



TORRAKA[™]





EN 342:2004

Protective clothing - ensembles and garments for protection against cold.

The standard specifies requirements and test methods for comprehensive clothing for protection against cold, -5°C and colder. The standard has no specific requirements for headgear, shoes or gloves.

Key for the pictogram:



EN 342:2004

*I*_{cle} = Insulation measured on a stationary thermal manikin. Value in m². K/W. (The type of base layer that is used for measuring must be indicated)

*I*_{cler} = Insulation measured on a moving thermal manikin. Value in m². K/W. (The type of base layer that is used for measuring must be indicated)

Air permeability class 1-3 in accordance with table 1.

Resistance to water penetration class 1-2 in accordance with table 2. Displaying the value is optional.

Type of base layer that can be used:

(B) Insulation value measured with standard base layer (2 layers)

(C) Insulation value measured with base layer from the supplier

(R) Insulation value for a single garment with base layer R

Torraka has chosen to certify with its own base layer:

Base layer (C): 20122 Hawk underpants, 22915 Power long underpants, 20127 Power shirt, 30316 Thule shirt, 25926 Bylot socks, 20830 Kodiak socks, 20525, Rohn hat, 20207 Grizzly gloves.

Base layer (C2): 20122 Hawk underpants, 20212 Eagle long underpants, 30245 Thule trousers, 20708 Eagle shirt, 20969 Wilmore shirt, 30316 Thule shirt, 25926, Bylot socks, 20830 Kodiak socks, 20525, Rohn hat, 20207 Grizzly gloves.

Table 1

Air permeability, class 3 has the lowest air permeability, which gives the best protection against wind.

<i>AP</i> mm/s	Class
$100 < AP$	1
$5 < AP \leq 100$	2
$AP \leq 5$	3

Table 2

Resistance to water penetration, class 2 has the highest water resistance.

The table indicates how long you can keep the heat balance at different levels of insulation, activity and outdoor temperatures. The table does not take account of wind chill, other than that achieved during an activity.

<i>WP</i> Class	Class
$8,000 \leq WP \leq 13,000$	1
$WP > 13,000$	2

Insulation m ² . K/W	/cle		/cler			
	Constant 75 W/m ²		Light 115 W/m ²		Medium 170 W/m ²	
	8h	1h	8h	1h	8h	1h
0.310	11	-2	-1	-15	-19	-32
0.390	7	-10	-8	-25	-28	-45
0.470	3	-17	-15	-35	-38	-58
0.540	-3	-25	-22	-44	-49	-70
0.620	-7	-32	-29	-54	-60	-83



EN 343:2019

Protective clothing for protection against rain.

Protective clothing certified according to EN 343 mainly protects against precipitation and ground moisture. The standard takes account of the properties of the material and the seams, it is freely to test the water resistance of the garment. The top number next to the pictogram shows the class for resistance of water penetration, 4 classes of which 4 gives the best protection. The mid number shows the class for water vapour resistance, 4 classes of which 4 is the best. The bottom letter shows that the garment has been tested against rain. R means that the garment passed the test and X means that the garment has not been tested.

	Class 1	Class 2	Class 3	Class 4
Resistance to water penetration prior to washing	8000 Pa			-
Resistance to water penetration after washing	-	8000 Pa	13000 Pa	20000 Pa
Seam resistance to water penetration prior to washing	8000 Pa	8000 Pa	13000 Pa	-
Seam resistance to water penetration after washing	-	-	-	20000 Pa
Water vapour permeability Ret	> 40 m ² Pa/W	25-40 m ² Pa/W	15-25 m ² Pa/W	≤ 15 m ² Pa/W



EN 471:2003+A1

Protective clothing with high visibility

This garment is a protective garment with high visibility. The fluorescent fabric (background material) has good visibility in semi-darkness and the reflective material reflects light when hit by a light source. This garment must not be covered with another garment or product. The use of reflective clothing does not guarantee that the user will be visible in all conditions.

The specified maximum number of washes for the garment is based on laboratory washes and is not the only factor that affects the garment's service life. Its service life is also dependent on use, care, storage, etc. The maximum number of washes is specified on the garment and is determined by how much the reflective material of the garment can handle. The protective garment's effect deteriorates if it is dirty. The garment should be inspected regularly.



The number at the top of the pictogram indicates the visibility class, 3 classes of which 3 provides the best protection according to the table below.

max 100x

The number at the bottom of the pictogram shows how well the reflectors reflect, of which class 2 is the highest class.

Minimum permitted surface of visible material in m²:

Material	Class 3 garment	Class 2 garment	Class 1 garment
Background material	0.80	0.50	0.14
Reflective material	0.20	0.13	0.10
Combined material	n.a	n.a	0.20



EN ISO 20471:2013

Protective clothing with high visibility.

From 2013, high visibility clothing is certified according to this international standard. According to the standard, even the fluorescent fabric (background material) must be tested after at least 5 washes.

The specified maximum number of washes for the garment is based on laboratory washes and is not the only factor that affects the garment's service life. Its service life is also dependent on use, care, storage, etc. If the maximum number of washes is not specified in the washing instructions, the material has been tested after at least 5 washes.

