Load Floor and Rear Seatback
Ford Galaxy and Ford S-Max in SymaLITE

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Outline

- Application
- Material
- Processing
- Summary

Application (Load Floor/Rear Seatback)

Car Model: **Ford Galaxy, Ford S-Max, SOP 5/06**

Supply Chain: **OEM: Ford Motor Company**

Tier 1: Faurecia

Tier 2, Molder: Centrotec Composites

Tier 3, Material producer: QPC

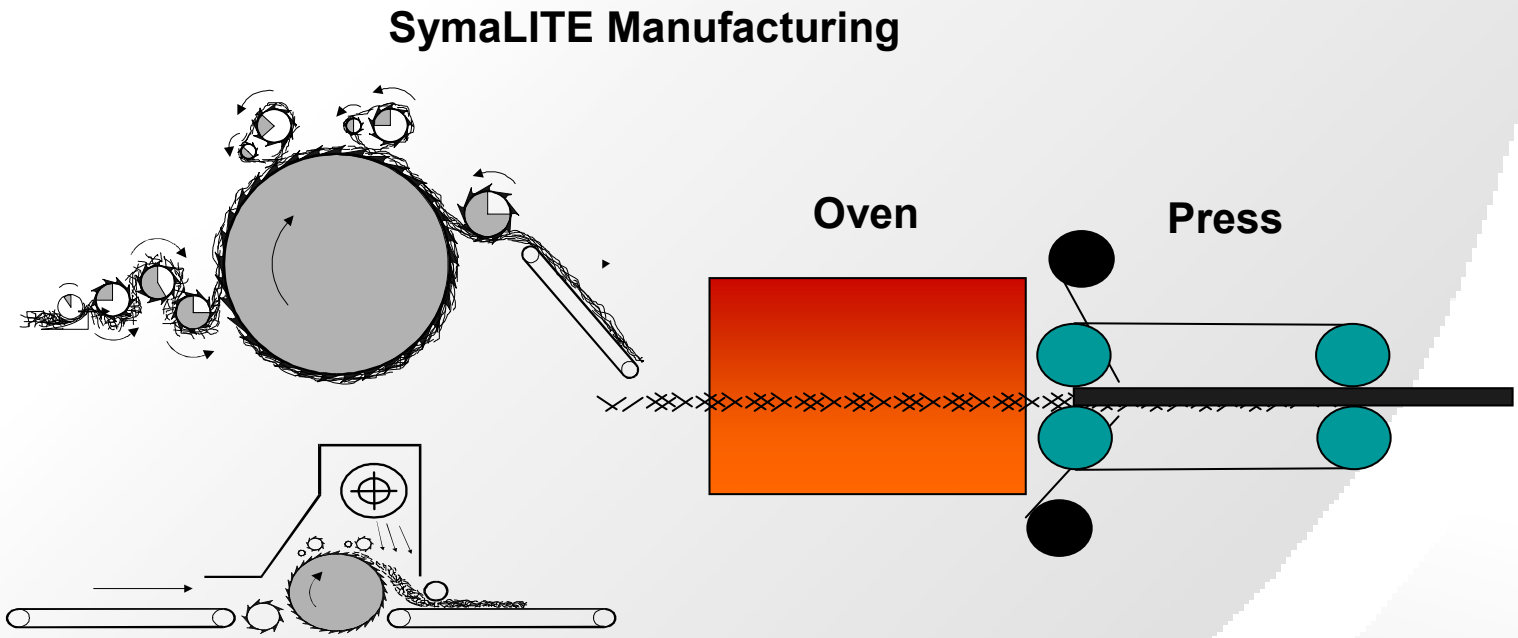
Application (Load Floor/Rear Seatback)

