



# BASF material solutions for charging systems

 **BASF**

We create chemistry

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# BASF material solutions for charging systems

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BASF offers a wide range of material solutions  
for charging infrastructure

Mobile charging systems



Wall box



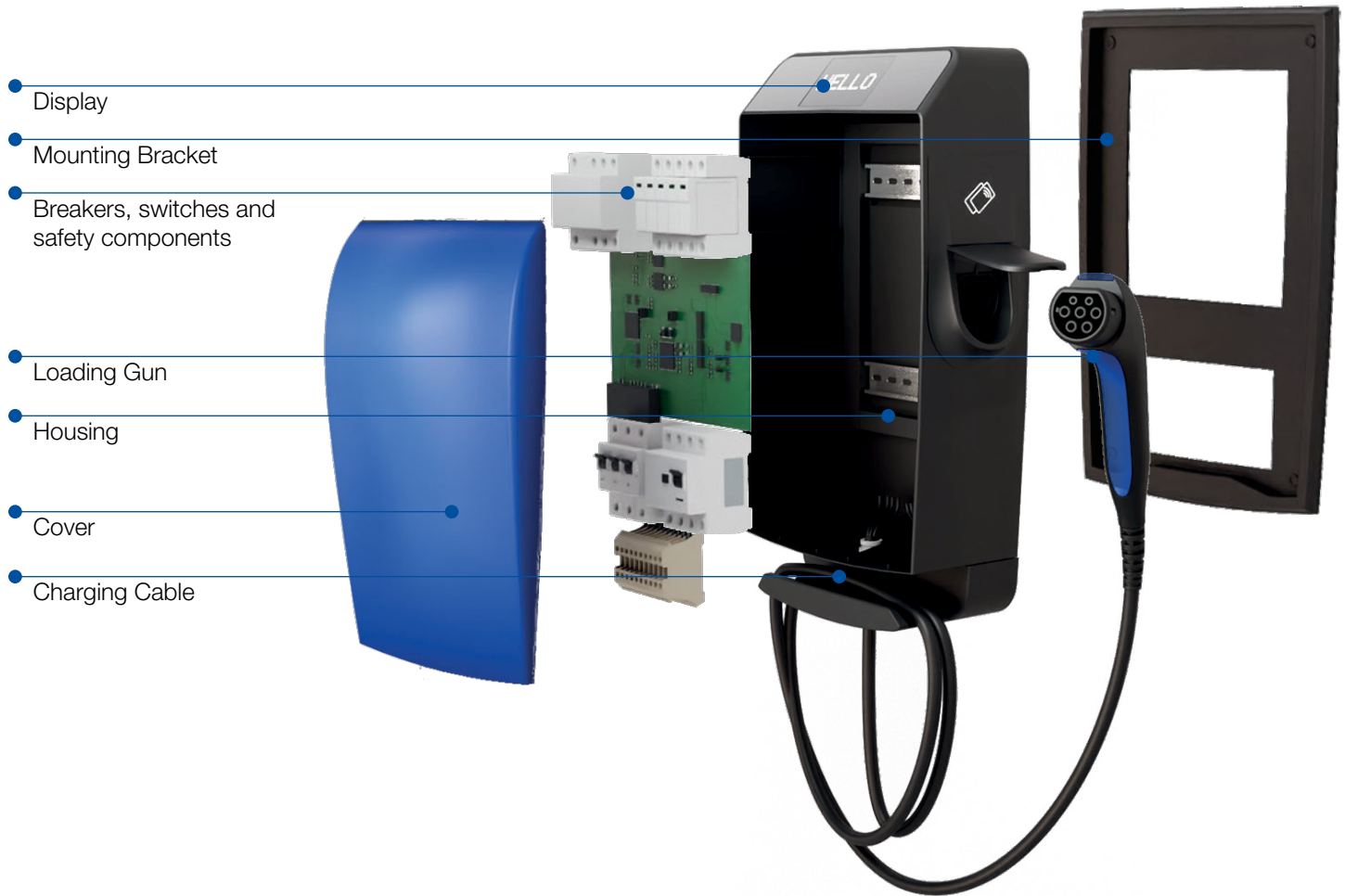
**Ultramid<sup>®</sup>, Ultradur<sup>®</sup>, Ultrason<sup>®</sup> and  
Elastollan<sup>®</sup> Portfolios**

Different requirements are based on the individual  
function of the part within the wall box.

