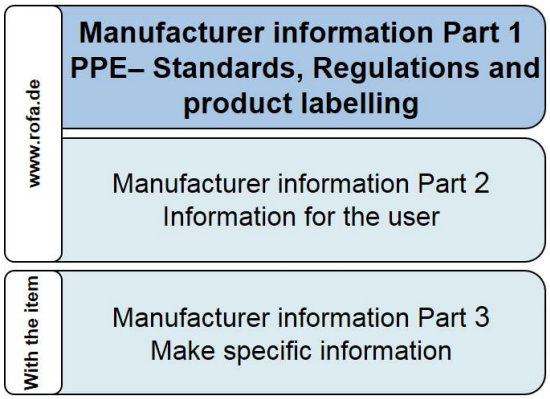
Personal Protective Equipment
Manufacturer Information

IMPORTANT INFORMATION

This manufacturer information is a constituent part of the product and consists of three interconnected and complementary documents. You will find units 1 and 2 under www.rofa.de, while the third part is available on the article itself.

We compiled and issued the information with due diligence and rigor. Nevertheless, we cannot assume any responsibility for the accuracy and integrity of the depicted data, irregardless of legal basis.



Before using our products, please read carefully all manufacturer information sections.

Save all sections of the manufacturer information in order to provide a third party with the relevant data related to the purchased equipment.

Please consider carefully the following information, as a support for the safe utilization of your Personal Protective Equipment (PPE).

Symbols:

⚠	Caution sign for circumstances that might lead to injuries, and/or warning sign for obvious hazardous situations or possible risks.
ℹ	References, tips or additional information

Manufacturer Information Part 1: PPE – Standards, Legislation, and Product labelling

1 TERMINOLOGY

- **Antistatic Capabilities**
  Fibres with antistatic capabilities (e. g. Carbon or Metal filaments) are mixed into the yarns or interlaced in the fabric during the weaving process forming a grid structure, avoiding herewith the electrostatic charges.

- **Aramids**
  The Aramids are inherent flame-retardant synthetic fibres, high temperature resilient, and able to char instead of melt at temperatures above 400°C. The Aramids are classified in Meta-Aramids (such as the DuPont Nomex) and the Para-Aramids (such as the DuPont Kevlar). The Meta-Aramids feature better acids and suds resistance properties while the Para-Aramids demonstrates a higher strength. The Para-Aramid yarns are mixed with the Meta-Aramid yarns in order to avoid the fabric to crack-open when exposed to high temperatures.

- **Breathable**
  The concept defines the fabrics capable to transport the body perspiration as vapour through the clothing. This is a very important feature, especially in physically demanding labours. The higher the water vapour permeability, the higher the wear comfort.

  The breathability unit is the R_{et}-Value or the MVTR-Value.
  The R_{et}-Value (Resistance to Evaporating Heat Transfer) gives the resistance (m^2Pa/W) a fabric demonstrates while allowing the transport of water vapour. The lower the value, the breathable the fabric.
  The classification issued by the Hohenstein Institute sets three performance categories (see Illustration 1). All our Rofa -Articles rank the very good respectively the good R_{et}-Values categories

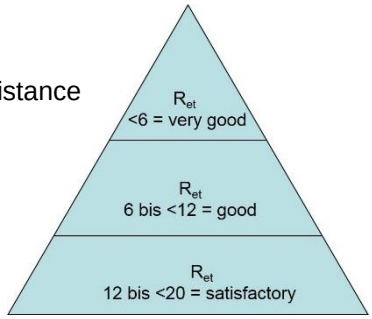


Illustration 1

Conversion example

R_{et} (m^2Pa/W)	MVTR (g/m^2 24h)
20	ca. 3.840
5	ca. 14.000

The MVTR (Moisture Vapour Transmission Rate) gives the water vapour permeability, measured for 24 hours through a square meter of fabric. The higher the value, the better the breathability.

- **ATPV (Arc Thermal Performance Value)**
  is an electric arc thermal value used for the electric arc testing. The ATPV (cal/cm^2) is defined as the energy level applied to a fabric, able with a 50% probability, to inflict 2nd degree skin burns. Due to the 50% protective capability, the test is not compliant with the EU 2016/425 Regulations provisions.

  By contrast, since the BoxTest is carried under constant/controlled testing conditions, all test values are ascertained not to generate 2nd degree skin burns; therefore this test complies with the regulatory provisions of EU 2016/425.

- **EBT (Energy Breakopen Threshold)**
  is an electric arc thermal value used for the electric arc testing. The EBT (cal/cm^2) is defined as the energy level applied to a fabric, able with a 50% probability, to break open before it burns.

  If the fabric 50% probability to break open lies below the ATPV Value, the EBT 50 must be mentioned as electric arc value.

- **Fluorocarbon**
  The fabrics treated with fluorocarbon during the manufacturing process, are granted water repellency properties and a limited chemical protection. The equipment will be impregnated periodically in order to maintain this protective capacity.

- **Fluorescence**
  Describes the warning colours (fluorescent orange and fluorescent yellow) capability to convert the invisible ultraviolet light spectrum into visible light wavelength for the human eye.
- **Inherent Flame-retardant**
  During the spinning process, the synthetic yarns (e. g. Aramid, Modacrylic, flame-retardant Viscose) undergo chemical treatments that provide permanent, washing resistant, flame-retardant capabilities.
- **Modacrylic**
  is a modified, inherent flame-retardant, self-extinguishing Acryl yarn, able not to melt or drip if subjected to flames. In a cotton blend, the fabric will char.
- **PPE (Personal Protective Equipment)**
  is a protective equipment, complying with the provisions of EU 2016/425 Regulations. A PPE is the compulsory outfit for a person, providing protection in a multiple risk working environment, where both its health and security might be exposed. The PPE concept designates a whole range of items, including protective clothing, feet and dead protection.
- **Proban®**
  is a quality controlled chemical procedure carried out by Solvay, former Rhodia. The treatment provides cotton based fabrics with washing resistant flame-retardant capabilities.
- **Retro-reflexion**
  Special materials (reflective stripes) reflect the light from a specific light source (e. g. headlights) sending it back to the source.
- **Laminated textiles**
  The laminated textiles are a product consisting of two (2 layers laminate) or three (3 layers laminate) agglutinated surfaces.
  Textile materials are laminated with breathable membranes (films) in order to provide protection against several weather conditions (wind, rain, cold). Outer layer laminate or lining laminate will be utilized, depending of clothing Design and purpose.

  Softshell-Jackets consist commonly of a three layers laminate, with a fleece interior. Softshell jackets are light, warm, draughtproof, water repellent, but not waterproof.

2 STANDARDS AND REGULATIONS

2.1 EU Instructions and EU Regulations

The EU 2016/425 Regulations (further on called PPE VO) are the **binding regulation** for PPE manufacturers valid since March 2016 replacing herewith is the 89/656/EWG instruction. The Regulations regulate the branch protagonists (Manufacturers, Importers, Merchants, Dealers) responsibilities when placing products on the market or making products available in the market.

The EU PPE VO Regulations provide with Article 47 a transition time. Afterwards, are the manufacturers entitled to market PPE according to the 89/686 EWG Instruction, until the 20th April 2019. The validity of the EG Sample Certification and EU Declaration of Conformity applies only to this date, beyond this moment will be automatically invalidated, if not expired until then.

