

WHY NOT FLAME RETARDANT TREATED COTTON?

One of the products used for flame resistant clothing is flame retardant treated cotton (FRT cotton). Recently, single layer and multiple layer arc flash suits have been introduced which consist solely of FRT cotton. Below are several important factors which need consideration prior to selection of arc flash suits fabricated with FRT cotton.

- ✓ **Garment Weight and Wearer Comfort:** The weight of an arc flash suit typically increases by over 50% when constructed of FRT cotton versus inherently flame resistant materials like Kevlar, Nomex, Pbi, Basofil or Carbtex materials. Heavy garments become a significant concern for higher Arc Ratings. These heavier FRT cotton arc flash suits feel also more stiff and bulky than lighter inherently flame resistant arc flash suits, and consequently worker mobility and productivity are diminished.
- ✓ **Garment Durability:** In spite of the heavier fabric weights, the typical garment life of an FRT cotton garment is about half that of a flash suit constructed of inherently flame resistant fabrics.
- ✓ **Laundering Limitations:** FRT cotton can lose its flame retardant when bleached with chlorine or hydrogen peroxide. If the flame retardant is lost, the FRT cotton becomes flammable cotton garment. Another related issue is that if the flame retardant is lost, the appearance of the FRT cotton remains the same, i.e., there is not a visual indication that the FRT cotton has become flammable. Full control of laundering and a periodic testing program become crucial for users of FRT cotton garments. Bleaching is also not recommended for inherent FR materials, but this is due to a potential loss of durability rather than a loss of flame resistance.
- ✓ **Exothermic Reaction:** FRT cotton is protective up to the point where the chemistry flame retardant system "activates" when the fibers begin to ignite. When this occurs, there is a chemical reaction which causes the FRT cotton fabric to "self-extinguish" is initiated. This is an "exothermic" chemical reaction which means that it gives off heat when the reaction takes place. Some of the heat from this exothermic reaction will be released on the body of the wearer causing second- or third-degree burn injuries. Inherently flame resistant materials contain no flame retardant chemical and consequently do not exhibit an exothermic reaction during an electric arc exposure.

When the exothermic reaction takes place, hot gases are released from the FRT cotton fabric. On the plus side, these gases help the fabric self-extinguish, but on the negative side, these gases can increase heat transmission when they condense on the body of the wearer, and secondly these gases are extremely noxious and can cause breathing problems when released inside the arc flash suit hood. Once these noxious flame retardant chemical off-gases are released in the hood, it is likely that the worker will be compelled to remove the arc flash hood, whether or not they have reached a safe location.

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