2016/425
EU Regulation on Personal Protective Equipment

Defines the terms for placing PPEs on the market, for their free movement in EU and for the basic and additional requirements that PPEs have to satisfy in order to protect user's health. It also defines the terms for ensuring user's, environment's and healthy competition's safety, economic operators' obligations and finally the procedure for placing CE marking on products, which also means compliance with all the points mentioned above. PPE (Personal Protection Equipment) is: a) equipment designed and manufactured to be worn or held by a person for protection against one or more risks to person's health and safety, b) Interchangeable components for equipment mentioned above which are essential for its protective function, c) Connection systems for equipment mentioned above that are not held or worn by a person, that are designed to connect that equipment to an external device or to a reliable anchorage point, that are not designed to be permanently fixed and that do not require fastening works before use.

- Cat I: PPEs that protect against minor risks that when they act gradually, are perceived by the user in time and without adverse consequences, such as superficial mechanical injuries, contact with cleaning materials of weak action or prolonged contact with water to name a few. These products are examined by manufacturer and user.
- Cat II: PPEs that protect against intermediate risks such as mechanical risks, static electricity, heat or cold or shock absorption are included in Category II. These products are examined by the manufacturer during their production and from a Notified Body during their certification.
- Cat III: PPEs that protect against risks with very serious consequences such as death or irreversible damage to health, including but not limited to: substances and mixtures which are hazardous to health, atmospheres with oxygen deficiency, harmful biological agents, ionising radiation, high temperature environments of >100°C. These products are examined by manufacturer during their production, from a Notified Body during their certification and they are also subjected to additional product checks at random intervals or production procedure examination.

EN ISO 13688:2013
Protective clothing
General Requirements

General performance requirements for ergonomics, innocuousness, size designation, ageing, compatibility and marking of protective clothing and the information to be supplied by the manufacturer with the protective clothing.

- Chromium VI content ≤ 3 mg/kg
- Nickel release < 0,5 μg/cm²
- pH: 3,5<pH<9,5
- Azo colorants shall not be detectable
- An amendment of this standard has been published, EN ISO 13688:2013/A1:2021

EN ISO 20471:2013+A1:2016
High Visibility clothing
Test methods and requirements

Garments visually signaling the user's presence defined in 3 different classes, with class 3 providing the highest degree of conspicuity. Classes are defined based on three different minimum areas of retroreflective, fluorescent and/or combined performance materials.

EN 17353:2020
Protective clothing
Enhanced visibility equipment for medium risk situations – Test methods and requirements

Enhanced visibility equipment or garments which are capable of visually signalling the user's presence in medium risk situations. This standard categorizes products in 3 different types, according to the lighting conditions when product is used and the areas of visibility materials on the products.

- Type A: These products are worn by users where risk of not being seen only exists in daylight conditions. Products use only fluorescent material as an enhanced visibility component
- Type B: These products are worn by users where risk of not being seen only exists in dark conditions. Products use only retroreflective material as an enhanced visibility component. Three sub-types: B1, B2 & B3, according to the placement of retroreflective material on product
- Type AB: Products are worn by users where risk of not being seen only exists in daylight and dark conditions. Products use fluorescent as well as retroreflective material as an enhanced visibility component. Two sub-types: AB2 & AB3, according to the placement of retroreflective material on product

EN 342:2017
Protective clothing
Ensembles and garments for protection against cold

Specifies requirements and test methods for the performance of clothing ensembles (i.e.g two piece suits or coveralls) for protection against the effects of cold environments equal to or below –5°C. These effects comprise not only low air temperatures but also humidity and air velocity. User should evaluate their work tasks and be aware of the temperature range they will be exposed to, so they can choose the proper level of protection.

- I_{cler}: Indicates garment's thermal insulation for light and medium activity levels
- Air Permeability (AP): Indicates garment's breathability (1 highest, 3 lowest). High air permeability allows for proper dry evaporative heat loss required to keep the user warm and comfortable
- Water Penetration Resistance (WP): Determines waterproof properties– it is an optional testing

EN 14058:2017
Protective clothing
Garments for protection against cool environments

Specifies requirements and test methods for the performance of garments for protection against the effects of cool environments above -5°C.

- Thermal resistance represents a quantity specific to textile materials, which determines the dry heat flux passing through a textile layer in a steady state condition effected by a temperature gradient (1 lowest, 4 highest)
- Air Permeability (AP): Indicates garment's breathability (1 highest, 3 lowest). High air permeability allows for proper dry evaporative heat loss required to keep the user warm and comfortable
- I_{cler}: Indicates garment's thermal insulation for light and medium activity levels
- Water Penetration Resistance (WP): Determines waterproof properties– it is an optional testing.

EN 343:2019
Protective clothing
Protection against rain

Specifies requirements and test methods for the performance of materials and readymade garments for protection against the effects of precipitation (e.g. rain, snowflakes, fog and ground humidity). Garments for protection against other effects than precipitation (e.g. water splashes, waves) are excluded from this standard. Class 1 being the lowest and Class 4 the highest. Water Vapour Resistance indicates material's ability to conduct moisture and sweat away from the body.

- Water penetration determines the level of rain protection (Class 1-4)
- Water Vapour Resistance indicates material's ability to conduct moisture and sweat away from the body (Class 1-4)
- Waterproofness of readymade garment (optional)

EN ISO 11612:2015
Protective clothing
Clothing to protect against heat and flame – Minimum performance requirements

Six code letters – each with different protective levels meant to protect against different type of heat exposure. The performance levels are:

- A: Limited flame spread (A1, A2). Test method for flame spread, flaming debris, hole formation, afterglow and afterflame.
- A1: Mandatory surface ignition
- A2: Bottom-edge ignition (optional)
- B: Convective heat (B1-B3). Measures heat transfer through the material when exposed to open flame or another heat source.
- B1: in most cases max performance on a single layer garment (4 seconds minimum to withstand temperature rise)
- B3: equivalent to 20 seconds minimum
- C: Radiant heat (C1-C4). Measures heat transfer through the material when exposed to radiant

EN 20471

m²	Fluorescent Material	Retroreflective Material	Combined Material
Class 1	0,14	0,10	0,20
Class 2	0,50	0,13	N/A
Class 3	0,80	0,20	N/A

heat.

