



PROTECTING THE WORLD'S FIREFIGHTERS



Structural



Bristol

A global force in firefighter protection

With 50 years' experience in the specification, design and manufacture of firefighter Personal Protective Equipment (PPE) it is little wonder that Bristol's garments now protect firefighters in over 110 countries.

This catalogue contains details of Bristol's clothing designed for use in structural fire fighting situations, known in some countries as bunker or turnout gear. The main standards covering structural firefighting garments are EN469 in Europe and the NFPA standards in the USA. You will find more information on these, together with test methods and a glossary of terms, on pages 6 and 7 of the Bristol Technical Introduction catalogue.

The European standard EN469 tests for compliance with:

- Heat transfer of flame and radiation
- Resistance to liquid chemicals
- Water vapour resistance

In the USA, the NFPA 1971 standard also calls for compliance with:

- Thermal Protective Performance (TPP)
- Conductive and Compressive Heat Resistance (CCHR)
- Blood/viral protection
- Total Heat Loss (THL)
- Transmitted and Store Thermal Energy Test

This catalogue shows the base styles from which Bristol's many product variations are made. With over 3500 separate models on offer, we can rightly claim to provide a unique bespoke service to meet firefighters' exact needs.



On pages 10, 11 and 12 of the Bristol Technical Introduction catalogue, you will see the most commonly used feature additions. And you can of course get further information from Bristol or your local distributor.

Structural firefighting clothing to Level 2 must consist of:

- An outer layer to protect the wearer from flame injuries
- Moisture barrier to give protection from external water penetration and allow internal moisture vapour to escape
- Thermal barrier and inner layer/lining providing heat protection from proximity to flame

There are also minimum requirements for reflective material that may be specified as part of EN471. All Bristol garments conform to EN343 water resistance requirements and most to EN1149 for protection against static electricity.

Bristol also meets the variations to European standards, such as the German HuPF, Australian Standard AS/NZ 4697: 2009, Austrian Standard AS-04 and Russian Standard. So, whatever your circumstances, you can be confident that our expertise and product range will meet your needs.



Using the best fabrics to achieve outstanding performance

Fabric choice

Protective clothing for firefighters is manufactured from three layers: outer layer, moisture barrier and thermal barrier.

The choice of fabrics available for each of these layers is described below.

Outer

The following fabrics are supplied and recommended by Bristol because their properties and construction are such that they will neither melt nor ignite.



NOMEX® TOUGH - Widely used over many years by fire brigades throughout the UK and Europe, Nomex® Tough has proved its durability for the rigours of firefighting. It comprises 75% Nomex®, 23% Kevlar® for strength and 2% P140 carbon fibre (which gives the fabric its anti-static properties). It is available in 195 g/m² twill weave in a variety of colours. This fabric gives excellent tensile and abrasion resistance.

TITAN This is a patented TI-technology™ fabric design manufactured using a Nomex®/Kevlar® fibre combination. Because the system uses the 'ACTIVE AIR ENTRAPMENT' system, coupled with the added strength, it offers the highest levels of thermal protection and garment integrity.

TITAN1220 A 220gsm outer shell fabric featuring DuPont™ Nomex® and DuPont™ Kevlar®. **TITAN1220** is a highly breathable fabric designed primarily as an outer shell for structural fire fighter garments, reducing the risk of heat stress by keeping you cool and comfortable, whatever the situation. Tried, tested, and requested by fire fighters worldwide, **TITAN1220** combines the flame resistant properties of Nomex® and Kevlar® to provide dynamic thermal protection and outstanding durability even in the most demanding situations.

The fabric composition is 89% Nomex®, 9% Kevlar®, 2% Antistatic.

TITAN1250 A 270gsm outer shell or single layer fabric featuring Nomex® and Kevlar®. **TITAN1250** is a highly breathable fabric, used both as an outer shell fabric for structural fire fighter garments, and as a single layer fabric in riot police coveralls. The inclusion of a higher percentage of Kevlar® in the composition ensures the fabric has outstanding tensile and tear strength for the most demanding situations.