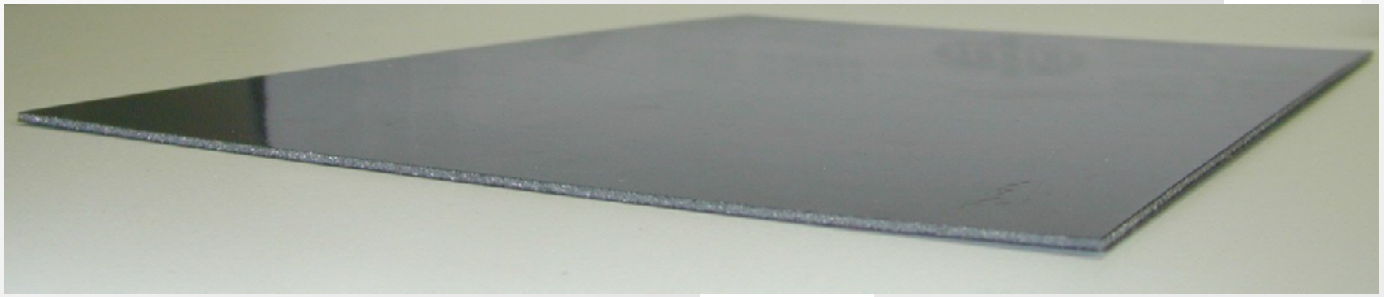
Part Details:	**Material**	**SymaLITE Intra, 1800 gsm**
	Area	**0.77 m^2**
	Weight	**2 x 1.6 kg**
	Thickness with cover	**15 mm**
	Thickness structure	**7 mm (density 0.26 g/cm^3)**
	Development time	**11 months**
	Volume	**110.000 units/a**

Application (Load Floor/Rear Seatback)

Part Details:	**Cycle time**	**90 s**
	Press force part	**220 t**
	Press force cover	**110 t**
	Hinges	**integrated with the cover**
	Cover stock	**PET- Dilour 680 gsm both sides**
	Load case	**Knee impact 980 N**
	Reinforcement	**Locally doubled material**

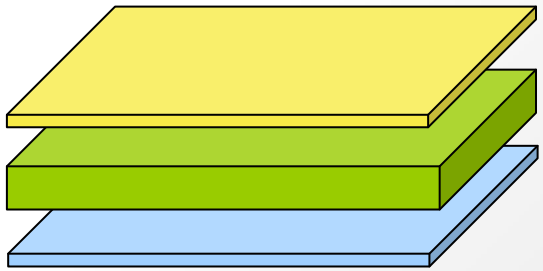
Material





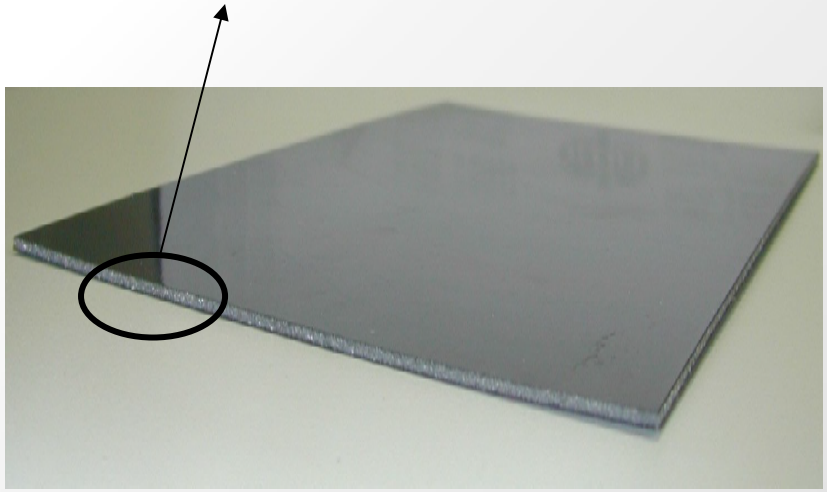
Material

SymaLITE INtra – Laminates with functional layers



Core layer

- Non-woven glass fibers in PP matrix
- Area weight: **1800 gsm** (600 – 2000)
- Glass fiber content: **55%** (30 – 55%)

