

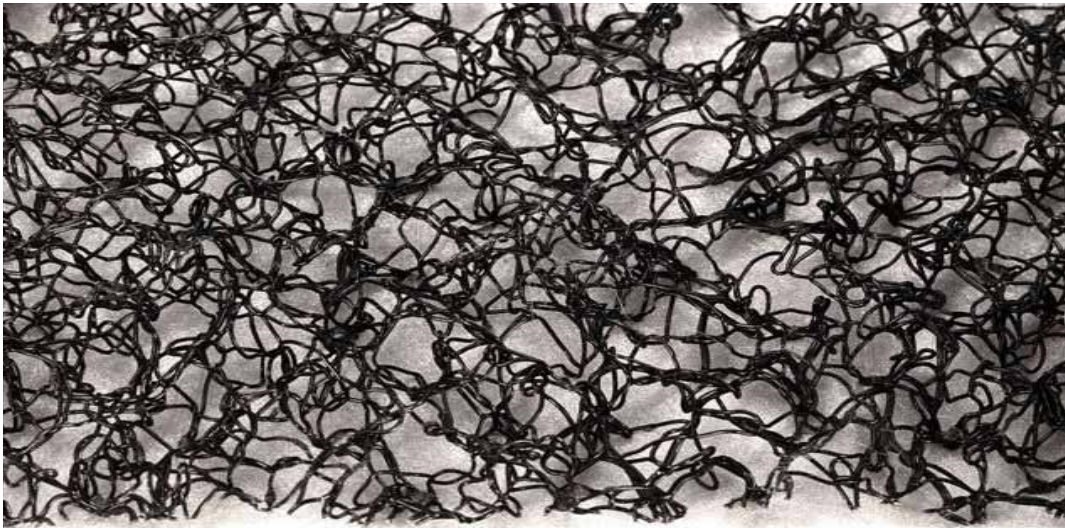
# Flow medium and Spacers for molding processes



# Polymeric spacer mats for automotive components

## What are polymeric spacer mats?

- Flexible monofilament mats made out of polymers like Polyester (PET), Polypropylene (PP) and Polyamide 6 (PA6).
- “Open” structure (>95% voids), usually with a cup, V-shaped -or pyramid shape;
- Thicknesses vary between 1 to 23 mm



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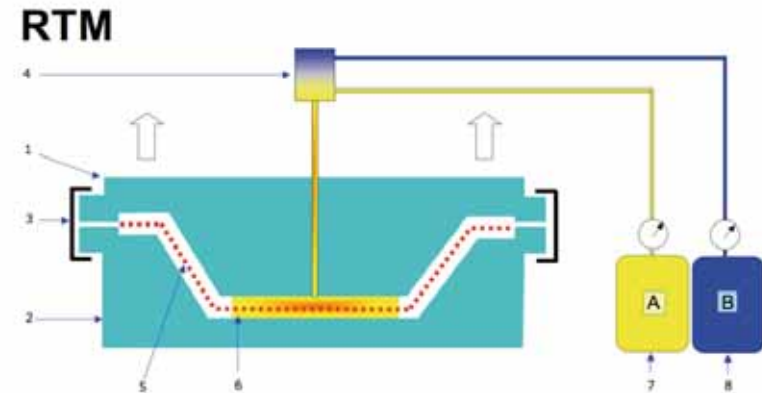
# S-RIM - PUR Foam Injection process

S-RIM = Structural Reaction Injection Molding

The S-RIM process is based on the injection of the two polyurethane components (a polyol and an isocyanate) inside a mold cavity

Mold-filling:

- Open Mold;
- Closed Mold;
- semi open/closed



Quantities are 500-10.000 pieces/year.