Starting with 21.04.2019 each and every marketed PPE will comply with the provisions of PPE Regulation.

Nevertheless, with the new Regulation EU 2016/425, issued on 07.12.2017, Article 47 stipulates a new procedure:

[http://ec.europa.eu/growth/sectors/mechanical-engineering/personal-protective-equipment_de]

The samples certifications issued in compliance with the Instruction 89/686EWG are further on valid if:

1. The standards are still valid respectively no safety relevant issues led to a Standard modification
2. The PPE are up to date

Off 21.04.2023, all Certificates and EU Declarations of Conformity issued in compliance to the instruction 89/686 EWG become invalid

Significant changes the PPE VO Regulation brings, compared to the PPE VO Instruction:

1. The EU Declarations of Conformity must come with the purchased article or be made available on the manufacturer's web page.
2. The article label will also state the mailing, and web address of the manufacturer
3. The label will provide information regarding the article manufacturing or expiration date
4. The Manufacturer Information will also provide data regarding the specific risks the PPE is protecting against.
5. Generally, the validity period for all Samples Certification is 5 years
6. Further amendments are depicted in picture 2 (Module)
7. New legal obligations for various market protagonists in the supply and distribution chain along with legal frame clarifications for making products available in the market.

2.2 Risk assessment

Increasing workplace risks also augment the standard requirements regarding the clothing outfit along with other PPE. The EU 216/425 Regulation discern between three products categories (see table 1).

PPE Category I - low risk
The user is able to assess himself the efficiency against low level risks, and is able to notice in due time the gradual hazards and their impact (if any).

PPE Category II - moderate risk
Category hosting each PPE allotted neither to category I nor to category III.

PPE Category III - high risk
In force for personal protective equipment assigned against lethal risks, and irreversible health condition hazards. The user is not able to perceive in due time the instantaneous risk impact.

Rofa manufactures the following PPE:

PPE	Description	Norm	Icon
Category I	Rain protection	EN343:2019	
Category II	Specification for protective clothing for use where there is a risk of entanglement with moving parts (Machine tools risks protection)	EN 510:2019	
	Cold environments protection (-5°C and above)	EN 14058:2017	
	High visibility Warning protection	EN ISO 20471:2013+A1:2016	
	Protective clothing – Enhanced visibility equipment for medium risk situations	EN 17353:2020	
	Protective equipment with electrostatic capability	EN 1149-3:2004 EN 1149-5:2018	
	Protective equipment for welders and similar procedures Class 1 and 2 , Code A	EN ISO 11611:2015	
	Flames and heat protective equipment Code A, B, C, F	EN ISO 11612:2015	
	Flames and heat protection Index 1, 2, 3	EN ISO 14116:2015	
Category III	Flames and heat protective equipment Code D, E	EN ISO 11612:2015	
	Chemical protection (Liquids) (Type 6)	EN 13034:2005+A1:2009	
	Protective equipment against the thermal effects of electric arcs. APC 1 and APC 2	IEC 61482-2:2020 EN IEC 61482-1-1:2019 IEC 61482-1-2:2014	

Table 1

The protective equipment labelling according to a specific standard, and if available, with the specific icon, means that the respective equipment complies with the depicted standard requirements. The icons associated numbers show the attained performance class. Supplementary, also the standard issue year, if the standard has been revised and the certification was made according to the updated version.

2.3 Tests and Certificates

Once the new PPE Regulation is in force, new provision applies for the individual PPE categories (see Illustration 2)

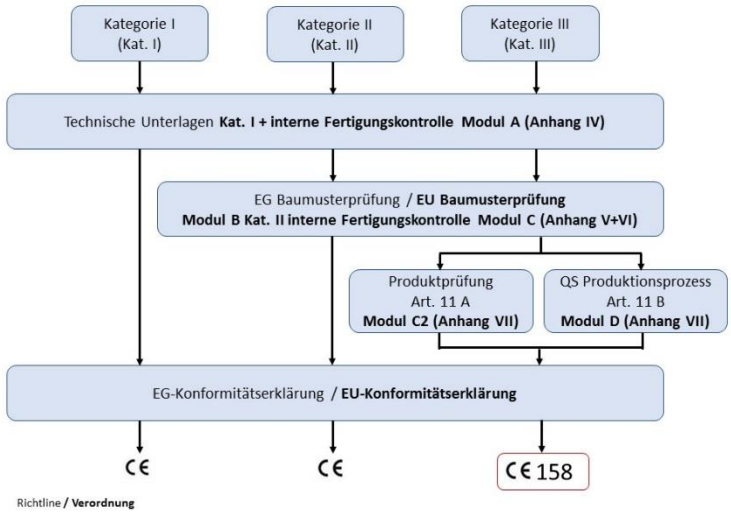


Illustration 2

The CE - marking is the indicator that the respective labelled product complies with the mandatory provisions of the European Union for the manufacturers (original abbreviation, of „Communautés Européennes“). With this marking, the manufacturer confirms on his own responsibility that his products comply with all the mandatory provisions associated with the CE marking. The manufacturer avouch that his products can be marketed in the entire EEA European Economic Area, all EU countries, along with Turkey and the EFTA – European Free Trade Association countries Iceland, Norway, and Liechtenstein. The provision is valid also for products manufactured in outsource countries and marketed in the EEA and Turkey. The number beside CE is the certified body identification number applicable for the class III PPE.

The EU Conformity Declaration the manufacturer issues, confirms that the delivered commodity, is complying with the relevant standards requirements; while for the PPE of category II and III, also that the goods are identical with the approved samples tested and attested by the certified body.

According to the new PPE Regulation, the EU Declaration of Conformity must come with the purchased article or be made available on the manufacturer’s web page. Rofa made the EU Declaration of conformity available on its web page

⚠ Warning! Each modification of the certified PPE, including but not limited to embroideries, additional logos (embroidered or transferred), and/or with fitting tailoring, might result in **an alteration of the approved prototype**. Subsequently, the issued certificate might become invalid. This is the very reason why each alteration must be referred to an expert in order to determine first the opportunity and if, the extent of such modification.

Please do not hesitate to contact Rofa regarding the required alteration.

3 QUALITY, SUSTAINABILITY, ECOLOGICAL AWARENESS

3.1 Quality Management ISO 9001

The Rofa QMS ensures the constant high performance level bidding to deliver a long-life product. This is the key to spare precious resources. Rofa employs only the best raw materials, benefits from the utilization of modern Quality Management Systems and strive for an ongoing improvement process.

Relying on optimally controlled processes, our professionally skilled staff monitor the entire production process, starting with raw materials acquisition and ending with the very delivery of the goods towards our customers, bearing in mind the ongoing Rofa high quality standards. While developing a new product, or during the products optimization, we focus on a state-of-the-art finished product that complies with the latest standards in force. On that account, we rely on the experience we gathered during the cooperation with the Standards Committee and the cooperative work with the certifying bodies, the professional associations, and safety advisors. Environmental protection and consumer protection are also essential points in our company statement; we make every effort to provide our customers with end products free of any hazardous materials.