BASF offers a wide range of materials, e.g.:

- Deep gloss for surface applications
- Structural materials for frames and brackets
- Elastic materials for cables and haptic elements
- A broad portfolio of flame retardant products

# WALL BOX OVERVIEW

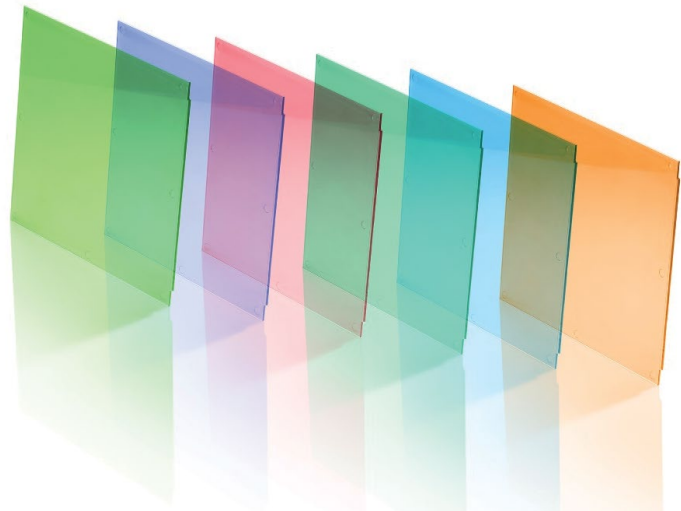
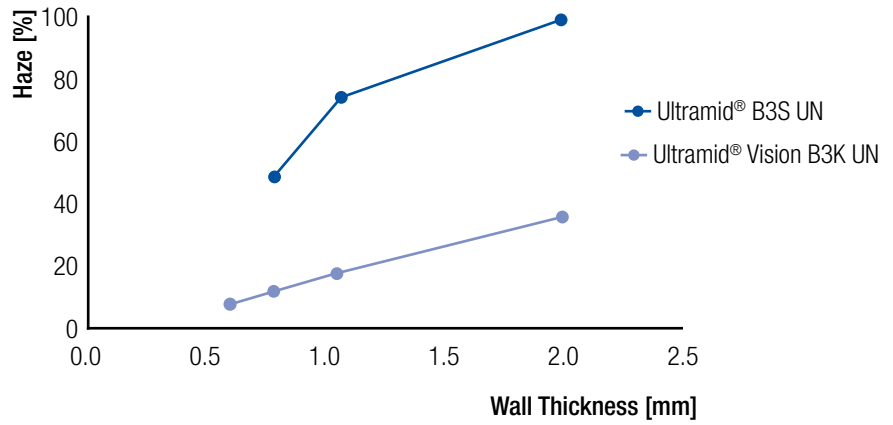


	Ultramid®	Ultradur®	Ultrason®	Elastollan®
Display	✓		✓	
Cover	✓			
Housing	✓	✓		
Mounting Bracket	✓			
Charging Cable Jacket				✓
Loading Gun	✓			✓
Breakers, Switches and Safety Components	✓			✓

# DISPLAY

## Ultramid® Vision

- First semi-transparent PA6 grade
- High scratch resistance
- Good chemical resistance
- UL94 V2 and UL 746C compliant



Material	Visual assessment
Ultramid® Vision	No scratch mark
Transparent PA12 copolymer	No scratch mark
Polyether sulfone	Visible scratch mark (approx. 0.25 μm)
Polycarbonate	Highly visible scratch mark (approx. 1 μm)
Copolyester	Barely visible scratch mark (approx. 0.2 μm)
SAN	Highly visible scratch mark (approx. 0.3 μm)
Polypropylene with clarifier	Highly visible scratch mark (approx. 0.5 μm)

### Proven chemical resistance against:

- Sun screen (tested according to PV3964)
- Sunflower oil
- Chloroform
- Isopropanol
- Glycerin
- Cyclohexane
- Methyl ethyl ketone
- Methanol

Test	0.4 mm	0.75 mm	1.5 mm	3 mm
UL94	HB	V-2	V-2	V-2
HWI	0*	0*	0*	0*
HAI	0*	0*	0*	0*
GWFI (°C)	960	960	960	960
GWIT (°C)	960	930	900	750
CTI (V)				550 (500)

\* UL746C: materials with HB/V-2 rating and HWI/HAI <2 can be used in applications requiring V-0 rating!

