HAND PROTECTION **EXPLANATION OF STANDARDS**

THE FOLLOWING OVERVIEW EXPLAINS THE DIFFERENT HAND PROTECTION STANDARDS AND SUITABLE PROTECTIVE EQUIPMENT. **FIND OUT WHICH DIFFERENT HAZARDS REQUIRE THE USE OF PROTECTIVE GLOVES, SKIN PROTECTORS OR ARM PROTECTORS.**

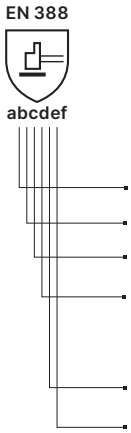
EN ISO 21420:2020 Protective gloves – General requirements and test methods
The new EN ISO 21420 applies to all protective gloves requiring a CE mark and specifies the general requirements applicable to all protective gloves in terms of design, construction, harmlessness, comfort, effectiveness, labelling and information.

The scope of the previous EN 420 standard has been extended. The follow-up standard EN ISO 21420 clarifies that it applies to arm protectors in addition to protective gloves and hand protectors.

EN 388:2016 Protective gloves against mechanical risks
Protection against the following hazards:
- Abrasion, especially on rough or abrasive surfaces
- Sharp objects
- Risk of cuts or punctures (cutting tools, glass, sheet metal, splinters, chips)
- Dirt
- Impact protection

The EN 388:2016 standard applies to all types of gloves and arm protectors to prevent injuries caused by physical and mechanical hazards.

The protection performance is indicated by the pictogram and the performance level a-f, which corresponds to the result of the corresponding hazard test. These ratings are located below the pictogram. The first rating (a) stands for abrasion resistance, the second (b) for blade cutting resistance, the third (c) for tear resistance, the fourth (d) for puncture resistance. The fifth (e) corresponds to ISO cut resistance (EN ISO 13997) and the sixth (f) or a "P" indicated here indicates that the glove has passed the test for protection against impact.



The pictogram for "mechanical risks" is accompanied by six performance levels (a-f).

		1	2	3	4	5	
a	Abrasion resistance (cycles)	100	500	2000	8000		
b	Blade cutting resistance (cutting test/index)	1,2	2,5	5	10	20	
c	Tear resistance (Newton)	10	25	50	75		
d	Puncture resistance (Newton)	20	60	100	150		
		a	**b**	**c**	**d**	**e**	**f**
e	ISO cutting resistance (Newton)	2	5	10	15	22	30
f	EN protection against impact	PASS (P) or FAIL (no marking)					

An X can also be specified for a to f. This stands for "Not tested" or "Not applicable".

SCOPE FOR INTERPRETATION OF STANDARDS
Please note that even protective gloves that meet puncture resistance requirements do not provide standards-based protection against pointed objects such as hypodermic needles.

ARTILUX SWISS SAFETY

ARTILUX Swiss Safety (ASS) AG
Industriestrasse 15
CH-4410 Liestal

Tel. +41 61 906 90 00
Fax +41 61 901 79 82

sales@artiluxswisssafety.ch
artiluxswisssafety.com

EN ISO 374-1:2016 Protective gloves against dangerous chemicals and micro-organisms
Part 1: Terminology and performance requirements for chemical risks

Protection against the following hazards:
- Skin contact with hazardous substances (full contact, splash contact)
- Contaminated work equipment
- Infectious agents

The "chemical protection" pictogram of the glove must be accompanied by code letters for type A and B gloves. Gloves marked as type C do not have a code letter. The code letters refer to a list of 18 test chemicals defined by the standard. Refer to the table on the right.

Code letter	Test chemical
A	Methanol
B	Acetone
C	Acetonitrile
D	Dichloromethane
E	Carbon disulphide
F	Toluene
G	Diethylamine
H	Tetrahydrofuran
I	Ethyl acetate (ethyl acetate, acetic ester)
J	n-Heptane
K	Sodium hydroxide 40 %
L	Sulphuric acid 96 %
M	Nitric acid 65 %
N	Essigsäure 99 %
O	Ammonium hydroxide 25 %
P	Hydrogen peroxide 30 %
S	Hydrofluoric acid 40 %
T	Formaldehyde 37

EN ISO 374-1/Typ A

UVWXYZ

- **Type A:** At least 6 test chemicals with a minimum penetration time of 30 minutes

EN ISO 374-1/Typ B

XYZ

- **Typ B:** At least 3 test chemicals with a a minimum penetration time of 30 minutes

EN ISO 374-1/Typ C

- **Typ C:** At least 1 test chemical with a minimum penetration time of 10 minutes

EN ISO 374-5:2016 Protective gloves against dangerous chemicals and micro-organisms Part 5 Terminology and performance requirements for risks from micro-organisms

EN ISO 374-5

The biohazard pictogram indicates protection against bacteria and fungi. For this purpose, the protective glove must also be tested for permeation tightness in accordance with the EN374-2 standard.

EN ISO 374-5

VIRUS

Gloves that protect against viruses as well as bacteria and fungi are marked with the same pictogram and the written word VIRUS. To this purpose the protective glove is tested for bacteria and fungi according to EN374-2 and additionally subjected to a bacteriophage penetration test in compliance with ISO 16604 (method B).

WHICH GLOVE IS THE RIGHT ONE?
Incorrectly selected chemical protection gloves lull the user into a false sense of security and can have serious consequences. Information on the required glove material when handling chemicals and the maximum wearing time is given on the safety data sheets for the various hazardous substances. We would be happy to help you select the right chemical protection gloves for your needs.