All textiles manufacturing processing steps, starting with the farming and raw fibres production until the textiles treatments, are a heavy burden for the environment. With the implementation of Best Available Technology (BAT), our in-house weaving mill, dyeworks, treatments and manufacturing shops actively contribute to the ecological sustainability.
Our responsibility reaches way beyond the environment protection and optimal resources management; it encompasses not only the strive to achieve a tidiest manufacturing procedure, but places the people in the spotlight, claims for respectful cultural and social interaction along with equitable and safe labour conditions. Beside the exquisite quality for your safety, and the customised customer service we assume responsibility for people and environment.

3.2 REACH

Rofa adheres to the liabilities arising from REACh and for its peremptory provisions implementation. The European Chemicals Directive REACh (Registration, Evaluation, Authorization of Chemicals) is the regulatory Chemicals Law for the entire European Union. The primary objective of REACh is the human health preservation and environment protection.

3.3 ÖKO - TEX

All Rofa products are safe in terms of human ecology. This is why all products made by Rofa are tested against harmful substances according to OEKO-TEX® Standard 100 (Class II: skin contact products) and confirmed as “skin friendly”) garments. Alongside, all trims – buttons, zippers, linings, labels, sewing threads, tapes and belts are also in complying with this standard.

OEKO-TEX® Standard 100 Class II definition:

“Articles with direct contact to skin are those, which are worn with a large part of their surface in direct contact with the skin e. g. blouses shirts, underwear, aso.”

3.4 STeP – Sustainable Textile Production

This independent certification system analyses and certifies production facilities in respect of environmental protection and social responsibility and promotes continuous improvement.

The objective of STeP certification is the permanent implementation of environmentally friendly production processes, optimum health & safety and socially acceptable working conditions. In contrast to other certification systems, that mostly only take into account certain individual aspects of sustainability, STeP present the opportunity of a comprehensive analysis and evaluation with regard to sustainable production conditions. Due to the dynamic further development of the STeP standard the criteria are periodically analysed, and if necessary updated, e. g. regarding new market

developments, legal provisions and scientific findings. A STeP certification involves a full analyse of the entire company departments required for a solid sustainability evaluation. The evaluation lean on

a modular structure, namely six components: Chemicals management, Environment management, Health, Labour safety, Social responsibility and Quality Assurance management.

3.5 Made in Green by OEKO-TEX®

Made in Green by OEKO-TEX is a product label allowing a smooth backtrack of textiles in the production chain. Only the textiles complying with the following criteria are awarded a Made in Green label:

- Manufactured with innocuous tested materials (according to STANDARD 100 by OEKO-TEX®)
- Manufactured in ecologically friendly factories (according to STeP by OEKO-TEX®)
- Manufactured in secure and socially responsible workplaces (according to STeP by OEKO-TEX®)

Made in Green by OEKO-TEX shows not only a commitment towards sustainable textile production, but also the actual implementation of this process, including continuous improvement.

With the possibility to backtrack the production steps on the MADE IN GREEN website, its achieved a new level of transparency for companies and customers. The label allows a production-chain assessment and brings forward the individual components in the production flow. A MADE IN GREEN product label is a special communication tool for companies that want to promote their responsible trade practices and for consumers who want to use the label to make more sustainable personal purchase decisions.

3.6 United Nation Global Compact

The UN Global Compact (UNGC) is the largest and prime global initiative calling the responsible companies to aligning their operation and strategies with 10 universal principles governing the human rights, labour rights, environment and anticorruption as well as the general goals of the United Nations particularly towards a Sustainable development.

Rofa joined the UN Global Compact in 2017

(www.globalcompact.de)

Illustration 3

4 Clarifications Standards Contents

4.1 Miscellaneous

We facilitate and assist the accurate PPE selection. Below, a presentation of the relevant standards in the personal protective equipment field, with annotations regarding the scope, the requirements along with important references. For detailed information please refer to the actual standards literature.

4.2 Protective clothing – General requirements according to EN ISO 13688:2013

EN ISO 13688:2013 sets the general PPE requirements and is prerequisite for specific standards. Therefore, this standard alone is not mentioned.

General requirements refer to innocuousness, comfort and ergonomics and set requirements for dimensional stability during care and maintenance, sizes fittings/designation and labelling.

4.3 Protective clothing – Protection against rain, according to EN 343:2019

Rain, snow and generally wet areas protection equipment.

Weather protection equipment is waterproof and breathable; both these values are given in the icon symbols, as Y – Water Penetration Resistance and Y – Water Vapour Permeability.

Y = Water Penetration Resistance in 4 classes
The Water Penetration Resistance (W_P), is measured in Pa, and stands for the fabric resistance against the hydrostatic pressure.

Y = Water Vapour Permeability in 4 classes
The Water Vapour Permeability, is measured in m^2Pa/W, and stands for the fabric water vapour passage resistance

R = Rain tower tested garment. If the garment did not undergo the said testing, the R will be replaced by the X attribute

Performance parameters classification:

Classification	Class 1	Class 2	Class 3	Class 4
Water Penetration Resistance W_P [Pa] DIN EN 20811	≥ 8 000 Without prior treatment	≥ 8 000 After prior treatment[1])	≥ 13 000 After prior treatment [1])	≥ 20 000 After prior treatment [1])
Water Vapour Permeability [m^2Pa/W] DIN EN 31092	> 40	25 < R_{et} ≤ 40	15 < R_{et} ≤ 25	≤ 15

Table 2

[1]) Prior treatment: at least 5 full care cycles (washing and drying)

The smaller the R_{et}-Value, the better the equipment breathability.

The highest performance class for weather protection equipment is class 4 with R_{et} ≤ 15 and W_p ≥20 000 Pa.
13 000 Pa means a water column of about 1,3 m – a typical measuring unit for the outdoor gears

⚠	Special work conditions have a detrimental influence on the gear breathability, diminishing herewith the wearing time.
ℹ	The wearing comfort can be enhanced wearing special undergarments, respectively functional underwear.

Physical Properties

Requirements	Standard minimal requirements
Textile tensile strength (EN ISO 1421) longitudinal and transversal	≥ 450 N
Tear strength (EN ISO 4674) longitudinal and transversal	≥ 20 N
Seams strength (ISO13935-2)	≥ 200 N

Table 3

4.4 Specification for protective clothing for use where there is risk of entanglement with moving parts according to EN 510:2019

Due to a special seams system and design, the machine tools risk protective equipment is able to reduce, the possibility of entanglement by the machine tool moving parts. The machine tools equipment is provided for half or full automatic machine tools operators.

Special requirements concerning PPE protecting against specialized tools, as for instance chainsaws related PPE are not covered by this standard.

⚠ The protective capacity is only fulfilled if the equipment is fit tight, and fully closed. All below lying clothing must be covered by this PPE.
⚠ The full equipment is a combination of jacket and dungarees, or jacket and sleeveless coverall, or a coverall. Regular trousers cannot be certified according to EN 510.
⚠ There are no outer lying pockets allowed. Inner pockets will have no opening towards the exterior.
⚠ Outwards lying closing elements and fastening attachments are not allowed. Al loose ends must be covered and secured.

4.5 PPE with electrostatic capabilities according to EN 1149-3:2004 and EN 1149-5:2018

The PPE with electrostatic discharge capabilities is designed to

- Avoid the electrostatic charge of the human body and
- Avoid the accidental spark capable electrostatic discharge.

Such equipment is assigned when working in explosion prone areas, consisting of flammable air and gas/mist mix (such as refineries or oil tanks), or a flammable air and dust mix (mills, mixing and conveying sites, silos).

