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INTRODUCTION

Thank you for purchasing the ProJet™ 6000 3D Printer. We pride ourselves in our ability to offer customers three dimensional modeling solutions.

The 3D Systems team is confident your system will provide many years of service.
ABOUT THIS MANUAL
This manual provides users with an understanding of features, system requirements, and operating procedures needed to create finished parts using the ProJet 6000.
Should additional questions arise, contact 3D Systems:

Service Contact

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotline</td>
<td>Every workday: 8:00 - 17:00 EST/EDT</td>
</tr>
<tr>
<td></td>
<td>1.800.793.3669</td>
</tr>
<tr>
<td>E-Mail</td>
<td><a href="mailto:moreinfo@3dsystems.com">moreinfo@3dsystems.com</a></td>
</tr>
<tr>
<td>Service Address</td>
<td>3D Systems Inc.</td>
</tr>
<tr>
<td>U.S.A.</td>
<td>333 Three D Systems Circle</td>
</tr>
<tr>
<td></td>
<td>Rock Hill, SC 29730</td>
</tr>
<tr>
<td>Service Address</td>
<td>3D Systems, Japan K.K.</td>
</tr>
<tr>
<td>Japan</td>
<td>4-6-8 Tsurumaki</td>
</tr>
<tr>
<td></td>
<td>Setagaya-Ku, Tokyo 154-0016</td>
</tr>
<tr>
<td>Service Address</td>
<td>3D Systems Europe Ltd.</td>
</tr>
<tr>
<td>Europe</td>
<td>Mark House, Mark Road</td>
</tr>
<tr>
<td></td>
<td>Hemel Hempstead</td>
</tr>
<tr>
<td></td>
<td>Herts HP2 7UA</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
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FCC NOTICE
This equipment has been tested and found to comply with the limits for a class “A” digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their expense. Changes or modifications not expressly approved by 3D Systems could void your authority to operate this equipment.

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SAFETY

You must be properly trained before operating the ProJet™ 6000. Also, anyone assisting you must be properly trained. After you are trained, always follow the safety guidelines and procedures in this section before operating the ProJet™ 6000.

CUSTOMER SAFETY PROGRAM

Before using the ProJet™ 6000, customers must have a safety program in place. The safety program should do the following:

- Label and point out hazardous equipment, materials, and procedures.
- Explain what to do in an emergency situation.
- Provide information about the hazards of equipment and materials in the form of Material Safety Data Sheets (MSDS). The MSDSs are provided with all materials supplied by 3D Systems.

The information in this chapter supplements the customer’s existing safety program. It points out safety considerations that specifically concern the ProJet™ 6000.

LEVELS OF USER

**WARNING:** Do not attempt to perform any procedures described in this manual unless you have been specifically trained to do so.

There are two levels of users of the ProJet™ 6000, based on the amount and type of training the user has received. The two levels of users (operators and certified service personnel), are described below.

**Operators**

Operators are trained to operate the system and perform all the necessary tasks to build a part.

**Certified Service Personnel**

Certified service personnel are those who have completed the 3D Systems service training package and are certified to perform service tasks. Certification may occur at various levels, and certified service personnel should only perform tasks they are authorized and certified to complete.

SAFETY DESIGN FEATURES IN THE ProJet™ 6000

The following design features are provided to reduce potentially hazardous operating conditions:

**WARNING:** If any of the following safety features fail, your actions may be all that will prevent potentially hazardous operating conditions.

- Safety interlocks at the ProJet™ 6000 process chamber door and limited access to cabinets are intended to prevent accidental exposure of the user to the laser beam, thermal hazards, pinch points, or to electrical shock.
- The design of the beam delivery system is intended to prevent the laser from being aimed outside the area of the process chamber.
- Limited access to service areas prevents accidental exposure to electrical shock hazards or pinch points.
- The viewing window to the process chamber prevents operator exposure to laser emission while observing operation.
- If the ProJet™ 6000 detects certain unsafe conditions during operation, it is designed to shut down immediately.
SAFETY SYMBOLS AND DEFINITIONS

⚠️ **CAUTION:** Indicates the possibility of damage to the equipment.

⚠️ **WARNING:** Indicates the possibility of injury or death to personnel.

⚠️ **ELECTRIC SHOCK HAZARD:** High voltage electricity is accessible in the vicinity of this sign or behind the access panel. High voltage can cause severe burns or death. Access panels are for service only and should be opened only by certified service personnel.

