

# Makrolon<sup>®</sup>



**Product range**  
Typical values

# Makrolon®

Makrolon® is the brand name of our polycarbonate, which we produce in all the major economic regions of the world. For Makrolon®, the most important economic regions are Asia-Pacific (APAC), Europe, Middle East, Africa and Latin America (EMEA/LA), and North America and Mexico (NAFTA).

## Characterization

Compared with other thermoplastics, the amorphous material Makrolon® has a very unique property profile. It is noted above all for its high transparency, heat resistance, toughness and

dimensional stability coupled with a high creep modulus and good electrical insulation properties. Glass fiber reinforced Makrolon® has particularly high stiffness and outstanding dimensional stability.

## Makrolon® is available in:

- General purpose grades
- Food contact grades
- Impact modified grades
- Flame retardant grades
- Glass fiber reinforced (milled fiber) grades
- Glass fiber reinforced (normal fiber) grades

- Grades for special applications
  - Optical storage media
  - Optical lenses
  - Light guides
  - Lighting
  - Automotive lighting
  - Automotive glazing
  - Blow molding
  - Furniture
  - Extrusion
  - Structural foam
  - Medical devices

## Nomenclature

The non-reinforced, general purpose and food contact grades of Makrolon® are available in different viscosity classes. The first two digits in the type designation usually characterize the viscosity, while the third and fourth digits specify the additives:

- ..03 UV-stabilized
- ..05 Easy release
- ..07 UV-stabilized, easy release

- ..06 So-called "food contact" grades that comply with the regulations of the EU and its member states with regard to plastics in contact with foodstuffs, conform to the relevant FDA regulations and also meet the recommendations of Germany's Bundesinstitut für Risikobewertung (BfR = Federal Institute for Risk Assessment)
- ..56 Easy release "food contact" grades that comply with the regulations of the EU and its member states with regard to plastics in contact with foodstuffs, conform to the relevant FDA regulations and also meet the recommendations of Germany's Bundesinstitut für Risikobewertung (BfR = Federal Institute for Risk Assessment)



## Properties

- **Inherent color**

Clear and transparent, like glass

- **Toughness**

Without notching, no failure  
High notched impact strength

- **Dimensional accuracy and stability**

Exceptionally high, since no change in dimensions due to water absorption and post shrinkage, high creep modulus, high heat deflection temperature, isotropic behavior

- **Heat resistance**

Glass transition temperature up to 148 °C

- **Resistance to ignition sources**

Fire classification (grade-dependent) to UL 94V-0/1.2mm, and UL 94-5VA/3.0 mm; maximum temperature in glow wire test: up to 960 °C

- **Electrical insulation**

Volume resistivity  $10^{14} \Omega \cdot m$ ;  
Dielectric strength up to 36 kV/mm  
(1 mm thickness)

## Main application areas

- Automotive & Transportation
- Construction
- Electrical
- Electronics, IT & Communication
- Appliances

- Consumer products
- Food contact
- Medical devices
- Security & Protection

All Makrolon® batches are homogenized after production.

The production plants for Makrolon® have been certified to DIN EN ISO 9001 and 14001 by the appropriate certification organizations.

## Colors

The Makrolon® general purpose grades are available in transparent, translucent and opaque colors. Special colors can be arranged on request.

The food contact grades having ..06 and ..56 as the final digits are only available in colors which are in compliance with the relevant provisions on colorants for plastic materials.

In Germany, the BfR Recommendation IX applies (BfR = Federal Institute for Risk Assessment).

In France, Circulaire No. 176 applies. In the USA, FDA's regulations in 21 CFR apply (CFR = Code of Federal Regulations).

In the EU, the Commission Regulation (EU) No. 10/2011 on "plastic materials and articles intended to come into contact with food" does not regulate the use of colorants.

Certain grades contain additives which affect transparency. Therefore they are not available in transparent shades. In particular, this refers to all impact modified and glass fiber reinforced grades as well as certain flame retardant grades. A higher degree of pigmentation can lead to reduced toughness, especially in case of the easy flow grades of the 22.. and 24.. series. Hence, for applications where toughness is particularly important, higher-viscosity grades or impact modified grades should be selected.



## Color designations

The range of colors for Makrolon® is based largely on the RAL color system. The colors are designated by a numerical code in which the first two digits specify the basic color, while the other four digits indicate the various shades.

	Opaque	Transparent	Translucent	Metallic	Transparent
	Non-reinforced, glass fiber reinforced		Non-reinforced		IR-protected
<b>Natural color</b>	000000	000000	–	–	–
<b>Clear transparent</b>	–	55....	–	–	–
<b>White</b>	01....	–	02....	03....	–
<b>Yellow</b>	10....	15....	12....	13....	17....
<b>Orange</b>	20....	25....	22....	23....	27....
<b>Red</b>	30....	35....	32....	33....	37....
<b>Violet</b>	40....	45....	42....	43....	47....
<b>Blue</b>	50....	55....	52....	53....	57....
<b>Green</b>	60....	65....	62....	63....	67....
<b>Gray</b>	70....	75....	72....	73....	77....
<b>Brown</b>	80....	85....	82....	83....	87....
<b>Black</b>	90....	–	92....	93....	–

## Processing

### Pre-treatment/drying

Makrolon® must be dried prior to processing. For injection molding, no more than 0.02 % residual moisture may be present in the granules and, for extrusion, no more than 0.01 %. Moisture in the melt leads to surface defects and an increased reduction in molecular weight. Makrolon® should be dried in suitable driers at 120 °C.

Please refer to our ISO data sheets for any exceptions.

The drying time for moist granules is largely a function of the nature and type of the drying unit and can total 2 to 12 hours depending on the drying capacity. Drying times of 2 to 4 hours are sufficient in modern high-speed driers.

One means of dispensing with pre-drying is for the moisture to be removed during melting with the aid of a degassing unit, as has been standard practice in extrusion for a long time.

Please consider that some of our special grades, particularly grades containing flame retardants, show significantly lower dimensional stability under heat.

Therefore, these grades require lower drying and processing temperatures as indicated in the corresponding ISO datasheets.

## Injection molding

Makrolon® can be processed on all modern injection molding machines. Shut-off nozzles are suitable given sufficient, uniform heating. At high melt temperatures, melt can flow out of open nozzles.

The melt temperatures generally employed during processing are between 280 and 320 °C.

It should be possible for the molds to be heated intensively and uniformly, and the mold temperature should be at least 80 °C to ensure parts with a low inherent stress and a good surface. No demolding difficulties are encountered at up to 120 °C. It will not generally be necessary to employ mold release agents when Makrolon® grades with easy mold release are used.

Please consider that some of our special grades, particularly grades containing flame retardants, show significantly lower dimensional stability under heat. Therefore, these grades require lower drying and processing temperatures as indicated in the corresponding ISO datasheets.

Under the recommended processing conditions small quantities of decomposition product may be given off during processing. To preclude any risk to the health and well-being of the machine operatives, tolerance limits for the work environment must be ensured by the provision of efficient exhaust ventilation and fresh air at the workplace in accordance with the Safety Data Sheet.

In order to prevent the partial decomposition of the polymer and the generation of volatile decomposition products, the prescribed processing temperatures should not be substantially exceeded.

## Extrusion

The high-viscosity and high-viscosity/branched Makrolon® grades (Grades for Extrusion) are particularly suitable for processing by extrusion. Use is made solely of single-screw extruders.

With regard to temperature control, a barrel temperature profile that decreases from 280 °C at the hopper to 250 °C at the die, for instance, has proved successful. The downstream equipment, right through to the die, is best aligned to the temperature of the final barrel section. The melt temperature on output from the die should be 240 °C to 300 °C as a function of the processing method. The extruder should be run until it is empty in the event of interruptions to production. It is recommended that all components in contact with the molten polycarbonate (extruder barrel, screen changer, melt pump, adapter, die) be kept at a temperature of 160 °C to 170 °C.

Details about the properties and the processing of our Makrolon® grades can be found in our Technical Information Sheets.

The Technical Information Sheets can be found in the Internet at <http://plastics.covestro.com>



## ■ General Purpose Grades

### ■ Low viscosity

<b>2205</b>	MVR (300 °C/1.2 kg) 34 cm <sup>3</sup> /10 min; general purpose; low viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors	<b>2405</b>	MVR (300 °C/1.2 kg) 19 cm <sup>3</sup> /10 min; general purpose; low viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors
<b>2207</b>	MVR (300 °C/1.2 kg) 35 cm <sup>3</sup> /10 min; general purpose; low viscosity; UV-stabilized; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors	<b>2407</b>	MVR (300 °C/1.2 kg) 19 cm <sup>3</sup> /10 min; general purpose; low viscosity; UV-stabilized; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors

### ■ Medium viscosity

<b>2605</b>	MVR (300 °C/1.2 kg) 12 cm <sup>3</sup> /10 min; general purpose; medium viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors	<b>2805</b>	MVR (300 °C/1.2 kg) 9.0 cm <sup>3</sup> /10 min; general purpose; medium viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors
<b>2607</b>	MVR (300 °C/1.2 kg) 12 cm <sup>3</sup> /10 min; general purpose; medium viscosity; UV-stabilized; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors	<b>2807</b>	MVR (300 °C/1.2 kg) 9.0 cm <sup>3</sup> /10 min; general purpose; medium viscosity; UV-stabilized; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors

### ■ High viscosity

<b>3105</b>	MVR (300 °C/1.2 kg) 6.0 cm <sup>3</sup> /10 min; general purpose; high viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors	<b>3107</b>	MVR (300 °C/1.2 kg) 6.0 cm <sup>3</sup> /10 min; general purpose; high viscosity; UV-stabilized; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors
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## ■ Food Contact Grades

### ■ Low viscosity

<b>2256</b>	MVR (300 °C/1.2 kg) 34 cm <sup>3</sup> /10 min; food contact quality; low viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors	<b>2456</b>	MVR (300 °C/1.2 kg) 19 cm <sup>3</sup> /10 min; food contact quality; low viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors
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■ **Medium viscosity**