EN 1149-3: 2004 Test procedure to measure the fabric electrostatic charge dissipation

EN 1149-5: 2018 Performance requirements for fabrics and PPE design

According to EN 1149-5:2018, the fabric is able to provide electrostatic protection if the measured values are t_{50}< 4 s or S > 0,2 (where t_{50} = charge dissipation half-life period and S = shielding coefficient).

⚠ The electrostatic deflection efficiency is only provided with a further secure grounding of person/equipment, using antistatic shoes complying with EN ISO 20345 and the additional demands A or professional shoes complying with EN ISO 20347 and the additional A demands.

4.6 Protective clothing for use in welding and allied processes according to EN ISO 11611:2015

EN ISO 11611:2007 (former EN 470-1) regulate the PPE and accessories such as balaclavas, aprons, wrist cuffs and gaiters protective requirements against hot metal sputter and incandescent drops, arising during welding processes and/or similar procedures.

For an appropriate protection against specific risks, the welders shall address further protective equipment for head, face, hands and leg safety, complying with relevant the standards.

Class 1 (lower safety class: protection by low-risk welding processes, and similar procedures, involving a small amount of spurts and low radiant heat)

Class 2 (higher safety class: protection by high-risk welding processes, and similar procedures, involving a large amount of spurts and massive radiant heat)

The classification is made according to the following performance parameters:

Requirements	**Class 1**	**Class 2**
Metal drops resistance (ISO 9150)	$\geq$ 15 drops	≥ 25 drops
Radiant heat deflecting capability (Radiation) RHTI[1]) for 24°C (DIN EN ISO 6942)	$\geq$ 7 s	≥ 16 s
Resistance to heat transfer (DIN EN 1149-2)	$\geq 10^5$ Ω (at 85% relative humidity)	
Limited flame propagation (DIN EN ISO 15025)	No flame propagation No perforation No dripping After-burn time $\leq$ 2 s After-burn time $\leq$ 2 s Procedure details: Test procedure A1 – flame exposed fabric surface Test procedure A2 – flame exposed fabric edge	

Table 4

[1])**RHTI** (radiant heat transfer index) – Transfer index. The duration of a temperature increases with 24°C on the fabric left side, while the right side is subjected to radiant heat.

Requested physical properties:

Requests	**Standard minimal requirements**
Textile Tensile strength (ISO 13934-1) longitudinal and transversal	≥ 400 N
Tear strength (ISO 13937-2) longitudinal and transversal	≥ 15 N (Class 1); ≥ 20 N (Class 2)
Seams strength (ISO13935-2)	≥ 225 N

Table 5

Flammable undergarments made of synthetic yarns will negatively affect the protective capabilities of this equipment.
It is recommended to also wear flame-retardant undergarments.

The available welding procedures are classified as follows:

PPE	Procedure related selection criteria	Ambience/Technology related criteria
Class 1	Manual welding procedures generating small amounts of spurts and metal drops, e.g.: - Gas metal arc welding - GTAW welding - TIG welding - Micro plasma arc welding - Soldering - Spot welding - SMAW welding (Electric arc hand welding with rutilium electrodes coating)	Machine operation e.g.: - Oxygen cutting machines - Plasma cutting machines - Resistance welding machines - Table welding
Class 2	Manual welding procedures generating significant amounts of spurts and metal drops, e.g.: - SMAW welding (with regular or cellulose coated electrodes) - MAG welding (with CO_2 or mixed gases) - Gas metal arc welding (high-voltage) - Flux core wire arc welding - Plasma cutting - Gouging - Oxy-fuel cutting - Thermite/Exothermic welding	Ambient conditions e.g.: - closed environments - Overhead welding or cutting procedures, completed in similar forced postures

Table 6

The standard contains new requirements regarding the test results evaluation:

1. Each and every measured value must comply with the performance requirements
2. A measurement inaccuracy must be determined for all measurements. Even once the measurement inaccuracy quota is deducted, the individual values must comply with the performance requirements

4.7 Protective clothing – Clothing to protect industrial operators against heat according to EN ISO 11612:2015

EN ISO 11612:2015 regulate the requirements for heat and flames protection PPE, as well as the protection from large splashes of molten metall.

The equipment is intended for a broad scope, such as heavy industries, petrochemical and automobiles industry. The PPE provides protection against flames, radiant heat, convective or contact heat, as well as drops/splashes of molten metal.

A1 and A2 codes stand for the testing criteria regarding the limited flame propagation. The letters B to F for the heat type.

The code letters (B to F) are also classified with performance scores. The higher the figure, the better the provided protection.

The PPE complying with this standard requirement will fulfil at least the provisions of code A and at the minimum one requirement concerning the heat transfer requirements, classification code B to F.

The classification is made according to the following performance parameters:

Code	**Performance level**	**Requirements**
Code A: Limited flames propagation tested according to DIN EN ISO 15025		**Open flame for 10 s**
	A1	**Surface flaming** No afterglow, no perforation, no melting, no dripping, Afterglow time ≤ 2 s After-burn time ≤ 2 s
	A2	**Edge flaming** No after-burn, no melting, no dripping, Afterglow time ≤ 2 s After-burn time ≤ 2 s
Code B: Convective heat tested according to ISO 9151		**Heat transfer index HTI[a] [s]**
	B1	4 to < 10
	B2	10 to < 20
	B3	ab 20
Code C: Radiant heat tested according to DIN EN ISO 6942 Procedure B		**Transfer index RHTI[b] [s]**
	C1	7 to < 20
	C2	20 to < 50
	C3	50 b to is < 95
	C4	off 95
Code D: Molten aluminium splashes tested according to DIN EN ISO 9185		**Melted aluminium drops [g]**
	D1	100 to < 200
	D2	200 to < 350
	D3	off 350
Code E: Molten metal drops tested according to DIN EN ISO 9185		**Melted iron drops [g]**
	E1	60 to < 120
	E2	120 to < 200
	E3	off 200
Code F: Contact heat with 250°C tested according to DIN EN ISO 12127-1		**Threshold value [s]**
	F1	5 to < 10
	F2	10 to < 15
	F3	off 15

Table 7

[a] **HTI** Heat Transfer Index: the duration required for the temperature to increase with 24 °C on the fabric left side, once subjected to a convective heat source, affecting herewith the human skin.

[b] **RHTI** Radiant Heat Transfer Index: the duration required for the temperature to increase with 24 °C on the fabric left side, once subjected to a radiant heat source, affecting herewith the human skin.

Further tested criteria:

- **Heat resistance**

Requirements	Minimal requirements
Heat resistance at (180 ± 5) °C (ISO 17493)	No ignition or melting Shrinkage ≤ 5%
Heat resistance at (260 ± 5) °C (ISO 17493) (optional requirement for skin contact materials)	No ignition or melting Shrinkage ≤ 10%

Table 8

- **Physical properties**

Requirements	Minimal requirements
Textile tensile strength (ISO 13934-1) longitudinal and transversal	≥ 300 N
Tear strength (ISO 13937-2) longitudinal and transversal	≥ 10 N
Knitted fabric bursting strength (ISO 13938-1 und -2)	≥ 100 kPa on 50 cm^2 ≥ 200 kPa on 7,3 cm^2
Seams strength (ISO13935-2)	≥ 225 N

Table 9

⚠	Flammable undergarments made of synthetic yarns can diminish the equipment protective capabilities.
ℹ	It is recommended to wear also flamesafe undergarments.

