

# REFSTAR

Radiant Heat Protection

Protection **YOU** Deserve



## Why REFSTAR?

People working in front of high temperatures like iron&steel or glass industry are exposed to high radiant heat which may cause injuries. Non-FR products like cotton or polyester may catch fire. High radiant heat also restricts working conditions.

REFSTAR protective clothing is designed to reflect the radiant heat ensuring people to work more comfortably and safely.

REFSTAR protective clothing should be worn on other protective garments to ensure an additional protection. They should be used as complementary equipment to current protective clothing, not instead of those.

REFSTAR garments are tested and certified according to ISO 11612 standard. Radiant Heat Transfer value of aluminized garments are much higher compared to woven protective fabrics. Radiant Heat Transfer Index is called C according to ISO 11612. There are 4 levels. C1 is the lowest protection level and C4 is the highest protection level.

### Application Areas

- Airport Personel
- Aluminium Workers
- Automotive Industry
- Cement Industry
- Ceramic Industry
- Railways
- Glass Industry
- Iron & Steel Industry
- Shipbuilding
- Welding

Aluminized garments also give protection against molten metal splashes. Molten Aluminium Splash is Index D and Molten Iron Splash is Index E where D1 and E1 are the lowest protection level and D3 and E3 are the highest protection level.

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Group



**REFSTAR**



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Group



**REFSTAR**

**ALUSTAR ULTRA LIGHT**

830100 - Aluminized Suit

[www.kivancgroup.com](http://www.kivancgroup.com)

## ALUSTAR ULTRA LIGHT | Aluminized Suit

### Model Details

- » This suit is designed to protect the wearer against high radiant, convective and contact heat.
- » The set contains the following items
  - » Jacket with back space for covering SCBA cylinders
  - » Trousers
  - » Shroud with gold coated visor and EN 397 certified helmet
  - » Gloves
  - » Gaiters with EN 15090 certified rubber boots
  - » Carrying bag
- » This suit may be used in
  - » proximity firefighting
  - » front or inside ovens during maintenance
  - » glass or iron&steel industries in front of molten glass or metals
  - » areas where there is high radiant heat



827100 - Wolf Shroud



805100 - Tyler Gloves



817100 - Harvey Gaiters

### Outershell

378 ADK 290  
290 g/m<sup>2</sup>

Aluminized knitted para-aramid  
fabric with Dual Mirror Technology

**Moisture Barrier**  
4000 Heat Resistant  
nonwoven  
laminated to a  
PU Membran

**Heat Barrier**  
5004 Two layers of aramid  
felt quilted to an  
Aramid/Viscose FR  
inner lining



EN 1486





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**REFSTAR**

**ALUSTAR**

830102 - Aluminized Suit

[www.kivancgroup.com](http://www.kivancgroup.com)

**Model Details**

- » This suit is designed to protect the wearer against high radiant, convective and contact heat.
- » The set contains the following items
  - » Jacket with back space for covering SCBA cylinders
  - » Trousers
  - » Shroud with gold coated visor and EN 397 certified helmet
  - » Gloves
  - » Gaiters with EN 15090 certified rubber boots
  - » Carrying bag
- » This suit may be used in
  - » proximity firefighting
  - » front or inside ovens during maintenance
  - » glass or iron&steel industries in front of molten glass or metals
  - » areas where there is high radiant heat



827100 - Wolf Shroud



805100 - Tyler Gloves

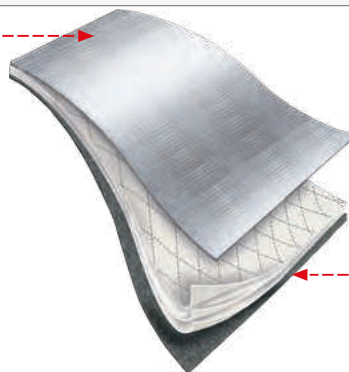


817101 - Curtis Gaiters

**Outershell**

304 APC 500  
500 g/m<sup>2</sup>

Aluminized Glass Fabric with  
Double Reflection Tehnology

**Heat Barrier**

5005 Three layers of aramid  
felt quilted to an  
Aramid/Viscose FR  
inner lining



EN 1486



378

**ADK 290** g/m<sup>2</sup>

Aluminized knitted para-aramid fabric with Dual Mirror Technology



EN ISO 11612  
A1 A2 B1 C4 D2 E2 F1



302

**ADK 460** g/m<sup>2</sup>

Aluminized woven para-aramid with Transfer Foil Technology



EN ISO 11612  
A1 A2 B1 C3 D3 E3 F1



**KIVANC**  
Group



**REFSTAR**

**FELIX**

837114 - Jacket & Trousers

[www.kivancgroup.com](http://www.kivancgroup.com)





