



NFPA 1851-2008 Instructional Guide

For Quaker Safety Turnout Gear



Quaker Safety has prepared this guide to help organizations which have purchased Quaker Safety garments comply with the requirements of NFPA 1851 Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2008 Edition. This guide is specific to Quaker Safety garments and does not apply to garments, helmets, gloves, footwear or interface components manufactured by other companies.

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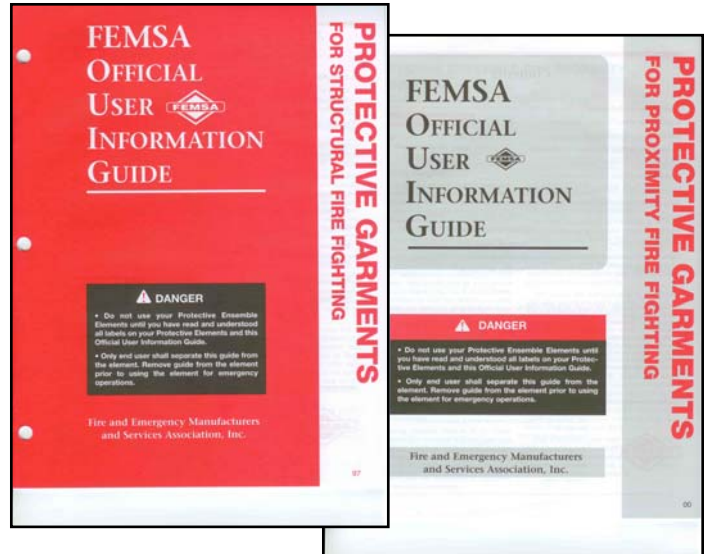
NFPA 1851 GUIDELINES

NFPA 1851 provides guidelines for the program, selection, inspection, cleaning and decontamination, repair, storage, retirement and disposition of ensemble elements as well as verification requirements for organizations or Independent Service Providers.

Quaker Safety highly recommends that you obtain a copy of NFPA 1851-2008. Copies may be purchased directly from the National Fire Protection Association at www.nfpa.org.

Important information regarding your structural or proximity turnout gear is also contained in the FEMSA Official User Information Guide provided with your new Quaker Safety garment. Additional copies of the structural or proximity FEMSA Official User Information Guide may be requested by e-mailing us at info@quakersafety.com.

W.L. Gore & Associates Inc.'s NFPA 1851 Instructional Guide for moisture barriers can be viewed at www.goreprotectivefabrics.com/NFPA1851.



Quaker Safety offers Advanced Cleaning, Advanced Inspection and Repair Services. Please feel free to contact your distributor or our Customer Service Department at info@quakersafety.com or call 215-536-2991 ext. 1 for more details.

RECORD KEEPING

Your organization should compile and maintain records on its Quaker Safety structural or proximity fire fighting garments.

The standard specifies at least the following records shall be maintained for each Quaker Safety garment:

- Person to whom the garment is issued
- Date and condition when issued
- Manufacturer and model name or design
- Manufacturer's identification number, lot number or serial number
- Month and year of manufacture
- Date(s) and findings of advanced inspection(s)
- Date(s) and findings of advanced cleaning or decontamination
- Reason for and who performed advanced cleaning or decontamination
- Date(s) of repair(s), who performed repair(s) and brief description of repair(s)
- Date of retirement
- Date and method of disposal

This information should be recorded on the Quaker Safety PPE Tracking Form (see sample below).

Quaker Safety PPE Tracking Form

Garment issued to: Ray Miller
 Date Issued: 6/30/2006
 Condition when issued: New
 Model Number: 90C-33-3-85
 Serial Number: 123456
 Manufacture Date: 3/2006
 Date Retired:
 Disposal Method:

Advanced Inspection

Date:	6/29/2007	Performed by:	J. Smith	Reason:	Annual Adv
Inspection Findings:	No findings				
Date:	6/29/2008	Performed by:	J. Smith	Reason:	Annual Adv
Inspection Findings:	Torn reflective trim on lower right sleeve				
Date:	1/6/2009	Performed by:	J. Smith	Reason:	Hole in upper routine inspection
Inspection Findings:	See attached Garment Advanced Inspection Checklist for				
Date:	6/29/2009	Performed by:	J. Smith	Reason:	Annual Adv and Complete Liner
Inspection Findings:	No findings				

Advanced Cleaning

Date:	6/29/2007	Performed by:	J. Smith	Reason:	Annual Advanced Cleaning
Notes:					
Date:	6/29/2008	Performed by:	J. Smith	Reason:	Annual Advanced Cleaning
Notes:					
Date:	1/6/2009	Performed by:	J. Smith	Reason:	Advanced Cleaning needed prior to performing repairs
Notes:					
Date:	6/29/2009	Performed by:	J. Smith	Reason:	Annual Advanced Cleaning
Notes:					