The standard contains new requirements regarding the test results evaluation:

1. Each and every measured value must comply with the performance requirements
2. A measurement inaccuracy must be determined for all measurements. Even once the measurement inaccuracy quota is deducted, the individual values must comply with the performance requirements

4.8 Chemical protection equipment according to EN 13034:2005+A1:2009 (Type 6)

The EN 13034 regulate the protective requirements for chemical protection equipment against light aggressive, type 6 liquid chemicals, where type 6 is the lowest classification level. The PPE is able to provide a limited protection against aerosols, liquid sprays and small drops of chemical substances. The area of application will define the chemical hazards and exposure impact as minor risk zone.

Chemical industry, electroplating operations and a wide range of laboratories are the typical application areas for the chemical protection Type 6 PPE.

The water repellency treatment along with specific make ensures the PPE protection factor against the liquid chemicals penetration.

- **Stipulated chemical testing:**

According to the spreadsheet below, the chemical protection equipment will be tested for liquids repellency (Repellency Index) and the protection factor against the liquid chemical penetration (Penetration Index). The repellency index shall provide a minimal level 3 performance class for at least one of the listed chemical substances, while the penetration index will achieve a minimal level 2 class, again for at least one of the listed chemicals.

Test chemicals	Repellency index EN ISO 6530	Penetration index EN ISO 6530
30% Sulphuric acid (H_2SO_4)	Class 3: R > 95% Class 2: R > 90% Class 1: R > 80%	Class 3: P 0 to < 1% Class 2: P 1 to < 5% Class 1: P 5 to < 10%
10% Caustic lye (NaOH)		
o-Xylene undiluted (Solvent)		
100% Butan-1-ol undiluted (Solvent)		

Table 10

The **Repellency Index** refer to a defined chemical substance proportion, repelled for a certain amount of time by the tested fabric.

The **Penetration Index** refer to a defined chemical substance proportion, penetrating over a certain amount of time the tested fabric.

⚠ The fabric protective capabilities against further chemical substances or different concentrations, shall be individually tested.

- **Stipulated physical properties tested on the chemical protection fabric**

The prepared fabrics are tested for 5 different physical properties, according to the below indicated standards. Each parameter is categorized in 6 classes, in ascending order. All properties must achieve at least class 1. The tests results will be communicated to the customer.

Requirements according to DIN EN 14325:2004	Minimal values
Abrasion resistance (DIN EN 530)	Class 6: > 2000 Cycles Class 5: > 1500 Cycles Class 4: > 1000 Cycles Class 3: > 500 Cycles Class 2: > 100 Cycles Class 1: > 10 Cycles
Tear strength (DIN EN ISO 9073-4)	Class 6: > 150 N Class 5: > 100 N Class 4: > 60 N Class 3: > 40 N Class 2: > 20 N Class 1: > 10 N
Tensile strength (DIN EN ISO 13934-1)	Class 6: > 1000 N Class 5: > 500 N Class 4: > 250 N Class 3: > 100 N Class 2: > 60 N Class 1: > 30 N
Puncture resistance (DIN EN 863)	Class 6: > 250 N Class 5: > 150 N Class 4: > 100 N Class 3: > 50 N Class 2: > 10 N Class 1: > 5 N
Seams resistance (DIN EN ISO 13935-2)	Class 6: > 500 N Class 5: > 300 N Class 4: > 125 N Class 3: > 75 N Class 2: > 50 N Class 1: > 30 N

Table 11

- **Compulsory equipment tests:**

  When testing the PPE in Spray Test (Mist test), the equipment will perform a predefined sequence of motions. A number of 3 equipment will be verified, none of the test items will show infiltration.

⚠ The complete protection is only achieved if the equipment is fully closed. As the circumstances require, additional protection items will be utilized.
⚠ Chemical protection PPE is treated with FC for liquids repellancy. This treatment will be regularly renewd. Details under Part 2 Chapter 9.

4.9 Cold environments PPE, according to EN 14058:2017

The PPE certified according to EN 14058:2017 provides protection in cold environments, at -5°C and above. The special materials the equipment is made of, are able to retain the body heat.

The equipment may be utilized outdoors e. g. by constructions professionals and indoors for example, by food processing industry teams

The cold environments PPE is scaled in three ascending performance classes, depending on the heat transition resistance. Evidently, the class 4 provides the highest protection level.

Y = heat transition resistance scaled in 4 classes

Y = air permeability scaled in 3 classes

Y = Icler derived total thermal insulation

WP = resistance to water penetration, optional

If the item has not been tested, the Y and/or WP exponents will be replaced by X

The heat transition resistance (R_{ct}) is the heat flux (a combination of conductive, convective and radiant heat parameters) flowing through a fabric.

Air permeability is the value given by the velocity an air stream is crossing through a fabric sample in controlled conditions.

If the resulting $R_{ct} \geq 0{,}25 m^2 K/W$, the consequent thermal insulation must be measured.

The resistance to water penetration (WP) measured in Pa, is expressed by the fabric resistance, exposed to hydrostatic pressure.

The classification is made according to the following performance parameters:

Classification	**Class 1**	**Class 2**	**Class 3**	**Class 4**
heat transition resistance R_{ct} ($m^2 \cdot K/W$) DIN EN 31092	$0{,}06 \leq R_{ct} < 0{,}12$	$0{,}12 \leq R_{ct} < 0{,}18$	$0{,}18 \leq R_{ct} < 0{,}25$	$0{,}25 \leq R_{ct}$
Air permeability AP (mm/s)	100 > AP	5 > AP ≤ 100	AP ≤ 5	

Table 12

The clothing with fabric layers pertinent to class 1 shall be considered for cool indoor areas with minor air movement, less than 1 m/s.

The clothing with fabric layers pertinent to class 2 shall be considered for cool areas with air movements below 5 m/s.

The fabrics pertinent to class 3 shall be considered for outdoors assignment with an air movement exceeding ≥ 5 m/s.

- **Water Vapour Permeability Resistance:**

When testing the PPE Water Vapour Permeability Resistance (WP), it is necessary to also test the Water Vapour Permeability R_{et}. During the PPE water vapour permeability resistance test, the combined equipment layers must achieve a value below 55 m² PA/W.

- **Physical properties**

Requirements	Minimal standard requirements
Tear propagation resistance (ISO 13937-2) longitudinal and transversal	≥ 20 N
Burst pressure knitwear (ISO 13938-1 and 2)	≥ 100 kPa to 50 cm² ≥ 200 kPa to 7,5 cm²

Table 13

In time, it is possible to witness a reduction of the puffy material volume (nonwoven fibres, wadding, Fleece). This will diminish the gear heat transition resistance.
When applying pressure in order to affix the thermal transfers or while attaching/stitching an embroidery it is possible to prejudice the gear heat transition resistance.

4.10 Flames protection PPE according to EN ISO 14116:2015

The EN ISO 14116:2008 regulate the requirements for heat and limited flames propagation protection fabric, fabric combinations, and manufactured clothing. Such equipment offers protection against short accidental contact with small flames.

The PPE complies with the lowest demands for protection against flames and generally applies, among others, for shirts and T-shirts.