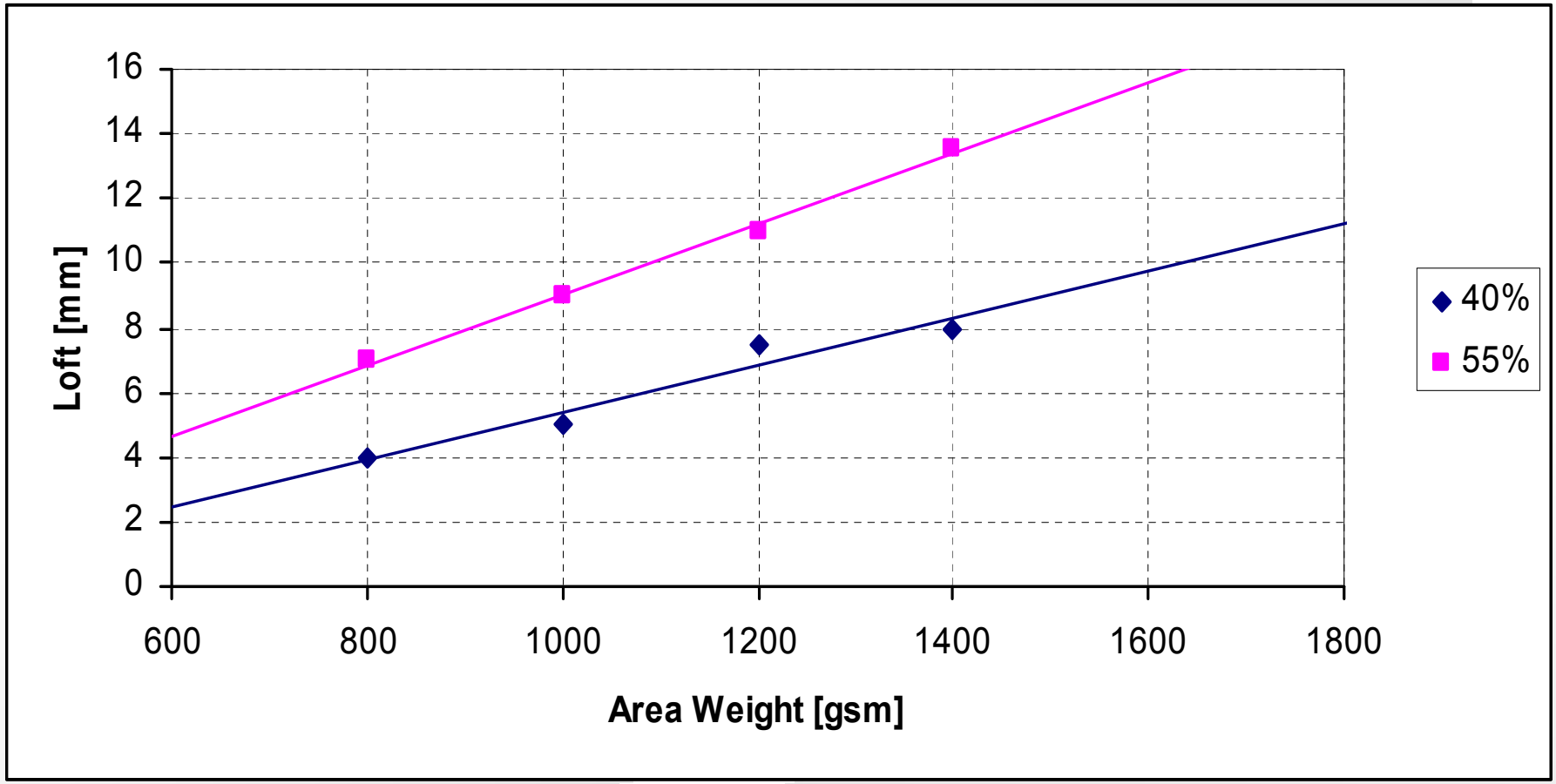


Surface layer 1 / 2

- **Thin PE-film for better adhesion**
- Non-woven PET-scrim 20-80 g/m2
- Adhesive film w. acoustic function
- Adhesive film w. barrier function
- Barrier film
- Abrasive resistant PP-film
- Thin textile composites

Material

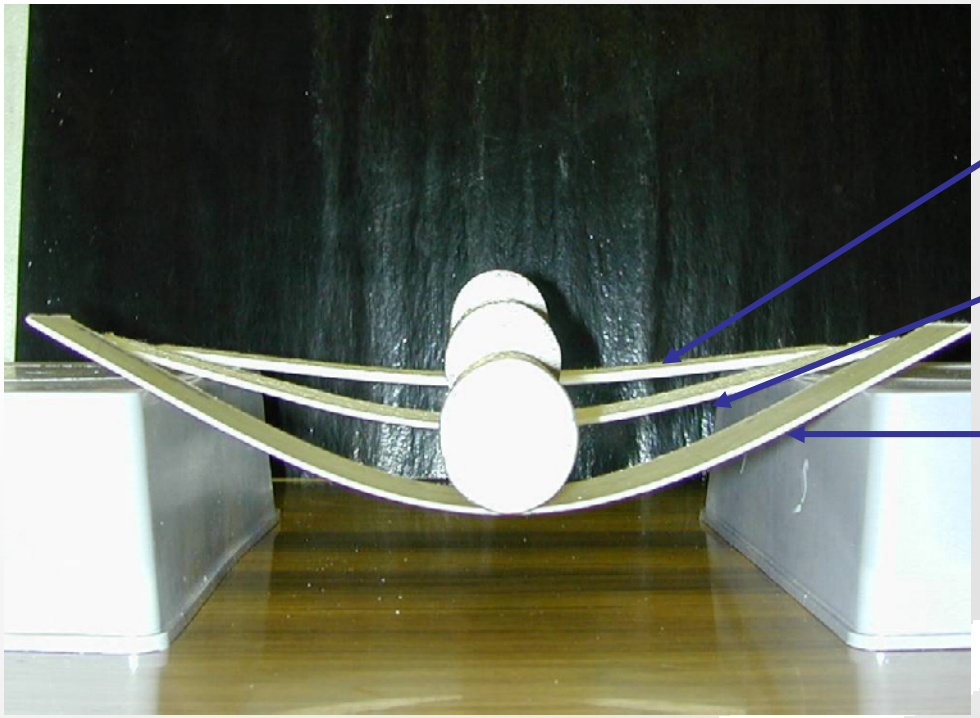
Loft vs. Area Weight, comparison between 40% and 55% glass content