The fabric composition is 59% Nomex®, 40% Kevlar®, 1% Antistatic.

TITAN1260 A 220gsm outer shell or single layer fabric featuring Nomex®, Kevlar® and PBI®. **TITAN1260** is a highly breathable fabric used as an outer shell fabric for structural fire fighter garments. Like its stable mates **TITAN1220** and **TITAN1250** this fabric features the unique and innovative 'Active Air Entrapment', provided by the double cloth construction. The inclusion of PBI® fibre increases thermal integrity, ensuring that, after cooling, the fabric remains flexible and intact, and does not break open after flashover. The fabric uses a specially developed proprietary yarn with smoother surface to maximise breathability by reducing fibrillation. The Nomex® yarn is slightly raised to protect the PBI® yarn and thus improve abrasion resistance.

The fabric composition is 74% PBI® (proprietary blend), 23% Nomex®, 3% Kevlar®.



PBI Gold is an exclusive blend of fibres that provides protection and comfort. This fabric does not shrink or become brittle after exposure to heat or flame. PBI Gold gives you extra time and mobility to be effective and to get out quickly from the heat and flame, when every second counts.

The fabric composition is 40% PBI and 60% Para-Aramid and is available in a ripstop plain weave, 205 g/m². The natural colour is gold but other colours are available.



PBI Matrix® is a durable matrix of high-strength Aramid filaments which have been woven into the PBI Gold fabric to enhance and reinforce its resistance to wear and tear whilst retaining its heat and flame protection. This fabric does not shrink or become brittle after exposure to heat or flame.

The fabric composition is 40% PBI and 60% Para-Aramid and is available in a plain weave of 205 g/m². The natural colour is gold but other colours are available.

Other PBI fabrics are also available, such as



Other fabrics. Fibre producers and weavers are constantly introducing new developments, and Bristol can supply outershell fabrics in addition to those described above.



Moisture Barrier

Moisture barriers manufactured by Gore & Associates are the primary choice for firefighting clothing produced by Bristol. The micro-porous breathable fabric performs a dual role: stopping water passing through to the firefighter's personal clothing while allowing perspiration and heat to escape to the outside atmosphere. This reduces any heat stress the firefighter might suffer.

The moisture barriers are extremely durable, ensuring that the properties of the fabric last the lifetime of the garment.

Gore & Associates products available from Bristol are:



GORE-TEX® CROSSTECH® FIREBLOCKER moisture barrier is an ePTFE membrane laminated to a non-woven substrate.

GORE-TEX® CROSSTECH® AIRLOCK moisture barrier - A unique combination of thermal protection and moisture barrier which eliminates the need for extra-thick insulation. The innovative construction uses thermally stable and chemically resistant foam silicone spacers to create an insulating air cushion, giving a very high level of thermal protection without a bulky and restrictive insulation layer.

GORE-TEX® CROSSTECH® FLAMELINER G moisture barrier is an ePTFE membrane laminated to a woven 50% Aramid/50% Viscose FR fabric.



The GORE-TEX® CROSSTECH® PARALLON™ system has been developed to specifically combat the risks associated with moisture and heat stress by introducing a unique new solution that incorporates a highly breathable Gore thermal barrier combined with a GORE-TEX® or CROSSTECH® Moisture barrier.

This is a unique use of two membranes encapsulating a layer of thermal protection that maintains breathability while wicking moisture away from the skin and out through the suit, simultaneously preventing liquid penetration from the outside.

GORE® Parallon™ Moisture barrier laminate with quick redry moisture management properties.

GORE® Parallon™ Thermal barrier laminate with critical thermal protection coupled with membrane for additional moisture protection.

