

AP- Nylon Materials

Application sheet 14

Nyrim[®] Dowels for tunnel construction

Brüggemann Chemical provides raw materials for three distinct families of **AP-Nylon** (polyamides produced by **Anionic Polymerization**) used in a wide range of applications.

Mechanical properties of these AP-Nylons extend from thermoplastic polyamides into rubber-like elastomeric materials.

AP Caprolactam along with different catalyst systems (**Bruggolen[®] C**) leads to standard cast Nylon 6.

Nyrim[®] is elastomer toughened, recyclable, thermoplastic Nylon 6 for industrial Reaction Injection Molding (RIM), Injection Molding and Rotomolding applications. Nyrim[®] usually contains 10-40% built-in elastomer, depending on the specific performance needs.

The stiffness / toughness combination of Nylon-6 and elastomer gives excellent impact resistance, wear resistance and repetitive load (fatigue) endurance.

Nyrim[®] can be selectively reinforced with glass fiber or glass mats and can also be filled with mineral fillers.

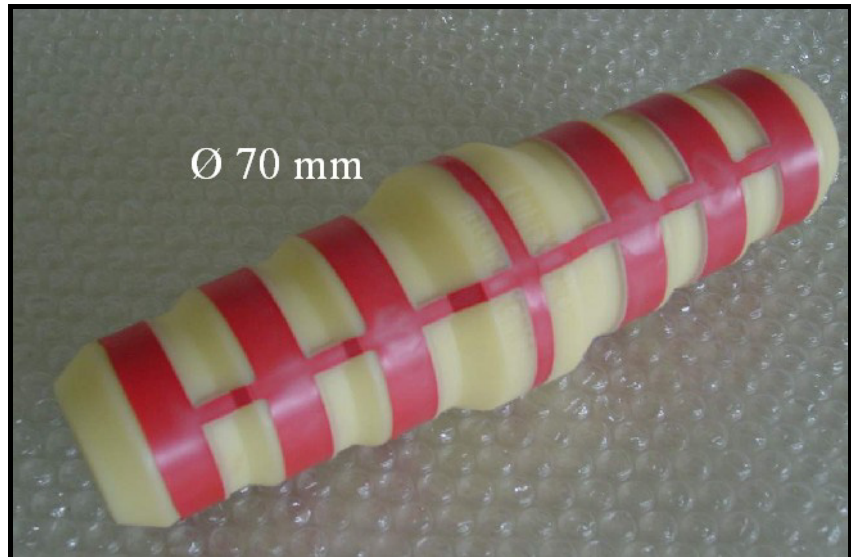
Star-Rim is a toughened Nylon suitable for RIM processing. It can also be reinforced with glass or filled with mineral fillers.

RIM processing is the preferred method to manufacture large, complex or thick parts. RIM processing allows for large design flexibility.

Pressures are lower than injection molding pressures, resulting in lower mold and manufacturing costs.

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Nyrim is the material of choice for a dowel connection used to secure large concrete segments in tunnels.

Main benefit of the Nyrim dowel, when compared to the standard solution to connect these elements – using large steel bolts – is the enormous reduction in building time.

This dowel connection for a single-pass tunnel construction system enables a continuous driving operation in a fully automated, computer controlled and sensor monitored tunneling system.

The dowel joins pre-cast concrete tunnel segments. These segments weigh about 4-6 tonnes each and are connected using only a press fit connection with 2 to 3 Nyrim dowels.

Part thickness of the dowels ranges to up 70mm while the weight of the largest one is about 600 grams.

Important features for this application

Physical properties features

- High impact resistance
- High load bearing capabilities

RIM design features

- Effective part cycle time of 70 mm thick part reduced to 30 seconds through multi cavity tooling
- Economical molding of thick parts