- C1: corresponds to 7 seconds minimum, for temperature rise on the other side of the material
- C4: corresponds to 95 seconds minimum, for temperature rise on the other side of the material and is usually aluminum coated
- D: Molten aluminium splash (D1-D3). Measures heat transfer resistance for different amount/ weight of melted aluminium or similar metal drops.
- E: Molten iron splash (E1-E3). Measures heat transfer resistance for different amount/weight of melted iron or similar metal drops.
- F: Contact heat (F1-F3). Measures temperature rise on the other side of the material when this contacts an object with temperature of 250°C.

Performance Levels	Molten Aluminium Splash (g)	
	min	max
D1	100	<200
D2	200	<350
D3	350	

Performance Levels	Molten Iron Splash (g)	
	min	max
E1	60	<120
E2	120	<200
E3	200	

Performance Levels	Threshold Time (s)	
	min	max
F1	5,0	<10
F2	10,0	<15,0
F3	15,0	

EN ISO 11611:2015
Protective Clothing for use in welding and allied processes

Standard specifies minimum basic safety requirements and test methods for protective clothing including hoods, aprons, sleeves, and gaiters that are designed to protect the wearer's body including head (hoods) and feet (gaiters) and that are to be worn during welding and allied processes with comparable risks.

Class 1 offers protection against less hazardous welding techniques and situations, which produce lower levels of spatter and radiant heat.

Class 2 offers protection against more hazardous welding techniques and situations, which produce higher levels of spatter and radiant heat.

- Class 1: Can withstand at least 15 drops of molten metal and radiant heat RHTI 24 > 7 seconds
- Class 2: Can withstand at least 25 drops of molten metal and radiant heat RHTI 24 > 16 seconds
- A1: Surface ignition or A2: Bottom-edge ignition

Depending on the type of welding performed EN ISO 11611 suggests the type of welder's clothing (Class 1/ Class 2) to be used, shown in the table beside.

EN ISO 14116:2015
Protective clothing Protection against flame Limited flame spread materials, material assemblies and clothing

This standard refers to protection against accidental and short contact with small flames in conditions where there is no other type of heat stress. When protection against heat hazards is primary, EN ISO 11612 is to be used. This means that if risk from flame is a secondary risk, then EN 14116 is suitable for PPE certification, as applicable in jackets that mainly protect against rain or cold or disposable suits that mostly protect against chemicals.

- Index 1:No flame spead and flaming debris allowed, afterglow shall be ≤2s
- Index 2: No flame spread and flaming debris allowed, afterglow shall be ≤2s and no hole formation ≥5mm
- Index 3: No flame spread and flaming debris allowed, afterglow and afterflame shall be ≤2s, no hole formation ≥5mm

EN 1149-5:2018
Protective clothing Electrostatic properties

This standard defines the design and material requirements of electrostatic dissipative protective clothing. The user should be properly earthed via a resistance of less than 10^8 Ω, e.g. by wearing correct shoes. These requirements may not provide sufficient protection in oxygen enriched atmospheres. The purpose is to avoid incendiary discharge and reduce the risk of formation of sparks.

- EN 1149-1: Electrostatic properties (surface resistivity = Surface resistance is ≤ $2.5 \cdot 10^9$
- EN 1149-2: Electrostatic properties (electrical resistance through a material, vertical resistance) = Electrical resistance > 10^5
- EN 1149-3: Electrostatic properties (inductive charge) = t_{50} < 4 s or S > 0.2 values
- EN 1149-5: Electrostatic properties. Performance requirements and material design = t_{50} < 4 s or S > 0.2 values; or surface resistance is ≤ $2.5 \cdot 10^9$

EN 469:2020
Protective clothing for firefighters – Test methods and requirements for reflective clothing for specialised fire-fighting

This standard specifies requirements for protective clothing designed to be worn during firefighting activities, mostly in structures. It covers requirements for design, thermal protection, chemical protection during firefighting, mechanical protection, water penetration resistance in combination to breathability and visibility where necessary. According to the standard, there are two performance levels for garments: Level 1, which is the lowest level and it is recommended for outdoor firefighting and support activities and Level 2, which is the highest level and it is recommended for fighting fires or rescue from fire in structures.

- X (X1 or X2): Represents thermal protection provided from garments. Based on the performance levels, it consists of the following tests: Level 1: Convective and radiant heat protection and Level 2: Convective, radiant and contact heat protection
- Y (Y1 or Y2): Represents water penetration resistance of the garment
- Z (Z1 or Z2): Represents water vapour resistance of the garment

EN 1486:2007
Protective clothing for firefighters – Test methods and requirements for reflective clothing for specialised fire-fighting

This standard considers requirements for the protection of the whole body including head, hands and feet. It specifies test methods and minimum performance requirements for reflective

EN 11611

Type of Welders' Clothing	Selection Criteria Relating to the Process	Selection Criteria Relating to the Environmental Conditions
Class 1	***Light formation of spatters and drops, e.g.:***	***Operation of machines e.g.:***
	gas welding	oxygen cutting machines
	TIG welding	plasma cutting machines
	MIG welding (with low current)	resistance welding machines
	micro plasma welding	machines for thermal spraying
	brazing	bench welding
	spot welding	
	MMA welding (with rutile-covered electrode)	
Class 2	***Heavy formation of spatters and drops, e.g.:***	***Operation of machines e.g.:***
	MMA welding (with basic or cellulose covered electrode)	in confined spaces
	MAG welding (with CO_2 or mixed gases)	at overhead welding/cutting or in comparable constrained positions
	self-shielded flux cored arc welding	
	plasma cutting	
	gouging	
	oxygen cutting	
	thermal spraying	

protective clothing used in specialized fire-fighting. This clothing provides protection against flame lick and intense radiant heat and is worn in short periods only, to enable firefighter to enter specific high-risk fire-fighting and fire rescue situations which also require the use of breathing apparatus.

