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# LITEPOL®

Lightweight Engineering Plastics



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LITEPOL® is a new family of extra light engineering plastics based on Polypropylene or Polyamide and filled with Hollow Glass Microspheres<sup>1</sup>.

LITEPOL® compounds are suitable for all those applications in which weight reduction is the primary objective: for this reason they are particularly aimed at the automotive industry which is subject to strict regulations and targets in terms of reducing emissions.

<b>WEIGHT REDUCTION</b> FROM -9% TO -30%	<b>REDUCTION OF COOLING TIMES</b>	<b>EXCELLENT DIMENSIONAL STABILITY</b>
<b>STIFFNESS FROM</b> +13% TO +179%	<b>REDUCTION OF TEMPERATURE BY 1.1°C PER EACH 1% MICROSPHERES</b>	<b>EXCELLENT VERSATILITY AND CUSTOMIZATION POTENTIAL</b>
<b>MIXED HB/GF GRADES, IMPACT STRENGTH</b> FROM +20% TO +218%	<b>REDUCTION OF CYCLE TIMES</b>	<b>TECHNICAL SUPPORT DURING INJECTION MOULDING INITIAL PHASE</b>

<sup>1</sup>in short: HB Hollow Bubbles

CURRENT RANGE

POLYPROPYLENE:

**LITEPOL C 8 HB/24**  
PP copolymer with 24% HB

**LITEPOL L15 GFHB/1020**  
PP homopolymer with + 20% HB + 10% GF chemically bonded

POLYAMIDE 6:

**LITEPOL B2 GFHB/1020 H2**  
PA6 with 10% GF + 20% HB

**LITEPOL B2 GFHB/2010 H2**  
PA6 with 20% GF + 10% HB



European 2020 Target

**95 g CO<sub>2</sub>/km**

Emissions limit for new vehicles Regulation (EC) 443/2009.

2000 plastic components, 225 kg



(on average, in a medium-sized 1500 kg vehicle)

**- 100 kg**

<b>Vehicle lifespan: (*)</b>	<b>-1500 t CO<sub>2</sub></b>	<b>-750 l fuel</b>
<b>Per km:</b>	<b>-10 g CO<sub>2</sub></b>	<b>-0,4 l fuel</b>

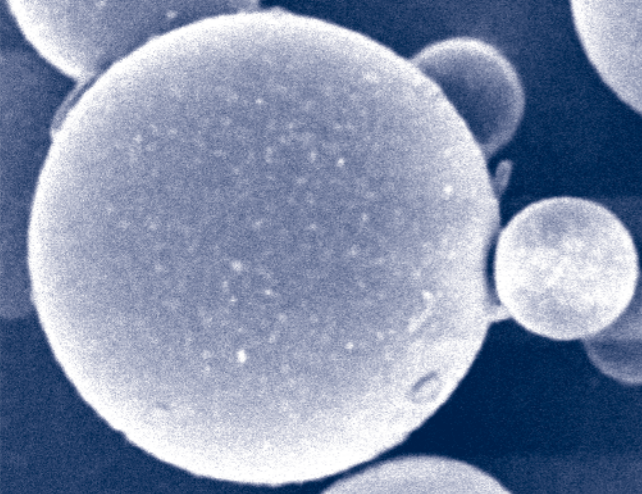
(\*) estimated consumption: medium-sized car weight = 1,500 kg / lifespan = 150,000 km/fuel consumption = 12 km/l  
Source: "Automotive. The world moves with plastics", PlasticsEurope Association of Plastics Manufacturers, 2013.



