



**Ultrason® –  
Special Products**

BASF Plastics  
key to your success

 **BASF**  
The Chemical Company



# Ultrason®

The Ultrason® resins are amorphous thermoplastics derived from polysulfone, polyethersulfone and polyphenylsulfone and offer very high resistance to heat. Their wide spectrum of beneficial properties allows them to be molded into high-quality engineering parts and high-load mass-produced articles. They can be processed by almost all the techniques adopted for thermoplastics. Ultrason® can be successfully used for applications in which other plastics, e. g. polyamide, polycarbonate, polyoxy-methylene and ploy (alkylene terephthalates), fail to meet the requirements. By virtue of their extraordinary versatility, Ultrason® resins can substitute thermosets, metals and ceramics.

The following pages present an extension to the Ultrason® product line. You will find a variety of innovative Ultrason® products tailor-made for special applications offering intelligent solutions for manufacturing and answering the latest trends in design and technology.

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# Ultrason® E 2010 MR black HM PESU with optimized heat management



Foglamp

## Typical applications:

- reflectors
- housings
- bezels for fog lamps

## Requirements:

- black or opaque color
- high surface quality
- direct metallization possible

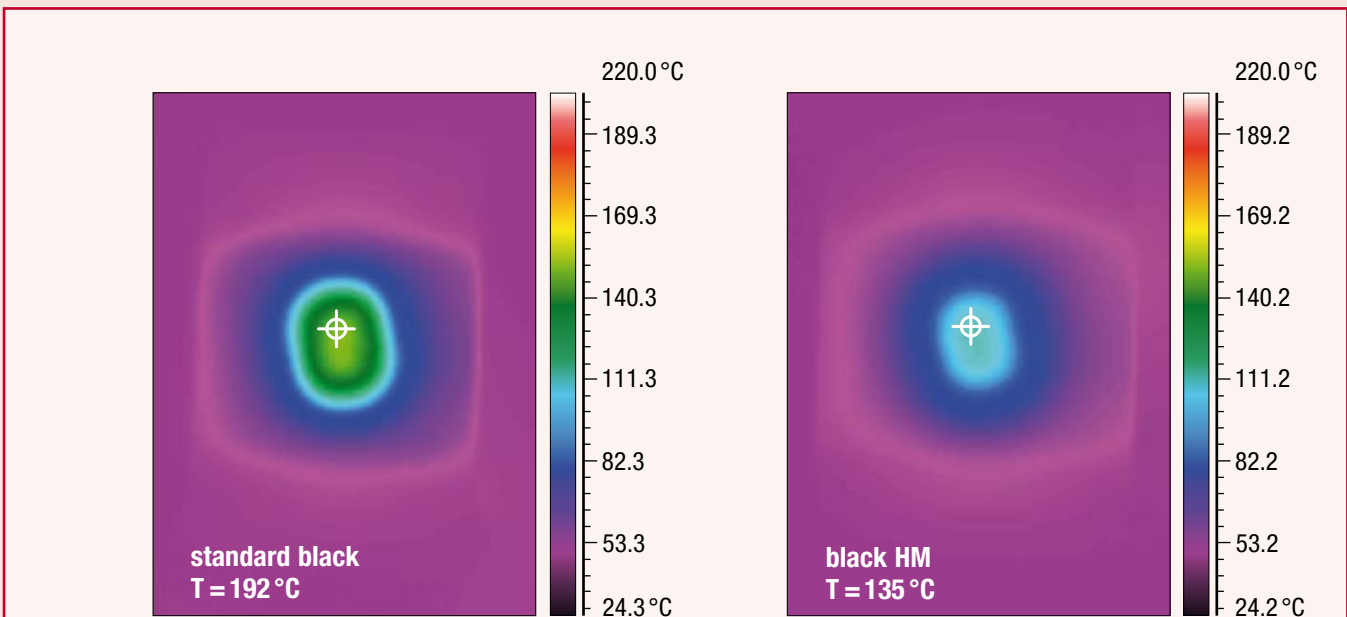
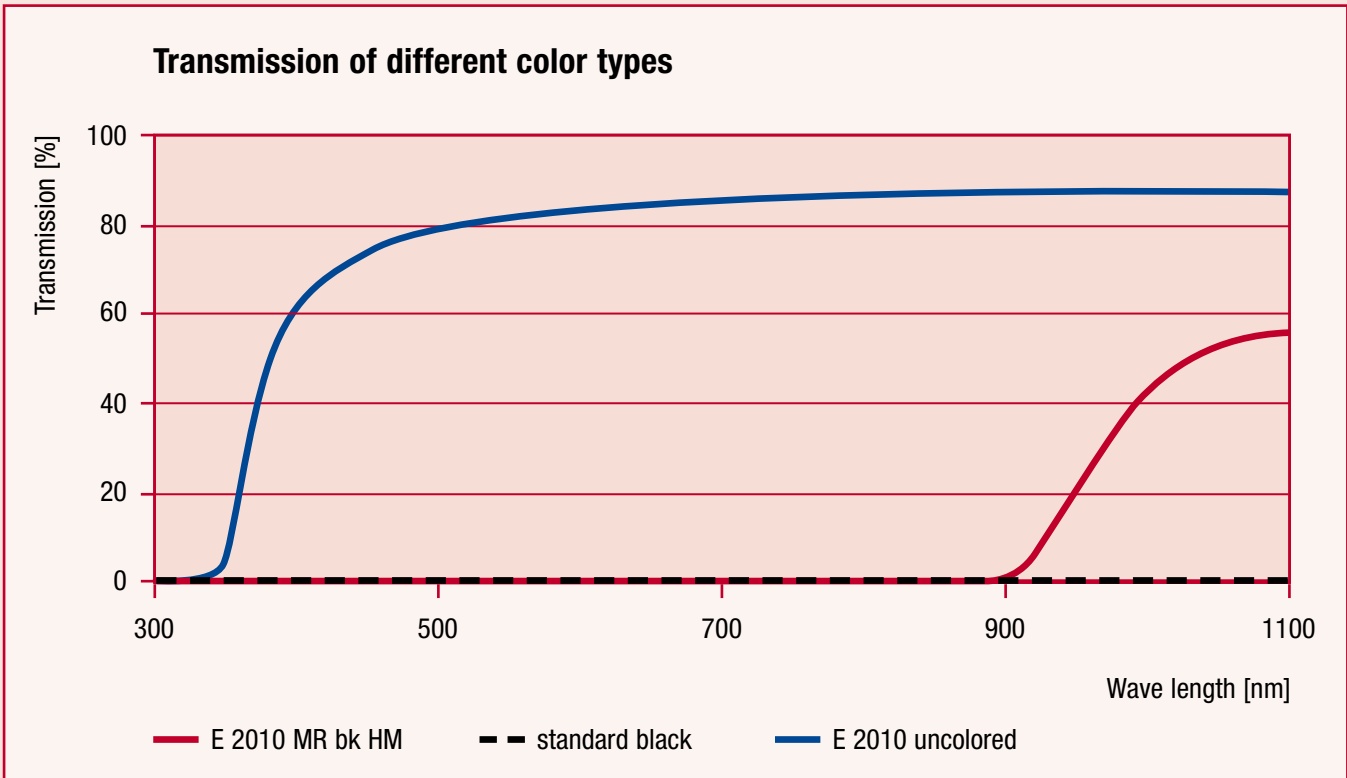
## Challenge:

- reduction of heat accumulation in small housings, reflectors, electronic devices

## Solution:

- new black color with improved transparency to infrared and heat radiation
- ➔ Ultrason® E 2010 MR black HM

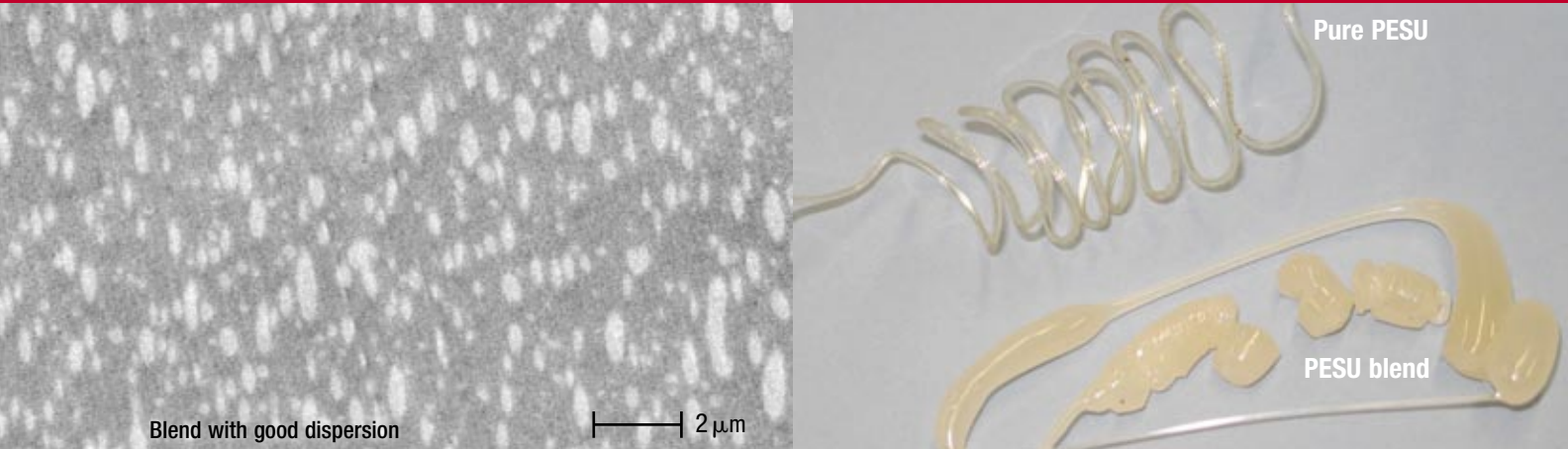




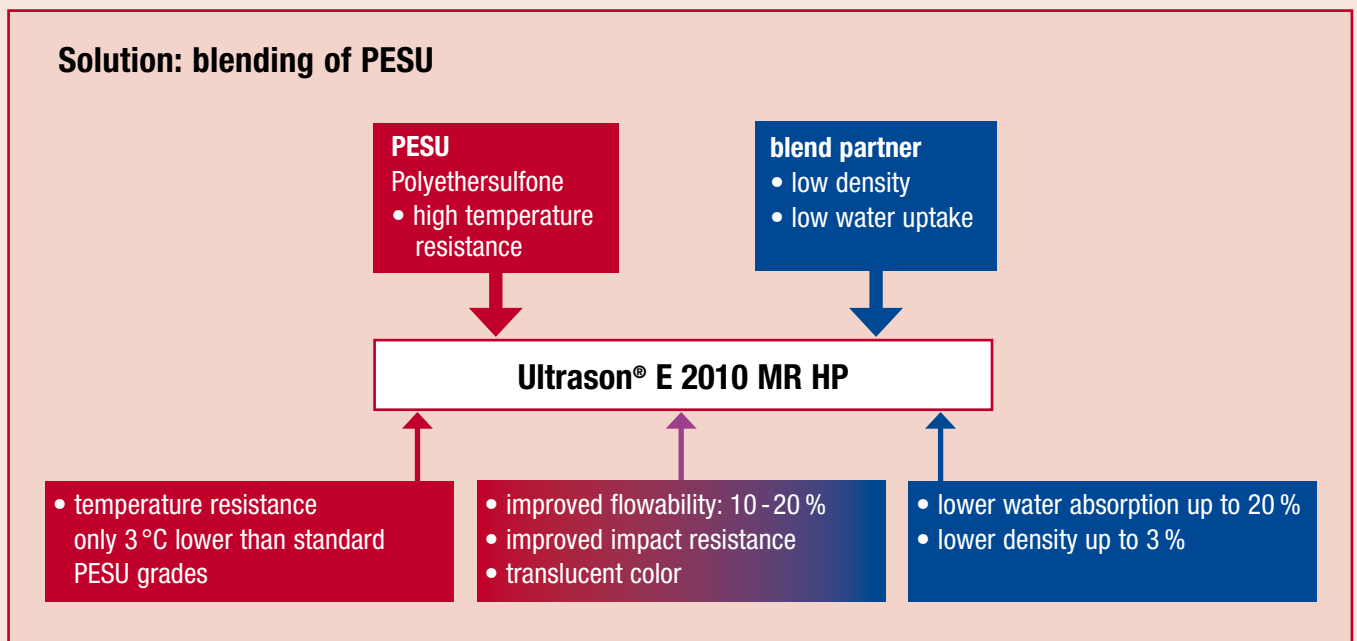
For equal test conditions, a significant lower heating-up effect will be observed with Ultrason® E 2010 MR black HM than with standard black types. Plates: 2 mm thick; 20-watt halogen light bulb: heated up for 2 minutes; infrared temperature measurement: 10 seconds after removal of the heat source.