IEC 61482-2:2018
Live working
Protective clothing against the thermal hazards of an electric arc

This standard specifies requirements and test methods applicable to materials and garments for protective clothing for electrical workers against thermal hazards of an electric arc. Electric shock hazard is not covered by this clothing. Arc Thermal Performance Value (ATPV) is defined as the arc incident energy required to cause the onset of second-degree burn and is represented in cal/cm². This rating is the result of a testing procedure that measures the amount of thermal protection a FR fabric would provide a wearer if the person were exposed to electric arc.

- Arc rating of materials (ATPV or EBT): when tested with an open electric arc under defined laboratory conditions according to IEC 61482-1-1

Energy Break-open Threshold (EBT) is defined as the incident energy on a material that has a probability of 50% that the heat transfer is sufficient through the sample tested to cause an open breakage in it.

- Arc protection class (APC) of materials and garments (Class 1 (4kVA) or Class 2 (7kVA)), when tested with a directed and constrained electric arc (box test) under defined laboratory conditions according to IEC 61482-1-2

Arc flash can happen in facilities with damaged wiring, corroded electrical connections, ageing or/and exposure to solar radiation. Arc generates a high level of energy (higher than the temperature on the surface of the sun) for a very short span of time, which can melt any material around. Melting materials expand and create an explosion along with a high temperature blast launching a plasma ball on worker.

This phenomenon results on second and third degree burns on human which can cause irreparable harm, amputation or even death. In order to choose the appropriate PPE desired protection has to be determined and calculations depending on equipment used have to be done. In practical terms, 3 safety zones are determined: The first zone is marked to protect employees from arc's thermal load. If an employee wants to enter this zone has to wear appropriate PPEs, such as a garment of wisely chosen level of protection. Next zone of protection requires the use of additional PPEs and either user to be trained or to be accompanied by properly educated person, since there is the risk of blast. Finally, third zone of protection requires special education and written consent for an employee to approach.

NFPA 70E requires the area to be marked so as the distance of these zones to be clear.

Directive 2014/34 EU (ATEX)

To meet the exacting requirements of ATEX directive 94/9/EC and and 2014/34/EU, Peli Lights are tested to ensure that they pose no threat of ignition when operated within hazardous environments. Using approved laboratories, the lights are tested to ensure that they will withstand rigorous impact and drop tests, severe environmental exposure and meet a minimum of IP54 solid and liquid particles ingress protection. Longevity and safety are assured by design.

Each light certified by ATEX should have a code printed on its body. This code advises the user as to the area in which it can be safely used without risk of explosion.

- CE: Means CE mark permitted by the European Committee for the Electrotechnical Standardization
- Ex: Inside the Hexagon means "Protection against the Explosions"
- I: Means Group I equipment = For use in mines
- II: Means Group II equipment = Not for use in mines
- 1G:Means ATEX Category 1 (Old Zone 0)
- 2G: Means ATEX Category 2 (Zone 1/2)
- 3G: Means ATEX Category 3 (Zone2)
- G:Means tested for Gases and Vapours
- ia/ib/ic: Means intrinsic Safety "i" (Zone 0/1/2)
- IIA: Gas Grouping (Propane)
- IIB: Gas Grouping (Ethylene)
- IIC: Gas Grouping (Acetylene & Hydrogen)
- T6: It concers the classification according to the maximum temperature of the lamp surface (85°C)
- IPX4 = Water Resistant
- IPX7 = Water Proof (submerged to 1 meter for 30 min)
- IPX8 = Submersible (submerged to 100 meters for 4 hours)

Chemical Protection
Multiple Standards

Depending on the type of chemical protection required in each working environment, the following standards can be used for choosing the appropriate protective garment.

Type of clothing	Standard	Protection provide
Type 1	EN 943-1 & EN 943-2	Protection against hazardous sprays and vapours
Type 3	EN 14605	Protection against jet sprays of hazardous liquids
Type 4	EN 14605	Protection against sprays of hazardous liquids
Type 5	EN 13982	Protection against hazardous dry particles
	EN 1073-2	Protection against dust contaminated with radiation
Type 6	EN 13034	Protection against reduced/light liquid sprays and splashes
Type 3[B] Type 4[B] Type 5[B] Type 6[B]	EN 14126	Protection against bacteria, biological contaminants and infectious agents

EN 420:2003+A1:2009
Protective Gloves
General Requirements and test methods

Defines the general requirements and test procedures for glove design and construction, resistance of glove materials to water penetration, innocuousness, comfort and efficiency, marking and information supplied by the manufacturer.

General conditions:

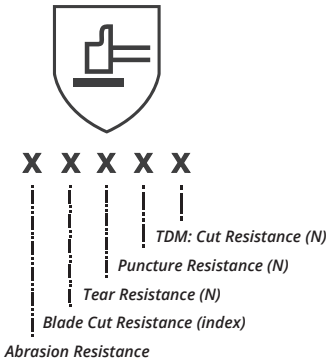
- pH level must be: 3,5 < pH < 9,5
- Chromium VI content must be ≤ 3 mg/kg (for leather gloves)
- Gloves made of natural rubber shall be tested on extractable protein content
- Where applicable, resistance of glove materials to water penetration shall be tested (Class 1-4)

Where applicable, protective gloves shall allow water vapour transmission, which shall be at least 5mg/(cm²·h). When glove's construction does not allow water vapour transmission, then it shall be designed to reduce perspiration as much as possible.