Material

Tailored Consolidation

All specimen have same weight but different thickness and density --> significant reduction of deflection under the same load

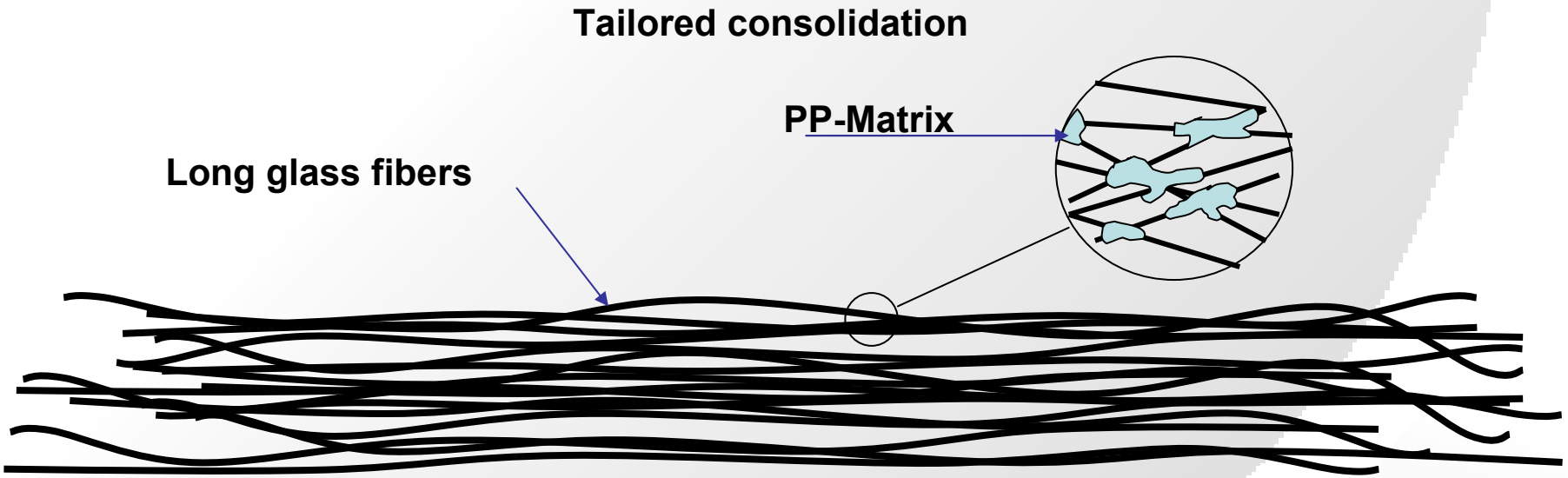


h = 3.6 mm, ρ = 0.37 g/cm^3

h = 2.4 mm, ρ = 0.55 g/cm3

h = 1.2 mm, ρ = 1.1 g/cm3
(Conventional design)