<b>2656</b>	MVR (300 °C/1.2 kg) 12 cm <sup>3</sup> /10 min; food contact quality; medium viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors	<b>1248</b>	MVR (300 °C/1.2 kg) 7.0 cm <sup>3</sup> /10 min; food contact quality; medium viscosity; impact modified; injection molding – melt temperature 280 – 320 °C; available in light colors only
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<b>2856</b>	MVR (300 °C/1.2 kg) 9.0 cm <sup>3</sup> /10 min; food contact quality; medium viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors
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■ **High viscosity**

<b>3156</b>	MVR (300 °C/1.2 kg) 6.0 cm <sup>3</sup> /10 min; food contact quality; high viscosity; easy release; injection molding – melt temperature 280 – 320 °C; extrusion; available in transparent, translucent and opaque colors
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■ **Impact Modified Grades**

■ **Low viscosity**

<b>1260</b>	MVR (300 °C/1.2 kg) 34 cm <sup>3</sup> /10 min; impact modified; low viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in light colors only
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■ **Medium viscosity**

<b>1837</b>	MVR (300 °C/1.2 kg) 11 cm <sup>3</sup> /10 min; impact modified; medium viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in opaque colors only	<b>1248</b>	MVR (300 °C/1.2 kg) 7.0 cm <sup>3</sup> /10 min; food contact quality; medium viscosity; impact modified; injection molding – melt temperature 280 – 320 °C
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■ **Flame Retardant Grades**

■ **Low viscosity**

<b>2467</b>	MVR (300 °C/1.2 kg) 19 cm <sup>3</sup> /10 min; flame retardant; UL 94V-2/1.5 mm and 3.0 mm; low viscosity; UV-stabilized; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors	<b>6165X</b>	MVR (300 °C/1.2 kg) 28 cm <sup>3</sup> /10 min; flame retardant; UL 94V-0/1.2 mm; low viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in opaque colors only; LCD TV frame
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<b>6265X</b>	MVR (300 °C/1.2 kg) 19 cm <sup>3</sup> /10 min; flame retardant; UL 94V-0/1.5 mm; low viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in opaque colors only	<b>6267X</b>	MVR (300 °C/1.2 kg) 19 cm <sup>3</sup> /10 min; flame retardant; UL 94V-0/1.5 mm; low viscosity; UV-stabilized; easy release; injection molding – melt temperature 280 – 320 °C; available in opaque colors only
<b>■ Medium viscosity</b>			
<b>2665</b>	MVR (300 °C/1.2 kg) 12 cm <sup>3</sup> /10 min; flame retardant; UL 94V-2/1.5 mm and 3.0 mm; medium viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors	<b>6485</b>	MVR (300 °C/1.2 kg) 9.0 cm <sup>3</sup> /10 min; flame retardant; UL 94V-0/1.5 mm and 5VA/3.0 mm; medium viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in opaque colors only
<b>2667</b>	MVR (300 °C/1.2 kg) 12 cm <sup>3</sup> /10 min; flame retardant; UL 94V-2/1.5 mm and 3.0 mm; medium viscosity; UV-stabilized; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors	<b>6487</b>	MVR (300 °C/1.2 kg) 9.0 cm <sup>3</sup> /10 min; flame retardant; UL 94V-0/1.5 mm and 5VA/3.0 mm; medium viscosity; UV-stabilized; easy release; injection molding – melt temperature 280 – 320 °C; available in opaque colors only
<b>2865</b>	MVR (300 °C/1.2 kg) 10 cm <sup>3</sup> /10 min; flame retardant; UL 94V-2/1.5 mm and 3.0 mm; medium viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors	<b>6555</b>	MVR (300 °C/1.2 kg) 10 cm <sup>3</sup> /10 min; flame retardant; UL 94V-0/3.0 mm; medium viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors
<b>6455</b>	MVR (300 °C/1.2 kg) 12 cm <sup>3</sup> /10 min; flame retardant; UL 94V-0/3.0 mm; medium viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors	<b>6557</b>	MVR (300 °C/1.2 kg) 10 cm <sup>3</sup> /10 min; flame retardant; UL 94V-0/3.0 mm; medium viscosity; UV-stabilized; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent, translucent and opaque colors
<b>6457</b>	MVR (300 °C/1.2 kg) 12 cm <sup>3</sup> /10 min; flame retardant; UL 94V-0/3.0 mm; medium viscosity; UV-stabilized; easy release; injection molding – melt temperature 280–320 °C; available in transparent and opaque colors		
<b>■ High viscosity, branched</b>			
<b>6717</b>	MVR (300 °C/1.2 kg) 3.0 cm <sup>3</sup> /10 min; flame retardant; UL 94V-0/2.0 mm; high viscosity; branched; UV-stabilized; easy release; injection molding – melt temperature 280–320 °C; extrusion; available in transparent, translucent and opaque colors		

## ■ Glass Fiber Reinforced (Milled Fiber) Grades

### ■ 20 % glass fiber reinforced

**8025** MVR (300 °C/1.2 kg) 6.0 cm<sup>3</sup>/10 min; 20 % glass fiber reinforced; milled fiber; high viscosity; easy release; injection molding – melt temperature 310 – 330 °C; extrusion; available in opaque colors only; precision parts

### ■ 30 % glass fiber reinforced

**8035** MVR (300 °C/1.2 kg) 4.0 cm<sup>3</sup>/10 min; 30 % glass fiber reinforced; milled fiber; high viscosity; easy release; injection molding – melt temperature 310 – 330 °C; extrusion; available in opaque colors only; precision parts

## ■ Glass Fiber Reinforced (Normal Fiber) Grades

### ■ 10 % glass fiber reinforced

**9415** MVR (300 °C/1.2 kg) 6.0 cm<sup>3</sup>/10 min; 10 % glass fiber reinforced; flame retardant; UL 94V-0/1.5 mm and 5VA/3.0 mm; high viscosity; easy release; injection molding – melt temperature 310 – 330 °C; available in opaque colors only

**9417** MVR (300 °C/1.2 kg) 6.0 cm<sup>3</sup>/10 min; 10 % glass fiber reinforced; flame retardant; UL 94V-0/1.5 mm and 5VA/3.0 mm; high viscosity; UV-stabilized; easy release; injection molding – melt temperature 310 – 330 °C; available in opaque colors only

**GF9002** MVR (300 °C/1.2 kg) 15 cm<sup>3</sup>/10 min; 10 % glass fiber reinforced; flame retardant UL 94V-0/1.2 mm; low viscosity; easy release; injection molding – melt temperature 310 – 330 °C; available in opaque colors only; electrical/electronic; housing parts with low wall thickness

### ■ 20 % glass fiber reinforced

**GF8001** MVR (300 °C/1.2 kg) 16 cm<sup>3</sup>/10 min; 20 % glass fiber reinforced; low viscosity; easy release; injection molding – melt temperature 310 – 330 °C; available in opaque colors only; housing parts

**9125** MVR (300 °C/1.2 kg) 8.0 cm<sup>3</sup>/10 min; 20 % glass fiber reinforced; flame retardant; UL 94V-0/1.5 mm; medium viscosity; easy release; injection molding – melt temperature 310 – 330 °C; available in opaque colors only

**8325** MVR (300 °C/1.2 kg) 4.0 cm<sup>3</sup>/10 min; 20 % glass fiber reinforced; high viscosity; easy release; injection molding – melt temperature 310 – 330 °C; extrusion; available in opaque colors only

**9425** MVR (300 °C/1.2 kg) 5.0 cm<sup>3</sup>/10 min; 20 % glass fiber reinforced; flame retardant; UL 94V-0/1.5 mm and 5VA/3.0 mm; high viscosity; easy release; injection molding – melt temperature 310 – 330 °C; extrusion; available in opaque colors only

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■ **35 % glass fiber reinforced**

**8345** MVR (300 °C/1.2 kg) 3.0 cm<sup>3</sup>/10 min; 35 % glass fiber reinforced; high viscosity; easy release; injection molding – melt temperature 310 – 330 °C; extrusion; available in opaque colors only

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■ **Grades for Special Applications**

■ **Optical storage media**

**OD2015** MVR (250 °C/2.16 kg) 17 cm<sup>3</sup>/10 min; optical storage media; suitable for all formats; high purity; injection molding – melt temperature 300 – 350 °C; available in color code 000000 only

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■ **Light guides**

**LED2045** MVR (250 °C/2.16 kg) 17 cm<sup>3</sup>/10 min; light guides; PC with highest transmission; low viscosity; easy release; injection molding – melt temperature 260 – 300 °C; available in transparent colors only

**LED2643** MVR (300 °C/1.2 kg) 13 cm<sup>3</sup>/10 min; light guides; PC with highest transmission; medium viscosity; UV-stabilized; injection molding – melt temperature 280 – 320 °C; available in transparent colors only

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**LED2245** MVR (300 °C/1.2 kg) 34 cm<sup>3</sup>/10 min; light guides; PC with highest transmission; low viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent colors only

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■ **Optical lenses**

**LQ2647** MVR (300 °C/1.2 kg) 12 cm<sup>3</sup>/10 min; optical lens; medium viscosity; UV-stabilized; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent tints only; safety glasses

**LQ3187** MVR (300 °C/1.2 kg) 6.0 cm<sup>3</sup>/10 min; optical lens; high viscosity; UV stabilized; UV 400 cut off; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent tints only; safety glasses; sun glasses

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■ **Lighting**

**LTG2623** MVR (300 °C/1.2 kg) 13 cm<sup>3</sup>/10 min; lighting; High Intensity Discharge (HID) lenses; medium viscosity; UV-stabilized; injection molding – melt temperature 280 – 320 °C; available in transparent colors only

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■ **Automotive lighting**

**AL2447** MVR (300 °C/1.2 kg) 19 cm<sup>3</sup>/10 min; automotive lighting; low viscosity; UV-stabilized; easy release; injection molding – melt temperature 280 – 320 °C; available in clear transparent colors and in various signal colors; headlamp lenses for automotive forward lighting

**AL2647** MVR (300 °C/1.2 kg) 12 cm<sup>3</sup>/10 min; automotive lighting; medium viscosity; UV-stabilized; easy release; injection molding – melt temperature 280 – 320 °C; available in clear transparent colors and in various signal colors; headlamp lenses for automotive forward lighting

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■ **Automotive glazing**

**AG2677** MVR (300 °C/1.2 kg) 12 cm<sup>3</sup>/10 min; medium viscosity; UV-stabilized; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent colors only; automotive glazing; roof modules

