



HIGH VISIBILITY FLAME RESISTANCE INHERENT vs. TREATED



Flame Resistant Fabric / Clothing – Intended to Provide a Range of Protection

- Reduces exposure to flame.
- Create barrier to heat.
- Self Extinguishing (will not support combustion after source of ignition is removed).
- Resistant to breaking open when exposed to flame.

Inherently Flame Resistant (IFR)

- Inherently more difficult to ignite than normal clothing.
- FR properties introduced during the initial stages of fiber formation.
- Flame resistant for the life of the fiber / garment.
- Flame resistance is not altered by variations in laundering conditions or environment.

Flame Retardant Treated (FRT)

- Base fabric has no FR properties such as cotton.
- Chemical treatment required to make the base fiber flame resistant.
- Flame resistance is not permanent, diminishes when laundering and certain environmental exposure.
- Monitoring how much FR has been lost due to laundering and rain is not practical.

GlenGuard® Hi-Vis - Modacrylic

- Primary material for hazards requiring IFR and ANSI 107.
- All components are IFR and will last the life of the garment.
- Meets ASTM 1506 (vertical flame spec) after 50 launderings.
- Meets ANSI 107 – 2010 after 50 launderings.
- Protected by 4 US patents.

VERTICAL FLAME TEST COMPARISONS ASTM 1506 vs. NFPA 701

ASTM 1506 – Verifies Materials are IFR

- Vertical flame test
- Self extinguishing after the flame has been removed < 2.0 seconds
- Char length = < 6 inches
- Observation & reported
 - No melt
 - No drip
- Test method developed for fabrics intended for NFPA 70E hazards or applications requiring arc rating greater than 4.0 cal
 - Applications requiring arc rating greater than 4.0 cal
- Fabric passing this specification cannot increase the risk of exposure to open flame or reduce arc flash protection of primary FR clothing

NFPA 701 – Self Extinguishing

- Vertical flame test
- Self extinguishing after the flame has been removed < 2.0 seconds
- Char length < 6.5 inches
- Allows melting and dripping
- Test method developed for testing draperies used in public spaces
- Not appropriate for hazards with NFPA70E or open circuit electrical voltage



NFPA 70-E ARC FLASH

What is an Arc Flash

- Explosive blast resulting from electricity passing through ionized air
- Extreme temperature (up to 35,000° F)
- Molten metal and debris projected at extremely high velocity

Arc Flash Protection Requirements

- Potential hazard rated by UOM called "calories"
 - Temperature resistance (1.2 calories represents holding your finger in the blue flame of a lighter for one second)
 - Measures blast force needed to break open fabric exposed to an arc flash
- 5 Hazard Risk Categories (HRC) – different degrees of hazards
 - Ranges from 0 = < 4.0 calories to hazards exceeding > 40 calories
- GlenGuard Hi-Vis Modacrylic - Category I
 - Knitted Mesh > 5.1 calories
 - Woven Solid > 5.5 calories
 - Woven Solid Anti-Stat > 6.3 calories
 - Inherently FR
 - No melt / no drip
- NFPA 701 polyester treated fabrics have no arc flash protection properties.
 - Will melt / drip
 - No arc flash blast force resistance
 - Not intended for any 70-E hazards

The NFPA 70E standard addresses electrical safety related practices for, but not limited to, the Installation, Inspection, Operation, Maintenance and Demolition of:

- Electric Conductors
- Electric Equipment
- Signaling and Communications Conductors and Equipment
- Electric Utilities that are not an integral part of a generating plant, substation or control center

HRC	Description	# of Layers	ATPV
0	Non-melting, flammable materials (untreated cotton, wool, rayon, or silk or a blend) with a fabric weight at 4.5 oz/yd	1	N/A
1	Arc rated FR shirt, FR safety vest & FR pants or FR coverall	1	4 cal/cm2 Min
2	Arc rated FR shirt & FR pants or FR coveralls	1	8 cal/cm2 Min
3	Arc rated FR shirt & FR pants or FR coveralls, and arc flash suit selected so that the system arc rating meets the required min.	2 or 3	25 cal/cm2 Min
4	Arc rated FR shirt & FR pants or FR coveralls, and arc flash suit selected so that the system arc rating meets the required min.	2 or 3	40 cal/cm2 Min

ALL CSS MODACRYLIC GARMENTS INCLUDE:

- FR 3M Reflective tape, either 8935 sew on or 8735 heat applied.
- All garments are constructed with Nomex® thread.
- All hook and loop is FR.
- All zipper closures are non-arc.
- All bindings are self-material.
- All garments are stamped with a tracking number, which allows each product to be traced back to the roll it was cut from.

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