No electric car without plastic

Engineering plastics and polyurethanes in the BMW i3
Seat backrest in the driver and passenger seats

The seat backrest in the driver and passenger seats is the first injection molded and uncoated structural component made from polyamide (PA) to have a visible surface and to be used in the vehicle interior. This lightweight hybrid component, weighing only 2 kg, embodies all the know-how of BASF’s Global Seat Competence Team.

Material:
Ultramid® B3ZG8 UV (PA)

Properties:
- High UV-stability
- Very good scratch resistance
- Excellent surface quality
- Sufficient rigidity
- Good elongation and toughness from -30°C to +80°C
- Low emission
- Use of simulation tool Ultrasim®: accompanied all the required certificates at different seat positions, temperatures and loads

The seat backrest owes its final, complex and above all very slim shape to the early use of BASF’s universal simulation tool Ultrasim®. Thanks to the precise numerical simulation of the materials used for the backrest, release lever and belt guide, the calculated behavior in the crash simulation matched the subsequent tests very accurately.
Structural component in the carbon fiber body

The BMW i3 carbon body contains PBT (polybutylene terephthalate) structural parts between the inner and outer shell. The largest component and the first of its kind is a so-called integral component located in the rear side area between the carbon fiber body shells. Apart from its load-bearing function in the event of a crash, it also serves to keep the two body shells apart and forms the rear opening for the side window.

**Material:**
Ultradur® B4040 G6 (PBT)

**Properties:**
- High dimensional stability irrespective of surrounding climate conditions
- Necessary buckling resistance
- Use of simulation tool Ultrasim®: low-warpage production and glass fiber orientation for occurring loads achieved

The integral component comprises several smaller parts thus reducing complexity and costs. More than two dozen smaller Ultradur® components with a combined weight of around nine kilograms are integrated in other areas of the vehicle’s body where they provide reinforcement and achieve the desired acoustics.

Rear seat shell

Within the self-supporting rear seat shell, carbon fibers are combined with a polyurethane matrix for the first time in a serial production vehicle. The component integrates a variety of functions such as the cupholder attachment and storage tray, saving on both assembly work and weight.

**Material:**
Elastolit® (PU)

**Properties:**
- Wide process window
- High fatigue strength
- Very good damage tolerance

The crash-relevant part meets the stringent safety requirements by the BMW Group despite its wall thickness of just 1.4 millimeters.
Versatile BASF plastics and construction know-how in the BMW i3

By bringing together all plastics expertise in one division, BASF can offer customized solutions to innovative customers and their suppliers worldwide as well as support them during component construction. For several innovative components in the BMW i3, the electric vehicle from the BMW Group, BASF supplies versatile plastics and supported part development with extensive construction know-how. Furthermore, the BMW i3 incorporates many other parts made of BASF plastics which have already been established in a number of vehicles.

Innovations in the BMW i3
- New seat structure in the backrests of the front seats made of Ultramid® (PA)
- Multifunctional reinforcement in the carbon fiber body made of Ultradur® (PBT)
- Self-supporting rear seat shell made of Elastolit® (PU)

Established problem solvers for interior and exterior
- Structural rigidity: reinforcement of the roof frame made of Elastolit® D (PU)
- Automotive electronics: electric and electronic parts made of engineering plastics and cable elements made of polyurethane
- Interior acoustics: Elastoflex® E foams in the roof construction
- Module production: glass encapsulation system Elastolit® R for the optional sliding roof
- Axle suspension: lightweight spring aids made of the special elastomer Cellasto®
- Design: basecoats in four colors by the BASF Coatings division

Further information on all parts: www.plasticsportal.eu/bmwi3
Elastolit® D
Roof frame and A-pillar reinforcement

Elastoflex® E
Instrument panel

Elastoflex® E
Roof construction

Elastolit® R 8919
Glass encapsulation of the optional sliding roof

Ultradur® B4040 G6
Sliding roof frame

Ultradur® B4040 G6
Structural component in the carbon fiber body

Ultradur® B4040 G6
C-pillar cover

Elastolit® D
Roof frame and A-pillar reinforcement

Cellasto®
Spring aids for the front and back axle suspension

Ultradur® B4040 G6
Sliding roof frame

Ultradur® B4040 G6
C-pillar cover

Ultramid® A3EG6
High-voltage connector

Ultradur® B4040 G6
Sliding roof frame

Ultramid® B3ZG3
Fuse box

Elastolit®
Rear seat shell

Elastoflex® E
Instrument panel

Ultradur® B4040 G6
Seat backrest in the driver and passenger seats

Elastolit® R 8919
Glass encapsulation of the optional sliding roof

Ultradur® B4040 G6
Structural component in the carbon fiber body

Cellasto®
Spring aids for the front and back axle suspension

Ultradur® B4040 G6
Sliding roof frame

Ultramid® A3EG6
High-voltage connector

Ultradur® B4040 G6
Sliding roof frame

Ultramid® B3ZG3
Fuse box

Elastolit®
Rear seat shell

Elastoflex® E
Roof construction
Selected Product Literature:

- Ultramid® – Product Brochure
- Ultramid® – Product Range
- Ultradur® – Product Brochure
- Ultradur® – Product Range
- Engineering Plastics for Automotive Electrics – Products, Applications, Typical Values

Note
The data contained in this publication are based on our current knowledge and experience. In view of the many factors that may affect processing and application of our product, these data do not relieve processors from carrying out own investigations and tests; neither do these data imply any guarantee of certain properties, nor the suitability of the product for a specific purpose. Any descriptions, drawings, photographs, data, proportions, weights etc. given herein may change without prior information and do not constitute the agreed contractual quality of the product. It is the responsibility of the recipient of our products to ensure that any proprietary rights and existing laws and legislation are observed. (October 2014)

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www.plasticsportal.eu
www.polyurethanes.basf.eu

Additional information on specific products:
www.plasticsportal.eu/name of product
e.g. www.plasticsportal.eu/ultramid

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