STARLINE

Personal Protective Equipment

EN Europe Glove Standards Directory

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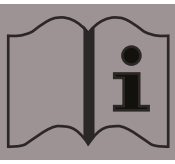
INDEX

GUIDE and REGULATIONS

Personal Protective Equipment Categorization Guide:
The category of personal protective equipment within the scope of the Personal Protective Equipment Regulation must be determined in order to perform CE certification. In this sense, you can download and review the notification on the categorization of Personal Protective Equipment from our website.
(See: PPE Categorization Guide)

Harmonized National Standards (EN Standards) on Personal Protective Equipment:
EN Standards are technical standards accepted by committees formed by Standard Authorities in Europe. These technical standards set minimum performance requirements and test methods for a wide variety of products, including Personal Protective Equipment (PPE).



EN 420:2003+A1:2009

GENERAL FEATURES AND TEST METHODS OF PROTECTIVE GLOVES

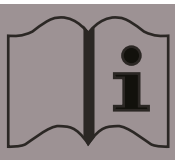
SCOPE:
This standard specifies the design, structure, protection against hazards, comfort, efficiency and general requirements for marking and information that can be applied to all protective gloves. This standard also applies to arm guards.
The key points are given below. Some gloves designed for the most specific applications, such as electricians or surgical activities, are subjected by specific strict standards.

DEFINITION:
Glove is a personal protective equipment that protects the hand or other parts of the hand from hazards. It can also cover the forearm and arm part. Performance level is a number (from 0 to 4) that indicates how well a glove performed in a particular test and was rated based on the results of that test. Level 0 indicates that the glove was either not tested or is below the minimum performance level. Performance level X indicates that the test method is not suitable for the glove sample. Higher numbers indicate higher performance levels.

REQUIREMENTS:
Glove Construction and Design
Gloves must provide the best possible degree of protection in the predictable conditions of end use.
The strength of these seams, including stitches, should not degrade the overall performance of the glove.

Harmlessness
Gloves should not cause any damage to the user.
The pH value in the glove should be between 3.5 and 9.5.
The chromium content (VI) should be below the detection threshold (<3ppm).
According to EN 455-3, natural latex gloves are to be tested on extracted proteins.

Cleaning Instructions
If the maintenance instructions are followed, performance levels should not decrease after the recommended maximum number of cleaning periods.



EN 420:2003+A1:2009

GENERAL FEATURES AND TEST METHODS OF PROTECTIVE GLOVES

Electrostatic Properties
Anti-static gloves designed to reduce the risk of electrostatic discharges should be tested according to EN 1149.
The test values obtained must be specified in the Instructions for Use.
An electrostatic symbol should NOT be used.

Sizing
Gloves below the minimum lenght is called “Suitable for Special Purposes”

Water Vapor Passing And Suction
Gloves should allow transition of water vapor (5mg / cm2.h) if necessary.
If gloves prevent the transition of water vapor, this should be at least 8 mg / cm2 for 8 hours.

SIZE: The glove must be produced in accordance with the common approved European hand size.

EN 420: 2003 / A1: 2009 Defined Hand Sizes	Glove Sizes (STARLINE)	Hand Around
6	XS / 6 *	152mm
7	S / 7 *	178mm
8	M / 8 *	203mm
9	L / 9 *	239mm
10	XL / 10 *	254mm
11	XXL / 11 *	279mm

* Glove size is taken by leaving the glove straight and comfortable. The stretch properties of these products allow the gloves to fit the hand sizes mentioned above.

PRODUCT INFORMATION AND MARKING:
Each product should be identified with the manufacturer’s name, glove name, size, performance levels, EN standards and CE mark.

PACKAGING:
Manufacturer and manufacturer’s contact information, glove name, glove size, CE mark, performance levels, EN standards, duration of use and risk level.

USAGE INSTRUCTIONS:
Manufacturer and manufacturer’s contact information, glove name and size, CE mark, instructions for care, storage and use, notified body information, allergen status description.