When products need to be strong, light weight or have complex curvatures

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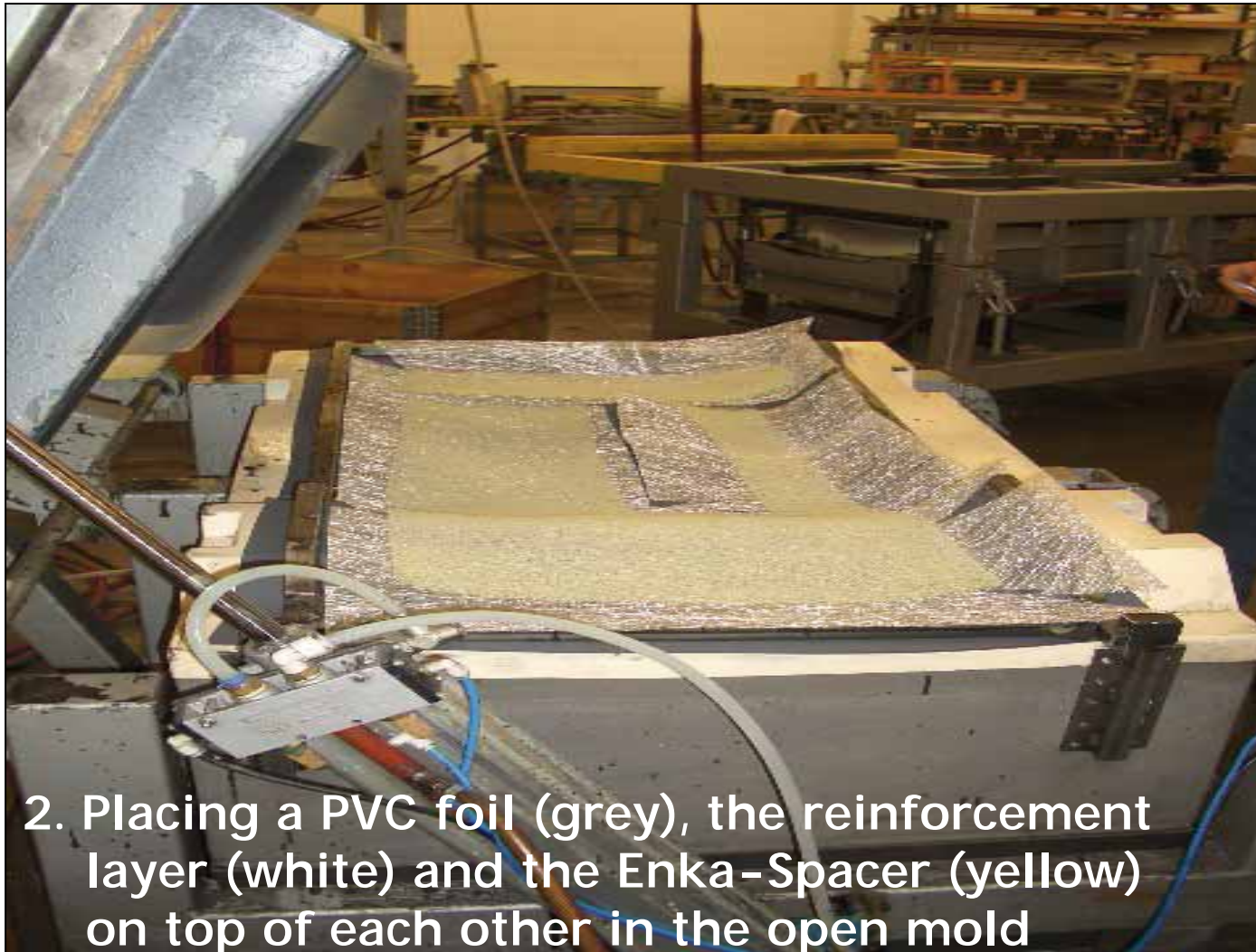
# Example of S-Rim (open) molding



