GLOBE Globe Family of Brands

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CLASSIFIED UL

ISO 9001 Certified

GLOBE Globe Family of Brands

Technical Reference Guide

Globe Firefighter Suits • Globe Cairns • Globe LifeLine • Globe FootGear • Globe CARES

Table of Contents

Structural Outer Shell Materials - NFPA 1971

▲ PBI MATRIX™

PBI MATRIX™ is the latest version of PBI™ fabric which has achieved a remarkable record of performance. Like its predecessor, PBI MATRIX™ is engineered to withstand the most severe temperatures and offers proven durability, comfort and flexibility. PBI MATRIX™ uses a web of filament KEVLAR® for even greater tear and tensile strength and the flat plain weave construction provides even better abrasion resistance than the original. PBI MATRIX™ is everything you know and love about PBI™, only stronger!

Content: 40% PBI™, 60% KEVLAR®

Weight: 7.5 oz/yd^2 plain weave reinforced with KEVLAR® filament

Colors: Gold, Black

Supplier: TenCate

Attributes:
- ✓ Superior thermal stability
- ✓ Excellent tensile and tear strengths
- ✓ Excellent abrasion resistance
- ✓ Durable water repellent SST finish

PBI™

For many years, this has been our highest performance and most popular shell fabric. With the advent of PBI MATRIX™, many of our customers who swear by the performance of PBI™ are moving up to the new and improved version - PBI MATRIX™.

Content: 40% PBI™, 60% KEVLAR®

Weight: 7.5 oz/yd^2 ripstop weave

Colors: Gold, Black

Supplier: TenCate

Attributes:
- ✓ Superior thermal stability
- ✓ Very good tensile and tear strengths
- ✓ Very good abrasion resistance
- ✓ Durable water repellent SST finish

▲ Denotes PEAK PERFORMANCE SYSTEM component.

▲ MILLENIA™ XT

MILLENIA® XT is a relatively newer entry into the turnout gear outer shell arena, but if your problem is durability, MILLENIA® XT is an amazingly strong solution.

Content: 40% PBO, 60% Para-Aramid

Weight: 7.5 oz/yd^2 ripstop weave

Color: Gold

Supplier: TenCate

Attributes:
- ✓ Superior thermal stability
- ✓ Superior tensile and tear strengths
- ✓ Superior abrasion resistance
- ✓ Durable water repellent SST finish

ADVANCE ULTRA®

A brand new tri-blend from TenCate provides a step up in performance from their proven ADVANCE™ outer shell by adding some PBO fiber.

Content: 20% PBO, 20% NOMEX®, 60% KEVLAR®

Weight: 7.5 oz/yd^2 ripstop weave

Colors: Yellow, Light Gold, Dark Gold, Black Gold

Supplier: TenCate

Attributes:
- ✓ Very good thermal stability
- ✓ Excellent tensile and tear strengths
- ✓ Excellent abrasion resistance
- ✓ Durable water repellent SST finish

ADVANCE®

Combining the proven performance of NOMEX® with the high strength of KEVLAR®, ADVANCE™ provides a very good balance of performance, durability, and cost.

Content: 40% NOMEX®, 60% KEVLAR®

Weight: 7.0 oz/yd^2 ripstop weave

Colors: Gold, Yellow, Khaki, Black*

* Black is producer colored for dye stability

* Black is 50% NOMEX®, 50% KEVLAR®,

Supplier: TenCate

Attributes:
- ✓ Very good thermal stability
- ✓ Very good tensile and tear strengths
- ✓ Very good abrasion resistance
- ✓ Durable water repellent SST finish

BASOFIL®

The heat blocking ability of BASOFIL® fiber in this outer shell allows it to be combined with lightweight thermal liners and still achieve high TPP values.

Content: 40% BASOFIL®, 60% KEVLAR®

Weight: 7.5 oz/yd^2 ripstop weave

Colors: Gold, Black, Yellow (special order)

Supplier: NorFab

Attributes:
- ✓ Excellent TPP values
- ✓ Good tensile and tear strengths
- ✓ Durable water repellent finish

NOMEX® IIIA

Earning a well-deserved reputation for proven performance for three decades, NOMEX® IIIA provides protection at an affordable price.

Content: 93% NOMEX®, 5% KEVLAR®, 2% Anti-Static

Weight: 7.5 oz/yd^2 plain weave

Colors: Yellow, Black, Tan, White, Red, Royal Blue

Supplier: TenCate

Attributes:
- ✓ Basic thermal stability
- ✓ Very good tensile and tear strengths
- ✓ Good abrasion resistance
- ✓ Durable water repellent SST finish

ALUMINIZED PBI™

Recommended for proximity environments where radiant heat is encountered such as aircraft rescue and industrial applications, this fabric utilizes a reflective aluminized film for radiant heat resistance laminated to a knit PBI™ blend fabric for thermal stability.

Content: 30% PBI™, 70% Para-Aramid

Weight: 7.0 oz/yd^2 knit with laminated aluminized film

Color: Silver

Supplier: Gentex

Attributes:
- ✓ Highly reflective for superior resistance to radiant heat
- ✓ Lightweight and flexible
- ✓ Engineered for proximity applications

Rescue and EMS Outer Shell Materials - NFPA 1951

MILLENIA® LIGHT

(CONVERTIBLE™ and TECHRESCUE™)

Content: 40% PBO, 60% KEVLAR®

Weight: 5.3 oz/yd^2 Ripstop Weave

Color: Gold

Supplier: TenCate

Attributes:
- ✓ Flame resistant
- ✓ Most thermally stable (1300+ degrees F)
- ✓ Highest cut, tear, and abrasion resistance
- ✓ Durable water repellent finish

NOMEX® IIIA

(CONVERTIBLE™, EMSRESCUE™ and TECHRESCUE™)

Content: 93% NOMEX®, 5% KEVLAR®, 2% Anti-Static

Weight: 6.0 oz/yd^2 Plain Weave

Colors: Navy (Standard), Royal Blue and Yellow (Optional)

Supplier: TenCate

Attributes:
- ✓ Flame resistant
- ✓ Heat resistant (to 750 degrees F)
- ✓ Proven durability from abrasion, cuts, tears
- ✓ Durable water repellent finish

Structural Moisture Barrier Materials - NFPA 1971

▲ CROSSTECH® 2-Layer

This moisture barrier has earned a well-deserved reputation for being the best in the world. As the inventors of liquid resistant and breathable ePTFE films, W.L. Gore & Associates have spent three decades improving this critical technology. Widely recognized for being the most protective and the most breathable, Globe recommends CROSSTECH® moisture barrier above all others.

Substrate:	NOMEX® fabric woven from spun fibers (pajama check)
Film:	Enhanced bi-component ePTFE membrane
Total Weight:	5.0 oz/yd^2
Supplier:	W.L. Gore & Associates
Attributes:	✓ The best liquid resistant and breathable moisture barrier ✓ Thin and flexible ✓ The highest THL/TPP combinations

CROSSTECH® moisture barrier is an enhanced bi-component membrane that is laminated to a flame-resistant DuPont™ NOMEX® IIIA woven pajama check fabric. The end result is a barrier fabric that is highly breathable and liquid penetration resistant to blood, body fluids, NFPA common liquids*, and water. The total performance of CROSSTECH® moisture barrier is unmatched by any other liquid barrier product.

▲ CROSSTECH® 3-Layer

For those who want the highest durability in the most rigorous situations, CROSSTECH® 3-Layer moisture barrier provides the best durability/THL/TPP combinations possible.

Top Substrate:	NOMEX® fabric woven from spun fibers (pajama check)
Botton Substrate	NOMEX® fabric woven from spun fibers (patent pending)
Film:	Enhanced bi-component ePTFE membrane
Total Weight:	7.0 oz/yd^2
Supplier:	W.L. Gore & Associates, Inc.
Attributes:	✓ Most durable flex and abrasion resistance ✓ Best durability/THL/TPP combinations

▲ Denotes PEAK PERFORMANCE SYSTEM component.

GORE RT7100™

For those who need premium performance at a value price, GORE™ RT7100 moisture barrier provides an excellent alternative. Utilizing their years of experience in ePTFE technology, W. L. Gore & Associates, Inc. developed an alternative barrier consisting of a membrane laminated to a non-woven NOMEX® substrate. This combination delivers thermal stability, waterproof performance and a high level of breathability. If you can't afford CROSSTECH® moisture barrier, this is the moisture barrier to buy.

Substrate:	NOMEX® non-woven spunlace
Film:	Bi-component ePTFE membrane
Total Weight:	4.3 oz/yd^2
Supplier:	W.L. Gore & Associates
Attributes:	✓ Better liquid resistant, breathable moisture barrier ✓ Lightweight and flexible

*NFPA defined "common liquids": Battery acid [37% sulfuric], ASTM Ref. Fuel C [unleaded gasoline surrogate], hydraulic fluid [phosphate-ester], aqueous film-forming foam [AFFF], and swimming pool chlorine solution [65% free Cl].

Rescue Moisture Barrier Materials - NFPA 1951

CROSSTECH® S/R Fabric (CONVERTIBLE™ and TECHRESCUE™)

Barrier:	Enhanced bi-component ePTFE technology
Substrate:	NOMEX® fabric
Weight:	4.9 oz/yd^2
Color:	Grey
Supplier:	W.L. Gore & Associates, Inc.
Attributes:	✓ Flame and heat resistant ✓ Most breathable barrier ✓ Most durable barrier in abrasion, cuts, and punctures ✓ Meets NFPA 1951 and NFPA 1999

EMS Moisture Barrier Materials - NFPA 1999

CROSSTECH® EMS Fabric (EMSRESCUE™)

Barrier:	Enhanced bi-component ePTFE technology
Substrate:	Texturized polyester fabric
Weight:	3.5 oz/yd^2
Color:	Charcoal Grey
Supplier:	W.L. Gore & Associates, Inc.
Attributes:	✓ Most breathable barrier ✓ Lightweight and flexible ✓ Durable barrier in abrasion, flexing, and tear resistance ✓ Meets NFPA 1999

Structural Thermal Liner Materials - NFPA 1971

▲ QUANTUM3D™ (2-layer)

The latest thermal liner from TenCate is the most flexible, easy-wearing, and most efficient insulation package yet. A special waffle design is built into one of the batting layers to trap more dead air space without adding weight, and the new face cloth weave slides on like a dream.

Face Cloth: NOMEX® blend of filament and spun fibers

Batting: 2 layers of NOMEX®, KEVLAR® blend spunlace (1 layer 2.3 oz/yd^2 with waffle design and 1 layer 1.5 oz/yd^2)

Total Weight: 7.7 oz/yd^2

Color: Gold

Supplier: TenCate

Attributes:
- ✓ Excellent donning/doffing properties
- ✓ Most flexible, thin, and lightweight
- ✓ More thermal protection per composite weight
- ✓ Excellent wickability and quick drying

▲ QUANTUM3D™ (1-layer)

A lighter-weight version of QUANTUM3D™ (2-layer) from TenCate. It has the same special waffle design and same face cloth for easy donning and doffing.