# Ultrason® E 2010 MR HP

## PESU Blend for high productivity



**Swelling behavior:** Morphology of blend leads to better swelling behavior. So, characteristic molding problems like record effect, jet of material or flow lines, can be minimized.

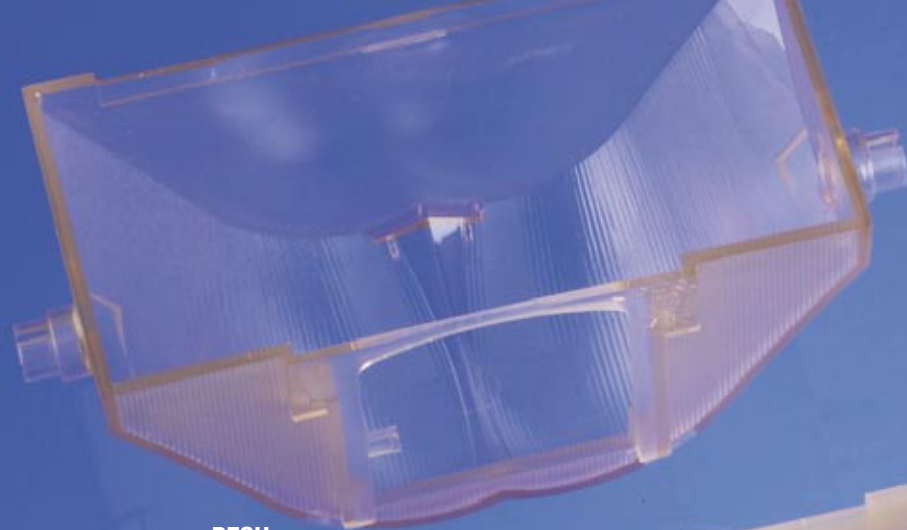


### Typical applications:

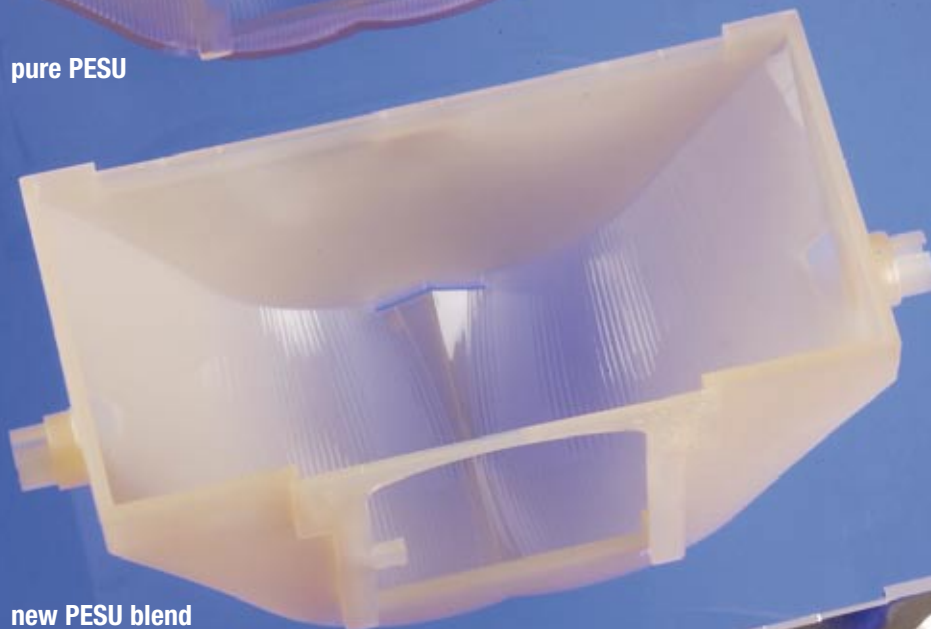
- automotive lighting (reflectors, bezels, housings)

