



**Protal.**  
advanced technology

A  
NEW  
FORCE  
IN  
PROTECTIVE  
CLOTHING



**Waxman**





# The revolutionary new range of protective clothing solutions from Waxman

For over a decade Waxman and our partners have successfully introduced and provided our branded Protex products to international markets which include major utilities, civil engineering, construction and petrochemical companies.

Now, with a new super high performance type Protex fibre (Oeko-Tex Class 1 compliant), Waxman introduces a new range of Partner solutions from general flame retardant workwear to very high performance niche applications. "Welcome" to the Protal family of products.

Protal is the result of many years of intensive research and development by the Waxman technical team and is in response to some of the biggest end users' requests for the next generation of protective clothing.

This brand new innovative range of fabrics doesn't just offer different levels of protection against hazards like flame, arcing and metal splash: thanks to ground-breaking technology, it also does the equally tough job of remaining comfortable and cooler thanks to breathable properties previously impossible in this type of protective clothing.

Waxman's uniquely balanced blend of Protex fibre, So FR viscose and other technical fibres produce an inherently flame retardant fabric range that's strong and extremely durable, yet lightweight, flexible and breathable.

Protal is a truly world-class new product from the world's experts in flame retardant fibres and blends.



# Protal - The next generation of FR PPE solutions from Waxman

## How Protal works

Fire requires three elements; heat, fuel and oxygen. Remove any one of these factors and the fire is effectively extinguished. When a flame comes into contact with Protal's unique intimate blends, tiny amounts of inert, non-burning gases push the oxygen away from the surface to stop the burning process.

As soon as the flaming stops and the source is removed, gas production stops and a charred barrier remains – no melting, no dripping and no material sticking to the skin.

The charring action and protected integrity of the fabric gives the wearer valuable time to react appropriately, whilst being fully protected.



Before



After

Ralph Test carried out at BTTG.

The test involves temperatures of up to 900°C with 8 flame emitters enveloping the garment and mannequin in flame.

## The unique Protal blend

High-performance fibres intimately blended with long-staple combed cotton without any chemical treatment give Protal its unparalleled soft, natural touch and appearance. Each balanced blend of fibres allows the resulting fabric to have highly effective moisture management properties.

Protal's inherent flame retardant properties will not deteriorate or diminish; they are literally 'built-in' to the fabric. As well as eliminating the need for costly re-treatment and unpleasant odours, this also gives Protal the edge in practical comfort. There is no loss in performance, even after repeated laundering (including industrial), dry or spot-cleaning.

Protective clothing manufactured with any of the blends in the Protal range, stays looking good for longer, performing right to the end of its lifecycle.



## Applications and options

Protal is available from very lightweight fabrics. The carefully balanced blends of fibres accept all colours, including Hi-visibility.

As you would expect, to stay at the cutting edge of FR technology, Waxman invests heavily in refining the range in order to improve product performance and maintain its position in the protective clothing market. Naturally, we also insist on the same strict processing controls from our partners.

Protal fabrics are suitable for woven, knitted or non-woven protective workwear and are designed for use as next to skin, liner, inter-liner and outer fabric.

Waxman's knowledgeable and skilled partners are constantly developing new yarn, fabric and garment solutions for a number of diverse applications.

Specifiers and procurement personnel alike can rest assured that the Protal range offers a wide choice of fabric options to cover the increasingly complex and ever-changing global compliancy laws and world safety standards.



Protal 1 is Waxman's standard industrial fibre blend featuring the new generation of Protex fibre; the next generation in FR PPE solutions.

Our partner producers take this highly technical fibre and carefully blend it with the very best complementary fibres to produce workwear that hundreds of thousands of workers rely on every day.

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## Features and Benefits of Protal® 1

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### Inherently FR

- Permanent FR performance for lifetime of the garment
- Does not wash out
- No deterioration in FR performance
- No chemical treatments or re-treatments
- More environmentally friendly than treatments
- No unpleasant odours
- Added security (safety)
- No loss of mechanical properties
- More comfortable than treated cotton

### Blending Fibre

- Blends easily with other fibres
- Cost-effective
- Breathable fabric
- Comfortable for the wearer
- Good moisture management

### Easily Dyed

- Hi-visibility yellow
- Multiple shades available
- Cationic dyes for cost effective dyeing
- Good colour fastness for longer life
- Good batch to batch consistency

### Dimensional Stability

- Application of finishing treatments at HIGH (standard) temperature
- Good launderability including Industrial

### Target Markets

- General FR workwear
- Petrochemical
- Utilities
- Police / Military undergarments

### Most Common Applications

- Woven coverall, jacket, trouser, shirting
- Knitted undergarments, polo-shirt, sweatshirt, fleece, balaclava



Convective Heat



Radiant Heat



Electric Arc



Hi-Visibility



Surface & Edge ignition



FIA





Protal 3 takes modacrylic blends to a new technical level, providing enhanced protection for welding applications at lighter weights, edge ignition and general metal splash protection. Specifically designed for multi-risk avoidance, Protal 3 also offers improved fabric strength.