Face Cloth: NOMEX® blend of filament and spun fibers

Batting: NOMEX®, KEVLAR® blend spunlace (1 layer 2.3 oz/ yd^2 with waffle design)

Total Weight: 6.2 oz/yd^2

Color: Gold

Supplier: TenCate

Attributes:
- ✓ Excellent donning/doffing properties
- ✓ Most flexible, thin and lightweight
- ✓ Excellent wickability and quick drying
- ✓ Offered with CROSSTECH® 3 layer

▲ Denotes PEAK PERFORMANCE SERIES component

CALDURA® SL2

This thermal liner is our most popular when used in combination with many of our high performance outer shells and our latest designs. The face cloth helps you slide easily in and out of your turnout gear and the overall quilted liner is remarkably light and flexible.

Face Cloth: NOMEX® fabric woven from a blend of filament and spun fibers

Batting: 2 layers of NOMEX® E-89™ (1 layer each of 2.3 and 1.5 oz/yd^2)

Total Weight: 7.6 oz/yd^2

Color: Silver

Supplier: TenCate

Attributes:
- ✓ Excellent donning/doffing properties
- ✓ Lightweight and flexible
- ✓ Very good wickability
- ✓ Quick drying

CALDURA® SL3

For those who need additional thermal protection, this is the 3-layer version of our popular CALDURA® SL2.

Face Cloth: NOMEX® blend of filament and spun fibers

Batting: 3 layers of NOMEX® E-89™ (each layer is 1.5 oz/yd^2)

Total Weight: 8.3 oz/yd^2

Color: Silver

Supplier: TenCate

Attributes:
- ✓ Excellent donning/doffing properties
- ✓ The most flexible choice for this much insulation
- ✓ Very good wickability
- ✓ Quick drying

CALDURA® NP

This thermal liner uses the same filament/spun face cloth but with a single layer ARALITE® batting which provides solid thermal protection.

Face Cloth: NOMEX® fabric woven from a blend of filament and spun fibers

Batting: 50% KEVLAR®, 50% NOMEX® fiber batt (blend of virgin and reprocessed fiber)

Total Weight: 7.6 oz/yd^2

Color: Silver

Supplier: TenCate

Attributes:
- ✓ Excellent donning/doffing properties
- ✓ Good wickability

ARALITE® SL2

Similar to CALDURA® SL2, this thermal liner uses the same 2-layer E-89™ batting but with a spun NOMEX® fiber face cloth.

Face Cloth: NOMEX® fabric woven from spun fibers

Batting: 2 layers of NOMEX® E-89™ (1 layer each of 2.3 and 1.5 oz/yd^2)

Total Weight: 7.2 oz/yd^2

Color: Grey

Supplier: TenCate

Attributes:
- ✓ Lightweight and flexible
- ✓ Very good wickability
- ✓ Quick drying

ARALITE® SL3

Similar to CALDURA® SL3, this thermal liner uses the same 3-layer E-89™ batting but with a spun NOMEX® fiber face cloth.

Face Cloth: NOMEX® fabric woven from spun fibers

Batting: 3 layers of NOMEX® E-89™ (3 layers of 1.5 oz/yd^2)

Total Weight: 8.0 oz/yd^2

Color: Grey

Supplier: TenCate

Attributes:
- ✓ Very good wickability
- ✓ Quick drying
- ✓ High Performance

ARALITE® NP

This thermal liner uses a spun NOMEX® fiber face cloth with a single layer ARALITE® batting which provides solid thermal protection at a value price.

Face Cloth: NOMEX® fiber woven from spun fibers

Batting: 50% KEVLAR®, 50% NOMEX® fiber batt (blend of virgin and reprocessed fiber)

Total Weight: 7.2 oz/yd^2

Color: Teal

Supplier: TenCate

Attributes:
- ✓ Lightweight
- ✓ Good wickability

FIREFLITE™ (Globe Cairns only)

A customer favorite, this thermal liner harnesses the "Power of Wool" for superior moisture management and loft retention.

Face Cloth: Calendared NOMEX® fabric (for improved slide)

Batting: 2 layers spunlace blended from BASOFIL® fibers, NOMEX® fibers and wool

Total Weight: 7.2 oz/yd^2

Color: Blue

Supplier: NorFab

Attributes:
- ✓ Lightweight and flexible
- ✓ Superior wicking from wool

SYNERGY®

Available for use only with our BASOFIL® outer shell, this combination gives excellent TPP values in a lightweight package.

Face Cloth: Calendered NOMEX® fabric (for improved slide)

Batting: 2 layers of BASOFIL®/NOMEX® blend spunlace

Total Weight: 7.2 oz/yd^2

Color: Blue

Supplier: NorFab

Attributes:
- ✓ Lightweight and flexible
- ✓ Quick drying

Q-8™

This is a new version of a thermal liner that has provided basic protection for decades.

Face Cloth: 50% Meta-aramid, 50% FR Modacrylic

Batting: Reprocessed Aramid fiber, FR Rayon

Total Weight: 8.0 oz/yd^2

Color: Blue

Supplier: TenCate

Attributes:
- ✓ A lot of insulation for the least amount of money

Reinforcements

DRAGONHIDE™ Fabric

Reinforcing high-abrasion areas of firesuits has long been accomplished with traditional materials like leather, externally coated fabrics like ARA-SHIELD®, and extra layers of tough shell fabrics like MILLENIA™ XT. However, the optimum balance of abrasion resistance, flexibility, low water absorption, durability, and ease of cleaning in an NFPA 1971 certified lightweight material has been elusive. That is, until now.

DRAGONHIDE™ fabric is a newly formulated version of a material that has been in use for over fifteen years in an application that had similar requirements. Initial development research work was aimed at creating a fabric which would provide similar protective functions to those of leather (including abrasion and tear resistance), with greater freedom of movement (flexible and lightweight), high water resistance (and low absorption), and resistance to soiling (easy care). Can you guess the application? Motorcycle racing.

DRAGONHIDE™ fabric weighs 10.0 oz/yd^2 and is made from 100% meta-aramid, back-coated with a specially formulated polymer.

Suede leather remains the king of reinforcements with respect to providing high abrasion resistance. However, leather is relatively heavy, stiffens with age and use, and can in some instances be difficult to decontaminate. ARA-SHIELD® performs extremely well in abrasion resistance, water resistance, and cleaning but is relatively stiff and slippery when used for knee reinforcements, and tends to crack with age or when folded for cuff reinforcement. Outer shell materials are pliable and light, but not highly abrasion or water resistant.

DRAGONHIDE™ fabric combines the flexibility of outer shell materials with outstanding abrasion resistance. Because DRAGONHIDE™ is coated on one side, it resists water and other liquid absorption issues, but is easy to clean. When subjected to Taber Abrasion Tests using H-18 abrasion wheels and a constant load of 500 grams on each wheel, DRAGONHIDE™ consistently exceeds 6,000 cycles with no sign of holes or fiber breakage.

DRAGONHIDE™ is only available in the color black, is certified to NFPA 1971, 2007 Edition, and is available on all models of Globe or Cairns structural fire fighting suits, as well as on selected LifeLine offerings.

ARA-SHIELD® (Grey, Black, Gold)

Polymer-coated DuPont™ KEVLAR® with matte finish for improved appearance and traction. This material is easy to clean, offers exceptional strength, is lightweight and double coated to prevent moisture absorption. It is a moderately priced alternative and easy to clean, but it is not as pliable as other reinforcements and like any coated fabric, can crack along stress lines.

Outer Shell Material (All Shell Fabrics Available)

Self-reinforcements are soft and pliable, resulting in comfort and ease of movement, but in most cases they are not the most economical, water resistant or durable reinforcements. If selecting a self-reinforcement material, consider ADVANCE™ or MILLENIA™ XT (MILLENIA™ XT being the most durable). Each is treated with Super Shelltite™ durable water resistance finish.

Heavy Duty Leather (Grey, Black)

Globe leather is the most economical reinforcement option offering the highest durability available. It can be cleaned but stains easily since it is a porous material. Globe uses a heavy duty high quality leather not readily prone to dry-rot.

Globe Firefighter Suits & Globe Cairns Trim Styles

STRUCTURAL (NFPA 1971)

Project Fires
3″ Trim

NFPA Vertical
3″ Trim

High Visibility
3″ Trim

Project Fires 2
3″ Trim

NFPA Vertical 2
3″ Trim

High Visibility 2
3″ Trim

NYC
3″ Trim

NFPA Basic
3″ Trim

Pants
3″ Trim
Also available down side of legs

G-XCEL & RSX Trim Styles

Letter Rows
27"-31" length

Letter Rows
29"-33" length

Letter Rows
32"-36" length

AVERAGE MAXIMUM LETTERS		
Per 1- Line Letter Patch	2″	3″
Row A	16	11
Row B	16	11
Row C	16	11
Row D	14	10
Row E	14	10
Row F	14	10
Row G (29"/33" length)	14	10
Row H (32"/36" length only)		

Globe Firefighter Suits Lettering Guidelines

Lettering

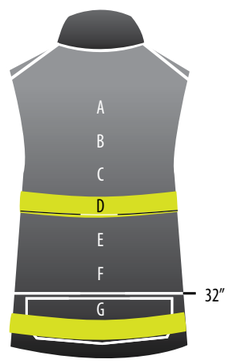
3M SCOTCHLITE™
2″ and 3″
(4″ to 12″ lettering available upon special request)
Lime/Yellow or Red/Orange

Letter Patches

SEW-ON, SNAP-ON, HOOK AND LOOP
1-3 Lines

HANGING (SNAPS/HOOK AND LOOP)
1 Line Only

4 X 4 NUMBER PATCHES
Available as sew-on, snap-on or hook and loop



Letter patches are available in straight line or arched style and a variety of sizes to accommodate 1 to 3 lines of text. If you have too many letters to fit in a straight line, arched letters may allow you to squeeze in more.

AVERAGE MAXIMUM LETTERS		
Per 1- Line Letter Patch	2″	3″
Row A	12	8
Row B	13	9
Row C	13	9
Row D	13	9
Row E	12	8
Row F	12	8

This chart provides basic guidelines for the amount of lettering available in the specific locations. It also reflects the available space on a 1-line letter patch. In some cases, more room is available when the lettering is applied directly to the back of the jacket and not on a patch. If more room is required, arching the letters may be a solution.

