

## Fire Characteristics of Sintra Material

Sometimes it is necessary to know the fire characteristics of materials that are used in the production of certain signage, graphics, exhibits or displays. These characteristics become important when the materials are used in applications where there may be stringent rules on how the materials behave when exposed to sources of combustion.

The following sections discuss the flame characteristics of Sintra, the standards it has been tested to, and where applicable it's classifications under these standards.

*Self Extinguishing* — remove the flame and the burning stops.

*Relatively High Ignition Resistance*—the heat content of Sintra material is 8,600 BTU/LB. Heat produced by a flame from Sintra material is not enough to produce those necessary vapors which combine with atmospheric oxygen to create a combustible mixture. Beacaut support combustion.

*High Oxygen Index* — ASTM D-2863 measures the percent of oxygen in an oxygen/nitrogen mixture which barely supports burning. The oxygen content of the earth's atmosphere is about 21%. Materials with oxygen index values of approximately 26 and above should not continue burning after the flame source is removed, because the normal atmospheric oxygen content is insufficient to support combustion. The oxygen index values of Sintra material is 46–49%. Many other plastics and natural products have values under 26.

*No "Flaming Drip"* — some burning polymers produce molten flaming drips which contribute to flame spread. Sintra material produces a form-retaining carbonaceous char. This char totally prevents fire-spreading flaming drips.

## RELATIVE FLAMMABILITY COMPARISONS TO OTHER MATERIALS

In addition to its unique balance of performance properties, Sintra material has the following advantages as a fire-retardant material:

### UL 1975 - FIRE TEST FOR FOAMED PLASTICS USED FOR DECORATIVE PURPOSES

The test method determines the ability of foamed plastics and products containing foamed plastics used for decorative purposes to resist rapid heat release when subjected to a flaming ignition source. The method is intended to apply to foamed plastics, and products containing foamed plastics, to be used for the following decorative purposes:

- Typical open-ceiling, portable exhibit booth constructions incorporating manufactured panels.
- Individual, manufactured decorative objects such as, but not limited to, mannequins, murals, and signs.
- Theater, motion picture, and television stage settings, with or without horizontal projections.

THICKNESS	DENSITY (lbs/ft3)	MAX. INST. RHR (kW)
1 mm	44	38
6 mm	44	42
10 mm	28	80
19 mm	28	62

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### UL 94 - STANDARD FOR FLAMMABILITY OF PLASTIC MATERIALS FOR PARTS IN DEVICES AND APPLIANCES

The test method is intended to characterize flame propagation of a material and its tendency to char. The test also indicates the tendency of the material to produce flaming particles which could ignite a cotton indicator located below the sample. It is used to determine a material's tendency either to extinguish or to spread the flame once the specimen has been ignited.

UL-94 Classification	Sintra Gauges
V-0	1 – 19 mm
5VA	2 – 19 mm
5VB	1 mm

There are various flame classifications specified in UL 94 that are assigned to materials based on the results of these small-scale flame tests. These classifications are used to distinguish a material's burning characteristics after test specimens have been exposed to a specified test flame under controlled laboratory conditions.

These classifications show that the material was tested in a vertical position and self-extinguished within a specified time after the ignition source was removed. These classifications also indicate that the material dripped no flaming particle that ignited a cotton indicator located below the sample. A material with a 5VA or 5VB classification is subjected to a flame ignition source that is approximately five times more severe than that used in the V-0 classification.

### ASTM E-84 (UL STEINER TUNNEL TEST) - STANDARD TEST METHOD FOR SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS

The test method uses a sample of material 20-24" wide by 24' long that fits under the roof of a 25' long tunnel forming the ceiling of the tunnel. Gas burners on one end of the tunnel impinge a flame on 7 square feet of the test specimen. The rate of progression of flame is observed as it passes side windows in the tunnel. The decrease in light caused by smoke development is measured by a photometer.

	Flame Spread	Smoke Development
2mm Gray	20	380
3mm all colors	20	315
4mm	20	425
5mm	20	>450
6mm all colors	20	>450
10mm White	25	>450
13mm White	>25	>450
19mm White	>25	>450

The flame propagation is plotted as distance vs. time. The photometer data is plotted as percent of absorption vs. time. The flame spread and smoke development indexes are then calculated and reported.