# DISPLAY

## Ultrason® E2010

- Transparent material
- UL94 V0
- Excellent temperature resistance

Flammability		Value	Testing method
Flammability class - UL	1.5 mm, ALL	V-0	UL 94 IEC 60695-11-10, -20
	3.0 mm, NC	V-0, 5VA	UL 94

Electrical properties		Value	Testing method
Hot-wire ignition (HWI)	1.5 mm	PLC 2	UL 746A
	3.0 mm	PLC 1	
High amp arc ignition (HAI)	1.5 mm	PLC 0	UL 746A
	3.0 mm	PLC 0	

Comparative tracking index (CTI)	PLC 4	UL 746A
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Thermal properties		Value	Testing method
RTI Elec	1.5 mm	180 °C	UL 746B
	3.0 mm	180 °C	
RTI Imp	1.5 mm	180 °C	UL 746B
	3.0 mm	180 °C	
RTI Str	1.5 mm	190 °C	UL 746B
	3.0 mm	190 °C	

# COVER

## Ultramid® Deep Gloss

- High gloss (different colors)
- Surface textures possible
- Excellent scratch resistance
- High chemical and good UV resistance

High gloss colors



Surface textures



### Erichsen Scratch Test:

acc. to PV3952, 10 N, needle Ø 1 mm	ΔL=0.1 (acc. to DIN 5033-4) (scratch depth: 0.87 μm)
acc. to DBL9202, 10 N, needle Ø 1 mm	O.K. (visual assessment)
acc. to GS93045-9, 5 N, needle Ø 0.75 mm	assessment index: 2A

### Tested chemical resistance:

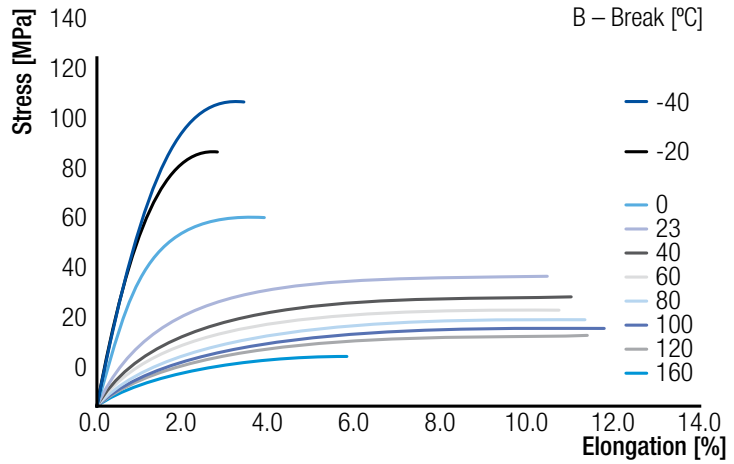
- Sunscreen
- Perspiration
- Ethyl alcohol
- Plastic cleaner
- Window cleaner
- Soapy water

Accelerated weathering test (Indoor, acc. to DIN75202)	4 Cycles (280 h)	6 Cycles (420 h)
Color change ΔE	0.3	0.7
Greyscale	4-5	4
Gloss 20°(Gloss units)	94.3	74.8
Gloss retention (20°)	101 %	80 %

# HOUSING

## Ultramid® B3UG4

- UL94 V2 and UL746C compliant
- High mechanical strength
- Good processability
- Hal. free



Flammability	Value	Testing method
Flammability class - UL	0.71 mm, BK	V-2
	1.5 mm, BK	V-2
	3.0 mm, BK	V-2

Electrical properties	Value	Testing method
Hot-wire ignition (HWI)	0.71 mm	PLC 3
	1.5 mm	PLC 2
	3.0 mm	PLC 1
High amp arc ignition (HAI)	0.71 mm	PLC 0
	1.5 mm	PLC 0
	3.0 mm	PLC 0

Comparative tracking index (CTI)	PLC 1	UL 746A
Dielectric strength	17 kV/mm	ASTM D149
High voltage arc tracking rate (HVTR)	PLC 0	UL 746A
Volume Resistivity	1.0E+10 ohms*cm	ASTM D257 IEC 60093
Arc Resistance	PLC 6	ASTM D495