Globe Cairns Lettering Guideline

Lettering

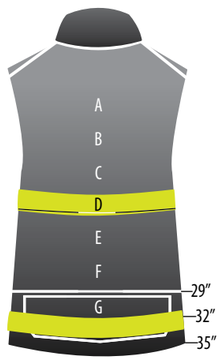
3M SCOTCHLITE™
2″ and 3″
(4″ to 12″ lettering available upon special request)
Lime/Yellow or Red/Orange

Letter Patches

SEW-ON, SNAP-ON, HOOK AND LOOP
1-3 Lines

HANGING (SNAPS/HOOK AND LOOP)
1 Line Only

4 X 4 NUMBER PATCHES
Available as sew-on, snap-on or hook and loop



Letter patches are available in straight line or arched style and a variety of sizes to accommodate 1 to 3 lines of text. If you have too many letters to fit in a straight line, arched letters may allow you to squeeze in more.

AVERAGE MAXIMUM LETTERS		
Per 1- Line Letter Patch	2″	3″
Row A	14	10
Row B	14	10
Row C	14	10
Row D	14	10
Row E	12	8
Row F	12	8

These charts provide basic guidelines for the amount of lettering available in the specific locations. They also reflect the available space on a 1-line letter patch. In some cases, more room is available when the lettering is applied directly to the back of the jacket and not on a patch. If more room is required, arching the letters may be a solution.

3″ XPS™		
29″	32″	35″
F	F	F
G	G	G
	H	H
		I

6″ XPS™		
29″	32″	35″
F	F	F
G	G	G
H	H	H
	I	I
		J

The shaded boxes represent trim areas and are not available for lettering.

Globe LifeLine Trim Styles

RESCUE (NFPA 1951) EMS (NFPA 1999)

3M SCOTCHLITE™ Trim Styles

Color: Lime/Yellow or Red/Orange with Silver Center

CONVERTIBLE™ and EMSRESCUE™ Jacket
3M SCOTCHLITE™ Triple Trim

CONVERTIBLE™ Jacket is available with 2" or 3" 3M Scotchlite™ Triple Trim. EMSRESCUE™ Jacket is available with 2" 3M SCOTCHLITE™ Triple Trim.

EMSRESCUE™ Coat
2" 3M SCOTCHLITE™ Triple Trim

TECHRESCUE™ Jacket
3" 3M SCOTCHLITE™ Triple Trim

Globe LifeLine Lettering Guidelines

- ✓ Letters can be sewn directly on garments or pants
- ✓ Letter Patches are available in 1, 2 or 3 line configurations with 2" or 3" 3M SCOTCHLITE™ Letters
- ✓ 15" Patches (XS – SM Sizes) Max. 3" Letters = 8 / Max. 2" Letters = 12
- ✓ 20" Patches (M – 7XL Sizes) Max. 3" Letters = 11 / Max. 2" Letters = 16
- ✓ 6" Star of Life (available only on EMSRescue™) requires 2 rows or 2 line Letter Patch

AVERAGE MAXIMUM LETTERS		
Rows A – F	2"	3"
SIZES XS – S Based on a 15" Letter Patch	12	8
SIZES M – 7XL Based on a 20" Letter Patch	16	11

CONVERTIBLE™ & EMSRESCUE™ Jacket

A
B
C
D (N/A Trim)
E
F

EMSRESCUE™ Coat

A (N/A Trim)
B
C
D
E
F
G (N/A Trim)

TECHRESCUE™ Jacket

A
B
C
D (N/A Trim)
E
F
G (N/A Trim)

Trim Materials

3M SCOTCHLITE™ Triple Trim
Color: Lime/Yellow or Red/Orange with Silver Center
Width: 3" only

3M SCOTCHLITE™
Color: Lime/Yellow or Red/Orange
Width: 3"

3M SCOTCHLITE™ Retroreflective Lettering
Color: Red/Orange, Lime/Yellow
Size: 2" and 3"

The purpose of trim on turnouts, helmets and other gear is to provide day/night visibility and quickly ID the firefighters by trim alone or with the visibility of letters/numerals. While this may seem self-evident, the importance of a turnout's trim cannot be stressed enough. It is especially critical where visibility is minimal and confusion is maximum with large numbers of personnel from several departments on the fireground. Trim specifications are fully covered in NFPA 1971, 2007 Edition.

3M SCOTCHLITE™ Triple Trim

Globe's first choice for overall proven performance and affordability is 3M Scotchlite™ Triple Trim which incorporates a center silver stripe impregnated into the 3M Scotchlite™ trim. available with red/orange or lime/yellow borders offering both fluorescence for daytime visibility and superior reflective properties for nighttime visibility.

3M SCOTCHLITE™

3M Scotchlite™ Reflective Material

The reflective surface of fluorescent trim is composed of wide angle, exposed retroreflective lenses (glass beads) integrally centered with the fluorescent color and bonded with a special polymer layer to a flame – resistant durable backing. 3M Scotchlite™ trim is available in solid lime/yellow or red/orange colors.

TRIMTRAX™ Thread Protection System

TRIMTRAX™ is our patented system of abrasion resistant KEVLAR® fiber cording that protects the threads securing our trim from abrasion. Anyone who has ever worn protective clothing is familiar with the phenomenon of trim separating from the garment, hanging loose, and eventually requiring repair or replacement. Emergency responders have complained long and loud about this problem and Globe has the solution: **TRIMTRAX™**.

First, we identified the real issue: trim is not a woven fabric so the thread cannot sink down between the fibers in the same way that traditional stitching does. The top thread of the stitch actually sits on top of the trim and is therefore very susceptible to abrasion and snagging. And since the real issue is abrasion to the sewing thread, additional rows of stitching do nothing to solve the problem.

The solution is simple. The sewing thread needs to be protected from the severe abrasion of everyday wear and tear. However, remembering the very strict requirements for any component of an NFPA labeled garment, the finished result must not in any way compromise the thread, the trim, or the garment.

7 cycles to thread breakthrough

35 cycles and still going strong

Using specially developed equipment, the TRIMTRAX™ process stitches through a narrow strip of KEVLAR® blended fiber cording as the trim is sewn to the garment. The thread is protected by the cording so that the cording takes the abuse before the stitching is exposed. This process results in amazing abrasion resistance which is significantly higher than traditional methods. And remember that two rows of stitching does nothing to alleviate abrasion.

In order to measure the effectiveness of TRIMTRAX™, we tested it on a Taber Model 503 Standard Abrasion Tester, using H-18 Calibrade® wheels and two 500 gram weights. Laboratory testing has shown that under these test conditions a standard application using NOMEX® 24/4 thread and the 3M Scotchlite™ trim, the abrasion will cause the top thread to break in as little as 7 cycles. We next tested the same thread, on the same trim using the same operator and the same sewing machine, but with the TRIMTRAX™ system. At 35 cycles, there is no thread breakthrough using the TRIMTRAX™ system.

Guide to Standards

NFPA (National Fire Protection Association)

NFPA is a standards writing organization, founded in 1896 and dedicated to the concept of voluntary consensus standards writing. While it is not an enforcing agency, NFPA enjoys a unique reputation and its standards have been adopted by all levels of government, in many cases giving the standards the force of law. Each NFPA standard undergoes revision every 5 years to ensure that it is kept current with new fire protection knowledge and technologies. The NFPA process is open and anyone can participate.

Third-Party Certification

In order for an element to be labeled compliant to a given NFPA Standard, it must be tested by an independent third-party organization that is not owned or controlled by manufacturers or vendors of the product being certified. The third-party testing agency cannot have any monetary interest in the product to be certified. Additionally, the certification organization must be primarily engaged in certification work, such as Underwriters Laboratories.

This independent third-party company verifies that the design and construction is in accordance with design requirements, and that the element has successfully passed all performance requirements set forth in the Standard to which it is labeled. Any change in materials or design requires re-testing and random samples are also taken to ensure that every requirement is tested annually. A third-party registrar is also required to validate the manufacturing quality process, in accordance with ISO 9001.

Federal and State OSHA Standards

Several states have their own OSHA Standards, however, NFPA Standards are generally more rigorous than OSHA Standards. Since the FED-OSHA Standard has not been revised for over twenty years, clothing that is labeled to NFPA Standards will easily exceed FED-OSHA Standards. However, clothing meeting OSHA will not necessarily meet NFPA, and so it is important for the end users to be aware of existing state OSHA requirements and how they compare to NFPA requirements.

OSHA Rule 29 CFR 1910.1030

Final rule on Protecting Health Care Workers from Occupational Exposure to Bloodborne Pathogens

"When there is occupational exposure, the employer shall provide, at no cost to the employee, appropriate personal protective equipment."

"Personal protective equipment will be considered 'appropriate' only if it does not permit blood or other potentially infectious materials to pass through to or reach the employee's work clothes, street clothes, undergarments, skin, eyes or other mucous membranes under normal conditions of use and for the duration of time which the protective equipment will be used."

NFPA 1500, 2007 EDITION

Standard on Fire Department Occupational Safety and Health Program

This document addresses the occupational safety in the working environment of the fire service as well as safety in the proper use of tools, equipment, vehicles, protective clothing, breathing apparatus, even details such as overlap between coats and trousers:

The protective coat and the protective trousers shall have at least a 2 in. (50mm) overlap of all layers so there is no gaping of the total thermal protection when the protective garments are worn. The minimum overlap shall be determined by measuring the garments on the wearer, without SCBA, in both of the following positions:

Position A. *Standing, hands together reaching overhead as high as possible.*

Position B. *Standing, hands together reaching overhead, with body bent forward at a 90-degree angle, to the side (either left or right), and to the back.*

Career, volunteer, private and military departments are included.

NFPA 1851, 2008 EDITION

Standard on Selection, Care and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2008 Edition.

Originally published in February of 2001 and revised to the current 2008 edition, this is a user standard with chapters on administration, definitions, program, selections, inspection, cleaning and decontamination, repair, storage, retirement, verification test procedures, and an annex with explanatory material. The standard requires that organizations, including fire departments, independent service providers, and other entities who wish to perform cleaning and inspection, receive training from the manufacturer. In conjunction with this requirement, Globe offers both in-house training, as well as an online training course through the educational website, PPE101.com. By visiting this website you can register for Globe's no charge online training course on Personal Protective Equipment Advanced Care and Cleaning and learn how to properly care for your turnout gear. This easy to follow program follows the NFPA's 1851 standard chapter by chapter, and is a free course which can be taken at your convenience. Following the course there is an open book test and if you answer 20 of the 25 questions accurately, you can download a certificate which demonstrates that you have successfully completed the Globe training. In the alternative, if you wish more personal, hands on training, you may contact Globe Manufacturing LLC directly for details and information on the in-house program.

NFPA 1951, 2007 EDITION

Standard on Protective Ensembles for Technical Rescue Incidents

The 2001 edition of NFPA 1951 was titled Standard on Protective Ensemble for USAR Operations. Although the title has been changed, the standard still deals with technical rescue incidents in urban and other non-wilderness locations that require special equipment. This standard sets forth requirements for the protective clothing and equipment needs of emergency responders engaged in technical rescue activities, and also includes optional requirements for CBRN protection.