Repairs (including accessories added to garment)

Date:	6/30/2006	Performed by:	Quaker Safety	Reason:	
Notes:	Hole patched, Crosstech moisture barrier replaced per back				
Date:		Performed by:	Quaker Safety	Reason:	
Notes:	Hole patched, Crosstech moisture barrier replaced per back				

CLEANING - GENERAL

Maintaining the cleanliness of your garments is extremely important. Soiled or contaminated garments may contain hazardous oils, chemicals, or contaminants that may be flammable, toxic or carcinogenic and may reduce your garment's useful life and protective qualities.

Following each use, the wearer must evaluate the garments to determine whether routine or advanced cleaning needs to be performed.

Protective gloves and eye/face splash protection should be worn when cleaning your garments.

Routine cleaning may be performed by the user and is appropriate for spot cleaning of the garment.

Advanced cleaning may only be performed by Quaker Safety, a verified Independent Service Provider (ISP) or organization personnel who have received written documentation of their training in advanced cleaning from Quaker Safety or a verified ISP. Verified ISPs performing advanced cleaning are responsible for demonstrating to the organization that their cleaning procedures

do not compromise the performance of the garment. Advanced cleaning is appropriate when the garment is soiled or the entire garment needs to be cleaned, when routine cleaning does not render the garment sufficiently clean for service, or if the garment has not been subjected to advanced cleaning in the previous 12 months.

Garments should never be brought into the home, washed in home or public laundries, or washed with other clothing.

To prevent damage and cross contamination, outer shells, liners, and DRDs should be cleaned and dried separately.

We recommend that you contact Quaker Safety or a verified ISP if your garments require decontamination or specialized cleaning.

Garments that are not thoroughly cleaned and dried should NOT be worn

USE ONLY MILD LIQUID DETERGENTS WITH A PH RANGE OF NOT LESS THAN 6.0 AND NOT GREATER THAN 10.5. DO NOT USE COMPOUNDS CONTAINING CHLORINE OR AMMONIA, ACTIVE-INGREDIENT CLEANING AGENTS, OXIDIZING OR ABRASIVE AGENTS, OR SOLVENTS. DO NOT DRY CLEAN YOUR GARMENT. DO NOT MACHINE WASH OR DRY PROXIMITY (ALUMINIZED) OUTER SHELLS. DO NOT CLEAN MOISTURE BARRIERS OR PROXIMITY OUTER SHELLS WITH A BRUSH OR ANY OTHER ABRASIVE CLEANING DEVICES

We recommend that each organization assess the suitability of all cleaning products based on the requirements outlined in NFPA 1851-2008 and any additional requirements of their organization.

Routine and advanced cleanings should be recorded on the Quaker Safety PPE Tracking Form.

ROUTINE CLEANING

Routine Cleaning of Structural Outer Shells, Structural and Proximity Liners and DRDs

To be performed as required by the user for spot cleaning only when no contamination is present

- Empty all pockets
- Remove the liner and drag rescue device (DRD) (where applicable) and clean separately to avoid cross contamination
- Brush off any dry debris
- Gently rinse off any remaining debris with water
- Where necessary, use a soft bristle brush to lightly scrub and rinse again
- Where necessary, use a utility sink designated for cleaning personal protective equipment and follow these procedures
 - Wear protective gloves and eye/face splash protection
 - Use only mild liquid detergents with a pH range of 6.0-10.5. Do not use compounds containing chlorine or ammonia, active-ingredient cleaning agents, oxidizing or abrasive agents, or solvents
 - Pre-treat heavily soiled or spotted areas by applying a mild liquid detergent directly onto the soiled area(s) and gently rubbing the fabric together. For deeper stains on the outer shell, lightly scrub the soiled areas with a soft bristle brush. Treat stains as soon as possible to minimize permanent marks
 - Lightly scrub other soiled areas using a soft bristle brush, warm water not exceeding 105 degrees F (40 degrees C), and mild liquid detergent
 - Rinse outer shell, liner, or DRD (where applicable), brush, and utility sink thoroughly
 - Inspect for cleanliness and rewash if necessary. Submit for advanced cleaning if routine cleaning does not render the garment sufficiently clean for service
- Drying
 - Air drying
 - Air drying is the preferred method of drying, as it minimizes the possibility of shrinkage and maximizes garment service life
 - Dry by hanging in a shaded area with good cross ventilation, or use a fan to circulate the air. Do not dry by hanging in direct sunlight, as ultraviolet light will cause exposed materials to degrade
 - Machine drying
 - Remove the liner and DRD (where applicable)
 - Fasten all closures on the outer shell, including pocket closures, hook and loop tape, snaps, zippers, and hooks and dees. All hook tape must be covered to prevent pulling or snagging during drying
 - Turn the outer shell and liner inside out, place the DRD (where applicable) in a mesh bag, and dry each item separately only with like items to prevent damage
 - Do not exceed recommended load capacity
 - Use a “no heat” or “air dry” setting
 - If neither of these options is available, select a setting which will result in the basket temperature not exceeding 105 degrees F (40 degrees C), discontinue drying prior to the removal of all moisture to prevent shrinkage, and follow the air drying instructions listed above
- Reinstall the liner and DRD (where applicable)
- Do not store in direct sunlight or in a wet, damp, or contaminated condition