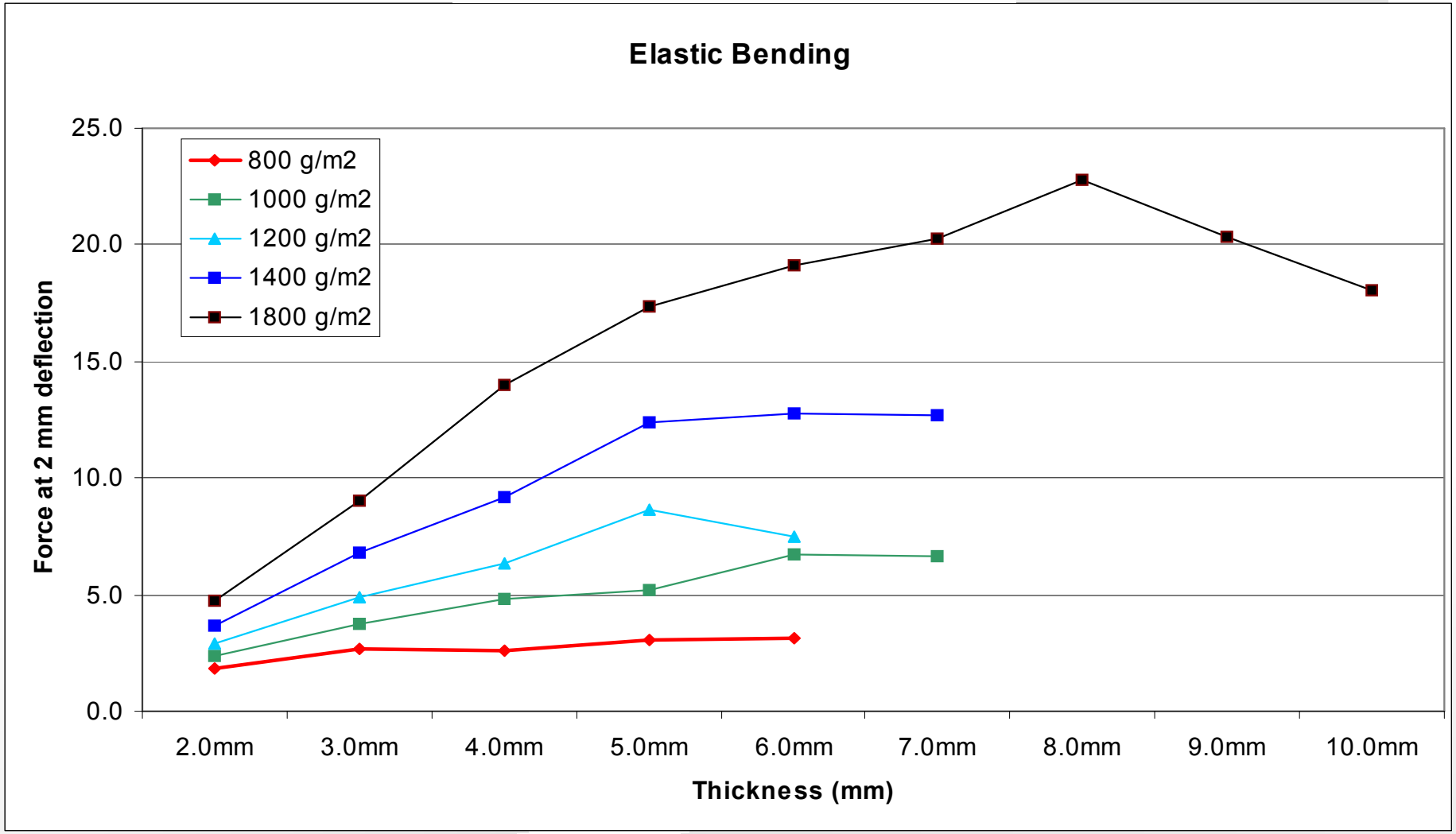
Material



⇒ **Sound absorption in the open cell structure**
⇒ **Open surface layers increase sound absorption**
⇒ **A decreased density increases stiffness**
⇒ **A decreased density increases acoustic absorption**