NFPA 1971, 2007 EDITION

Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting

This standard sets the minimum requirements for design, performance, testing, and certification of the elements of the ensemble for body protection in structural firefighting – coats, trousers, one-piece suits, hoods, helmets, gloves, and footwear. As with all NFPA Standards, the 2007 Edition of NFPA 1971 replaced the 2000 edition, and all previous editions. Unlike previous editions, the 2007 edition of NFPA 1971 incorporated design and performance requirements for proximity protective ensemble elements as well as structural protective ensemble elements.

Additionally, the 2007 Edition incorporated design and performance requirements for optional CBRN requirements. This means that departments who wish to specify CBRN protection are able to do so, although they will not be required to specify this level of protection. Manufacturers who label a garment as providing CBRN protection will be required to test against the specific requirements set forth in the standard. In other words, the CBRN protection is optional, but if you are labeling a garment as complying with that option, the test requirements for making the claim are mandatory and must also be third party certified.

NFPA 1977, 2005 EDITION

Standard on Protective Clothing and Equipment for Wildland Fire Fighting, 2005 Edition

This revision became effective on February 7, 2005, and represents the third edition of this standard. The standard was completely reformatted according to the new style for all NFPA codes and standards. In addition to the new requirements for manufacturers' quality assurance programs, this revision included additional items of wildland fire fighting protective clothing and equipment that were not addressed in previous editions, including cold weather outerwear, chain saw protectors, load carrying equipment, and goggles.

NFPA 1999, 2008 EDITION

Standard on Protective Clothing for Emergency Medical Operations (EMS)

EMTs require specialized protection in some ways more stringent than structural firefighting. These include protective clothing, gloves and face-shielding equipment to protect EMS providers from bloodborne and liquid pathogens. Testing includes 25 wash/dry preconditioning cycles.

CANADIAN GENERAL STANDARDS BOARD (CGSB)

CAN/CGSB-155.1-2001, the Canadian General Standards Board standard for Firefighters' Protective Clothing for Protection Against Heat and Flame, was last revised in 2001. Although very similar to NFPA 1971 (2000 Edition), there are some exceptions.

- ✔ The Moisture Barrier is subject to a diffusion resistance test, with no THL values required.
- ✔ The NFPA 1971 Shower Test is not required to validate design.
- ✔ The method specified for Flame Resistance testing is different.
- ✔ Tear Strength Testing is performed after exposure to UV.

NFPA Jacket and Pants: Performance Requirements

PERFORMANCE REQUIREMENTS	NFPA 1999 2008 Edition	NFPA 1971 2007 Edition	NFPA 1951 2007 Edition UTILITY	NFPA 1951 2007 Edition RESCUE	NFPA 1951 2007 Edition CBRN
THL	450 w/m^2	205 w/m^2	650 w/m^2	450 w/m^2	250w/m^2
TPP Rating	None required	35	10	10	10
Tear Resistance Outer shell Thermal & moisture barrier	 8 lbs 8 lbs	 22 lbs 5 lbs	6.75 lbs	6.75 lbs	6.75 lbs
Shell Breaking Strength	50 lbs	140 lbs	90 lbs	90 lbs	90 lbs
Shell Abrasion Resistance	None	None	50 lbs	50 lbs	50 lbs
Shell & Liner Clean Shrinkage	5% Max	5% Max	5% Max	5% Max	5% Max
Seams Major A (shell) Major B (thermal & moisture barrier)	 50 lbs 50 lbs	 150 lbs 75 lbs	 70 lbs 40 lbs	 70 lbs 40 lbs	 70 lbs 40 lbs
Flame Test – all textiles excludes elastic, hook & loop, zippers, seam seal materials unless they contact body, and exempting labels unless on interior of garment	Flame spread of 3.5 seconds or more; no char length; no after flame	Maximum char length of 4"; after flame of no more than 2 seconds & no melting or dripping	Maximum char length of 4"; after flame of no more than 2 seconds & no melting or dripping	Maximum char length of 4"; after flame of no more than 2 seconds & no melting or dripping	Maximum char length of 4"; after flame of no more than 2 seconds & no melting or dripping
Hot Air Oven Test excludes elastic, hook & loop, and seam seal materials	AS TM D 1230	No melting, dripping, or ignition. Hardware to remain functional.	No melting, dripping, or ignition. Hardware to remain functional.	No melting, dripping, or ignition. Hardware to remain functional.	No melting, dripping, or ignition. Hardware to remain functional.
Water Absorption (shell)	30% Max	30% Max	15% Max	15% Max	15% Max
Label Durability	Legibility after 25 wash/dry cycles	Legibility after 5 wash/dry cycles	Legibility after 10 wash/dry cycles	Legibility after 10 wash/dry cycles	Legibility after 10 wash/dry cycles
Liquid Penetration Tested against AFFF, battery acid, Fuel C, swimming pool chlorine, and hydraulic fluid	None	Barrier fabric & seams	Barrier fabric & seams	Barrier fabric & seams	Barrier fabric & seams
Viral Penetration	Barrier fabric & seams	Barrier fabric & seams	Barrier fabric & seams	Barrier fabric & seams	Barrier fabric & seams
Shower Test (duration)	1 garment, each closure 8 minutes	3 garments, each closure 20 minutes	NO 20 minutes	3 garments, each closure 20 minutes	3 garments, each closure
OPTIONAL CBRN PROTECTION:					
Mist Test	NO - Particulate Inward Leakage Test	4 ensembles PPDF: no less than 360/pad System: no less than 361	NO	NO	4 ensembles PPDF: no less than 120/pad System: no less than 76
Chemical Permeation	YES	YES	NO	NO	YES
External Layer Bursting Strength Puncture Propagation Cold Weather Performance	 50 lbs 5.5 lbs NO	 35 lbs 7 lbs YES	 NO NO NO	 NO NO NO	 35 lbs 7 lbs YES

CAVEATS:

- Preconditioning, when required, remains at 10 w/d cycles for 1951 garments; 5 w/d for structural garments, and 25 w/d requirements for 1999 garments, even when performance requirements are the same.
- A minimum trim package is required on 1971 garments. Trim is optional on 1951 garments, but when utilized, trim must provide both retroreflection and fluorescence and must have a minimum of 100^2 in. placed in a manner sufficient to provide 360° visibility of wearer. No required pattern or square inches. Trim is not required on 1999 garments but when present and intended for high visibility must meet ANSI/ISEA 107, or have label requiring a least Class 2 approval when worn on roadside.

NFPA Jacket and Pants: Design Requirements

DESIGN REQUIREMENTS	NFPA 1999 2008 Edition	NFPA 1971 2007 Edition	NFPA 1951 2007 Edition
Collars	None	Minimum 3" in height	Minimum 2" height; remain upright in vertical position
Sleeves	None	Liner 1" from cuff Wristlet	No turn up cuffs Sleeve closure system
Pockets	None	All exterior pockets must have water drainage & closure	Patch & upper torso pockets must have flaps with closure
Hardware	External fittings free of rough spots, burrs, or sharp edges	Free of rough spots, burrs, or sharp edges	Free of rough spots, burrs, or sharp edges
Snaps	Style 2 MIL-F-10884F	Style 2 MIL-F-10884F	Style 2 MIL-F-10884G
Fastener Tape	AA55126	ARAMID tapes not permitted	AA55126
Zippers	AA55634	A-A-55634	AA55634
Cargo Pockets	None	Means of drainage and flaps with closure	Means of drainage and flaps with closure
Upper torso garments	Designed to cover any torso part, excluding hands, and face	Provide protection to upper torso, neck, arms, & wrists; not hands & head	Closure system at neckline
Metallic closure systems/ metal components	None	Shall not contact body; unless covered by closure flap	Shall not contact body
Reinforcements	None	CCHR on shoulders and knees	None required
Means for securing liner to shell	None	Required	Rescue & Recovery elements required to secure barrier to shell
Sizing	None	Male & female patterns Chest Men 34 – 60; Female 28 - 50 in 2" increments or to order Sleeves M: 32 – 38 F: 28 – 34 in 1" increments or to order Waist M: 30 –60 F: 28 – 50 in 2" increments or to order Lengths M: 24 – 36; F: 24 – 34 in 2" increments or to order	Male & female patterns Chest 30 – 50 in 2" increments or to order Sleeves 30 – 36 in 1" increments or to order Waist 26 –50 in 2" increments or to order Lengths 26 – 35 in 1" increments or to order

These charts do not contain all requirements for these standards, but do compare some of the most common requirements.

NFPA Footwear: Performance Requirements

PERFORMANCE REQUIREMENTS	NFPA 1999 2008 Edition	NFPA 1992 2005 Edition	NFPA 1977 2005 Edition	NFPA 1971 2007 Edition	NFPA 1951 2007 Edition
Abrasion resistance	Footwear soles & heels – rating > 65	Sole & heel abrasion rating of not less than 65	Footwear soles & heels, excluding caulked boots, rating of not less than 100 NBS Index	Sole & heel abrasion index of not less than 100	Footwear uppers – show no wear through; Sole & heel abrasion index of not less than 65
Conductive heat resistance	No requirement	No requirement	Temperature of insole surface not to exceed 44°C (111°F)	Temperature of insole surface not to exceed 44°C (111°F)	Uppers not second degree burn in less than 10 seconds; time to pain not less than 4 seconds
Cut resistance	Footwear uppers – distance of blade travel <25mm (1 in)	Footwear uppers – distance of blade travel <25mm (1 in)	Footwear – distance of blade travel <25mm (1 in)	Footwear uppers – distance of blade travel <25mm (1 in)	Footwear uppers – distance of blade travel <25mm (1 in)
Electrical Insulation	No requirement	No requirement	No requirement	No current leakage in excess of 3 mA	No electrical leakage exceed 3 milliamperes
Eyelet & Stud Post Attachment	Detachment strength of 295N (66 lbf)	No requirement	Detachment strength of 294N (66 lbf)	Detachment strength of 294N (66 lbf)	Detachment strength of 300N (66 lbf)
Flame Resistance	Flame spread of 3.5 seconds or more	No requirement	Afterflame of no more than 2 seconds; shall not melt or drip	Afterflame of no more than 2 seconds; shall not melt or drip, nor exhibit any burn-through	Afterflame of no more than 2 seconds; shall not melt or drip, nor exhibit any burn-through
Flex Cracking	No requirement	No requirement	No requirement	3 puncture resistance devices tested; exhibit no cracking	No requirement
Heat and Thermal Resistance (excepting laces)	No requirement	No requirement	No melting; no delamination and all hardware must remain functional	No melting, dripping, or ignition. No water penetration and all components must remain functional	No melting, dripping, or ignition. No water penetration; no separation or delamination and all hardware must remain functional.
Impact & Compression Tests	Toes: Men - min interior height clearance of 12.7mm (1/2 in) during impact energy of 67.8J (50 ft-lb); Women - min interior height clearance of 11.9mm (.468 in) during impact energy of 67.8J (50 ft-lb); Compression - Mens: 7784N (1750 lbf) with min. clearance of 12.7mm (1/2 in; Womens - 7784N (1750 lbf) with min. clearance of 11.911.9mm (.468 in)	Impact resistance of not less than 101.7J (75 ft-lb); Compression - not less than 11,121N (2500 lbf)	No requirement	Toes shall have impact 102J (75 ft-lb); compression 11,121N (2500 lbf) with min. clearance of 13mm (1/2 in)	Footwear: minimum interior height clearance of 13 mm (1/2 in) during impact energy of 101.7J (75 lbf) Compression - min. interior height clearance of 13mm (1/2 in) with compressive force of 11,121N (2500 lbf)
Label Durability	Legibility test after abrasion	No requirement	Legibility test after abrasion	Legibility test after abrasion & heat	Legibility test after abrasion & heat
Ladder Shank Bend Resistance	No requirement	Ladder shanks shall not deflect more than 6mm (1/4 in)	No requirement	Ladder shanks or whole sole equivalents shall not deflect more than 6 mm (1/4 in)	Ladder shanks shall not deflect more than 6mm (1/4 in)
Liquid penetration	No requirement	Chemical penetration using 5 chemicals; no penetration	No requirement	Barrier material & seams; 1 hour duration; no penetration	Barrier material & seams; 1 hour duration; no penetration

