

DINALON® NANO-REINFORCED COMPOUNDS

February 2004

Nanotechnology. Lately one of the hottest subjects in the high tech industries. In terms of plastic materials, nanoclay reinforced materials offer the potential of major property improvements even at low charge levels.

Grupo Repol has developed this potential into a range of Dinalon® PA compounds for demanding technical applications.

The Nanoclay reinforced Dinalon® compounds contain microscopic clay plates, coupled to the resin by organic agents. These plates form a perfectly dispersed web that ensure unique mechanical, thermal and barrier properties of the resin with minimal or no impact on density and processability.

Even at less than 8% load, the nanoclay produces a rigidity comparable to that of a 20-30% mineral reinforced compound, which create an interesting alternative to mineral reinforced automotive parts, where the density of the piece is critical.

The nanocomposites exhibit significant increase in the Heat Deflection Temperature (HDT), making them ideally suited for substitution of high-cost materials for combined high temperature resistance and rigidity applications.

As an added bonus to the mechanical and thermal properties, the exfoliated nanoclay also creates excellent barrier properties. This leads directly to feasible applications within the food, medical and chemical industry for containers and packaging.

Grupo Repol has furthermore developed a nanocomposite that solves the eternal problem of the elastic or rubber-like structure of high impact polyamides. The nanoclay increases the rigidity and reduces the elongation without compromising the flexibility and impact strength of the material.

With this development of nanocompounds, Grupo Repol once again positions it self as an innovative company among the European custom compounders.

In the table below a brief example of properties of the Dinalon Nanocompounds compared to conventional PA materials:

Properties	Norm	Units	Dinalon PA 6 NANO I	PA 6	PA 6 30%MC	PA 6 10%GF	PA 6 High Impact	Dinalon PA 6 NANO II
DENSITY	ISO 1183	g/cm ³	1.15	1.13	1.36	1.21	1.08	1.04
TENSILE STRENGTH	ISO 527	MPa	100	60	70	90	35	35
ELONGATION	ISO 527	%	3.2	40	4.0	3.5	40	4.6
FLEXURAL STRENGTH	ISO 178	MPa	123	80	95	120	30	40
FLEXURAL MODULUS	ISO 178	MPa	4400	2100	3000	4100	1300	1600
IMPACT STRENGTH	ISO 180	KJ/m ²	2.1	5	4	8.9	90	60
HDT(1.80MPa)	ISO 75	°C	104	60	95	140	46	53

Fig. N1 – Comparison of conventional and nano reinforced PA compounds