Material

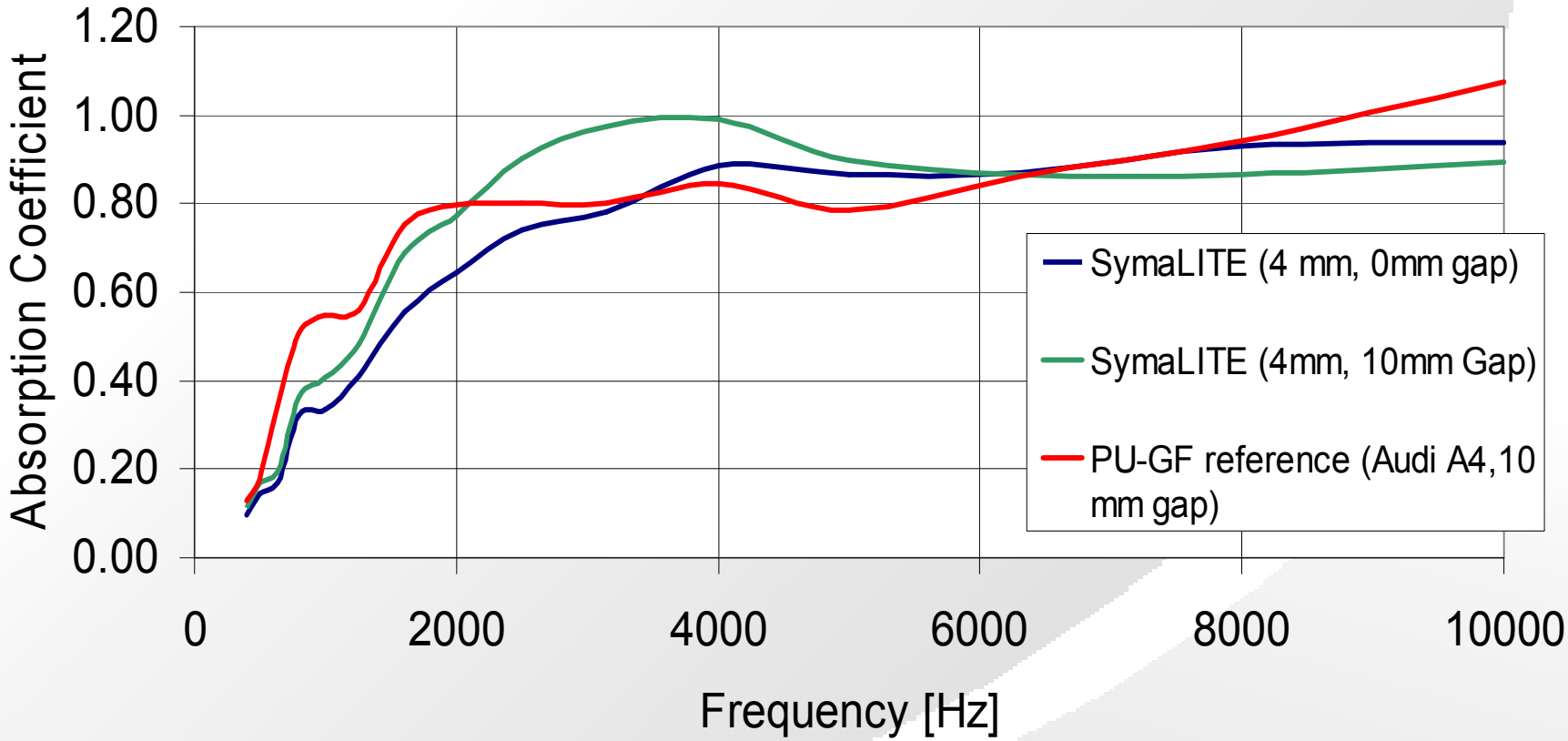
Mechanical properties - Stiffness



Spann = 100 mm, Specimen = 150 mm x 20 mm x Thickness

Material

Acoustics - Alpha Cabin Results (Bremen University):

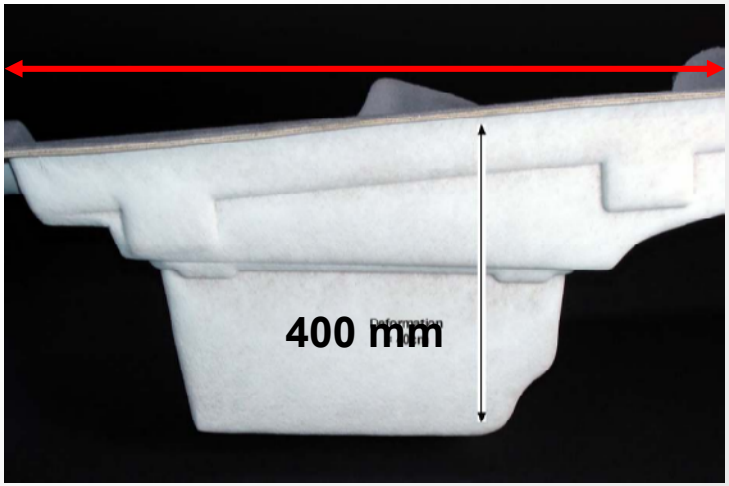


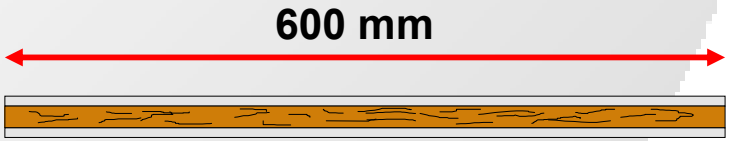
Similar absorption to “high performance” acoustics (PU-GF)

Material

Form freedom – deep draw capability

Deep draw without local thinning possible!