NFPA Footwear: Performance Requirements

PERFORMANCE REQUIREMENTS	NFPA 1999 2008 Edition	NFPA 1992 2005 Edition	NFPA 1977 2005 Edition	NFPA 1971 2007 Edition	NFPA 1951 2007 Edition
Metal hardware	20 hr. Corrosion test	No requirement	20 hr. Corrosion test	20 hr. Corrosion test	20 hr. Corrosion test
Metatarsal Protection Test	No requirement	No requirement	No requirement	No requirement	Height of wax form used to measure shall be min. of 25mm (1 in) after impact of 101.7J (75 ft-lbf)
Overall Liquid Integrity Test	3 footwear elements; tested after 100,000 flexes- no liquid penetration & sole shall not separate	10 specimens – no liquid penetration	No requirement	3 footwear elements; tested after 100,000 flexes – no liquid penetration	No requirement
Puncture Resistance	Footwear soles and heels shall not puncture under applied force of 1200N (270 lbf)	Footwear uppers shall not puncture under applied force of 36N (8 lbf); Sole and heel shall not puncture under applied force of 1210N(272 lbf)	Footwear shall not puncture under applied force of 59N (13 lbf)	Footwear uppers shall not puncture under applied force of 60 N (13 lbf); Sole and heel shall not puncture under applied force of 1212N(272 lbf)	Footwear uppers shall not puncture under applied force of 45N (10 lbf); Sole and heel shall not puncture under applied force of 1200N(270 lbf)
Radiant Heat	No requirement	No requirement	No requirement	Temperature of upper surface in contact with skin not to exceed 44°C (111°F)	No requirement
Slip resistance	Soles shall have a static coefficient of .75 or greater in dry condition	Soles shall have a static coefficient of .75 or greater in dry condition	Soles shall have a minimum static coefficient of .5 condition	Soles shall have a static coefficient of .75 or greater in dry condition	Soles shall have a static coefficient of .75 or greater in dry condition
Thread	No requirement	No requirement	Shall not melt , ignite or char	Shall not melt below 260°C	Inherently flame resistant; shall not melt below 260°C
TPP	No requirement	No requirement	No requirement	No requirement	Footwear uppers - 10
Viral Penetration	Barrier layer and seams	No requirement	No requirement	Footwear upper material composites and seams	Footwear upper material composites, upper & vamp seams

These charts do not contain all requirements for these standards, but do compare some of the most common requirements.

NFPA Footwear: Design Requirements

PERFORMANCE REQUIREMENTS	NFPA 1999 2008 Edition	NFPA 1992 2005 Edition	NFPA 1977 2005 Edition	NFPA 1971 2007 Edition	NFPA 1951 2007 Edition
Options	Multiple or Single Use Footwear permitted	None	None	Structural, Proximity, or CBRN footwear	3 levels of protection: utility, rescue & recovery, or CBRN
Composite	No requirement	Chemical protective layer considered as primary material can be configured as separate layer or as composite. Chemical-protective layer can depend on other materials to provide physical protection.	No requirement	No requirement	Either continuous or joined single layers or continuous or joined multiple layers. If multiple, all layers graded to size
Components	Must consist of an upper with sole and heel	Constructed using primary material that shall provide protection from chemical and physical hazards; Chemical-protective layer shall be designed to provide chemical resistance to liquid chemical splash.	Must consist of sole with heel, upper, insole, and shank	Must consist of sole with heel; Upper with lining; Puncture resistant device; Insole; Ladder Shank or whole sole equivalent; impact & compression-resistant toecap	Sole with heel; Upper with lining; Insole with puncture resistant device; Ladder shank; Toecap
Configuration	No requirement	Can be constructed using an outer boot, worn over primary footwear. Booties, where used, designed as an extension of the chemical protective suit and provide protection to foot and ankle.	No requirement	No requirement	No requirement
Height	Minimum of 100mm (4 in) Removable inserts not removed prior to measuring	Minimum of 200mm (8in) when measured from plane of sole bottom.	Minimum of 200mm (8 in) Removable inserts not removed prior to measuring	Minimum of 250mm (10in). Removable inserts removed prior to measuring; Thermal, physical and moisture protection continuous for entire footwear height	Minimum of 200mm (8in). Removable inserts removed prior to measuring
Width	No requirement	No requirement	No requirement	Footwear heel width shall be equal or > than width of sole at intersection of heel breast and sole bottom, excluding any calendar roll where present	No requirement
Footwear with heel breast	No requirement	Heel breast not less than 13mm (1/2 in)	Heel breast not less than 13mm (1/2 in) Angle not less than 90° or more than 135°	Heel breast not less than 13mm (1/2 in) or not more than 25 mm (1 in). Angle not less than 90° or more than 135°. Edges must measure 13mm (1/2 in) from upper at any point.	Heel breast not less than 13mm (1/2 in) or not more than 25 mm (1 in). Angle not less than 90° or more than 135°. Edges must measure 13mm (1/2 in) from upper at any point.
Puncture Resistant Device	No requirement	No requirement	No requirement	Must cover maximum area of insole	Must cover maximum area of insole

NFPA Footwear: Design Requirements

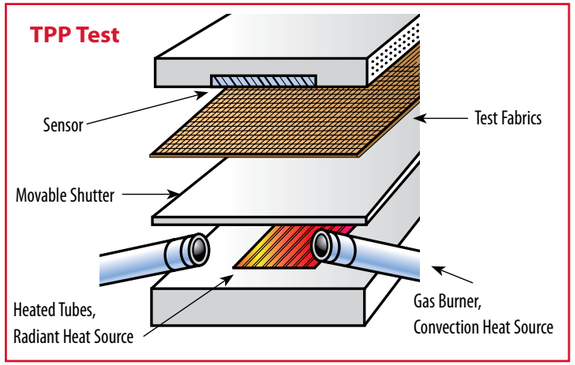
PERFORMANCE REQUIREMENTS	NFPA 1999 2008 Edition	NFPA 1992 2005 Edition	NFPA 1977 2005 Edition	NFPA 1971 2007 Edition	NFPA 1951 2007 Edition
Toecap	No requirement	No requirement	No requirement	No requirement	Must extend not less than 50mm (2 in) from front edge
Thread	No requirement	No requirement	Inherently flame resistant	Inherently flame resistant	Inherently flame resistant
Metal Parts	No requirement	Not penetrate from outside into liner or insole at any part. Not used in construction of sole with heel to puncture-resistant device, insole, upper. All external hardware free of rough spots, burrs or sharp edges.	Not penetrate from outside into liner or insole, unless metal parts covered	Free of rough spots; not penetrate from outside into liner or insole at any point. Not used in construction of sole with heel to puncture-resistant device, insole, or upper	Not penetrate from outside into liner or insole, unless metal parts covered; Not used in construction of sole with heel to puncture-resistant device, insole, upper
Stud Hooks (when used)	No requirement	No requirement	Minimum of four on each side eyerow	No requirement	Minimum of four on each side eyerow
Eyelets (when used)	No requirement	No requirement	Constructed of coated steel, solid brass, brass-coated nickel, or nickel	No requirement	Constructed of coated steel, solid brass, brass-coated nickel, or nickel
Metatarsal Impact Guard	No requirement	No requirement	No requirement	No requirement	Positioned partially over toecap & extended to cover metatarsal bone area. Must be integral & permanent part of footwear
Sizing	Available in mens 5-13 and womens 5-10, including half sizes and a min of 3 widths. Full & half sizes shall be accomplished by individual & unique lasts.	Available in six different and unique sizes.	Available in mens 7-13 and womens 5-10, including half sizes and a min of 3 widths. Full & half sizes shall be accomplished by individual & unique lasts.	Available in mens 5-13 and womens 5-10, including half sizes and a min of 3 widths. Full & half sizes shall be accomplished by individual & unique mens and womens lasts. Dual sizing to cover both men & women not permitted.	Available in mens 6-15 and womens 5-10, including half sizes and a min of 3 widths. Full & half sizes shall be accomplished by individual & unique lasts.
Permanent Attachments	Shall not interfere with function of footwear and any attachments must meet all requirements; cannot degrade performance of footwear.	No requirement	No requirement	No requirement	No requirement

These charts do not contain all requirements for these standards, but do compare some of the most common requirements.

Thermal Protective Performance (TPP)

In the 1986 revision of NFPA 1971, Protective Clothing for Structural Fire Fighting, a new test method for measuring thermal protection was introduced and a minimum Thermal Protective Performance (TPP) rating was established. This sophisticated test method replaced the requirement for a minimum composite thickness. Its purpose is to measure the time elapsed for convective and radiant heat to penetrate through the composite system – Outer Shell, Thermal Liner and Moisture Barrier – to damage the human skin.