Thermal Barriers

Quilted Barriers

The lightweight thermal barrier used by Bristol is 100% Aramid non-woven felt and is quilted to either:

- Nomex® Delta C
- Nomex® Viscose
- FR cotton

ECO-DRYCOOL lining, which is lightweight incorporating wool/Lenzing FR to transport moisture vapour, in the form of sweat, through the liner. The hygroscopic nature of wool absorbs moisture and keeps you dry without feeling cold or wet. Weight 135 g/m².

ECO-DRYACTIVE has a unique double cloth construction which has all the features of the above but with the double cloth construction which gives enhanced thermal protection. Weight 220 g/m².

Weaves

Twill

Diagonal twill gives good tensile strength and abrasion resistance.

Plain weave

This usually consists of an equal number of warp (down) and weft (across) yarns, so that there is no diagonal weave effect.

Rip stop (twill or plain weave)

This produces a raised self colour check effect, retaining virtually all of the abrasion resistance of normal twill. A thicker gauge or superior strength thread used periodically in both warp and weft directions gives a subtle checked appearance, and prevents tears becoming larger.



B-Tech

Standard EN469 Level 2

B-Tech is Bristol's entry level for a structural firefighting coat and trousers to EN469 Level 2.

The short style coat is designed with ergonomic fit. The trouser measurements provide adequate overlap, so that there is no gap between coat and trousers when bending.

Features

Coat

- Two outer lower welt pockets with mitred flaps
- One internal patch pocket
- Plain cuffs with Neoprene anti-wicking barrier
- Neoprene anti-wicking barrier in hem
- Hanger loop on under collar
- Moulded zip front with hook and loop fastened flap, Neoprene lined
- Flip back throat tab Gore-tex lined
- Articulated sleeves

BT/A with silver reflective

BT/B with triple trim reflective

Trousers

- Standard waist trousers with side elastication
- Fixed braces crossed at back
- Back seat with yoke
- Self cloth outer curved kneepads, twin stitched seam and Aramid felt internal knee pads
- One internal hip patch pocket
- Plain trouser hems with Neoprene anti-wicking panels

TBT/A with silver reflective

TBT/B with triple trim reflective

Sizes

Chest/waist: Small to 4XL

Height fittings: short/regular/tall/extra tall

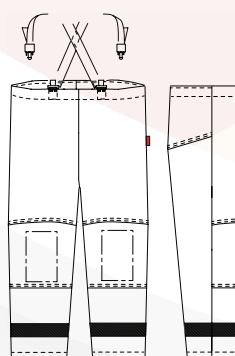
28 male and 28 female sizes



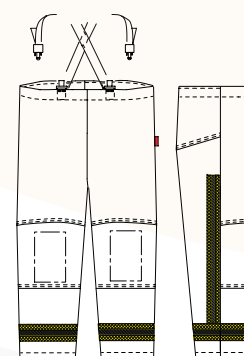
BT/A Coat



BT/B Coat



TBT/A Trousers



TBT/B Trousers



BT/A Coat, TBT/A Trousers



BT/B Coat, TBT/B Trousers



Ergotech Action fire coat and trouser

Standard EN469 Level 2

Ergotech Action coat model EA2/A

- Collar and throat tab shape provide optimal compatibility with helmet and fire hood
- Shoulder shape and increased upper sleeve allow full rotational mobility in shoulder and arm
- Shaped panel over the shoulder eliminates the shoulder seam and makes a smoother line with greater comfort when wearing breathing apparatus
- Increased underarm gusset allows more manoeuvrability when reaching overhead
- Two action pleats added at the back shoulder

Ergotech Action trouser model TEA2/A

- Articulated knees with convex seams around the knee for greater flexibility when bending/climbing
- Shaped seaming on back of knee to reduce fullness when crawling
- Top of trouser contoured to the body with raised back and elasticated adjustment across lumbar region
- H pattern braces
- Two large half bellow pockets