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■ **Blow molding**

**WB1239** MVR (300 °C/1.2 kg) 2.0 cm<sup>3</sup>/10 min; blow molding; high viscosity; branched; food contact quality; extrusion blow molding; injection stretch blow molding; available in transparent colors only; water bottles

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■ **Extrusion**

<b>ET2613</b>	MVR (300 °C/1.2 kg) 12 cm <sup>3</sup> /10 min; extrusion; medium viscosity; UV-stabilized; available in transparent colors only; solid sheet	<b>ET UV120</b>	PC/UV absorber concentrate; high viscosity; easy release; special grade for the coextrusion of Makrolon® ET base resins; available in transparent colors only; solid sheet; multi wall sheet/profiles
<b>ET3113</b>	MVR (300 °C/1.2 kg) 6.0 cm <sup>3</sup> /10 min; extrusion; high viscosity; UV-stabilized; available in transparent colors only; solid sheet; corrugated sheet	<b>ET UV130</b>	PC/UV absorber concentrate; high viscosity; easy release; special grade for the coextrusion of Makrolon® ET base resins; available in transparent colors only; solid sheet; multi wall sheet/profiles
<b>ET3117</b>	MVR (300 °C/1.2 kg) 6.0 cm <sup>3</sup> /10 min; extrusion; high viscosity; UV-stabilized; easy release; available in transparent colors only; multi wall sheet/profiles; corrugated sheet	<b>ET UV510</b>	PC/UV absorber concentrate; high viscosity; easy release; very low plate-out; special grade for the coextrusion of Makrolon® ET base resins; available in transparent colors only; solid sheet; multi wall sheet/profiles
<b>ET3137</b>	MVR (300 °C/1.2 kg) 6.0 cm <sup>3</sup> /10 min; extrusion; high viscosity; branched; UV-stabilized; easy release; available in transparent colors only; multi wall sheet/profiles	<b>ET UV530</b>	PC/UV absorber concentrate; high viscosity; easy release; very low plate-out; special grade for the coextrusion of Makrolon® ET base resins; available in transparent colors only; solid sheet; multi wall sheet/profiles
<b>ET3227</b>	MVR (300 °C/1.2 kg) 3.0 cm <sup>3</sup> /10 min; extrusion; high viscosity; branched; UV-stabilized; easy release; multi wall sheet/profiles	<b>ET UV540</b>	PC/UV absorber concentrate; high viscosity; easy release; very low plate-out; special grade for the coextrusion of Makrolon ET base resins; available in transparent colors only; solid sheet; multi wall sheet/profiles
<b>ET UV110</b>	PC/UV absorber concentrate; high viscosity; easy release; special grade for the coextrusion of Makrolon® ET base resins; available in transparent colors only; solid sheet; multi wall sheet/profiles		

■ **Structural foam**

<b>SF800</b>	MVR (300 °C/1.2 kg) 5.0 cm <sup>3</sup> /10 min; structural foam; 5 % glass fiber reinforced; flame retardant; high viscosity; easy release; in combination with an appropriate blowing agent for the production of structural foam moldings	<b>SF810</b>	MVR (300 °C/1.2 kg) 6.0 cm <sup>3</sup> /10 min; structural foam; glass fiber reinforced; flame retardant; easy release; injection molding; in combination with an appropriate blowing agent for the production of structural foam moldings
<b>SF805</b>	MVR (300 °C/1.2 kg) 7.0 cm <sup>3</sup> /10 min; structural foam; 5 % glass fiber reinforced; flame retardant; high viscosity; easy release; injection molding; available in natural (opaque) and opaque colors; in combination with an appropriate blowing agent for the production of structural foam moldings		

■ Medical devices*			
<b>2258</b>	MVR (300 °C/1.2 kg) 34 cm <sup>3</sup> /10 min; medical devices; suitable for ETO and steam sterilization at 121 °C; biocompatible according to many ISO 10993-1 test requirements; low viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent and opaque colors	<b>Rx2430</b>	MVR (300 °C/1.2 kg) 19 cm <sup>3</sup> /10 min; medical devices; suitable for sterilization with high-energy radiation; biocompatible according to many ISO 10993-1 test requirements; low viscosity; injection molding – melt temperature 280 – 320 °C; transparent parts for medical devices
<b>2458</b>	MVR (300 °C/1.2 kg) 19 cm <sup>3</sup> /10 min; medical devices; suitable for ETO and steam sterilization at 121 °C; biocompatible according to many ISO 10993-1 test requirements; low viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent and opaque colors	<b>Rx2435</b>	MVR (300 °C/1.2 kg) 23 cm <sup>3</sup> /10 min; medical devices; suitable for sterilization with high-energy radiation; biocompatible according to many ISO 10993-1 test requirements; low viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in color code 451118 only; transparent parts for medical devices
<b>2558</b>	MVR (300 °C/1.2 kg) 14 cm <sup>3</sup> /10 min; medical devices; suitable for ETO and steam sterilization at 121 °C; biocompatible according to many ISO 10993-1 test requirements; medium viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent and opaque colors	<b>Rx2530</b>	MVR (300 °C/1.2 kg) 15 cm <sup>3</sup> /10 min; medical devices; suitable for sterilization with high-energy radiation; biocompatible according to many ISO 10993-1 test requirements; medium viscosity; injection molding – melt temperature 280 – 320 °C; transparent parts for medical devices
<b>2658</b>	MVR (300 °C/1.2 kg) 12 cm <sup>3</sup> /10 min; medical devices; suitable for ETO and steam sterilization at 121 °C; biocompatible according to many ISO 10993-1 test requirements; medium viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent and opaque colors	<b>Rx2635</b>	MVR (300 °C/1.2 kg) 12 cm <sup>3</sup> /10 min; medical devices; suitable for sterilization with high-energy radiation; biocompatible according to many ISO 10993-1 test requirements; medium viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in color code 451118 only; transparent parts for medical devices
<b>2858</b>	MVR (300 °C/1.2 kg) 9.0 cm <sup>3</sup> /10 min; medical devices; suitable for ETO and steam sterilization at 121 °C; biocompatible according to many ISO 10993-1 test requirements; medium viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent and opaque colors	<b>Rx1805</b>	MVR (300 °C/1.2 kg) 6.0 cm <sup>3</sup> /10 min; medical devices; high lipid resistance; suitable for sterilization with high-energy radiation; biocompatible according to many ISO 10993-1 test requirements; high viscosity; injection molding – melt temperature 280 – 320 °C; transparent parts for medical devices
<b>3258</b>	MVR (300 °C/1.2 kg) 5.0 cm <sup>3</sup> /10 min; medical devices; suitable for ETO and steam sterilization at 121 °C; biocompatible according to many ISO 10993-1 test requirements; high viscosity; easy release; injection molding – melt temperature 280 – 320 °C; available in transparent and opaque colors		





# Makrolon® – typical values

## General purpose grades

### Low viscosity

Typical Properties	Test Conditions	Units	Standards	2205	2207	2405	2407
<b>Rheological properties</b>							
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	34	34	19	19
<b>Mechanical properties (23 °C / 50 % r. h.)</b>							
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	2400	2400	2400	2400
C Yield stress	50 mm/min	MPa	ISO 527-1, -2	65	65	65	66
C Yield strain	50 mm/min	%	ISO 527-1, -2	6.0	6.0	6.0	6.0
C Nominal strain at break	50 mm/min	%	ISO 527-1, -2	> 50	> 50	> 50	> 50
C Stress at break	50 mm/min	MPa	ISO 527-1, -2	60	60	65	65
C Strain at break	50 mm/min	%	ISO 527-1, -2	120	120	125	130
C Tensile creep modulus	1 h	MPa	ISO 899-1	2100	2100	2200	2200
C Tensile creep modulus	1000 h	MPa	ISO 899-1	1700	1700	1900	1900
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	N	N	N	N
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	55P(C)	55P(C)	65P	65P(C)
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	12C	12C	14C	14C
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	55P	55P	65P	65P
C Puncture maximum force	23 °C	N	ISO 6603-2	4900	4900	5100	5100
C Puncture energy	23 °C	J	ISO 6603-2	55	55	55	55
<b>Thermal properties</b>							
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	145	144	144	143
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	124	123	124	124
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	137	136	137	136
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	145	143	145	143
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	V-2 <sup>1)</sup> (0.75)	V-2 <sup>1)</sup> (0.75)	V-2 (0.75)	V-2 (0.75)
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	HB <sup>1)</sup> (2.9)	HB <sup>1)</sup> (2.9)	HB <sup>1)</sup> (2.7)	HB (2.7)
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	–	–	–	–
C Oxygen index	Method A	%	ISO 4589-2	28	28	27	27
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	850	850	850	850
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	875	875	875	875
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	930	930	930	930
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	875	875	875	875
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	875	875	875	875
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	875	875	875	875
<b>Electrical properties (23 °C / 50 % r. h.)</b>							
C Relative permittivity	100 Hz	–	IEC 60250	3.1	3.1	3.1	3.1
C Relative permittivity	1 MHz	–	IEC 60250	3.0	3.0	3.0	3.0
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	5	5	5	5
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	90	90	90	90
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	1E14	1E14
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	1E16	1E16
C Electrical strength	1 mm	kV/mm	IEC 60243-1	34	34	34	34
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	250	250	250	250
<b>Other properties (23 °C)</b>							
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.30	0.30	0.30	0.30
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.12	0.12	0.12	0.12
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1190	1190	1200	1200
<b>Material specific properties</b>							
Refractive index	Procedure A	–	ISO 489	1.586	1.586	1.585	1.584
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	89	89	89	89
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	89	89	89	89
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	88	88	88	88
<b>Processing conditions for test specimens</b>							
C Injection molding – Melt temperature	–	°C	ISO 294	280	280	280	280
C Injection molding – Mold temperature	–	°C	ISO 294	80	80	80	80
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties:  
N = non break  
P = partial break  
C = complete break

