



# 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.*

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**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 re-stitched 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 re-stitched, 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:** 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.

Each and every one of the items mentioned above should be considered when trying to decide if a garment has reached its 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 safe. Just knowing the age of the garments cannot be the sole determining factor. Any judgment call should be made erring on the side of caution.