A new edition of this standard has been published, EN ISO 21420:2020.

EN 388:2016+A1:2018
Protective Gloves
against mechanical risks

Specifies requirements and test methods for protective gloves against mechanical risks.



EN 388

Test	Level				
	1	2	3	4	5
Abrasion Resistance (no of rubs)	100	500	2000	8000	-
Blade Cut Resistance	1,2	2,5	5,0	10,0	20,0
Tear Resistance (N)	10	25	50	75	-
Puncture Resistance (N)	20	60	100	150	-

Test	Level					
	A	B	C	D	E	F
TDM Cut Resistance (N)	2	5	10	15	22	30

EN ISO 374-1:2016+A1:2018
Protective gloves against dangerous chemicals and micro-organisms – Part 1: Terminology and performance requirements for chemical risks

This standard specifies the requirements for protective gloves intended to protect against dangerous chemicals and defines terms to be used. Based on three test methods:

- Penetration test according to EN 374-2: Determination of resistance to penetration
- Permeation test according to EN 16523: Permeation by liquid chemical under conditions of continuous contact
- Degradation test according to EN 374-4: Determination of resistance to degradation by chemicals

A	Methanol	
B	Acetone	ISO 374-1/ TYPE A
C	Acetonitrile	
D	Dichloromethane	
E	Carbon Disulphide	
F	Toluene	
G	Diethylamine	
H	Tetrahydrofuran	ISO 374-1/ TYPE B
I	Ethyl Acetate	
J	n-Heptane	
K	Sodium Hydroxide 40%	
L	Sulphuric Acid 96%	
M	Nitric Acid 65%	
N	Acetic Acid 99%	
O	Ammonium Hydroxide 25%	ISO 374-1/ TYPE C
P	Hydrogen peroxide 30%	
S	Hydrofluoric acid 40%	
T	Formaldehyde 37%	

- **Type A:** Protective gloves with permeation breakthrough time at least 30 minutes (performance level 2) against a minimum of six test chemicals.
- **Type B:** Protective gloves with permeation breakthrough time at least 30 minutes (performance level 2) against a minimum of three test chemicals.
- **Type C:** Protective gloves with permeation breakthrough time at least 10 minutes (performance level 1) against a minimum of one test chemical.

EN 407:2004
Protective gloves against thermal risks

This standard specifies requirements, test methods, information to be supplied and marking for protective gloves against heat and/or fire.

A new edition of this standard has been published, EN 407:2020.

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

This standard specifies the requirements for protective gloves intended to protect the user against micro-organisms. These micro-organisms include bacteria, viruses and/or fungi.

EN 421:2010
Protective gloves against ionizing radiation and radioactive contamination

This standard specifies requirements and test methods for gloves to protect against ionizing radiation and radioactive contamination.

Seperate markings for protection against particulate radioactive contamination and against ionizing radiation.

EN 455-1:2000
Medical gloves for single use – Part 1: Requirements and testing for freedom from holes

Standard describes a method in which randomly sampled gloves are subjected to a watertightness test (ability to hold 1000ml of water without leaking). The number of gloves to be tested are based on the batch size of the gloves manufactured.

For compliance with EN 455-1, the accepted quality level shall be 1.5%

EN 511:2006
Protective gloves against cold

This standard specifies the requirements and test methods for gloves which protect against convective and conductive cold down to -50°C.

EN 60903:2003
Live Working – Gloves of insulating materials

This standard defines insulating gloves worn alone or in conjunction with leather protector gloves. According to this standard, gloves should be tested to the relevant voltage shown in the table below. Construction, thickness and test voltage combine to give the class compliance. To maintain compliance gloves must be inspected or/and re-tested every 6 months

A/C

CLASS	Testing Voltage	Maximum Working Voltage
00	2,500 V	500V
0	5,000V	1,000V
1	10,000V	7,500V
2	20,000V	17,000V
3	30,000V	26,500V
4	40,000V	36,000V

D/C

CLASS	Testing Voltage	Maximum Working Voltage
00	4,000 V	750V
0	10,000V	1,500V
1	20,000V	11,250V
2	30,000V	25,000V
3	40,000V	39,750V
4	60,000V	54,000V

Note: Gloves of Classes 00 and 0 must be checked every 6 months for air leaks by air inflation. Gloves of Classes 1,2,3 and 4 must also undergo a routine dielectric check.

EN 455-1

Batch Size	Gloves for Testing
0-150,000	300
150,001-500,000	450
500,001 +	6,500

EN 511

Performance Level	Level 0	Level 1	Level 2	Level 3	Level 4
Convective Cold	I_{TR}<0,10	0,10 ≤I_{TR}<0,15	0,15 ≤I_{TR}<0,22	0,22 ≤I_{TR}<0,30	0,30 ≤I_{TR}
Conductive Cold	R<0,025	0,025≤R<0,05	0,05≤R<0,10	0,10≤R<0,15	0,150≤R
Water Penetration Resistance	fail	pass			

EN 407

Performance Level	Level 1	Level 2	Level 3	Level 4
Burning Behaviour (afterflame, afterglow)	≤20 no requirement	≤10 ≤120	≤3 ≤25	≤2 ≤5
Contact Heat	100°C ≥15s	250°C ≥15s	350°C ≥15s	500°C ≥15s
Convective Heat	≥4s	≥7s	≥10s	≥18s
Radiant Heat	≥7s	≥20s	≥50s	≥95s
Small Splashes of Molten Metal	≥10	≥15	≥25	≥35
Large Quantities of Molten Metal	≥30gr	≥60gr	≥120gr	≥200gr

EN 12477:2001+A1:2005
Protective Gloves for Welders

Specifies requirements and test methods for protective gloves for use in manual metal welding cutting and allied processes.