The classification is made according to the following 3 performance scales:

Classification	Index 1	Index 2	Index 3
Limited flame propagation DIN EN ISO 15025 Procedure A (no after-burn until up to the sample edge)	x	x	x
Dripping (no burning dripping allowed)	x	x	x
After-glow (no sample will after-glow longer than > 2 s)	x	x	x
Perforation (no sample will produce a hole larger than 5mm)		x	x
After-burn (no sample will after-burn longer than > 2 s)			x

Table 14

The Index 1 equipment is not skin contact clothing. Such items will be only worn over Index 2 or Index 3 undergarments/clothing; wrists and neck will also be protected from Index 1 with cuffs and collar to avoid direct skin contact.
The PPE is not suitable as welding protective equipment, according to EN ISO 11611.
The PPE is not suitable as heat protection equipment (EN ISO 11612)

Stipulated physical properties:

Requirements	Minimal requirements
Textile tensile strength (ISO 13934-1) longitudinal and transversal	≥ 150 N
Tear strength (ISO 13937-2) longitudinal and transversal	≥ 7,5 N
Seams strength (ISO13935-2)	≥ 75 N

Table 15

4.11 High visibility warning PPE according EN ISO 20471:2013+A1:2016

EN ISO 20471:2013+A1:2016 regulate the requirements and test procedures for high visibility equipment. Such PPE will provide visibility in the dark of the night but also in the daytime in poor visibility conditions. Warning PPE application areas: railroads, railings, road works, utilities intervention, logistics and contractors.

The warning PPE is made of fluorescent background fabric and retroreflective material (reflective stripes) and is categorized in 3 classes. The equipment class is determined depending of the background fabric minimal surface along with the minimal quantity of reflective stripes calculated for the smallest size, while at least 50 (±10) % of the minimal surface of the visible background fabric will cover the equipment front. The higher the protection class, the higher the user visibility. It is essential that the background fabric covers the body completely – torso, sleeves, and legs – and feature a minimal width of 50mm. Only the reflective stripes are allowed to interrupt the background fabric continuity.

The reflective stripes will be at least 50mm wide, spaced at minimum 50mm intervals, starting 50mm from the seams edge, at a maximal allowed inclination of 20°.

X = PPE class

The retroreflective values will be tested before and after the test preparation/stress procedures and the test results depend on the observation and illumination angle. EN ISO 20471 requires a retro-reflection coefficient of 330 cd /(lx*m²) in new condition and 100 cd/(lx*m²) after the stress test (illumination angle: 5°, observation angle 12°). The stress test will cover among others: extended bending, abrasion, folding, washing aso.)

The classification is made according to the following performance parameters:

	Minimal surface		
Classification	**Class 1**	**Class 2**	**Class 3**
Fluorescent background fabric	0,14 m^2	0,50 m^2	0,80 m^2
Retro-reflective material	0,10 m^2	0,13 m^2	0,20 m^2
Material with integrated properties	0,20 m^2	-	-

Table 16

The performance class can be determined for an individual item or for an overall combination consisting for example of jacket and trousers. A combination can be ranked in a higher class, if as a PPE in use (jacket overlapping the trousers) the overall, fulfils the minimal requirement of an upper class, e. g. Class 2 or Class 3. (see illustration 4)

Notwithstanding the above, and the employed materials, a Class 3 PPE must cover the torso and as minimum requirement provide at least, either sleeves with retro-reflective stripes or trousers legs fitted with retro-reflective stripes, if not both.

Illustration 4

Information regarding the overall combination of the warning protection PPE can be downloaded under www.rofa.de

⚠ Both background fabric and retro-reflective material reflection capabilities are reduced when soiled and wear out.
⚠ Wear the jackets and waistcoats fully buttoned and closed all the time. Reflective stripes will be always visible.

4.12 Features providing enhanced visibility in medium risk conditions – Test procedures and requirements according to EN 17353:2020

The standard EN 17353:2020 is setting the test procedures and requirements for high visibility clothing and items able to visually indicate the wearer's presence.

The high visibility features purpose is to make the user visible in medium risk situations, in all daylight conditions, and/or during the night-time under the vehicles high beams or spotlights/searchlights.

The clothing labelled with this standard can be used for both domestic (including children) and industrial purposes. The Rofa industrial equipment complying with the provisions on this standard, is especially used by the municipal utilities, the logistics sector and services.

The high visibility equipment classification is made according to 3 conditions:

Type A Daylight	**Type B** Night-time	**Type AB** Daylight, Dawn/Dusk/Twilight and Night-time
Equipment made of fluorescent material/fabric	Equipment made using retro-reflective material	Equipment made of fluorescent fabric and retro-reflective materials or material combining the above-mentioned properties.
	B1 (free hanging elements)	
	B2 (limbs)	AB2
	B3 (midriff respectively midriff and limbs)	AB3

Table 17

The classification is made according to the following parameters:

Minimum required material surfaces in m² for Type B1 and Type B2

	B1[a]	B2[b]
Retro-reflective Material	0,003	0,0018
	a: Front and back, overall surface	b: valid for item with surface made of two different materials, measured as a flat lying surface

Table 18

Minimum required material surfaces in m² for Type A, Type B3 and Type AB

	A	B3	AB	A	B3	AB
User height (h)	h ≤ 140 cm			h > 140 cm		
Fluorescent material	0,14	-	0,14	0,24	-	0,24
Retro-reflective Material	-	0,06	0,06	-	0,08	0,08
Materials combining the above-mentioned properties	-	-	0,14	-	-	0,24

Table 19

Type A: The clothing must be made (for the front and back) of fluorescent materials/fabrics. The front will evenly cover the midriff and upper arms and/or extremities. The back will be evenly covered

Type B1 – Free hanging products: detachable and must provide a minimal optical active surface of 15 cm² on each body side.

Type B2 – Limbs protection features: the retro-reflective material must be finished with a minimal width of 20 mm, evenly cover each limb and fulfil the requirements of table 17.

Type B3 – Midriff and limbs protection features. The retro-reflective material will have a minimal width of 20mm, covering the midriff around. If separate clothing may cover the lower arms and legs below the knees, the demands of Type B2 must be considered. The requests of table 18 must be fulfilled.

Type AB – This is a combination of Type A and Type B2 or B3: the clothing requirements will fulfill the ones expressed by all demands set by Type A and Type B2 or Type B3 along with table 17 and 18 requests.

The surface will be measured on the smallest available size.

Symbols:

Icons for Type A and Type AB2 or Type AB3 are still on the drawing board

Type A Type B Type AB

Jackets and waistcoats will be fully closed. The retro-reflective stripes will be visible at all time

4.13 PPE against the thermic effects of the electric arc, according to EN 61482-2:2020, EN IEC 61482-1-1:2019 and EN IEC 61482-1-2:2014 for hot wires operations

The PPE certified according to the standards above is suitable for interventions on electrical installations, with electrical arc hazard, e. g. house fuse boxes, distributions boards, local or area power stations and other similar installations.

Currently, we have in Europe two standardized test procedures, for fabrics and equipment:

- Arc-Rating-Test according to EN IEC 61482-1-1:2019
- Box-Test according to EN IEC 61482-1-2:2014

Since each test is based on different parameters and unalike set-ups, a comparison and/or conversion between the two testing outcomes is not possible, or at the most an empirical development.

