

## *Fire Barrier II* *New and Improved*

### NEW AND IMPROVED

Unlike the Fire Barrier, FIRE BARRIER II is a newly developed product from 5<sup>th</sup> generation development with fire retardation products. Fire Barrier II is a water based polymer product which can be applied as a coating under *two conditions of retardation durability*. Completely NON-TOXIC and NON-CORROSIVE.

The first condition is a **non-durability** condition. This means simply that when the Fire Barrier II is applied and air dried, it will last indefinitely provided it does not come in contact with a complete washing process i.e., washing of curtains, sheets, pillow cases, clothing, carpeting, wall surfaces, plastics, papers, metals, etc.

The second condition is a **semi-durable** condition. This means that when the Fire Barrier II is applied it can be dried with the aid of heat i.e., clothes dryer, hair dryer, oven baking, hot air gun, etc. and the polymer base will adhere to the fibers of the material be it wood or fabric.

### HOW IT WORKS

Fire Barrier II is easy to use and comes in 4 series of application for the consumer. The X-10, X-20, X30 and X100. It is applied by either spraying, painting or soaking. Depending upon the application, Fire Barrier II works in concert with water saturation and dispersion to blend with the polymer ingredients and attaches itself around the wood, paper or fabric fibers and provides a retardant non or semi durable protection of flame retardancey. With metal and plastics it provides a strong and durable surface protection.

The X-10 is a clear, highly concentrated water-based coating that provides excellent fire retardant properties when applied to combustible surfaces. X-10 can be used on the following surfaces:

*Wood materials, paper materials, metal and plastic materials.* APPLICATION – Can be sprayed on, rolled on, brushed on. FAST DRYING without heat on all surfaces. Comes in a READY TO USE form. Cleans up with soap and water.

The X-20 is a safe, non-toxic, non-corrosive, water based fire retardant *finish and additive*. It finds usefulness to different combustible materials including lumber, plywood, textiles, paper, grasses, trees, brush and other combustible materials. It is considered to be effective in treating vegetable topsoil, and grasses offering semi-durable fire resistance to weather and at the same time enriching the ground with valuable nutrients. Fast transparent drying without heat. APPLICATION – Can be sprayed on, rolled on, brushed on. FAST DRYING without heat on all surfaces. Comes in READY TO USE form.

The X-30N is a safe non-toxic, non-corrosive, water based fire retardant LIQUID - READY TO USE product that is for all natural fabric applications. When applied and dried with heat it will provide a SEMI-DURABLE resistance to flames. This means that when washing the fabric, not all the product will wash out and most will remain for future protection. Can be either air dried or heat assisted for durability. APPLICATION – can be either spraying on, brushing on, rolling on or soaking. Clean up with soap and water

The X-30 S and SS Are safe non-toxic, non-corrosive, water-based fire retardant LIQUID -READY TO USE product. The x-30S is for all Synthetic fabrics and materials and the X-30 SS is for a blend of natural/synthetics of up to 70%. All the features of the X-30N are shared and the same with the X-30 S and X-30 SS.

The X-100 is a safe, non-toxic, non-corrosive, water-based fire retardant DRY POWDER for mixing with all types of paint, poly urethane, varnishes, shellacs, etc. It is different from the X-10, X-20, X-30 series but provides the same protection as a semi-durable resistant to flame. Mix ratio is as directed per gallon of specific paint. APPLICATION – As any other paint product and washes up with water. It dilutes to a clear property.

The SAFETY BLANKET is a treated 100% cotton fiber blanket that can used to put out any flame upon a stove or person instantly. They measure 3' x 3' and come completely treated and ready for use. Great to carry on outdoor vacations or keep in the car in case of car fire or fires resulting from accidents of any kind. And as with the other "X" Series products, The Fire Blanket is a semi-durable resistant product and completely non-toxic and non-corrosive. The Fire Blanket has a baked in treatment so as to provide the highest level of RETARDANT PROTECTION.

### ACHIEVED RATINGS

The Fire Barrier II "X" Series has been independently tested by the Fire Prevention Service of the European Internal Affairs who tested the Fire Barrier II "X" Series to the ASTM E-84 10 Minute Fire Test Tube and Surface Flame spread test. Also, the SOS 12.1.044-84 10 Minute Flame Chamber Test. This product is rated and classified to the NON-COMBUTIBLE CLASS of materials, CLASS A, CLASS 1.

IBCO – International Building Code Organization Standards- Can be used under that standard in and out of the United States  
European Safety Standards Test – Highest standard world wide

Pending "UL" APPROVAL – The FIRE BARRIER II is currently under application and review process of the Underwriters Laboratories. Certification is Pending the completion of the process.