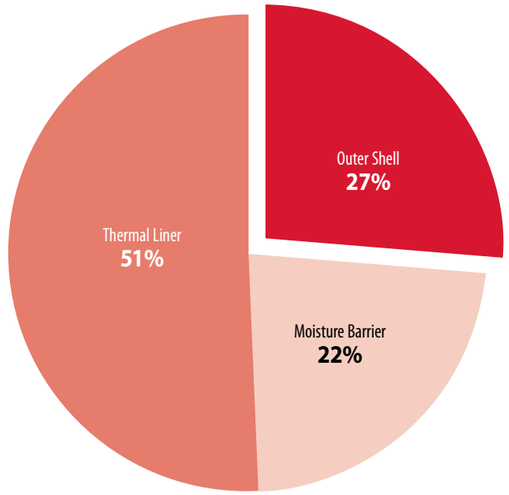
The illustration below is of a standard TPP tester. The test fabrics – all 3 layers in composite form – are placed beneath the sensor, which records skin temperature. The layers are placed onto the machine in the same order in which they are found in the protective system, with the Thermal Liner next to the sensor, Moisture Barrier in the center and the Outer Shell next to the energy source. The movable shutter enables the technician to control the time and the amount of exposure; gas burners provide the actual flame. At the same time, the heated tubes provide the radiant heat and a flashover situation can be simulated. The point at which heat transfer through all 3 layers is enough to cause second degree burn is determined graphically by using a recorder chart of the sensor readings. During testing, the recording continuously traces the average temperature rise on paper, depicted as a curved line representing higher and higher temperatures as more heat penetrates through the sample materials to the sensor.



After the test is completed, its tracing is compared with a second curve, called the Stoll's curve, which shows the blister point of human skin as a function of heat and time. The point of intersection between these two curves is the actual TPP rating. For the purpose of measuring actual time to burn, the TPP rating is divided in half to determine the number of seconds until the human tissue reaches second degree burn. Thus, the NFPA minimum requirement of a TPP rating of 35 equates to 17½ seconds until second degree burn occurs in a flashover situation.

A popular misconception is that if 35 is good, a rating of 40, 50, or even 60 must be better. It is important to remember, however, that the only way to increase your TPP rating is to add more insulation, usually by specifying heavier material components. Generally speaking, added insulation will mean increased weight of the total system, resulting in a lower THL rating and greater heat stress for the firefighter. The question one must ask is whether the added seconds of protection in the event of a flashover environment is a good trade-off against today's lighter weight systems. It is also important to note that by selecting the 3 layers to be used in your system, you have automatically specified the TPP rating, since it is a function of the materials chosen and not an independent requirement.

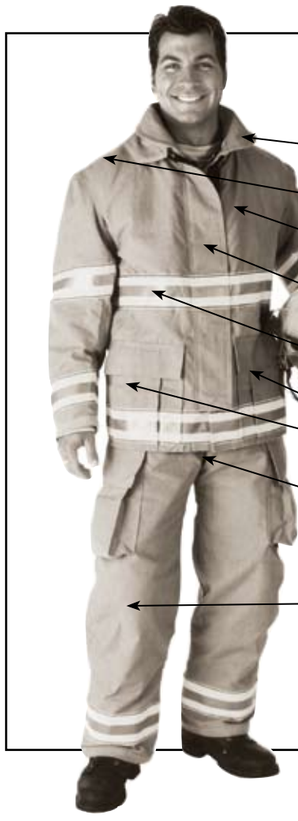
Turnout Composite Thermal Performance



The outer shell is the first line of defense against flame, heat, wear and tear.

73% of thermal protection comes from the inner components.

Turnout Protection



	TPP
COLLAR	54
SHOULDER	65 ->120
INSIDE LABEL	69
FRONT FLAP	>120
TRIM	64
POCKETS	90 ->120
FLY	>120
KNEE	>120

Garment design and features dominate the thermal and heat stress performance of the clothing system.

More than 50% of a typical turnout is reinforced by additional fabrics, trim, labels or overlap.

Base Composite: TPP = 50
KEVLAR®/NOMEX® Outer Shell
PTFE/E-89™ Moisture Barrier
Aramid® batt Thermal Liner.

Total Heat Loss (THL)

Total Heat Loss (THL) is a test method adopted by NFPA 1971, 2000 Edition. The most specific issue leading to its adoption by the technical committee was firefighter heat stress. This test specifically measures the ability of the garment to allow heat to pass away from the body through the 3 composite layers that make up the jacket and pants – in short, breathability. Generally, the higher the THL, the more likely the system will be able to dissipate excess body heat. Higher THL values are created by lighter thermal liners and outer shells, but most effectively by high performance breathable moisture barriers such as CROSSTECH® moisture barrier. Obviously, older garments with non-breathable moisture barriers or heavier thermal liners will inhibit the total heat loss and carry the high risk of elevating the body's core temperature to extreme levels.

The 2000 Edition requirement was that the 3-layer ensemble provide a minimum total heat loss of 130 W/m^2. This requirement eliminated neoprene moisture barriers. In the 2007 Edition, the requirement increased to 205 W/m^2.

Total Heat Loss has a direct relationship to Thermal Protective Performance (TPP), discussed in the preceding section. Researching TPP and THL values provides the best predictive indication currently available for safety and performance levels in firefighters protective clothing.

The choice in combinations for outer shells, moisture barriers and thermal liners can be daunting. However, CROSSTECH® moisture barriers, combined with other ensemble components as shown, consistently provide the highest levels of heat stress relief (THL).

Departments should carefully evaluate the various composites available for the best balance of THL and TPP values to suit overall structural fire fighting needs consistent with budget. Know your most common working environments and spec your clothing appropriately.

THL versus TPP

Both THL and TPP tests are conducted on all 3 layers of the garment together. You can't take the values of one layer and add it to the values of another layer to get the result.

Let's review and simplify:

THL (Total Heat Loss) – In short, breathability.
Lighter/Thinner garment = Higher THL (Comfort).

TPP (Thermal Protective Performance) – Thermal Insulation.
Thicker/Heavier = Higher TPP (Protection).

There is, in most systems, an important inverse relationship between TPP and THL. The optimum values for each are needed to achieve both comfort and protection. Generally as TPP goes up THL comes down, and as THL goes up TPP comes down, so the goal is to balance the two values.

A lightweight, thin garment with high THL values may be comfortable but won't offer you as much thermal protection. A thicker, heavier garment with high TPP values may provide more thermal protection but the heat stress and added weight can be dangerous. Hence the balancing act: the need to determine the level of protection required while maintaining a workable system. Keep in mind that the moisture barrier plays a crucial role in the breathability and THL value of the garment.

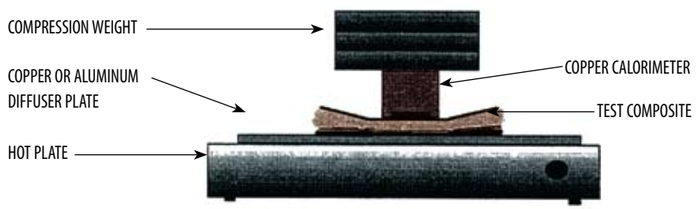
Conductive and Compressive Heat Resistance (CCHR)

A new Conductive and Compressive Heat Resistance (CCHR) test was added to the 2000 Edition of NFPA 1971 Standard to specify minimums in protective insulation required in high compression areas.

The requirement is that the CCHR rating of shoulder and knee areas, when compressed, must equal the established base garment rating. This is intended to ensure that the shoulder and knee areas will provide the same level of protection when compressed, as does the remainder of the garment. The test is run in both the wet and dry conditions.

The CCHR rating is the time in seconds to achieve a temperature rise of 24˚C. The minimum requirement established in the 2000 Edition was 13.5 seconds, which was arrived at by testing a garment with a TPP of 35 on a hot plate set at 280˚C, under a pressure of ½ lb. per square inch. The shoulder area is tested under 2 lbs. psi, which simulates a firefighter wearing a 2" SCBA strap, with a 40 lb. fully loaded tank. The knee section is tested at 8 lbs. psi, which represents the amount of force that a 180 lb. firefighter would exert to the knee area when in the kneeling position. In the 2007 Edition of NFPA 1971, the CCHR requirement increased to 25 seconds.

Measures the Conductive and Compressive Heat Resistance Through a Composite Under Pressure



The original requirement did necessitate additional insulation in some systems, depending upon which materials the base garment was built from. However, Globe made the decision to automatically add a second layer of thermal liner in these high compression areas, to ensure that minimum requirements were always exceeded. Our shoulder reinforcements extend 5" from the top of the shoulder in the front and a full 7" in the back. For the knee area, we install not just a layer of thermal liner, but also an additional layer of moisture barrier, for a level of protection far and above the minimum requirement.

Color Change to Outer Shell Materials

Outer shell materials used in the production of today's protective clothing are blends of very high temperature resistant fibers, such as KEVLAR® and PBI.® These high temperature blends are flame and heat resistant and have the ability to self extinguish when the source of ignition is removed. However, these outer shell fabrics are difficult to dye and the dyestuff used to color the material is simply not able to withstand the same high temperatures as the fibers. Dyestuff will also react to exposure to ultraviolet rays by causing the material to fade or to exhibit color change. When an outer shell shows signs of discoloration, generally what has occurred is dye sublimation. It has been our experience, confirmed by TenCate, that the color change to the outer shell material is generally indicative of a thermal exposure. Laboratory tests have shown that the dyestuff will normally begin to exhibit change at temperatures in the vicinity of 450° F, with or without direct flame impingement.

Discoloration by itself is not necessarily cause for alarm, since the heat and flame characteristics are inherent to the material and cannot be washed off or worn out. However, any material should be checked for continued tensile strength whenever discoloration is noted. This can be accomplished by using manual pressure to pull and poke at the discolored areas. If the fabric can be torn, it should be considered too weak for service and immediately removed from the field. If any outer shell material has been exposed to enough heat to cause discoloration, then the liner system must also be carefully checked, especially the moisture barrier layer which is located closer to the outer shell. We recommend that if the outer shell has become discolored, the moisture barrier should be evaluated using the hydrostatic water test method.

Care and Cleaning Guidelines

Globe CARES: CARES is our acronym for Cleaning and Repair Evaluation Services which Globe offers to assist our customers with the advanced cleaning and inspection required by the 2008 revision of NFPA 1851, Standard on Selection, Care and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting. This user standard also requires that Independent Service Providers (ISP's) or Organizations (fire departments) who wish to perform their own advanced cleaning and inspections must be trained by the manufacturer. Please visit our website for more information on the various ways in which we are able to provide this necessary training.

GUIDELINES

With the recently published revision of NFPA 1851, Standard on Selection, Care and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2008 edition there has been an increased awareness among fire fighters for the need to have turnout clothing laundered regularly. The NFPA Technical Committee for structural clothing addressed this in the 1991 revision of NFPA 1971, almost 17 years ago, by adding an appendix item dedicated exclusively to the care and cleaning of bunker clothing. NFPA 1851 sets minimum requirements for the inspection, care and cleaning of all protective ensemble elements covered by NFPA 1971. The Globe label on every garment provides basic information for laundering; however, what follows is a much more comprehensive set of instructions for cleaning gear.