⚠️ **LASER RADIATION HAZARD:** Invisible laser radiation is accessible in the vicinity of this sign or behind the access panel. Direct and scattered radiation can cause severe burns and blindness. Access panels are for service only and should be opened only by certified service personnel.

🚫 **IRRITANT:** Indicates that skin or eye irritation could result while exposed to a chemical composition.

⚠️ **Ultraviolet radiation inside. Exposure may cause eye damage. Do not operate without covers. Wear UV eye protection.**

⚠️ **HOT SURFACE:** There are surfaces in the vicinity that may be hot and could cause severe burns or fire.

📝 **NOTE:** Indicates an important point.
SAFETY HAZARDS AND GENERAL GUIDELINES

The ProJet™ 6000 was designed with safety in mind. However, as with all equipment, improper use and malfunctions could cause injury.

This section provides general guidelines for operating the ProJet™ 6000.

Follow these general safety guidelines regarding

- Training and Instructions
- Material Handling
- Machine Handling
- Laser Safety
- Alarms and Warnings

Training and Instructions

- Do not operate the ProJet™ 6000 before receiving proper training.
- Read and follow all operating instructions.
- Follow all safety rules in this section and heed all hazard warnings in this guide. Operators are trained to operate the system and perform all the necessary tasks to build a part.

Material Handling

- Do not use any material without first reviewing its MSDS.
- To prevent injury and equipment damage, be sure to follow all handling guidelines in 2.09 Print Material Handling and Safety.

Machine Handling

- When operating the ProJet™ 6000, always keep the following points in mind:
  - Do not try to open any panel or door while a machine is running.
  - Do not operate the ProJet™ 6000 before receiving proper training.
  - Always follow the procedures in this manual.
  - Conform to all the safety rules described in this section and in other sections of this manual.
  - Use common sense in dealing with the heated, inert environment of the process chamber.
  - Do not allow operators to attempt to access or adjust the laser system in any way.

Laser Safety

- Post warning signs during open laser beam operations. Only Certified Service Personnel are permitted to perform open laser beam operations.
- Do not enter any area displaying posted warning signs during open beam operations without proper eye protection.

**WARNING:** Open laser beam operation should occur only during service procedures performed by certified service personnel.

Alarms and Warnings

- If you hear an alarm, or if you see an error, alarm, or warning message on the ProJet™ 6000 display or on the front panel indicators, clear the alarm, error, or warning message before resuming operation.
- Displayed error, alarm, or warning messages can result from unsafe practices, such as opening an enclosure door or panel when equipment is powered up and running.
ENVIRONMENTAL SAFETY ISSUES

The following are environmental issues concerning the ProJet™ 6000:

• Controlling waste heat is not required for normal operation of the ProJet™ 6000.
• When you dispose of materials, refer to the MSDS for that material and follow any applicable local regulations.
• All waste products, (spilled print material, cleaning liquids, etc.) must be disposed of in accordance with all applicable local regulations.

SAFETY INTERLOCKS

Interlocks

Safety interlock devices on the ProJet™ 6000 equipment help prevent accidental laser exposure, electrical shock and crush injuries. ProJet™ 6000 equipment will not operate unless all safety interlocks are satisfied.

WARNING: Never disable or override any safety interlock device on the ProJet™ 6000. Operating equipment without all safety interlocks enabled can cause injury. If you suspect a safety interlock device is not working, do not operate the ProJet™ 6000. Disconnect power from the equipment and contact 3D Systems Customer Support for assistance.
LASER SAFETY
The ProJet™ 6000 is designated as a Class I Laser Device by the U.S. Center for Devices and Radiological Health (CDRH). Class I devices are not considered harmful and require no special safety precautions. Under normal operation conditions, the laser beam is completely confined. The viewing window blocks the UV laser radiation from exposure outside of the build area.

LASER RADIATION HAZARD: Operating the equipment or performing procedures other than those specified within this guide may result in exposure to hazardous, invisible laser radiation.

LASER RADIATION HAZARD: Never stare directly into a laser beam, nor into any beam reflection, whether diffused or from a mirror-like surface.

LASER RADIATION HAZARD: During normal operation, and with all panels installed, the ProJet™ 6000 is classified as a Class I laser device. If any of the interlocks are defeated, the ProJet™ 6000 becomes a Class IV device. Eye damage can occur by looking directly into the beam or by viewing any type of beam reflection.

