berner-safety.de/manuprene_gb

Certified safety
+ AQL = 1.0 (water test)
+ Ideal for e.g. the GMP-compliant production of cytostatics
+ Suitable for cleanrooms up to ISO class 5 to EN ISO 14644-1:1999
+ sterile plastic packaging
+ Viral protection in accordance to ASTM F 1671
+ Additionally tested as medical gloves in accordance to EN 455

Material
+ 5 year shelf life
+ Sterile and non-sterile
+ No detectable allergens
+ Polymer-coating for easy donning and removal
+ Anatomical shape
+ Length: 295 mm
+ Special stainless steel dispenser system available

To order Manu Prene XP – Colour latte machiato

Size	XS (6)	S (6 ½)	SM (7)	M (7 ½)	ML (8)	L (8 ½)	XL (9)
Order No.(non-sterile)	2010	2012	2014	2016	2018	2020	2022
Order No. (sterile)	2011	2013	2015	2017	2019	2021	2023



Manu L

Latex protective glove – the robust standard

L stands for „Latex“, a natural product, which is made from the sap of the rubber tree. The protective gloves‘ distinguishing features are their special elasticity, high wearing comfort and extra protective properties for cytostatic substances, many chemicals and biological agents. A special virus protection test provides additional safety.
Comprehensive permeation list: Tested for numerous substances.
Detailed information available at unter www.berner-safety.de/manu_l_gb

Certified safety
+ AQL = 1.0 (water test)
+ Ideal for e.g. the GMP-compliant production of cytostatics
+ Suitable for cleanrooms up to ISO class 5 to EN ISO 14644-1:1999
+ sterile polythene packaging
+ Viral protection in accordance to ASTM F 1671
+ Additionally tested as medical gloves in accordance to EN 455

Material
+ 5 year shelf life
+ Sterile and non-sterile
+ Powder-free
+ Low in protein: 17 µg/g
+ Very low allergenic: 0.5 µg/g
+ Anatomical shape
+ Length: 295 mm
+ High material thickness
+ Special stainless steel dispenser system available

To order Manu L – Colour blue

Size	S (6 ½)	SM (7)	M (7 ½)	ML (8)	L (8 ½)	XL (9)
Order No. (n.-sterile)*	4010	4015	4020	4025	4030	4040
Order No. (sterile)**	100207	100208	100209	100210	100211	100212

* 50 pairs **200 pairs

Profeel NR

Latex glove - low material thickness with good protection

Chemical glove with optimised fit for long, fatigue-free working. Due to the low wall thickness the glove also offers good tactile sensitity and is suitable for double-gloving. The inner coating makes it easier to change the gloves, the rolled cuff edge fixes the glove shaft to the coverall or oversleeve. Also suitable for use with isolator rings.

Certified safety
+ AQL = 0.65 (water test)
+ Optimal for GMP-compliant production of cytostatics
+ Suitable for cleanrooms up to ISO class 5 to EN ISO 14644-1:1999
+ Poly/poly sterile packaging
+ Viral protection in accordance to ASTM F 1671
+ Additionally tested as medical gloves in accordance to EN 455

Material
+ Sterile
+ Powder-free
+ Low in protein: 12 µg/g
+ Very low allergenic: 0.3 µg/g
+ Anatomical shape
+ Length: 290 mm

To order Profeel NR – Colour vanilla

Size	XS (6)	S (6 ½)	SM (7)	M (7 ½)
Order No. (200 pairs)	100000	100001	100002	100003

Size	ML (8)	L (8 ½)	XL (9)
Order No. (200 pairs)	100004	100005	100006

Dermagrip-D

The non-sterile version of the Profeel NR

Chemical protective glove made of latex with optimized anatomical fit for long, fatigue-free working. Due to the low wall thickness, the protective glove offers a good tactile feel. The inner coating facilitates the change of the glove, the roller edge fixes the glove on the protective gauntlet or the protective arm cuff. The protective glove is additionally tested as a medical glove according to EN 455 and also has the virus protection test according to ASTM F1671.