PC 1 = testing according to EN IEC 61482-1-2:2014

PC 2 = testing according to EN IEC 61482-1-2:2014

EN 61482-2:2020 – Arc-Rating-Test
With this test, is determined the ATPV – the thermal performance value of an electric arc – respectively the EBT50 the break open energy.

A fabric ATPV is the incident energy on a material that results in a 50% probability that sufficient heat transfer through the specimen is predicted to cause without breaking open, the onset of second degree burn injury.

The incident energy on a fabric that might with a 50% probability result in the material to break open. If such is the situation, the EBT50 will be mentioned as electric arc performance value.

EN 61482-1-2:2014 – Box-Test
The fabric and equipment certified according to IEC 61482-1-2 have been tested under a low voltage directional electric arc. The tests grade the outcomes in 2 performance classes, accordingly.

- **The classification is made according to the following performance parameters:**

Testing class	Average electric arc energy value W arc (kJ)	Test current (kA)	Electric arc length (ms)
APC 1	168	4	500
APC 2	320	7	500

Table 20

- **Stoll curve**

Simultaneously is also determined the heat transition energy. The determined value must lie beneath the Stoll curve, according to the diagram (Illustration 3) below. The Stoll curve is the criteria establishing the possibility/probability that second degree burns occur under the respective test conditions, depending on the value of thermic energy and the arc flash duration.

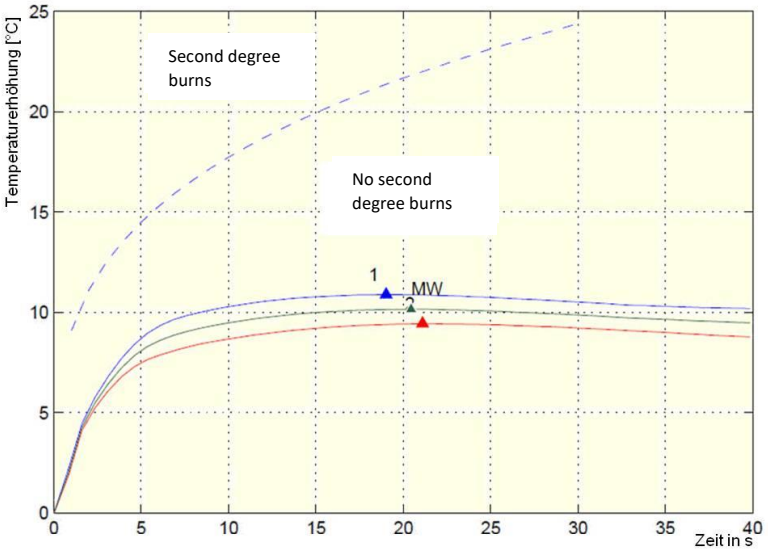


Illustration 5

This chart demonstrates the heat transition energy through a fabric sample, measured on 2 calorimeters along with the average value (MW) calculated thereof.

⚠	The complete mandatory garment is a combination of jacket and dungarees or trousers. It is strongly recommended that both items bear the same certification level.
⚠	The full protective gear might involve besides PPE further appropriate protection elements such as helmet visor and gloves.
⚠	This PPE is not an insulating, electric current protective equipment, in compliance with the provisions of EN 50286:1999.
ℹ	Flame-retardant undergarments are recommended.

EN 61482-2: 2020 – Requirements

This standard regulates the security related demands for PPE Design and configuration, as well as labelling provisions for the certain protection classes (ATPV value, class 1 and 2).

An equipment can be classified as electric arc protection PPE, once tested according to Arc Rating Test, with a resulting ATPV value of at least 167,5 kJ/m² (4 cal/cm²) or, in compliance with the Box-Test requirements, where it must achieve at least the class 1 demands. The higher the ATPV value, or the Box-Test classification, the better the protective capabilities.

Eurotest

This is a further test procedure addressing the electric arc impact on protective equipment. The procedure, developed by the energy provider Westnetz Netzservice GmbH is known as „in house testing standard PIP001“. In this case, the assessment is made after the impact of an electric arc (10kA / 1 second, not aimed). The results are compared against the Stoll curve in order to establish the second degrees burns risks.

Eurotest is not a procedure which comply the provisions of any international, European or national standards.

4.14 UV Protection

Scope:

A clothing UV protection capability can be determined using several standards (see Table 17). Among them, sets the Hohenstein Institute UV 801 the highest standards. The clothing is tested both new, as well as after various procedures simulating multiple care and wear cycles. The product is labelled according to the lowest test result off several tests. All other standard rely only on the original, new clothing. The care and wear tests results – simulating the clothing regular, daily stress – proved that a decrease of 70% in the UV protection capability is not uncommon.

UV Standard	**Tests**
UV STANDARD 801:2021 Hohenstein	- Original goods (unstretched, dry, new) - stretched, wet - after mechanical deterioration - artificial exposure to the elements - testing under the Australian light, midsummer conditions, for sensitive skin types
AS/NZS 4399:2017	- Original goods (unstretched, dry, new) - testing under the Australian light conditions
EN 13758-1:2001+A1:2006 EN 13758-2:2003+A1:2006	- Original goods (unstretched, dry, new) - testing under the Mexican light conditions, and similar South European ones

Table 21

Classification:

The classification is determined according to the UPF (**U**ltra Violet **P**rotection **F**actor). According to Hohenstein, test regulations, the UPF classification is set according to the following performance chart (without intermediary values) UPF 10, 15, 20, 30, 40, 60 and 80, where 80 is the top value.

For example, a UPF 50 signify that the person wearing such clothes, depending on its own skin sensitivity, may increase fivefold the full sun exposure, without risking any skin damage.

Icon:

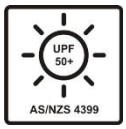
1. Labelling according to UV STANDARD 801 – Standard Hohenstein

2. Labelling according to EN 13758-2:2003 in correspondence with EN 13758-1:2001-A1:2006

The EN 13758-1 is setting the test procedures regarding the solar ultraviolet radiation protection provided by clothing and the EN 13758-2 the relative classification and labelling

40 is the minimal ultraviolet protection level to be achieved. The unitary labelling for the achieved values is depicted in the icon below:

3. Labelling according to the AS/NZ 4399 UV-Standards is not prewritten. Therefore, Rofa is using the following icon:



4.15 Multi Standard PPE

A multiple purpose equipment is made to fulfil several standards requirements and to protect the user against multiple risks. Such PPE has a wide application area, such as railways, tramways, road works, as well as utilities, airports, transports, gas stations, offshore operations, petrochemical and chemical industries.

The prior introduced standards will be considered, according to the specific garments labelling.

> ⚠ It is critical to keep in mind that each alteration, care/maintenance or mending/reparation procedure must be carried out taking into consideration the compliance with ALL standards regulated demands!!

