DIMENSIONAL STABILITY IN POLYMER COMPONENTS

As polymers are used in more and more challenging applications, often the dimensional stability of the part becomes increasingly important. This is especially true in applications where the part is in motion or providing part of the fixings for a moving component. Imerys' additives can help reduce the size changes and warpage of these components and allow them to perform at a higher level.

Such applications where this performance criteria is especially important is with cooling fans, hard disk drive (HDD) housings and compact disk players and can provide benefit in a range of polymers.

In addition to the thermal stability provided, micas will help in reducing the noise often associated with these high speed moving components, providing a degree of sound dampening.

The fact that mica is a particle that exhibits two principal dimensions in its shape, means that it will give consistent shrinkage when used in a plastic component. This is in contrast to accicular or fibrous additives such as glass fibre or wollastonite which will often show different shrinkage according to the direction of flow which can lead to warpage.

The unique structure of Imerys' mica range of products provides key attributes for these applications:-

- **High Flex Modulus**
- **Low Warpage**
- **Low thermal expansion coefficient**
- **High heat deflection temperature**
- **Sound dampening**

Mica is a phyllosilicate mineral that exhibits an almost perfect basal cleavage. This allows it to be produced in a range of particle sizes and aspect ratios which can help in optimising other mechanical features of the polymer with finer products giving higher tensile performance and better impact strength.

TYPICAL PROPERTIES | MINERAL REINFORCED POLYPROPYLENE COMPOSITES*

Property	ASTM Method	PP	L-135 Mica	Talc
Tensile Strength (MPa)	D638-01	29	23	29
Tensile Modulus (MPa)	D638-01	1100	5000	3500
Flexural Modulus (MPa)	D790-00	1400	7400	4600
Un-notched Izod (Nm)	D256-00	No break	0.19	0.41
Notched Izod (Nm)	D256-00	0.20	0.06	0.05
Heat Deflection Temp (°C)	D648-01	60	95	83
Shrinkage (%)	Parallel	2.1	0.7	1.1

** 40% mineral loadings in PP resin*

IMERYS Performance Minerals

WORLD MINERALS

FIGURE 1 | FLEXURAL MODULUS (MPa)

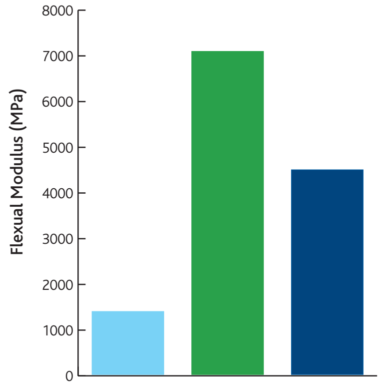


FIGURE 2 | HEAT DEFLECTION TEMP. (°C)

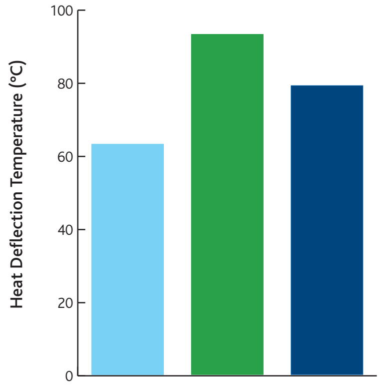
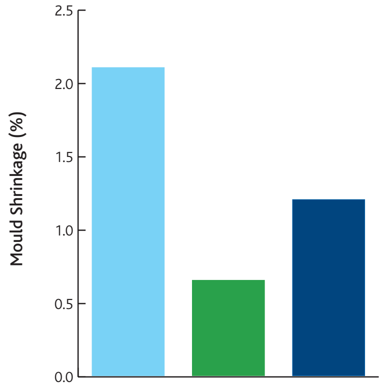


FIGURE 3 | SHRINKAGE (%)



Unfilled PP MICA (L-135) Talc

TYPICAL PROPERTIES | NYLON 6,6 COMPOSITES

Property	ASTM Method	Nylon 6,6	35% Fiberglass	35% 325-HK Mica
Tensile Strength (MPa)	D638-01	75	120	6
Tensile Modulus (MPa)	D638-01	2800	6800	3500
Flexural Strength (MPa)	D790-00	116	204	148
Flexural Modulus (MPa)	D790-00	2800	6400	7800
Un-notched Izod (Nm)	D256-00	No break	0.82	0.63
Notched Izod (Nm)	D256-00	0.06	0.70	0.07
Heat Deflection Temp (°C)	D648-01	74	233	199
Shrinkage (%)	Parallel	2.3	0.8	0.8
Shrinkage (%)	Perpendicular	2.2	1.6	0.8

FIGURE 4 | FLEXURAL MODULUS (MPa)

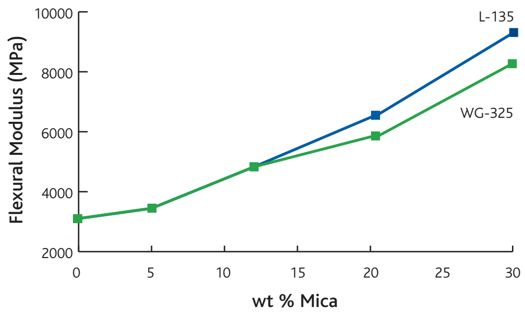
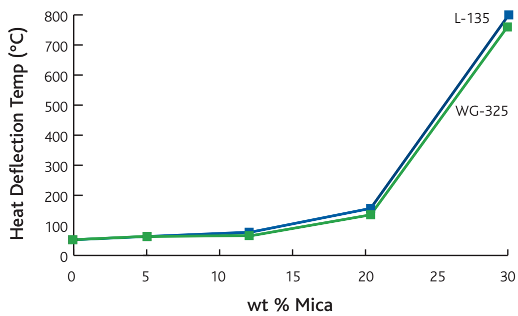


FIGURE 5 | HEAT DEFLECTION TEMP. (°C)



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