Routine Cleaning of Proximity Outer Shells

To be performed as required by the user for spot cleaning only when no contamination is present

- The proximity outer shell contains a highly reflective surface which must be kept clean to perform at peak efficiency
- Do not dry clean, machine wash or dry, or clean with a brush or any other abrasive cleaning devices
- Empty all pockets
- Remove the liner and DRD (where applicable) and clean separately to avoid cross contamination
- Wipe off any dry debris with a soft cloth
- Gently rinse off any remaining debris with water
- Where necessary, use a utility sink designated for cleaning personal protective equipment and follow these procedures
 - Wear protective gloves and eye/face splash protection
 - Use only mild liquid detergents with a pH range of 6.0-10.5. Do not use compounds containing chlorine or ammonia, active-ingredient cleaning agents, oxidizing or abrasive agents, or solvents
 - Clean by gently rubbing the surface with a soft cloth or sponge and a mild liquid detergent
 - Rinse outer shell, cloth or sponge, and utility sink thoroughly
 - Inspect for cleanliness and re-clean if necessary
- Dry by hanging in a shaded area with good cross ventilation, or use a fan to circulate the air
- Do not dry by hanging in direct sunlight, as ultraviolet light will cause exposed materials to degrade
- Reinstall the liner and DRD (where applicable)
- Do not store in direct sunlight or in a wet, damp, or contaminated condition

ADVANCED CLEANING

Advanced Cleaning of Structural Outer Shells, Structural and Proximity Liners and DRDs

To be performed only when no contamination is present by a verified ISP or organization personnel who have received written documentation of their training in advanced cleaning from Quaker Safety or a verified ISP.

- Machine Washing
 - Use only mild liquid detergents with a pH range of 6.0-10.5. Do not use compounds containing chlorine or ammonia, active-ingredient cleaning agents, oxidizing or abrasive agents, or solvents
 - Empty all pockets
 - Remove the liner and DRD (where applicable)
 - Fasten all closures on the outer shell, including pocket closures, hook and loop tape, zippers, snaps, and hooks and dees. All hook tape must be covered to prevent pulling or snagging during laundering
 - Pre-treat heavily soiled or spotted areas by applying a mild liquid detergent directly onto the soiled area(s) and gently rubbing the fabric together. For deeper stains, lightly scrub the soiled areas with a soft bristle brush. Treat stains as soon as possible to minimize permanent marks
 - Use a front loading washing machine whenever possible. Top loading washing machines use mechanical agitation to clean, which may reduce garment service life.
 - Follow the machine manufacturer's instructions for proper settings or program selection for the items being laundered, and for maximum garment service life ensure that the G force of the spin cycle does not exceed 100
 - Fill the washing machine to the desired level with warm water not exceeding 105 degrees F (40 degrees C)
 - Add the appropriate amount of mild liquid detergent
 - Turn the outer shell and liner inside out, place the DRD (where applicable) in a mesh bag, and wash each item separately only with like items to prevent damage and cross contamination
 - Load size must permit the items being laundered to move freely throughout the wash and rinse cycles
 - Inspect for cleanliness and rewash if necessary
 - Rinse washing machines used to launder other clothing such as station wear by running a complete cycle empty, with detergent, and the maximum level of water not exceeding 125 degrees F (52 degrees C)