Sizes

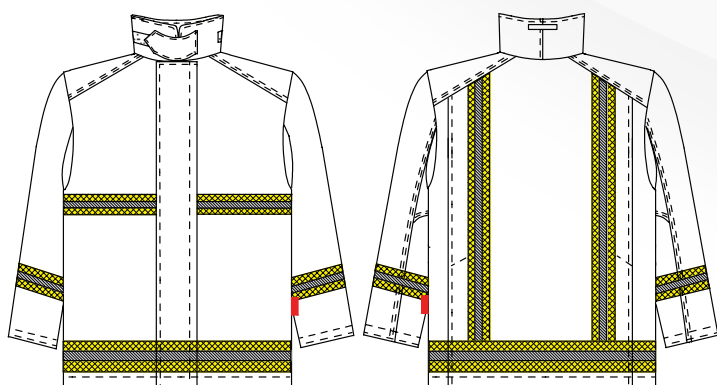
Chest/waist: Small to 4XL

Height fittings: short/regular/tall/extra tall

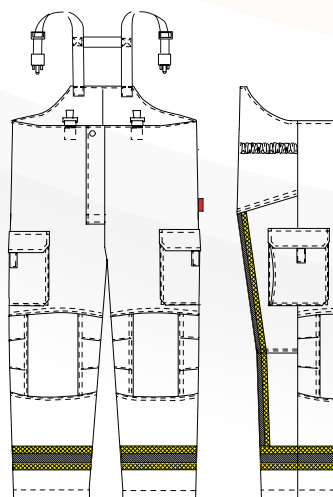
28 male and 28 female sizes



H braces and elastication in lumbar region



EA2/A Coat



TEA2/A Trousers



Back
Pleat



Articulated
Knee

EA2/A Coat, TEA2/A Trousers



EA2/A Coat, TEA2/A Trousers



XFlex: EN469

XFlex is Bristol's latest silhouette in light-weight firefighting PPE. Ergonomically designed it gives the ultimate in fit and comfort for the maximum number of body types. XFlex has distinctive sports styling and offers a garment combination that is suitable for the various hazardous roles associated with a fire-fighter's work.

Coat

Silhouette

- Tapered body shape
- Hem curved up at front and down at back – comfort and protection
- Shoulder shape and under arm gussets allow for full rotational arm movement
- Shoulder yoke shaped for comfort, especially with breathing apparatus
- Angled and curved style lines, emphasised shaping highlighted with reflective piping and contrast stitching

Style Features

- Double zip flap extends to neck with internal zip guard to protect throat
- Soft knitted inner lining on collar
- Deep return on cuff hem ensures gloves fit well inside sleeve
- Large landscape side pockets with shaped flaps incorporating internal pull tab
- Vertical pocket under zip flap and pen pocket
- Large internal pocket with care and instruction label
- Ergonomic three dimensional articulated elbow
- Hem of sleeve curved over back of hand for additional protection

Trouser

Silhouette

- Natural waistline at front with high curved back
- Centrally placed zip fly allows tapering of top of trouser, giving superior fit and making it easier to put on
- Distinctive angled and shaped seam lines highlighted with reflective piping

