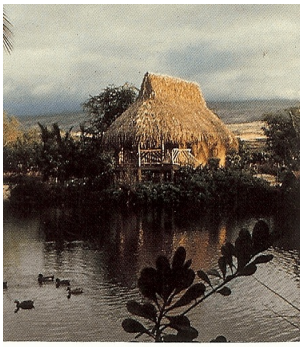
FLAME SAFE WORKS


Thatching

Flame Safe's fire retardant actually interferes with the chemistry of the fire process. Flame Safe's compounds automatically react in the presence of heat or flame to convert combustible gases and tars to non-combustible carbon char, nitrogen and carbon dioxide. The substantial increase in carbon char helps to keep the fire from regeneration. Nitrogen produced as a by-product displaces oxygen, smothering the fire. The chemical reaction also separates the fuel from the source of ignition. With this "double protection," Flame Safe's fire retardant dramatically outperforms others. Flame Safe treated wood will not burn and it retards the propagation of the fire (flame spread). Significantly, smoke development is reduced by 50% or more, "and that's important" considering that smoke inhalation causes more deaths than fire.

PROPERTIES OF FLAME SAFE TREATED WOOD

Permanence

Flame Safe treated wood is a permanent guard against the spread of fire.

Strength

Flame Safe's aqueous based resin treatment and kiln-drying process strengthens the wood

Hygroscopicity

Flame Safe treated wood is no more hygroscopic than untreated wood of any given species.

Corrosion

Flame Safe treated wood does not demonstrate any greater corrosion rate than untreated wood on metal fasteners or hardware.

Decorating and Finishing

Flame Safe treated wood surfaces can be stained or painted with ordinary preparation, however avoid using lacquer based stains or varnishes.

Field Cuts

Flame Safe treated wood allows the user to re-surface, mill, or rip lumber or plywood provided the exposed surfaces are coated with Flame Safe's fire retardant coating (Fire Poly).

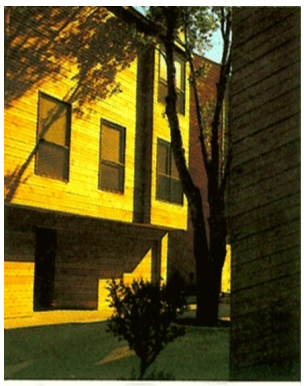
Versatility

Flame Safe treated wood is compatible with most waterborne preservative treatments for lumber, plywood and timber for exterior and in ground use.


Interior trim and moldings

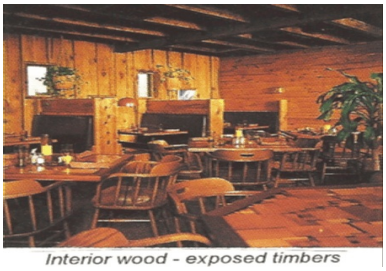
ADVANTAGES OF FLAME SAFE VACUUM-PRESSURE TREATED WOOD

* Reduces flamespread to less than 25
* Water-based wood preservative
* Odorless
* Environmentally friendly
* Fungus and mold inhibitor
* Reduces smoke generation
* Requires no special cutting tools
* Will not harm plants or animals
* Resistant to insects and rodents
* Termite resistant

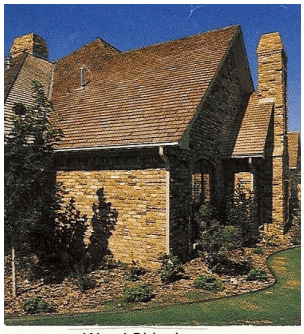

Exterior multi-family dwellings

Flame Safe's treated wood is a low cost, effective building material for homes, apartments, manufactured housing, hotels, restaurants, decks, docks, commercial, industrial, and institutional buildings, for interior and exterior use, "and it won't burn".