1. Preparation of the mold,  
spraying of release agent

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## Example of open molding



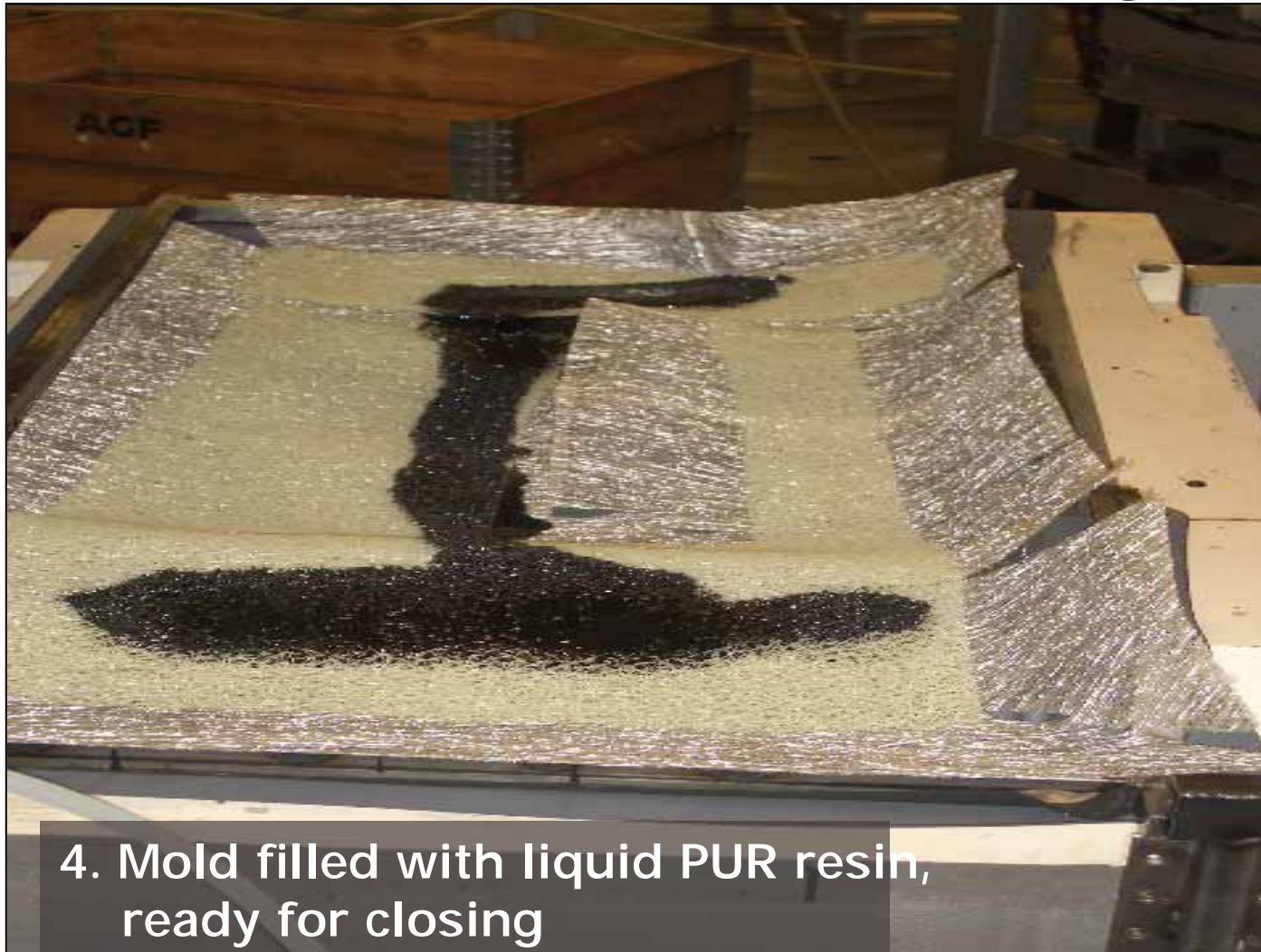
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# Example of openmolding