Style Features

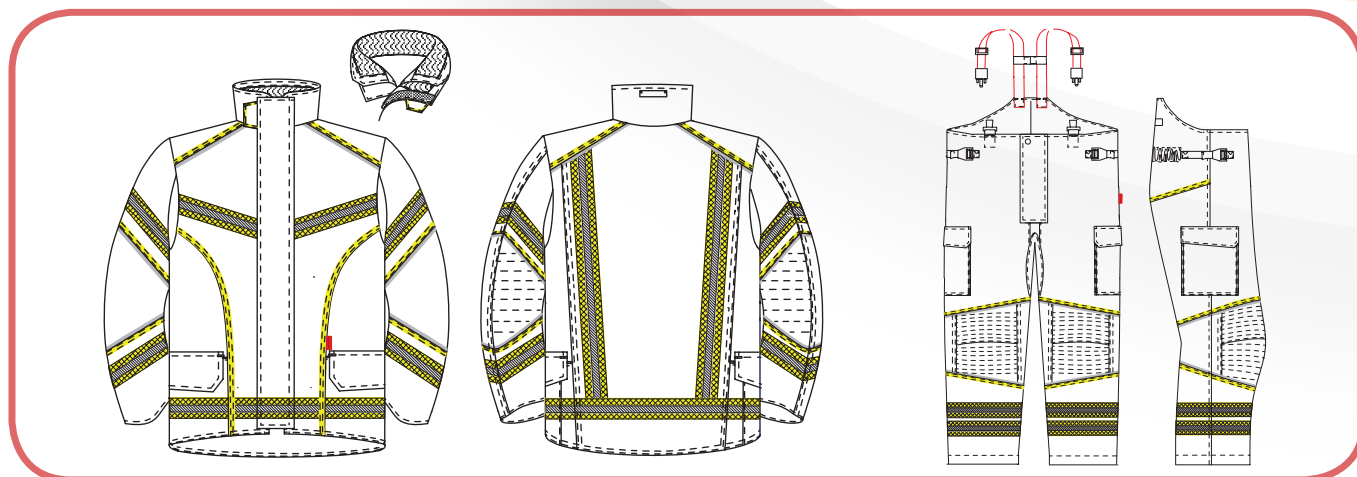
- H Braces with unique webbing slide adjuster
- Large twin pleated cargo pockets with shaped pocket flap incorporating integral pull tab, and large internal patch pocket, with care and instruction label
- Inside hem lined with Neoprene to minimise abrasion from boots
- Fully articulated 3 dimensional ergonomic knee shaping which goes through all layers
- Very flexible reinforcement fabric used

General

Tape configuration gives extra reflective area whilst also emphasizing style lines. The tape is breathable and stitched with 'Trimsaver' meta-aramid braid.

Brigade names can be added to the back or on a vertical sleeve graphic on the coat.

28 sizes, i.e. 7 chest fittings 4 height fittings available in both male and female ranges.





Shaped
Back



Articulated
Knee





LayerFlex

In a move away from the traditional approach to PPE design, firefighters are issued with fire coats and trousers designed for structural firefighting to be used for all operational activities. We have designed and introduced a new layered approach using three garments, which when used in different combinations, provide the required levels of protection for structural and wildland firefighting as well as technical rescue operations.

These garments have been designed to ensure that a firefighter is wearing garments which are suitable for the role being undertaken, rather than wearing structural fire clothing for all roles (including Technical Rescue and Wildland firefighting).

The ensemble consists of three garments:

A RescueFlex Coat

An XFlex Outer Coat

An XFlex Trouser

RescueFlex Coat

The Coat is manufactured from:

Outer Fabric: Hi Visibility Red or Yellow

Moisture Barrier: Gore-tex® Crosstech®



The RescueFlex Coat meets the following standards:

Wildland Standard EN15164: 2007 Code Letter A1

Hi-Visibility Standard EN20471: 2013 Class 3

Industrial (Protective Clothing against Heat and Flame) EN11612: 2008

Style Features

- Short style coat
- Vented underarm panels
- Angled pockets and flaps
- Fully breathable through all layers
- Elbow reinforcement
- Improved weatherproof seal over front zip
- Improved throat protection
- Knitted cuff with thumb loops
- Wrist straps to close hems on sleeves over gloves
- Pleated back
- Underarms gussets
- 3M silver reflective trim





XFlex Outer Coat

Outer Fabric:

Available in Hainsworth TITAN1260 **TITAN1260**, Hainsworth TITAN1220 **TITAN1220**, PBI Matrix® **PBI**, Nomex® **NOMEX** 3DP, and other fabrics are also available.

