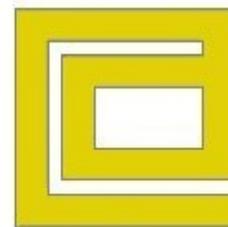
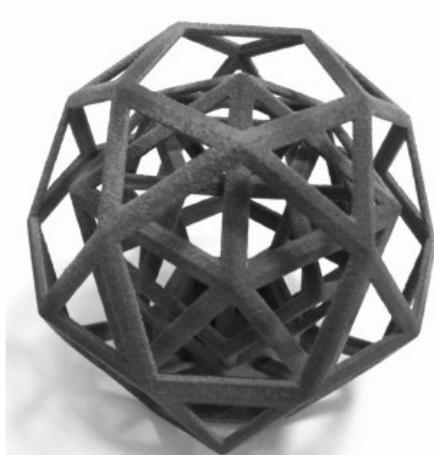


Laser composite

PAQc



Ateliers CINI



PAQc part representing a possible arrangement of atoms in a complex metallic alloy.

PAQc is an innovative composite material in the field of Rapid Prototyping and Rapid Manufacturing. It was developed and patented jointly by the French national center for scientific research **CNRS** and the **Ateliers CINI**.

PAQc parts are obtained by selective laser sintering of a powder mixture of complex aluminum alloy and polyamide (PA). This composite is lightweight, non-porous and leak tight under pressure even for low wall thicknesses (1-2 mm). Mechanical properties such as hardness, friction and wear resistances are superior to that of PA or conventional PA based composites (glass, carbon, aluminium).

The metallic alloy used belongs to a family of new materials known as quasicrystals. They are mostly constituted of aluminum but are characterized by a particular atomic arrangement, which is neither crystalline nor amorphous but quasicrystalline, illustrated by pentagonal atomic arrangement (see photograph). This unusual state of matter correlates with improved properties that benefit to the **PAQc**.

APPLICATIONS

Leak tight without infiltration of resin.

Functional parts resistant to friction and wear under severe conditions (humidity, sliding on metal or ceramic parts).

Lightweight parts with isotropic properties.

Part skin appearance similar to a molded part.

MAIN CHARACTERISTICS*

General properties

Visual aspect	Dark gray matte
Density	1.45 g/cm ³
Degree of porosity	< 1.5 %

Tightness

Leak tight to air and water with low thickness

Friction properties

30% improvement compared to the unfilled PA

Wear properties

50% improvement compared to the PA filled by Al
25% improvement compared to the PA filled by C fibers

Mechanical properties

Tensile Modulus (ASTM D638)	3700	Mpa
Tensile strength	32	Mpa
Elongation at break (± 0,5)	3	%
Hardness	78	shore D
Young Modulus at 100°C	600	Mpa

Thermal properties

Thermal insulator		
Melting point	180	°c
Use limit	170	°c

Electrical properties

Electrical insulator

Chemical resistance

Fuels, solvents, gasoline
No moisture absorption

Use properties

Easily machined parts
Adhesive bonding is possible
Possibility of applying paint



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*The experimental conditions of the tests can be sent on request.