THE BEST FIRE INSURANCE IS PREVENTION


Interior wood - exposed timbers


Interior Commercial


Wood Shingles

VACUUM- PRESSURE IMPREGNATION

Lumber, plywood or timber is loaded into a treatment cylinder. The door is sealed and a vacuum is applied. During this stage, most of the moisture and air is removed from the wood cells. The vacuum in the cylinder causes the cylinder to fill with Flame Safe's proprietary fire retardant. Pressure is raised in the cylinder forcing the fire retardant solution into the wood. The pressure and time varies depending on the species of the wood, the commodity being treated, the cross-sectional area, and the amount of the fire retardant solution to be impregnated into the wood. The pressure in the cylinder forces the remaining fire retardant solution to flow back into a holding tank. Another vacuum is applied, removing the excess fire retardant solution from the wood. The lumber, plywood or timber is loaded onto trams that service a gas fired forced air kiln.

Framing lumber, floor, wall and roof sheathing plywood

KILN-DRYING

Heated air is used to extract moisture from wood.

A gas fired forced air convection system removes most of the moisture from the wood after treatment. The moisture laden air is dehumidified. The drying rate is monitored to prevent cracking in the lumber. Lumber is kiln dried to a moisture content not to exceed 19%. Plywood is kiln dried to a moisture content not to exceed 15%. Finished moldings and trim is kiln dried to a maximum moisture content of 6 to 12% depending on the species and specific use. Pitch in the wood is crystallized permitting interior and exterior finishes to be easily applied. When kiln dried, Flame Safe treated wood becomes lighter and stronger, maximizing it's structural uses.

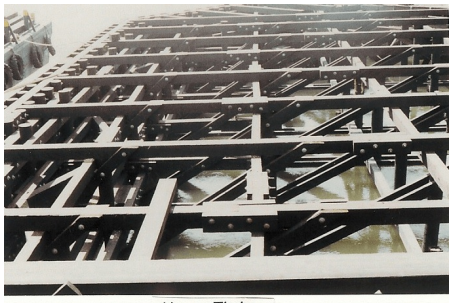
Specialty architectural millwork

SPECIFICATIONS

All Flame Safe's treated lumber, plywood and timber shall be vacuum-pressure impregnated to comply with the ASTM E-84 standard (UL723 and the NFPA 255) and shall have a flame spread rating of 25 or less.

All Flame Safe's licensed manufacturers are monitored with Fire Prevention Technologies' Follow-Up Service (FPT-FUS). FPT-FUS requires compliance to the ASTM E-84 standard or ASTM D-3806 equivalency for Class A Type 1 (Surface Burning Characteristics of Building Materials).

Each piece of treated lumber, plywood, timber or architectural millwork shall bear a Flame Safe tradename and/or it's "Firebuster ™" trademark.



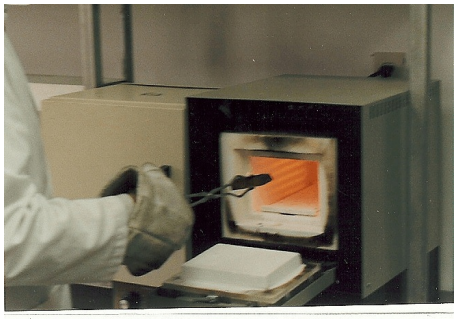
Heavy Timber

FLAME SAFE WOOD PRODUCTS MEET THE TESTS

Flamespread less than 25
in accordance with
ASTM E-84 - NFPA 255 - UL723

Conforms to
AWPA STANDARDS
C-20 for lumber and C-27 for plywood

Flame Safe products have met the standard of the major testing laboratories in the United Sates and some foreign countries, such as Underwriters Laboratories, United States Testing, Southwest Research Institute, Maxim Technologies-Southwestern Laboratories, United States Forestry Department, Forestry Commission of New South Wales, Australia, Ontario Research of Canada, and the European Institute for Fire Research of Budapest, Hungary.



