

 **Polytron**[®]

 **Polyram**
Group

Molding guide

2017

Worldwide
smart solution



- ❖ **Polytron is the product name for a family of long fiber reinforced thermoplastic materials for Injection Molding, Compression Molding and Extrusion applications.**
- ❖ **Retention of fiber length in the finished part is key to the performance of Polytron.**

- ❖ **Fiber length is retained by proper use of free flowing check valves, metering screws and a complete evaluation of the mold to reduce high shear and allow the materials to fill the part while maintaining the critical fiber length.**

- ❖ **These materials differ from standard thermoplastic compounds in the length of the fiberglass in the pellets.**
- ❖ **The fiberglass is continuous within the pellet and offers incredible properties and performance when molded correctly.**

- ❖ **Suggestions and methods of using these materials are outlined in this guide.**
- ❖ **If further information or support is required you should contact Polyram or its agents for further support and assistance.**

Comparison of Short Glass to Long Glass Thermoplastic Pellets

	Short Glass Thermoplastic Compounds	Polytron Long Fiber Thermoplastic Compounds
Fiberglass length in Pellet	Random length and distribution of fiberglass but maximum length in pellets is typically 1mm	12 mm or longer, (length of pellet = length of glass) parallel and aligned with length of pellet
Pellet Diameter	3 mm	3 to 6 mm
Pellet Length	3 mm	12 mm to 25 mm



Standard Thermoplastic Compound (not to scale)
With random short fiberglass reinforcement



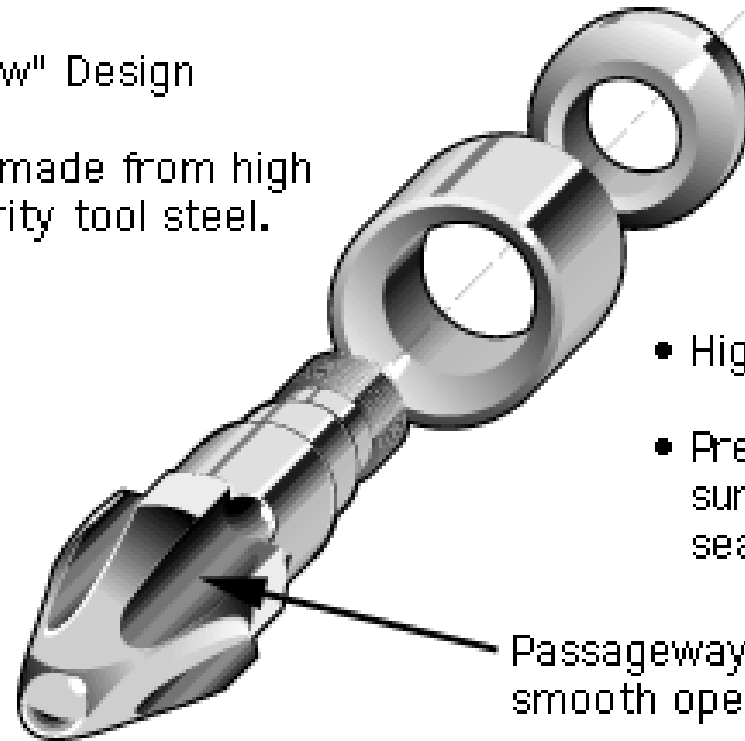
Polytron with fiberglass the length of the pellet (not to scale)

➤ Injection Molding Machine Considerations

- Use a metering screw for plasticizing and delivery of material to mold.
 - 2:1 or 3:1 compression ratio
 - 40% feeding
 - 40% transition
 - 20% metering
 - 18:1 to 24:1 l/d ratio
 - Feed zone depth minimum 7.5mm
 - Metering zone depth minimum 3.5mm
- Mold with a 100 ton (or higher) machine for best performance
- Use a free flow check valve to reduce shear
- Use a large open bore nozzle to reduce shear.
- Keep back pressure between 0.15MPa and 0.35MPa

100% "Free Flow" Design

All components made from high quality, high purity tool steel.



- High Polish
- Precision ground mating surfaces for effective sealing

Passageways sized to provide smooth open melt flow.