EN 388:2016

PROTECTIVE GLOVES AGAINST MECHANICAL RISKS

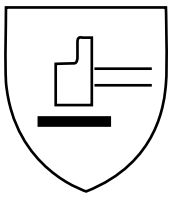
SCOPE:
This standard covers the properties and test methods for protective gloves against mechanical risks such as abrasion, knife cut, tear, puncture.

SPECIFICATIONS:
Protective gloves conforming to this standard must meet all applicable features of EN 420.

The performance level of a glove protecting against mechanical risks should be higher for one of the attributes (abrasion, knife cut, tear and puncture) classified according to the minimum characteristics of each level shown in the table below.

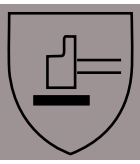
NOTE Gloves meeting the specification for puncture resistance may not be suitable for protection against sharp-pointed objects such as subcutaneous (hypodermic) needles.

EN 388:2016



a b c d e f

The mechanical risks pictogram is accompanied by 6 performance levels (a-f).
a. Abrasion Resistance: Based on the number of turns required to abrade the sample glove.
b. Blade Cut Resistance: Based on the number of cycles required to cut the sample at a constant speed.
c. Tear Resistance: Based on the force required to tear the sample glove.
D. Puncture Resistance: Based on the force required to make a hole in the sample product with a standard size drill.
e. ISO Cut Resistance: Based on the force required to cut a glove sample using a special cut machine (i.e. Tomodynamometer) under specified conditions.
f. EN Impact Protection: Based on the measured energy and force transmission when the sample product is subjected to a dropped load.



EN 388:2016

PROTECTIVE GLOVES AGAINST MECHANICAL RISKS

PERFORMANCE LEVEL RATING:

LEVEL	1	2	3	4	5
a. Abrasion resistance (Number of cycles)	100	500	2000	8000	-
b. Blade cut resistance (Index)	1.2	2.5	5.0	10.0	20.0
c. Tear resistance (N)	10	25	50	75	-
d. Puncture resistance (N)	20	60	100	150	-

TEST	A	B	C	D	E	F
e. Knife Cut Test	2	5	10	15	22	30
f. EN impact protection	SUCCESS (P) or FAIL (no markup)					

a: The abrasion test is now carried out with a new sandpaper with a more consistent quality.

e (NEW): EN ISO 13997 cut resistance test (e) will be applied in case the blade becomes blunt due to the material during ISO cut resistance (N). This test result will be expressed with a new performance result expressed from A to F.
The letter F denotes the highest cut resistance.

f (NEW): New test to describe impact glove performance (EN 13594: 2015). This test is optional. If the glove is subjected to this test, it is indicated as P (successful) if it passes, and without a symbol (no marking) if it fails.

The letter X means the test has not been done or cannot be administered.

These performance levels are next to the pictogram on the gloves and on the gloves.
It must be clearly displayed on the packaging immediately above.

EN 374:2016

PROTECTIVE GLOVES AGAINST CHEMICALS AND MICROORGANISMS

SCOPE:
This standard determines the gloves' ability to protect the wearer from chemicals and microorganisms.

Penetration
Penetration is the movement of a chemical and / or microorganism on a non-molecular level through porous materials, seams, pinholes and other defects in the material of the protective glove.

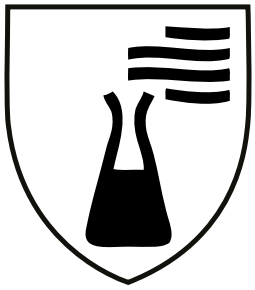
Permeability
The rubber and plastic films inside the gloves constitute a barrier against chemicals. Therefore, it is important to measure the transmission times or the time it takes for the dangerous liquid to come into contact with the skin. Each tested chemical is classified in terms of breakthrough time performance of 0 to 6.

Performance Values (leakage)	1	2	3	4	5	6
Measured Time (minutes)	>10	>30	>60	>120	>240	>480

Degradation
Protective gloves against chemicals sometimes act as sponges, absorb fluids and expose the skin to these fluids. This degrades (spoils) the glove. Degradation is the harmful change in one or more properties of a protective glove material as a result of contact with a chemical. Signs of degradation include shedding, swelling, dispersion, embrittlement, color change, size change, change in appearance, hardening, softening, etc. are available.