### Requirements:

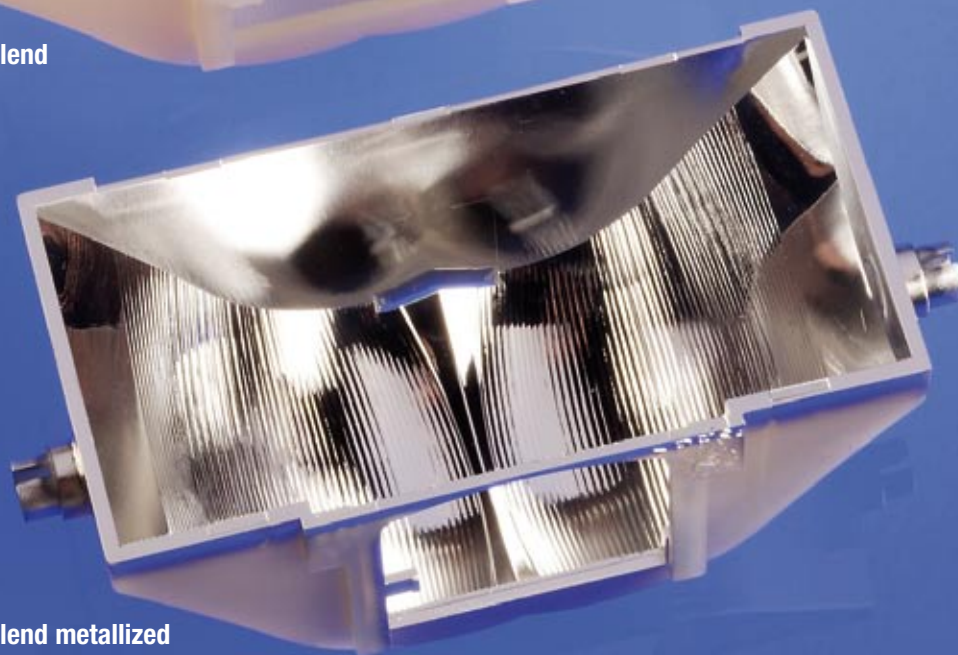
- high flowability
- good impact behavior
- good processability
- opaque color
- direct metallization possible



pure PESU



new PESU blend

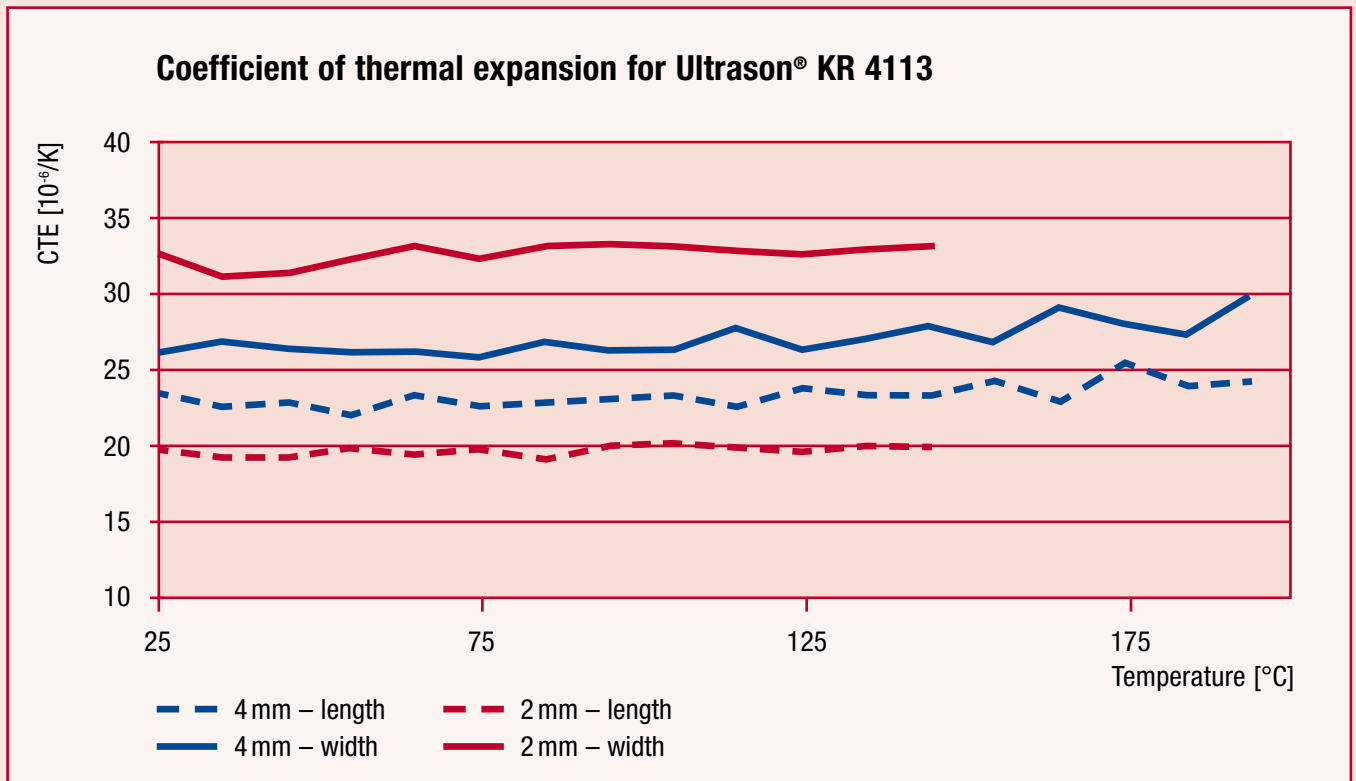


new PESU blend metallized

Solution: blending of PESU

# Ultrason® KR 4113

PESU with 10% carbon fibres,  
10% graphite and 10% PTFE



## Typical applications:

- oil control piston in standard automotive oil pumps
- oil control piston in volume controlled automotive oil-pumps

