ECCOSORB™ JCP PA
Application Note

Thermoplastic Injection Moldable Microwave Absorbers

Eccosorb™ JCP PA is a new class of thermoplastic injection moldable microwave absorbers.

The thermoplastic matrix contains polyamide with a proprietary filler for applications requiring enhanced performance for resonance and reflectivity in the higher frequency band. Polyamide is a widely qualified semi-crystalline thermoplastic across multiple applications thanks to its high thermal stability as well as exhibiting very good mechanical properties.

Polyamide is among the most important and useful of engineered thermoplastic materials. This is due to its outstanding wear resistance and stiffness on top of exhibiting good chemical resistance. This excellent balance of properties makes polyamide an ideal material of choice for parts requiring robust performance in automotive components as well as in industrial, railway and telecom applications.

Eccosorb JCP PA from Laird Performance Materials is an alternative to Eccosorb JCP PBT 252 and Rezorb PP when enhanced performance is required and the preference is for greater design and process flexibility.

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Properties

Property	Value
Physical	All testing per ASTM standards
Density, gm/cc	1.24
Shrinkage	
Parallel, %	1,4-1,9
Normal, %	1,4-1,9
Mechanical	
Tensile Strength, Mpa	100
Tensile Elongation, %	2.5
Flexural Strength,Mpa	175
Flexural Modulus, Mpa	5000
Impact	
Izod, kg*cm/cm	6.8
Thermal	
Heat Deflection Temp, C	190
Electrical	
Surface Resistance, ohm	>100000
Volume Resistance, ohm*cm	>20,000
Injection Molding guidelines	
Drying temperature Drying time	80°c 4 hours
Max moisture content	<0.2%
Mold temperature, C	65-95°c
Barrel temperature, front/middle/rear	280-310°c

Key Features

- Easy flowing grade
- Strength and stiffness
- Durability over a wide temperature range
- Optimal for 60-90 GHz band with good performance as well as on on the 40-60 Ghz band
- Compliant with Rezorb design (surface texturing for outstanding reflectivity performance)

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Design considerations

- **Gating** – It is highly recommended to gate from thick sections into thin sections.

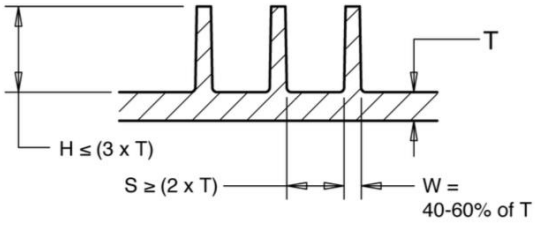
Thick sections in the part will retain heat and stay molten longer, preventing early solidification, or a phenomenon known as 'gate freeze'. Gating into thin sections will cause pressure spikes during fill, and lead to other processing issues such as jetting or no fills.

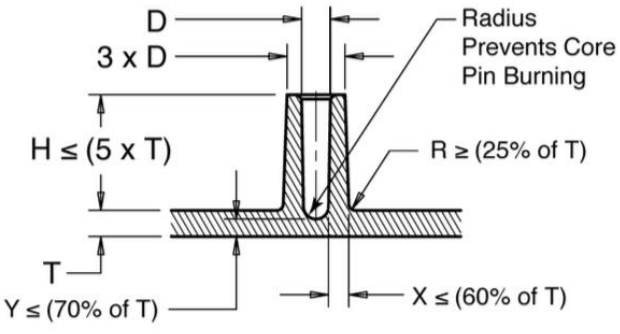
- **Wall thickness** – The major quality problem of injection molded parts is related to large differences in wall thickness. For such, it is recommended that wall thickness stay constant as much as possible and stay as standard between 2 and 3.5mm*. Sharp corners or thin/thick sections created by critical geometry or special features will result in differences in shrinkage across the part. This can lead to cosmetic deformities such as sink marks or warping; or in some cases can lead to internal stress and eventually crack formation/propagation.

- **Ribs/Bosses** – Ribs and bosses are common features on most injection molded parts, whether for structure or assembly.

External drafts at least 2^{0}; Internal drafts at least 3^{0}

Typical guidelines for ribs and bosses are shown below.





*These guidelines are a good starting point but can change slightly depending on critical functions of the finished parts.

- **Warpage** – Warpage, in short, is caused by variations in shrinkage across a part. It is affected by a multitude of factors: thick versus thin sections, cooling gradient, fiber orientation, etc. The best way to reduce warpage is through design. Following nominal wall thickness, rib/boss guidelines, and reducing extreme thin/thick sections will help create relatively uniform shrinkage across the entire part. Supplying part geometry via CAD will allow Laird to simulate a fill/pack/warp analysis to aid in predicting warpage.

Processing Guidelines

- One of the key points when processing polyamide-based material is to manage properly the moisture content. It is important to control the moisture level and enter a drying stage if necessary, beforehand.
- Use a high injection speed to fill most of the part without causing visual defects. Hold pressure should be set at a point halfway between a 'just full' part and a 'just flashed' part.
- As a reference, hold pressure should be no more than 80 percent of the fill pressure.

Contact Laird Performance Materials today:
Americas: +1 (866) 928-8181
Europe: +49 8031 2460 0
China: +86-7552 7141166

www.laird.com