<sup>1)</sup> clear



				General purpose grades					
				Medium viscosity				High viscosity	
Typical Properties	Test Conditions	Units	Standards	2605	2607	2805	2807	3105	3107
<b>Rheological properties</b>									
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	12	12	9	9	6	6
<b>Mechanical properties (23 °C / 50 % r. h.)</b>									
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	2400	2400	2400	2400	2400	2400
C Yield stress	50 mm/min	MPa	ISO 527-1, -2	66	66	66	66	66	66
C Yield strain	50 mm/min	%	ISO 527-1, -2	6.1	6.1	6.2	6.1	6.2	6.1
C Nominal strain at break	50 mm/min	%	ISO 527-1, -2	> 50	> 50	> 50	> 50	> 50	> 50
C Stress at break	50 mm/min	MPa	ISO 527-1, -2	70	70	70	70	70	70
C Strain at break	50 mm/min	%	ISO 527-1, -2	130	130	130	130	125	120
C Tensile creep modulus	1 h	MPa	ISO 899-1	2200	2200	2200	2200	2200	2200
C Tensile creep modulus	1000 h	MPa	ISO 899-1	1900	1900	1900	1900	1900	1900
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	N	N	N	N	N	N
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	70P	70P	75P	75P	80P	80P
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	16C	14C	16C	14C	16C	14C
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	70P	70P	70P	70P	70P	70P
C Puncture maximum force	23 °C	N	ISO 6603-2	5400	5400	5400	5400	5600	5600
C Puncture energy	23 °C	J	ISO 6603-2	60	60	60	60	60	60
<b>Thermal properties</b>									
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	144	143	145	144	146	145
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	125	123	125	124	126	125
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	136	135	137	136	138	137
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	144	143	144	143	145	144
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.65	0.65
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.65	0.65
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	V-2 (0.75)	V-2 (0.75)	V-2 (0.75)	V-2 (0.75)	HB (1.5)	HB (1.5)
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	HB (2.5)	HB (2.5)	HB (2.5)	HB (2.5)	V-2 (0.75)	V-2 (0.75)
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	–	–	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	–	–	–	–	–	–
C Oxygen index	Method A	%	ISO 4589-2	28	28	28	28	27	27
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	850	850	850	850	875	875
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	850	850	875	875	875	875
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	930	930	960	960	960	960
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	875	875	875	875	875	875
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	875	875	875	875	875	875
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	875	875	900	875	900	900
<b>Electrical properties (23 °C / 50 % r. h.)</b>									
C Relative permittivity	100 Hz	–	IEC 60250	3.1	3.1	3.1	3.1	3.1	3.1
C Relative permittivity	1 MHz	–	IEC 60250	3.0	3.0	3.0	3.0	3.0	3.0
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	5	5	5	5	5	5
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	90	90	90	90	95	95
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	1E14	1E14	1E14	1E14
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	1E16	1E16	1E16	1E16
C Electrical strength	1 mm	kV/mm	IEC 60243-1	34	34	34	34	34	34
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	250	250	250	250	250	250
<b>Other properties (23 °C)</b>									
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.30	0.30	0.30	0.30	0.30	0.30
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.12	0.12	0.12	0.12	0.12	0.12
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1200	1200	1200	1200	1200	1200
<b>Material specific properties</b>									
Refractive index	Procedure A	–	ISO 489	1.586	1.586	1.586	1.586	1.586	1.586
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	89	89	89	89	89	89
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	89	89	89	89	89	89
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	88	88	88	88	88	88
<b>Processing conditions for test specimens</b>									
C Injection molding – Melt temperature	–	°C	ISO 294	290	290	300	300	300	300
C Injection molding – Mold temperature	–	°C	ISO 294	80	80	80	80	80	80
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties:  
N = non break  
P = partial break  
C = complete break

				Food contact grades					
				Low viscosity		Medium viscosity			High viscosity
Typical Properties	Test Conditions	Units	Standards	2256	2456	2656	2856	1248	3156
<b>Rheological properties</b>									
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	34	19	12	9	7	6
<b>Mechanical properties (23 °C / 50 % r. h.)</b>									
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	2400	2400	2400	2350	2250	2400
C Yield stress	50 mm/min	MPa	ISO 527-1, -2	65	65	66	65	61	66
C Yield strain	50 mm/min	%	ISO 527-1, -2	6.0	6.2	6.1	6.2	6.0	6.2
C Nominal strain at break	50 mm/min	%	ISO 527-1, -2	> 50	> 50	> 50	> 50	> 50	> 50
C Stress at break	50 mm/min	MPa	ISO 527-1, -2	60	70	70	70	70	70
C Strain at break	50 mm/min	%	ISO 527-1, -2	125	130	130	130	130	130
C Tensile creep modulus	1 h	MPa	ISO 899-1	2200	2200	2200	2200	–	2200
C Tensile creep modulus	1000 h	MPa	ISO 899-1	1900	1900	1900	1900	–	1900
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	N	N	N	N	N	N
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	55P(C)	65P	70P	75P	70P	80P
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	12C	14C	16C	16C	60P(C)	16C
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	55P	65P	65PP	70P	65P	70P
C Puncture maximum force	23 °C	N	ISO 6603-2	4900	5100	5400	5400	5200	5600
C Puncture energy	23 °C	J	ISO 6603-2	55	55	60	60	55	60
<b>Thermal properties</b>									
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	145	146	145	145	147	146
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	124	125	124	125	125	126
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	137	138	137	137	139	138
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	145	145	143	145	146	147
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.7	0.65
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.7	0.65
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	–	V-2 (0.75)	V-2 (0.75)	V-2 (0.75)	HB (1.5)	–
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	–	HB (2.7)	HB (2.5)	HB (2.5)	–	–
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–	–
C Oxygen index	Method A	%	ISO 4589-2	28	28	28	28	30	27
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	850	850	850	850	850	850
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	875	875	850	875	850	850
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	930	930	960	930	900	930
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	875	875	875	875	800	875
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	875	875	875	875	875	875
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	875	875	875	875	875	900
<b>Electrical properties (23 °C / 50 % r. h.)</b>									
C Relative permittivity	100 Hz	–	IEC 60250	3.1	3.1	3.1	3.1	3.1	3.1
C Relative permittivity	1 MHz	–	IEC 60250	3.0	3.0	3.0	3.0	3.0	3.0
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	5	5	5	5	12	5
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	90	90	95	90	120	95
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	1E14	1E14	1E14	1E14
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	1E16	1E16	1E16	1E16
C Electrical strength	1 mm	kV/mm	IEC 60243-1	34	34	34	34	34	34
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	250	250	250	250	225	250
<b>Other properties (23 °C)</b>									
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.30	0.30	0.30	0.30	0.40	0.30
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.12	0.12	0.12	0.12	0.12	0.12
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1190	1200	1200	1200	1200	1200
<b>Material specific properties</b>									
Refractive index	Procedure A	–	ISO 489	1.586	1.586	1.586	1.586	1.586	1.586
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	89	89	89	89	89	89
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	89	89	89	89	89	89
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	88	88	88	88	88	88
<b>Processing conditions for test specimens</b>									
C Injection molding – Melt temperature	–	°C	ISO 294	280	280	290	300	300	300
C Injection molding – Mold temperature	–	°C	ISO 294	80	80	80	80	80	80
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties:  
N = non break  
P = partial break  
C = complete break

Typical Properties	Test Conditions	Units	Standards	Impact modified grades		
				Low viscosity	Medium viscosity	
				1260	1837	1248
<b>Rheological properties</b>						
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	33	11	7
<b>Mechanical properties (23 °C / 50 % r. h.)</b>						
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	2350	2200	2250
C Yield stress	50 mm/min	MPa	ISO 527-1, -2	63	58	61
C Yield strain	50 mm/min	%	ISO 527-1, -2	5.8	5.7	6.0
C Nominal strain at break	50 mm/min	%	ISO 527-1, -2	> 50	> 50	> 50
C Stress at break	50 mm/min	MPa	ISO 527-1, -2	55	60	70
C Strain at break	50 mm/min	%	ISO 527-1, -2	100	120	130
C Tensile creep modulus	1 h	MPa	ISO 899-1	–	–	–
C Tensile creep modulus	1000 h	MPa	ISO 899-1	–	–	–
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	N	N	N
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	55P	60P	70P
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	14C	50P	60P(C)
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	50P	60P	65P
C Puncture maximum force	23 °C	N	ISO 6603-2	4800	4900	5200
C Puncture energy	23 °C	J	ISO 6603-2	50	50	55
<b>Thermal properties</b>						
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	142	143	147
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	122	121	125
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	135	134	139
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	142	141	146
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.7	0.7	0.7
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.7	0.7	0.7
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	–	–	–
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	V-2 (0.75)	HB (0.75)	HB (1.5)
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	–	–	–
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	–	–	–
C Oxygen index	Method A	%	ISO 4589-2	30	30	30
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	875	850	850
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	900	875	850
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	960	900	900
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	875	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	875	–	850
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	900	–	850
<b>Electrical properties (23 °C / 50 % r. h.)</b>						
C Relative permittivity	100 Hz	–	IEC 60250	3.1	3.2	3.2
C Relative permittivity	1 MHz	–	IEC 60250	3.0	3.1	3.1
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	10	14	12
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	100	125	120
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	1E14
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	1E16
C Electrical strength	1 mm	kV/mm	IEC 60243-1	34	34	34
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	250	225	225
<b>Other properties (23 °C)</b>						
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.30	0.40	0.40
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.12	0.12	0.12
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1200	1190	1200
<b>Material specific properties</b>						
Refractive index	Procedure A	–	ISO 489	–	–	–
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	–	–	–
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	–	–	–
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	–	–	–
<b>Processing conditions for test specimens</b>						
C Injection molding – Melt temperature	–	°C	ISO 294	280	290	300
C Injection molding – Mold temperature	–	°C	ISO 294	80	80	80
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties:  
N = non break  
P = partial break  
C = complete break

