



Part Dipping

SOFTWARE / PRODUCT / FINISHING

An experiment was performed on several ABS and ABSi parts that were dipped in a methylene chloride solution (50% methylene chloride, 50% Trichloroethylene, and 1% methyl methacrylate monomer) in an attempt to determine the effect to surface finish.

Process

A variety of ABS and ABSi FDM parts were dipped in an IPS Weld-On methylene chloride baths. Two different Weld-On products were used: formulation 4 and formulation 2354 (whose noticeable difference was the viscosity of the liquid and also it contains an additive ingredient that adds a thin layer of plastic to the outside surfaces). Each part was dipped for a duration of time between 5 and 90 seconds and then left to dry overnight.

Observations

Dipping parts in the IPS Weld-On 4 (the more viscous one) had a much more significant effect than dipping in the 2354.

The amount of time spent in the methylene chloride bath had a large influence on the amount of smoothing that occurred in the part. Exposure for 5 seconds in Weld-On 4 had a negligible effect on surface roughness, but did give the part a shiny luster.

Dipping a part for 90 seconds caused all layering and roads to become obscured and created a very glossy finish, but it also caused part features to meld together. A dip time of about 30 seconds seemed to be sufficient to smooth all roads without damaging surface detail as significantly.

Dipping ABS parts for 30 seconds in the Weld-On 4 resulted in a very smooth finish where part layers could not be detected by touch or sight. Air gaps within rasters and between rasters and contours were filled, but small features such as a .050" hole on one part was plugged as a result of dipping.



Dipping a part.

PART DIPPING

Similar dipping of ABSi parts resulted in a very smooth finish where layers could not be detected by touch. Walls with only one road became optically clear and layering could not be discerned by sight. Walls with more than one road saw only moderate improvements in translucence and layering remained visible, as the chemical probably was not able to penetrate between walls to affect internal roads.

Measurements were performed on one ABSI open-faced box with varying wall thickness before and after dipping. The wall thickness on each side increased by about .002” to .003” to as a result of dipping. It is unknown what effect this dipping has on the strength of a part.

Conclusion

Dipping ABS and ABSi parts in a methylene chloride solution has potential as a quick and easy way of improving the surface finish of FDM parts. The benefits of this method seem to be:

1. Smooths out layering
2. Fills in gaps between rasters and contours, and 3) improves translucence of thin ABSi parts. This dipping seems to be very well suited for applications such as finishing hearing aide shells in which a thin walled part with limited feature detail is required to have a smooth, non-porous surface.

NOTE

Recently after the dipping process has been performed, some parts have been becoming cloudy while drying. It is not known as to why this is happening. Some theories as to possible reasons for cloudy surface finishes are contaminated solutions and environmental issues such as temperature and humidity. Also keep in mind that these chemicals have strong vapors and should be used in well-vented areas.

Resources

The Weld -on product is available through
IPS Corporation
P.O. Box 379
17109 S. Main St.
Gardena, CA 90248

Or

455 W. Victoria St.
Compton, CA
Phone: (310) 898-3300

Also check with your local plastic supply company for availability.

CONTACT

For questions about the information contained in this document, contact Stratasys at www.stratasys.com/contact-us/contact-stratasys.



E info@stratasys.com / STRATASYS.COM

HEADQUARTERS

7665 Commerce Way, Eden Prairie, MN 55344
+1 800 801 6491 (US Toll Free)
+1 952 937 3000 (Intl)
+1 952 937 0070 (Fax)

2 Holtzman St., Science Park, PO Box 2496
Rehovot 76124, Israel
+972 74 745 4000
+972 74 745 5000 (Fax)

ISO 9001:2008 Certified

© 2009, 2014, 2015 Stratasys Inc. All rights reserved. Stratasys, FDM and Fortus are registered trademarks and Fused Deposition Modeling, FDM Technology, Fortus 250mc, Fortus 360mc, Fortus 400mc, Fortus 900mc, Insight and Control Center are trademarks of Stratasys Inc., registered in the United States and other countries. ULTEM 9085 is a trademark of SABIC Innovative Plastics IP BV. All other trademarks are the property of their respective owners. Product specifications subject to change without notice. BP_FDM_PartDipping_1115