- ✔ If the liners and or the DRD are detachable, they should be removed from the shell and laundered separately. This is to prevent any contaminants the shell may have been exposed to from being transferred to the inner portions of the garment during the laundering process. This will also facilitate drying of the protective clothing, especially the liners.
- ✔ All closures should be fastened: Hook and loop hook tape covering hook and loop pile, hooks and dees fastened, zippers zipped and snaps fastened. ***It is imperative that you cover the hook portion of all hook and loop to prevent snagging during laundering and to help guard against premature wear.***
- ✔ *PROXIMITY GEAR SHOULD NEVER BE MACHINE WASHED UNDER ANY CONDITIONS.* For structural gear, we recommend a front loading washing machine, which does not have an agitator, and preferably one that is designated specifically for cleaning turnouts. A stainless steel tub should be utilized if available. We have been advised by care and cleaning facilities who work with protective clothing that the extractor G force is very important and they suggest that 85 G's would be best, but certainly no more than 100 G's. If you are trying to convert RPM's to G force, you can do so using the following formula:

CRPM = Cylinder RPM
CD = Cylinder diameter (inches)

$$\text{G Forces} = \frac{\text{CRPM} \times \text{CRPM} \times \text{CD}}{70{,}500}$$

- ✔ If you must use a top loader, we suggest utilizing a laundry bag to protect the inside of the washing machine from the hooks and dees (and to protect the hooks and dees from the agitator of a washing machine when using a top load model).

Machine Washing: We are often asked if machine washing could affect the protective qualities of your turnout gear. The special fabrics that make up your turnouts contain inherent flame and heat resistance properties, which cannot be washed off or worn out. However, given the nature of the contaminants to which fire fighters are exposed, you should never, never use the same machine that you do your home laundry in. When machine washing, always prepare the clothing as directed, by separating removable liners and DRD's from outer shells and fastening all closure systems. Use warm water and a normal cycle; water temperature should not exceed 105°F. Following each complete wash cycle, thoroughly rinse your garments. Liners should be turned inside out, while DRD's should be laundered in a mesh bag; every separable component should be laundered separately.

Protective clothing should always be washed by itself; do not overload the washing machine, do not use softeners, and NEVER use chlorine bleach. Our recommended method of drying is to hang in a shaded area that receives good cross ventilation or hang on a line and use a fan to circulate the air. Naturally, the turnout system will dry more quickly if you separate the layers for laundering and turning the liner system inside out will facilitate drying of the quilt thermal barrier.

Cleansers: Cleansers generally fall into two categories, detergents and soaps. Of the two, detergents make the best cleansers because they are formulated to contain special agents that help prevent redeposition of soil. Soil redeposition is soil which is first removed from a laundered article, but later in the same wash cycle is redeposited as a thin soil film on the entire surface of the article. The most distinctive advantage of detergents is that they do not form curd in hard water. Soap curd is the material which forms a ring around the bathtub when bathing with soaps, and this curd is extremely difficult to rinse out of your garment. All cleaning agents are clearly labeled as being either detergents or soaps; and we recommend liquid detergents, since they are less likely to leave any residue on the clothing. It should also be noted that NFPA 1851, Standard on Selection, Care, and Maintenance for Structural Fire Fighting and Proximity Fire Fighting Ensembles requires that cleaning and contamination solutions shall have a pH range of not less than 6.0 pH and not greater than 10.5 pH.

Spot Cleaning and Pretreating: Precleaners can be used to clean light spots and stains on protective clothing. Squirt the precleaner onto the soiled area and gently rub fabric together until a light foam appears on the surface; this foam should be completely rinsed off with cool water prior to washing. A soft bristle brush, such as a toothbrush may be used to gently scrub the soiled area for approximately one to one and a half minutes. An alternative method would be to pretreat garment by applying liquid detergent directly from the bottle onto the soiled area and proceed as with precleaners. Any spot cleaning or pretreating should be followed by machine washing prior to field use.

Dry Cleaning: Dry cleaning can adversely affect both the 3M triple trim and the Reflexite trims and is therefore not recommended. If you should decide that your particular exposure requires dry cleaning, knowing and accepting the risks involved, you must be sure and specify to the launderer to use non-flammable dry cleaning processes that will not adversely affect the materials. Again, our experience is that dry cleaning will result in Reflexite trim becoming cracked and brittle.

Special Cleaning Compounds: We are not able to "endorse" any of the special compounds that are being advertised for use in the fire service. However, if you are interested in a specific cleaning agent, we recommend that you contact the manufacturer of the cleaner being considered and make your own determination as to suitability. You may want to ask for names of other departments currently using the product and see what their experience has been.

Removing Oil or Tar: Oil based soils such as motor oil and tar can be removed with solvents such as "VARSOL" prior to washing, says E.I. DuPont, the folks who produce the NOMEX® fibers. However, they do add the cautionary statement that the garment must be thoroughly washed and rinsed to insure that all residual solvent is completely removed. They also point out that coated material should never be dry cleaned. The manufacturers of PBI fiber also recommend in their User Advisory that solvents such as VARSOL may be used to remove stubborn stains such as tar, providing that the garments are well laundered and rinsed prior to actual use. You must always avoid using solvents on the leather or reflective trim. **NOTE:** NFPA 1851 instructs the user to not use solvents; however, based upon our experience, we believe VARSOL to be the one exception to the rule.

Bleach: One of the most often asked questions concerns the decontamination of a turnout system, especially with chlorine bleach. *UNDER NO CIRCUMSTANCES* should chlorine bleach be used on fire fighters' clothing; most systems contain KEVLAR®, either as a blend or as the primary fiber, and Kevlar is extremely susceptible to damage when exposed to bleach.

Trim: 3M, the manufacturers of both SCOTCHLITE and Triple Trim, recommend that the following guidelines be used for their product: (1) Damp wipe, using warm water not to exceed 105°F, and mild detergent. Rinse thoroughly, dry with a soft cloth, or allow to air dry. (2) If you choose to machine wash, use warm water. (3) Do not dry clean.

Decontamination: For extreme contamination with products of combustion, fire debris or body fluids, removal of the contaminants by flushing with water as soon as possible is necessary, followed by appropriate cleaning. In the case of blood born pathogens, recommended decontamination procedures include using a .5 to 1% concentration of LYSOL, or a 3-6% concentration of stabilized hydrogen peroxide. Liquid glutaraldehyde, available through commercial sources, will also provide high to intermediate levels of disinfectant activity. The current edition of NFPA 1851 states that if a garment is verified as having been exposed to chemical, biological or radiological agents, that garment should be immediately removed from service and retired. When decontamination is not possible, the garments should be discarded in accordance with local, State and Federal regulations. Garments that are discarded should be destroyed.

Hand Washing: The industry recognizes that hand washing is generally not able to remove the ground-in soil embedded in the material fibers and usually only serves to remove surface dirt. However, in the event that you do not have access to a washing machine and must hand wash your garment, remove your liner system and lay the outer shell on a non-abrasive hard surface. Using a soft bristle scrub brush and a detergent (not soap), clean your garment by making circular motions with the brush, forming progressively larger circles until the entire surface has been washed. You must then rinse the shell, using clear water, to insure that all of the detergent has been removed. We recommend that you rinse the entire garment several times to avoid any possibility of soil detergent residue.

Outside Cleaning Assistance: One question we are often asked is whether the gear can be or even should be cleaned by a professional. NFPA 1851 requires that training for advanced cleaning of turnouts be provided by the manufacturer and to this end we can provide you with a list of ISP's (independent service providers) who have completed the Globe training classes. We believe that these companies offer a valuable service and we encourage our customers to directly contact any of these outside cleaning facilities to determine if they are able to meet the fire department needs. Some possible questions to ask would be if they provide any warranties on their services, and whether they are able to give any guarantees concerning the effectiveness of their cleaning.

Cleaning Proximity Clothing: GENTEX®, the producers of the aluminized outer shells used in the fire service today, point out that the outer side of the aluminized material offers a highly reflective surface and it is extremely important to keep this surface clean so that it may perform at peak efficiency. They recommend the following care and cleaning instructions for aluminized proximity outer shells:

- ✔ Clean by gently rubbing the surface with a soft cloth or sponge containing mild soap.
- ✔ Rinse thoroughly.
- ✔ DO NOT MACHINE WASH.
- ✔ Dry garment by hanging in a well ventilated, shaded area.
- ✔ Use a fan to circulate the air if necessary
- ✔ Do not store garment wet or with any chemical contamination.
- ✔ Do not clean with any compounds containing ammonia, chlorine or other oxidizing or abrasive agents.

Conclusions: In caring for your turnout clothing, you must always remember that it features three piece layering and you must consider each individual layer when deciding how to clean. We do encourage every department to keep their clothing clean and to routinely inspect and repair as needed. Having dirt, soot, and other debris clinging to your gear represents a safety hazard. Clean turnout gear is lighter in weight, lasts longer, and is more visible than dirty turnout gear.

Inspection Guidelines for Protective Clothing

All protective clothing should be routinely inspected to insure continued serviceability. Damaged clothing should be immediately removed from service until the decision to repair or retire has been made by the safety officer or his designee. The following represent some fairly simple criteria for inspection and should be considered as the most basic, rather than all inclusive. For detailed information, reference is made to *NFPA 1851, Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2008 Edition.*

Char and Heat Damage: All three layers should be examined for charred, burned, or discolored areas that may result in loss of tensile strength and material degradation. To check for weakening of fabric, aggressively flex the material and attempt to push a finger or thumb through the fabric.

Fabric or Material Damage: Clothing that has become torn, ripped, cut, abraded or otherwise damaged by wear should be repaired. All moisture barrier material, including sleeve well assemblies, should be checked for peeling or cracking, which are signs of wear and require replacement.

Thread or Seam Damage: All seams in each separate layer of the garment shall be inspected for thread or seam damage and restitched as necessary.

Discoloration: Discoloration to any of the three layers of the protective clothing should be evaluated. Check all discolored or faded areas for tensile strength by aggressively flexing the material and attempting to push a finger or thumb through the fabric. Any loss of strength or weakening of the materials to the degree where the material can be torn with manual pressure is a sign of deterioration and the garment should be removed from service for repair or retirement. Discoloration of the moisture barrier layer may indicate abrasion or other damage that would render the fabric incapable of preventing water entry.

Moisture Barriers: There is a simple field test you can perform to check *any* moisture barrier: Place your liner over a five gallon bucket with the dry *thermal barrier* facing down and dry *moisture barrier* facing up. Using an alcohol- tap water mixture (made by combining 1 part rubbing alcohol , 70% isopropanol alcohol with six parts of tap water), pour 1 cup of the liquid on the moisture barrier and inspect the thermal side after three minutes. If the water passes through the moisture barrier and wets the thermal barrier, your liner should be removed from service and repaired or replaced. Perform this simple test in high abrasion areas like the broadest part of the shoulders, at the coat waistline, the trouser knee, crotch or seat area, or where you have detected other potential damage. It is difficult to determine with any certainty whether your moisture barrier leaks simply by looking at either the film or the fabric it's laminated to, so some type of leakage evaluation is necessary.