- Drying
 - Air drying
 - Air drying is the preferred method of drying, as it minimizes the possibility of shrinkage and maximizes garment service life
 - Dry by hanging in a shaded area with good cross ventilation, or use a fan to circulate the air. Do not dry by hanging in direct sunlight, as ultraviolet light will cause exposed materials to degrade
 - Machine drying
 - Remove the liner and DRD (where applicable)
 - Fasten all closures on the outer shell, including pocket closures, hook and loop tape, snaps, zippers, and hooks and dees. All hook tape must be covered to prevent pulling or snagging during drying
 - Turn the outer shell and liner inside out, place the DRD (where applicable) in a mesh bag, and dry each item separately only with like items to prevent damage
 - Do not exceed recommended load capacity
 - Use a “no heat” or “air dry” setting
 - If neither of these options is available, select a setting which will result in the basket temperature not exceeding 105 degrees F (40 degrees C), discontinue drying prior to the removal of all moisture to prevent shrinkage, and follow the air drying instructions listed above
- Reinstall the liner and DRD (where applicable)
- Do not store in direct sunlight or in a wet, damp, or contaminated condition

Advanced Cleaning of Proximity Outer Shells

- Proximity outer shells cannot be machine washed and accordingly cannot be advanced cleaned
- Please follow the instructions for routine cleaning of proximity outer shells

SPECIALIZED CLEANING

Any garment that is known or suspected to be contaminated with a hazardous material, body fluid or blood should be evaluated at the emergency scene

A preliminary assessment should be performed at the scene only by trained personnel to evaluate the extent of the contamination and whether the garment should be isolated, bagged and tagged or retired

Contact Quaker Safety or a verified ISP if your garments require decontamination or specialized cleaning

ROUTINE INSPECTION

Routine Inspection Criteria for Structural Garments, Proximity Garments, and DRDs

To be performed by the user after each use and after each cleaning.

If your garment has been exposed to excessive heat or flame or has sustained damage, it must be disassembled and have an advanced inspection performed.

Protective gloves should be worn when inspecting your garments.

Inspection findings (including specific locations) should be recorded on the Quaker Safety PPE Tracking Form.

Inspect your Quaker Safety garment for the following:

- Soiling
- Contamination
- Physical damage such as the following
 - Rips, tears and cuts
 - Damaged, corroded or missing hardware and closure
 - Thermal damage (charring, burn holes, melting, discoloration of any layer)
- (Structural outer shell only) Damaged or missing reflective trim
- Loss of seam integrity and broken or missing stitches
- Correct assembly and size compatibility of outer shell, liner and DRD

If any of these conditions exist, are deficient or are not functioning properly, your garment should be evaluated by trained personnel prior to returning to service.

Additional Routine Inspection Criteria for Proximity Outer Shells

- Loss of reflectivity
- Loss of reflective coating(s)

If any of these conditions exist, your garment should be evaluated by trained personnel prior to returning to service.

*A damaged
garment
must never
be worn*

ADVANCED INSPECTION

Advanced Inspection Criteria for Structural Garments and Proximity Garments

To be performed only by a verified ISP or organization personnel who have received written documentation of their training in advanced inspection from Quaker Safety or a verified ISP.

An advanced Inspection should be performed at a minimum of every 12 months or whenever routine inspection indicates a problem could exist.

Protective gloves and eye/face splash protection should be worn when inspecting your garments.

Advanced Cleaning should be completed prior to performing an Advanced Inspection

Quaker Safety's NFPA 1851 Garment Advanced Inspection Checklist can be used as a guide when performing visual advanced inspections.

Remove the liner and DRD (where applicable) from the outer shell (be sure to turn your liner inside out when inspecting the thermal barrier portion of your liner).

Inspection findings (including specific location) should be recorded on the Quaker Safety PPE Tracking Form.

A damaged garment must never be worn



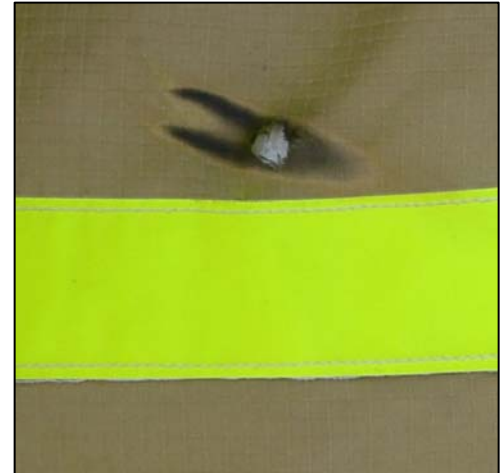
**Fluorescent
Work Light**

What you will need to perform an Advanced Inspection:

- Clean garment
- Well lit work area
- Protective gloves
- Quaker Safety NFPA 1851 Garment Advanced Inspection Checklist
- Quaker Safety NFPA 1851 Moisture Barrier Evaluation Form
- Quaker Safety PPE Tracking Form
- 4"-6" piece of new reflective trim (matching your garment's reflective trim)
- Flashlight (with a bright adjustable focused light)
- Light source such as a fluorescent work light (*The light should not produce enough heat to damage the liner composite and it needs to fit into the sleeves of your coat and the legs of your pants*)
- 5 gallon bucket
- Measuring cup
- Tap water
- Isopropyl alcohol (70%)
- Stopwatch or timer