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## Example of open molding



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## Example of open molding

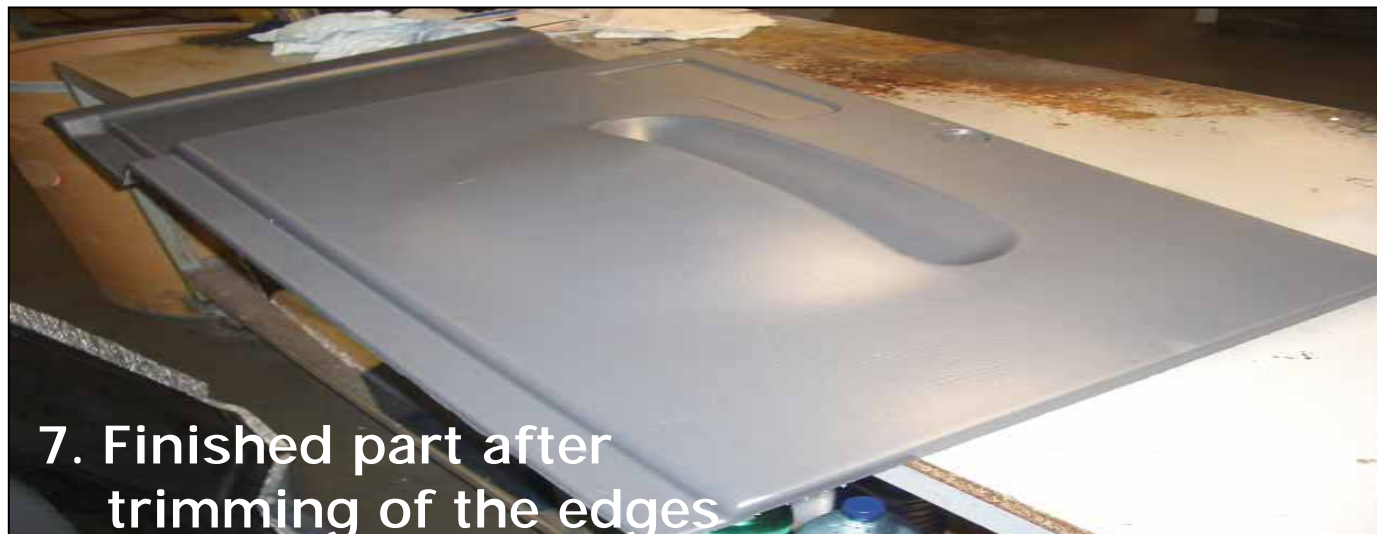


5. Open mold after foaming and curing of the PUR resin

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# Example of open molding



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# Market

- Applications Automotive :
  - Automotive (special composite parts for cars, trucks and busses), like: dashboards, sunshade roofs, interior panels, bumper beams, front grills etc
- Other applications examples
  - Leisure/sports market (Ski/Snowboard and safety helmets manufacturers)



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# Spacers applied in S-RIM processes

- Spacers are usually sandwiched between multiple layers of glass-fiber and embedded in PUR.

Build up of S-RIM components:

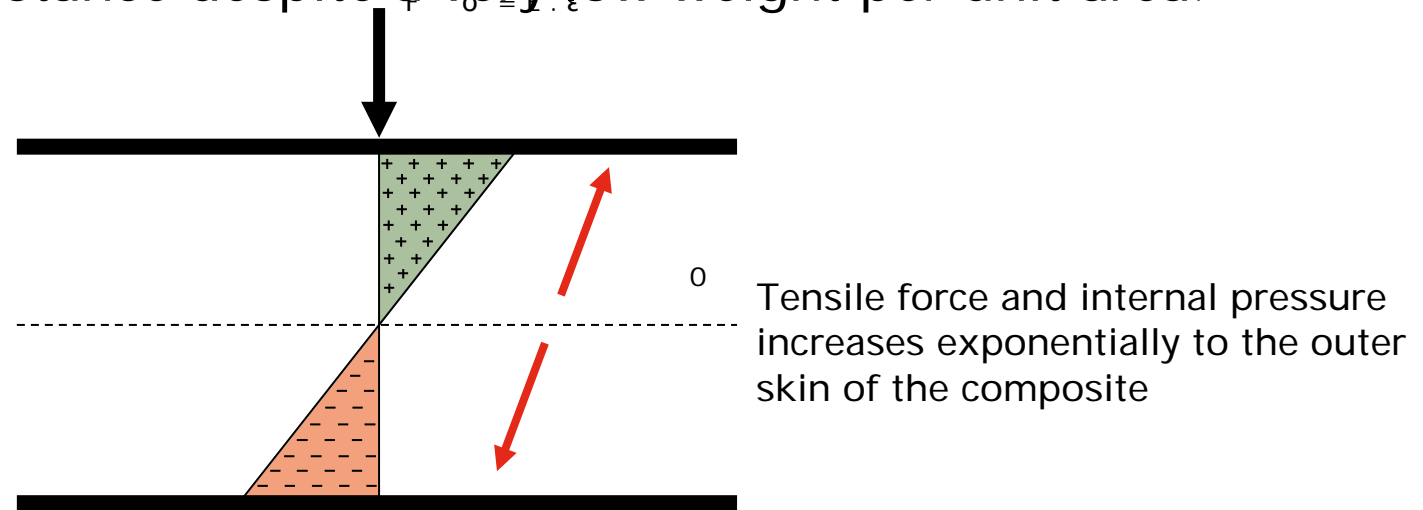
- (Glass)fiber
- Spacer material embedded in PUR
- (Glass)fiber



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# Principle functionality of Spacers

Sandwich structures panels get extremely good load-bearing properties, excellent dimensional stability and stress resistance despite a very low weight per unit area.



The better and closer the fibers are positioned to the outer layer, the higher the resistance for mechanical stress.

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# Why applying Spacers in S-RIM processes?

Dramatic improvement of product properties, in particular:

- Flexural strength and Modulus, but also
- Impact strength and heat resistance.