Mold and Part Design Considerations:

- Use full round runners with minimum diameter of 5.5mm
- Use rounded corners to change flow of materials
- Use hot runner system
- Use maximum allowable gate size
- Shorten Sprues to minimum and taper them to gate in graduated taper
- Proper venting and drafting required for good part production
- Use care in placing bosses, pins and projections in the mold to reduce weld line issues

- **12 mm pellets can bridge in the hopper. Use large diameter openings for hopper and feed to injection molding machine**
- **Materials perform well in typical vacuum systems**
- **Drying may be needed after long storage or for moisture sensitive products.**
 - ❖ **PP based products: 2-4 hours @ 80 C**
 - ❖ **PA based products: 2-4 hours @ 120 C**
- **Polytron can be delivered in bags, boxes, supersacks or in bulk, depending upon the application and requirements of the customer**
- **Polyram can assist you in design of proper material handling systems for Polytron.**

Processing Parameters for Polytron Polypropylene Products



Material Grade	Rear Zone °C	Center Zone °C	Front Zone °C	Nozzle °C	Melt Temp °C	Mold °C
All Polytron Polypropylene products	220-240	230-250	230-250	240-260	250-260	50-70

Low to Medium Injection Speed

Low to Medium Injection Pressure

Holding Pressure 200-400 Bar

Close to zero Back Pressure up to 0.3 MPa

Low screw Revolutions

Cushion Pad 6.5 mm

Processing Parameters for Polytron PA 6,6 Products



Material Grade	Rear Zone °C	Center Zone °C	Front Zone °C	Nozzle °C	Melt Temp °C	Mold °C
All Polytron PA 6,6 products	280	290	290	300	290-300	90-120

Medium to Maximum Injection Speed

Medium to Maximum Injection Pressure

Close to zero Back Pressure up to 0.3 MPa

Low screw Revolutions

Cushion Pad 6.5 mm

Do not use a tapered or “Nylon” tip

Dry to 0.1% moisture prior to molding

Processing Parameters for Polytron PA 6 Products



Material Grade	Rear Zone °C	Center Zone °C	Front Zone °C	Nozzle °C	Melt Temp °C	Mold °C
All Polytron PA 6 products	260	270	270	270	260-270	80-100

Medium Injection Speed

Medium Injection Pressure

Close to zero Back Pressure up to 0.3 MPa

Low screw Revolutions

Cushion Pad 6.5 mm

Do not use a tapered or “Nylon” tip

Dry to 0.1% moisture prior to molding

➤ **Regrind Use**

Regrind can be added to Polytron during the molding process.

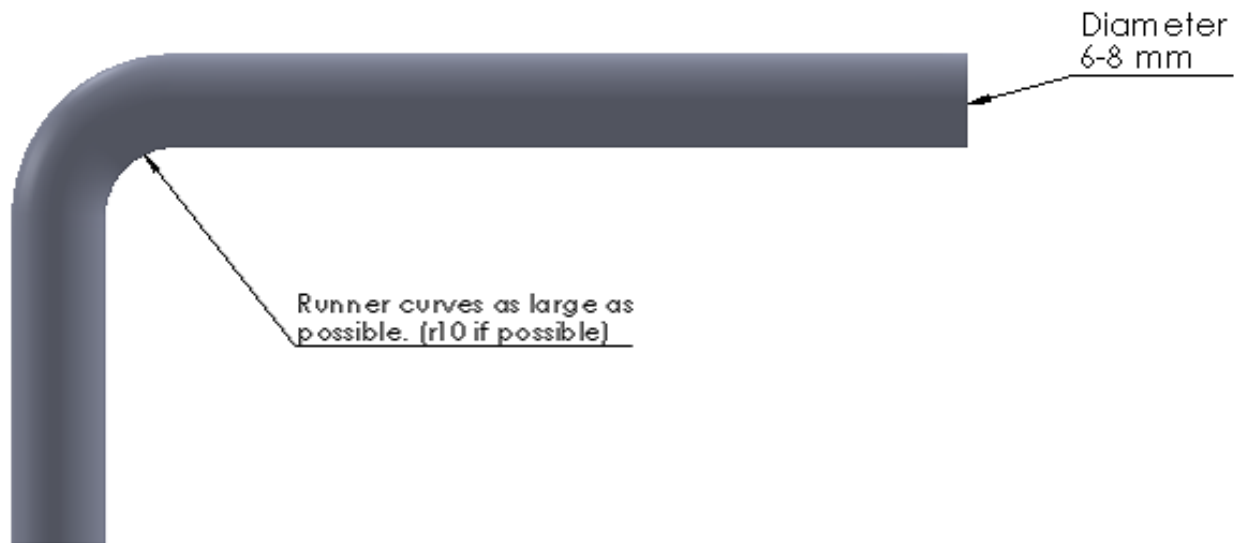
It is recommended that no more than 5% regrind be added to reduce the possibility of property and performance degradation in the molded part.