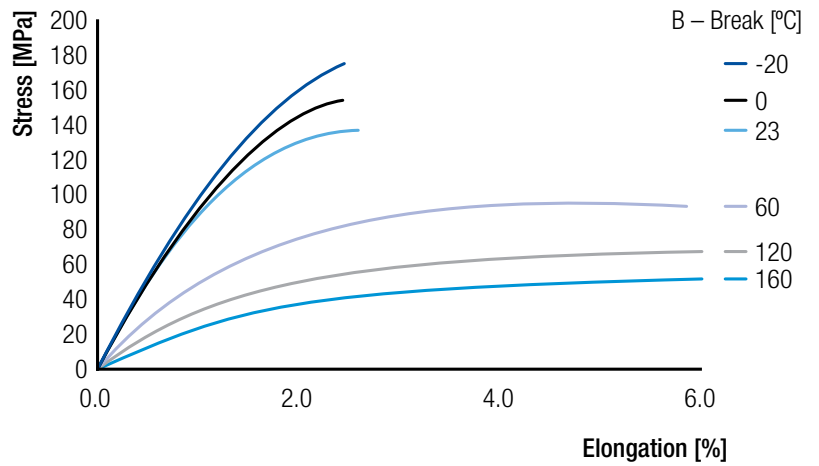
Thermal properties	Value	Testing method
RTI Elec	0.71 mm	140 °C
	1.5 mm	140 °C
	3.0 mm	140 °C
RTI Imp	0.71 mm	125 °C
	1.5 mm	125 °C
	3.0 mm	125 °C
RTI Str	0.71 mm	140 °C
	1.5 mm	140 °C
	3.0 mm	140 °C

Physical properties	Value	Testing method
Dimensional Change	0.00 %	ASTM D1042 ISO 2796
Outdoor suitability	f1	UL 746C

# HOUSING

## Ultradur® B4300 G6

- UL94 HB
- High mechanical strength
- Good processability



If your wall box requires an IP gasket between housing, display and cover, we offer formed-in-place foam gasket solutions based on Elastofom® I PU Systems.

# MOUNTING BRACKET

## Ultramid® B3GK24

- UL94 HB
- GWFI > 650C
- Reduced warpage
- Good processability



# MOUNTING BRACKET

## Ultramid® B3U50G6

- UL94 V0
- Halogen free
- Suitable for unattended household appliances (IEC 60335)

Flammability	Value	Testing method
	0.40mm, ALL	UL 94
	0.75mm, ALL	UL 94 IEC 60695-11-10, -20
Flammability class - UL	1.5mm, ALL	UL 94 IEC 60695-11-10, -20
	3.0mm, ALL	UL 94 IEC 60695-11-10, -20
	0.40mm, ALL	HB75 IEC 60695-11-10, -20
<b>Electrical properties</b>		
Hot-wire ignition (HWI)	0.40mm	PLC 0
	0.75mm	PLC 0
	1.5mm	PLC 0
	3.0mm	PLC 0
High amp arc ignition (HAI)	0.40mm	PLC 0
	0.75mm	PLC 0
	1.5mm	PLC 0
	3.0mm	PLC 0
Comparative tracking index (CTI)	PLC 1	UL 746A
Inclined-plane tracking	1.0 kV	ASTM D2303
<b>Thermal properties</b>		
RTI Elec	0.40mm	140°C
	0.75mm	150°C
	1.5mm	150°C
	3.0mm	150°C
RTI Imp	0.40mm	105°C
	0.75mm	115°C
	1.5mm	115°C
	3.0mm	115°C

## Ultramid® B3EG6

- UL94 HB
- High mechanical strength
- Good processability

<b>Thermal properties</b>		
RTI Elec	0.75mm	120°C
	1.5mm	120°C
	3.0mm	120°C
	6.0mm	120°C
RTI Imp	1.5mm	95.0°C
	3.0mm	95.0°C
	6.0mm	95.0°C
RTI Str	1.5mm	130°C
	3.0mm	130°C
	6.0mm	130°C
Flammability class - UL	1.5mm, ALL	HB
	3.0mm, ALL	HB
	6.0mm, ALL	HB
	3.0mm, ALL	HB40
	6.0mm, ALL	HB40
	1.5mm, ALL	HB75

# CHARGING CABLE JACKETING

## Elastollan® 1100 W-, FHF- & FR-Series

- Non-halogenated flameretardant ether grades
- Superior hydrolysis resistance
- Outstanding wear resistance
- DIN EN 50620 and IEC 62893-EVM-1
- Cold temperature flexibility and ability to be coiled