All separable layers of your garment should be inspected separately for the following:

- Soiling
- Contamination
- Physical damage such as the following
 - Rips, tears, cuts, and abrasions
 - Damaged, corroded or missing hardware and closures
 - Thermal damage (charring, burn holes, melting, discoloration of any layer)
- (Liner only) Loss of moisture barrier integrity as indicated by any of the following:
 - Rips, tears, and abrasions
 - Discoloration
 - Thermal damage



Burn hole on outer shell



Dye loss on outer shell

- Evaluation of system fit and coat/pant overlap
- Loss of seam integrity and broken or missing stitches
- Loss of material physical integrity (Ultraviolet (UV) or chemical degradation) as evidenced by discoloration, significant changes in material texture, loss of material strength, loss of liner material, and shifting of thermal liner material
 - Material discoloration can indicate many types of possible damage, including, but not limited to dye loss, heat degradation, chemical contamination and UV damage. (Prolonged exposure to UV or fluorescent light can severely reduce the strength of the material or seams and greatly impair its ability to provide

protection). If you have discoloration on the outer shell or thermal liner, test its strength by firmly tugging that fabric of the garment between your fingers/hands. If the garment has any damage or can be easily torn it should be properly repaired prior to returning to service

- When inspecting the liner, pay special attention to those areas that correspond with damage on the outer shell
- Loss of elasticity, stretching, runs, cuts, or burn holes in the wristlets



Discoloration on outer shell caused by thermal damage

- (Structural outer shell only) Reflective trim integrity, attachment to garment, reflectivity, or damage

- To assess the retro-reflectivity of trim do a side by side comparison with a sample of new reflective trim

- Stand at least 40 feet from the trim that needs to be evaluated and a sample of the new trim
 - Hold a flashlight at eye level directly next to your face or on the bridge of your nose
 - Aim the light beam of the flashlight at the trim
 - Compare the brightness of the reflected lights. If the reflected light of the trim being evaluated is substantially less than the new trim, the trim should be replaced



Discoloration on moisture barrier caused by thermal damage

- Label integrity or legibility (if labels are illegible or loose contact Quaker Safety for instructions)
- Hook and loop tape functionality
- Liner attachment system functionality
- Closure system functionality
- Accessories that have been added after the original manufacture date
- Correct assembly and size compatibility of outer shell, liner and DRD (where applicable)

If any of these conditions exist, are deficient or are not functioning properly, your garment should be evaluated and/or repaired by Quaker Safety or a verified ISP prior to returning to service.

The DRD should be inspected separately for the following:

- Proper installation in garment
- Soiling
- Contamination
- Physical damage such as the following
 - Rips, tears, cuts, abrasions and punctures
 - Cracking or splitting
 - Thermal damage (charring, burn holes, melting, discoloration)
- Loss of seam integrity and broken or missing stitches

If any of these conditions exist, are deficient or are not functioning properly, your garment should be evaluated and/or repaired by Quaker Safety or a verified ISP prior to returning to service.

Field Test for Moisture Barriers (Bucket Test):

As part of an advanced inspection, you must also test the moisture barrier for leaks.

Visually inspect the moisture barrier for any discoloration. Discoloration may be a sign of damage. Use the field test described below to test for leaks on any discolored areas:

- Separate the liner from the outer shell
- Mix (1) part Isopropyl alcohol with (6) parts tap water in a measuring cup
- Place the liner over a 5 gallon bucket on a flat surface. (The moisture barrier should be facing up and the thermal liner should be facing down)
- Cup the liner area that you want to evaluate so that it is lower than the surrounding liner
- Pour (1) cup of the alcohol-tap water mixture onto the moisture barrier
- After 3 minutes visually inspect the thermal liner side to see if the alcohol-tap water mixture has leaked. (If the alcohol/water solution has leaked through, the liner must be sent to Quaker Safety for repair or replacement or to a verified ISP for repair).
- In addition to testing any discolored areas, high abrasion areas of your liner should also be tested. These areas include but are not limited to:
 - Coats:
 - Broadest part of the shoulders
 - Back waist area
 - Pants:
 - Knees
 - Crotch
 - Seat area
- Record any leakage (including specific locations) on the Quaker Safety PPE Tracking Form. If there is no leakage, a complete liner inspection is not required and the liner should be thoroughly washed and dried to remove all traces of the alcohol-tap water mixture.
- The liner and DRD (where applicable) can be reinstalled into the outer shell and the garment can be returned to service.