Knit distortion: All knit areas of the garments shall be examined for loss of strength, loss of shape, or loss of elasticity.

Reflective trim: Trim that is loose but still reflective may be restitched, while trim that has become burned or otherwise damaged must be replaced. Note that the trim may appear to be undamaged to the human eye when it has actually lost much of the ability to reflect. To check for continued reflectivity, perform a simple "flashlight" test. Standing a minimum of 40 feet from the trim sample to be examined, hold a flashlight at eye level and aim the light beam at the sample to be evaluated. Compare the brightness of the reflected light coming back to a sample of "new" or unused trim. If the reflected light is substantially less than that seen on the new trim, the trim needs to be replaced.

Hardware: Check all hardware, including snaps and dee rings, pocket snaps, zippers, and take-up buckles to insure functionality. Hook & loop should be inspected to insure that contamination has not affected functionality and that stitching remains secure.

Proximity Garments: NFPA 1971 requires an aluminized outer shell, which must be inspected for loss of reflectivity. The standard requires that the outer shell have a radiant reflective capability, and that the only areas allowed to be non-reflective are the collar lining (that which comes into contact with the neck) and a 1" expanse around the sleeve cuffs and trouser leg cuffs. To the best of our knowledge, there is no way to restore an aluminized surface that has become abraded to the point where it is no longer reflective. Thus, the only means of refurbishing an outer shell is to patch the affected area with the same aluminized fabric as the garment is produced from to cover any areas that are no longer reflective. Obviously, some judgments need to be made as to whether this is cost effective, and/or safe.

Retirement: In general, once a garment has reached the point where repairs will cost more than 50% of the price of a new garment, you may want to consider having it retired. When considering retirement, the authority having jurisdiction should take into account things like the amount of ground-in soil contained in the garment, any stains or clinging debris of unknown origin, and overall condition of each individual layer. If the fibers of the various layers are beginning to show wear in the form of abrasion, especially in high stress areas such as the outer shell inseam of trousers, there is no way to restore them to like new condition, nor any way in which to prevent further break down, and repair to garments with these conditions are usually not cost effective.

In conclusion, each and every one of the items contained in this bulletin should be considered when trying to decide if a garment has reached it useful life span. The bottom line, regardless of when the clothing was produced, is that the safety officer or authority having jurisdiction must routinely inspect protective clothing in order to assure that it is clean, maintained, and still safe. Just knowing the age of the garments cannot do that and for safety sake, any judgment call should be made erring on the side of caution.

Field Repair Guidelines for Protective Clothing

1. Globe uses NOMEX® thread on NFPA 1971 and NFPA 1951 garments.
2. All field repairs should use materials consistent with information on the content label.

   Example: Globe would not repair a MILLENIA® LIGHT fabric garment with NOMEX® IIIA fabric.
3. NFPA requires that ALL components, including letters, emblems, etc. meet minimum flame and heat test requirements through third party testing. (Excludes NFPA 1999 Standard, 2008 Edition)
4. All repairs/alterations should use the same stitch configurations.
5. All stress areas should be reinforced, preferably using a bartack.
6. Never stitch through a Protective Barrier or Liner. In fact, field alterations or repairs of Protective Barriers should only be undertaken by the manufacturer or verified ISP's.
7. An equal amount of replacement trim must be added to areas that have been covered up by repairs or alterations. Example: covering existing trim with a patch pocket requires the same amount of trim to be added to the pocket.
8. When a section of a garment has been disassembled, the sleeve for example, it must be reassembled precisely as originally constructed at the factory.
9. Never perform any repair or alteration that will compromise the original performance specifications or integrity of the garment.

DOUBTS? QUESTIONS? PROTECT YOUR INVESTMENT. Contact Globe before making any field repairs. **800-232-8323** or **info@globefiresuits.com**

Life Expectancy for Protective Clothing

As the NFPA Technical Committee on fire fighters protective clothing worked through the year 2008 revision of NFPA 1851, Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, one of the most debated issues continued to be "What is the life expectancy of protective clothing?" Although the committee was not able to reach complete agreement on the answer to this question, there was consensus that structural ensemble elements should be retired ten years after the date of manufacture, and that proximity outer shells must be retired five years after the date of manufacture. However, the Annex does contain language explaining that this does not mean all ensemble elements will last or should remain in service for the full 5 or 10 years – just that five year old proximity outer shells and ten year old structural gear must be retired. The standard also provides additional criteria for inspection and retirement as well.

Having explained the mandatory requirements found in NFPA 1851, it is fairly well understood in the industry that the average life of a structural turnout suit is three to five years, and that proximity outer shells become worn out even sooner than that. It is important to remember, however, that average means some garments have lasted much longer and other garments not as long. Some segments of the fire service have even suggested that since the NFPA clothing standard is revised every five years, then five years should be the maximum time to leave garments in service. While this would insure that as technology improves, garments would automatically be upgraded to meet new requirements and offer new levels of safety, it could leave the false impression that anything less than five years old is still perfectly compliant.

The reality is that the life span of any protective clothing is entirely dependant upon the type and amount of field use to which each separate garment has been exposed. Contributing factors to this include frequency of maintenance, storage conditions, exposures, and other issues that are beyond the garment manufacturer or material supplier's control. Facilities that specialize in care and cleaning will advise that they have seen clothing that is much older than five years and still in excellent shape; likewise, however, they have seen instances where the first time a garment was worn it was exposed to circumstances that totally destroyed the clothing. Since the purpose of fire fighters clothing is to protect the wearer, if the gear has saved a life or prevented serious injury just once, then it has done its job.

It is also important to remember that protective clothing is a component system, not a single layer, and each component needs to be evaluated in its own right, with each layer routinely inspected for continued serviceability. For example, we have evaluated garments wherein the outer shell appears visually to be in excellent condition; however, closer inspection of the liner - moisture barrier will reveal rips or tears that would not be obvious in a cursory examination. Discoloration to any layer of the protective ensemble may be an indication that the garment is no longer able to provide the same level of protection as when it was new. Any discoloration should be carefully inspected.

The bottom line, regardless of when the clothing was produced, is that the safety officer or authority having jurisdiction must routinely perform an advanced inspection on all protective ensemble elements in order to assure that they are clean, maintained, and still safe. Just knowing the age of the gear cannot do that.

Globe Firefighter Suits & Globe Cairns Limited Warranty

Globe warrants its firefighters' protective clothing to be free from defects in materials and workmanship for their serviceable life when properly used and cared for. Our obligation under this warranty shall be limited to the repair or replacement, without charge, of any product which is returned to Globe at buyer's expense and is determined by us to be defective in materials or workmanship, but is otherwise serviceable.

This warranty shall not be effective unless the products are used for the purpose for which they were designed and are used by trained personnel following proper fire fighting procedures and in accordance with the product's warning, use, inspection, maintenance, care, storage, and retirement instructions. Failure to properly care for the garment will lead to a shortening of the serviceable life.

"Serviceable" refers to the general condition of the garment which can be expected to provide at least reasonable limited protection against the hazards from which the garment was designed to protect. "Serviceable life" is the period of time protective clothing, which has been properly cared for, can be expected to provide reasonable limited protection. "Defects in Materials" refers to weak areas or other flaws caused by irregularities in their manufacture. "Defects in Workmanship" refers to improperly manufactured seams, stitching, or other construction methods.

This warranty does not cover wear and tear nor damage from fire, heat, chemicals, misuse, accident or negligence.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. The remedy of repair or replacement for breach of this warranty shall be the sole and exclusive remedy and Globe shall not under any circumstances be liable for incidental or consequential damages.

Globe LifeLine Limited 3-Year Warranty

Globe LifeLine, LLC warrants its protective clothing to be free from defects in materials and workmanship for a period of three (3) years from the date of purchase when properly used and cared for. Our obligation under this warranty shall be limited to the repair or replacement, without charge, of any product which is returned to Globe at buyer's expense and is determined by us to be defective in materials or workmanship, but is otherwise serviceable.

This warranty shall not be effective unless the products are used for the purpose for which they were designed and are used by trained personnel following proper emergency medical, rescue or recovery procedures and in accordance with the product's warning, use, inspection, maintenance, care, storage, and retirement instructions. Failure to properly care for the garment will lead to a shortening of the serviceable life.

"Serviceable" refers to the general condition of the garment which can be expected to provide at least reasonable limited protection against the hazards from which the garment was designed to protect. "Serviceable life" is the period of time protective clothing, which has been properly cared for, can be expected to provide reasonable limited protection. "Defects in Materials" refers to weak areas or other flaws caused by irregularities in their manufacture. "Defects in Workmanship" refers to improperly manufactured seams, stitching, or other construction methods.

This warranty does not cover wear and tear nor damage from fire, heat, chemicals, misuse, accident or negligence.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. The remedy of repair or replacement for breach of this warranty shall be the sole and exclusive remedy and Globe LifeLine, LLC shall not under any circumstances be liable for incidental or consequential damages.

Globe FootGear Limited Warranty

Globe Footwear, LLC warrants its protective footwear to be free from defects in materials and workmanship for a period of one (1) year from the date of purchase when properly used and cared for. Our obligation under this warranty shall be limited to the repair or replacement, without charge, of any product which is returned to Globe at buyer's expense and is determined by us to be defective in materials or workmanship, but is otherwise serviceable.

This warranty shall not be effective unless the products are used for the purpose for which they were designed and are used by trained personnel following proper procedures and in accordance with the product's warning, use, inspection, maintenance, care, storage, and retirement instructions. Failure to properly care for the footwear will lead to a shortening of the serviceable life.

"Serviceable" refers to the general condition of the footwear which can be expected to provide at least reasonable limited protection against the hazards from which the footwear was designed to protect. "Serviceable life" is the period of time protective footwear, which has been properly cared for, can be expected to provide reasonable limited protection. "Defects in Materials" refers to weak areas or other flaws caused by irregularities in their manufacture. "Defects in Workmanship" refers to improperly manufactured seams, stitching, or other construction methods.

This warranty does not cover wear and tear nor damage from fire, heat, chemicals, misuse, accident or negligence.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. The remedy of repair or replacement for breach of this warranty shall be the sole and exclusive remedy and Globe Footwear, LLC shall not under any circumstances be liable for incidental or consequential damages.

Globe's Barcode Label

The Globe Barcode Label represents the latest in technology. Heat-sealed to the garment, it allows us to reduce the label size, import all information to eliminate hand marking, and offer barcoding as standard. When tested for durability as required by NFPA, this printed label visually outlasts traditional label stock to offer the fire service a more durable, user friendly, lasting source of information.

By installing the one-dimensional barcode directly onto the label at the time of manufacture, we have provided an easy interface with PPEtracker.com.

The barcode can be used with most common scanners, eliminating the need for expensive scanning devices or external software for a specialized tracking system.