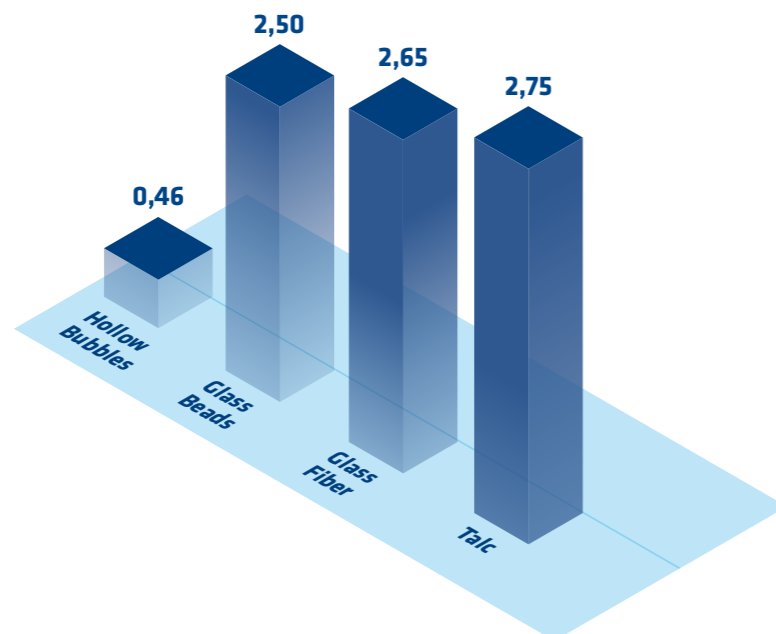
## HOLLOW GLASS MICROSPHERES

### CHARACTERISTICS

-  **LOW DENSITY**, EQUAL TO LESS THAN 1/5 OF OTHER MINERAL FILLERS
-  **LOW ACOUSTIC TRANSMITTANCE**, GIVES THE MATERIAL A SOUND DEADENING EFFECT
-  **LOW THERMAL CONDUCTIVITY**, ALLOWING FOR LOWER TEMPERATURES AND FASTER COOLING TIMES
-  **ISOTROPIC BEHAVIOUR**, ENABLES DIMENSIONAL STABILITY OF THE MOULDED PARTS

	Shape	Unicellular spheres made of borosilicate glass
	Average diameter	20 microns
	Density	0.46 g/cm <sup>3</sup>
	Crush strength	115 MPa=16500 psi
	Hardness (Mohs scale)	5
	Softening temperature	600°C
	Color	White