363 378

FRONT FABRIC

**ADK 290** g/m<sup>2</sup>

Aluminized knitted para-aramid fabric with  
Dual Mirror Technology

BACK FABRIC

**Heavy-Metal 330** g/m<sup>2</sup> Double Face

54% Viscose FR, 20% Wool, 20% Polyamid  
5% Aramid, 1% Antistatic



EN ISO 11612  
A1 A2 B1 C4 D2 E2 F1



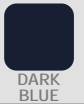
EN ISO 11612  
A1 A2 B1 C1  
D3 E3 F1



EN 1149-3  
EN 1149-5



EN ISO 11611  
Class 2



DARK  
BLUE

363 302

FRONT FABRIC

**ADK 460** g/m<sup>2</sup>

Aluminized woven para-aramid fabric

BACK FABRIC

**Heavy-Metal 330** g/m<sup>2</sup> Double Face

54% Viscose FR, 20% Wool, 20% Polyamid  
5% Aramid, 1% Antistatic



EN ISO 11612  
A1 A2 B1 C3 D3 E3 F1



EN ISO 11612  
A1 A2 B1 C1  
D3 E3 F1



EN 1149-3  
EN 1149-5



EN ISO 11611  
Class 2



DARK  
BLUE

**KIVANC**  
Group



**REFSTAR**  
**GLEEN**

837157 - Jacket & Trousers

www.kivancgroup.com

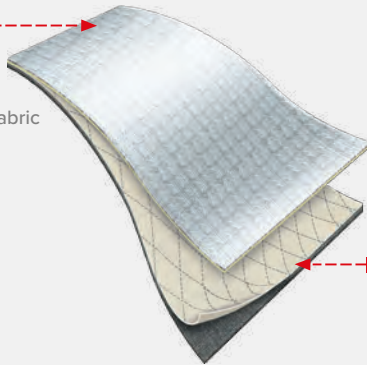




### Outershell

**378 ADK 290**  
290 g/m<sup>2</sup>

Aluminized knitted para-aramid fabric  
with Dual Mirror Technology



### Heat Barrier

5003 Heat and flame  
resistant non-woven  
quilted to  
Aramid/Viscose FR  
inner lining  
250 g/m<sup>2</sup>



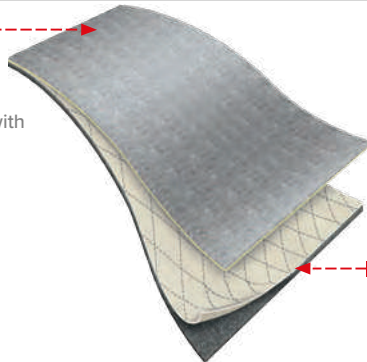
EN ISO 11612  
A1 A2 B1 C4 D2 E2 F1

819

### Outershell

**302 ADK 460**  
460 g/m<sup>2</sup>

Aluminized woven para-aramid with  
Transfer Foil Technology



### Heat Barrier

5003 Heat and flame  
resistant non-woven  
quilted to  
Aramid/Viscose FR  
inner lining  
250 g/m<sup>2</sup>



EN ISO 11612  
A1 A2 B1 C3 D3 E3 F1

879

**KIVANC**  
Group



**REFSTAR**

**CLIFF**

834109 - Jacket & Trousers

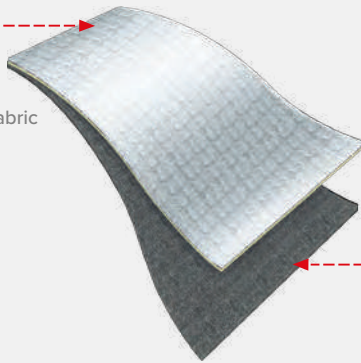
www.kivancgroup.com



### Outershell

**378 ADK 290**  
290 g/m<sup>2</sup>

Aluminized knitted para-aramid fabric  
with Dual Mirror Technology



**Inner Lining**  
6000 Aramid/Viscose FR  
120 g/m<sup>2</sup>



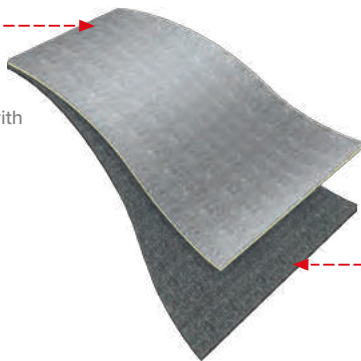
EN ISO 11612  
A1 A2 B1 C4 D2 E2 F1

825

### Outershell

**302 ADK 460**  
460 g/m<sup>2</sup>

Aluminized woven para-aramid with  
Transfer Foil Technology



**Inner Lining**  
6000 Aramid/Viscose FR  
120 g/m<sup>2</sup>



EN ISO 11612  
A1 A2 B1 C3 D3 E3 F1

