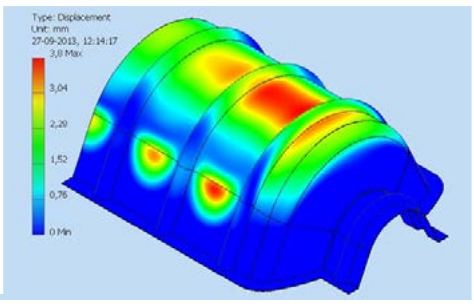
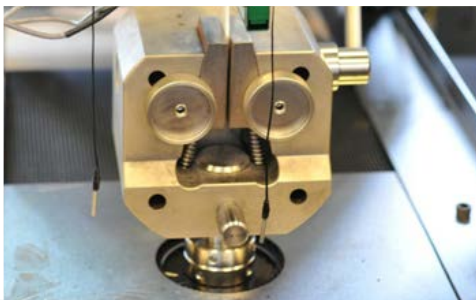




Technical Information

Composite Material

TUNETANKEN

Comparison of properties between composite and conventional materials

Composite derives from the word "componere", which means "to put together". Composite materials are made when physically combining two or more materials. Thereby, a new material with special, targeted, and superior properties is created.

The most basic advantage of composite materials is the extreme flexibility in shape and strength.

The material technical properties include the function of the qualities and properties, the combinations of the fabrics (matrix, reinforcement, curing/hardener, and additives), as well as, production processes and production conditions.

The possibilities are endless!

In many areas, composite has replaced conventional materials, such as steel, wood, and concrete. Today, for example, aircrafts, trains, ships, and tanks are produced predominantly of composite materials.

	Stretchable bracing	Beam /bar	Plate	
Material	**E/p [MPa/kg/m³]**	**$E^{1/2}/p$**	**$E^{1/3}/p$**	**σ_f/p [MPa/kg/m³]**
Steel	27	1.9	0.7	0.05-0.1
Aluminum	26	3.1	1.5	0.07-0.2
E-glass	27	3.2	1.6	0.8-1.4
S-Glass	36	3.8	1.8	1.6-2.0
HS CAP*	140	8.8	3.5	1.8
HM CAP*	170	9.3	3.6	1.2

Material indexes to maximize the stiffness limited design with minimal volume.

**Carbon fiber reinforced polyester.*

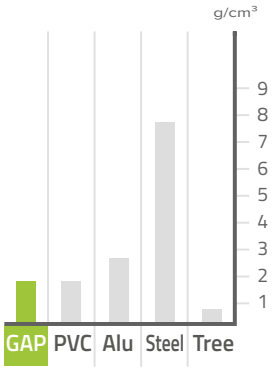
The benefits of composite materials

- High specific rigidity – E/p, $E^{1/2}/p$, $E^{1/3}/p$
- High specific strength – σ_f/p, $\sigma_f^{2/3}/p$, $\sigma_f^{1/3}/p$
- Chemical resistance.
- Corrosion and temperature resistance.
- Low weight.
- Good fatigue and weakening properties.
- Aesthetically superior surface finish and free choice of colors.
- Cost-effective design optimization.
- Customized features.
- Minimal maintenance.
- Noise-reducing and flexible.
- Thermic and electric isolation.
- Anti-magnetic and moisture resistance.
- Low thermic expansion coefficient.
- Easy processing and mounting.
- Free from sparks and metal.
- Electromagnetic transparency.

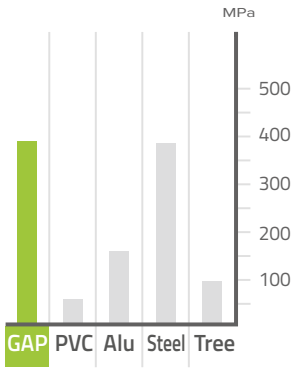
Material properties

Comparison between one type of glass fiber reinforced polyester (GRP) and PVC, aluminum, steel, and wood.