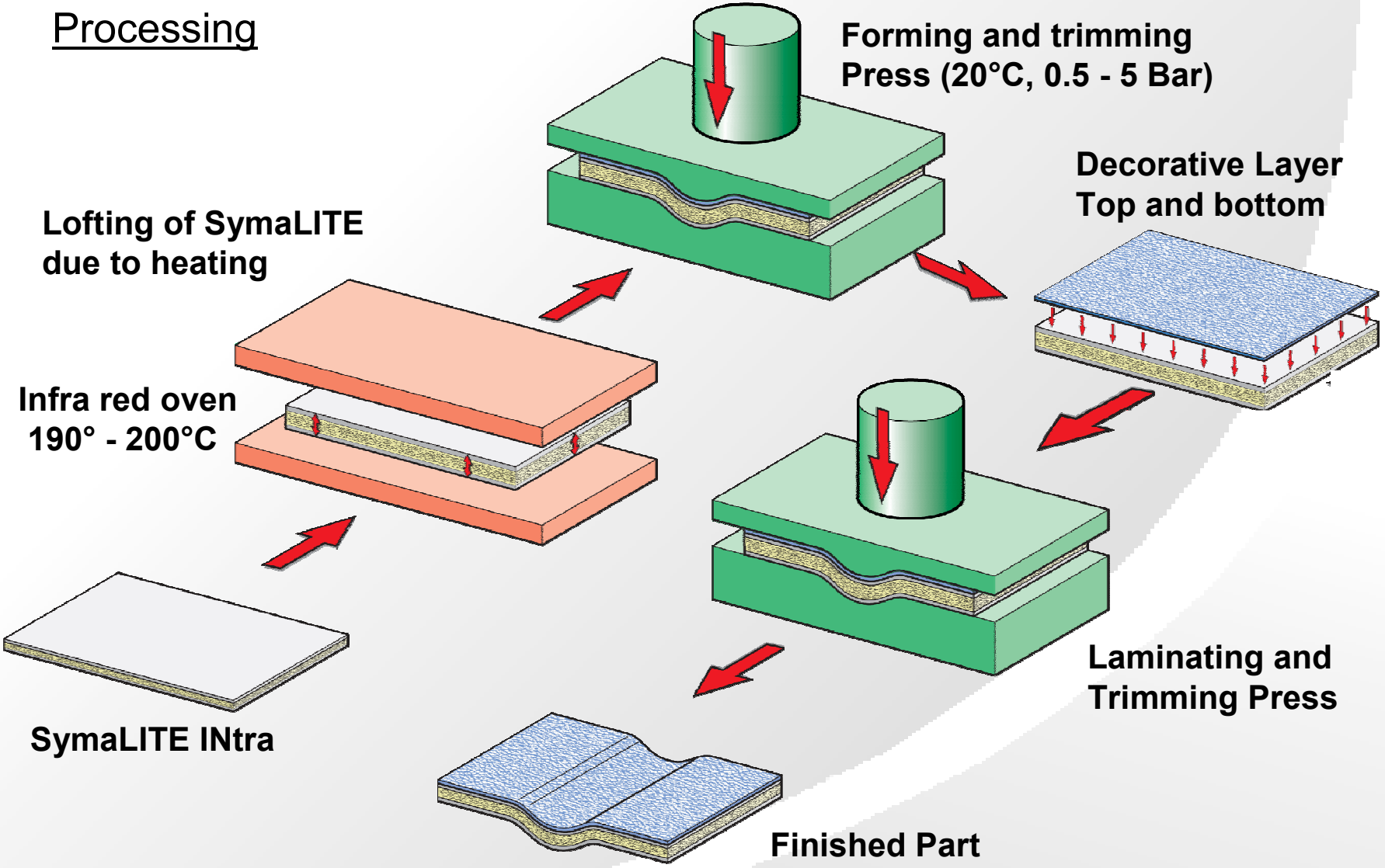


Material

Quadrant supplies material for:

- Parcel shelves
- Door panels
- Sunshades
- Headliners
- Instrument panels
- Pillar trims
- Luggage compartment claddings
- Surface layers for sandwich parts like load floors