839

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**REFSTAR**

**COOPER**

818112 - Poncho

[www.kivancgroup.com](http://www.kivancgroup.com)





378

**ADK 290**g/m<sup>2</sup>

Aluminized knitted para-aramid fabric with Dual Mirror Technology



EN ISO 11612  
A1 A2 B1 C4 D2 E2 F1



302

**ADK 460** g/m<sup>2</sup>

Aluminized woven para-aramid with Transfer Foil Technology



EN ISO 11612  
A1 A2 B1 C3 D3 E3 F1



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**REFSTAR**

**BRUNO**

835105 - Overjacket

[www.kivancgroup.com](http://www.kivancgroup.com)



363 378

FRONT FABRIC

**ADK 290** g/m<sup>2</sup>

Aluminized knitted para-aramid fabric with  
Dual Mirror Technology

BACK FABRIC

**Heavy-Metal 330** g/m<sup>2</sup> Double Face

54% Viscose FR, 20% Wool, 20% Polyamid  
5% Aramid, 1% Antistatic



EN ISO 11612  
A1 A2 B1 C4 D2 E2 F1



EN ISO 11612  
A1 A2 B1 C1  
D3 E3 F1



EN 1149-3  
EN 1149-5



EN ISO 11611  
Class 2



DARK  
BLUE

363 302

FRONT FABRIC

**ADK 460** g/m<sup>2</sup>

Aluminized woven para-aramid fabric

BACK FABRIC

**Heavy-Metal 330** g/m<sup>2</sup> Double Face

54% Viscose FR, 20% Wool, 20% Polyamid  
5% Aramid, 1% Antistatic



EN ISO 11612  
A1 A2 B1 C3 D3 E3 F1



EN ISO 11612  
A1 A2 B1 C1  
D3 E3 F1



EN 1149-3  
EN 1149-5



EN ISO 11611  
Class 2



DARK  
BLUE

**KIVANC**  
Group



**REFSTAR**

**DREW**

835101 - Overjacket

www.kivancgroup.com





378

**ADK 290** g/m<sup>2</sup>

Aluminized knitted para-aramid fabric with Dual Mirror Technology



EN ISO 11612  
A1 A2 B1 C4 D2 E2 F1



302

**ADK 460** g/m<sup>2</sup>

Aluminized woven para-aramid with Transfer Foil Technology



EN ISO 11612  
A1 A2 B1 C3 D3 E3 F1



**KIVANC**  
Group



**REFSTAR**

**MELVIN**

818102 - Apron

[www.kivancgroup.com](http://www.kivancgroup.com)



378

**ADK 290**g/m<sup>2</sup>

Aluminized knitted para-aramid fabric with Dual Mirror Technology



EN ISO 11612  
A1 A2 B1 C4 D2 E2 F1



302

**ADK 460**g/m<sup>2</sup>

Aluminized woven para-aramid with Transfer Foil Technology



EN ISO 11612  
A1 A2 B1 C3 D3 E3 F1



**KIVANC**  
Group



**REFSTAR**

**TROY**

818103 - Apron

[www.kivancgroup.com](http://www.kivancgroup.com)