➤ **Shut Down Procedure**

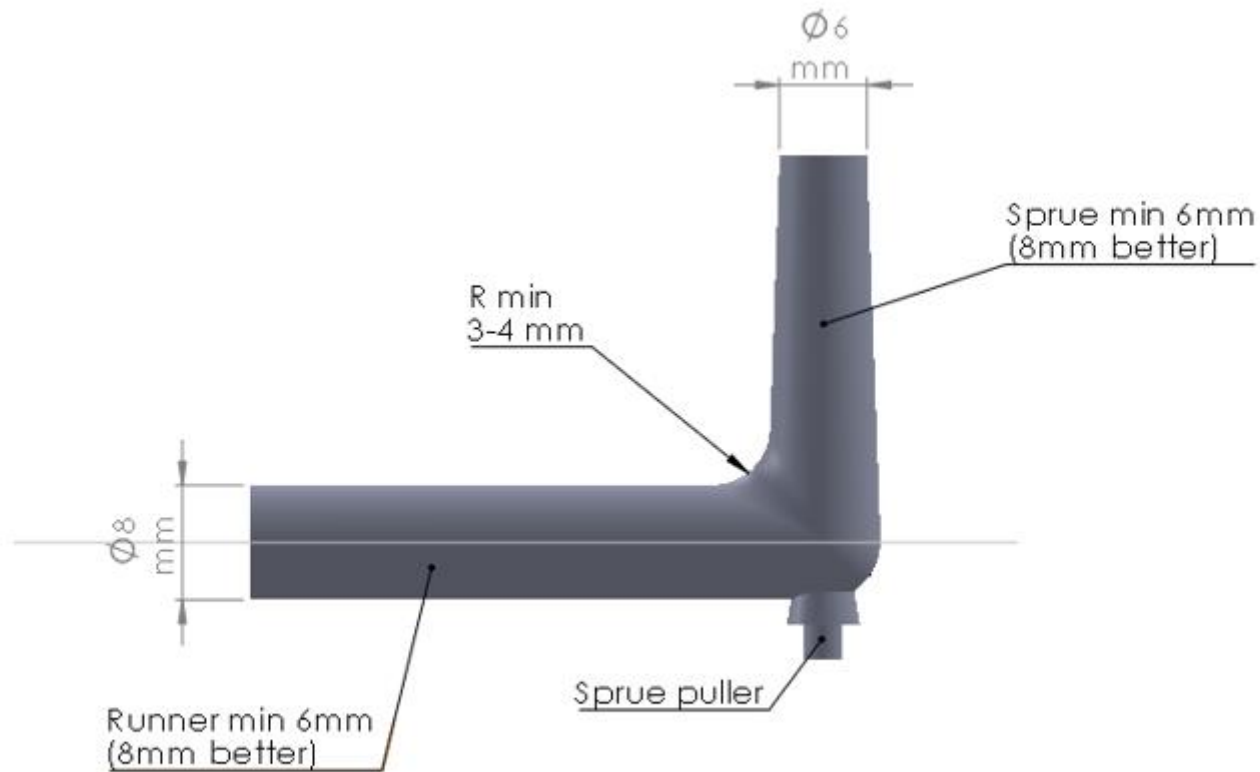
The injection Molding machine should be purged with polyethylene or polypropylene prior to shut down. It is not recommended to leave long glass products in the barrel or in the tools.

- **Highly glass loaded thermoplastics can cause significant wear on tools and equipment.**
- **Fiberglass has a Mohs hardness of 7.**
- **Where possible machine parts and tools that are exposed to Polytron should be hardened.**
- **Further, molds should be polished to a 0.0001 (or better) finish**
- **High wear is often seen at the gates. If possible; a hardened insert can help in this high wear area**
- **For long production molds, a Rockwell hardness of +60 is recommended. This can be obtained by using D2 or A2 steel and then hardening it.**
- **Shorter runs can be effectively managed by plating the molds with a electroless nickel, slow deposition dense chrome or Nye-carb plating.**

