

NEW ULTRA-STIFF MATERIALS: NON-DEFORMABLE AS METAL ALLOYS

Metal replacement is a well known opportunity in the world of thermoplastic compounds for injection moulding. Carbon and glass fibres are commonly used to improve mechanical performance of plastics, i.e. elastic and flexural modulus, elongation and load at break as well as impact strength. Zamak, aluminium and similar alloys can be replaced in a wealth of projects produced across the most different market sectors.

Advantages deriving from injection moulding technique may be very appealing also for the manufacturing of parts where high performance materials are required, as special steel, thermoset resins and composites.

Talking about composite materials, it is acknowledged how proprietary production techniques, hardware, assets and know-how, as well as the finishing process of parts, are extremely costly.

Also the managing of scraps, defective parts and end-of-life waste can generate issues because of the intrinsic lack of recyclability belonging to thermosets acting as matrix for reinforced composites.

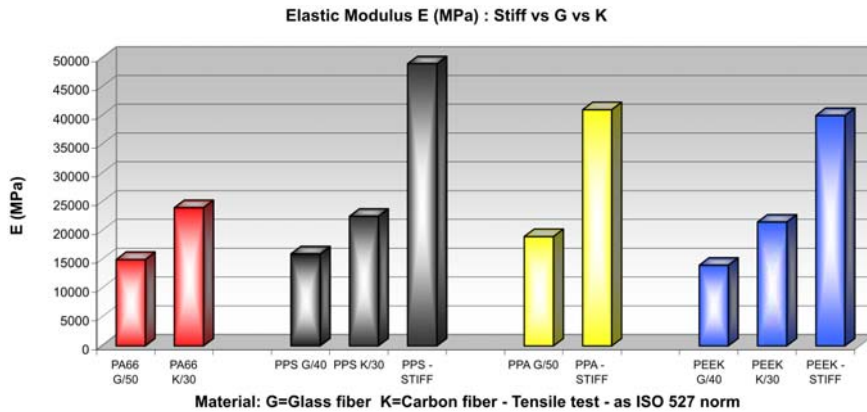
LATI has created a brand new family of injection mouldable ultra-stiff compounds capable to supply new opportunities to



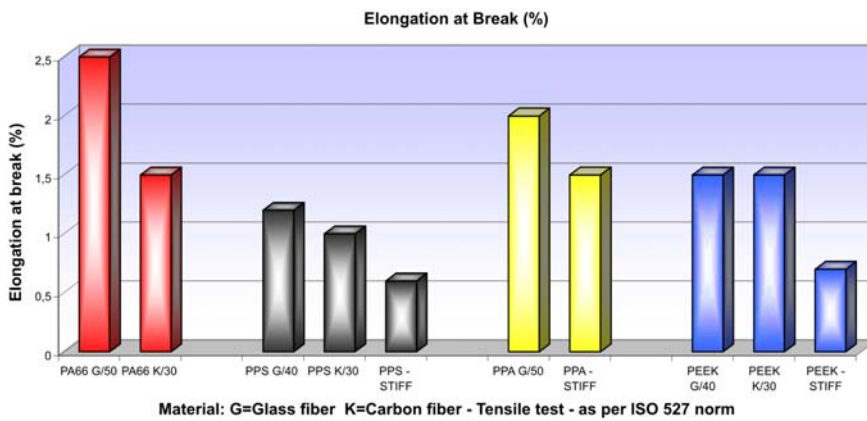
engineers, designers and developers all over the industry. Based on the best performing thermoplastic resins, these compounds feature high modulus carbon fibre and resulting compounds can represent a valid replacement of metal alloys as well as many composites. Ultra-stiff compounds can be injection moulded on ordinary machines and equipment, do not require curing processes, can be recycled and are never harmful or dangerous to health and environment.

COMPOUND	Elastic Modulus (MPa)	Load at break (MPa)	Elongation at break (%)
PA66 G/50	15000	215	2,5
PA66 K/30	24000	240	1,5
PPS G/40	16000	160	1,2
PPS K/30	22500	185	1
PPS - STIFF	49000	200	0,6
PPA G/50	19000	265	2
PPA - STIFF	41000	280	1,5
PEEK G/40	14000	205	1,5
PEEK K/30	21500	225	1,5
PEEK - STIFF	40000	210	0,7

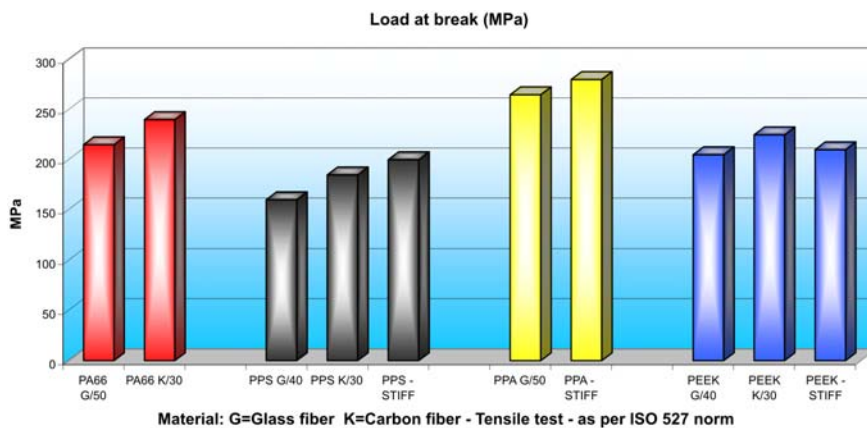
Tensile test – as ISO 527 norm



Mechanical properties are just outstanding in comparison to any other engineering high performance compound. Tensile elastic modulus (as per ISO 527 norm) can reach 50000 MPa, against 15000 MPa of an ordinary carbon reinforced thermoplastics compound; load at break rises up to 300 MPa against 200 MPa of a glass or carbon highly charged reinforced compound.



The very low ratio between elongation and applied load is anyhow the most interesting parameter, guaranteeing the feasibility of parts that show little or no deformation. Elongation at break lower than 1% is a mandatory feature leading to the lowest deformations, a necessary requirement for military and aerospace industry, for medical sector, for automotive, for sport and leisure time etc.



LATI products are available on the best thermoplastics: PA, PPS, PPA and PEEK. These base resins allow products to withstand the most aggressive chemical environment as high temperatures, much above 200°C. High modulus reinforcement fibres can vastly limit also fatigue and creep related problems, furtherly reducing the performance gap between injection mouldable plastics and composites.

LATI R&D and Technical Assistance will help you to solve any issue related to the implementation of special products and metal replacement.