Inner Lining: Thermal barrier (options are available)

The XFlex Outer Coat when worn with the RescueFlex Coat meets EN469: 2005 Level 2.

Style Features

- Tapered body shape
- Hem curved up at front and down at back – comfort and protection
- Shoulder shape and under arm gussets allow for full rotational arm movement
- Shoulder yoke shaped for comfort, especially with breathing apparatus
- Deep return on cuff hem ensures gloves fit well inside sleeve

XFlex Trouser

Outer Fabric:

Available in Hainsworth TITAN1260 **TITAN1260**, Hainsworth TITAN1220 **TITAN1220**, PBI Matrix® **PBI**, Nomex® **NOMEX** 3DP, and other fabrics are also available.

Moisture Barrier: Gore-tex® Crosstech® **CROSSTECH** Fire Blocker

Inner Lining: Thermal Barrier (options are available)

The XFlex Trouser meets EN469: 2005 Level 2

Style Features

- Natural waistline at front with high curved back
- Centrally placed zip fly allows tapering of top of trouser, giving superior fit and making it easier to put on
- H Braces with unique webbing slide adjuster
- Large twin pleated cargo pockets with shaped pocket flap incorporating integral pull tab, and large internal patch pocket, with care and instruction label
- Inside hem lined with Neoprene to minimise abrasion from boots
- Fully articulated 3 dimensional ergonomic knee shaping which goes through all layers
- Very flexible reinforcement fabric used




XFlex: NFPA

The XFlex design has been developed and will also meet NFPA 2013. The ergonomic design gives the ultimate in fit and comfort for the maximum number of body types. XFlex has distinctive sports styling and is available in fabric combinations that are suitable for the various hazardous roles associated with a fire-fighter's work.

The NFPA XFlex suits are available in the following fabric combinations:

Outer: Hainsworth TITAN1220 **TITAN1220** or PBI Matrix® 


Moisture Barrier: Crosstech®  Black.

Inner Lining: Thermal Barrier quilted to a Nomex®  filament lining which wicks the sweat away from the body and also is "slippery" for ease when putting the garments on and taking them off.

In addition, the XFlex suits manufactured from:

Outer: Hainsworth TITAN1220 **TITAN1220**.

Moisture Barrier: Crosstech®  Black.

Inner Lining: Thermal Barrier quilted to a Nomex®  filament lining.

are also certified to EN469: 2005

Coat

Silhouette

- Tapered body shape
- Hem curved up at front and down at back – comfort and protection
- Shoulder shape and under arm gussets allow for full rotational arm movement
- Shoulder yoke shaped for comfort, especially with breathing apparatus
- Angled and curved style lines, emphasised shaping

Style Features

- Bristol designed Drag Rescue Device (DRD)
- Double zip flap extends to neck with internal zip guard to protect throat
- Deep return on cuff hem ensures gloves fit well inside sleeve
- Large landscape side pockets with shaped flaps
- Vertical pocket under zip flap and pen pocket
- Large internal pocket with care and instruction label
- Ergonomic three dimensional articulated elbow
- Hem of sleeve curved over back of hand for additional protection
- Inspection zip