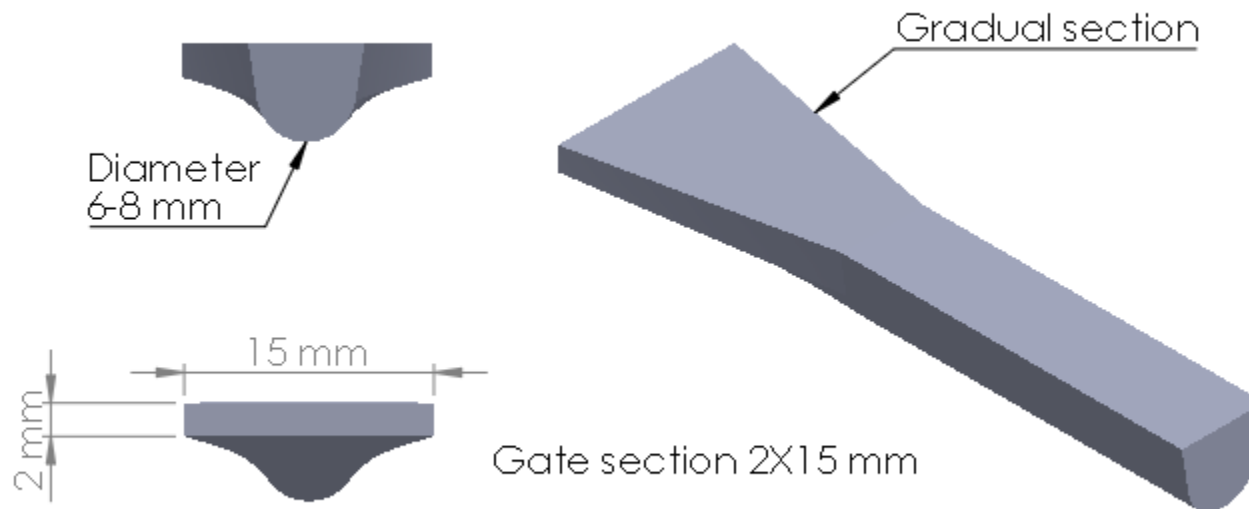
❖ Sprue/Runner



❖ Sprue/Runner

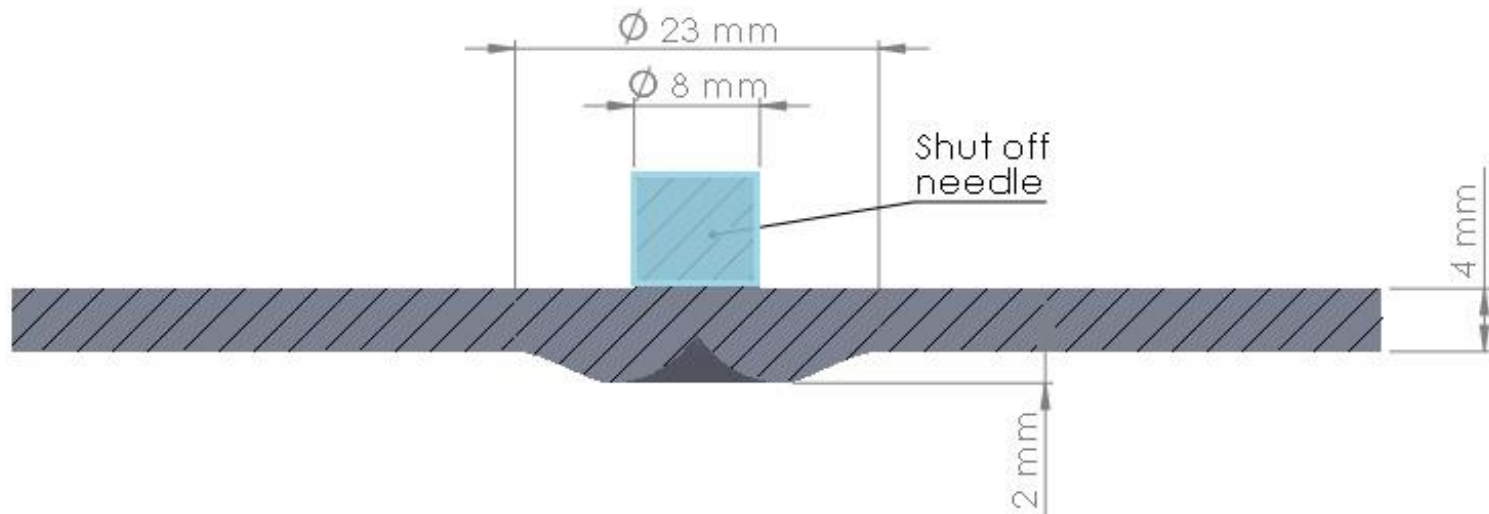


❖ Gates



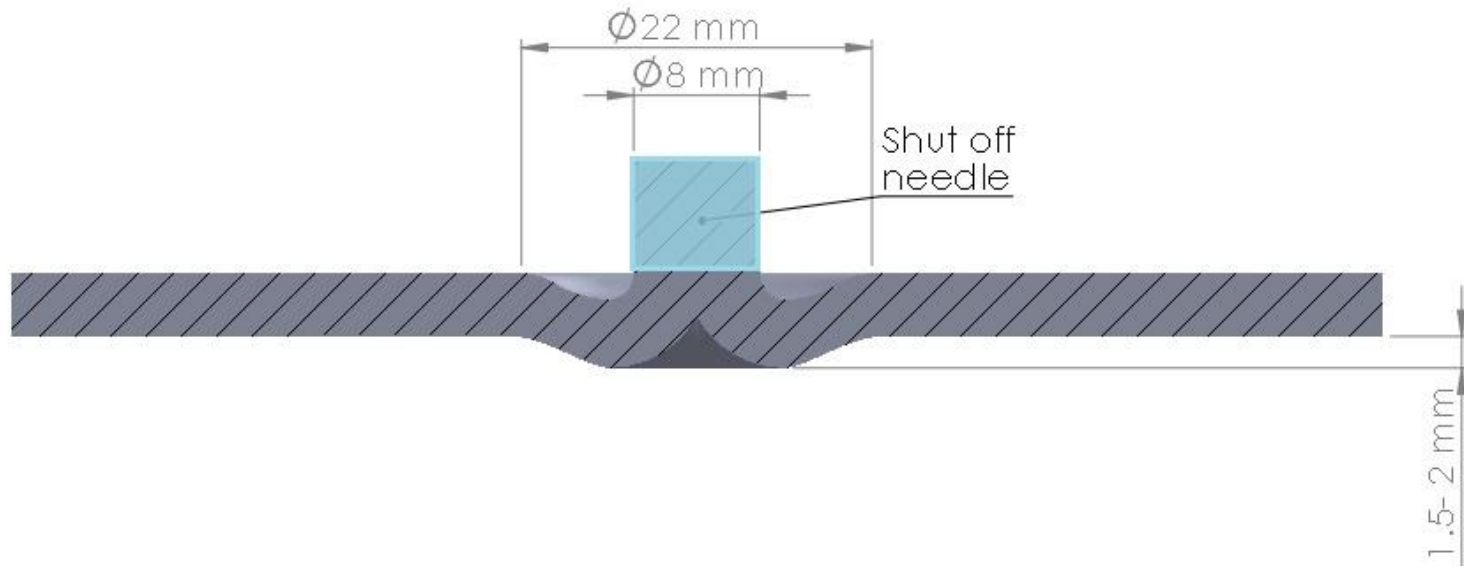