EN 374:2016

PROTECTIVE GLOVES AGAINST CHEMICALS AND MICROORGANISMS



Chemical protective gloves:
Penetration: The glove should not leak when subjected to an air or water leak test.

Permeability: The glove must meet the minimum conditions of at least Level 1 (more than 10 minutes) against one of the chemicals in the list of chemicals defined in Type C part 1.

Degradation: The change in puncture resistance after chemical contact should be tested for all chemicals claimed on the glove and the result should be stated in the instructions for use.

Long gloves: If the length of the chemical protective glove is longer than or equal to 40 cm, the cuff part should also be tested for permeability.

Protective gloves against microorganisms:
Penetration: If protection against bacteria and fungi is claimed, the relevant conditions are the same as for chemical protective gloves.

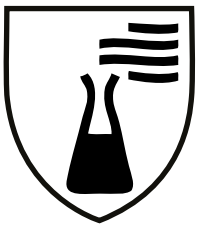
Virus protection: If virus protection is claimed, gloves are subjected to an additional test in accordance with ISO 16604.

Long gloves: If the length of the chemical protective glove is longer than or equal to 40 cm, the cuff part should also be tested for virus penetration.

EN 374:2016

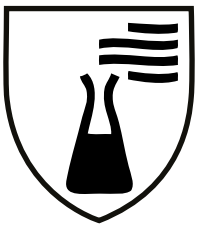
PROTECTIVE GLOVES AGAINST CHEMICALS AND MICROORGANISMS

EN 374-1/Type A



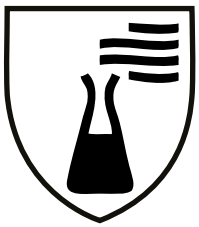
UVWXYZ

EN 374-1/Type B



XYZ

EN 374-1/Type C



Marking of Chemical Protective Gloves
Type A and Type B gloves must be accompanied by coding letters under the “chemical resistant” pictogram shown below.
The coding letter is not used for gloves marked as Type C.

These coding letters refer to the list of chemicals defined in the standard (indicated in the table on page 11). The minimum breakthrough time for a Type C glove is 10 minutes for a listed chemical. 30 minutes for at least 3 chemicals for Type B and 30 minutes for at least 6 chemicals for Type A.

What are the Marking and Information Contents?
- CE mark
- Care and storage instructions
- Instructions and limitations for use
- Degradation results for claimed chemicals
- List of ingredients used in gloves that are known to cause allergies
- List of all materials in the glove is available on request.
- Name and address of the notified body that certifies the product

EN 374:2016

PROTECTIVE GLOVES AGAINST CHEMICALS AND MICROORGANISMS

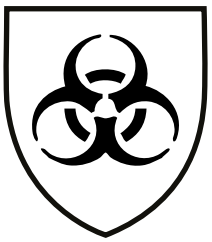
LIST OF CHEMICALS USED IN THE EXPERIMENT:

CODE	CHEMICAL MATTER	CAS NUMBER	CLASS
A	Methanol	67-56-1	Primary Alcohol
B	Nail polish remover	67-64-1	Ketone
C	Acetonitrile	75-05-8	Nitrile Compound
D	Dichloromethane	75-09-2	Chlorinated Paraffin
E	Carbon Disulfide	75-15-0	Organic Compound Containing Sulphur
F	Toluene	108-88-3	Aromatic Hydrocarbon
G	Diethylamine	109-89-7	Amine
H	Tetrahydrofuran	109-99-9	Heterocyclic And Ester Compound
I	Ethyl Acetate	141-78-6	Ester
J	n-Heptane	142-85-5	Saturated Hydrocarbon
K	Sodium Hydroxide, 40%	1310-73-2	Inorganic Base
L	Sulfuric Acid, 96%	7664-93-9	Inorganic Mineral Acid
M	Nitric acid 65%	7697-37-2	Inorganic mineral acid, oxidizer
N	Acetic acid 99%	64-19-7	Organic acid
O	Ammonia 25%	1336-21-6	Inorganic base
P	Hydrogen peroxide 30%	7722-84-1	Peroxide
S	Hydrofluoric acid 40%	7664-39-3	Inorganic mineral acid
T	Formaldehyde 37%	50-00-0	Aldehyde