Certified safety
+ AQL = 1.5 (water test)
+ Dispenser box with 25 pairs
+ Viral protection in accordance to ASTM F 1671
+ Additionally tested as medical gloves in accordance to 93/42/EEC (CE class 1) EN 455

Material
+ Sterile
+ Powder-free
+ Low in protein: 12 µg/g
+ Very low allergenic: 0.3 µg/g
+ Anatomical shape
+ Length: 290 mm

To order Dermagrip-D – Colour vanilla

Size	XS (6)	S (6 ½)	SM (7)	M (7 ½)
Order No. (25 pairs)	100007	100008	100009	100010

Size	ML (8)	L (8 ½)	XL (9)
Order No. (25 pairs)	100011	100012	100013

Isolator-Glove Changing System

Changing gloves safely during normal operation

When handling cytostatic substances and CMR drugs, but also chemicals, there are recommendations set out by the German Federal Association for Health and Welfare (BGW), which states that protective gloves should be changed at least every 30 minutes. The reason for this is the breakthrough on a molecular level (permeation), which is the movement of a chemical through the unbroken protective material. The innovative glove changing system makes it easy and safe to keep to the recommended changing times for protective gloves. The complete glove changing system can also be installed at other commerically available isolators and glove boxes. Should you already have a double ring system - our gloves will very likely fit your system, too.

+ Keeping to the recommended glove changing frequency is easily achieved even when working at an isolator
+ Changing gloves safely while in use due to multiple sealing system
+ Cost-effective: Expensive special gloves are unnecessary
+ Perfect protection: Tested and certified protective gloves

To order Isolator-glove-changing system

Locking ring	803018	Isolator sleeve covers (vinyl)	803016
Glove inner ring	803021	Double seal for inner ring	803019
Retaining ring 85 mm	803020		
Retaining ring 300 mm	803015	Sleeve cover isolator*	6451

*patented system

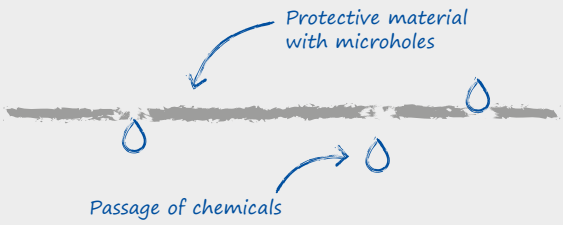
INFO

Expert knowledge safety gloves

DIFFERENCE BETWEEN PENETRATION AND PERMEATION

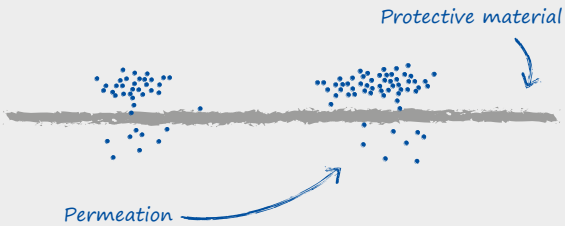
Penetration is defined as the passage of material through micro-holes!

These can be caused during manufacture, or incorrect packaging or storage.



Permeation is the passage of substances on a molecular level in undamaged material!

Depending on the protective barrier or chemical this process can take from a few seconds to many hours/days.



Ultranitril 492

Thin reusable long-lasting protective glove

Nitrile protective gloves for working in pathology, anatomy, crematories and laboratories. Anatomical shape and flock-lining on the inside makes the gloves comfortable to wear.

Permeation list: Tested for various substances.
Detailed information available at www.berner-safety.de