**United Community Services of America**  
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**FIRE BARRIER II**

**MULTI-FUNCTIONAL  
FIRE RETARDANT POLYMERS  
PLASTICS AND FIRE RETARDANCY**

Materials for the plastics industry fall into the general category of synthetic polymers. In other words, organic substances of high molecular weight that are made by repeating units of lesser molecular weight called monomers.

Polymers have generally been divided into two groups; thermoplastics and thermosets. Thermoplastics are capable of being repeatably softened by the application of heat and hardened by the removal of heat. Thermosets are capable of being changed into insoluble or infusible products when cured with an application of heat or a chemical substance called a catalyst. The lines between the two classes of products are becoming blurred with the advent of the so-called "engineering plastics" that act like thermoplastics, and yet can be cured with catalysts.

We will confine ourselves to the more traditional materials that exhibit very straightforward properties that are characteristic to each class. Thermoplastics usually soften to the point of flow in a fire, depending on molecular weight, and the degree of cross linking. This flow is characterized by a decomposition or "un-zipping" of the polymer structure in the monomers. These monomers are usually very flammable, and can cause secondary ignition from "flaming drips". Thermosets are flammable as well, although not in the same way as thermoplastics, these materials usually tend to pyrolyze during a fire (i.e., produce carbon) releasing low density hydrocarbons such as methane, acetone, furfuryl alcohol, as well as complex creosotes.

**Thermoplastics and Thermosets**

**THERMOPLASTICS**

olefin- polyethylene, polypropylene  
vinyl- polyvinyl chloride, polyvinyl acetate  
polystyrene  
acrylonitrile-butadiene-styrene (ABS)  
acrylic  
cellulosic-nitrate, acetate, butryate  
polycarbonate  
polysulfone  
polyamide (nylon)  
acetal  
thermoplastic polyester

**THERMOSETS**

polyurethane  
phenolic  
amino-urea and melamine formaldehyde

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unsaturated polyester

A wide variety of techniques have been used to increase the heat resistance of polymers. In addition to modification of the polymer structure, the most common approach is through additives. Currently, the vast majority of these materials are fire retarded using some type of halogen containing additives. Usually either chlorine or bromine. Antimony oxide works well in synergism with halogens and borates. Alumina tri-hydrate is used. All of these additives are added to thermoplastics in the extruder where the final resin is compounded prior to use in forming a product.

Additives retard burning by either the condensed phase or vapor phase mechanisms. Condensed phase additives inhibit the formation of flammable gases by forming a char layer. Vapor phase additives inhibit burning by removing free radicals from the burning vapors.

Initial evaluation of additives usually involves a physical property test ( such as Izod Impact) in relation to the response of the plastic/additive combination to the LOI Test and UL 94. In the United States , these tests are considered industry standards, and any product wishing to enter the market usually discusses its relationship to these fire tests versus its effect on strength.

LOI Test- Measures the percent of oxygen required for the material to support combustion. Any figure less than 20% indicates high flammability as the normal oxygen content in the atmosphere is considered 20%.

**Oxygen Index for Some Typical Thermoplastics**

Polyethylene 17.0

Polyvinyl Chloride 17.0

Polyacetal 46.0

Acrylic 15.0

Polystyrene 17.0

UL 94 Test- Measures the ability of a plastic to resist burning in both a horizontal and vertical position. The dimensions of the material remain the same, but the thickness is gradually reduced. The best result is a VO rating at less than 2mm thickness.

IZOD IMPACT TEST: Measures the amount of energy in ft-lbs required to break a specimen of plastic. The idea is to add as little of the FR material as possible in order to reduce strength loss.

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**FIRE BARRIER II**

With the X-30 S and X-30 SS (Synthetic and Synthetic Soft finish) we can treat the following fabric constructions.

Up to 70/30 Polyester / Cotton blend....	Any lesser amount of Polyester is fine
Up to 70/30 Acrylic / Cotton blend ...	“ Acrylic “
Up to 70/30 Rayon / Cotton blend.....	“ Rayon “
Up to 50/50 Nylon / Cotton blend.....	“ Nylon “

Our X-30 N (Natural Fiber) can treat any combination / ratio of natural fibers.

There are three categories of Flame Retardant finishes in Textiles;

Non-Durable: Will wash out

Semi-Durable: Will eventually wash out but will stand spot cleaning and steaming.