For more information, go to

<https://wireandcable.basf.us/features/read/elastollan-1176a10fr-and-1188a10fr-new-solutions-for-emobility>

# LOADING GUN

## Haptic element – Elastollan® 1185

- Good adhesion to PA housing
- Good chemical resistance
- UV resistance

## Contact carrier – Ultramid® B3U42G6

- UL94 V0
- Halogen free
- CTI 600

## Housing – Ultramid® B3SR03

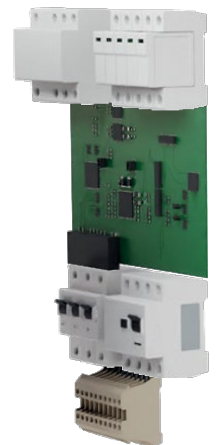
- High chemical resistance
- UL94 V2 UL f1 approved
- High toughness



# BREAKERS, SWITCHES AND SAFETY COMPONENTS

Materials with UL, IEC, CCC, CSA approvals:

- Ultramid® B3UG4 → UL94 V2 (0.71 mm), CTI etc.
- Ultramid® B3U42G6 → UL94 V0 (0.8 mm), CTI 600
- Ultramid® C3U → UL94 V0 (0.4 mm), GWIT 775
- Ultramid® A3UG5 → UL94 V0 (0.75 mm)
- Ultramid® B3U30G6 → UL94 V2 (0.75 mm)



# PUBLIC CHARGING STATION OVERVIEW

HPC-Loading Gun



Smart Meter

Power Electronics

Tubes



Ultramid®

Ultradur®

Ultrason®

Elastollan®

HPC-Loading Gun

Smart Meter

Power Electronics

Tubes

Charging Inlet

High voltage connectors for power distribution

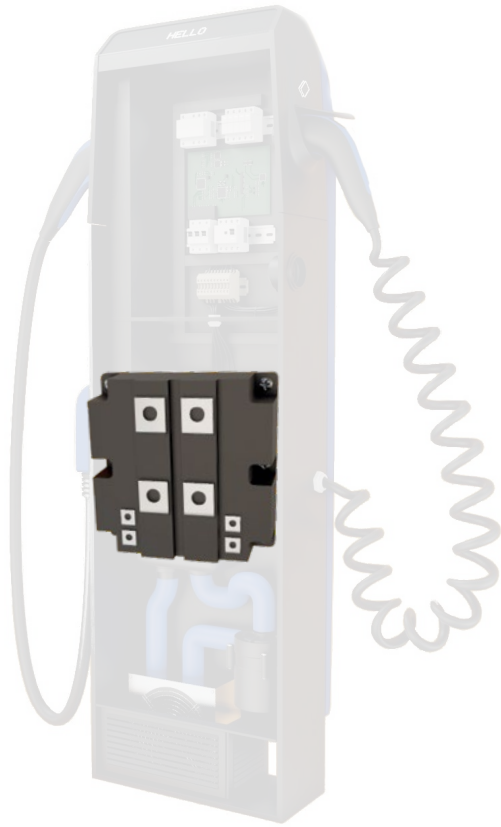
Durable orange-colored products

Charging Cable Jacket



# PUBLIC CHARGING STATION - POWER ELECTRONICS

## Ultradur® B4450G5



### Key requirements

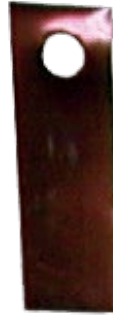
- Electric insulation of high AC and DC voltages
- Excellent insulation performance for tight contact arrays
- High CTI and RTI
- Constant dielectric strength
- Very few free ions, to avoid electrical corrosion under DC currents
- Long term thermal resistance
- Thermal conductivity if risk of hot spots exist

### Corrosion

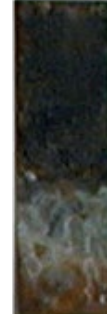
Ref. PBTGF25 FR

Ultradur® B4450 G5

#### Copper



#### Brass

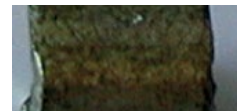


Storage of metal contacts and pellets in moist heat at 70 °C for 55 days.