**Flame retardant grades**
**Low viscosity**

Typical Properties	Test Conditions	Units	Standards	Flame retardant grades			
				6165 X	2467	6265 X	6267 X
<b>Rheological properties</b>							
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	28	19	19	19
<b>Mechanical properties (23 °C / 50 % r. h.)</b>							
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	2350	2400	2400	2450
C Yield stress	50 mm/min	MPa	ISO 527-1, -2	65	66	65	67
C Yield strain	50 mm/min	%	ISO 527-1, -2	6.0	6.0	6.0	6.0
C Nominal strain at break	50 mm/min	%	ISO 527-1, -2	> 50	> 50	> 50	> 50
C Stress at break	50 mm/min	MPa	ISO 527-1, -2	55	70	65	65
C Strain at break	50 mm/min	%	ISO 527-1, -2	120	130	120	120
C Tensile creep modulus	1 h	MPa	ISO 899-1	–	–	2200	–
C Tensile creep modulus	1000 h	MPa	ISO 899-1	–	–	1900	–
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	N	N	N	N
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	15C	65P(C)	65P(C)	12C(P)
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	12C	14C	12C	12C
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	15P(C)	60P	15P(C)	15P(C)
C Puncture maximum force	23 °C	N	ISO 6603-2	4800	5100	5000	5000
C Puncture energy	23 °C	J	ISO 6603-2	45	55	50	50
<b>Thermal properties</b>							
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	–	144	144	–
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	124	124	124	122
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	136	138	137	134
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	143	144	145	144
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	–	V-2 (0.75)	–	–
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	V-0 (1.2)	V-0 (6.4)	V-0 (1.5)	V-0 (1.5)
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	–	–	–	–
C Oxygen index	Method A	%	ISO 4589-2	35	30	36	36
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	–	–	960	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	960	–	960	960
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	960	–	960	960
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	–	–	875	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	–	–	900	–
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	–	–	900	–
<b>Electrical properties (23 °C / 50 % r. h.)</b>							
C Relative permittivity	100 Hz	–	IEC 60250	3.1	3.1	3.1	3.1
C Relative permittivity	1 MHz	–	IEC 60250	3.0	3.0	3.0	3.0
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	–	5	8	8
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	–	90	90	90
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	1E14	1E14
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	1E16	1E16
C Electrical strength	1 mm	kV/mm	IEC 60243-1	34	34	34	34
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	225	225	225	225
<b>Other properties (23 °C)</b>							
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.30	0.30	0.30	0.30
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.12	0.12	0.12	0.12
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1200	1200	1200	1200
<b>Material specific properties</b>							
Refractive index	Procedure A	–	ISO 489	–	1.586	–	–
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	–	89	–	–
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	–	89	–	–
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	–	88	–	–
<b>Processing conditions for test specimens</b>							
C Injection molding – Melt temperature	–	°C	ISO 294	280	280	280	280
C Injection molding – Mold temperature	–	°C	ISO 294	80	80	80	80
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties:  
N = non break  
P = partial break  
C = complete break

**Flame retardant grades**
**Medium viscosity**

Typical Properties	Test Conditions	Units	Standards	Flame retardant grades				
				2665	2667	2865	6455	6457
<b>Rheological properties</b>								
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	12	12	10	12	12
<b>Mechanical properties (23 °C / 50 % r. h.)</b>								
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	2400	2400	2400	2400	2450
C Yield stress	50 mm/min	MPa	ISO 527-1, -2	66	67	66	66	67
C Yield strain	50 mm/min	%	ISO 527-1, -2	6.1	6.1	6.2	6.1	6.1
C Nominal strain at break	50 mm/min	%	ISO 527-1, -2	> 50	> 50	> 50	> 50	> 50
C Stress at break	50 mm/min	MPa	ISO 527-1, -2	70	70	–	65	65
C Strain at break	50 mm/min	%	ISO 527-1, -2	130	130	–	115	115
C Tensile creep modulus	1 h	MPa	ISO 899-1	2200	2200	2200	–	–
C Tensile creep modulus	1000 h	MPa	ISO 899-1	1900	1900	1900	–	–
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	N	N	N	N	N
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	70P	70P	75P	70P	70P(C)
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	16C	14C	16C	14C	14C
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	65P	65P	65P	65P	65P
C Puncture maximum force	23 °C	N	ISO 6603-2	5400	5400	5400	5400	5400
C Puncture energy	23 °C	J	ISO 6603-2	60	60	60	60	60
<b>Thermal properties</b>								
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	144	144	146	145	144
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	124	123	125	125	123
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	136	135	137	136	135
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	143	143	145	143	142
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.65
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.65
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	V-2 (0.75)	V-2 (0.75)	V-2 (0.75)	V-2 (1.5)	V-2 (1.5)
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	V-0 (6.0)	V-0 (6.0)	V-0 (6.0)	V-0 (3.0)	V-0 (3.0)
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–
C Oxygen index	Method A	%	ISO 4589-2	30	34	32	35	35
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	850	850	850	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	900	900	850	960	960
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	960	960	960	960	960
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	875	875	875	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	875	875	900	960	960
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	875	875	900	960	960
<b>Electrical properties (23 °C / 50 % r. h.)</b>								
C Relative permittivity	100 Hz	–	IEC 60250	3.1	3.1	3.1	3.1	3.1
C Relative permittivity	1 MHz	–	IEC 60250	3.0	3.0	3.0	3.0	3.0
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	5	5	5	8	8
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	90	90	90	90	90
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	1E14	1E14	1E14
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	1E16	1E16	1E16
C Electrical strength	1 mm	kV/mm	IEC 60243-1	34	34	34	34	34
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	225	225	225	225	225
<b>Other properties (23 °C)</b>								
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.30	0.30	0.30	0.30	0.30
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.12	0.12	0.12	0.12	0.12
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1200	1200	1200	1200	1200
<b>Material specific properties</b>								
Refractive index	Procedure A	–	ISO 489	1.586	1.586	1.586	1.586	1.586
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	89	89	89	89	89
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	89	89	89	89	89
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	88	88	88	88	88
<b>Processing conditions for test specimens</b>								
C Injection molding – Melt temperature	–	°C	ISO 294	290	290	300	290	290
C Injection molding – Mold temperature	–	°C	ISO 294	80	80	80	80	80
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties:  
N = non break  
P = partial break  
C = complete break



Typical Properties	Test Conditions	Units	Standards	Flame retardant grades				
				Medium viscosity				High viscosity
				6485	6487	6555	6557	6717
<b>Rheological properties</b>								
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	10	10	10	10	3
<b>Mechanical properties (23 °C / 50 % r. h.)</b>								
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	2400	2450	2400	2400	2400
C Yield stress	50 mm/min	MPa	ISO 527-1, -2	66	66	66	66	67
C Yield strain	50 mm/min	%	ISO 527-1, -2	6.1	6.0	6.2	6.1	6.4
C Nominal strain at break	50 mm/min	%	ISO 527-1, -2	> 50	> 50	> 50	> 50	> 50
C Stress at break	50 mm/min	MPa	ISO 527-1, -2	65	65	70	70	65
C Strain at break	50 mm/min	%	ISO 527-1, -2	120	115	130	130	105
C Tensile creep modulus	1 h	MPa	ISO 899-1	2200	–	2200	2200	–
C Tensile creep modulus	1000 h	MPa	ISO 899-1	1900	–	1900	1900	–
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	N	N	N	N	N
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	70P(C)	70P(C)	70P	70P(C)	70P
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	14C	12C	14C	14C	14C
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	65P(C)	65P(C)	65P	65P	60P
C Puncture maximum force	23 °C	N	ISO 6603-2	5200	5200	5400	5400	5500
C Puncture energy	23 °C	J	ISO 6603-2	50	50	60	60	60
<b>Thermal properties</b>								
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	142	141	145	144	146
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	124	122	125	124	127
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	136	134	137	136	139
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	144	143	144	143	146
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.70
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.70
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	V-1 (0.75)	–	V-2 (1.0)	V-2 <sup>1)</sup> (0.75)	–
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	V-0 (1.5)	V-0 (1.5)	V-0 (3.0)	V-0 (3.0)	V-0 (2.0)
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	–	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	5VA (3.0)	5VA (3.0)	–	–	–
C Oxygen index	Method A	%	ISO 4589-2	36	36	35	36	43
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	960	960	875	900	960
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	960	960	960	960	960
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	960	960	960	960	960
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	875	875	875	875	875
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	875	900	875	875	900
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	875	930	875	900	900
<b>Electrical properties (23 °C / 50 % r. h.)</b>								
C Relative permittivity	100 Hz	–	IEC 60250	3.1	3.1	3.1	3.1	3.1
C Relative permittivity	1 MHz	–	IEC 60250	3.0	3.0	3.0	3.0	3.0
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	8	8	8	8	10
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	90	90	90	90	90
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	1E14	1E14	1E14
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	1E16	1E16	1E16
C Electrical strength	1 mm	kV/mm	IEC 60243-1	34	34	34	34	34
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	225	225	225	225	225
<b>Other properties (23 °C)</b>								
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.30	0.30	0.30	0.30	0.30
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.12	0.12	0.12	0.12	0.12
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1200	1200	1200	1200	1200
<b>Material specific properties</b>								
Refractive index	Procedure A	–	ISO 489	–	–	1.586	1.586	1.586
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	–	–	89	89	87
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	–	–	89	89	86
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	–	–	88	88	85
<b>Processing conditions for test specimens</b>								
C Injection molding – Melt temperature	–	°C	ISO 294	300	300	300	300	310
C Injection molding – Mold temperature	–	°C	ISO 294	80	80	80	80	90
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties:  
N = non break  
P = partial break  
C = complete break  
<sup>1)</sup> clear

