Material Handling and Post Processing Guide
VisiJet® X build material is the next generation part material for use in the ProJet™ family of plastic 3D printers. VisiJet X along with our proprietary MultiJet Modeling technology delivers best in class material features and performance. VisiJet X is the most robust, versatile plastic material in the ProJet material family and rivals competitive materials in its durability, opaque white appearance and heat resistance. VisiJet X can achieve an opaque white finish for an even more plastic-like look and feel with a simple post processing as described in this guide.
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**PART MATERIAL SAFETY**

Users of the printer should be informed of potential hazards of part material prior to working with a printer, or performing duties which may result in exposure to uncured part material, such as removal of material waste pan and empty material cartridges.

Always wear gloves when handling part material that is uncured and not totally solidified.

**Disposal**

- Disposal of fully cured parts produced are not subject to regulations of any known agency worldwide. VisiJet® support material cartridges may be disposed of in ordinary office trash.

- Uncured part material waste is classified as regulated, and in some areas hazardous; requiring special packaging, transportation, and disposal. The disposal of partially cured or uncured part material must comply with all local, state, and federal environmental safety regulations. Applicable part “waste” includes cartridges (empty or full) and waste pans. Any materials used cleaning up uncured part material should be disposed of as uncured part material.

- To find out facility disposal requirements, contact a local waste disposal provider. (Local environmental regulatory agency should have a list of qualified providers.) You will need to give disposal service provider a copy of the part material MSDS / SDS, and possibly other forms included in the Appendix of your VisiJet® Material Handling Guide, such as Waste Profile Worksheet and SNUR (Significant New Use Regulation - U.S. only). A report will be provided, indicating disposal requirements, as well as a quotation for regularly scheduled pickups. If assistance is needed locating a waste disposal provider, or completing a waste disposal form, contact your local 3D Systems certified reseller or 3D Systems Technical Support.

- 3D Systems assumes no liability or responsibility for proper disposal of uncured part material. Proper disposal of uncured part material is the sole responsibility of the user.
Health Hazards / Irritant

Irritant

- Uncured VisiJet® part material is a sensitizer. Skin or eye irritation could occur when exposed to the chemical composition of the material.
- Any chemical may exert harmful effects if contacts or enters the body. VisiJet® part material is a sensitizer and irritant.
- Skin Sensitization
- Uncured VisiJet® part material is a sensitizer. Skin or eye irritation could occur when exposed to the chemical composition of the material.
- Uncured material is a sensitizer, and can cause allergic reactions if contacts skin without protective gloves. Refer to personal protection equipment for more information. To avoid sensitization, do not allow uncured material to contact skin. Consult the MSDS for specific information about the sensitization potential.

Inhalation

- Under normal operation, inhalation is not an expected route of entry.
- Ingestion
- Uncured VisiJet® part material is toxic if ingested.
- Uncured material is toxic if ingested. Uncured material must not be present where food and drink are stored, prepared, or consumed and not ingested. After handling materials, wash hands with soap and water before consuming or preparing food.

Handling Finished Parts

- Finished (cured) parts can be handled or disposed of the same as standard household plastic products. VisiJet® parts are not recyclable. VisiJet® materials are not intended for and cannot be used for medical implant, or food or drink handling applications.
- Exposure control
- The printer has a variety of built-in engineering controls which are designed to prevent operator exposure. Do not try to change or disable these controls.
- Use caution when loading and unloading parts in the Finisher Oven as the walls may be hot to the touch.

Hygienic Practices

- Appropriate hygienic practices should be followed, including washing with soap and water before meals, breaks, smoking, applying cosmetics, using toilet facilities, and after work.
- Employees should be alerted to the need to clean and rinse off any contacted surface promptly in order to prevent further contami-
Emergency (MSDS)

- Chemtrec USA (800) 424-9300; Europe +1-703-527-3887

Packaging Inspection

- The VisiJet® material cartridge are packaged in shipping cartons. Upon receipt of material shipments, inspect cardboard carton exterior for signs of damage and leakage. If leakage is observed, DO NOT open carton, and contact 3D Systems’s Technical Support Hotline. If no leakage is observed, keep the material cartridge in their cartons and store until material is used.

Part Building

- If uncured material is observed on the part or platform after build, this is an abnormal condition, and is an indication the printer requires servicing by 3D Systems or a certified servicing reseller. Assume any liquid or paste-like material is part material. Do not directly touch uncured part material without protective gloves. Discontinue use of the printer pending service by a 3D Systems Technical Support Representative.