In competition with BMC and metal, the combination of

- tribological behavior
- oil resistance
- low coefficient of thermal expansion

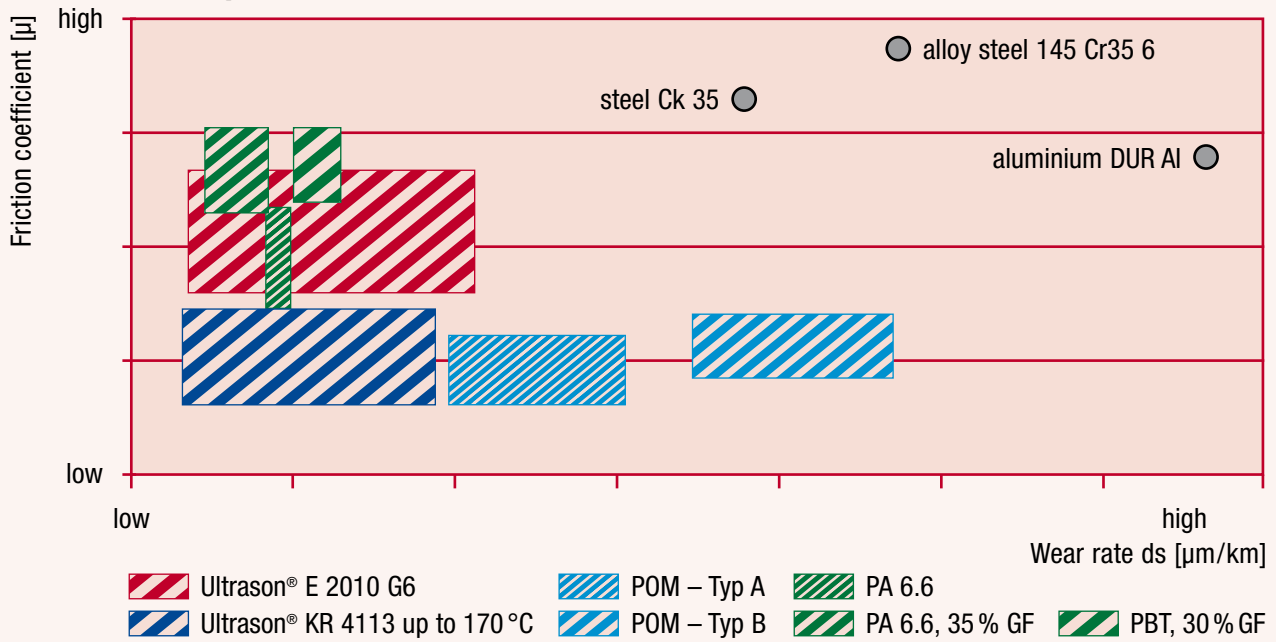
over the temperature range from -30 °C to 150 °C is the key factor for choosing Ultrason® KR 4113 for this application.



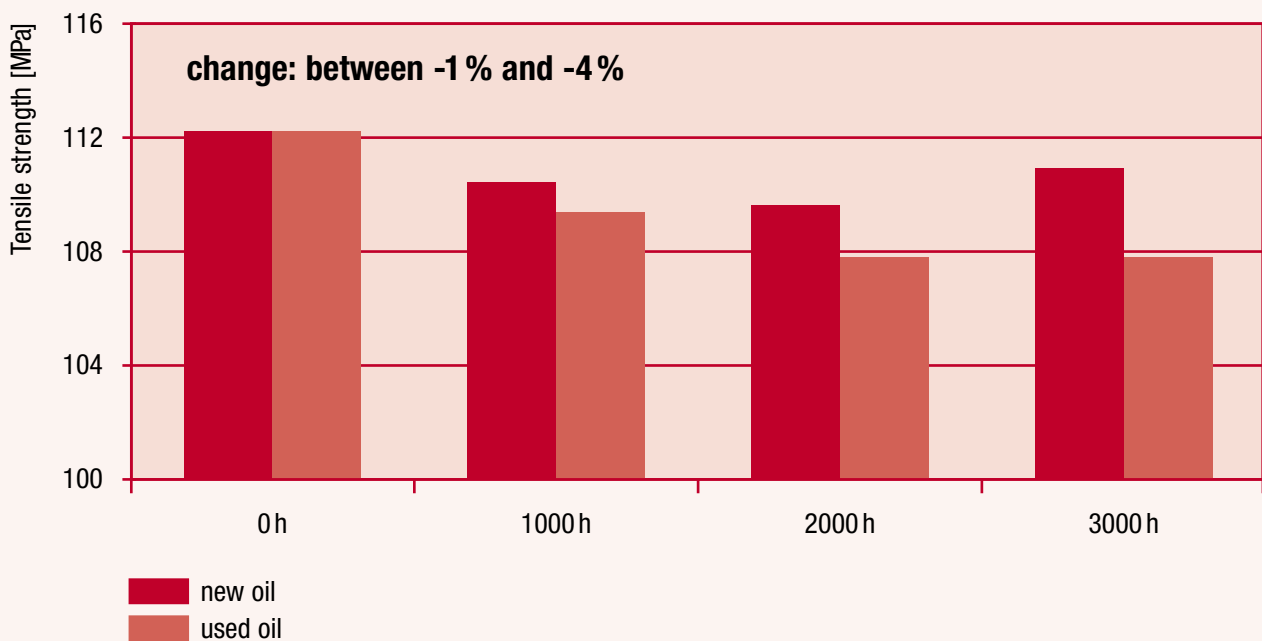
Oil control piston



### Wear rate and coefficient of friction for different Ultrason® grades in comparison to other materials



### Ageing of Ultrason® KR 4113 at 150 °C in new and used oil



# Ultrason® E 2010 C6

PESU with 30 % carbon fibers for better mechanical properties



Carbon fibers (left) and Ultrason® granules (right)

Carbon fibers and Ultrason® – two partners with outstanding properties

**The combination of carbon fibers with the amorphous high-temperature plastic Ultrason® guarantees extraordinary mechanical properties for temperatures of up to 200 °C.**

Excellent properties:

From -100 °C to +200 °C

- very high stiffness
- very constant mechanical properties
- low and constant thermal expansion = dimensionally stable
- excellent creep behavior