Typical Properties	Test Conditions	Units	Standards	Glass fiber reinforced (milled fiber)		Glass fiber reinforced (normal fiber)		
				20 % GF	30 % GF	10 % GF		
				8025	8035	GF9002	9415	9417
<b>Rheological properties</b>								
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	6	4	15	6	6
<b>Mechanical properties (23 °C / 50 % r. h.)</b>								
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	4000	5100	3900	3800	3800
C Yield stress	5 mm/min	MPa	ISO 527-1, -2	58	59	60	64	62
C Yield strain	5 mm/min	%	ISO 527-1, -2	3.5	2.5	4.5	4.4	4.6
C Nominal strain at break	5 mm/min	%	ISO 527-1, -2	–	–	–	–	–
C Stress at break	5 mm/min	MPa	ISO 527-1, -2	50	55	45	45	45
C Strain at break	5 mm/min	%	ISO 527-1, -2	6.5	3.5	10	15	15
C Tensile creep modulus	1 h	MPa	ISO 899-1	3700	4700	–	3600	3600
C Tensile creep modulus	1000 h	MPa	ISO 899-1	3500	3900	–	2900	2900
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	55C	40C	>100C	150C(N)	150C(N)
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	12C	8C	8C	10C	10C
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	8C	7C	–	8C	–
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	12C	8C	–	10C	10C
C Puncture maximum force	23 °C	N	ISO 6603-2	3300	1300	3200	4000	4000
C Puncture energy	23 °C	J	ISO 6603-2	20	5	16	25	25
<b>Thermal properties</b>								
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	–	–	–	–	–
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	134	135	132	135	133
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	141	141	–	140	141
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	146	147	141	145	143
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.45	0.35	0.4	0.4	0.4
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.55	0.55	0.6	0.65	0.65
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	V-2 (1.5)	–	V-2 (0.75)	V-2 (0.75)	–
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	V-1 (6.0)	V-1 (1.5)	V-0 (1.2)	V-0 (1.5)	V-0 (1.5)
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	5VA (6.0)
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	5VA <sup>2)</sup>
C Oxygen index	Method A	%	ISO 4589-2	32	37	35	35	36
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	800	960	960	960	960
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	960	960	960	960	960
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	960	960	960	960	960
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	850	875	–	900	825
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	875	875	800	900	900
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	875	875	875	900	900
<b>Electrical properties (23 °C / 50 % r. h.)</b>								
C Relative permittivity	100 Hz	–	IEC 60250	3.3	3.5	3.2	3.2	3.2
C Relative permittivity	1 MHz	–	IEC 60250	3.3	3.5	3.2	3.2	3.2
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	10	15	10	10	10
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	90	90	90	90	90
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	1E14	1E14	1E14
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	1E16	1E16	1E16
C Electrical strength	1 mm	kV/mm	IEC 60243-1	36	36	36	36	36
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	175	175	175	175	175
<b>Other properties (23 °C)</b>								
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.24	0.22	0.3	0.26	0.26
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.10	0.10	0.10	0.12	0.12
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1340	1420	1270	1270	1270
<b>Material specific properties</b>								
Refractive index	Procedure A	–	ISO 489	–	–	–	–	–
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	–	–	–	–	–
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	–	–	–	–	–
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	–	–	–	–	–
<b>Processing conditions for test specimens</b>								
C Injection molding – Melt temperature	–	°C	ISO 294	300	300	300	300	300
C Injection molding – Mold temperature	–	°C	ISO 294	110	110	110	110	110
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties:  
N = non break  
P = partial break  
C = complete break

<sup>2)</sup> black

**Glass fiber (normal fiber)**
**20 % GF**
**35 % GF**

Typical Properties	Test Conditions	Units	Standards	Glass fiber (normal fiber)				
				GF8001	9125	9425	8325	8345
<b>Rheological properties</b>								
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	16	8	5	4	3
<b>Mechanical properties (23 °C / 50 % r. h.)</b>								
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	6000	5800	5800	5800	9400
C Yield stress	5 mm/min	MPa	ISO 527-1, -2	–	82	86	99	113
C Yield strain	5 mm/min	%	ISO 527-1, -2	–	2.2	2.7	3.3	1.9
C Nominal strain at break	5 mm/min	%	ISO 527-1, -2	–	–	–	–	–
C Stress at break	5 mm/min	MPa	ISO 527-1, -2	105	85	85	85	110
C Strain at break	5 mm/min	%	ISO 527-1, -2	3.0	2.2	2.6	4.4	1.8
C Tensile creep modulus	1 h	MPa	ISO 899-1	–	5700	5700	–	9000
C Tensile creep modulus	1000 h	MPa	ISO 899-1	–	5200	5200	–	8500
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	50C	35C	40C	60C	40C
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	8C	8C	8C	10C	8C
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	–	–	–	–	–
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	–	8C	8C	10C	8C
C Puncture maximum force	23 °C	N	ISO 6603-2	700	800	900	1000	900
C Puncture energy	23 °C	J	ISO 6603-2	2.7	5	5	5	5
<b>Thermal properties</b>								
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	–	–	–	–	–
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	137	138	138	142	140
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	141	142	142	145	144
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	144	145	146	149	148
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.3	0.3	0.3	0.3	0.2
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.6
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	V-2 (1.0) <sup>2)</sup>	–	V-2 (0.5) <sup>2)</sup>	V-2 (1.5) <sup>2)</sup>	V-1 (1.5) <sup>2)</sup>
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	HB (1.5)	V-0 (1.5)	V-0 (1.5)	V-0 (3.0)	V-0 (3.0)
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	5VA	–	–
C Oxygen index	Method A	%	ISO 4589-2	–	36	35	32	35
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	–	–	960	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	–	960	960	–	960
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	–	960	960	–	960
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	–	–	875	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	–	850	875	–	–
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	–	850	900	–	–
<b>Electrical properties (23 °C / 50 % r. h.)</b>								
C Relative permittivity	100 Hz	–	IEC 60250	3.3	3.3	3.3	3.3	3.6
C Relative permittivity	1 MHz	–	IEC 60250	3.3	3.3	3.3	3.3	3.6
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	10	10	10	10	10
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	90	90	90	90	90
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	1E14	1E14	1E14
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	1E16	1E16	1E16
C Electrical strength	1 mm	kV/mm	IEC 60243-1	36	36	36	36	36
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	175	175	175	175	175
<b>Other properties (23 °C)</b>								
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.24	0.24	0.24	0.24	0.20
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.10	0.10	0.10	0.10	0.80
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1340	1340	1340	1340	1480
<b>Material specific properties</b>								
Refractive index	Procedure A	–	ISO 489	–	–	–	–	–
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	–	–	–	–	–
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	–	–	–	–	–
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	–	–	–	–	–
<b>Processing conditions for test specimens</b>								
C Injection molding – Melt temperature	–	°C	ISO 294	300	300	300	300	300
C Injection molding – Mold temperature	–	°C	ISO 294	110	110	110	110	110
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties:  
N = non break  
P = partial break  
C = complete break

<sup>2)</sup>black



Typical Properties	Test Conditions	Units	Standards	Speciality grades					
				Optical storage media	Light guides			Optical lenses	
					OD2015	LED2045	LED2245	LED2643	LQ2647
<b>Rheological properties</b>									
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	17	17	–	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	34	13	12	6
<b>Mechanical properties (23 °C / 50 % r. h.)</b>									
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	2350	2350	2350	2350	2400	2400
C Yield stress	50 mm/min	MPa	ISO 527-1, -2	63	63	63	65	67	66
C Yield strain	50 mm/min	%	ISO 527-1, -2	5.9	6.0	6.0	6.3	6.1	6.2
C Nominal strain at break	50 mm/min	%	ISO 527-1, -2	> 50	> 50	> 50	> 50	> 50	> 50
C Stress at break	50 mm/min	MPa	ISO 527-1, -2	55	55	60	70	70	70
C Strain at break	50 mm/min	%	ISO 527-1, -2	100	100	125	130	130	125
C Tensile creep modulus	1 h	MPa	ISO 899-1	–	–	–	–	2200	2200
C Tensile creep modulus	1000 h	MPa	ISO 899-1	–	–	–	–	1900	1900
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	N	N	N	N	N	N
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	50P(C)	50P(C)	60P(C)	70P	70P	80P
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	12C	12C	12C	14C	14C	14C
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	50P	50P	55P	65P	70P	70P
C Puncture maximum force	23 °C	N	ISO 6603-2	4700	4700	4900	5400	5400	5600
C Puncture energy	23 °C	J	ISO 6603-2	50	50	55	60	60	60
<b>Thermal properties</b>									
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	145	144	145	146	144	145
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	124	124	125	126	123	125
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	138	137	138	138	135	137
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	145	145	145	145	143	145
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.65	0.65
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.65	0.65
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	–	–	V-2 <sup>1)</sup> (0.75)	V-2 (0.75)	V-2 (0.8)	V-2 (0.8)
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	V-2 (0.71)	V-2 <sup>1)</sup> (0.71)	HB <sup>1)</sup> (2.9)	HB (2.5)	–	–
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–	–
C Oxygen index	Method A	%	ISO 4589-2	28	27	28	28	28	28
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	–	–	850	850	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	–	–	875	855	–	–
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	–	–	930	960	–	–
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	–	–	875	875	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	–	–	875	875	–	–
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	–	–	900	875	–	–
<b>Electrical properties (23 °C / 50 % r. h.)</b>									
C Relative permittivity	100 Hz	–	IEC 60250	3.1	3.1	3.1	3.1	3.1	3.1
C Relative permittivity	1 MHz	–	IEC 60250	3.0	3.0	3.0	3.0	3.0	3.0
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	5	5	5	5	5	5
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	95	90	95	95	90	95
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	–	–	1E14	1E14
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	–	–	1E16	1E16
C Electrical strength	1 mm	kV/mm	IEC 60243-1	34	34	34	34	34	34
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	225	225	250	250	250	250
<b>Other properties (23 °C)</b>									
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.30	0.30	0.30	0.30	0.30	0.30
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.12	0.12	0.12	0.12	0.12	0.12
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1190	1190	1190	1200	1200	1200
<b>Material specific properties</b>									
Refractive index	Procedure A	–	ISO 489	1.584	1.584	1.584	1.586	1.586	1.586
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	> 89	90	90	90	89	89
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	–	90	90	90	89	89
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	–	89	89	89	88	88
<b>Processing conditions for test specimens</b>									
C Injection molding – Melt temperature	–	°C	ISO 294	280	280	280	290	290	300
C Injection molding – Mold temperature	–	°C	ISO 294	80	80	80	80	80	80
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties: <sup>1)</sup> clear  
 N = non break  
 P = partial break  
 C = complete break