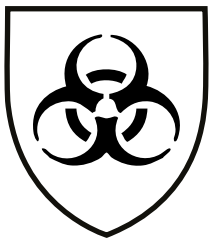
EN 374:2016

PROTECTIVE GLOVES AGAINST CHEMICALS AND MICROORGANISMS

EN 374-5



EN 374-5



VIRUS

Marking Protective Gloves Against Microorganisms
For gloves protecting against bacteria and fungi, the above mentioned “biohazard pictogram” is applied. However, for this, the glove must be subjected to a leakproofness test in accordance with EN374-2: 2013.

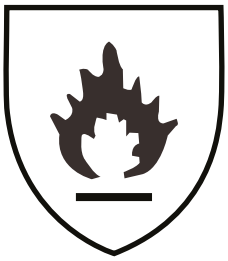
The biohazard pictogram for protection against bacteria, fungi and viruses is accompanied by the phrase “VIRUS” at the bottom. It is essential for this protective standard that the glove be tested for bacteria and fungi in accordance with EN 374-2: 2013 and bacteriophage penetration test in accordance with ISO 16604: 2004 (Method B).

EN 407:2004

PROTECTIVE GLOVES AGAINST THERMAL RISKS (HEAT and / or FIRE)

SCOPE:
This standard covers the properties of heat and / or fire protective gloves, test methods, information required to be provided and marking.

MARKING:
Performance levels in the main pictogram for protective gloves against thermal risks are given in the following order.



a b c d e f

a. Flammability Resistance (0-4)
b. Contact Heat Resistance (0-4)
c. Convective Heat Resistance (0-4)
d. Radiant Heat Resistance (0-4)
e. Resistance to small drops of molten metal (0-4)
f. Resistance to large quantities of molten metal (0-4)
(NOTE: Using an X instead of a number means “the glove was not manufactured for the use covered by the relevant experiment.”)

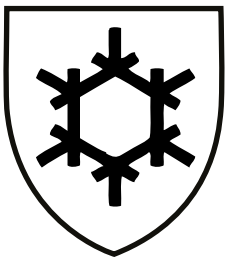
	PERFORMANCE VALUES	1	2	3	4
Against Ignition	Flaming Time (s)	≤ 20	≤ 10	≤ 3	≤ 2
	Burning time on ember (s)	-	≤ 120	≤ 25	≤ 5
Contact Temperature	Contact Temperature (ºC)	100ºC	250ºC	350ºC	500ºC
	Threshold Duration (s)	≥15	≥15	≥15	≥15
Transport (Convection) Heat / Heat transfer delay (s)		≥4	≥7	≥10	≥18
Radiant Temperature / Heat transfer delay (s)		≥7	≥20	≥50	≥95
Small Pieces of Molten Metal / Number of Drops		≥10	≥15	≥25	≥35
Large Amount of Molten Metal / Melted mass (g)		30	60	120	200

EN 511:2006

GLOVES PROTECTING AGAINST COLD

SCOPE:
This standard applies to gloves produced against all kinds of cold transmitted by transport or contact at –50 ° C.

MARKING:
The symbol below represents the protection gloves against cold. The 3-digit number indicates the resistance levels.



a b c

a. Resistance to Convective Cold (0-4)
b. Resistance to Contact Cold (0-4)
c. Water Permeability Resistance (0-1)

(NOTE: These types of gloves must resist at least performance 1 level of wear and tear.)