### DENSITY

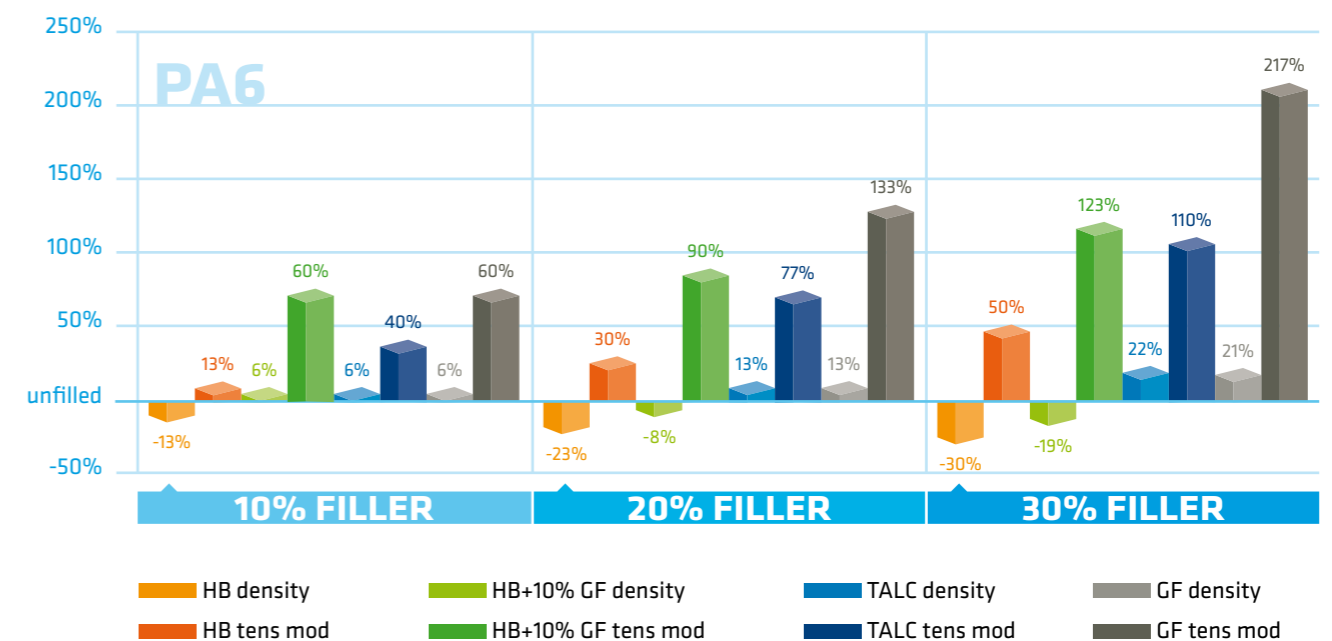
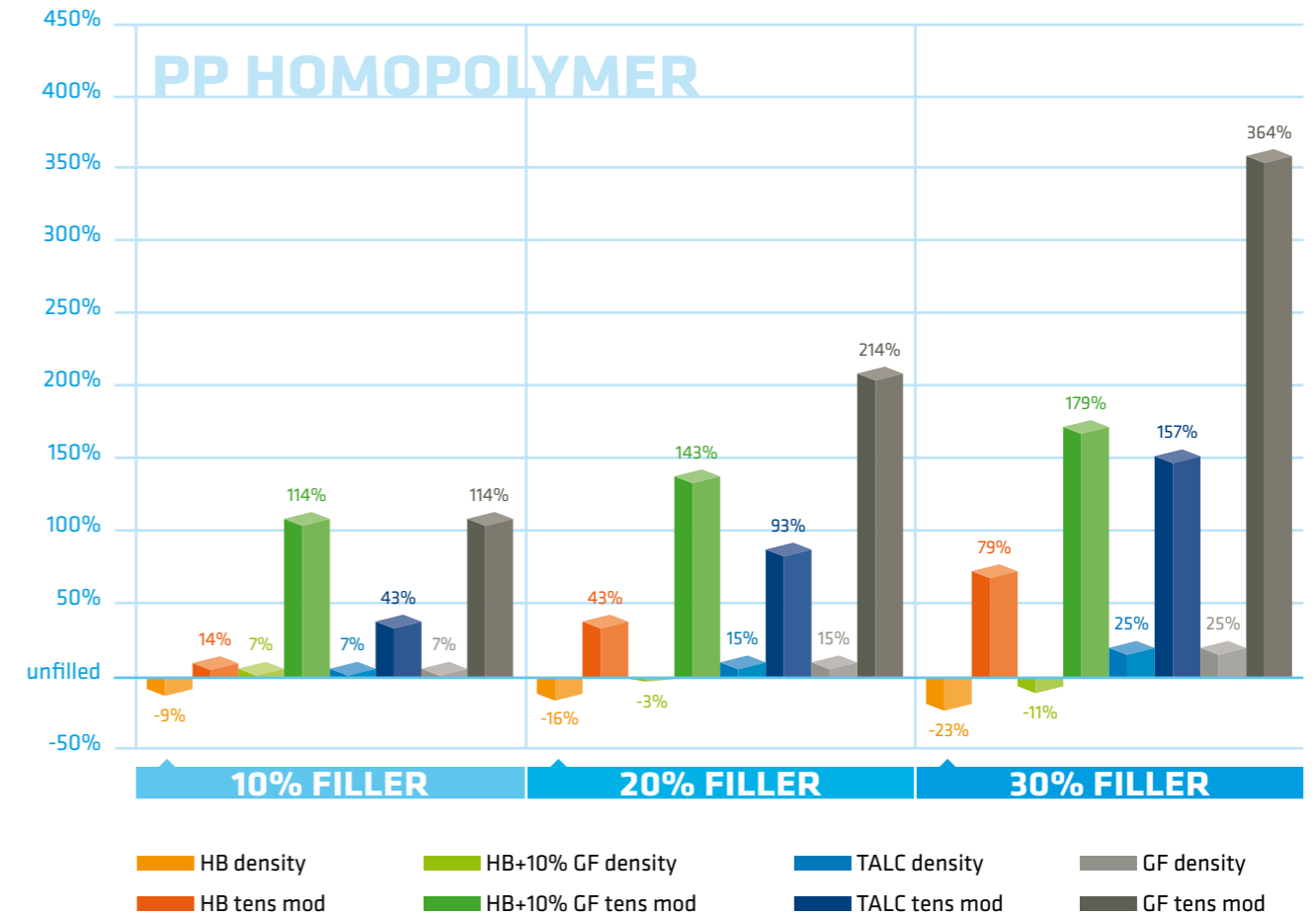


### DIMENSIONAL STABILITY

Due to their geometry, glass microspheres have an isotropic behaviour, i.e. they do not follow any preferential direction during injection moulding. This guarantees dimensional stability of the moulded pieces, avoiding **warp** problems which are typical of other mineral fillers including talc and glass fiber.

