FIRE PROTECTION FOR TEXTILE & ADHESIVES

ICL Industrial Products


Curtains
Wallpaper (PVC)
Upholstered furniture
(Flexible PUF, textile)
Carpet
(PP, Polyester)

Fire retardation of textiles is an especially difficult challenge due to their high surface area, high permeability to gases, and universal proximity to people. Textiles are often comprised of blends of different polymeric materials such as polyester and cotton. Also, textiles impose complex durability requirements of stability to laundry, moisture, perspiration, abrasion, flexing and sunlight. Most significantly, textiles have strict demands such as softness, breathability, & smoothness, acceptable odor and minimal impact on color.

Natural fibers comprise over 50% of the global fiber market of millions of tons per annum. To render them flame retardant they require a post finishing treatment. Synthetic fibers can be treated by addition of FR agents to the polymer melt or solution before fiber spinning, but are more often also treated in a finishing step. Two main technologies serve this market. They are the char enhancing phosphorous /nitrogen based chemistries and the halogen based chemistries which mainly act as radical scavengers and provide a non-combustible gaseous layer.

Additive FRs that have no affinity to the textile substrates, are immobilized using polymer binders such as polyacrylates. The FR dispersions are commonly applied by back coating or padding onto the textile substrate.

ICL-IP sees its mission to fit the most suitable & sustainable products to the different materials and textiles in the market.

FLAME RETARDANT SOLUTIONS BY APPLICATIONS

Application	Process	Tradename
Upholstery	Back coating	**TexFRon 4002, FR-1410**
Drapes/Blinds	Back coating	**TexFRon 4002, FR-1410**
Flex Ducts	Coating	**TexFRon 9001, TexFRon 4002 (F), FR-1410**
Tents/Awnings	Padding	**TexFRon 4002, TexFRon 5001, TexFRon 3000, TexFRon P**
Apparel /PPE	Padding	**TexFRon P, TexFRon 4002, TexFRon 5001, TexFRon AG**
Air Filters	Coating	**TexFRon 4002**
PVC coated fabric	Release paper	**Phosflex 71B, Phosflex 390, Phosflex 362, TexFRon 4002, TexFRon 5001**

FLAME RETARDANT MAIN ADVANTAGES

Brominated flame retardants

FR-1410	High FR efficiency and thermal stability, multi-purpose.
TexFRon 3000 **TexFRon 9001**	Highly durable, tailor made FR systems for natural fibers, synthetics and blends with optimal melting range for textile finishing.

Brominated **polymeric** flame retardants

TexFRon 4002/1	Back coating applications with excellent durability. Oeko-Tex approved. Also used in antimony trioxide free systems
TexFRon P	Polymeric brominated acrylic adhesive

Phosphorus based flame retardants

TexFRon AG	Inorganic, non-soluble, non-hydrolizable, non-corrosive, smolder suppressant. Used in antimony trioxide free systems
TexFRon 5001	Organic, high FR efficiency and thermal stability, soft hand. Used in antimony trioxide free systems

MAIN FIRE SAFETY STANDARDS

Flaming exposure test methods typically impinge a flame on the fabric and the subsequent after flame, after glow and flame spread time are measured along with the total distance of charring. Some methods include measurement of heat, smoke and toxic gas generation.

ASTM D6413 Standard Test Method for Flame Resistance of Textiles". A fabric is secured on three sides and hung vertically. The edge of the fabric on the bottom is exposed to a flame for twelve seconds.

CFR 16 Part 1610 "Standard for the Flammability of Clothing Textiles". A sample of fabric is, mounted at a 45°angle, is exposed to a flame for one second.

CFR 16 Parts 1615 and 1616 "Standard for Flammability of Children's Sleepwear". A fabric is suspended vertically and exposed on the bottom edge for three seconds.

ASTM D 1230-94 "Standard Test Method for the Flammability of Clothing Textiles" is similar to CFR 1610.

ASTM F 1358-95 "Standard Test Method for Effects of Flame Impingement on Materials Used in Protective Clothing Not Designed Primarily for Flame Resistance" .A specimen is folded over a holder with the fabric surface suspended over a flame and is then exposed to a flame for a period of 3 seconds. If ignition does not occur, the sample is exposed for an additional 12 seconds

FTMS 5903.1 Federal Test Method 5903.1, "Standard Test Method for Flame Resistance of Cloth; Vertical" is very similar to ASTM F 1358-95, except that the sample is in a vertical position and the exposure time to a methane flame is 12 seconds.

NFPA 701 "Standard Test Method of Fire Tests for Flame-Resistant Textiles and Films" is divided into two tests, test 1 is for textiles and test 2 is for films or fabrics with a density greater than 700 g/m2. The specimen is hung vertically and exposed to a flame for a period of forty five seconds. Test 2 consists of exposure to a flame of 280 mm for two minutes.

Underwriter Laboratory, Inc.'s Bulletin UL 94, the "Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances Testing". A flame is applied to the center of the lower edge of the specimen for ten secondss and then removed. If burning ceases within thirty seconds, the flame is reapplied for an additional ten seconds.

BS EN ISO 15025 "Protective Clothing - Protection Against Flame - Method Of Test For Limited Flame Spread". A flame is directed for ten seconds at the surface of the test fabric.

BS5852 "Methods of test for assessment of the ignitability of upholstered seating by smoldering and flaming ignition sources" source 0, 1 & 5 (Cigarette, Match and Crib 5). A simulated foam filled upholstered chair is constructed. Ignition Source 0 (cigarette), Ignition Source 1 (flame/ simulated match) for twenty seconds and Ignition Source 5 (Crib 5) are applied as required.

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