PERFORMANCE VALUES	0	1	2	3	4
a. Convective Cold / Insulation	ITR<0.10	0.10≤ITR<0.15	0.15≤ITR<0.22	0.22≤ITR<0.30	0.3≤ITR
b. Contact Cold / Resistance	R<0.025	0.025≤R<0.50	0.050≤R<0.100	0.100≤R<0.150	0.150≤R
c. Waterproof Test / 30min.	Negative	Positive	-	-	-

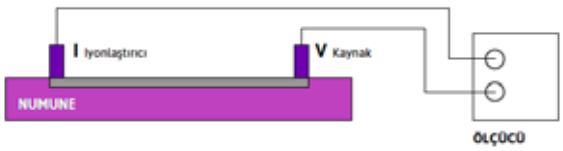
EN 1149

ELECTROSTATIC SPECIFICATIONS

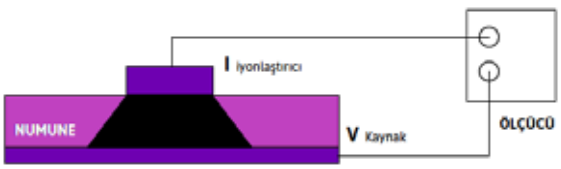
Scope
This standard specifies the requirements for test methods for materials used in the manufacture of electrostatic dissipative protective suits to avoid electrostatic effects.

Terms and Conditions
Within the scope of EN 420: 2003, it is defined that it's electrostatic properties will be tested according to the test methods specified in EN 1149.

EN 1149-1: 2006
The Part 1 test is defined as resistivity / surface resistivity () = resistance in ohms and an potential of 100 ± 5V across the surface of the material between two electrodes placed on the sample.



EN 1149-2: 1997
The Part 2 test is defined as the vertical resistance () = resistance in ohms and a potential of 100 ± 5V between two electrodes placed on opposite surfaces inside the sample material.



EN 1149-3: 2004
Part 3 half decay time test
T50 (s) = defined as the time until 50% attenuation of a material occurs with a change induced by an electrode on the sample.

EN 1149-5: 2007
Section 5 defines anti-static request criteria for gloves:
• Surface Resistivity <2.5x109 Ω (or Surface Resistivity <5x1010 Ω) or
• There are no specified criteria for vertical resistance (Ω).
• Change attenuation time T50 <4s

In accordance with the EN 420 standard, no anti-static pictograms are used.

EN 60903:2003

WORKING ON ENERGY TRANSMISSION LINES - ELECTRIC INSULATION GLOVES

Scope

This standard is applied to insulating gloves and gloves with or without lining, designed to protect the user from electric shock in environments operating with energized transmission lines. Rubber insulating gloves should be worn over leather gloves to provide mechanical protection

Conditions

An insulating glove intended to work on powered transmission lines is a Category III product defined in the PPE regulation. A glove with a certificate of conformity to work on powered transmission lines meets the requirements of EN 420; It must pass all mandatory tests and meet various requirements in accordance with EN 60903, including those related to mechanical, thermal, flame retardancy and aging.

Depending on the application specific properties (= resistance), rubber insulating gloves can be additionally tested:

Acid: The product is expected to provide satisfactory mechanical and dielectric performance after immersion in highly concentrated sulfuric acid.

Oil: After being immersed in oil, it is expected to provide satisfactory mechanical and dielectric performance.

Ozone: After contact with highly concentrated ozone, the product is expected to provide satisfactory surface quality (cracking) and dielectric performance.

Very low temperature: It is satisfactory if the product does not tear, break or crack after being bent at -40 ° C for 24 hours.

Harmful physical irregularities are not allowed. Each glove should be individually inspected and subjected to dielectric testing.

Insulating gloves can cover six different protection classes from 500 to 36,000 Volts AC, depending on their single wall thickness.