5 Product labeling

5.1 Rofa label – sample

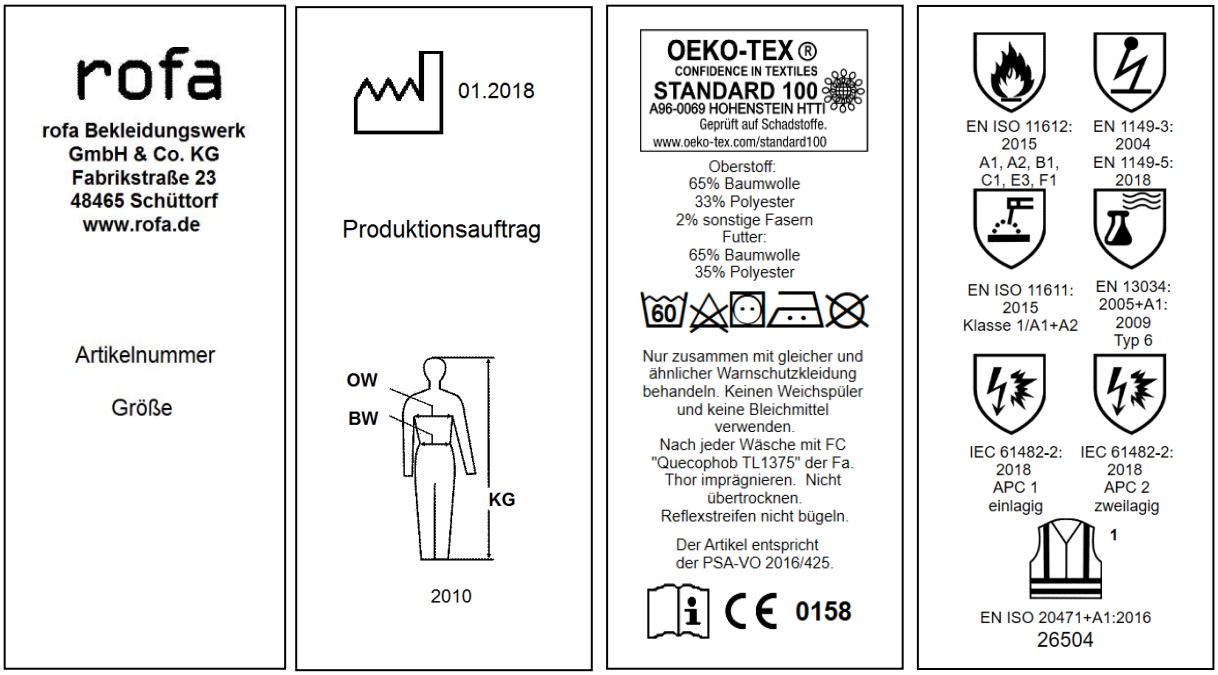


Illustration 6

Where:

2010 and 26504: Rofa – internal ID numbers

0158: Certified body ID, valid for PPE Class III

5.2 Labels icons

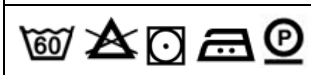
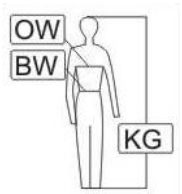
	Manufacturer information with important utilization guidelines. It is imperative to read all the related documents before use!
	Icons Graphic Symbols for a hazard or a purpose/type of application (see also Part 1 Chapter 2.2)
	CE - Marking – see Part 1, Chapter 2.3
	Care instructions – see Part 1, Chapter 5.5
 01.2018	Manufacturing date: January 2018

Table 22

5.3 Sizes

Appropriate fitting equipment can be selected, depending on the user body sizes. Use the sizes chart in our catalogue or under www.rofa.de



OW **Chest size**
Horizontal measurement of chest girth at its widest

BW **Waist size**
Horizontal waist girth, above the hip bones. For ladies at its thinnest

KG **Height**
Vertical full body height, head to heel length (without shoes!)

Make and Design particular sizes fitting are available on demand under psa@rofa.de

	It is prohibited to remove the equipment labels, as long as the item is in use!
	Always use washed garments for sizes fitting! It is recommended that the cotton articles undergo 5 washing/drying cycles before being used for fitting purposes; if new articles are utilized, please also consider the shrinking possibility of the equipment.
	To ensure the full garments perfect fit, we recommend to perform a sizes fitting with all the PPE elements, also including the further protective elements, such as aprons, wrist cuffs, gaiters, etc. (if required).

5.4 Fabric data

The fabric composition is indicated on the label and manufacturer information leaflet and refer to the outer layer. For multiple layers equipment, each separate will be indicated.

5.5 Care instructions

5.5.1 Domestic wash and care

EN ISO 6330:2012 regulates the care instructions for the domestic wash and drying procedures. Fabric, trims and garments are tested according to this standard, both by the certified bodies, and our Rofa in-house testing facility.

According to EN ISO 3758:2012 Rofa label the following care instructions:

	Regular washing In compliance with the highest indicated temperature (here 60°C)		Delicate dryer program Low dryer temperature, max 60°C
	Delicate washing*		Dryer regular programme
	Do not wash		Do not dry in dryer
	No bleaching No chlorine or oxygen bleaching		
	Low temperature ironing, max. 110°C		High temperature ironing, max. 200°C
	Medium temperature ironing, max. 150°C		Do not iron

Table 23

* Delicate means diminished load, higher water quantity, slow spinning.

If washing is not allowed, dry cleaning could be the alternative. Below, the dry-cleaning symbols and clarifications for dry cleaning.

	Dry cleaning – regular procedure with Perchloroethylene
	Dry cleaning - Delicate procedure**
	Do not dry clean

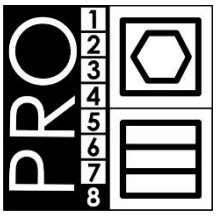
Table 24

** Delicate procedure means diminished load, dwell time and drying temperature

5.5.2 Textiles industrial wash and care

Along with certified bodies, Rofa is testing in controlled conditions fabrics, trims and PPE according to EN ISO 15797:2018. Rofa labels according to the provisions of EN ISO 30023:2021

Example:



➢ Drying in tumble dryers

➢ Drying in tunnel finishers

Washing procedure Number 4/2 according to EN ISO 15797 for dyed (coloured) labour garments will be labelled as Procedure 8

Along with reliable partners, Rofa is also testing the industrial care cycles according to the specific requirements.

⚠	We strongly recommend to independently test the parameters, because the wash and care processes might vary in the industrial textile care branch.
⚠	The SJ Articles are only designed as domestic wash and care products. Industrial care procedures and parameters must be individually tested and designed.

5.5.3 Number of care cycles

The PPE performance can alter during the equipment lifetime, slipping below the standard limits (also called aging process). Rofa sourced out the testing procedures after 5 care cycles according to EN ISO 13688:2013. Information concerning the testing outcomes after further care cycles require additional tests. Specific textile properties, such as flame resistance, brightness, warning-fluorescent pigments colorimetry or laminated fabrics waterproofness are tested by Rofa during way larger test cycles (e. g. 25 or 50). Such data are detailed for specific articles in the third part of the manufacturer information. Additionally, Rofa is testing the garments resistance after 25 and 50 washes, both as industrial and household procedures, in our in-house laboratory and in cooperation with our partners in the textile rental and care services.

Nevertheless, a maximal number of care cycles cannot be indicated, since this is not the single element influencing the clothing lifespan. Major impact elements are also the utilization frequency, mending, storage conditions, etc.

Rofa Bekleidungswerk GmbH & Co. KG
Fabrikstraße 23
48465 Schüttorf

Phone: +49 (0)5923/898-0
Fax: +49 (0)5923/898-800
Mail: info@rofa.de or psa@rofa.de
Internet: www.rofa.de