## DENSITY AND STIFFNESS

The following charts show the density/tensile modulus ratio of different mineral fillers at different filler content percentage (variations vs unfilled grades).



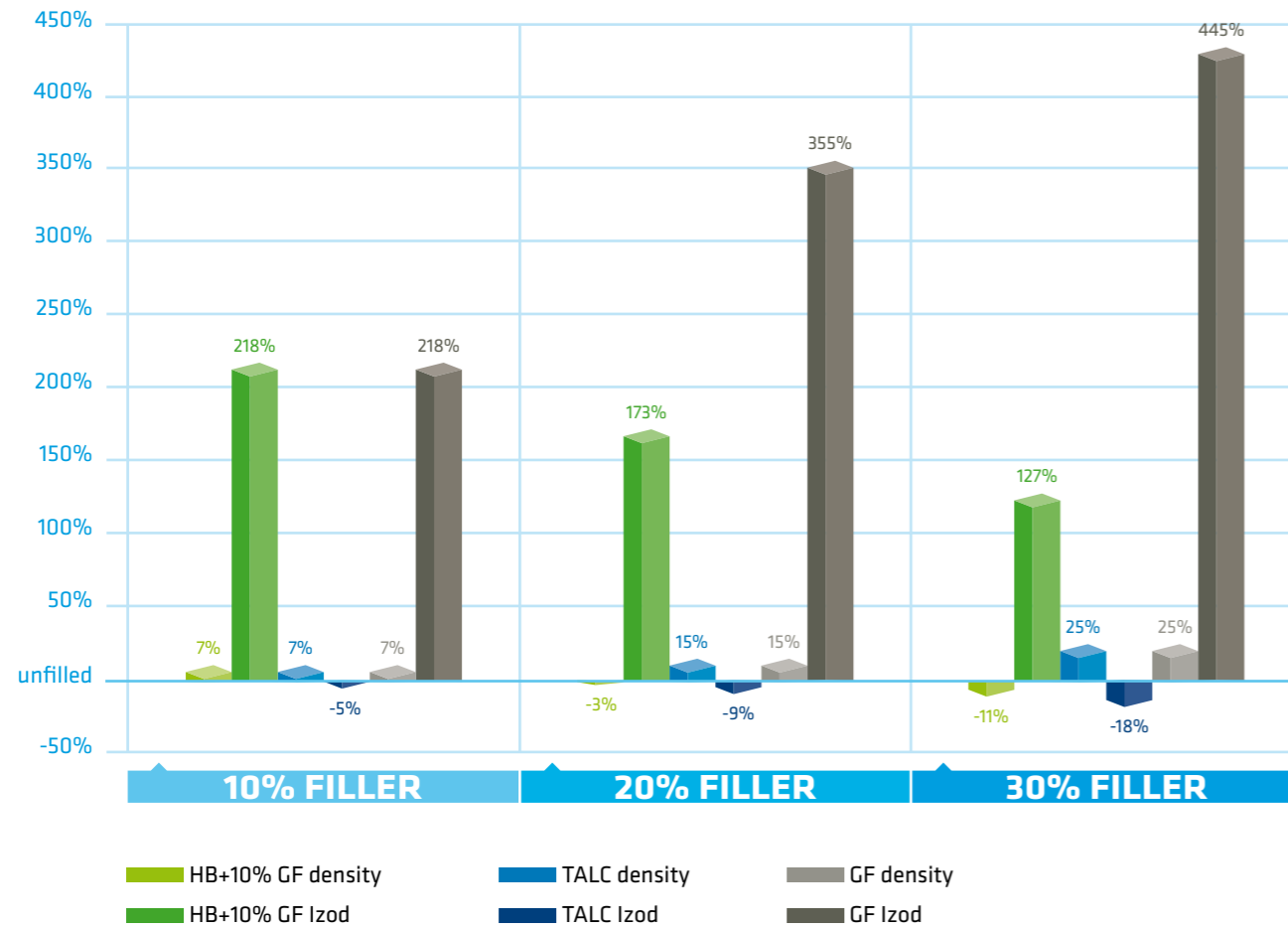
**LITEPOL® HB** filled with Hollow Glass Microspheres only, provides a **weight reduction** ranging from 9% to 30% and improvement of **stiffness** (tensile modulus) from 13% to 79% depending on the polymer base and on the percentage of microspheres used in the compound.

