

Workwear With the Advanced Protection of PBI Fiber



When
Seconds
Count

Workers in refineries and chemical plants, utility linemen, and others who wear protective clothing will appreciate the outstanding flame and heat protection, comfort, and performance of PBI fiber. Hoechst Celanese developed PBI fiber to protect America's astronauts. It's the fiber that firefighters prefer in protective clothing. And now, the advanced protection of PBI is available in a lightweight, blended woven fabric engineered especially for industrial workwear.

Non-Flammable

PBI fiber does not ignite, melt, or drip in Federal Vertical Flame Tests FSTM 5903 and FSTM 5905. And PBI's inherent flame resistance is permanent for the life of the garment. Comfortable Fabrics made of PBI fiber are lightweight, soft, and more absorbent than fabrics of conventional aramids. In fact, PBI fiber is more absorbent than cotton.

Protective

PBI fiber provides better flame and thermal protection than other fibers.

Chemically Resistant

PBI fiber has excellent chemical resistance to inorganic acids and bases, and maintains its tensile strength after exposure to a broad range of organic chemicals and solvents.

Heat Stable

When exposed to flame or high temperature, fabrics made of PBI fiber do not shrink or embrittle.

Durable

Fabrics containing PBI fiber have superior penetration resistance and tear strength. The blend contains high strength aramid fibers, which are also used in bullet-proof vests and other demanding applications.

Low Static Buildup

Fabrics containing PBI fiber have electrical conductance similar to untreated 100% cotton. Static protection is inherent in the fabric and will not wash out.

PBI Fiber Passes the Tests

Results of standard tests (shown on the back of this sheet) show the superior thermal properties and durability of PBI fiber over Nomex IIIA® aramid fiber and FR cotton in typical protective-clothing fabrics. In the vertical flame test, the fabric made with PBI fiber has a char length only one-fourth that of the Nomex IIIA® and FR cotton fabrics. The fabric containing PBI fiber has no after-flame even with two 12-second burns, as specified in Federal Vertical Flame Test 5905, and it remains supple after exposure to flame and high temperature. When flexed after exposure, the fabric of Nomex IIIA® shrinks, embrittles, and

breaks, and the FR cotton fabric chars, becomes very tender, and breaks. Garments made with PBI fiber are durable. Tensile strength, burst strength, and abrasion tests illustrate their excellent performance in use. In Elmendorf tear tests, tear resistance of the fabric containing PBI fiber is 1½-2 times higher than that of the competitive FR cotton fabric.

Garments of PBI fiber have the excellent chemical resistance and electrical resistivity characteristics required for protective clothing used in chemical plants, oil refineries and utility companies. The fabric maintains more than 85% of its original tensile strength even after 10 hours of contact with hydrochloric acid, sodium hydroxide, acetone, or gasoline. PBI fiber guards against static build-up in volatile environments.

Along with outstanding protection and durability, the fabric containing PBI fiber is comfortable and practical. With a moisture regain of over 8%, the blend fabric will absorb over 130% more perspiration than a typical Nomex IIIA® fabric. And garments containing PBI fiber are soft, flexible, and lightweight. Garments of PBI fiber are easily machine-washed and dried. Their resistance to flame and heat exposure, chemical resistance, and static dissipative properties are inherent to the fiber and are not affected by laundering.

We have safety covered.

Comparative Properties Of Woven Fabrics Containing PBI fiber Vs Nomex IIIA® and FR Cotton

Properties	PBI Fiber Blend	Nomex IIIA®	FR Cotton	Test Method
Nominal Weight (oz/yd ²)	4.5	4.5	9	—
Weave	Twill	Plain	Twill	—
Thermal Properties				
Vertical Burn (WxF)				
Char Length	0.6 x 0.6 in.	2.4 x 2.4 in.	2.3 x 2.5	FSTM 5903
Vertical Burn (WxF)				
% Consumed	7 x 7	40 x 40	40 x 30	FSTM 5905
Strength after Thermal Exposure ¹				
Grab Strength (lb)	43	8	2	ASTM 1682
Fabric Character	Supple, intact	Brittle, crisp	Brittle, tender	—
Thermal Protective				
Performance (TPP)	11	11	10	—
Dynamic Flame ² (sec)	51	6	5	—
Comfort				
Moisture Regain (%)	7-8	4-5	7-8	ASTM 2654
Fabric Strength				
Elmendorf Tear Strength (lb WxF)	20 x 15	8.5 x 8.3	6 x 8	ASTM D-1424
Tensile, 1-Inch Strip (lb WxF)	135 x 90	84 x 84	105 x 75	ASTM D-1682
Durability				
Tabor Abrasion (cycles to failure)	1500	870	1350	ASTM 3884
Flat Abrasion, 280A Emery	2	1-2	1-2	HCC142
Abrasion - Inflated Diaphragm	835	210	670	ASTM D-3886
Launderability				
Shrinkage After Five Cycles (%) ³	<3	<3	<3	AATCC 135

¹ Strength after thermal exposure is a measure of fabric integrity after 8-second exposure to 1800°F TPP flame and radiant heat.

² Dynamic flame measures a fabric's time to tear when exposed to flame and mechanical load. The test demonstrates a material's reaction to movement and thermal load.

³ Garments containing PBI fiber should be fitted to allow for 5% shrinkage over the life of the garment.

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