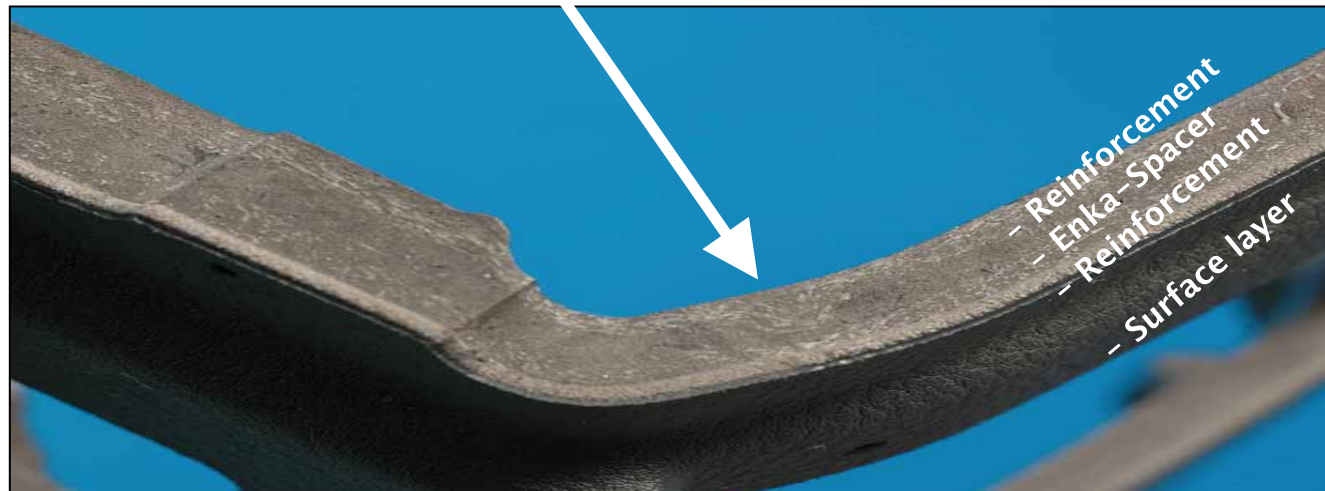
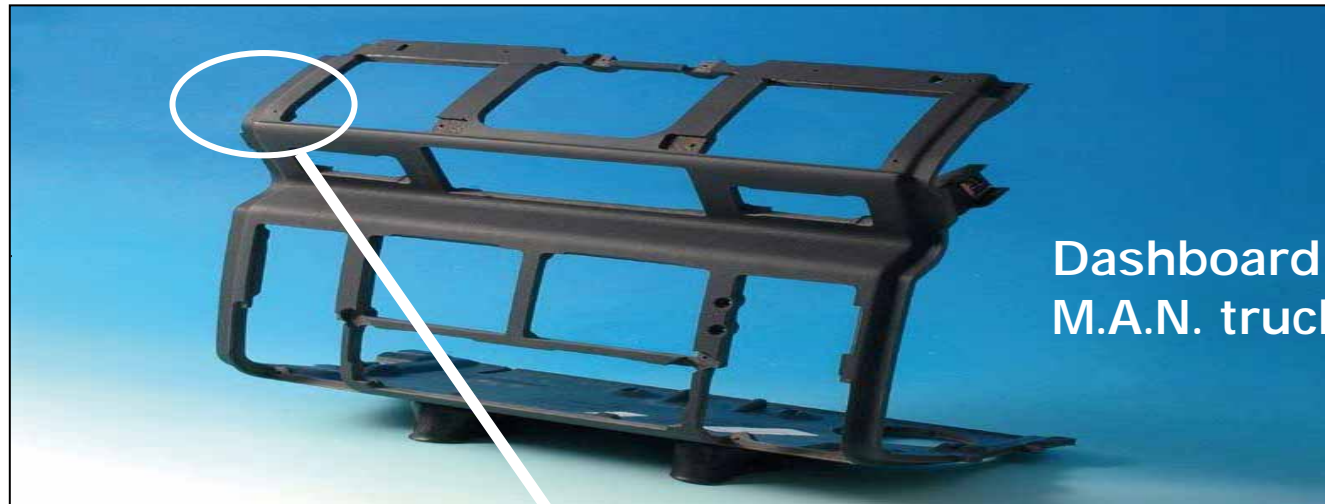
Composite made of glass mat (300 g/m <sup>2</sup> Unifllo 816) in a PUR matrix			without Enka- Spacer 7008	with Enka- Spacer 7008	improvement in %
Flexural strength	MPa	EN ISO 178	28	64	128
Flexural modulus	MPa	EN ISO 178	940	2380	153
Impact strength	kJ/m <sup>2</sup>	EN ISO 179	21	27	28
Heat resistance	C	ISO 53432	143	202	41