Will not sustain combustion

For more information call Flame Safe Products, Inc. 1-800-333-9197

TESTING INFORMATION OVERVIEW

TEST	MATERIAL TESTED	RESULTS
ASTME E-84--UL 723 - NFPA 255 SURFACE BURNING CHARACTERISTICS FLAME SPREAD (F.S.) SMOKE GENERATION (S.G.)	Douglas Fir	Class A F. S. 20 S. G.-140
		Class B F. S. 35 Smoke - 95
	Vacuum Pressure Yellow Pine	Class A F.S. 19 S.G. - 48
	Vacuum Pressure SPF	Class A - F.S. 19 S. G. 75
	Vacuum Pressure SYP Plywood	Class A F.S. 19 S. G. 56
ASTM - E 108 BURNING BRAND	Western Red Cedar Shake Shingles SYP Taper sawn CCA treated Shake Shingles	Class C
ASTM -E 108 FLYING BRAND		Class C
ASTM - E 108 INTERMITTENT FLAME		Class C
ASTM - E 108 SPREAD OF FLAME		Class C

TESTING AGENCIES

Underwriters Laboratories, Inc.
Underwriters' Laboratories of Canada
Southwest Research Institute
United States Testing
Maxim-Technologies
Western Fire Center, Inc.
Forestry Commission of New South Wales, Australia
Ontario Research of Canada
European Institute for Fire Research
Southwestern Laboratories
United States Forestry Department
Professional Services Industries, Inc.

FLAME SAFE products have also been field tested and recognized for both commercial and residential use by State Fire Marshals and Building Officials in major metropolitan areas throughout the country.

The above is a brief summary of the extensive performance testing of FLAME SAFE products. Because of the wide array of products and chemical formulas available, it is impossible to display all testing results here. For more information, please call our toll free information hotline at 1-800-333-9197.

TECHNICAL DATA

	CLASS A INTERIOR (COATING)	CLASS A INTERIOR (VACUUM PRESSURE)	CLASS A EXTERIOR (COATING)	CLASS A EXTERIOR (VACUUM PRESSURE)	CLASS C EXTERIOR (COATING)
TOTAL SOLIDS	51%	31.5%	46%	31.5%	33%
WT PER GALLON	11.1 LBS	9.40 LBS	10.7 LBS	9.40 LBS	9.4 LBS
SPECIFIC GRAVITY	1.33	1.104	1.33	1.104	1.110
PH	2.5--2.8	4.6--5.2	2.5 - 2.8	4.6--5.2	4.6 - 5.2
FLASH POINT	NON-FLAMMABLE	NON-FLAMMABLE	NON-FLAMMABLE	NON-FLAMMABLE	NON-FLAMMABLE
COLOR	CLEAR @ 78°F	CLEAR @ 78°F	CLEAR @ 78°F	CLEAR @ 78°F	CLEAR @ 78°F
VOLATILITY	NON-VOLATILE	NON-VOLATILE	NON-VOLATILE	NON-VOLATILE	NON-VOLATILE
SOLVENTS	WATER	WATER	WATER	WATER	WATER
ANTI-FUNGUS	EXCELLENT RESISTANCE	EXCELLENT RESISTANCE	EXCELLENT RESISTANCE	EXCELLENT RESISTANCE	EXCELLENT RESISTANCE
BACTERIAL	MILDLY RESISTANT	MILDLY RESISTANT	MILDLY RESISTANT	MILDLY RESISTANT	MILDLY RESISTANT
LINEAR SHRINKAGE	NONE	NONE	NONE	NONE	NONE
HYGROSCOSIPITY	SLIGHT *	SLIGHT *	SLIGHT *	SLIGHT *	SLIGHT *
CORROSIVE	MILDLY	SLIGHT *	MILDLY	MILDLY	MILDLY
TOXIC	NONE	NONE	NONE	NONE	NONE
PRESERVATIVE FOR WOOD	YES	YES	YES	YES	YES
RECOMMENDED USES	WOOD, PLYWOOD WALL COVER	WOOD, PLYWOOD	W OOD, PLYWOOD, THATCHING,SIDING	WOOD, SIDING, PLYWOOD	WOOD SHINGLES, SIDING,PLYWOOD