Bucket Test

A complete liner inspection (see page 16) is required for garments that showed signs of leakage.

Please note that a complete liner inspection is required for garments that have been in service for three (3) years and annually thereafter or whenever advanced inspections indicate that a problem might exist

Light Evaluation Test for Thermal Liners:

As part of an advanced inspection, you must also evaluate the thermal liner for loss of thermal protection. Use the evaluation described below to test for loss of thermal protection:

- Turn your liner inside out so that the thermal liner is on the outside
- Using your fluorescent work light, slowly pass the light over the liner on the inside surface (batting) making sure that the light bulb does not make direct contact with the liner. As you look at the light, the brightness should be uniform. If the light is brighter in some areas than others, this could be an indication of the shifting of liner material or thin spots and a complete liner inspection should be performed prior to returning to service. Perform this test on:
 - Coats:
 - Front and back panels
 - Upper back
 - Shoulders
 - Underarms
 - Sleeves
 - Pants:
 - Waist
 - Knees
 - Crotch Area
- Also check areas where thermal damage was identified during your visual evaluation of the outer shell and liner



Light Evaluation Test showing a thin spot on the thermal liner

Additional Advanced Inspection Criteria for Proximity Outer Shells

- Loss of reflectivity
- Loss of reflective coating(s)

If any of these conditions exist, your garment should be evaluated for repair by trained personnel prior to returning to service.

COMPLETE LINER INSPECTION

Complete liner inspections should be performed at a minimum after three (3) years in service and annually thereafter or whenever advanced inspections indicate that a problem might exist. The liner should be opened to expose all layers.

If the moisture barrier has been replaced, a complete liner inspection should be performed after two (2) years in service and annually thereafter.

Complete liner inspections should be performed only by a verified ISP or organization personnel who have received written documentation of their training in advanced inspection from Quaker Safety or a verified ISP.

What you will need to perform a Complete Liner Inspection:

- Clean garment
- Well lit work area
- Protective gloves
- Eye/face splash protection
- Quaker Safety NFPA 1851 Moisture Barrier Evaluation Form
- Quaker Safety PPE Tracking Form
- Tap water
- Hydrostatic Testing (Suter) Machine
- Stopwatch or timer

Protective gloves and eye/face splash protection should be worn when performing a complete liner inspection.

The liner must be opened to expose all layers of the garment for visual examination. If the liner is sewn together, first remove the snap fasteners and then unstitch the binding tape around the liner and separate the moisture barrier from the thermal liner. Some garments may have an inspection opening that allows the liner to be completely inverted and does not require a seam to be opened. If you have a liner with an inspection opening, detach the hook and loop tape in the collar (for coats) and hook and loop tape and snaps (for pants) and invert the moisture barrier and thermal liner to expose all of the composite layers.

Quaker Safety's NFPA 1851 Moisture Barrier Evaluation Form can be used to record your inspection findings when performing complete liner inspections.

Inspection findings (including specific locations) should be recorded on the Quaker Safety PPE Tracking Form.

NFPA 1851 Moisture Barrier Evaluation Form

Fire Dept: **Quakertown FD**

Tested by: **J. Smith**

Date Tested: **6/29/2009**

P = Pass F = Fail

Quaker Safety
Quaker Safety
103 South Main Street
Quakertown, PA 18851-1118
Phone 215-638-2891 | Fax 215-638-2184
E-mail: info@quakersafety.com

Serial # / Name: **123456** Serial # / Name: _____

Front Back Front Back

Notes: **Failed on left shoulder & upper back** Notes: _____

Serial # / Name: _____ Serial # / Name: _____

Front Back Front Back

Notes: _____ Notes: _____

Serial # / Name: _____ Serial # / Name: _____

Front Back Front Back

Notes: _____ Notes: _____

The thermal liner should be inspected for the following:

- Physical damage
 - Rips, tears, cuts, and abrasions
 - Thermal damage (charring, burn holes, melting or discoloration)
- Loss of seam integrity, broken or missing stitches
- Material physical integrity; UV or chemical degradation as evidenced by discoloration, significant changes in material texture, loss of material strength, loss of liner material or shifting of liner material
 - Material discoloration can indicate many types of possible damage, including, but not limited to dye loss, heat degradation, chemical contamination and UV damage. (Prolonged exposure to UV or fluorescent light can significantly reduce the strength of the material or seams and greatly impair its ability to provide protection). If you have discoloration, test its strength by firmly tugging that fabric of the garment between your fingers/hands. If the liner has any damage or can be easily torn it should be properly repaired prior to returning to service