**LITEPOL®** mixed grades HB+10%GF provide an excellent **density/stiffness ratio**: weight reduction ranges from 3% to 19% with improvement of the tensile modulus values from 60% to 179%.

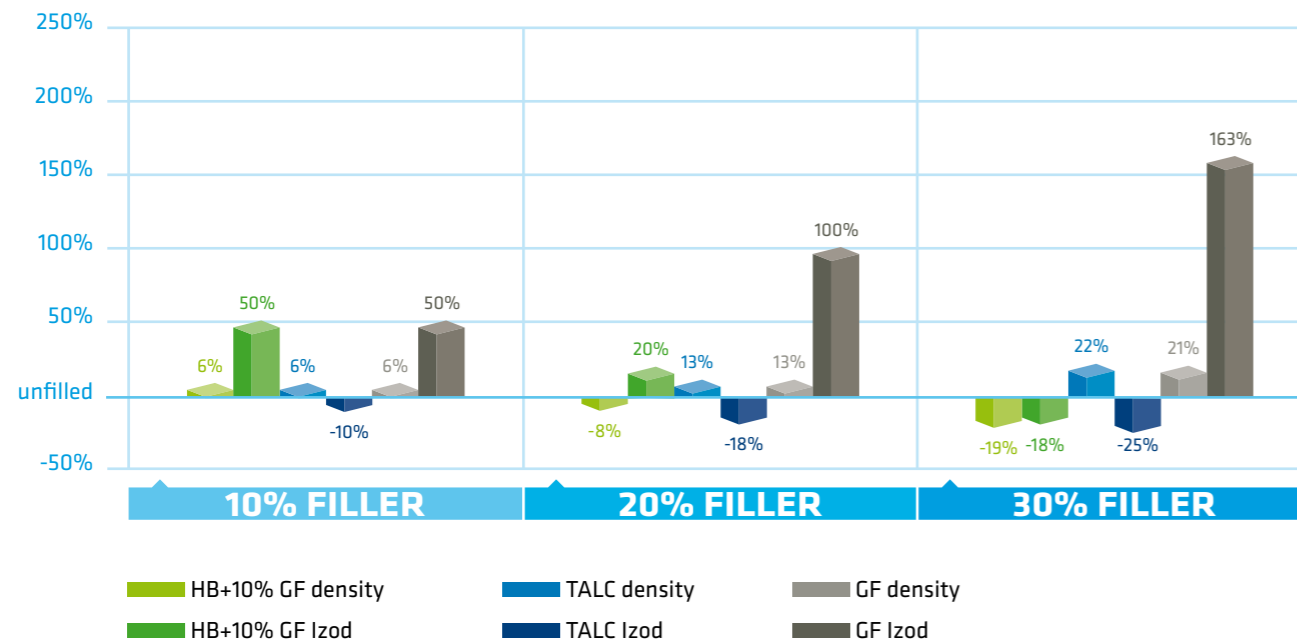
## IMPACT PROPERTIES

For applications requiring both **lightweight** and **impact resistance**, **LITEPOL®** mixed grades filled with Hollow Microspheres and chemically bonded Glass Fiber are the most suitable, as they provide a weight reduction ranging from 3% to 19% and improved impact values from +20% to +218%, depending on the base polymer and on the percentage of filler used in the compound.