Source: Bayer AG

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# Example of Spacer application



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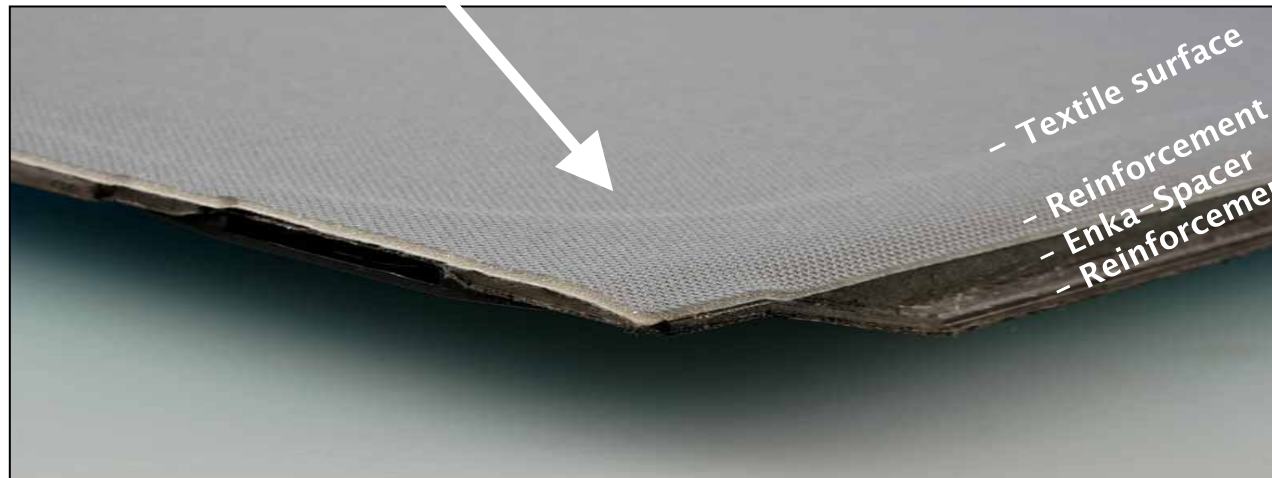
# Example of spacer applications



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# Example of Spacer application

Sliding roof  
BMW



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# Example of spacer applications

Locking cap storage box  
Neoplan Bus



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# Advantages Spacers:

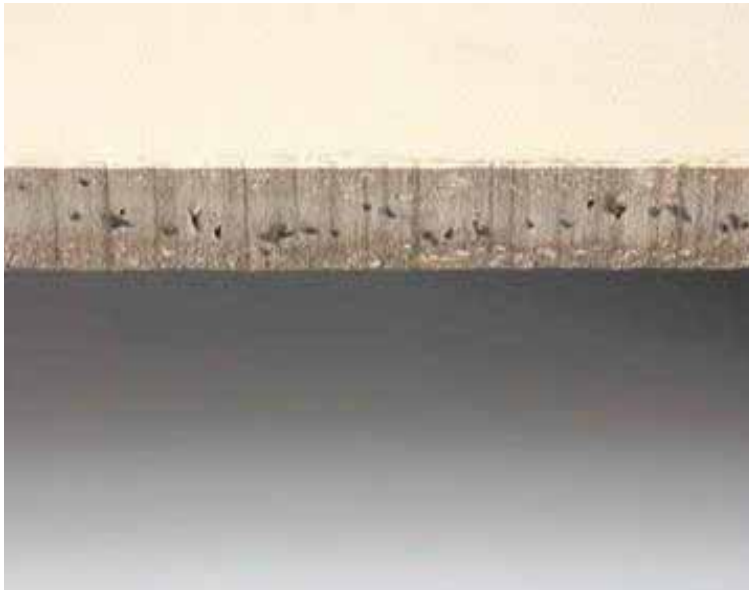
- Easy to process:
  - High resilience of (PA6) Spacers presses the (glass)fibers to the inner skin and follows the geometry of the mold easily
  - Open mat structure allows PUR to flow regular and avoids air inclusion;
  - Can be applied in heavily contoured parts with varying wall thicknesses.
  - Can be easily cut and handled



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# Advantages Spacers in short:

- Improvement of overall product properties:
  - Smoother surfaces;
  - Heat resistance;
  - Impact strength
  - tensile strength (flexural strength and modulus/rigidity)



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