### Deposits

Ref. PBTGF25 FR

Ultradur® B4450 G5



Storage of metal contacts and pellets in dry heat at 150 °C for 7 days.

## Significantly reduced risk of corrosion and deposits

# CHARGING INLET



## Ultramid® B3EG6 black

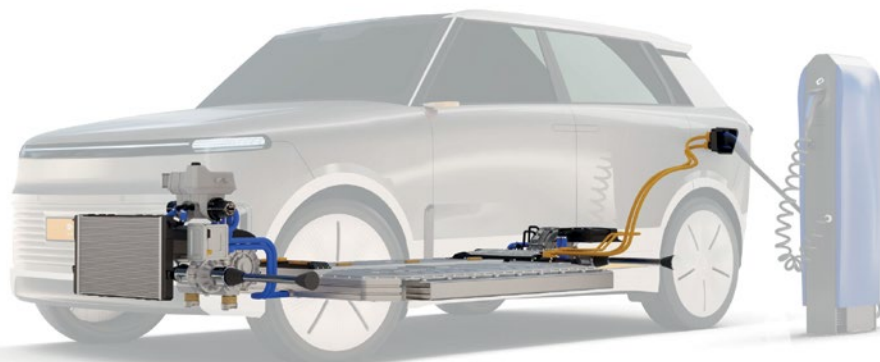
- UL94 HB

## Ultramid® B3U30G6 black

- UL94 V2

## Ultradur® B4450G5 black

- UL94 V0



### Key requirements

- High mechanical strength
- UV resistance
- High CTI
- Dielectric strength

# HIGH VOLTAGE CONNECTORS FOR POWER DISTRIBUTION

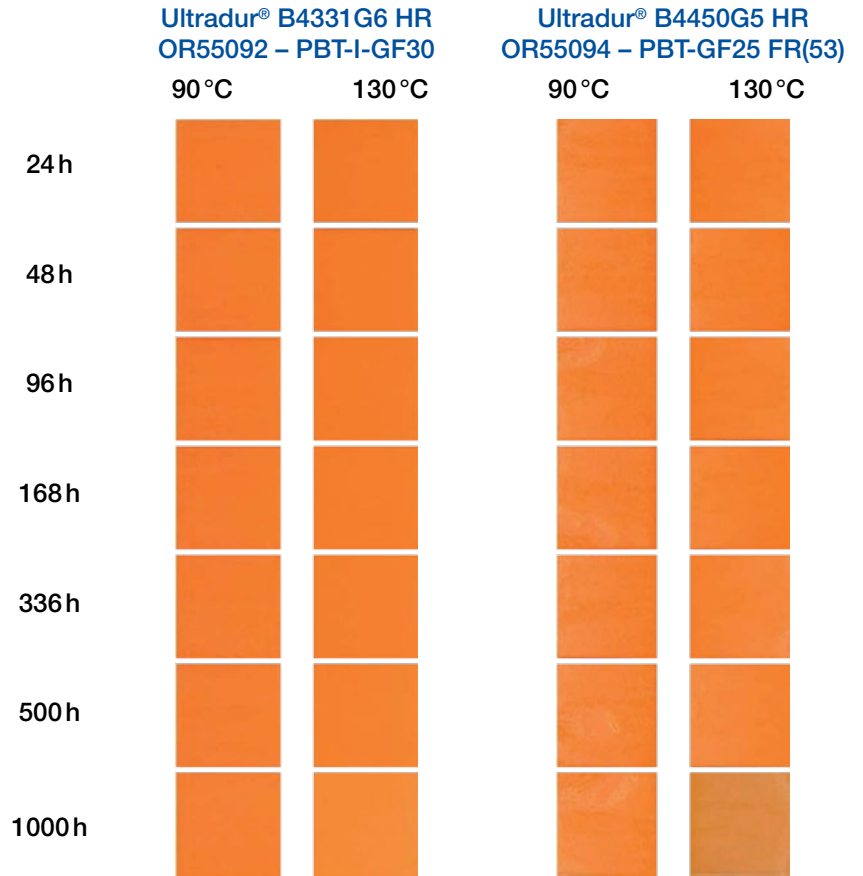
## Ultradur® and Ultramid®



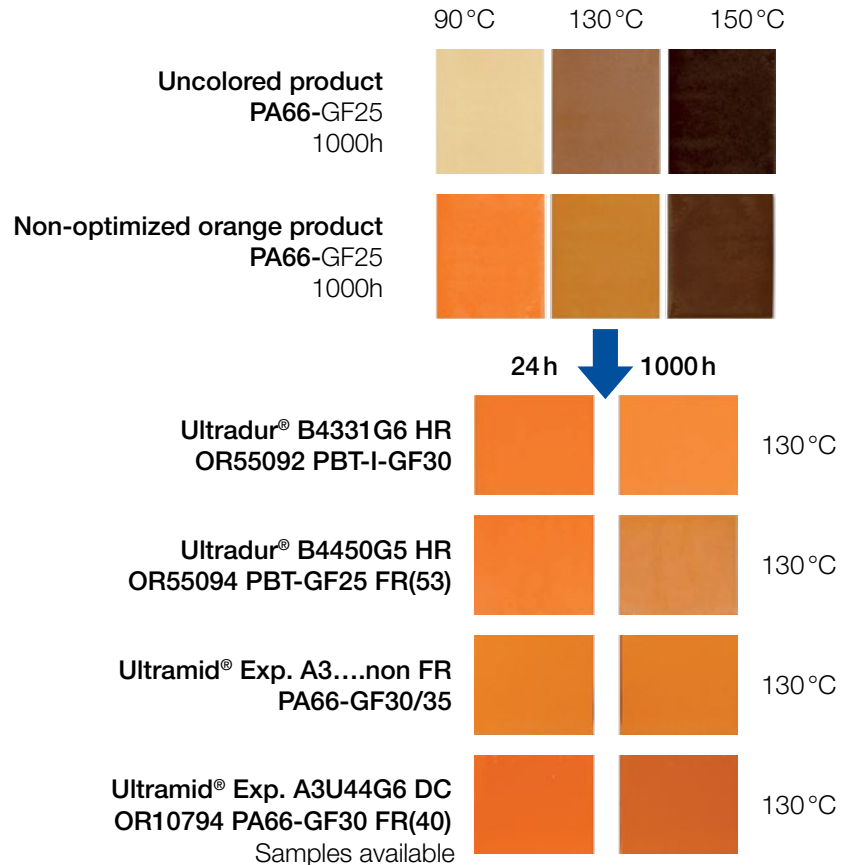
- UL94 HB and V0
- High mechanical strength
- High CTI
- Hydrolysis resistance
- Good processability
- Durable orange color

# DURABLE ORANGE-COLORED PRODUCTS

## Ultradur® and Ultramid®



## Existing materials and new developments





To learn more about our innovative solutions, please go to:



### Virtual Car:

[https://plastics-rubber.basf.com/global/en/performance\\_polymers/industries/pp\\_automotive/applications/application\\_electronics\\_for\\_automotive/appl\\_emobility/virtual-car.html](https://plastics-rubber.basf.com/global/en/performance_polymers/industries/pp_automotive/applications/application_electronics_for_automotive/appl_emobility/virtual-car.html)



### eMobility solutions:

[www.eMobility-plastics.basf.com](http://www.eMobility-plastics.basf.com)