Shifting of thermal liner material (batting)

- Check the inside surface (batting) of the thermal liner for thin spots or raised areas by visually examining the batting and also running your hand across the batting to feel for thin or raised areas. These thin spots could indicate wear, compression, damage or shifting of fibers. Pay special attention to known compression areas such as shoulders, elbows and knees
- Pay special attention to those areas that correspond with damage on the outer shell or moisture barrier

If any of these conditions exist, your garment should be evaluated and/or repaired by Quaker Safety or a verified ISP prior to returning to service

The moisture barrier should be inspected for the following:

- Physical damage
 - Rips, tears, cuts, and abrasions
 - Thermal damage (charring, burn holes, melting or discoloration)
- Loss of seam integrity, broken or missing stitches
- Loose or missing moisture barrier seam tape
- Material physical integrity; UV or chemical degradation as evidenced by discoloration, significant changes in material texture, loss of material strength or loss of moisture barrier material
 - Material discoloration can indicate many types of possible damage, including, but not limited to dye loss, heat degradation, chemical contamination and UV damage. (Prolonged exposure to UV or fluorescent light can severely reduce the strength of the material or seams and greatly impair its ability to provide protection). If you have discoloration, test its strength by firmly tugging that fabric of the garment between your fingers/hands. If the liner has any damage or can be easily torn it should be properly repaired prior to returning to service
 - Pay special attention to those areas that correspond with damage on the outer shell or thermal liner
- Delamination as evidenced by separation of film from substrate fabric, flaking, cracking or powdering



Loose moisture barrier seam tape

If any of these conditions exist, your garment should be evaluated and/or repaired by Quaker Safety or a verified ISP prior to returning to service

A Complete Liner Inspection also requires that a water penetration test be performed on the moisture barrier.

This test requires the use of hydrostatic (suter) testing machine. With this machine, the moisture barrier is isolated with a clamp to provide a water tight seal. Water is pressurized to one (1) psi on the substrate side of the moisture barrier for fifteen (15) seconds. After fifteen (15) seconds with the water pressure still applied, visually inspect the film side to determine if the water is penetrating. The moisture barrier should show no signs of leakage. When testing areas with a seam, position the seams in the center of the clamped area, the test should be performed on at least three (3) areas on the moisture barrier and three (3) areas with a seam for a total of six (6) areas per liner. The testing areas should be from high abrasion areas, including but not limited to:

- Coat:
 - Broadest part of shoulders
 - Back waist area
- Pant:
 - Knees
 - Crotch
 - Seat area

If there is water penetration (including pin holes) through the film to the substrate on any areas of the moisture barrier areas, record the results (including specific locations) on the Quaker Safety NFPA 1851 Moisture Barrier

Evaluation Form. Use an 'F' (for Fail) if water penetration has occurred and a 'P' (for Pass) if water penetration has not occurred.

If there are any signs of water penetration, the garment should be sent to Quaker Safety for repair or replacement or a verified ISP for repair.

If there are no signs of leakage on any of the tested areas, restitch the seams or rebind the liner and replace the snap fasteners or if the liner has an inspection opening, return it to its original configuration by reattaching the hook & loop tape and/or snap fasteners.



Hydrostatic Testing Machine

Please contact your distributor if you are interested in purchasing hydrostatic testing equipment.

More information on moisture barriers can be found on W.L. Gore & Associates, Inc.'s web site

www.goreprotectivefabrics.com/NFPA1851

Please be sure to view this information prior to taking the online exam

REPAIRS

There are many repairs that can be performed to maintain your Quaker Safety garments. Repairs are necessary when the inspection criteria are not met for your garments.

NFPA 1851-2008, Section 8 requires that all repairs be performed by the original manufacturer, an ISP (Independent Service Provider) or a trained member of the organization.

*Advanced Cleaning
should be completed
prior to performing
any repairs*



A limited number of basic repairs as defined in NFPA 1851 can be performed by the manufacturer, verified and non-verified ISPs, and verified and non-verified organizations.

Basic repairs are defined as:

- Patching of minor tears, char marks and ember burns to an outer shell
- Repairing of skipped, broken, and missing stitches to an outer shell
- Replacement of missing hardware (excluding closure) to an outer shell
- Reclosing the liner of a garment after inspection

Advanced repairs as defined in NFPA 1851 can be performed by Quaker Safety, a verified ISP or a verified organization. Non-verified organizations cannot perform advanced repairs.

Garment repairs should be recorded on the Quaker Safety PPE Tracking Form

All repairs or alterations should be performed in a manner and using like materials and components that are compliant with NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting.