*SIMILAR TO UNTREATED WOOD OF ANY GIVEN SPECIES

BUILDING CODE RECOGNITIONS AND REFERENCES

USES OF FLAME SAFE FIRE RETARDANT-TREATED WOOD			
	NATIONAL BUILDING CODE (NBC)	STANDARD BUILDING CODE (SBCC)	UNIFORM BUILDING CODE (UBC)
PARTITIONS		TYPE I & TYPE II	
MULTIFAMILY	TYPE A		
SEPARATING DWELLING UNITS	TYPE B		
SUBDIVIDING SPACE	TYPE B		
PERMANENT PARTITIONS IN NONCOMBUSTIBLE CONSTRUCTION	TABLE 602 noted	609.2 (except type I & II used as an I-restrained occupancy)	602.1 & 603.1
FIRE PARTITIONS	TABLE 602	609.2 (except type I & II used as an I-restrained occupancy)	602.1 & 603.1
FIRE SEPARATION NOT CREATING AN EXIT	TABLE 602	609.2 (except type I & II used as an I-restrained occupancy)	602.1 & 603.1 (If wall with fire retarded wood has the required fire resistance)
ONE HOUR FIRE RESISTANCE WALL SEPARATING DWELLING UNITS	TABLE 602	609.2	
CANOPIES		TYPE I, TYPEII, TYPEIII, TYPEIV, TYPE V 3106.2	
MARINE AND MOTOR VEHICLE SERVICE STATIONS		404.2.2	311.2.3.2
INTERIOR WOOD FINISH REQUIRING CLASS I FLAMESPREAD RATING (<25)	TABLE 803.4	TYPE I, TYPEII, TYPEIII, TYPE IV, TYPE V TABLE 803.3	TYPE I -F.R., TYPE II- F.R., TYPE II- 1HR., TYPE II N, TYPE III 1HR, TYPE III N , TYPE IV- H.T. TABLE 8-B
ARCHITECTURAL TRIM & CORNICES	1406.2.2	TYPE I, TYPE II, TYPEIII, TYPE IV, TYPE V F102.2.6	
WALLS & CEILINGS FURRED & DROPPED MORE THAN 1¾"		803.8.2	803#2
WOOD VENEER	1406.2.2	1403.6.8.1	601.5.4#2
EXTERIOR BEARING & NONBEARING WALLS - HEAVY TIMBER CONST.			503.4.3 (except H & I)
EXTERIOR BEARING & NONBEARING WALLS IN NONCOMBUSTIBLE CONST			503.4.3 (except H & I)
NONBEARING EXTERIOR WALLS >30' FROM PROPERTY LINE		TYPE I, TYPE II, TYPE IV, TYPE V TABLE 600	
PLATFORMS OF LESS THAN ⅓ OF FLOOR AREA OF ROOM	412.4.1	403.2.4	
ROOF CONSTRUCTION FOR TWO STORY HIGH BUILDINGS ONLY		TYPE I & TYPE II	
ROOFS - ONE & TWO STORY NONCOMBUSTIBLE CONST		TABLE 600	
SHINGLES & SHAKES CLASS A,B, & C	1506.3	1509.8.7	1504
NO PARA PET REQUIRED IF ROOF IS FIRE RETARDANT WOOD			
EXTERIOR WALLS	705.6		
FIRE & PARTY WALLS	707.5.2	704.5.1.1 TYPE III, TYPE V, & TYPE VI	
TOWNHOUSES	707.5.2	704.4	

ALLOWABLE LUMBER STRESSES, lb/in^2 Kiln Dry after Treatment (KDAT)