- Flammability and Combustibility

- Do not expose materials to heat at or above 230°F (110°C), flames, sparks, or any source of ignition. (Though the U.S. Department of Transportation does not consider VisiJet materials a “flammability hazard,” they do classify them “combustible” based on flash points.) For more information on VisiJet material flash points and combustibility, see VisiJet® Material Handling and Post Processing Guide.

Personal Protection Equipment

- Exposure to uncured part material may occur when removing and disposing of the waste pan. To prevent contact, wear chemically resistant protective gloves - nitrile or neoprene gloves are recommended. Do not use Latex gloves.

- In the event of a leak or spill of uncured part material, wear safety glasses with side shields to provide eye protection.

- Because of the printer’s built in engineering controls, respiratory protection is not necessary during normal operation. A NIOSH-approved (or equivalent) dust mask is recommended when dry sanding cured material parts.

Training

- Employees should be trained in the hazards and management of VisiJet materials. Such training should be provided to new employees before they begin working with the modeler, or disposing of material waste.
Regulatory Information

- Support material has no known regulatory requirements.
- In the U.S., uncured material is subject to special EPA disposal regulations and record-keeping requirements. “Uncured VisiJet® material” includes any part material cartridge (empty or full), and waste pan which is partly uncured part material. For complete disposal regulation details, see Appendix in your Material Handling Guide.
- In the U.S., you must keep the following disposal records for five years after the date of disposal:
  - The quantity of part material received (new or “virgin”).
  - The name and address of the shipping location (the “responsible party” - generally your waste disposal service provider).
  - The quantity of part material shipped (disposed). For further information, see your Material Handling Guide.
- For assistance, contact 3D Systems Technical Support.

Spilled VisiJet® Material

- Spills of material are HIGHLY UNLIKELY, and should NOT occur in normal operation of the printer. If a leak occurs, it is an indication of a serious printer malfunction.
- The first priority is to protect users from inadvertently touching material. Spills of support material can be cleaned without use of protective gear, and disposed of as office trash. Handling uncured part material requires use of gloves and other personnel protective equipment to ensure no direct contact with uncured part material. If you don’t know which material it is, assume it to be uncured part material, and handle accordingly - with the recommended personal protective equipment.
- Promptly remove spilled material, dispose of waste material, and cleanup materials per local regulatory requirements. Discontinue use of the printer, and contact 3D Systems Technical Support for a service visit to determine and repair the source of leakage.
- Small spills of uncured liquid part material can be cleaned up using disposable towels, non-reusable rags, or absorbing materials such as sawdust, clay, diatomaceous earth, or activated charcoal. If spilled material is hot (liquid), wait until cools and gels before wiping up. After wiping up the spill, wipe surface with denatured or isopropyl alcohol and clean thoroughly with soap and water.
- Consider avoiding placement of the printer over carpeting, or consider use of barriers to avoid the possibility of carpet damage if spills were to occur.
- Advise service provider involved, of the spilled material, and provide MSDS and other material information prior to contact with the material. Advise them of disposal requirements for part material and clean-up products if part material (uncured) is the spilled material. Use of heat above 65°C (149°F) may prove helpful in removing spilled part material from carpet.
- Tools contaminated with part material should be cleaned prior to reuse. Solvents such as denatured alcohol or Isopropyl Alcohol (IPA), are normally required to clean equipment and tools. Wash with soap and water to remove any traces of excess part material or solvent. Contact solvent suppliers for information on proper handling of solvents if used for clean-up.

Waste Removal

CAUTION: Uncured part material is a sensitizer. Skin or eye irritation could occur when exposed to the chemical composition of the material

- Wear protective gloves before removing any waste product from the printer. Be careful not to spill, drop, or expose others to these materials - particularly part material or waste pan. Dispose of all waste material appropriately per local regulatory requirements.
- Dispose of waste pan (if it is not reusable) containing both support and uncured part material. Replace the waste pan every time or reuse pan if the pan is reusable.
Material Storage

<table>
<thead>
<tr>
<th>Build Material</th>
<th>Support Material</th>
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</thead>
<tbody>
<tr>
<td>Shelf life for VisiJet Build Materials</td>
<td>Shelf life - 5 yr</td>
</tr>
<tr>
<td>Climate - Cool, dry area with adequate ventilation</td>
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</tr>
<tr>
<td>Temperature Range - 60°F (16°C) to 80°F (27°C)</td>
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</tr>
<tr>
<td>Maximum Storage Temp - 95°F (35°C)</td>
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<tr>
<td>Environmental Conditions - No direct sunlight, heat, flames, or UV energy.</td>
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**NOTE:** For optimal results, keep stored cartons closed and sealed until material cartridges are ready for use.