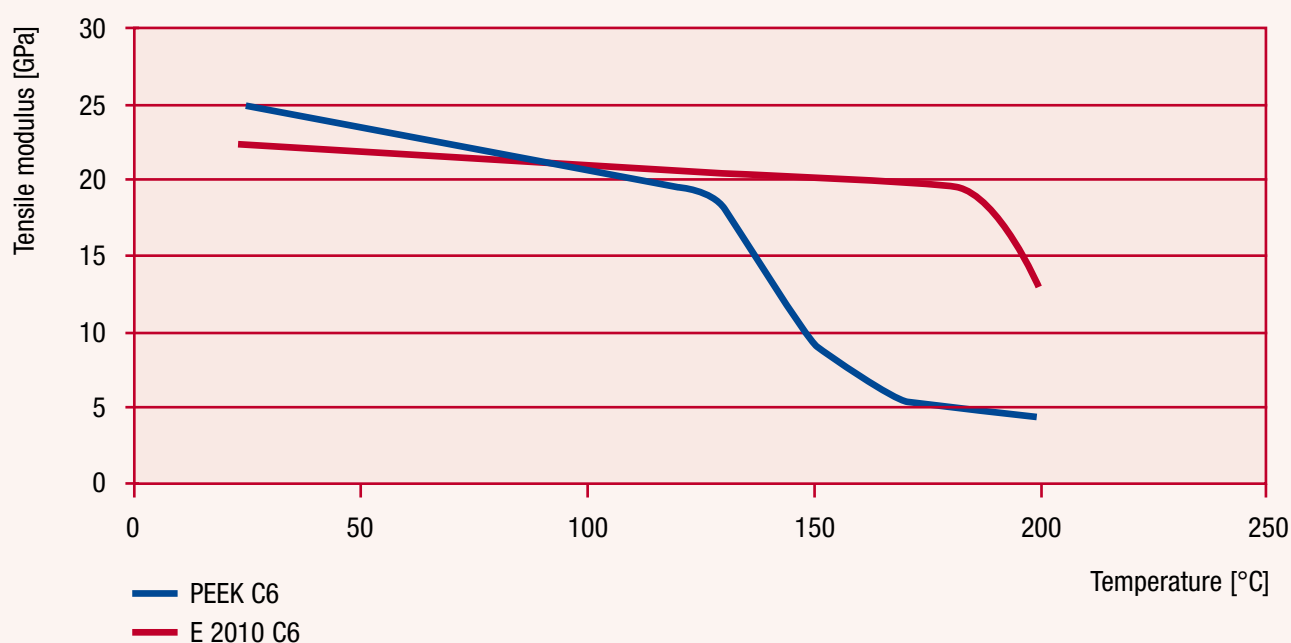
Potential applications:

- substitution of metal, using the advantages of thermoplastic materials (e.g. realization of complex designs by injection-molding)
- substitution of PEEK for applications with a maximum of 200 °C
- parts with antistatic requirements
- parts with electrically conductive requirements

### Characteristic features of Ultrason® E 2010 C6

Features	Unit	Ultrason® E 2010 C6	PEEK CF 30%
Tensile modulus	[MPa]	22	24.0
Tensile strength	[MPa]	185	232
Charpy impact strength	[KJ/m]	40	51.2
Charpy impact notched	[KJ/m]	7.5	9.2
HDT/A	[°C]	225	>250
MVR 360 °C, 10 kg	[cm³/10 min]	15	2.2
MVR 400 °C, 10 kg	[cm³/10 min]	45	5
Volume resistance	[Ohm · cm]	2	160
Surface resistance	[Ohm]	1000	10000

### Stiffness of Ultrason® E 2010 C6 in comparison to PEEK





# Ultrason® P 3010

Polyphenylsulfone (PPSU) with outstanding impact and stress cracking behaviour

Characteristic features of Ultrason® P 3010		
Features	Unit	Ultrason® P 3010
Tensile modulus	[MPa]	2350
Tensile strength	[MPa]	75
Charpy impact strength	[KJ/m]	n.b.
Charpy impact notched	[KJ/m]	65
HDT/A	[°C]	196
MVR 360 °C, 10 kg	[cm <sup>3</sup> /10 min]	20

**Extension of the Ultrason® product line: the amorphous high-temperature polymer PPSU, a polymer with outstanding impact and stress cracking behavior.**

## Application segments:

- sanitary and plumbing (e.g. fittings)
- aviation (e.g. overhead bins, aircraft interior covering)
- catering (e.g. food trays, dairy farming)

## Requirements for these applications:

- compliancy with FDA and EU food contact regulations
- approvals for drinking water contact
- excellent resistance to superheated steam (134 °C)
- high toughness
- excellent flame resistance
- excellent heat resistance



# Ultrason® E 2020 P and E 2020 P SR

## PESU for non-stick applications and structural resins



To enable faster and easier solving Ultrason® E 2020 P and E 2020 P SR will be sold as small flakes (right) instead of granules (left)

### Typical applications:

#### **in non-stick applications and coatings as**

- binder (e.g. for PTFE)
- coupling agent to metal surfaces
- chemically resistant coating component