Type B gloves are recommended for TIG welding, where high dexterity is required, while Type A gloves are recommended for other welding processes.

EN 12477

Requirement	Type A	Type B
Abrasion Resistance	2	1
Cut Resistance	1	1
Tear Resistance	2	1
Puncture Resistance	2	1
Burning Behaviour	3	2
Contact Heat	1	1
Convective Heat	2	-
Small splashes of molter metal	3	2
Dexterity	1	4

EN 659:2003+A1:2008
Protective gloves for firefighters

This standard defines minimum performance requirements and test methods for firefighter's protective gloves, which protect the hands during normal firefighting, including search and rescue.

EN 659

Test	Standard	Minimum Requirement
pH	EN 420	3,5 < pH < 9,5
Minimum Length	EN 659	size 6-11 between 260mm to 315mm
Abrasion Resistance	EN 388	At least Performance Level 3
Cut Resistance	EN 388	At least Performance Level 2
Tear Resistance	EN 388	At least Performance Level 3
Puncture Resistance	EN 388	At least Performance Level 3
Burning Behaviour	EN 407	At least Performance Level 4
Convective Heat	EN 367	At least Performance Level 3
Radiant Heat	ISO 6942	t_{24}>18
Contact Heat	EN 702	t>10s at 250°C
Heat Resistance on lining material	ISO 17493	At 180°C, it shall not melt, drip or ignite
Heat Shrinkage	ISO 17493	<5% at 180°C
Dexterity	EN 420	1
Seam Breaking Strength	ISO 13935-2	>350N
Time for the removal of gloves	EN 659	<3s whether they are dry or wet
Water Penetration Resistance	EN 20811/EN20344	Optional
Whole Glove Integrity	ISO 15383	Optional
Resistance to liquid chemical penetration	EN ISO 6530	No penetration

EN 1082-1

Protective clothing - Gloves and arm guards protecting against cuts and stabs by hand knives - Part 1: Chain mail gloves and arm guards

This standard specifies requirements and test methods for chain mail gloves and arm guards for protection against cuts and stabs by hand knives. These gloves should be tested at power of 2,45 joules (similar to falling weight of 1kg at a height of 250mm).

Gloves in Real Life

Safety Cuff

Safety cuff for internal and external protection of the wrist at the radial and ulnar artery. This is not a requirement described in any standard, however 25% of work accidents relate to this area

Hexavalent chromium (Cr^{6+})

All hexavalent chromium compounds are genotoxic, carcinogenic substances, harmful to reproduction, oxidizing and particularly harmful to the environment. Certified leather gloves of this category contain quantity of Cr^{6+} that does not exceed 3mg/kg (EN 420 requirement).

STOP systematically monitors CR^{6+} levels in each gloves batch.

SANITIZED® Treatment

Shield series gloves are Sanitized® treated to inhibit bacteria and as a result to minimize bad odor and increase freshness feeling. This way, user feels comfortable when wearing his gloves which leads to increased productivity. Sanitized® treatment in polymers increases their service life, enhancing the feeling of new. Sanitized® treatment complies to the strictest regulations and standards and has been certified as safe to human and the environment.

EN ISO 20345:2011
Safety Footwear

Class I: Footwear made from leather and other materials

Class II: All-rubber or all-polymeric footwear

EN ISO 20345:2011

Cat.	Class.	Additional Requirements:
SB	I or II	
S1	I	A E FO
S2	I	A E FO Wru
S3	I	A E FO Wru P
S4	II	A E FO
S5	II	

Antistatic Footwear (in dry and wet testing)	A
Energy Absorption of seat region (min 20 Joules)	E
Resistance of the outsole to fuel oil	FO
Resistance of the upper to water penetration and absorption	Wru
Penetration resistance	P
Heat insulation of sole complex	HI
Resistance of the outsole to hot contact (at 300°C for at least 1 min)	Hro
Cold insulation of sole complex (temperature appr. -20°C)	CI
Metatarsal protection	M
Conductive footwear	C
Cut Resistance	CR
Ankle protection	An
Water resistance	WR

Slip Resistance - SRA, SRB, SRC

- SRA = Ceramic detergent, (Flat ≥0,32 Heel ≥0,28)
- SRB = Steel and soap, (Flat ≥0,18 Heel ≥0,13)
- SRC = SRA + SRB

Conductive Footwear

- Dielectric resistance 0-100 KΩ when new and unused.
- Must be accompanied with instructions sheet clearly stating that the conductive shoes must be used if necessary in order to minimize the electrostatic charge in minimum time eg. in explosives handling. They must not be used if the electrical shock hazard has not been completely eliminated.
- Since their resistance during use may significantly change mainly by sole contagion, users must always check their properties before entering a hazardous area.
- Wherever conductive shoes must be used, the floor resistance must be of a value that does not

cancel the protection the shoes provide.

- In case an extra insole is used, the combination of the shoes with the insole must be checked for its electric porperties.

Antistatic Footwear

- Dielectric resistance 100-1000 MΩ when new and used.
- Must be accompanied with instructions sheet clearly stating that conductive shoes must be used if necessary in order to minimize the electrostatic accumulation so as to elimated the danger of sparks e.g. flammable/combustible substances and gases. It must be also clearly stated that antistatic shoes do not guaranee sufficient protection from electric shock since they are only a means of resistance between the foot and the floor. If the electrical shock hazard has not be completely eliminated, then additional prevention should be taken.
- The discharge path through an object should usually have less than 1000 MΩ resistance during its lifetime. Since resistance during use may significantly change mainly by sole contagion or humidity, frequent testing is strongly advised.
- Especially shoes in class I may absorb humidity and turn conductive if used for long periods of time in humid and wet conditions.
- Wherever antistatic shoes must be used, the floor resistance must be a vaue that does not cancel the protection the shoes provide.
- In case an extra insole in used, the combination of the shoe with the insole must be checked for its electric properties.