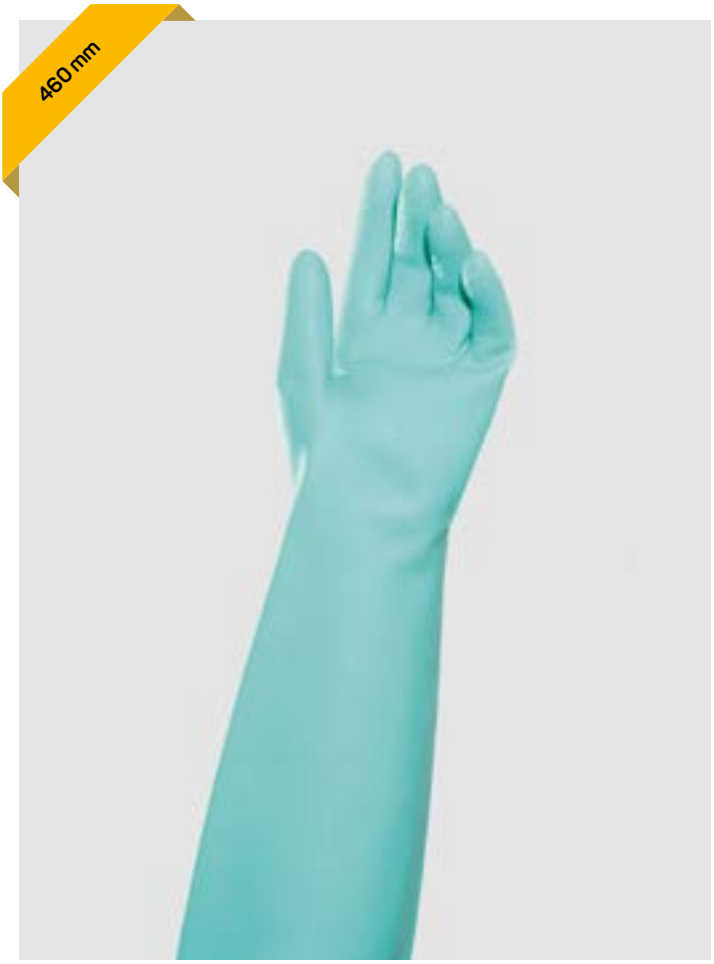
Certified safety
+ Personal protective equipment (PPE) of the highest category III
+ Type tested and certified
+ Protection against chemical risks in accordance to EN 374-3-2003
+ Good protection against diluted chemicals
+ Multiple use (please see product information)

Material
+ Non-sterile
+ Exterior finish: embossed texture
+ Straight cuff
+ Anatomical shape
+ Interior finish: flock-lining
+ Length: 320 mm

To order Ultranitril 492 – Colour green

Size	S (6)	SM (7)	M (8)	ML (9)	L (10)	XL (11)
Order No. (non-sterile)*	100029	100030	100031	100032	100033	100034

* 20 pairs



Ultranitril 480

Particularly long chemical protection glove

Chemical protective nitrile protective gloves for long, optimized use. Due to the excellent resistance this glove is also highly resistant to abrasion and perforation. The nitrile glove offers a good grip due to the embossed texture. With its 460 mm cuff the glove reaches up to the elbow. Chlorinated for easy donning and taking off.

Permeation list: Tested for various substances.
Detailed information available at www.berner-safety.de

Certified safety
+ Personal protective equipment (PPE) of the highest category III
+ Type tested and certified
+ Protection against chemical risks in accordance to EN 374-3:2003 and ASTM F 739
+ Multiple use (please see product information)

Material
+ Nitrile mixture
+ Non-sterile
+ Straight cuff
+ Anatomical shape
+ Good grip due to embossed texture
+ Length: 460 mm

To order Ultranitril 480 – Colour green

Size	S (7)	M (8)	ML (9)	L (10)
Order No. (non-sterile)	100025	100026	100027	100028

* 12 pairs

Stansolv AK 22 381

Multi-layer protective glove for reliable protection

The Stansolv AK-22 381 protective glove offers reliable protection against many liquids and chemicals. The combination of the nitrile glove with cotton knit lining for more wearing comfort and theremal insulation. Embossed texture for gripping wet objects.

Comprehensive permeation list: Numerous substances tested.
For further information: www.berner-safety.de

Certified safety
+ Personal protective equipment of the highest category III
+ Excellent protection against concentrated chemicals
+ Type-tested and certified
+ Comprehensive permeation list
+ Multiple use (see product information)

Material
+ Non-sterile
+ Nitrile-mixture
+ Exterior finish: embossed texturel
+ Anatomical shape
+ Scalloped cuff
+ Interior finish: cotton-knit lining
+ Length: 355 mm

To order Stansolv AK-22 381 – Colour green

Size	S (7)	M(8)	ML (9)	L (10)	XL (11)
Order No. (non-sterile*)	100016	100017	100018	100019	100020

* 12 pairs

Trionic 517

Suitable for cleanrooms up to ISO class 5

The chemical protective glove Trionic 517 is suitable use in cleanrooms up to ISO Class 5. Consisting of tri-polymer blend of natural latex , neoprene and nitrile, the glove provides increased comfort while protecting optimally against mechanical and chemical risks. The wide cuff supports the double-gloving procedure.