#### **in composite applications as**

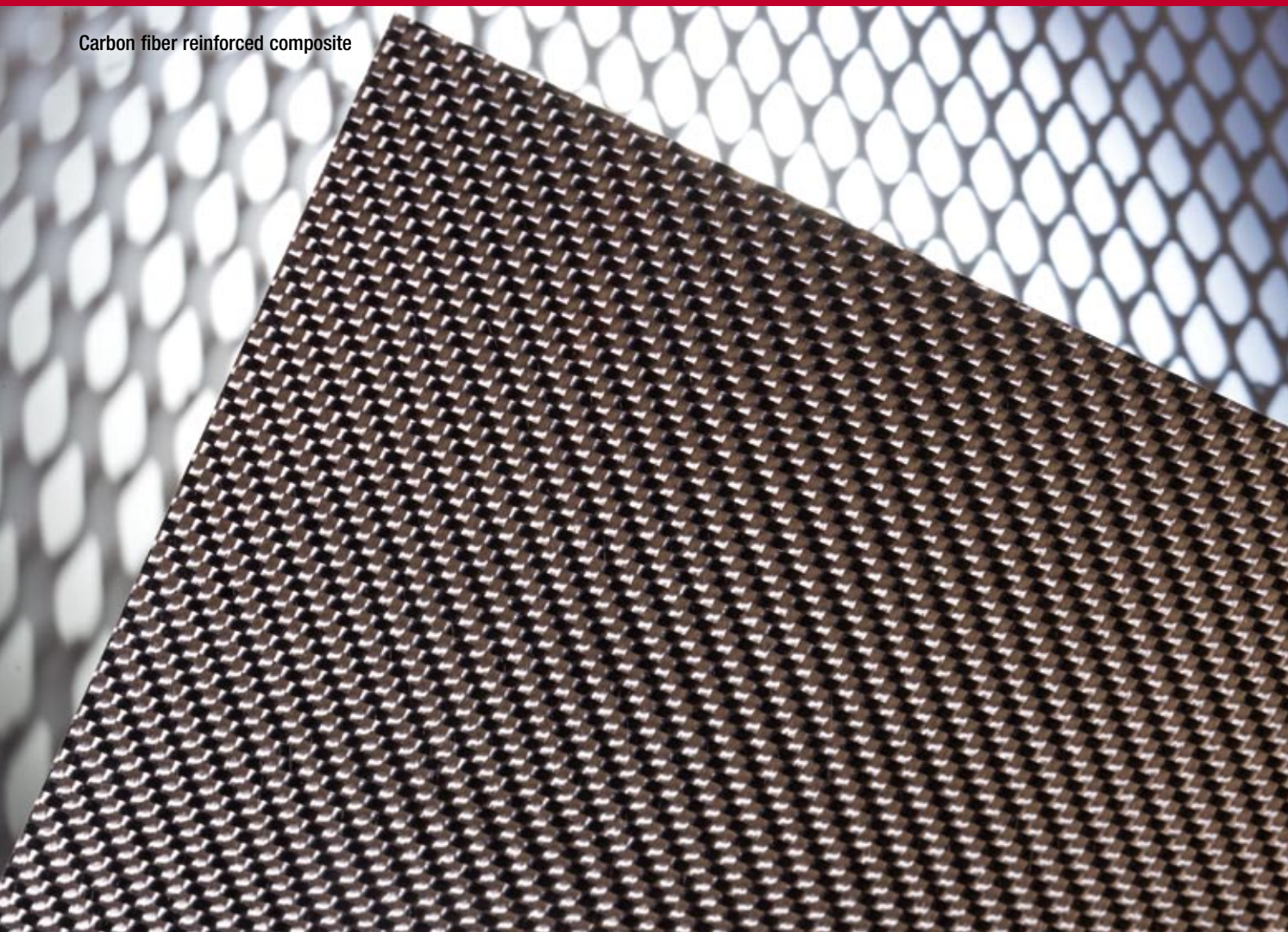
- impact modifier: up to 30 % higher impact resistance
- viscosity adjustment (e.g. of epoxy resins)
- improved flame resistance

### Required property profile:

- high Tg of 225 °C
- limiting oxygen index (LOI): 38 %
- soluble in NMP, DMAc, DMF etc.
- SR: OH-groups of total end groups >50 % (typically >70 %)
- flakes for easier dissolution



Carbon fiber reinforced composite



Ultrason® E 2020 P and E 2020 P SR for non-stick pans



# Ultrason® E 2010 HC

## PESU with high clarity



Higher optical purity for bottles



Extruded film for cell phone displays

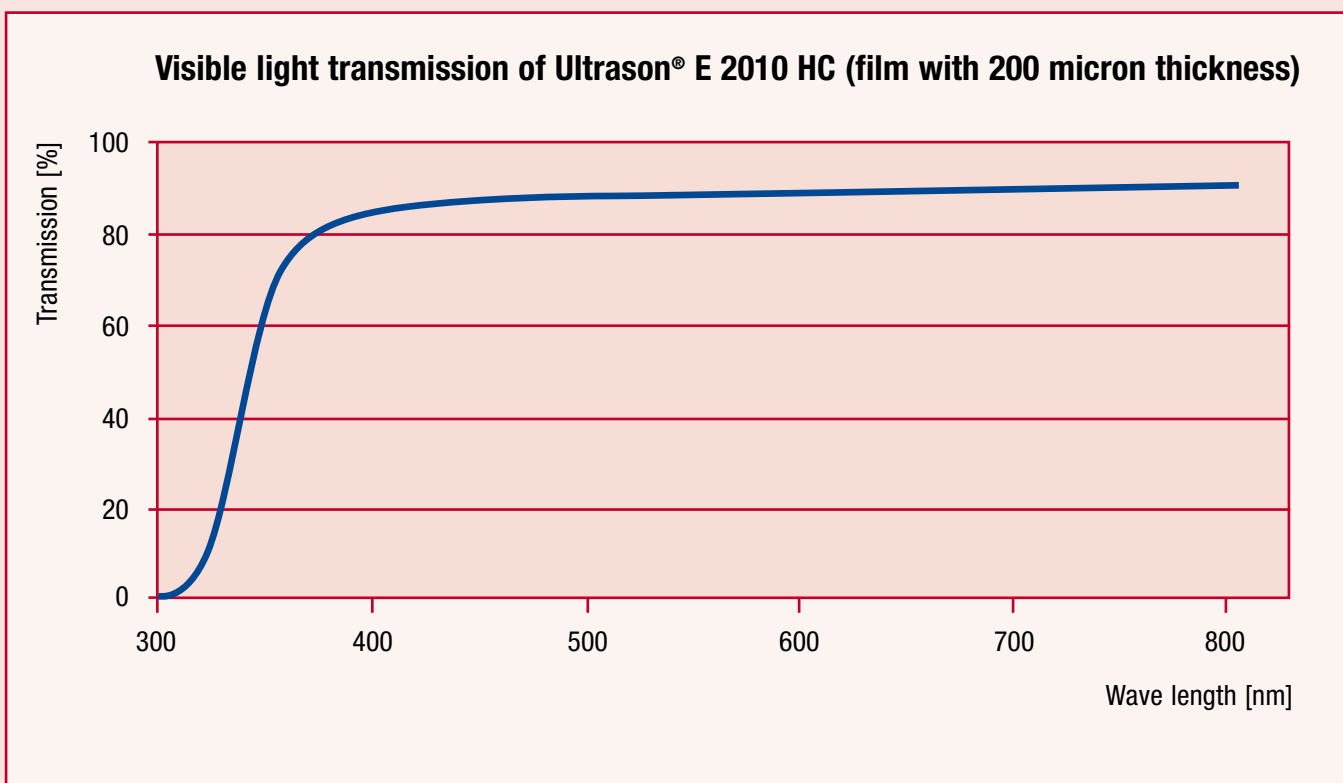
Characteristics of extruded film made of Ultrason® E 2010 HC as glass substitute for displays:

- low internal stresses
- very smooth surface
- light color

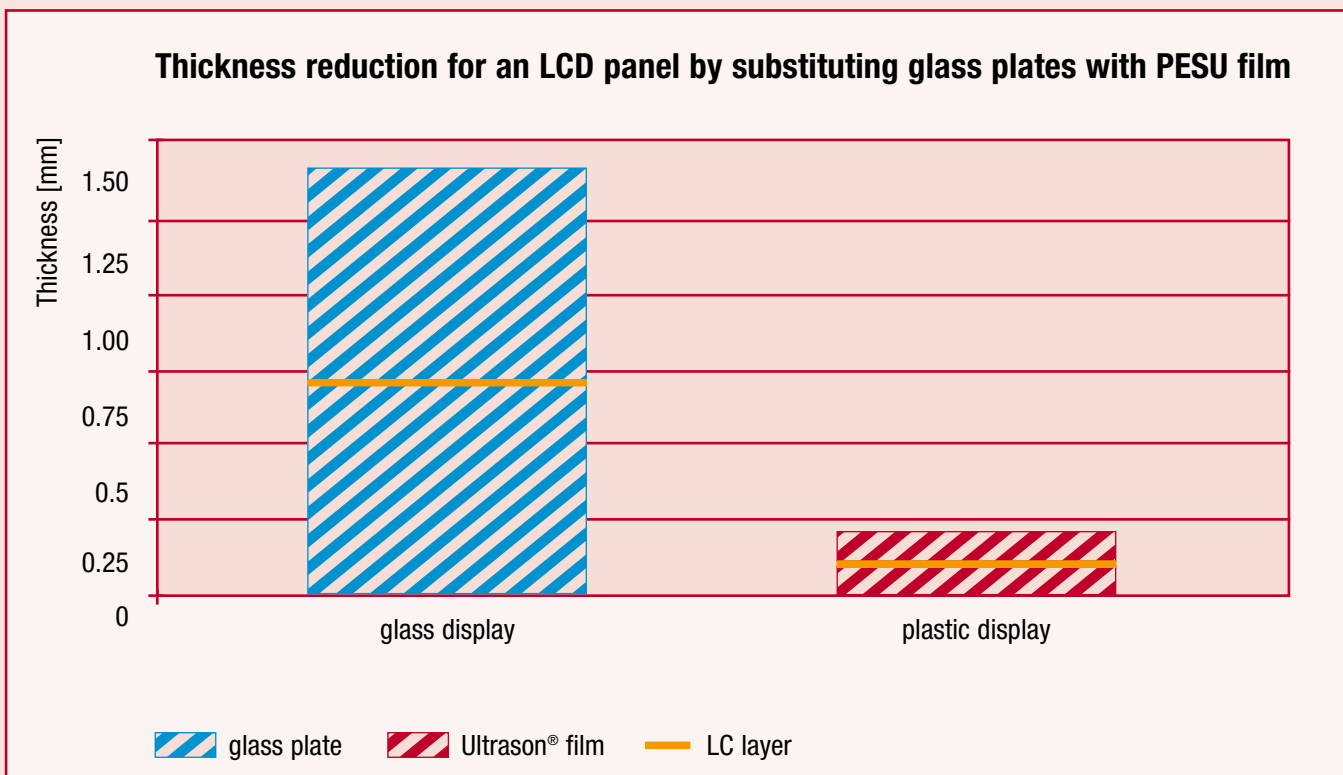
Advantages:

- lower yellowness and higher optical purity in comparison to standard PESU
- higher level of optical properties
- all other typical properties like standard Ultrason® E 2010

**Visible light transmission of Ultrason® E 2010 HC (film with 200 micron thickness)**



**Thickness reduction for an LCD panel by substituting glass plates with PESU film**





## Note

The data contained in this publication are based on our current knowledge and experience. In view of the many factors that may affect processing and application of our product, these data do not relieve processors from carrying out their own investigations and tests; neither do these data imply any guarantee of certain properties, nor the suitability of the product for a specific purpose. Any descriptions, drawings, photographs, data, proportions, weights etc. given herein may change without prior information and do not constitute the agreed contractual quality of the product. It is the responsibility of the recipient of our products to ensure that any proprietary rights and existing laws and legislation are observed. (September 2007)

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