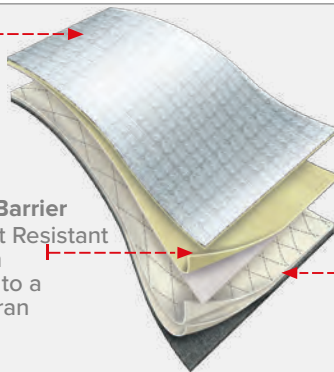
- » Gold coated polycarbonate visor
- » Glass fiber reinforced visor frame
- » 3M H700 helmet fixed to the shroud by means of Velcro tapes

### Outershell

**378 ADK 290**  
290 g/m<sup>2</sup>

Aluminized knitted para-aramid fabric with Dual Mirror Technology

**Moisture Barrier**  
4000 Heat Resistant  
nonwoven  
laminated to a  
PU Membran



**Heat Barrier**  
5004 Two layers of aramid  
felt quilted to an  
Aramid/Viscose FR  
inner lining



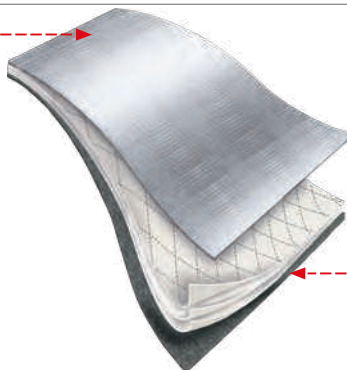
EN 1486

002

### Outershell

**304 APC 500**  
500 g/m<sup>2</sup>

Aluminized Glass Fabric with  
Double Reflection Tehnology



**Heat Barrier**  
5005 Three layers of aramid  
felt quilted to an  
Aramid/Viscose FR  
inner lining



EN 1486

003

**KIVANC**  
Group



**REFSTAR**

**WOLF**

827100 - Shroud

www.kivancgroup.com



- » Gold coated polycarbonate visor
- » Glass fiber reinforced visor frame
- » Bullard 911 CR helmet fixed to the shroud by means of Velcro tapes

378

**ADK 290**g/m<sup>2</sup>

Aluminized knitted para-aramid fabric with Dual Mirror Technology



EN ISO 11612  
A1 A2 B1 C4 D2 E2 F1



302

**ADK 460**g/m<sup>2</sup>

Aluminized woven para-aramid with Transfer Foil Technology



EN ISO 11612  
A1 A2 B1 C3 D3 E3 F1



**KIVANC**  
Group



**REFSTAR**

**PAUL**

827103 - Shroud

[www.kivancgroup.com](http://www.kivancgroup.com)





378

**ADK 290**g/m<sup>2</sup>

Aluminized knitted para-aramid fabric with Dual Mirror Technology



EN ISO 11612  
A1 A2 B1 C4 D2 E2 F1



302

**ADK 460**g/m<sup>2</sup>

Aluminized woven para-aramid with Transfer Foil Technology



EN ISO 11612  
A1 A2 B1 C3 D3 E3 F1



**KIVANC**  
Group



**REFSTAR**

**JACK**

827101 - Hood

[www.kivancgroup.com](http://www.kivancgroup.com)