## Features and Benefits of Protal® 3

### Inherently FR

- Permanent FR performance for lifetime of the garment
- Does not wash out
- Increased performance – EN 11612 A2  
EN 61482-1-2 Class 2 (Electric arc compliant)  
EN 11611 Class 2 (welding)  
EN 15614
- No chemical treatments or re-treatments
- More environmentally friendly than treatments
- No unpleasant odours
- Added security (safety)
- Improved mechanical properties
- More comfortable than treated cotton

### Patent Protected Blend

- Unique invention technology
- Security against copying

### Blending Fibre

- Multi fibre blend
- Light weight with high strength
- Breathable and comfortable

### Technical Fibre Blend

- Intimate, multi fibre blend
- Strictly controlled
- Partner spinners only
- Managed supply chain only

### Easily Dyed

- EN ISO 20471 Hi-visibility orange
- EN ISO 20471 Hi-visibility yellow
- Multiple shades available
- Cationic dyes for cost effective dyeing
- Good colour fastness for longer life
- Good batch to batch consistency

### Target Markets

- Multi-risk performance FR workwear
- Welding
- Low to mid risk metal splash industries
- Wildland firefighting
- Petrochemical
- Utilities

### Most Common Applications

- Woven coverall, jacket, trouser, shirting
- Knitted, polo-shirt, sweatshirt, fleece



Convective Heat



Wildland Firefighter



Radiant Heat



Electric Arc



Hi-Visibility



Surface & Edge ignition



Molten Metal



FIA







Protal 5 provides a globally compliant lightweight fabric. The unique blend has a super-strength, rip-stop grid that significantly increases the overall performance of this fabric, enabling a practical and extremely lightweight solution. For the first time, comfort and safety is now introduced to this market sector which has previously been dominated by aramid-only fabrics.



Global Compliance

## Features and Benefits of Protal® 5

### Inherently FR

- Permanent FR performance for lifetime of the garment
- Does not wash out
- Increased performance – EN 11612 A1 and A2  
EN 61482-1-2 Class 2 (Electric arc compliant)  
EN 11611 Class 2 (welding)  
EN 15614  
NFPA 2112 and NFPA 1977
- No chemical treatments or re-treatments
- More environmentally friendly than treatments
- No unpleasant odours
- Added security (safety)
- Improved mechanical properties
- More comfortable than treated cotton

### Patent Protected Blend

- Unique invention technology
- Security against copying

### Blending Fibre

- Multi fibre blend
- Light weight with high strength
- Breathable and comfortable

### Technical Fibre Blend

- Intimate, multi fibre blend
- Strictly controlled
- Partner spinners only
- Managed supply chain only

### Easily Dyed

- EN ISO 20471 Hi-visibility orange
- EN ISO 20471 Hi-visibility yellow
- Multiple shades available
- Cationic dyes for cost effective dyeing
- Good colour fastness for longer life
- Good batch to batch consistency

### Target Markets

- Universally compliant FR workwear (EN 11612 & NFPA 2112)
- Military
- Wildland firefighting
- FIA compliant

### Most Common Applications

- Woven coverall, jacket, trouser, shirting



Convective Heat



Wildland Firefighter



Radiant Heat



Electric Arc



Hi-Visibility



FIA



Surface & Edge ignition



Molten Metal



EU Test



EN 13937

Tear resistance

EN 11611

Welders

Flame A1

Flame A2

Metal drops class 1

Metal drops class 2

EN 11612

Flame and heat

Iron splash E

EN 20471

Hi-visibility

GO/RT 3279

Hi-visibility

EN 13034 type 6

Chemical

EN 61482-1-1

Electric arc

EN 61482-1-2 Class 1

Electric arc

EN 61482-1-2 Class 2

Electric arc

EN 1149-5

Antistatic

EN 61340-5-1

E.S.D.