Quaker Safety recommends using 100% NOMEX thread (tex size 90 or higher for outer shells and tex size 60 or higher for liners). All repairs or alterations should use the same stitch configurations as used in the original construction. Stitching shall be at least 7-8 stitches per inch.

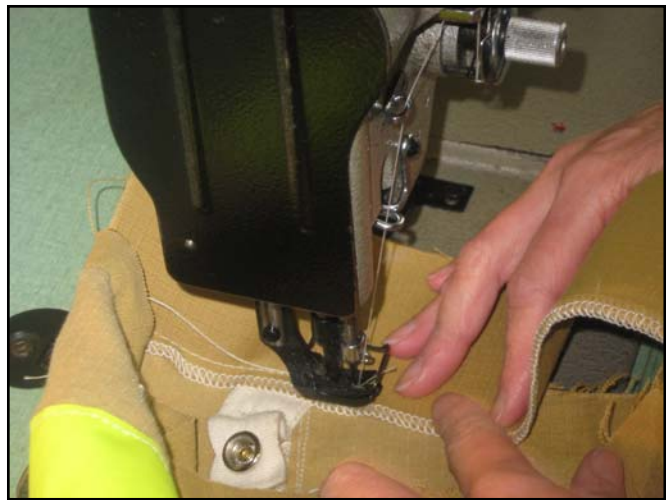
Any part or component that contains moisture barrier material should not be stitched through except for around the edges or perimeter.

After completing repairs on a moisture barrier, the repaired area should be tested with the hydrostatic testing machine to ensure that the area is waterproof.

Only Quaker Safety is authorized to perform moisture barrier or thermal liner replacements.

Minor tears, char marks, ember burns, and abraded areas can be covered by a maximum 5 in.² (32 cm²) patch of the same material that is compliant to NFPA 1971. The finished edges of the patch should extend at least (1 inch) in all directions beyond the damaged area.

All stress points should be reinforced, preferably with bartacks.



Hardware should be secured at least through two layers of material or backed by a material that is compliant with NFPA 1971.

Replacement zippers and replacement outer shell reinforcements should be double stitched to the outer shell.

Reflective trim being replaced should be removed prior to installing new reflective trim. When reflective trim is removed, an equal amount of reflective trim should be replaced.

NFPA 1971 requires that all components, including letters, patches, emblems, etc. be tested by a third party organization such as Underwriters Laboratories to meet the minimum heat and flame test requirements.

Quaker Safety should be contacted if you are unsure as to whether a repair can be performed without adversely affecting the performance characteristics or the integrity of your garment

USE OF ACCESSORIES

NFPA 1851 specifies that written approval from Quaker Safety be provided prior to adding accessories to a garment.

Quaker Safety requires that an accessory meet the performance and design requirements of NFPA 1971. Samples of the accessory must be submitted for evaluation (multiple samples may be required for testing purposes). Submitted samples may not be returned after the evaluation. If third party approval or testing is required, your organization is responsible for any costs associated with the evaluation.

Please e-mail the following information to info@quakersafety.com prior to sending your sample accessories to Quaker Safety:

- Contact name
- Organization name
- Organization address
- Phone number

- E-mail address
- Number of accessories to be used per garment
- Location of accessory on garment
- Trade name of accessory
- Model/part number of accessory
- Manufacturer of accessory

Quaker Safety will advise you as to whether samples of your accessory are needed for additional testing.

Your accessory will be evaluated and Quaker Safety will advise you in writing as to whether or not it is approved.

Accessories that have been added to a garment should be recorded on the Quaker Safety PPE Tracking Form.

RETIREMENT

In many cases, Quaker Safety garments can be repaired and returned to service. However, if a garment is worn or has been damaged beyond repair or if the organization deems it is not possible or cost effective to repair or decontaminate, the garment must be taken out of service and replaced.

NFPA 1851-2008 requires that all structural and proximity garments be retired 10 years from the date of manufacture. In all cases, the aluminized proximity outer shell should be replaced at a maximum of 5 years.

Retirement and disposal should be recorded on the Quaker Safety PPE Tracking Form.

ONLINE CERTIFICATION (OPTIONAL)

Quaker Safety offers organization personnel the opportunity to receive written verification of their training in advanced cleaning and advanced inspection of Quaker Safety turnout gear by successfully completing an online exam. Go to the NFPA 1851 page on www.quakersafety.com and follow the instructions to take the exam.

Your certificate will be available for printing immediately after receiving a passing grade on the exam and you will now be able to perform or manage advanced cleaning and advanced inspection of your organization's Quaker Safety turnout gear. Be sure to keep a copy of the certificate for your organization's records.