

Creating Clear or Translucent Models

Skill Level  Time  Cost 

Overview

Not all plastic parts are opaque. For clear parts such as lenses, containers, covers, panels and a variety of other applications, Objet's PolyJet™ Technology offers the advantages of rapid prototyping while also enabling the translucency required for the application.

Although there are no shortcuts to achieving the transparency and brilliance of clear parts, the process is simple and inexpensive.

With most rapid prototyping technologies, clear models are either impossible or too time-consuming to make. However, PolyJet Technology makes it both possible and practical. The smooth surfaces of PolyJet models and the translucency of FullCure® 720 model material combine to make clear models a reality. Right out of the machine, you are ready to begin the light sanding and polishing to produce a clear prototype.

Process

1. Build model

Orient the model so that the critical surface faces upwards and build in glossy mode (do not use support material). Wherever possible, avoid support material on clear surfaces since it will be difficult to remove (figure 1).

2. Prepare model

Using the WaterJet station, thoroughly pressure wash the model to remove the support material (figure 2). Pay special attention to corners, channels and pockets to ensure that the support material is completely removed.

Note: Sand blasting is not recommended. The abrasiveness can create small pits that are difficult to polish. However, for a frosted surface, mask off the part and sandblast the unprotected area.

3. Dry-sand surfaces

Following support removal, thoroughly dry the model and sand all surfaces with 200-grit sandpaper. A light sanding will remove surface imperfections and layers (figure 3).

Supplies:

1. Sandpaper:
dry: 220 & 320-grid
wet: 400 & 600-grid
micro-mesh sandpaper (optional)
2. Polishing compound:
3M™ Plastic Polish

Tools:

1. Buffing wheel / rotary tool with buffing drum

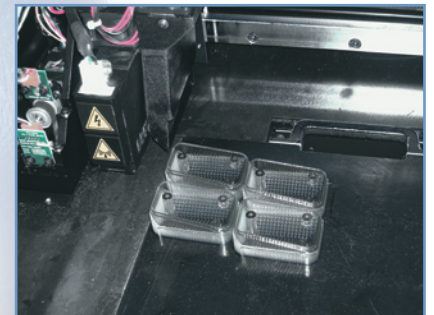


Figure 1. Build orientation. Orient the part to minimize support material on clear surface and build with glossy mode.



Figure 2. Wash model. Pressure wash the model to remove all support material.



Figure 3. Dry-sanding the part. Sand all surfaces to smooth the model.

After the 220-grit sanding, repeat with 320-grit to begin the polishing process.

4. Wet-sand surfaces

Lightly wet-sand the model, progressing through 400, 600 and 1000-grit sandpapers.

The wet-sanding is not intended to remove material. Rather, it reduces the scratches from previous sanding, so a light touch is all that is needed (figure 4).

Between each sanding, rinse the model with water to remove any grit and debris.

5. Micro-mesh sanding (optional)

For an exceptional finish, polish the model with micro-mesh sandpaper (figure 5).

Sand all surfaces with 1500 micro-mesh sandpaper. Depending on the desired results continue sanding with 1800, 2400, 3600 and 4000 micro-mesh sandpaper.

As with step 4, you can use soapy water, mineral oil or vegetable oil to lubricate the surface while sanding.

6. Polish model

The final step to achieving a clear PolyJet part is to buff and polish the surfaces. Using either a buffing wheel or a rotary tool with a buffing drum, apply a polishing compound to the buffing pad and work it onto all surfaces of the model. Reapply the polishing compound frequently.

An effective polishing compound is 3M Plastic Polish. Polishing compounds for plastics are also available from several other manufacturers. Some of these compounds do not require a buffing wheel.

After polishing all surfaces, buff off the compound with a soft cloth or a clean buffing pad. Your PolyJet model is now ready to be used as a lens, container, or cover (figure 6).

Disclaimer

Objet Geometries Ltd. is not responsible for misuse of our products or their use in conjunction with unsafe or improperly maintained equipment or for uses other than intended as specified in this application note.

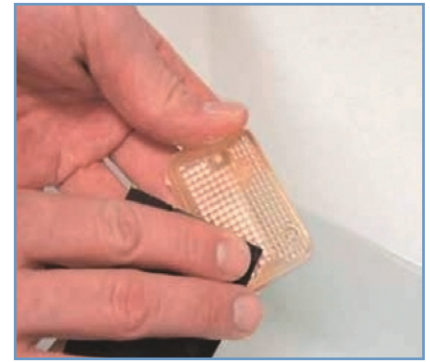


Figure 4. Wet-sanding. Wet-sand the model to begin polishing the clear surfaces.



Figure 5. Micro-mesh sanding (optional). Using micro-mesh sandpaper, polish out all surface scratches prior to buffing.



Figure 6. Finished model. The polished PolyJet model has the clarity needed for product demonstration.

Tip: When wet-sanding, you can add a few drops of dishwashing soap or vegetable or mineral oil to the water to lubricate the surface.

Objet Geometries Ltd.
Headquarters
2 Holzman St., Science
Park
P.O.Box 2496,
Rehovot 76124, Israel
Tel: +972-8-931-4314
Fax: +972-8-931-4315

Objet Geometries Ltd.
Europe
Leuvensesteenweg 388
1932 Sint-Stevens-
Woluwe
Belgium
Tel: +32-2-717-6502
Fax: +32-2-717-6500

Objet Geometries Inc.
North America
5 Fortune Drive
Billerica,
MA 01821
USA
Tel: 1-877-489-9449
Fax: 1-866-676-1533

Objet Geometries
AP Limited
13 Floor, Unit 52A,
HITEC,
1 Trademart Drive
Kowloon Bay
Hong Kong
Tel: +852-2174-0111
Fax: +852-2174-0555

©2007 Objet Geometries, Ltd. Objet™, Objet Geometries™, PolyJet™, Eden250™, Eden260™, Eden330™, Eden350™, Eden350V™, Eden500V™, Eden™, SHR™, PolyLog™, QuadraTempo™, Objet Quadra™, FullCure® and Objet Studio™ are trademarks of Objet Geometries Ltd. and may be registered in certain jurisdictions. All other trademarks belong to their respective owners.