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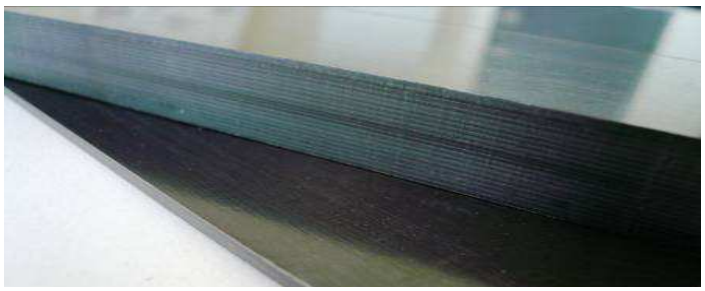
OLIMUNLLUM®

PROCESSING GUIDE

Olimunllum® QI-Grade CF/PEEK



Overview
Olimunllum® consolidated carbon fiber reinforced thermoplastic plates, sheets and profiles can be further processed into finished products through the common post processing technics in use for metallic materials (chip removing machining, turning, grinding, and cutting) and bend into 2.5D and 3D structures using thermoforming press equipment.

Storage

Thanks to its very low water absorption and inert behavior, Olimunllum® has an indefinite shell life at ambient conditions.

Machining

Carbon fibers produce increased wear on cutting tools compared with metals; therefore HSS/HM tools should be replaced more frequently. Special Diamond coated tooling can be used for longer runs, but it is usually more efficient to use low cost cutters and replace them at short intervals.

In general, the following rule applies for NC-machining:
“High cutting speed/Low cutting depth/Fast feed rates”, as to avoid top layers delaminating and polymer heat up.
Sample parameters:

- Cutting speed: 3...4m/s (e.g. 12'000rpm for a 6mm Dia. cutter)
- Cut depth: max 0.5mm (0.1...0.2mm steps to reach end measures)
- Tool feed: 3...5 m/min

Thermoforming

Thanks to its wide melt temperature window (360…420°C), Olimunllum® offers very welcomed degrees of freedom to adjust cycle-times and surface accuracy.
In general, there are two main rules to reach shortest cycle times depending on product geometry:

A) Thin parts with low curvature levels

1) Heat up material “out-of mould” (through conduction - hot plates -, radiation - IR-Heaters -, or induction)
2) Press and cool down “cold-mould” (please note that “cold” mould means here 140°C)

B) Thicker plates or sheets with highly curved surfaces

To help the polymer flow and reallocate the reinforcing fibers, allow more time by means of a hot mould surface and cool down under pressure in the closed mould.
For certain shapes and products, diaphragm forming or roll forming can optimize further your cycle times.

Joints and Bonds

Assemblies can be produced via standard **mechanical joints** like bolts and rivets.
Direct thread tests on Olimunllum® panels have shown experimentally higher load capacity as in an EN AW 6082 aluminum coupon.
However, thread inserts should be evaluated if joint is frequently released.

Fusion bonding among Olimunllum® partners is the strongest bond.
Alternatively, a (lower-temperature) thermoplastic film adhesive (e.g. PEI) can be used if parts heat up is restricted.

Adhesive bonding; though selected thermosetting adhesives (mainly 2-component epoxy systems) lead to good results, it is in most of the cases necessary to determine the right Olimunllum® surface preparation and glue system. The following steps can be considered in most cases as a starting point in the development of the right bond for a specific application:

1) Cleaning/Degreasing
2) Surface Roughening (Abrade or shot blast using medium grit e.g. 120 - 200 mesh)
3) Cleaning/Degreasing (e.g. Acetone)

Alternatively or additionally:

4) Energetic etching (flame, corona discharge or plasma)

There are some toughened and flexible structural adhesives that provide excellent results. Tell us if you need our advice.

Olimunllum® semi-finished products offer:

- excellent impact strength and creep resistance
- very high fatigue resistance
- very good tribological behavior
- good damping characteristic (less vibrations)
- very high chemical and corrosion resistance
- continuous service-temperature up to 250°C
- minimum weight (1/2 of Aluminum, 1/3 of Titanium, 1/5 of Steel)

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