EUROPLEX®
PPSU

A new engineering plastic material for safety face shields

EUROPLEX® PPSU is the new innovative standard material for firefighter helmet visors!

A sheet material distinguished by its special combination of properties:

- EUROPLEX® PPSU is inherently flame-retarded (self-extinguishing without flame retardant). Its rating of UL94:V0 at 0.8 mm thickness stands for very good fire behaviour.
- High heat distortion temperature up to 190 °C in permanent service.
- EUROPLEX® PPSU shows excellent mechanical properties over a wide temperature range – also at low temperatures. Face shields manufactured from this material are virtually unbreakable.
- EUROPLEX® PPSU shows extraordinary chemical resistance for an amorphous material.

Therefore EUROPLEX® PPSU engineering plastic sheets are the better alternative for manufacturing visors for firefighter helmets or other safety helmets. The EUROPLEX® PPSU offers decisive advantages in all applications with high requirements on the material in terms of temperature resistance, chemical resistance or mechanical resistance.

EUROPLEX® sheets based on the engineering polymer polyphenyl sulphone (PPSU) are employed worldwide more and more frequently to manufacture visors for the protection of fire workers at their dangerous operations during firefighting and lifesaving.

EUROPLEX® PPSU as a new innovative material for this special application was tested by leading helmet and visor manufacturers and obtained all necessary approvals in accordance to the ongoing standard EN 443:2008 for helmets for fire fighting in buildings and other structures and the integrated standard EN 14458:2004 for personal eye-equipment – faceshields and visors for use with firefighters´ and high performance industrial safety helmets used by firefighters, ambulance and emergency services.

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Product Properties	EUROPLEX® PPSU	Unit	Standard
Density	1,29	g/cm³	ISO 1183
Vicat softening temperature	222	°C	ISO 306/B50
Max. permanent service temperature	190	°C	
Modulus of elasticity	2.350	MPa	ISO 527
Tensile strength	70 – 80	MPa	ISO 527
Izod notched impact strength (2.0 mm)	60 – 70	kJ/m²	ISO 180/1A

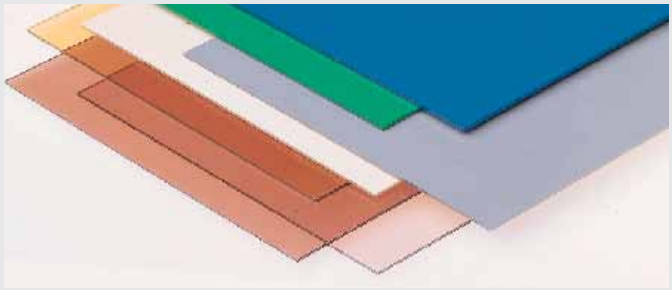
Processing instructions for thermoforming:

Before thermoforming, EUROPLEX® PPSU sheets must be dried in an air-circulation oven. The sheets are to be positioned in such a way that the air can circulate freely between and around them. They should not, therefore, be stacked, so as not to prolong drying unnecessarily. The temperature of the oven must be controlled. Following drying time and temperature is recommended: five hours per 1 mm sheet thickness at 175 °C (+/- 5 °C). This recommendation was established after storage under normal conditions (23 °C, 50 % rel. humidity). If the sheets are stored in particularly damp rooms, the drying periods may have to be extended by up to 50 %.

To permit problem-free thermoforming, the machines must be equipped as follows: Heating from above and below; the output of the individual upper radiators should be adjustable. It should be possible to support the heated sheets automatically by means of air. Area output approx. 43 – 54 kW/m² (heating potential for sheets up to approx. 300 °C). Minimum 22 kW/m². If necessary, facility for mould heating. The forming temperature range of EUROPLEX® PPSU sheets lies between 270 and 285 °C, the optimum forming temperature being approx. 275 °C.

This provides good mould reproduction, preservation of the surface texture and minimal sagging. Due to the narrow range of the forming temperature, it must be possible to control the sheet temperature throughout the heating phase. Suitable for this are radiation pyrometers, which in some thermoforming machines are firmly installed in the centre of the upper heaters. In general, the edges of the sheets should be heated to a higher temperature than the central areas, especially if these are flat. The thermoformed parts shrink upon cooling down to room temperature. The shrinkage of EUROPLEX® PPSU is uniform and predictable and must be taken into account when designing the moulds so that the finished part is of the required dimensions.

Since the various mould materials have different coefficients of linear thermal expansion, the shrinkage values of EUROPLEX® PPSU were determined as the difference between the dimensions of the mould at operating temperature and those of the part after cooling for at least 24 hours and conditioning under standard conditions. The shrinkage of EUROPLEX® PPSU mouldings, measured according to this method, is about 0.8 – 1 %. Additional processing instructions on request.



EUROPLEX® PPSU sheets are available in transparent and opaquely colors and thicknesses of 0.5 to 6.0 mm. Beside the here described visor application they are mainly used for sterilizable surgical instrument trays.

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