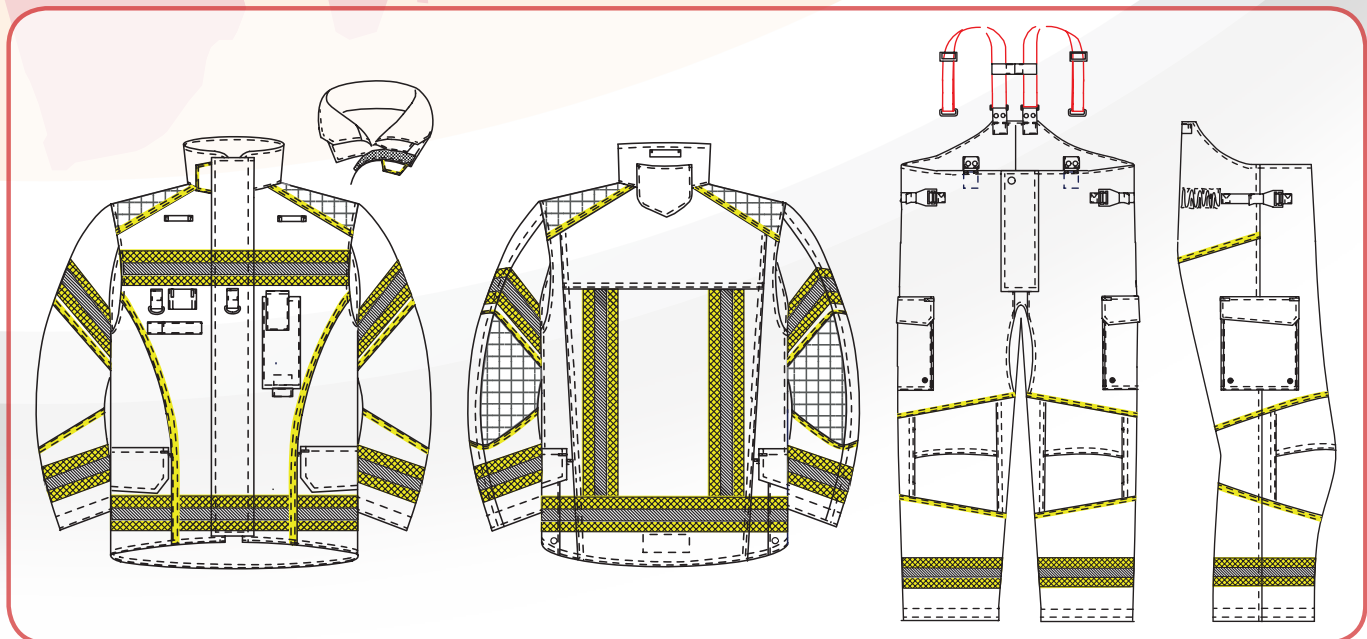
Trouser

Silhouette

- Natural waistline at front with high curved back
- Centrally placed zip fly allows tapering of top of trouser, giving a superior fit and making it easier to put on.
- Distinctive angled and shaped seam lines

Style Features

- Detachable H Braces with unique webbing slide adjuster
- Large twin pleated cargo pockets with shaped pocket flap, large internal patch pocket with care and instruction label
- Inside hem lined with Neoprene to minimise abrasion from boots
- Fully articulated 3 dimensional ergonomic knee shaping which goes through all layers. Very flexible reinforcement fabric used
- Two side waist adjusters





North American style - NFPA

Standard NFPA 1971

Based on the Ergotech model, Bristol manufactures firefighter garments which meet the North American standard NFPA. They are tested independently by Underwriters Laboratories Inc. (UL), who carry out rigorous testing on all materials, components and garments.

Not surprisingly, Bristol was the first company to have sold NFPA type garments, manufactured in the UK from European fabrics, into the United States market.

Coat NE/A

Features

- Bristol design Drag Rescue Device (DRD)
- Underarm gussets
- Flip back throat tab
- Articulated sleeves
- Action pleats on back
- Elbow and shoulder pads
- Two lower box bellow pockets with flaps, pull tabs and drainholes, handwarmer pockets behind
- One inside patch pocket on lining
- Two vertical jetted pockets under front flap
- Radio pocket
- Two microphone loops
- Two D rings on front
- Torch loop
- 75mm triple trim reflective tape

Trouser TNE/A

Features

- Two box bellow pockets with flaps, pull tabs and drainholes
- Zip fly with hook and loop flap
- Detachable 'H' braces
- Articulated knees with Arashield centre panel
- High back
- One inside hip patch pocket
- 75mm triple trim reflective tape
- Two side waist adjusters and elastics at back

Sizes

Coat: 34" - 60", **Trousers:** 30" - 60"

Height fittings: short/regular/tall/extra tall



NE/A Coat, TNE/A Trouser



Coverall to EN469

Fully lined coverall UNC9

In certain areas, a one-piece garment is preferred to the coat and trouser. Bristol offers a practical solution which is durable, yet comfortable.