Species, construction grade,repetiitve member use,19% moisture content	Max. bending f_b	Vertical shear v_v	Horizontal shear v_h	Ten.∥ Grain f_t	Comp.∥ Grain f_c	Comp. ⊥ grain f_p	Modulus of elasticity E
Cedar: Northern white	675	450	65	350	625	205	600,000
Western red	875	600	75	450	850	265	900,000
Douglas Fir	1200	900	95	625	1150	385	1,500,000
Hemlock, eastern	1050	600	85	525	975	365	1,000,000
Oak, white	1450	1000	200	700	900	500	1,500,000
Pine: Northern	950	900	70	475	875	280	1,100,000
Southern	1250	250	105	650	1300	405	1,500,000
Redwood	950	850	80	475	925	270	900,000
Spruce: Eastern	875	750	65	450	800	255	1,100,000
Engleman	800	700	70	400	675	195	1,000,000
DVA FOR ALL SPECIES - .9775							
Glued laminated beams, normal loads *○							
Douglas fir, dry	100F †	1000	165	900	1500	385	1,700,000
Southern pine, dry	100F	1350	200	900	1500	385	1,500,000
Hem-fir, dry	100F	700	155	900	1250	245	1,600,000
Wet conditions	0.80 X dry	0.88 X dry	0.88 X dry	0.80 X dry	0.67 X dry	0.73 X dry	0.83 X dry

* Flame Safe Fire Poly 75 coated ○ Gluelam stresses are for loads perpendicular to laminations.

† Bending unit stresses of gluelams depend on the combination symbol (such as 20 F, 22F, 24F, etc.) of the structural member. *Example:* the bending unit stress of a 20F gluelam = 100 X 20 = 2000 lb/in^2.

		WEIGHT			All weights are approximate
Lumber	GDF (Green Doug-Fir)	2600/MBFT	Wood Panels	¼" Plywood	850/MSQFT
	DDF (Dry Doug. Fir & Larch)	2000/MBFT		⅜" Plywood	1100/MSQFT
	GHF (Green Hem. Fir)	2100/MBFT		½" Plywood	1500/MSQFT
	DHF (Dry Hem. Fir)	1650/MBFT		⅝" Plywood	1850/MSQFT
	SPF (Spruce-Pine-Fir)	1650/MBFT		¾" Plywood	2200/MSQFT
	SYP (Southern Yellow Pine)	2200/MBFT		¼" Wafer OSB	850/MSQFT
	Treated (Air dried after treatment)	3200/MBFT		7/16" Wafer OSB	1500/MSQFT
	Treated (Final vacuum pulled)	2800/MBFT		¾" Wafer OSB	2500/MSQFT
	Treated Timbers	3800/MBFT		⅜" Particle Boards	1350/MSQFT
	Cedar (Western Red-surface green)	1900/MBFT		⅝" Particle Boards	2400/MSQFT
Gypsum	⅜" Regular	1600/MSQFT		¼" Hardboard	1175/MSQFT
	½" Regular	2100/MSQFT		7/16" Hardboard	1900/MSQFT
	⅝" Regular/firecode	2700/MSQFT		½" Sheathing	1500/MSQFT

SECTIONAL PROPERTIES OF LUMBER SIZES

Nominal Size, in.	Dressed Size in.	C-S area in^2	Section modulus in^3	Moment of inertia in^4
2 x 2	1.5 x 1.5	2.25	0.56	0.42
2 x 3	1.5 x 2.5	3.75	1.56	1.95
2 x 4	1.5 x 3.5	5.25	3.06	5.34
2 x 6	1.5 x 5.5	8.25	7.56	20.80
2 x 8	1.5 x 7.25	10.9	13.1	47.60
2 x 10	1.5 x 9.25	13.9	21.4	98.90
2 x 12	1.5 x 11.3	16.9	31.6	178.00
3 x 4	2.5 x 3.5	8.75	5.10	8.93
3 x 6	2.5 x 5.5	13.8	12.6	34.70
3 x 8	2.5 x 7.25	18.1	21.9	79.47
3 x 10	2.5 x 9.25	23.1	35.7	165.00
3 x 12	2.5 x 11.3	28.1	52.7	297.00
4 x 4	3.5 x 3.5	12.3	7.15	12.50
4 x 6	3.5 x 5.5	19.3	17.6	48.50
4 x 8	3.5 x 7.25	25.4	30.7	111.00
4 x 10	3.5 x 9.25	32.4	50.0	231.00
4 x 12	3.5 x 11.3	39.4	73.8	415.00
6 x 2	5.5 x 1.5	8.25	2.06	1.55
6 x 4	5.5 x 3.5	19.3	11.2	19.70
6 x 6	5.5 x 5.5	30.3	27.7	76.30
6 x 8	5.5 x 7.5	41.3	51.6	194.00
6 x 10	5.5 x 9.5	52.3	82.7	393.00
6 x 12	5.5 x 11.5	63.3	121	697.00
8 x 2	7.25 x 1.5	10.9	2.72	2.04
8 x 4	7.25 x 3.5	25.4	14.8	25.90
8 x 6	7.5 x 5.5	41.3	37.8	104.00
8 x 8	7.5 x 7.5	56.3	70.3	264.00
8 x 10	7.5 x 9.5	71.3	113.	536.00
8 x 12	7.5 x 11.5	86.3	165.	951.00