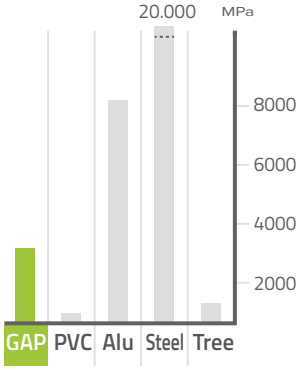
Density



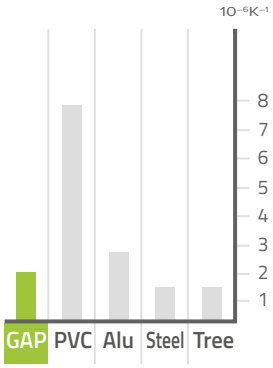
Tensile strength



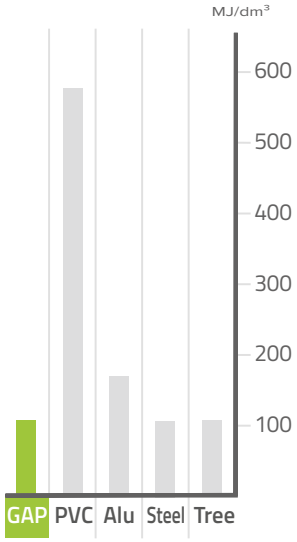
E-module Tensile strength



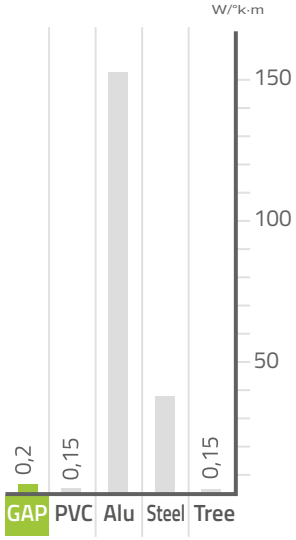
Length extension coefficient



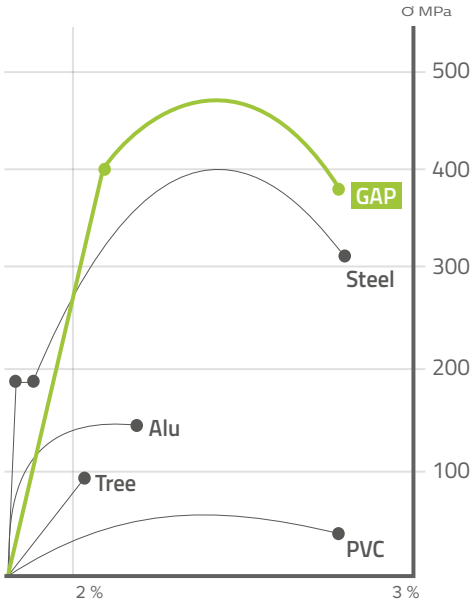
Energy consumption from material production

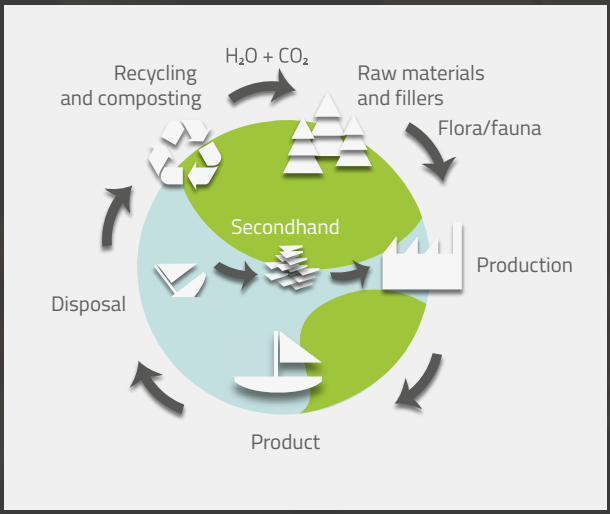


Thermal conductivity



Hooke's Law





Environment

Composite (GRP) is reusable, completely or partially, both with and without processing.

If the material cannot be re-used, it is degradable and therefore able to re-enter the natural cycle.

Tunetanken has developed a system for recycling our products when they are returned.
We reuse close to 100 % of the materials by using them in new products and/or for developed solutions. By re-using recycled materials, we achieve equivalent properties and often even better properties compared to new materials.

An environment-friendly production is important to us. Our customers contribute to the recycling system by paying an environment fee when purchasing our products.

Se our products on www.tunetanken.com

Agro

Industry

Energy

09.10.2019