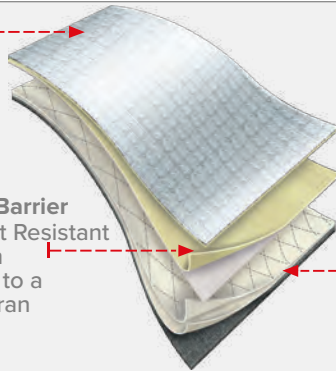


## Outershell

**378 ADK 290**  
290 g/m<sup>2</sup>

Aluminized knitted para-aramid fabric with Dual Mirror Technology

**Moisture Barrier**  
4000 Heat Resistant nonwoven laminated to a PU Membran



**Heat Barrier**  
5004 Two layers of aramid felt quilted to an Aramid/Viscose FR inner lining

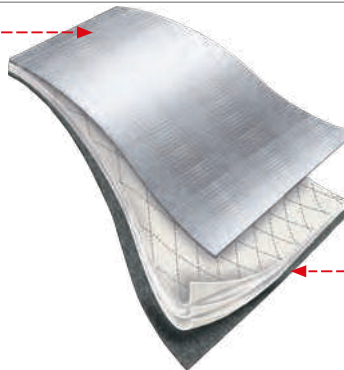


EN 1486

## Outershell

**304 APC 500**  
500 g/m<sup>2</sup>

Aluminized Glass Fabric with Double Reflection Technology



**Heat Barrier**  
5005 Three layers of aramid felt quilted to an Aramid/Viscose FR inner lining



EN 1486

**KIVANC**  
Group



**REFSTAR**

**TYLER**

805100 - Gloves

[www.kivancgroup.com](http://www.kivancgroup.com)





### Outershell

302 ADK 460

460 g/m<sup>2</sup>

Aluminized woven para-aramid with Transfer Foil Technology



EN 407  
433444



### Inner Lining

Heat Resistant Fleece

939

**KIVANC**  
Group



**REFSTAR**

**TERRY**

805105 - Gloves

[www.kivancgroup.com](http://www.kivancgroup.com)

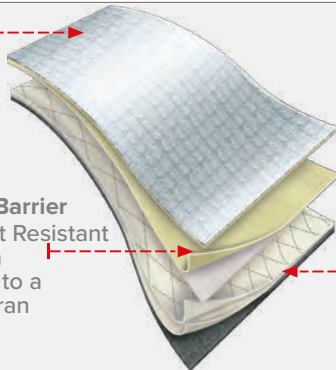


## Outershell

**378 ADK 290**  
290 g/m<sup>2</sup>

Aluminized knitted para-aramid  
fabric with Dual Mirror Technology

**Moisture Barrier**  
4000 Heat Resistant  
nonwoven  
laminated to a  
PU Membran



**Heat Barrier**  
5004 Two layers of aramid  
felt quilted to an  
Aramid/Viscose FR  
inner lining



EN 1486

002

**KIVANC**  
Group



**REFSTAR**

**HARVEY**

817100 - Gaiters

[www.kivancgroup.com](http://www.kivancgroup.com)

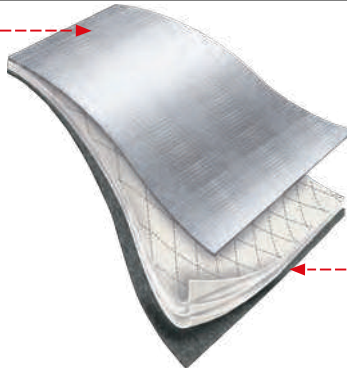




### Outershell

304 APC 500  
500 g/m<sup>2</sup>

Aluminized Glass Fabric with  
Double Reflection Tehnology



### Heat Barrier

5005 Three layers of aramid  
felt quilted to an  
Aramid/Viscose FR  
inner lining



EN 1486

003

**KIVANC**  
Group



**REFSTAR**

**CURTIS**

817101 - Gaiters

[www.kivancgroup.com](http://www.kivancgroup.com)



378

**ADK 290** g/m<sup>2</sup>

Aluminized knitted para-aramid fabric with Dual Mirror Technology



EN ISO 11612  
A1 A2 B1 C4 D2 E2 F1



302

**ADK 460** g/m<sup>2</sup>

Aluminized woven para-aramid with Transfer Foil Technology



EN ISO 11612  
A1 A2 B1 C3 D3 E3 F1



304

**APC 500** g/m<sup>2</sup>

Aluminized Glass Fabric with Double Reflection Technology



EN ISO 11612 A1 B1 C4



**KIVANC**  
Group



**REFSTAR**

**STAN**

817102 - Gaiters

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# STANDARDS FOR INDUSTRIAL SOLUTIONS

There are several standards regarding personal protective clothing:

- EN ISO 11612 – Heat, Flame & Molten Metal Splash
- EN ISO 11611 – Welding Protection
- EN ISO 14116 – Heat & Flame Protection, Limited Flame Spread
- EN 1149-5 – Electrostatic Properties
- EN 61482-1-2 – Electric Arc Protection (Box Test)
- EN 61482-1-1 – Electric Arc Protection (Open Arc)
- EN 20471 – High Visibility
- EN 343 – Protection against Rain

Check the label of your garment in order to learn the protection level.