# Makrolon® – typical values

Typical Properties	Test Conditions	Units	Standards	Speciality grades				
				Lighting	Automotive lighting	Automotive glazing	Blow molding	
				LTG2623	AL2447	AL2647	AG2677	WB1239
<b>Rheological properties</b>								
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	12	19	12	12	2
<b>Mechanical properties (23 °C / 50 % r. h.)</b>								
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	2350	2400	2400	2400	2300
C Yield stress	50 mm/min	MPa	ISO 527-1, -2	65	66	67	67	64
C Yield strain	50 mm/min	%	ISO 527-1, -2	6.3	6.0	6.1	6.1	6.6
C Nominal strain at break	50 mm/min	%	ISO 527-1, -2	> 50	> 50	> 50	> 50	> 50
C Stress at break	50 mm/min	MPa	ISO 527-1, -2	70	70	70	70	65
C Strain at break	50 mm/min	%	ISO 527-1, -2	120	130	130	130	100
C Tensile creep modulus	1 h	MPa	ISO 899-1	–	2200	2200	2200	–
C Tensile creep modulus	1000 h	MPa	ISO 899-1	–	1900	1900	1900	–
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	N	N	N	N	N
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	70P	65P	70P	70P	75P
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	16C	14C	14C	14C	20C(P)
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	70P	65P	70P	70P	65P
C Puncture maximum force	23 °C	N	ISO 6603-2	5400	5100	5400	5400	5500
C Puncture energy	23 °C	J	ISO 6603-2	60	55	60	60	55
<b>Thermal properties</b>								
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	147	145	144	144	152
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	126	125	124	124	132
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	138	138	136	136	145
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	145	144	143	143	150
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.7
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.7
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	V-2 (1.5)	V-2 (0.75)	V-2 (0.75)	V-2 (0.75)	–
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	–	HB (2.7)	HB (2.5)	HB (2.7)	–
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–
C Oxygen index	Method A	%	ISO 4589-2	27	28	28	28	26
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	–	–	–	–	900
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	–	–	–	850	900
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	–	–	–	930	930
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	–	–	–	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	–	–	–	–	–
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	–	–	–	–	–
<b>Electrical properties (23 °C / 50 % r. h.)</b>								
C Relative permittivity	100 Hz	–	IEC 60250	3.1	3.1	3.1	3.1	3.1
C Relative permittivity	1 MHz	–	IEC 60250	3.0	3.0	3.0	3.0	3.0
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	5	5	5	5	10
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	90	90	90	90	100
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	1E14	1E14	1E14
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	1E16	1E16	1E16
C Electrical strength	1 mm	kV/mm	IEC 60243-1	34	34	34	34	34
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	250	250	250	250	250
<b>Other properties (23 °C)</b>								
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.30	0.30	0.30	0.30	0.30
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.12	0.12	0.12	0.12	0.12
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1200	1200	1200	1200	1200
<b>Material specific properties</b>								
Refractive index	Procedure A	–	ISO 489	1.587	1.586	1.587	1.586	1.587
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	89	89	89	89	86 <sup>1)</sup>
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	89	89	89	89	83 <sup>1)</sup>
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	88	88	88	88	80 <sup>1)</sup>
<b>Processing conditions for test specimens</b>								
C Injection molding – Melt temperature	–	°C	ISO 294	290	280	290	290	310
C Injection molding – Mold temperature	–	°C	ISO 294	80	80	80	80	90
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties:  
N = non break  
P = partial break  
C = complete break

<sup>1)</sup> blue  
<sup>\*\*</sup> Burning behavior Uni 8456, 8457, 9174 and 9175

**Speciality grades**
**Extrusion**

Typical Properties	Test Conditions	Units	Standards	Speciality grades				
				ET2613	ET3113	ET3117	ET3137	ET3227
<b>Rheological properties</b>								
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	12	6	6	6.0	3
<b>Mechanical properties (23 °C / 50 % r. h.)</b>								
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	2350	2350	2400	2400	2400
C Yield stress	50 mm/min	MPa	ISO 527-1, -2	65	65	65	66	66
C Yield strain	50 mm/min	%	ISO 527-1, -2	6.3	6.3	6.3	6.3	6.2
C Nominal strain at break	50 mm/min	%	ISO 527-1, -2	> 50	> 50	> 50	> 50	> 50
C Stress at break	50 mm/min	MPa	ISO 527-1, -2	70	70	70	70	65
C Strain at break	50 mm/min	%	ISO 527-1, -2	130	130	130	125	100
C Tensile creep modulus	1 h	MPa	ISO 899-1	–	–	–	–	–
C Tensile creep modulus	1000 h	MPa	ISO 899-1	–	–	–	–	–
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	N	N	N	N	N
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	70P	80P	80P	78P	70P
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	16C	18C(P)	14C	16C	16C
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	65P	70P	70P	65P	65P
C Puncture maximum force	23 °C	N	ISO 6603-2	5400	5600	5600	5600	5500
C Puncture energy	23 °C	J	ISO 6603-2	60	60	60	60	60
<b>Thermal properties</b>								
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	147	148	146	146	146
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	–	128	127	125	128
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	–	141	140	138	140
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	145	148	146	146	146
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.65
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.65
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	V-2 (0.75)	V-2 (0.75)	HB (1.5)	–	HB <sup>2)</sup> (1.5)
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	HB (2.5)	V-0 <sup>1)</sup> (10.0)	V-2 (1.5)	HB (0.75)	–
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	–	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	–	–	–	–	–
C Oxygen index	Method A	%	ISO 4589-2	29	28	28	28	28
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	850	875	875	875	875
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	850	875	875	875	875
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	960	960	960	960	960
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	875	875	875	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	875	875	875	–	–
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	875	900	900	–	–
<b>Electrical properties (23 °C / 50 % r. h.)</b>								
C Relative permittivity	100 Hz	–	IEC 60250	3.1	3.1	3.1	3.1	–
C Relative permittivity	1 MHz	–	IEC 60250	3.0	3.0	3.0	3.0	–
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	5	8	10	–	8
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	90	100	95	–	95
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	1E14	1E14	1E14
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	1E16	1E16	1E16
C Electrical strength	1 mm	kV/mm	IEC 60243-1	34	34	34	34	36
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	250	250	250	–	250
<b>Other properties (23 °C)</b>								
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.30	0.30	0.30	–	0.30
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.12	0.12	0.12	–	0.12
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1200	1200	1200	–	1200
<b>Material specific properties</b>								
Refractive index	Procedure A	–	ISO 489	1.586	1.586	1.586	1.586	1.586
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	89	89	89	89	89
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	89	89	89	88	88
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	88	88	88	88	88
<b>Processing conditions for test specimens</b>								
C Injection molding – Melt temperature	–	°C	ISO 294	300	300	300	300	310
C Injection molding – Mold temperature	–	°C	ISO 294	80	80	80	80	80
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties:  
N = non break  
P = partial break  
C = complete break

<sup>1)</sup> clear  
<sup>2)</sup> clear, no color

**Speciality grades**
**Extrusion**

Typical Properties	Test Conditions	Units	Standards	ET UV110	ET UV120	ET UV130	ET UV510	ET UV530	ET UV540
<b>Rheological properties</b>									
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	10	11	11	8	10	11
<b>Mechanical properties (23 °C / 50 % r. h.)</b>									
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	–	–	–	–	–	–
C Yield stress	50 mm/min	MPa	ISO 527-1, -2	–	–	–	–	–	–
C Yield strain	50 mm/min	%	ISO 527-1, -2	–	–	–	–	–	–
C Nominal strain at break	50 mm/min	%	ISO 527-1, -2	–	–	–	–	–	–
C Stress at break	50 mm/min	MPa	ISO 527-1, -2	–	–	–	–	–	–
C Strain at break	50 mm/min	%	ISO 527-1, -2	–	–	–	–	–	–
C Tensile creep modulus	1 h	MPa	ISO 899-1	–	–	–	–	–	–
C Tensile creep modulus	1000 h	MPa	ISO 899-1	–	–	–	–	–	–
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	N	N	N	N	N	N
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	–	–	–	–	–	–
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	–	–	–	–	–	–
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	–	–	–	–	–	–
C Puncture maximum force	23 °C	N	ISO 6603-2	–	–	–	–	–	–
C Puncture energy	23 °C	J	ISO 6603-2	–	–	–	–	–	–
<b>Thermal properties</b>									
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	–	–	–	–	–	–
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	118	116	115	125	124	120
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	130	128	127	138	137	133
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	136	134	134	144	143	140
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	–	–	–	–	–	–
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	–	–	–	–	–	–
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	–	–	–	–	–	–
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	–	–	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	–	–	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	–	–	–	–	–	–
C Oxygen index	Method A	%	ISO 4589-2	–	–	–	–	–	–
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	–	–	–	–	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	–	–	–	–	–	–
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	–	–	–	–	–	–
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	–	–	–	–	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	–	–	–	–	–	–
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	–	–	–	–	–	–
<b>Electrical properties (23 °C / 50 % r. h.)</b>									
C Relative permittivity	100 Hz	–	IEC 60250	–	–	–	–	–	–
C Relative permittivity	1 MHz	–	IEC 60250	–	–	–	–	–	–
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	1E14	1E14	1E14	1E14	1E14	1E14
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	1E16	1E16	1E16	1E16	1E16	1E16
C Volume resistivity	–	Ohm · m	IEC 60093	–	–	–	–	–	–
C Surface resistivity	–	Ohm	IEC 60093	–	–	–	–	–	–
C Electrical strength	1 mm	kV/mm	IEC 60243-1	–	–	–	–	–	–
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	–	–	–	–	–	–
<b>Other properties (23 °C)</b>									
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	–	–	–	–	–	–
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	–	–	–	–	–	–
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	–	–	–	–	–	–
<b>Material specific properties</b>									
Refractive index	Procedure A	–	ISO 489	–	–	–	–	–	–
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	–	–	–	–	–	–
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	–	–	–	–	–	–
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	–	–	–	–	–	–
<b>Processing conditions for test specimens</b>									
C Injection molding – Melt temperature	–	°C	ISO 294	300	300	300	300	300	300
C Injection molding – Mold temperature	–	°C	ISO 294	80	80	80	90	80	80
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties:  
N = non break  
P = partial break  
C = complete break