ESD Footwear - For use with materials sensitive to electrostatic discharge.

- EN 61340 declares that ESD antistatic shoes must have resistance between 10^5 and 10^8 Ω and include the ESD marking.
- Their resistance ensures that under any circumstances a strong and uncontrollable electrostatic discharge can be avoided.

Insulating Footwear

- Extremely high electrical resistance for users facing high voltage hazard shock (above 1000 Volts).
- In case an extra insole is used, the combination of the shoe with insole must be checked for its electrical properties.

EN 15090:2012
Firefighter boots

Class I: Footwear made of leather and/or other materials, excluding all rubber and all polymeric footwear.

Type 1: General use for rescue (e.g. type 1, HI_1), firefighting (e.g. type 1, HI_2), firefighting-forest firefighting (e.g. type 1, HI_3). No protection against penetration, no toe protection, no protection against chemical hazards. Marking:

- FxA - General demands + antistatic characteristics.
- FxI - General demands + dielectric resistance.

Class 2: All-rubber (i.e. entirely vulcanized) and all-polymeric footwear.

Type 2: Suitable for fire rescue (e.g. type 2, HI_2), firefighting in buildings, vehicles, vessels or anything implicated in a fire or in an emergency situation (e.g. type 2, HI_3). Provides protection against penetration and toe protection, no protection against chemical hazards. Marking:

- FxIS - General demands + sole with high dielectric resistance.

Where x: 1 or 2 or 3 - Type of boot.

Type 3: Suitable for use in hazardous materials or active chemicals leakage which when released, can cause environmental pollutions, human damage or death. Also suitable for fire rescue, firefighting in buildings vehicles, vessels or anything implicated in a fire or in an emergency situation. Provides protection against penetration, toe protection and protection against chemical hazards.

Toe Protection:

- Steel - Wide toecap for greater comfort
- Polycarbonate - Ultralight, non-magnetic, thermal insulation
- Aluminium - Wide, very lightweight toecap
- Carbon Fibre - Non-metallic, non-magnetic, non-conducting of heat and cold.

Head Protection
EN Standards

EN 166	Personal eye-protection - Specifications
EN 167	Optical test methods
EN 168	Non-optical test methods
EN 169	Filters for welding and related techniques - Transmittance requirements and recommended use
EN 170	Ultraviolet filters - Transmittance requirements and recommended use
EN 172/A2	Sunglare filters for industrial use
EN 175	Equipment for eye and face protection during welding and allied processes
EN 1731	Mesh eye and face protectors
EN 812	Industrial bump caps
EN 397/A1	Industrial safety helmets
EN 50365	Electrically insulating helmets for use on low voltage installations
EN 379	Automatic welding filters
EN 352-1	Part 1: Ear-Muffs
EN 352-2	Part 2: Ear-plugs
EN 352-3	Part 3: Ear-muffs attached to an industrial safety helmet
EN 352-4	Safety requirements and testing - Part 4: Level-dependent ear-muffs
EN 352-5	Safety requirements and testing - Part 5: Active noise reduction ear-muffs

Eye Protection

Frame Marking:

- Manufacturer
- EN Standard
- Fields of use
- Mechanical Resistance
- Small head fit (where applicable) (H)
- Highest ocular scale number (where applicable)

Frame Fields of Use:

- No symbol: Protection during basic use
- Symbol 3: Protection against droplets or splashes
- Symbol 4: Protection against dust particles larger than 5µm
- Symbol 5: Protection against gases and fine dust particles smaller than 5µm
- Symbol 8: Protection against short circuit electric arc
- Symbol 9: Protection against molten metals and hot solids

Ocular Marking:

- Scale
- Manufacturer
- Optical Class
- Mechanical Resistance (where applicable)
- Short circuit electric arc resistance (where applicable)
- Molten metal and hot solids resistance (where applicable)
- Fine particles resistance (where applicable)
- Fogging resistance (where applicable)
- Enhanced reflectance (where applicable)
- Original or replacement ocular (optional)

Number	Type of Filter	DIN
-	Welding filter	1,2 - 16
2	Ultraviolet filter	1,2 - 1,4
3	Ultraviolet filter with good colour recognition	1,2 - 5
4	Infrared filter	1,2 - 10
5	Sunglare filter	1,1 - 4,1
6	Sunglare filter with infrared specification	1,1 -4,1

Optical Class:

- 1: Suitable for constant use
- 2: Suitable for occasional use
- 3: Suitable for use in special occasions

Ocular Mechanical Resistance

- No symbol: Minimum robustness
- S: Increased robustness
- F: Low energy impact
- B: Medium energy impact
- A: High energy impact
- (T): Resistance to high speed particles at extreme temperature

Additional requirements:

- 8: Resistance to short circuit electric arc
- 9: Non-adherence of molten metal and resistance to penetration of hot solids
- K: Resistance to surface damage by fine particles
- N: Resistance to fogging
- O/∇: Original/Replacement oculars

Lens Selection:

- Clear: Suitable for indoor and outdoor applications where impact protection is required
- Amber: Suitable for low light applications where contrast enhancement is required
- Blue mirror: Suitable for outdoor applications where sunlight and glare cause eye strain and fatigue
- Red mirror: Suitable for outdoor applications where sunlight and glare cause eye strain and fatigue
- Silver mirror: Suitable for applications where work situations change from indoor to outdoor and vise versa and looking into artificial light at ceilings like forklift truck drivers
- Brown: Suitable for applications in sunlight and bright glares with extremely good colour recognition
- Smoke: Suitable for applications in sunlight and bright glares with good colour distinction.

Eye protection during welding - To fully protect

the operator's eyes, a full range of cover plates, welding filters and backing lenses is recommended.