The pictogram now only shows the protection class. Class 3 has the highest protection class. The reflective material must meet the previous highest class and is therefore not displayed.



max 30x

Minimum permitted surface of visible material in m²:

Material	Class 3 garment	Class 2 garment	Class 1 garment
Background material	0.80	0.50	0.14
Reflective material	0.20	0.13	0.10
Combined material	n.a	n.a	0.20

The protective garment's effect deteriorates if it is dirty. The garment should be inspected regularly.



EN 1149-5:2018

Protective clothing - electrostatic properties

Certification of protective clothing that prevents electrostatic charging. The purpose is to provide protection against the sudden discharge of static electricity. Used where there is a risk that sparks may ignite flammable substances such as gas, fuel or dust. The standard only describes clothing as part of an earthed system.

Remember:

- Persons using electrostatic dissipative protective clothing must be properly earthed. The resistance between the persons skin and the ground must be less than 108 Ω, which can be achieved with shoes specified according to standards EN ISO 20345 types S1-S5, P1-P5, O1-O5 or with symbol A, on dissipative or conductive floors.
- Electrostatic dissipative protective clothing must not be open or removed in flammable or explosive environments or when handling flammable or explosive materials.

- Electrostatic dissipative protective clothing is intended to be worn in Zones 1, 2, 20, 21 and 22 (see EN 60079-10-1 (7) and EN 60079-10-2 (8)), in which the minimum ignition energy of any explosive atmosphere is not less than 0,016 mJ.
- Electrostatic dissipative protective clothing must always cover all the garments that do not meet the requirements during normal use (including bending and movement). For the best protection, the garments outer layer must be in contact with bare skin at some point.
- The garment must not be modified without consulting Torraka.
- Electrostatic dissipative protective clothing must not be used in oxygenated environments, or in Zone 0 (see EN 60079-10-1 (7)), without the approval of the responsible safety engineer.
- Electrostatic dissipative protective clothing can be affected by use, wear, washing and possibly by the impact of other agents.



EN ISO 11612:2015

Clothing for protection against heat and flame.

The standard specifies requirements and test methods for protection against heat and flame for various types of use. The standard does not apply to welding, BA rescue, etc., for which there are specific standards. The standard is designed to mainly protect the body, not the head, hands or feet. Hoods, shoe covers, etc. can be included.

The described protection works provided that an EN ISO 11612:2015 certified jacket and trousers are used together.

The garment's pictogram indicates against which heat sources and levels the garment provides protection



Ax Bx Cx Dx Ex Fx

Heat sources are divided into the following (A is mandatory and at least one of the other requirements must be completed):

Code	Requirement	Performance level
A	Limited flame spread – A1 mandatory	A1 Surface ignition A2 Edge ignition
B	Convective heat	B1-B3
C	Radiant heat	C1-C4
D	Molten aluminium	D1-D3
E	Molten iron	E1-E3
F	Contact heat	F1-F3

The higher the number of the performance level, the better the protection.

Warnings:

If chemicals or flammable liquids come into contact with the clothing, it must be removed immediately without contact with the skin. The clothing must then be washed or discarded. If the garment is dirty, note that its protection may be somewhat reduced.

If the garment is indicated as having protection against molten aluminium or molten iron: If the garment is splashed with molten metal, the user must immediately leave the workplace and then take off the garment. If the garment is worn directly on the body, burns can still be caused by molten metal splashes.



IEC 61482-2:2009

Protective clothing against the thermals hazards of an electric arc.

Protective clothing is tested to protect the wearer from heat generated by an unwanted electric arc. The standard does not take account of harmful noise, light, shock, etc.

Both material and garment are tested.

The purpose of the **material box test** is to investigate the material's response to an electric arc; heat transfer is measured and the fabric is inspected.

The purpose of the **garment box test** is to investigate the garment's and its components' response to an electric arc. For example, the jacket can be opened.

Classes	Duration	Test current	Test voltage
Class 1	0.5 sec.	4 kA	400 V
Class 2	0.5 sec.	7 kA	400 V

Warnings:

For full protection, the garment must be closed and other appropriate protective equipment must be worn, for example a helmet with face shield, protective gloves and protective shoes.

No garments, such as shirts, T-shirts, base layers (made of polyamide, polyester or acrylic fibres) may be used, which melt on exposure to an electric arc.

General washing instructions:

- Do not wash or tumble dry above the recommended temperature.
- Rinsing agents, chlorine and bleaching agents must not be used, nor must soap or solvent-based detergents.
- Do not soak the garment.
- Detergent with a low to medium high alkali content and a high content of surfactants is recommended.
- Repeated washing with stain treatment agents results in a significantly reduced service life for reflective and fluorescent materials and a test must be carried out prior to washing to see if the agents are compatible with the fabric of the garment.
- The garment should be re-proofed if necessary.

General care instructions:

- The service life and function of the garment are dependent on the number of washes, care and how the garment is used.
- When you no longer want your clothes, give them to someone in your area who can extend the service life of the garment.
- If there is not anybody, you can return the garment to Torraka and we will give clean, functional garments a new lifecycle. The garment should be cared for according to the care instructions on the garment for maximum protective effect.
- The garment should be inspected regularly.
- Check that the garment is undamaged and that its intended functions are not impaired. If a garment is damaged and it is possible to mend it, send the garment, washed and cleaned, to us at Torraka. The cost of repair and shipping will be added.

Finnish Institute of Occupational Health, Topeliusgatan 41 B, FI-00250 Helsingborg, Finland, registered body no. 0403, has EC-type tested and approved this type of personal protective equipment.



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