**Speciality grades**
**Structural Foam**

Typical Properties	Test Conditions	Units	Standards	Speciality grades		
				SF800	SF805	SF810
<b>Rheological properties</b>						
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	5	7	6
<b>Mechanical properties (23 °C / 50 % r. h.)</b>						
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	3000	2900	3800
C Yield stress	50 mm/min	MPa	ISO 527-1, -2	64	62	64
C Yield strain	50 mm/min	%	ISO 527-1, -2	5.4	4.7	4
C Nominal strain at break	50 mm/min	%	ISO 527-1, -2	–	–	–
C Stress at break	50 mm/min	MPa	ISO 527-1, -2	50	60	45
C Strain at break	50 mm/min	%	ISO 527-1, -2	40	20	15
C Tensile creep modulus	1 h	MPa	ISO 899-1	–	–	–
C Tensile creep modulus	1000 h	MPa	ISO 899-1	–	–	–
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	230C	190C	–
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	–	15C	–
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	–	–	–
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	12C	12C	–
C Puncture maximum force	23 °C	N	ISO 6603-2	4500	4300	–
C Puncture energy	23 °C	J	ISO 6603-2	35	25	–
<b>Thermal properties</b>						
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	–	–	–
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	135	130	135
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	143	140	140
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	146	143	145
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.55	0.55	0.4
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.7	0.65
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	–	–	–
C Burning behavior UL 94 (mm) (UL registration)	(..) mm	Class	UL 94	V-0 (6.0)	V-0 (3.0) <sup>1)</sup>	V-0 (3.6)
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	–	–	–
C Burning behavior UL 94-5V (UL registration)	(..) mm	Class	UL 94	5VA (6.0)	5VA (5.0) <sup>1)</sup>	5VA (4.4)
C Oxygen index	Method A	%	ISO 4589-2	36	32	35
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	–	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	–	960	960
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	–	960	960
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	930	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	930	825	825
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	930	825	825
<b>Electrical properties (23 °C / 50 % r. h.)</b>						
C Relative permittivity	100 Hz	–	IEC 60250	–	3.1	3.2
C Relative permittivity	1 MHz	–	IEC 60250	–	3.0	3.2
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	8	8	8
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	90	90	–
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	–
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	–
C Electrical strength	1 mm	kV/mm	IEC 60243-1	32	34	36
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	175	175	175
<b>Other properties (23 °C)</b>						
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.30	0.30	0.26
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.10	0.10	0.10
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1230	1230	1270
<b>Material specific properties</b>						
Refractive index	Procedure A	–	ISO 489	–	–	–
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	–	–	–
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	–	–	–
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	–	–	–
<b>Processing conditions for test specimens</b>						
C Injection molding – Melt temperature	–	°C	ISO 294	300	300	300
C Injection molding – Mold temperature	–	°C	ISO 294	110	110	110
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties: <sup>1)</sup> gray  
 N = non break  
 P = partial break  
 C = complete break

				Speciality grades					
				Medical devices*					
Typical Properties	Test Conditions	Units	Standards	2258	2458	2558	2658	2858	3258
<b>Rheological properties</b>									
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	34	19	14	12	9	5
<b>Mechanical properties (23 °C / 50 % r. h.)</b>									
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	2400	2400	2400	2400	2350	2400
C Yield stress	50 mm/min	MPa	ISO 527-1, -2	65	65	66	66	66	66
C Yield strain	50 mm/min	%	ISO 527-1, -2	6.0	6.1	6.1	6.1	6.1	6.2
C Nominal strain at break	50 mm/min	%	ISO 527-1, -2	> 50	> 50	> 50	> 50	> 50	> 50
C Stress at break	50 mm/min	MPa	ISO 527-1, -2	60	70	70	70	70	70
C Strain at break	50 mm/min	%	ISO 527-1, -2	125	130	130	130	130	120
C Tensile creep modulus	1 h	MPa	ISO 899-1	–	2200	2200	2200	2200	2200
C Tensile creep modulus	1000 h	MPa	ISO 899-1	–	1900	1900	1900	1900	1900
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	N	N	N	N	N	N
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	55P(C)	65P	70P	70P	75P	80P
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	12C	14C	16C	16C	16C	16C
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	55P	65P	65P	70P	70P	75P
C Puncture maximum force	23 °C	N	ISO 6603-2	4900	5100	5400	5400	5400	5800
C Puncture energy	23 °C	J	ISO 6603-2	55	55	60	60	60	65
<b>Thermal properties</b>									
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	145	146	144	145	145	147
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	124	125	124	124	125	127
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	137	139	136	137	137	139
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	145	145	144	144	145	148
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.65	0.65
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.65	0.65
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	V-2 (0.75) <sup>1)</sup>	V-2 (0.75)	–	V-2 (0.75)	V-2 (0.75)	–
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	HB (2.9) <sup>1)</sup>	HB (2.7)	–	HB (2.5)	HB (2.5)	–
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–	–
C Oxygen index	Method A	%	ISO 4589-2	–	28	28	27	28	–
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	–	–	–	–	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	–	–	–	850	850	–
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	–	–	–	930	930	–
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	875	–	–	875	875	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	875	–	–	875	875	–
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	900	–	–	875	900	–
<b>Electrical properties (23 °C / 50 % r. h.)</b>									
C Relative permittivity	100 Hz	–	IEC 60250	3.1	3.1	3.1	3.1	3.1	–
C Relative permittivity	1 MHz	–	IEC 60250	3.0	3.0	3.0	3.0	3.0	–
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	5	5	5	5	5	–
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	90	90	95	95	90	–
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	1E14	1E14	1E14	–
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	1E16	1E16	1E16	–
C Electrical strength	1 mm	kV/mm	IEC 60243-1	34	34	34	34	34	–
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	250	250	250	250	250	–
<b>Other properties (23 °C)</b>									
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.30	0.30	0.30	0.30	0.30	0.30
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.12	0.12	0.12	0.12	0.12	0.12
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1200	1200	1200	1200	1200	1200
<b>Material specific properties</b>									
Refractive index	Procedure A	–	ISO 489	1.586	1.586	1.586	1.586	1.586	1.587
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	89	89	89	89	89	89
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	89	89	89	89	89	89
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	88	88	88	88	88	88
<b>Processing conditions for test specimens</b>									
C Injection molding – Melt temperature	–	°C	ISO 294	280	280	290	290	300	310
C Injection molding – Mold temperature	–	°C	ISO 294	80	80	80	80	80	90
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties:  
N = non break  
P = partial break  
C = complete break

<sup>1)</sup> clear



**Speciality grades**
**Medical devices\***

Typical Properties	Test Conditions	Units	Standards	Rx2430	Rx2435	Rx2530	Rx2635	Rx1805
<b>Rheological properties</b>								
C Melt volume-flow rate (MVR)	250 °C; 2.16 kg	cm <sup>3</sup> /(10 min)	ISO 1133	–	–	–	–	–
C Melt volume-flow rate (MVR)	300 °C; 1.2 kg	cm <sup>3</sup> /(10 min)	ISO 1133	19	23	15	12	6
<b>Mechanical properties (23 °C / 50 % r. h.)</b>								
C Tensile modulus	1 mm/min	MPa	ISO 527-1, -2	2400	2400	2400	2400	2400
C Yield stress	50 mm/min	MPa	ISO 527-1, -2	67	67	67	67	67
C Yield strain	50 mm/min	%	ISO 527-1, -2	6.1	6.1	6.1	6.1	6.3
C Nominal strain at break	50 mm/min	%	ISO 527-1, -2	> 50	> 50	> 50	> 50	> 50
C Stress at break	50 mm/min	MPa	ISO 527-1, -2	70	70	75	75	75
C Strain at break	50 mm/min	%	ISO 527-1, -2	130	120	130	130	130
C Tensile creep modulus	1 h	MPa	ISO 899-1	–	–	–	–	–
C Tensile creep modulus	1000 h	MPa	ISO 899-1	–	–	–	–	–
C Charpy impact strength	23 °C	kJ/m <sup>2</sup>	ISO 179/1eU	N	N	N	N	N
Charpy notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	70P	75P	70P	–	80P
Charpy notched impact strength	–30 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 179/1eA	14C	12C	14C	–	16C
Izod notched impact strength	23 °C; 3 mm	kJ/m <sup>2</sup>	i. A. ISO 180/A	60P	60P	65P	65P	70P
C Puncture maximum force	23 °C	N	ISO 6603-2	5300	5100	5300	5300	5700
C Puncture energy	23 °C	J	ISO 6603-2	60	55	60	60	65
<b>Thermal properties</b>								
C Glass transition temperature	10 °C/min	°C	ISO 11357-1, -2	–	–	142	–	145
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1, -2	122	120	122	121	126
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1, -2	134	132	134	133	138
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	141	139	141	–	144
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.65
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1, -2	0.65	0.65	0.65	0.65	0.65
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–
C Burning behavior UL 94 (mm) (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–
C Burning behavior UL 94-5V (UL registration)	(...) mm	Class	UL 94	–	–	–	–	–
C Oxygen index	Method A	%	ISO 4589-2	–	–	27	–	27
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	–	–	–	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	–	–	–	–	–
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	–	–	–	–	–
Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-13	–	–	–	–	–
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-13	–	–	–	–	–
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-13	–	–	–	–	–
<b>Electrical properties (23 °C / 50 % r. h.)</b>								
C Relative permittivity	100 Hz	–	IEC 60250	–	–	–	–	–
C Relative permittivity	1 MHz	–	IEC 60250	–	–	–	–	–
C Dissipation factor	100 Hz	10 <sup>-4</sup>	IEC 60250	–	–	–	–	–
C Dissipation factor	1 MHz	10 <sup>-4</sup>	IEC 60250	–	–	–	–	–
C Volume resistivity	–	Ohm · m	IEC 60093	1E14	1E14	1E14	1E14	1E14
C Surface resistivity	–	Ohm	IEC 60093	1E16	1E16	1E16	1E16	1E16
C Electrical strength	1 mm	kV/mm	IEC 60243-1	–	–	–	–	–
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	–	–	–	–	–
<b>Other properties (23 °C)</b>								
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.30	0.30	0.30	0.30	0.30
C Water absorption (Equilibrium value)	23 °C; 50 % r. F.	%	ISO 62	0.12	0.12	0.12	0.12	0.12
C Density	–	kg/m <sup>3</sup>	ISO 1183-1	1200	1200	1200	1200	1200
<b>Material specific properties</b>								
Refractive index	Procedure A	–	ISO 489	–	–	–	–	–
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	–	–	–	–	–
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	–	–	–	–	–
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	–	–	–	–	–
<b>Processing conditions for test specimens</b>								
C Injection molding – Melt temperature	–	°C	ISO 294	280	280	280	290	300
C Injection molding – Mold temperature	–	°C	ISO 294	80	80	80	80	80
C Injection molding – Injection velocity	–	mm/s	ISO 294	200	200	200	200	200

C These property characteristics are taken from the CAMPUS® plastics data bank and are based on the international catalogue of basic data for plastic according to ISO 10350.

Impact properties:  
N = non break  
P = partial break  
C = complete break

\*See warranty on page 32

**Typical value**

These values are typical values only. Unless explicitly agreed in written form, they do not constitute a binding material specification or warranted values. Values may be affected by the design of the mold/die, the processing conditions and coloring/pigmentation of the product. Unless specified to the contrary, the property values given have been established on standardized test specimens at room temperature.

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COV00072448  
Edition 2018-02