Processing



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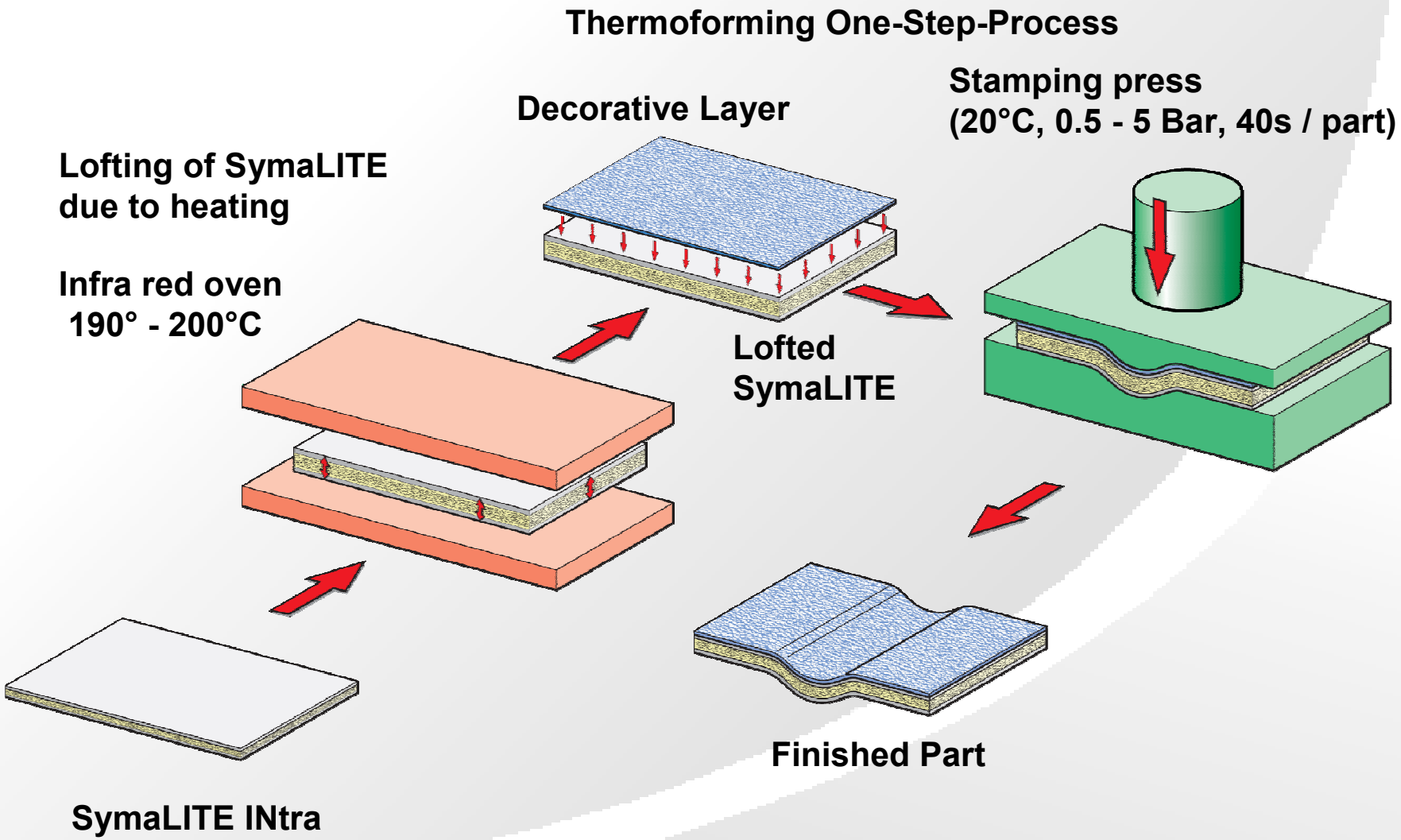

Summary

Properties:

High potential of weight saving, > 40% in this application, compared to wood fibre boards.

Tailor made mechanical properties due to lofting behavior and possible wall thickness changes from 2 – 10 mm.

Local reinforcement by doubling the material in extreme loaded areas possible.

Dimension stability at high forces of 980 N applied with a 80 mm diameter all over the part.

Very low densities in the finished part < 0.2 g/cm^3 possible, in this application 0.26g/m^3

Very good acoustical absorption due to open cell structure

Ductile failure behavior

Design freedom, deep draw, sharp edges and radii

No moisture sensitivity

Summary

Processing:

Short cycle times possible

Fast and effective heating with IR ovens

Very easy and short process

Edge trimming direct in the mold possible

Low forming pressure needed

- **low equipment investment**
- **use of pressure sensitive decoration layers**
- **fast and cheap prototyping in wooden tools**
- **high productivity while using family tools**

Integration potential like hinges and fixations possible

One and two step process