Nominal size (standard dressed size)	Board Feet per Lineal Foot	BOARD FEET					
		LENGTHS					
		6'	8'	10'	12'	14'	16'
1 X 2 (¾" x 1½")	0.1667	1	1.33	1.67	2	2.33	2.67
1 X 3 (¾" x 2½")	0.2500	1.50	2	2.5	3	3.5	4
1 X 4 (¾" x 3½")	0.3333	2	2.67	3.33	4	4.67	5.33
1 X 6 (¾" x 5½"0	0.500	3	4	5	6	7	8
1 X 8 (¾" x 7¼")	0.6667	4	5.33	6.67	8	9.33	10.67
1 X 10 (¾" x 9¼")	0.8333	5	6.67	8.33	10	11.67	13.33
1 X 12 (¾" x 11¼)	1.0000	6	8	10	12	14	16
2 X 2 (1½" x 1½")	0.3333	2	2.67	3.33	4	4.67	5.33
2 X 3 (1½" x 2½")	0.5000	3	4	5	6	7	8
2 X 4 (1½" x 3½")	0.6667	4	5.33	6.67	8	9.33	10.67
2 X 6 (1½" x 5½")	1.0000	6	8	10	12	14	16
2 X 8 (1½" x 7¼")	1.3333	8	10.67	13.33	16	18.67	21.33
2 X 10 (1½" x 9¼")	1.6667	10	13.33	16.67	20	23.33	26.67
2 X 12 (1½" x 11¼")	2.0000	12	16	20	24	28	32
3 X 3 (2½" x 2½")	0.7500	4.50	6	7.5	9	10.50	12
3 X 4 (2½" x 3½")	1.0000	6	8	10	12	14	16
3 X 6 (2½" x 5½")	1.5000	9	12	15	18	21	24
3 X 8 (2½" x 7¼")	2.0000	12	16	20	24	28	32
3 X 10 (2½" x 9¼")	2.5000	15	20	25	30	35	40
3 X 12 (2½" x 11¼)	3.0000	18	24	30	36	42	48
4 X 4 (3½" x 3½")	1.3333	8	10.67	13.33	16	18.67	21.33
4 X 6 (3½" x 5½")	2.0000	12	16	20	24	28	32
4 X 8 (3½" x 7¼")	2.6667	16	21.33	26.67	32	37.33	42.67
4 X 10 (3½" x 9¼")	3.3333	20	26.67	33.33	40	46.67	53.33
4 X 12 (3½" x 11¼")	4.0000	24	32	40	48	56	64
6 X 6 (5½" x 5½")	3.0000	18	24	30	36	42	48
6 X 8 (5½" x 7½")	4.0000	24	32	40	48	56	64
6 X 10 (5½" x 9½")	5.0000	30	40	50	60	70	80
6 X 12 (5½" x 11½")	6.0000	36	48	60	72	84	96
8 X 8 (7½" x 7½")	5.3333	32	42.67	53.33	64	74.67	85.33
8 X 10 (7½" x 9½")	6.6667	40	53.33	66.67	80	99.33	106.67
8 X 12 (7½" x 11½")	8.0000	48	64	80	96	112	128

FLAME SAFE WOOD PRODUCTS, INC.
1-800-333-9197