### Automotive Electric and Electronic solutions:

[https://plastics-rubber.basf.com/northamerica/en/performance\\_polymers/industries/pp\\_automotive/applications/application\\_electronics\\_for\\_automotive.html](https://plastics-rubber.basf.com/northamerica/en/performance_polymers/industries/pp_automotive/applications/application_electronics_for_automotive.html)



### Elastollan solutions for EV Charging Cables:

<https://wireandcable.basf.us/features/read/elastollan-1176a10fr-and-1188a10fr-new-solutions-for-emobility>



**Patrick Frey**

Segment Manager E&E and Manufacturing Industrial  
Performance Materials Europe  
patrick.frey@basf.com

**Andreas Nixdorf**

Group Leader Technical Development EP Industrial  
Performance Materials Europe  
andreas.nixdorf@basf.com



**Mark Ottens**

Segment Manager – TPU Extrusion  
Performance Materials Europe  
mark.ottens@basf.com

**Note**

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**Further information on plastics for Charging infrastructure can be found on the internet:**

[www.ultradur.basf.com](http://www.ultradur.basf.com)  
[www.ultramid.basf.com](http://www.ultramid.basf.com)  
[www.elastollan.basf.com](http://www.elastollan.basf.com)

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[www.plastics.basf.de](http://www.plastics.basf.de)