Acetal (POM) Polyoxymethylene

General Guide & Technical Data

Overview

When using Acetal polyoxymethylene (POM) rods, in manufacturing or machining processes, several key specifications are important to consider:

General Guide

- **Melting Temperature:** The melting temperature of acetal is typically between 165 to 175 °C (329 to 347 °F).
- **Service Temperature:** This refers to the temperature at which the material maintains its properties during continuous use. For acetal, the long-term service temperature is typically between -40 to 100 °C (-40 to 212 °F). Acetal can handle short-term exposure up to about 120 °C (248 °F) but continuous exposure at these higher temperatures can cause the material to degrade over time.
- **Machining Temperatures:** In general,The optimal machining temperature for acetal isn't a specific value. Instead, it's more about ensuring the material doesn't overheat during machining, which could cause it to soften and potentially result in a poor surface finish or dimensional inaccuracy. This is one of the reasons why sharp tools and correct machining parameters are important when working with acetal. In some cases, coolant might be used to keep the temperature down, although acetal is often machined dry.
- **Cutting Speeds:** Acetal can be machined at high speeds. For turning operations, a typical cutting speed might range from 600 to 1000 meters per minute (roughly 2000 to 3300 feet per minute), but the optimal speed can depend on the specific machining operation and the rigidity of the setup.Always follow machine and tooling manufacturer recommendations for specific speeds and feeds.
- **Feed Rate:** The feed rate, or the speed at which the tool moves through the material, also tends to be high when machining acetal. Feed rates can vary greatly depending on the depth of cut and the tool being used, but typical feed rates for turning might range from 0.2 to 0.5 mm/rev.
- **Tooling:** High-speed steel (HSS) tools can be used, but carbide-tipped tools are often preferred for their increased durability and cutting speed. The tooling should be kept sharp as acetal can be sensitive to excessive heat caused by dull tools.
- **Coolant:** Generally, acetal can be machined dry, but for deeper cuts or when superior surface finishes are required, applying a coolant can help. It's important to use a coolant compatible with acetal.

- **Workholding:** Acetal is relatively soft and can be sensitive to pressure, so care should be taken not to deform the workpiece when securing it.
- **Drilling:** When drilling acetal, it's important to frequently retract the drill bit to clear chips and prevent heat buildup.
- **Thread Cutting**: Acetal is suitable for both external and internal thread cutting. The thread profile should be sharp and clean.
- **Chip Removal:** Using tools with built-in chip breakers can help control the size and shape of the chips, making them easier to remove and less likely to cause issues.
- **Tool Material and Geometry:** The tool's cutting edge should be sharp. Dull tools can generate excessive heat and result in poor surface finish. The exact tool geometry can vary based on the specific operation (turning, drilling, etc.).For turning operations, a general-purpose tool with a 0-degree rake angle and a 5-10 degree relief angle can work well. For drilling, a standard twist drill often suffices, but it's important to ensure frequent chip clearance. While not always necessary for acetal, certain tool coatings can extend tool life and improve performance.

  Remember that these are general recommendations and the specific requirements can vary based on your machine, the grade of acetal, the type of operation, and other factors. Always consult with a machining expert or your tool manufacturer when setting up a new operation.

Technical Data

General properties	Test method	Unit	Value
Specific Gravity (23°C / 23°C	ASTM D792-13 (Test Method A)	-	1.414
Water absorption	ASTM D570-98 (2018) 24hr Immersion)	%	0,07
Mechanical properties			
Tensile Strength	ASTM D638-14(*)	MPa	63.8
Elongation at break	ASTM D638-14 (*)	%	30
Flexural Strength	ASTM D790-17 (Procedure A)	MPa	87.7
Izod Impact Resistance	ASTM D256-10 (2018) Test Method A)	J/m	71
Rockwell Hardness (HRR)	ASTM D785-08 (2015) (Procedure A)	-	118
(*) Specimen Type: Type 1, Speed of Testing: 50mm/min	-	-	-