Certifed safety
+ Personal protective equipment of the highest category III
+ Very good protection against concentrated chemicals
+ Type-tested and certified
+ Very comprehensive permeation list
+ Multiple use (see product information)

Material
+ Non-sterile
+ Made of tri-polymer
+ Straight cuff
+ Exterior finish: embossed texture
+ Interior finish: chlorinated
+ Length: 360 mm

To order Trionic 517 – Colour yellow

Size	S (7)	M(8)	ML (9)	L (10)	XL (11)
Order No. (non-sterile)*	100035	100036	100037	100038	100039

* 12 pairs

Butoflex 651

Butyl-protective glove for handling many different chemicals

The gloves Butoflex 651 offers maximum chemical resistance against highly caustic acids, ketones, esters and amine derivatives. Due to the unique flexibility and dexterity the protective gloves can be used for a wide range of tasks.

Certified safety
+ Category III personal protective equipment
+ Protection against chemical risks in accordance to EN 374-3-2003 and ASTM F 739
+ Protective gloves with electro-- static properties in accordance to EN 16350
+ Electrostatic properties: <1,0 10E5

Material
+ Non-sterile
+ Butyl rubber
+ Rolled cuff edge
+ Palm with profile
+ Anatomical shape
+ Material thickness: 0.5 mm
+ Length: 350 mm

To order Butoflex 651 – Colour black

Size	S (7)	M (8)	L (9)	XL (10)
Order No. (non-sterile - 6 pairs)	100040	100041	100042	100043

Kronit-Proof 395

Cut-resistant protective glove combined with good chemical protection

The Kronit- Proof 395 protective gloves offer a complete hand protection against cuts (level 5), good protection against thermal risks and is particularly resistant to mechanical stress. Through multi-layer technology, the glove is liquid-tight and facilitates secure handling of wet and slippery objects. Characterized by long-lasting performance: the Kronit-Proof 395 retains its properties unchanged for up to 5 washes.

Certified safety
+ Personal protective equipment (PPE) of the highest category III
+ Type tested and certified
+ Protection against chemical risks in accordance to EN 374-3-2003 and ASTM F 739
+ Highest cut resistance class 5
+ Electrostatic properties: <1.0 10E5

+ **Material**
+ Non-sterile
+ Nitrile / Cotton- Multi-layer technology
+ Anatomically shaped
+ Straight cuff
+ Interior finish: cotton knit
+ Length: 320 mm

To order Cut resistant gloves Kronit-Proof 395 – Colour green

Size	M (8)	L (9)	XL (10)
Order No. (non-sterile- 1 pair)	100022	100023	100024

INFO

Expert Know-How protective gloves

DEGRADATION - THE EFFECT OF MATERIAL CHANGES ON BREAKTHROUGH TIME

Coming into contact with chemicals can alter or even damage protective gloves.

This change in physical material properties is called degradation. It can vary from differences in colour to hardening or softening up to dissolving the material. Some changes may be reversible, other forms of degradation are, however, irreversible and/or accumulate during the lifetime of the gloves. In both cases the protective functions of the gloves can have a lasting negative effect.

To be able to determine and compare the degradation resistance of protective gloves against chemicals and microorganisms, these are tested in accordance to the standard EN 374-4. Here the puncture resistance of the material is determined after a defined contact period with the test chemical and compared to the untreated material. The test set-up only takes into account liquid chemicals. Also, the test is only valid for gloves made from natural or synthetic polymers.

Single-use gloves should generally be worn for a short period of time and should only be used once. Therefore the degradation problem normally plays a less important role. The resulting reduction of the protective effect for permeable substances is generally more suitable when carried out as part of the permeation testing procedure (see expert know-how penetration/ permeation).

This is different for reusable chemical protective gloves. The material changes can still be present after cleaning and drying. For this reason reusable glove degradation results have to be given for each tested chemical. These are measured using differences in the puncture resistance (residual force) of the glove material and are gven as four levels. Number 1 stands for a low residual force, 4 for a high one.

In addition, visual differences and weight changes (e.g. swelling of the material) have to be specified. The relevant details can be found in the product information for each type of glove.