Durable: Is inherently Flame Retarded, will not wash out

With our X-30 line of Topical Treatment for Textiles, we are in the Non-Durable and Semi-Durable category.

In order to achieve the durable rating, we need to be build into the yarn itself or apply it as a backing/coating that is permanent. When the customer wants permanent “Inherent” Flame Retardation in a synthetic textile, we can offer that by having it formulated especially for inclusion at the yarn extrusion process.

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**FIRE BARRIER II "X" SERIES**  
**FLAMMABILITY TEST REPORT**

**MAY 2001**

The Fire Barrier II "X" Series flame retardant product series was tested to the "Fire Tube" and "Flame Spread" methods at the Fire Prevention Research Department of the Fire Prevention Service of the European Internal Affairs.

Test were conducted by:

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Head of Fire Prevention Research  
Dept. of Fire Prevention Service

&

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Sr. Engineer of Fire Prevention Research  
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**SAMPLE SPECIES TESTED:**

1. Unfinished Chestnut, Pine, Beech, Veneer Plywood, and pressed MDF/ParticleBoard
2. Painted (Latex Paint) Chestnut, Pine, Beech, Veneer Plywood, and pressed MDF/ParticleBoard

**METHOD OF TREATMENT:**

Samples presented were treated with a "surface treatment", as well as a "pressure-treatment" method

**FIRE TUBE TEST**

First, the samples were tested by the "Fire Tube" method for the purpose of determining the degree of their combustibility. 6 samples of the standard 35 X 150 X 10 cm size were prepared and weighed with an accuracy of 0.01g. After that they were placed in the center of a device tube. The presented samples are exposed to the flame (methane) for 10 minutes. After the flame removal the duration to self-extinguishment was calculated. After cooling the samples at room temperature they were weighed, and the loss of its mass was determined.

As result of from the fire tube test, the mass loss of the presented samples has not exceeded 20%, and the self-extinguishment duration has not exceeded 60 seconds. Proceeding from this fact, we can assert that according to national standards, the samples belong to the non-combustible class of materials.

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**FLAME SPREAD TEST/ASTM-E-84/STEINER TUNNEL TEST**

The samples were tested by means of the "Flame Spread" method. The samples of the standard 12.5 X 0.3 X 1.3 cm size were fixed horizontally on the device, and exposed to the flame (methane) for 10 minutes. When the flame was removed the self-extinguishment duration and length of the samples lower edge char length were calculated to obtain flame spread ratings. According to national standards, the samples have stood the test, and they belong to the class of non-combustible materials.

**PAINTED SAMPLES**

Painted samples were also presented for testing. They were put to the "Fire Tube" and "Flame Spread" methods. This investigation has determined that the presented painted samples belong to the non-combustible class of materials.

The data obtained as a result of the testing, is given in the tables.

**FOR REGULATORY REFERENCE USE**  
**UNIFORM BUILDING CODE '97**  
**CHAPTER 8**

**802.2 Classification**

The standard test for the determination of the flame-spread characteristics of any interior finish materials is as indicated in the introduction to this chapter, UBC Standard 8-1, which is based on the ASTM Standard E-84. This test is commonly known as the Steiner Tunnel Test. Section 8.101 of the standard should be referred to for a thorough discussion of the scope, purpose, intent and limitations of the test standard. **The Uniform Building Code also permits the use of any other recognized test method or procedure for determining the surface-burning characteristics of finish materials that will give comparable results to those from the Steiner Tunnel Test.**

UBC  
TABLE 8-A  
FLAME-SPREAD CLASSIFICATION

CLASS	Flame-spread Index
I	0-25
II	26-75
III	76-200

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**TEST RESULTS**

**THE "FIRE TUBE" Method**  
(SOST 12.1.044-84 & ASTM E-69 PROCEDURE B)

**TEST PASS CRITERIA**

Weight Loss must not exceed 20% of test specimen (calculated  $M = (M1 - M2) / M1 \times 100\%$ )  
Self-extinguish with no afterglow within 60 seconds

**BEECH**

TEST SPECIMEN	"SURFACE TREATMENT" METHOD		TEST SPECIMEN FLAME EXPOSURE
MARKING	WEIGHT (g)		Flame (Methane) 10 Minutes
	BEFORE	AFTER	SELF-EXTINGUISH TIME (sec)
1	25.7	24.0	45
2	23.7	22.3	50
3	28.7	27.5	32
4	26.0	24.6	42
5	27.9	23.3	35
6	26.2	24.3	44

