



(HDPE) Rod High Density Polyethylene

General Guide & Technical Data

Overview

When using High Density Polyethylene (HDPE) rods, in manufacturing or machining processes, several key specifications are important to consider:

General Guide

- **Melting Temperature:** The melting point of HDPE ranges from 120 to 180°C (248 to 356°F), with most typical HDPE grades melting around 130-135°C (266-275°F). However, this can vary slightly depending on the specific grade of the material.
- **Service Temperature:** The service temperature of HDPE, or the temperature at which it can continuously function without significant deformation, is typically up to 80-100°C (176-212°F). Above this, the material may begin to soften and lose its structural integrity.
- **Machining Temperatures:** The machining temperature for HDPE should ideally be kept well below its melting and deformation temperatures. Though HDPE has good thermal stability, it's best to maintain the temperature below 60°C (140°F) during machining to avoid potential deformations. This is particularly important if high machining speeds are being used, as these can generate significant heat.
- **Cutting Speeds:** As a general rule, you should aim for a spindle speed between 600 to 1000 RPM for larger diameters and 1000 to 2500 RPM for smaller diameters when turning HDPE on a lathe. The exact speed will depend on the specific operation and the diameter of the rod.
- **Feed Rate:** The feed rate for HDPE can usually be quite aggressive. Start with a rate around 0.005 to 0.01 inch per revolution (IPR) and adjust as necessary based on the performance and quality of the cut.
- **Depth of Cut:** For roughing operations, a depth of cut around 0.1 to 0.2 inches is generally appropriate. Finishing operations may use a shallower depth of cut.
- **Tooling:** Since HDPE is a relatively soft plastic, it's important to use sharp tools with a positive rake angle to prevent the material from gumming up on the tool edge.
- **Coolant:** HDPE doesn't typically require coolant because it doesn't generate much heat during machining, although coolant can be used to clear chips away from the cutting area.
- **Workholding:** Because HDPE is a softer material, care should be taken not to clamp the workpiece too tightly as this can lead to deformations.

It's worth noting that HDPE can become deformed at temperatures as low as 60°C (140°F) and starts to melt at approximately 130°C (266°F), so keeping the working temperature below these thresholds is crucial. These are general guidelines and actual parameters can vary based on the specifics of your machine and the HDPE rod you are working with. Remember that these are general recommendations and the specific requirements can vary based on your machine, the grade of HDPE, the type of operation, and other factors. Always consult with a machining expert or your tool manufacturer when setting up a new operation.



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Technical Data

General properties	Test method	Unit	Value
Specific Gravity (23°C / 23°C)	ASTM D792-13 (Test Method A)	-	0.945
Water absorption	ASTM D570-98 (2018) 24hr Immersion)	%	0,00
Mechanical properties			
Tensile Strength	ASTM D638-14(*)	MPa	23.8
Elongation at break	ASTM D638-14 (*)	%	704
Flexural Strength	ASTM D790-17 (Procedure A)	MPa	22.4
Izod Impact Resistance	ASTM D256-10 (2018) Test Method A)(**)	J/m	126
Rockwell Hardness (HRR)	ASTM D785-08 (2015) (Procedure A)	-	45
(*) Specimen Type: Type IV, Speed of Testing: 50mm/min (**) Break Type: Partial Break	-	-	-



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