## EN ISO 11612 Heat & Flame Protection



The purpose of this standard is to provide minimum performance requirements for clothing to protect against heat and flame. Within many of the hazards listed in this standard there are three performance levels, Level 1 to indicate exposure to perceived low risk, Level 2 to indicate exposure to perceived medium risk and Level 3 to indicate exposure to perceived high risk. For protection against radiant heat, there is a fourth performance level, to take into account high performance materials such as aluminized and similar materials. The level of personal protection to be provided should be based on the outcome of the risk assessment. For complete protection against exposure to heat and/or flame, it is probable that it will be necessary to protect the head, face, hands and/or feet with suitable PPE and in some cases, appropriate respiratory protection may also be considered as necessary.

- Code A: Limited Flame Spread (A1 or A2)
- Code B: Protection against Convective Heat (B1, B2 or B3)
- Code C: Protection against Radiant Heat (C1, C2, C3 or C4)
- Code D: Protection against Molten Aluminium (D1, D2 or D3)
- Code E: Protection against Molten Iron Splash (E1, E2 or E3)
- Code F: Protection against Contact Heat (F1, F2 or F3)

## EN ISO 11611 Welding Protection



EN ISO 11611 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. For the protection of the wearer's head and feet, EN ISO 11611 is only applicable for hoods and gaiters. EN ISO 11611 does not cover requirements for hand protection. This type of protective clothing is intended to protect the wearer against spatter (small splashes of molten metal), short contact time with flame, radiant heat from the arc, and minimizes the possibility of electrical shock by short term, accidental contact with live electrical conductors at voltages up to approximately 100 V d.c. in normal conditions of welding. Sweat, soiling or other contaminants can affect the level of protection provided against short term accidental contact with live electric conductors at these voltages. EN ISO 11611 specifies two classes with specific performance requirements, i.e. Class 1; the lower level and Class 2; the higher level.

Class 1 is protection against less hazardous welding techniques and situations, causing lower levels of spatter and radiant heat.

Class 2 is protection against more hazardous welding techniques and situations, causing higher levels of spatter and radiant heat.

For adequate overall protection against the risks to which welders are likely to be exposed, personal protective equipment (PPE) covered by other standards should additionally be worn to protect the head, face, hands and feet.

## EN ISO 14116 Heat & Flame Protection, Limited Flame Spread



ISO 14116 specifies the performance requirements for the limited flame spread properties of materials, material assemblies and protective clothing in order to reduce the possibility of the clothing burning and thereby itself constituting a hazard. Additional requirements for clothing are also specified.

Protective clothing complying with this International Standard is intended to protect workers against occasional and brief contact with small igniting flames, in circumstances where there is no significant heat hazard and without the presence of another type of heat. When protection against heat hazards is necessary in addition to protection against limited spread flammability, then standards, such as EN ISO 11612, are more appropriate. A classification system (index 1, index 2, index 3) is given for materials, material assemblies and garments which are tested according to EN ISO 15025, Procedure A.

## EN 1149-5 Electrostatic Properties



This European Standard specifies material and design requirements for electrostatic dissipative protective clothing, used as part of a total earthed system, to avoid incendiary discharges. The requirements may not be sufficient in oxygen enriched flammable atmospheres. This European Standard is not applicable for protection against mains voltages.

### The standard specifies 3 areas:

- 1- Material performance requirements
- 2- Design requirements
- 3- Marking & guidance

Ad 1) Performance tests should be made after pretreatment for protective clothing produced from woven fabrics

### Electrostatic requirements

Materials with conduction threads in stripe or grid pattern, the maximum space shall not exceed 10 mm in one direction

### Surface Resistance & Induction Charging

- |               |                           |
|---------------|---------------------------|
| EN 1149-1     | ≥ 2.5 × 10 <sup>9</sup> Ω |
| EN 1149-3 - 2 | Half decay time > 4 s     |
|               | Shielding factor > 0.2    |

## IEC 61482 Electric Arc Protection



IEC 61482-2:2018

This standard regulates heat and flame resistant clothing for workers exposed to electric arcs. A direct and constrained electric arc in a low voltage circuit is used to classify material / garments in defined arc protection classes.