**BEECH**

TEST SPECIMEN	"PRESSURE TREATMENT" METHOD		TEST SPECIMEN FLAME EXPOSURE
MARKING	WEIGHT (g)		Flame (Methane) 10 Minutes
	BEFORE	AFTER	SELF-EXTINGUISH TIME (sec)
1	28.5	28.4	46
2	28.2	27.2	35
3	26.9	25.6	38
4	27.7	26.9	35
5	26.7	25.9	20
6	26.5	26.0	30

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**PARTICLEBOARD/MDF**

TEST SPECIMEN	"SURFACE TREATMENT" METHOD		TEST SPECIMEN FLAME EXPOSURE
MARKING	WEIGHT (g)		Flame (Methane) 10 Minutes
	BEFORE	AFTER	SELF-EXTINGUISH TIME (sec)
1	48.2	46.0	56
2	48.2	46.7	40
3	49.2	48.0	38
4	48.0	46.7	40
5	47.2	46.0	35
6	50.0	47.7	40

**PARTICLEBOARD/MDF**

TEST SPECIMEN	"PRESSURE TREATMENT" METHOD		TEST SPECIMEN FLAME EXPOSURE
MARKING	WEIGHT (g)		Flame (Methane) 10 Minutes
	BEFORE	AFTER	SELF-EXTINGUISH TIME (sec)
1	64.7	62.0	19
2	64.6	62.8	13
3	63.2	61.5	18
4	62.4	60.9	19
5	62.9	60.5	20
6	67.7	65.0	16

NOTE: SUBSTANTIAL DECREASE IN TIME TO SELF-EXTINGUISH

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**CHESTNUT**

TEST SPECIMEN	"SURFACE TREATMENT" METHOD		TEST SPECIMEN FLAME EXPOSURE
MARKING	WEIGHT (g)		Flame (Methane) 10 Minutes
	BEFORE	AFTER	SELF-EXTINGUISH TIME (sec)
1	25.9	24.7	30
2	24.3	22.7	35
3	24.7	21.2	38
4	23.5	19.8	25
5	24.7	22.0	30
6	24.3	23.4	40

**PAINTED PARTICLEBOARD/MDF**

TEST SPECIMEN	"SURFACE TREATMENT" METHOD		TEST SPECIMEN FLAME EXPOSURE
MARKING	WEIGHT (g)		Flame (Methane) 10 Minutes
	BEFORE	AFTER	SELF-EXTINGUISH TIME (sec)
1	52.7	51.5	35
2	52.8	51.7	37
3	52.5	51.5	40
4	50.0	49.0	32
5	53.2	51.9	45
6	50.0	49.0	39

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**"FLAME-SPREAD" METHOD**  
**(SOST 27570.0-87-ASTM-E84)**  
**STEINER TUNNER TEST**

**VENEER/PLYWOOD**

TEST SPECIMEN	"SURFACE TREATMENT" METHOD	TEST SPECIMEN FLAME EXPOSURE
MARKING	LENGTH OF LOWER EDGE COMBUSTION (cm) "FLAME SPREAD"	SELF-EXTINGUISH TIME (sec)
1	11	9
2	9	15
3	17	20
4	13	15
5	16	18

**VENEER/PLYWOOD**

TEST SPECIMEN	"PRESSURE TREATMENT" METHOD	TEST SPECIMEN FLAME EXPOSURE
MARKING	LENGTH OF LOWER EDGE COMBUSTION(cm) "FLAME SPREAD"	SELF-EXTINGUISH TIME (sec)
1	12	9
2	16	12
3	15	9
4	13	8
5	12	10

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**BEECH**

TEST SPECIMEN	"SURFACE TREATMENT" METHOD	TEST SPECIMEN
MARKING	LENGTH OF LOWER EDGE COMBUSTION (cm) "FLAME SPREAD"	SELF-EXTINGUISH TIME (sec)
1	14	12
2	14	15
3	13	13
4	15	20
5	16	17

**PINE**

TEST SPECIMEN	"PRESSURE TREATMENT" METHOD	TEST SPECIMEN
MARKING	LENGTH OF LOWER EDGE COMBUSTION (cm) "FLAME SPREAD"	SELF-EXTINGUISH TIME (sec)
1	12	9
2	16	12
3	15	9
4	13	8

**PAINTED VENEER/PLYWOOD**

TEST SPECIMEN	"SURFACE TREATMENT" METHOD	TEST SPECIMEN
MARKING	LENGTH OF LOWER EDGE COMBUSTION (cm) "FLAME SPREAD"	SELF-EXTINGUISH TIME (sec)
1	8	11
2	15	13
3	17	16
4	9	15