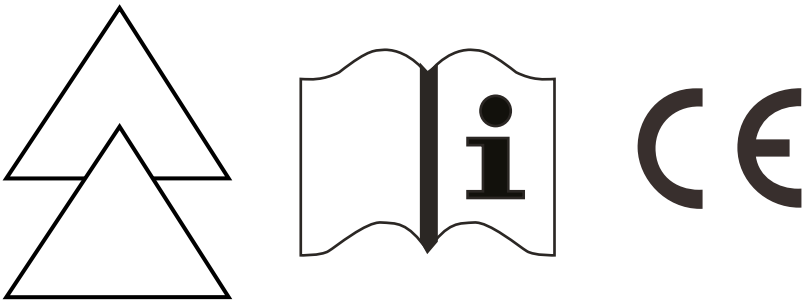
Glove Class	00	0	1	2	3	4
MAX USAGE VOLTAGE (V AC)	500	1.000	7.500	17.000	26.500	36.000
AC VERIFICATION TEST VOLTAGE (V AC)	2.500	5.000	10.000	20.000	30.000	40.000
SINGLE WALL THICKNESS OF MM	0,5	1,0	1.5	2,3	2,9	3,6

Periodic inspection and electrical retest

Class 1, 2, 3 and 4, including those in storage, should be retested visually and dielectrically every 6 months. Visual inspection is sufficient for classes 0 and 00.

EN 60903:2003

WORKING ON ENERGY TRANSMISSION LINES - ELECTRIC INSULATION GLOVES



Marking and Information
In addition to the identification of the manufacturer, product and size designation, relevant standards (EN 60903 and EN 420: “CE” -mark) and the corresponding pictogram, the marking may also contain a category indicating the glove’s resistance to the following hazards:

CATEGORY H: Oil resistance
CATEGORY A: Acid resistance
CATEGORY Z: Ozone resistance
CATEGORY C: Resistance to very low temperatures
CATEGORY R: Categories H + A + Z

Composite Gloves
Additional tests for abrasion (weight reduction) and cut (minimum level 2) are mandatory for insulating gloves made of non-natural rubber. Electrical insulating gloves provide additional integrated mechanical protection. Composite gloves are marked with an additional mechanical symbol (hammer) and are often worn without over-gloves.

Glove Class		00	0	1	2	3	4
Thickness	Gloves	0,50	1,0	1,5	2,3	2,9	3,6
	Composite Gloves	1,8	2,3	2,8	3,3	3,6	4,2

EN 12477:2001

PROTECTIVE GLOVES FOR WELDERS

SCOPE:
This standard is used for protective gloves used in hand metal welding, cutting and alloying.

Protective gloves for welders protect the welder's wrist and hands during the welding period.

Welding gloves provide protection against splashing small molten metal, exposure to short-term contact with restricted flame, transmission heat from arc, contact heat and UV radiation. In addition, it provides protection against mechanical damage.

They are classified into two types according to their performance:
. *Type A: Low proficiency*
. *Type B: Highly competent*

NOTE: Protective gloves are excluded for special welding work.

CLASSIFICATION TABLE:

Specifications	Least Performance Required		
	EN Number	TYPE A	TYPE B
Wear Resistance	EN 388	2 (500 cycle)	1 (100 cycle)
Blade Cut Resistance	EN 388	(index 1,2)	1 (index 1,2)
Tear Resistance	EN 388	2 (25N)	1 (10N)
Puncture Resistance	EN 388	2 (60N)	1 (20N)
Burning Behavior	EN 407	3	2
Contact Heat Resistance	EN 407	1 (100ºC)	1 (100ºC)
Conduction Heat Resistance	EN 407	2 (HTI≥7)	-
Small Molten Metal Splash Resistance	EN 407	3 (25 Droplet)	2 (15 Droplet)
Competence	prEN 420:1998	1 (Smallest diameter 11mm)	4 (Smallest diameter 6.5mm)

Type B gloves are recommended for situations requiring high dexterity (eg, TIG welding), while Type A gloves are recommended for other welding processes. Whether the product is Type A or B will be marked on its packaging and in the user manual.

STARLINE

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CAUTION: No glove can completely prevent or eliminate the possibility of cuts or abrasions. These gloves are not designed or tested to protect against electric blades, serrated, or other sharp or rotating equipment, and they cannot completely avoid the possibility of abrasion-related injury. Except for the information expressly provided to you, we cannot be held responsible for any warranties.

www.starlinesafety.com