## EN 61482-1-2 Box Test

- APC 1: Fabrics that pass 4kA current, burning time less than 5 seconds.
- APC 2: Fabrics that pass 7kA current, burning time less than 5 seconds.

Garment test must be done along with material tests. Both tests are necessary for certification. Garment class will be defined according to the results of tests. Garment protection level should be clearly written on the label.

If a garment consists of different layers this should be written on the user manual. Never use synthetic and flammable fabrics inside these garments. You can wear these garments with the other fire retardant suits to increase the safety performance.

## EN 61482-1-1 Open Arc Test

**ATPV:** Arc Thermal Performance Value (cal/cm<sup>2</sup>)  
**E<sub>bt</sub>:** Energy to Break Open Value  
**HAF:** Heat Attenuation Factor

EN 61482-1-1 specifies test methods to measure the arc thermal performance value of materials intended for use in heat- and flame-resistant clothing for workers exposed to the thermal effects of electric arcs and the function of garments using these materials.

## EN 20471 High Visibility



EN ISO 20471

EN ISO 20471 is the harmonized European standard for high visibility clothing. It specifies the requirements for signaling the users presence day or night. It intends to make users in hazardous situations conspicuous under any light conditions. The standard provides for two performance parameters:

- X: Surface of fluorescent and retroreflective material (3 levels)  
Y: Quality of the retro-reflecting materials (2 levels)

## EN 343 Protection Against Rain



EN 343

EN 343 is the harmonised European standard that applies to garments worn in adverse weather conditions. It specifies the characteristics of protective clothing against the influence of foul weather, wind and cool above -5°C. The standard provides for two performance parameters:

- X: Waterproofness (3 levels)  
Y: Breathability properties (3 levels)





**Established in 1980, Kivanç Group continues its activities in 4 divisions;  
Safety, Engineering, Mining and Technical Textile.**

**In Safety Division,** personal protective clothing against heat and flame, static discharges, arc flashes, molten metals, welding spatters is produced.

Our company has established the first heat laboratory for personal protective garments in Turkey. Following the second investment that we have made, our physical test laboratory has commenced to provide services. In our heat and physical test laboratory, raw materials (fabrics, accessories etc.,) and finished products (protective garments) are tested in accordance with EN and ISO standards. In our laboratory, which serves for R&D purposes also, new products are developed and all controls are performed before CE certification. These controls enhance product reliability and expedite required processes.

Thanks to the barcode system which have been integrated to our ERP (Enterprise Resource Planning) software that we have been using since 2009, the traceability has been made available and all product processes can be monitored. Depending upon work order number on the label of garments produced by our company, date of production; materials used in that production; date, lot number and supplier of the raw materials could be traced back. We also offer Product Liability Insurance for protective garments we produce. The cost of damages that may arise from the incidents to be encountered by the people using our garments due to material and faulty workmanship have been guaranteed within this insurance.

**In Engineering Division,** thermal insulation applications to reduce the heat loss are done by using high temperature resistant glass fiber based materials. We manufacture removable insulation pads for turbines, plastic injection molding machines, textile dyeing machines, exhaust parts of vehicles, valves etc. Correct materials are used by calculating the heat loss, minimum thickness of insulation, surface temperature etc. Thermal imaging cameras are used to find the heat loss areas.

**In Mining Division,** Silica (Quartz) Sand and Musselstone are extracted.

- Silica (Quartz) Sand is used in potable and waste water filtration, in construction chemicals, in railroads as a skid preventing sand, in hippodromes, in pitch and sports fields and in many other fields.

- Musselstone is a compact stone that consists of limestone, silica and fossil sediment (such as clams and mussels). It is in light beige color, highly or partly porous with fossil according to its formation. Musselstone has been used frequently in artistic works that require aesthetic, elegance and art such as interior spaces, coves, columns, jambs, exedras, wall copings, fire places, landscaping, reliefs, crown gates, portal, altars, minibars, birdhouses, benevolence stones. Nowadays, it is used for restoration of historical buildings, and in new buildings, kiosks, villas waterfront residences, garden walls, walking trails, and in similar places.

**In Technical Textile Division,** we start from fiber and produce our own technical yarns and fabrics.





# KIVANÇ Group

## Head Quarters:

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