- Always check material “Recertification Date” before use. Do not load material cartridges into printer if cartridge date has expired. When printer detects an expired cartridge, it aborts the build and rejects the cartridge.

- Support (white) material must be loaded in the left side of material drawer. VisiJet part (black) material cartridges must be loaded in the right side of material drawer. Before loading cartridges into printer, inspect the cartridges for signs of damage or leakage. Do not load a damaged or leaking cartridges. Dispose of material cartridge according to local regulations.

Storing a Partially Used Material Cartridges

- It is important not to lay material cartridges that are partially used on their side. Doing so will cause material to seep through the vent cap and clogging cap. This will cause damage to the material cartridge if used for a later build.

- To store a partially used material cartridges, insert cartridge into a plastic bag with the vent cap up; place cartridge into its original shipping carton’s sleeves and carton. Do not remove a partially used Support Bottle from the MDM if the MDM is NOT heating; the material will solidify and cause a breakage.
PARTS POST PROCESSING

Required Supplies

- Printed VisJet X parts with support
- New EZ Rinse solution (delivered in a 1 gallon container) – EZ Rinse helps to rinse trace amounts of wax off parts once they’ve had bulk wax removed.
- ProJet Finisher Oven for removing bulk wax
- Heated ultrasonic cleaner or some other container for holding and heating liquid

STEP 1: Removing Parts From the Build Platform

- There are three popular methods for removing parts from the build platform. All three methods should be done with care and consideration for the parts to avoid damage.
  - Mechanical Action – Hold the platform a few inches from on hard surface and drop to release parts. This works well for large bulky parts with a lot of support wax.
  - Metal Scraper – Use a metal putty knife or other scraper to scrape parts off. Use caution when scraping long, thin parts as scraping and pulling up can cause thin parts to break.
  - Freezer – Place parts in freezer for 10 minutes

STEP 2: Melt Bulk Wax

- Set the ProJet Finisher Oven or heating apparatus to 70°C
- Place parts on grate and allow all bulk wax to melt off parts. Exact time to melt will depend on the geometry and how much bulk wax is present.
STEP 3: Remove Residual Wax with EZ Rinse Solution

• Prepare a solution of EZ Rinse in a heated Ultrasonic Cleaner or Other Heated Container at 70°C.
• EZ Rinse is a water based solution that quickly rinses the residual wax off the part and in crevices or trapped cavities
• Place parts in the heated solution for 15 minutes (with or without ultrasonic)

STEP 4: Quench in Water to Achieve Opaque White Finish

• Prepare a separate container of room temperature water
• Take parts directly from the EZ Rinse solution and place in the water bath. The parts will begin to turn white. The whitening process should take no more than 10-15 seconds.

STEP 5: Dry

• Once parts have achieved the desired whiteness remove and allow to air dry on absorbent towels or blow dry with compressed air.
FREQUENTLY ASKED QUESTIONS

What is EZ Rinse and how does it work?
• EZ Rinse is a concentrated rinse agent composed of a proprietary blend of industrial materials. The solution is formulated to provide effective rinsing of residual wax on parts.

How much EZ Rinse should I use for cleaning parts?
• The amount of EZ Rinse required is determined by the size of parts being rinsed. Ensure there is enough EZ Rinse to complete cover and submerge the parts being cleaned.

My part is not completely white. What happened?
• Quenching parts in water helps to progress the whiteness of the part. Some thick geometries may cool and whiten more slowly since the inside of the part will take longer to cool down. If there is uneven whiteness on the geometry after quenching in water do the following:
  • Place part back in finisher oven for 10 minute or until part is hot (part will be cloudy opaque in appearance)
  • Remove part from oven and immediately quench in water

How long can I use EZ Rinse before I have to replace it?
• Over time the residual wax removed from parts will build up in the EZ Rinse solution and eventually become saturated reducing its effectiveness. The time to saturation will depend on the types and sizes of geometries being rinsed and how much residual wax is being rinsed off the parts. In order to determine when it’s time to dispose of and replace the EZ Rinse solution, do one or both of the following:
  • Turn off the heat source for the tank or container holding the EZ Rinse. If the solution cools to a solid then it is saturated and should be replaced.
  • If parts begin to feel waxy after going through EZ Rinse cycle then the solution is saturated and should be replace

How should I dispose of EZ Rinse Solution
• EZ Rinse is a water based rinse agent that should be handled and disposed of in accordance with the user’s local regulations and policies. Refer to the MSDS for general disposal guidelines. EZ Rinse should not be disposed of in sink drains or toilets. Disposal consideration should be very similar to other household cleaning and rinse agents.