- Welding filters (mineral or plastic) protect against intensive visible light, hazardous ultraviolet and infrared rays emitted during the welding process.
- Anti-spatter cover plates (mineral or Focalite CR39) protect the welding filter from molten metal and incandescent particles positioned in front of the welding filter on the outside of the filter assembly. They have no robust properties and should never be used as eye protection.
- Backing lens (polycarbonate) positioned on the eye side of the filter assembly to protect the eye against flying particles, particularly shards of glass that can break the welding filter on impact.

Safety Helmets

Safety helmets are included in the most commonly used PPE's and protect the user's head from:

- Head bumps from fixed objects in the workplace
- Head trauma from falling objects
- Lateral forces – depending on type of helmet used
- Open flame, molten metal splashes, electric shock, high temperatures – depending on the type of helmet used

When wearing and adjusting the helmet, the user must ensure that:

- harness straps crossing the top of the helmet adhere closely to the head
- headband which runs around the head strictly adhere to the forehead and nape of the neck,
- safety helmet is securely mounted on the head i.e. the helmet must be positioned on the head and should be limited by the minimum amount of clearance between the hard shell and the skull. This will give a low center of gravity and provide exceptional balance.
- helmet should be adjusted in a manner that even without the use of a chin strap it will stay on the head without falling.

Helmet life span is very hard to determine. Maximum life span of helmets is 5 year from the date of first use. Actual life span though depends on the conditions they were used under. Hits, friction, UV radiation exposure, chemical factors, extreme temperature or/and temperature variations, molten metal splash or electric arc are factors that decrease their life span.

Inspection before use is essential. In case of obvious decay signs of ratchet such as lost of elasticity or deformation, the ratchet must be replaced. In case of wears, breaks or shell discoloration the helmet must be replaced and the old one must be recycled.

Extra attention must be given to the use of adhesive signs that can -in the long run- attack helmet's material. Manufacturers suggest the use of acrylic or water based adhesives.

Instructions of use for the inspection, maintenance and storage are included in every package.

Hearing Protection

Hearing is one of the most important senses we have. It is our link to the environment and is vital for how we communicate with others. However, it is not designed for many of the sounds we are exposed to everyday. This is why hearing loss is among the most commonly reported occupational diseases, since more than 30% of workers are daily exposed to dangerous noise levels.

Hearing loss is an irreversible situation. According to the new Regulation 2016/425, harmful noise is officially recognized as an irreversible health hazard, so PPEs for protection against noise are now Category III PPEs instead of Category II on previous Directive.

The decibel is the unit used to measure the intensity of a sound. The lowest level distinguishable by the human ear is 0 dB. The sound pressure level at the threshold of pain (about 120 dB) is almost 100 billion times more powerful than the weakest sound human ear can perceive (0 dB). A noise increase by 3dB doubles the noise pressure level.

Noise level under the hearing protection should be reduced to 85dB. It is recommended that noise level under the hearing protection should be around 75dB, since:

- Noise attenuation can be affected by incorrect fitting, misuse and poor maintenance
- May also be affected by long hair, a beard and/or glasses
- Too much attenuation can also be dangerous, as there is a risk of not hearing warning signals.

Noise Level (dB)	SNR
85-90	20 or lower
90-95	20-30
95-100	25-35
100-105	30 or higher

SNR (Single Number Rating) is a simplified description of earcup's attenuation. However, SNR is a theoretical value and not an attenuation measure to each person.

Fall Protection
EN Standards

A typical Personal Fall Arrest System (PFAS) incorporates key components often described as the ABCs of Fall Protection. The (A) anchorage connector, (B) body support, (C) connecting device - when used together - form a complete system for maximum worker protection. Other important components of a comprehensive fall protection programme are (D) descent and resue, (E) education and (F) fall protection for tools.

- Anchorages are a secure point of attachment. Anchorage connectors vary by industry, job, type of installation and structure. They must be able to hold fast under the load of a fall, working in suspension or a rescue.
- Harnesses distribute fall forces over the upper thighs, pelvis, chest and shoulders. They provide a connection point on the worker for the personal fall protection system.
- Products such as shock absorbing lanyards or self-retracting lifelines connect a worker's harness to the anchorage.
- Descent and rescue devices are used to raise or lower a fallen or injured worker to safety or retrieve him from a confined space.

EN 1496	Personal fall protection equipment - Rescue lifting devices
EN 567	Rope clamps - Safety requirements and test methods
EN 353-1	Guided type fall arresters with a rigid anchor line
EN 353-2	Guided type fall arresters including a flexible anchor line
EN 361	Safety harnesses
EN 354	Lanyards
EN 1497	Resue Harnesses
EN 358	Belts and lanyards for work positioning or restraint
EN 360	Retractable type fall arresters
EN 355	Energy Absorbers
EN 362	Connectors

- STOP performs theoretical and practical training seminars for safe work at height. Theory is conducted in a hands-on environment with audiovisual presentation while practical training is conducted in our premises in specially designed areas to simulate work on various systems. Training equipment and facilities in total are conducted according to safety standards and provide complete protection to trainees.
- Fall protection for tools helps to make work environments safer and more productive by reducing dorpped object incidents.

Respiratory Protection
EN Standards

Selecting appropriate respiratory protection:

- Identification of the respiratory hazards, such as dangerous gases, vapors, dust, fumes and/or aerosols, including the monitoring of concentration levels.
- Risk assessment of the risks a seafarer may be exposed to and the possibility of their occurence and severity shall be evaluated.
- Selection of appropriate respiratory protection, taking into consideration efficiency and comfort.
- Training in proper use and fit of the respirator, as well as the cleaning procedure and filter change.

