

The fire behavior of PLEXIGLAS®

The Non-Smoker

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Technical publications show that about 80 % of all fire victims die from smoke poisoning rather than the fire itself. Thick fumes may block the view of fire escape signs, and invisible smoke gases may also be acutely toxic and lead to asphyxiation.

When it comes to the fire behavior of a given material, experts therefore look at more than just the building materials rating, i.e. its flammability. The nature and quantity of smoke gases, the extent to which they obscure visibility, and their toxicity and corrosiveness may often be far more important criteria. Other vital aspects are flame spread, the dripping behavior according to the relevant standards and the extinguishing characteristics.

The aim of this leaflet is to present the fire behavior of PLEXIGLAS® according to such criteria.

Smoke Gas Volume

The smoke development of various materials employed in indoor and exterior applications is shown. The tests are performed according to DIN 4102 by the materials testing agency (Materialprüfamt) of North Rhine-Westphalia in Dortmund.

The low level of light absorption or light attenuation exhibited by PLEXIGLAS® shows that virtually no obstacle to visibility is to be expected. Similar investigations in Austria and Switzerland confirm the low smoke levels it generates. In both countries, PLEXIGLAS® is classified as a material with low smoke formation. Tests performed

according to DIN EN 11925 for rating in Euroclass E confirm the low smoke formation. Tradeshow companies, among others, demand materials that generate no smoke in the event of fire.



Smoke Gas Toxicity

This is a particularly important criterion for all applications in rooms frequented by the public. The certificates of inoffensiveness confirm that PLEXIGLAS® does not release any acutely toxic gases. The certificates were issued by EPA GmbH, an institute that analyzes the smoke gases of

combustible materials and draws up expert reports and certificates on their classification. Apart from low smoke development, this property is a central requirement of almost all directives on tradeshow booth construction.

Smoke Gas Corrosiveness

Fires are dangerous. The corrosive gas mixtures that may form not just during a fire, but also during fire-fighting and for a long period afterwards, may be harmful to persons and damage buildings and equipment. Critical substances usually settle on surfaces and adhere to them or are constantly released into the air. The damage caused by these deposits and environmental hazards may be much more significant than the damage caused directly by fire, owing to the required renovation work. Tests performed according to DIN VDE 0482-267 and our own investigations clearly show that: The smoke gas and basic constituents of PLEXIGLAS® are neither corrosive, nor do they adhere permanently to surfaces.

Flame Spread

When materials start to burn, they may ignite neighboring objects. The speed with which fire spreads depends on a number of different factors. The flame spread of materials is determined by various test methods, depending on application.

Ignition Behavior/Building Materials Rating

The ignition behavior of a material is one criterion for its building materials rating. PLEXIGLAS® is rated B2, normally flammable, to DIN 4102, and is thus approved for a multitude of indoor and outdoor applications. In addition, PLEXIGLAS® is rated in Euroclass E according to DIN EN 13501. Apart from the ignition test in compliance with the given standards, tests performed under fire department supervision show that PLEXIGLAS® is not normally ignited by sources such as weld spatter or flying sparks from grinding operations, sparklers, fireworks or glowing charcoal.

Dripping Behavior

The dripping behavior of burning or melting materials depends not merely on their properties, but also on the progression of a fire. The assessment of dripping behavior is one of the investigations used to determine the building materials rating.

PLEXIGLAS® is rated in building materials class B2, without burning droplets, according to DIN 4102. This fire behavior is confirmed by Euroclass E to DIN EN 13501.

Extinguishing Characteristics

Materials burn in different ways, depending on their chemical composition or state. Materials are divided into four fire classes, ABCD, to assess the extinguishing requirements. Depending on the fire rating, only certain extinguishing agents may be used, e. g. water, foam, powder, CO2 etc.

All it normally takes to extinguish PLEXIGLAS® is a small quantity of water. However, all other extinguishing agents are equally suitable. That greatly facilitates fire-fighting.

A short overview

- PLEXIGLAS® burns almost without smoke. Euroclass E, DIN EN 13501, low smoke formation.
- PLEXIGLAS® releases no acutely toxic gases. DIN 53436
- PLEXIGLAS® has no corrosive effect in the event of fire. DIN VDE 0482-267
- PLEXIGLAS® can be extinguished with water and all other extinguishing agents.
- PLEXIGLAS® is approved as a building material for interior and exterior applications.
- PLEXIGLAS® is tested according to ASTM D 635-81 and other standards.

- PLEXIGLAS® is classed as B2, normally flammable, without burning droplets, according to DIN 4102. Euroclass E, DIN EN 13501, without burning Droplets.
- PLEXIGLAS® is employed in public constructions such as schools and kindergartens.
- PLEXIGLAS® has been approved for decades by the aviation industry for use in window glazing.

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