❖ Gates

No room above,
Limited room below.



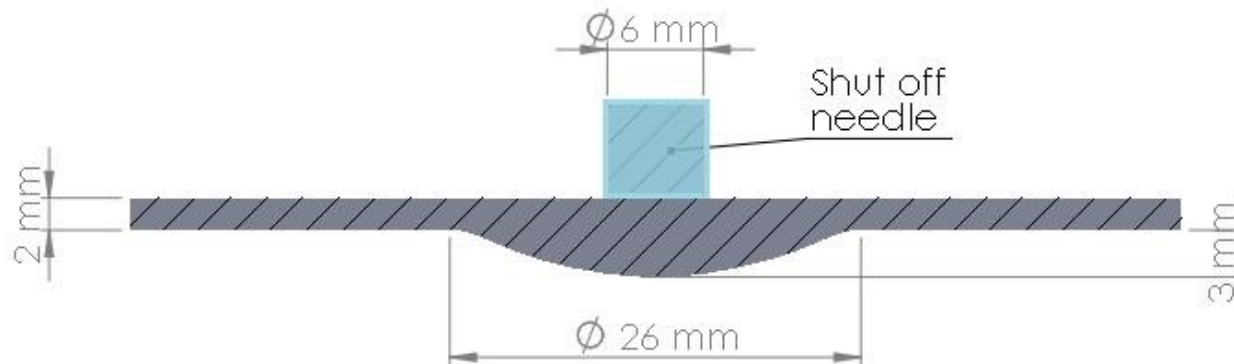
❖ Gates

No room above,
Limited room below.