EN 136	Full face masks - Requirements, testing, marking
EN 137	Self-contained open-circuit compressed air breathing apparatus with full face mask
EN 140	Half masks and quarter masks
EN 143	Particle filters
EN 14387	Respiratory protective devices - Gas filter(s) and combined filter(s)
EN 148-1	Threads for facepieces - Part 1: Standard thread connection
EN 148-2	Threads for facepieces - Part 2: Centre thread connection
EN 148-3	Threads for facepieces - Part 3: Tread connection M 45 x 3
EN 149/A1	Filtering half masks to protect against particles - Requirements, testing, marking
EN 12941/A2	Powered filtering devices incorporating a helmet or a hood - Requirements, testing, marking
EN 12942/A2	Power assisted filtering devices incorporating full face masks, half masks or quarter masks
EN 1146	Self-contained open-circuit compressed air breathing apparatus incorporating a hood for escape

FILTER RANGE - COLOR CODING

A	Gas & organic vapor compounds >65°C
AX	Gas & organic vapor compounds ≤65°C
B	Gas & inorganic vapor compounds
E	Gas & acidic vapors
K	Ammonia
CO	Carbon monoxide
Hg	Mercury vapors
NO	Nitrous gases incl. NO
Reactor	Radioactive iodine
P	Particles

Level 1: Toxic gas concentration 0.1% vol

Level 2: Toxic gas concentration 0.5% vol

Level 3: Toxic gas concentration 1.0% vol

MED

The Marine Equipment Directive (MED) is a requirement developed by the European Commission to ensure the quality of marine equipment placed onboard European flagged ships. The directive aim is to increase marine safety and reduce the risk of marine pollution.

MED Directive 2014/90/EU stipulates that marine equipment to be installed on new or existing ships registered in the EU countries and EFTA countries shall be approved to, and bear the MED mark of conformity, the "Wheel Mark" together with the unique ID number of the certifying Notified Body.

The directive covers types of marine equipment that fall under following International Conventions developed by the International Maritime Organization (IMO):

- SOLAS 1974: Life-saving appliances/navigation equipment/radio equipment
- MARPOL 1973: Marine pollution
- COLREGS 1972: Prevention of collisions

Wheel marked equipment are also accepted by several other Flag Administrations. This enables free movement of products in EU and many other countries.

OEKO-TEX®

The OEKO-TEX® label indicates the additional benefits of tested safety for skin-friendly clothing and other textiles. The International OEKO-TEX® Association is an independent test institute, testing textiles for harmful substances according to OEKO-TEX® Standard 100 for textile products of all types which pose no risk whatsoever to health.

CORDURA®

An extremely tough and hardwearing material, used to reinforce exposed parts such as pockets, knees and sleeves. It is also water and dirt repellent, easy to care for and retains its shape. A high technology fabric made with air-textured polyamide fibers able to meet the toughest standards of strength and durability. CORDURA® is a trademark of INVISTA Inc.

Thinsulate™

Thinsulate™ insulation has very high insulation properties compared to its weight. The fine fibres that make up Thinsulate™ insulation, work by trapping air molecules between you and the outside. The more air a material traps in a given space, the better it insulates you from the cold outside air. Thinsulate™ is breathable, moist-resistant and machine washable.

Scotchlite™

Retroreflectivity helps the eye perceive objects in low-light conditions when illuminated by a light source. In more scientific terms, retroreflection occurs when light rays are returned in the direction from which they came. Retroreflective materials appear brightest to an observer located near the original light source. Since very little light is scattered when the light is returned, retroreflective materials enhance the contrast of the wearer for an observer located near the original light source

Tencate™ Ecogreen

Tencate™ Ecogreen is a range of fabrics for workwear that are not only more sustainable, but also takes wearer comfort to a higher level – a unique combination. The workwear fabrics are made with TENCEL™ lyocell 100% bio-cellulosic fibres from sustainable sourced wood and 100% mechanically recycled polyester from PET.

Washing Instructions
Care labelling symbols

- wash by hand
- maximum temperature 40°C

- maximum washing temp 30°C
- normal process

- maximum temperature 40°C
- normal process

- maximum temperature 40°C
- mild process

- maximum temperature 60°C
- normal process

- do not wash

- do not bleach

- Tumble drying
- Coloured workwear - polyester/ cotton

- do not tumble dry

- tumble drying possible
- low temp, max 60°C

- tumble drying possible
- normal temp, max 80°C

- do not iron

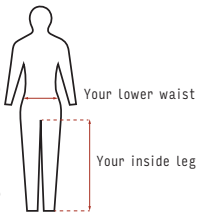
- iron at max sole-plate temp of 110°C without steam.

- iron at sole-plate temperature of 150°C

- professional dry cleaning
- normal process

- do not dry clean

STOP Workwear
Size chart for garments



Every CE-marked garment has to have a label with a pictogram that shows the size and the body measurements of the person that the garment is intended for. The user can always verify their correct size using this pictogram.

All non-certified garments are designed and manufactured in accordance with the guidelines laid out in EN ISO 13688. Follow the below size charts to make sure you find your correct fit according to style.

All measurements in cm.

WORKWEAR SIZE CHART - BOILERSUIT, WINTER GARMENT

SIZE	HEIGHT	CHEST	WAIST
XS	166-168	84-88	72-76
S	170-172	92-96	80-84
M	174-176	100-104	88-92
L	178-180	108-112	96-100
XL	182-184	116-120	104-108
2XL	186-188	124-128	112-118
3XL	190-192	132-136	120-124
4XL	194-196	140-144	126-130
5XL	198-200	148-152	134-138
6XL	202-204	156-160	142-146
7XL	202-204	164-168	148-152
8XL	202-204	172-176	156-160

WORKWEAR SIZE CHART -STOP TROUSER

	XXS	XS	S	M	L	XL	2XL	3XL	4XL
WAIST	64-68	72-76	80-84	88-92	96-100	104-108	112-118	120-124	126-130

WORKWEAR SIZE CHART -STOP SLIM FIT TROUSER

	46	48	50	52	54	56	58	60
WAIST	82	86	90	94	98	102	106	110
INNER LEG	74	76	78	80	82	84	86	88