Features

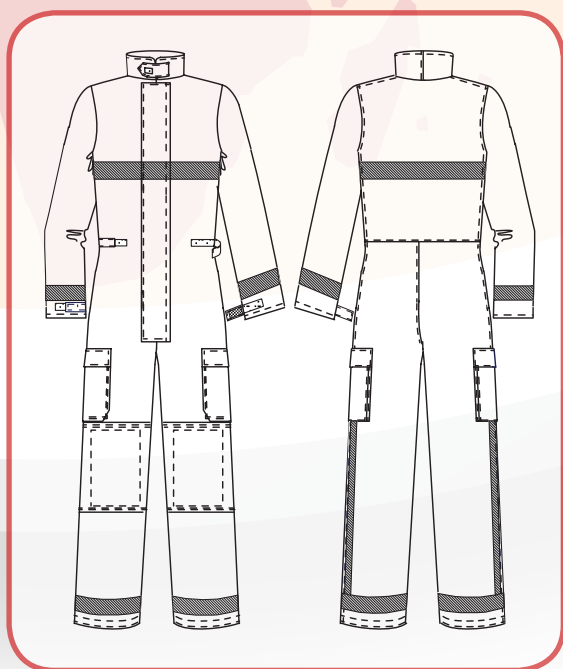
- Two half bellow thigh pockets with drainholes
- One internal pocket
- Plain waist (no elastic)
- Two way zip covered with hook and loop fastening flap
- 50mm silver 3M Scotchlite™ reflective tape
- Available in sizes: small, medium, large, X-large, XX-large

Sizes

Chest/waist: Small to 4XL

Height fittings: short/regular/tall/extra tall

28 male and female sizes



UNC9



UNC9



Making clothing to order ensures meeting the customer's requirements

Almost every fire brigade has its own special requirements when equipping operational teams: for instance, the type of radio used, where it is to be located with the associated mic loop and PPT fittings.

These needs are catered for by Bristol's bespoke approach to PPE specification, using our core designs (found in the Bristol Structural fire-fighting catalogue). The addition of special features is tailored to each fire brigade's needs.

Bristol can provide technical support in preparing specifications and tender documents.

This bespoke approach meets the unique need of each firefighter, as each element of the garment is tailored to the individual's requirements. Bristol has over 300 product feature variations.

The styles we have shown in this brochure are the base styles which can have a combination of additions, as required. Examples of the additions available are: Pockets and Flaps, Radio Pockets, Loops and Straps, Glove Hooks, Badging and Graphic – many other additions are also available.





Coat and trousers with harness

We have designs in Ergotech Action and XFlex which are designed to be worn with a harness. An example is shown below:



The trousers are fitted with a lightweight seat harness which is certified to CE EN368. The trousers are designed so the harness is fitted around the waist of the trouser. The leg straps are integrated inside the layers of the trouser with the adjustment via openings on either side fastened by hook and loop.



A second harness which is certified to EN361 can be added to the top half of the body and attached to the seat harness to give full fall arrest protection. When the coat is worn there is an opening on the front to allow access to the central carabiner when required.



Both harnesses can be removed and replaced to inspect the harness and also to clean the fire clothing.



PROTECTING THE WORLD'S FIREFIGHTERS



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Compatible PPE / Helmets/Hoods



Compatible PPE / Gloves



Compatible PPE / Boots



Compatible PPE / Rescue Tools



Introduction
Technical



Structural



Urban Search and
Rescue (USAR)



Marine



Emergency
Services



Managed
Services