❖ Gates

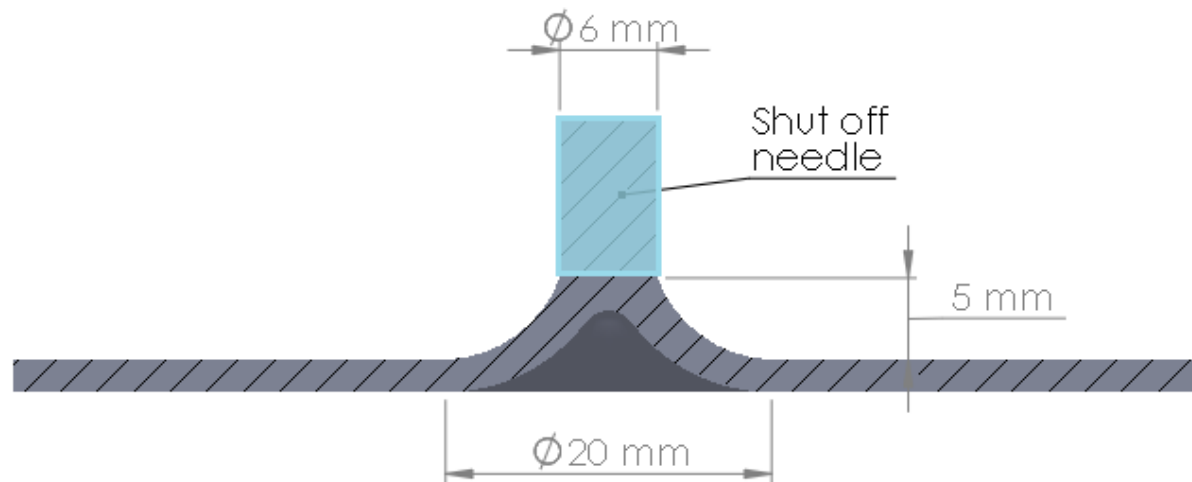
No room above plane,
room below plane.



❖ Gates

Limited room above plane,

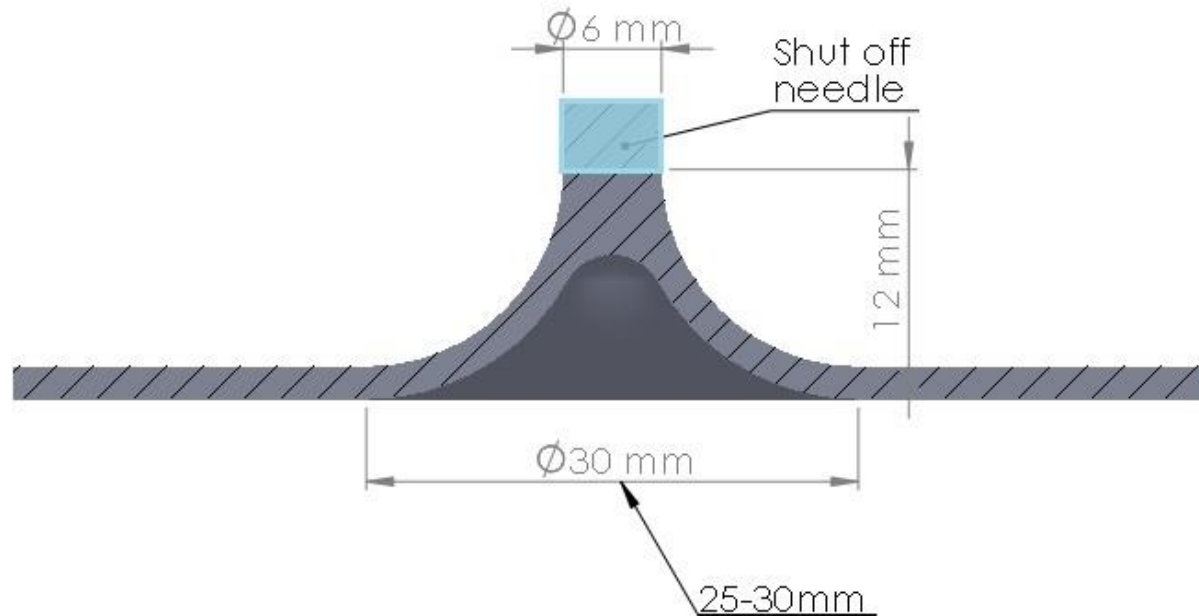
No room below.



❖ Gates

Room above plane (ribs etc.)

No room below.



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Thank you