### PP HOMOPOLYMER



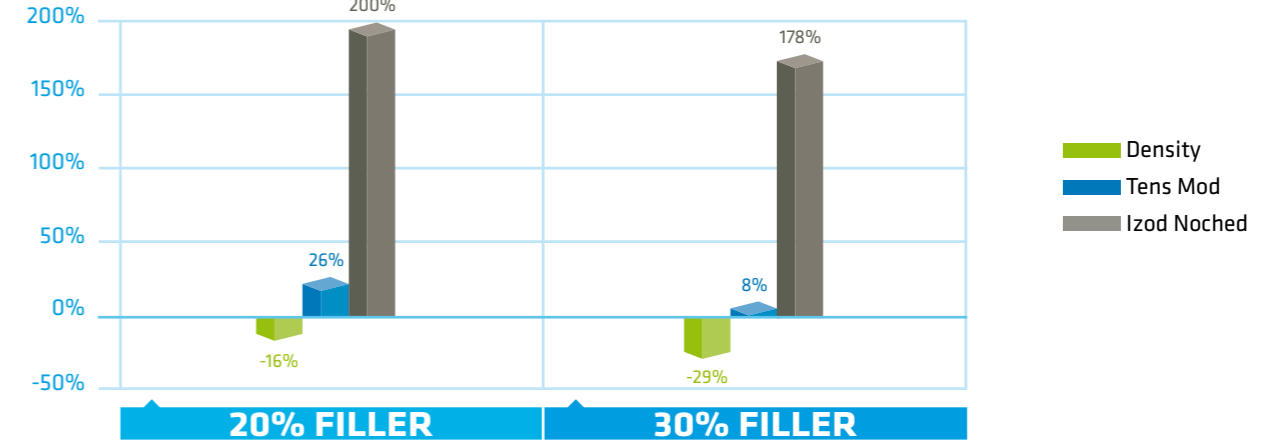
### PA6



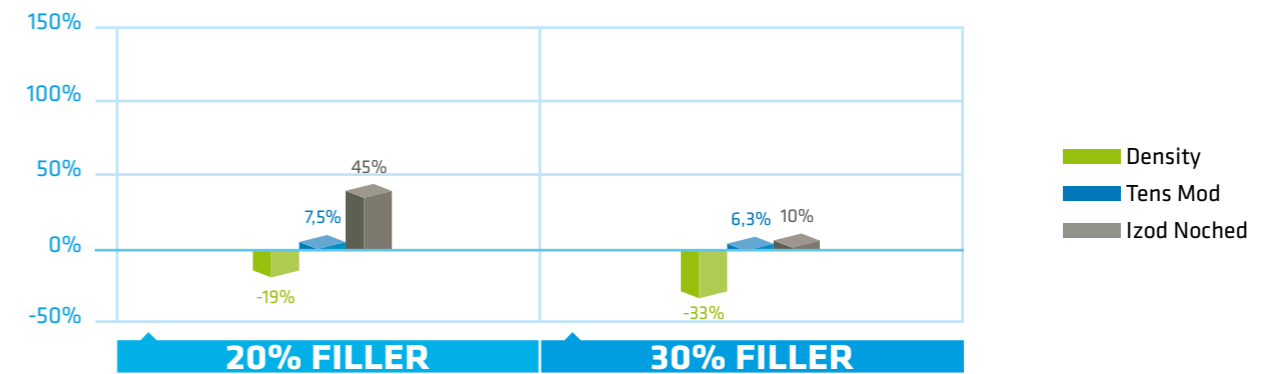
## MIXED HB/GF GRADES VS TALC FILLED GRADES

Mixed **HB/GF LITEPOL®** grades show excellent low density and mechanical performance compared to talc filled grades.

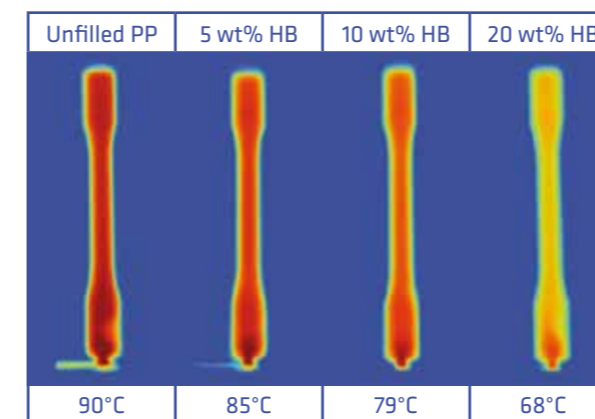
### PP HB+10%GF VS PP TALC



### PA6 HB+10%GF VS PA6 TALC



## COOLING



The hollow microspheres low heat capacity allows for a temperature reduction by about 1.1°C for each 1% of microspheres used in the compound.

Foto 3M.