ARTILUX SWISS SAFETY
ARTILUX Swiss Safety (ASS) AG
Industriestrasse 15
CH-4410 Liestal
Tel. +41 61 906 90 00
Fax +41 61 901 79 82
sales@artiluxswisssafety.ch
artiluxswisssafety.com

HAND PROTECTION STANDARDS

EN 407:2020 Protective gloves and other hand protection equipment against thermal risks (heat and/or fire)
Protection against the following hazards:

- Heat and flames
- Contact heat and convective heat
- Radiant heat
- Molten metal splashes in small and large quantities

In the EN 407:2020 standard there are two valid pictograms which may not be used together. The difference is the limited flame spread. The EN 407 standard is only met if the protective gloves meet at least performance level 1 for tear resistance as defined in EN 388.

The pictogram indicates protection unless there is **no** limited flame spread (performance level A = X).

The pictogram indicates protection in the event of danger of limited flame spread (performance level A = 1- 4) corresponding to the minimum performance level 1 in the flammability test.

	Performance levels	1	2	3	4
A	**Limited flame spread** After-flame and after-glow time (fingers and seam areas)	< 20 Sek. No requirement	< 10 Sek. < 120 Sek.	< 3 Sek. < 25 Sek.	< 2 Sek. < 5 Sek.
B	**Contact heat (increase by 10 °C)** Contact temperature and threshold time (palm and, if relevant, other areas of the glove)	100 °C > 15 Sek.	250 °C > 15 Sek.	350 °C > 15 Sek.	500 °C > 15 Sek.
C	**Convection heat (increase by 24 °C)** Heat transfer rate (palm and back of glove)	> 4 Sek.	> 7 Sek.	> 10 Sek.	> 18 Sek.
D	**Radiant heat (increase by 24 °C)** Heat transfer (palm and back of glove)	> 7 Sek.	> 20 Sek.	> 50 Sek.	> 95 Sek.
E	**Small drops of molten metal (increase by 40 °C)C)** Number of drops (palm, back of the hand and cuff of the glove)	> 10	> 15	> 25	> 35
F	**Large quantities of molten metal (damage to a PVC simulated skin))** Melting iron mass (palm, back of the hand and cuff of the glove)	30 g	60 g	120 g	200 g

EN 511:2006 Protective gloves against cold
Protection against the following hazards:

- Contact cold
- Convective cold

All cold protection gloves that protect against convective and contact cold down to - 50 °C are subject to the standard EN 511.

	Performance levels	0	1	2	3	4
a	Convective cold: Therm. insulation (ITR) in m² °C/ W	I < 0,10	0,10 < I < 0,15	0,15 < I < 0,22	0,22 < I < 0,30	0,30 < I
b	Contact cold: Therm. resistance R in m² °C/ W	R < 0,025	0,025 < R < 0,050	0,050 < R < 0,100	0,100 < R < 0,150	0,150 < R
c	Protection against water penetration	Failed	Passed	–	–	–

The EN 511 standard is only met if the protective gloves achieve at least performance level 1 for wear and tear resistance as specified in EN 388

ARTILUX SWISS SAFETY
ARTILUX Swiss Safety (ASS) AG
Industriestrasse 15
CH-4410 Liestal
Tel. +41 61 906 90 00
Fax +41 61 901 79 82
sales@artiluxswisssafety.ch
artiluxswisssafety.com

EN 421:2010 Protective gloves against radioactive contamination
For a protective glove to provide protection against radioactive contamination, it must be liquid-tight and have passed the penetration test stipulated in the EN 374 standard.

EN 16350:2014 Protective gloves – electrostatic properties
Protective gloves as specified in EN 16350 that have electrical discharge capability are used in areas such as metallurgy or the chemical industry where explosion hazards and electrostatic discharges are to be expected. These protective gloves are characterised by a high level of conductivity which can prevent unwanted electrical charges on the wearer. To prevent an electrostatic charge, in addition to gloves, a grounding chain is required, which consists of the appropriate equipment with protective clothing, work shoes, as well as suitable floor properties.

The contact resistance must be less than 100 megohms (Rv < 1.0 ×108Ω).

ISO 18889:2019 Protective gloves for pesticide operators and re-entry workers
This standard specifies the minimum requirements for protective gloves worn by people working with pesticide products. More specifically those that are worn during mixing, loading, spraying and processing of pesticides, as well as by re-entry workers. Re-entry workers are individuals who may come into contact with a partially or fully dried pesticide product in a previously treated area.

Performance levels	Chemical protection	Description
Level G1	Low	For contact with diluted pesticides
Level G2	High risks	For contact with diluted and concentrated pesticides
Level GR	Repeated contact* with a partial protection	For contact with dry or partially dry pesticide residues

* Repeated contact = contact with a fully or partially dried pesticide as necessary for the work/workplace in an area that has been previously treated (re-entry tasks).

EN 455 Medical gloves for single use
Four tests are performed:
- **EN 455-2 Part 1:** Requirements and testing for tightness
- **EN 455-2 Part 2:** Requirements and testing of physical properties
- **EN 455-3 Part 3:** Requirements and testing for biological evaluation
- **EN 455-4 Part 4:** Requirements and testing to determine the minimum shelf life

EN 12477 Protective gloves for welders
The European standard EN 12477 specifies the requirements for test methods for protective gloves for welders. The standard distinguishes between Type A or Type B welding gloves.

- **Type A:** These protective gloves are recommended for heavy-duty welding processes (MIG/MAG welding) and meet higher requirements than type B.
- **Type B:** These protective gloves provide less protection than type A, but have a higher level of flexibility and dexterity during welding (TIG welding).