EN 15614

Wildland fire

EN 343

Foul weather

US Test



ANSI 107

Hi-visibility

NFPA 1975

Stationwear

NFPA 70E

Electric arc

NFPA 2112

Flash fire

NFPA 1977

Wildland fire

South Africa



SANS 1423-1

Flammability

SANS 724:2010

Electric arc

World



ISO 15384

Wildland fire

AS/NZS 4824

Wildland fire

FIA 8856-2000

Racing Drivers



Standard Industrial

Multi-Risk Avoidance

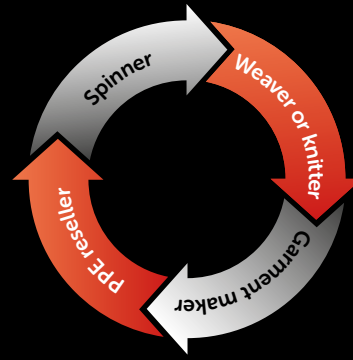
Globally Compliant

|  | ★★★                                 | ★★★★               | ★★★★★★                             |
|--|-------------------------------------|--------------------|------------------------------------|
|  | Typically >270gsm                   |                    |                                    |
|  | ✓                                   | ✓                  | ✓                                  |
|  | ✗                                   | ✓                  | ✓                                  |
|  | ✓                                   | ✓                  | ✓                                  |
|  | Typically >300gsm                   | Typically >250gsm  | Typically >250gsm                  |
|  | ✓                                   | ✓                  | ✓                                  |
|  | Typically >270gsm                   | ✓                  | ✓                                  |
|  | ✓                                   | ✓                  | ✓                                  |
|  | ✓                                   | ✓                  | ✓                                  |
|  | ✓                                   | ✓                  | ✓                                  |
|  | ✓                                   | ✓                  | ✓                                  |
|  | ✓                                   | ✓                  | ✓                                  |
|  | ✓                                   | ✓                  | ✓                                  |
|  | ✓                                   | ✓                  | ✓                                  |
|  | ✗                                   | ✓                  | ✓                                  |
|  | when laminated                      | when laminated     | when laminated                     |
|  | ✓                                   | ✓                  | ✓                                  |
|  | ✓                                   | ✓                  | ✓                                  |
|  | ✓ 240gsm<br>10.5cal/cm <sup>2</sup> | ✓                  | ✓ 180gsm<br>9.3cal/cm <sup>2</sup> |
|  | ✗                                   | ✗                  | ✓                                  |
|  | ✗                                   | ✗                  | ✓                                  |
|  | ✓                                   | ✓                  | ✓                                  |
|  | ✓                                   | ✓                  | ✓                                  |
|  | ✗                                   | ✗                  | ✓                                  |
|  | ✗                                   | ✗                  | ✓                                  |
|  | ✓ Knitwear<br>Only                  | ✓ Knitwear<br>Only | ✓ Knitwear<br>Only                 |

## Our partnerships

Waxman brings together the world's best technical spinning companies, weavers, knitters, garment makers and PPE resellers. Many of our partners are award-winning technical innovators, specialising in developing advanced textile products.

You'll find the full list of Protal Partnership members at [www.protal.co.uk](http://www.protal.co.uk)



## Protal quality control

As you'd expect, all our partners adhere to a stringent quality control programme which we regularly review and refine, to ensure a consistently high level of both quality and protection.



## Look for the label

Always look for the official Protal label. It's your assurance of outstanding quality, protection and compliance. All genuine Protal products carry the Protal identification labels.



## Testing

Waxman regularly push our blends and products to the limit. Our Technical Team (working with recognised laboratories) specialise in simulating 'real-life' scenarios and situations to verify every one of our blends, so that they not only meet compliancy criteria in global markets but go above and beyond those standards.



Image of Protal fabric passing EN 11612-E (Iron splash)

# The Waxman Group

Protal Ltd is a subsidiary of the Waxman Group of Companies based in Elland, West Yorkshire.

The Group's activities comprise three distinct business areas – the distribution of fibres, ceramics and renewable energy in the form of solar technologies.

Waxman's fibre business, centres around Protex which is produced by Kaneka Corporation of Japan, was first established over 50 years ago.

Through a network of carefully chosen partners Waxman has developed strong relationships in Asia, in addition to its core business in Europe, focusing and developing newly emerging global markets for Flame Retardant protective-wear products.

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## Contact

Protal Ltd  
Grove Mills, Elland  
West Yorkshire  
HX5 9DZ  
England

**Telephone**  
+44 (0) 1422 310600

**E-mail**  
info@protal.co.uk

**Website**  
www.protal.co.uk



Protal® is a registered trademark of Waxman Group

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Protex® is manufactured by Kaneka Corporation of Japan and distributed by Waxman Fibres Ltd.

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advanced technology

Specify Protal -  
The new name in  
flame retardant fabrics

[www.protal.co.uk](http://www.protal.co.uk)



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