PRINT MATERIAL HANDLING AND SAFETY

IRRITANT: Always wear chemical-resistant gloves, goggles and protective clothing when handling print material. Avoid skin contact. Avoid breathing print material fumes.

- Always wear approved goggles, nitrile gloves and protective clothing when working near print materials or with partially cured parts.
- Wearing contact lenses when working with print materials is not recommended.
- Always wear chemical-resistant gloves whenever handling print materials or partially cured parts. Recommended gloves are 100% Nitrile. Do NOT wear latex gloves.
- Always work in a well ventilated area when using print materials. Avoid breathing vapors.
- Always wash skin thoroughly with a non-abrasive soap and COLD water after working with print materials. DO NOT USE HOT WATER OR SOLVENTS to wash hands, as it will result in absorption through the skin.
- Use extreme care when handling solvents used to remove excess print material from uncured parts. These solvents (e.g., denatured alcohol, isopropyl alcohol) are very flammable.
- Keep all print materials away from heat, sparks and flame. Print material containers may rupture when exposed to extreme heat.

WARNING: Use National Fire Protection Association Class B extinguishers such as carbon dioxide, dry chemical, or foam.

Print Material Characteristics
The photopolymers used in the print materials may be hazardous if handled improperly. Repeated skin contact with print materials may cause sensitization. Consult the manufacturer’s Material Safety Data Sheet (MSDS) for information on specific print materials. For further information on this and related topics, consult the 3D Systems - Materials website.

CAUTION: Never mix different print materials.

Print Material Disposal
Do not dump used print material down any drains. Dispose of print material according to the guidelines given in the MSDS included with the print material and all applicable regulations,(local, state, and federal).

Print Material Spill Containment
Your company has the responsibility to define what constitutes a major spill. Personnel who are involved in cleaning up major spills of print material should wear NIOSH/MSHA approved respirators designed for use with organic chemical vapors. In addition, each person should wear protective goggles, rubber boots, and 100% nitrile gloves to minimize exposure to print material, which can cause eye, skin, and respiratory irritation, as well as possible skin allergies and respiratory reactions.
WARNING: Untrained personnel should be evacuated from the area.

WARNING: Print materials are flammable. Care should be taken during print material containment and cleanup operations.

A supply of dikes and control booms should be stocked so they are available to contain the affected area in the event of a major print material spill. The spilled print material should then be absorbed on inert absorbent material and placed into drums for transfer to an approved waste disposal site. After cleaning up the spill, individuals should wash thoroughly with soap and cold water. All clothing should be washed before reuse. Avoid exposure to sunlight until skin and clothing have been cleaned of print material. Refer to the MSDS before using any chemicals. Repeated or prolonged skin contact may cause sensitization. Vapor may be harmful.

Shelf Life
VisiJet SL & Accura materials are certified for use for at least 12 months from their date of manufacture. Most materials are certified for 18 months from their manufacture dates. The recertification dates are marked on the material cartridge labels. In general, resins are usable for several months after their recertification dates provided that the materials have been properly stored, handled and not exposed to excess heat. However, use of very old or material past its recertification date may shorten your In-Service material life. It is advisable to check the viscosity of any material past its recertification date prior to use.

In-Service Life
In-Service Life of the VisiJet SL materials is defined as the useful life of the material after having been poured into the ProJet 6000 print tray. The In-Service Life of the ProJet 6000 material greatly varies depending on material type, usage and environmental conditions. The more volume built, the more the material is refreshed with newer material. This blends older material with newer material and extends the In-Service Life of the materials. If the material is exposed to temperatures outside of the normal operating limits, is exposed to UV light, is exposed to particulates or vapors in the air such as dust or fumes, or if contaminates are introduced such as partially cured platforms being placed back into the print tray, this will shorten the material In-Service life. The type of patterns and builds performed also affect the in-service life of the material. With all this taken into consideration, we would expect the in-Service life of the material to be at least two years but can be much longer with proper care and maintenance. The material retains its usefulness until a buildup of viscosity or a change in reactivity prevents further processing in the ProJet™ 6000.

Contamination
Care should be taken when cleaning windows, panels, and other parts of the ProJet™ 6000. Cleaning products which contain ammonia should not be used because they can cause contamination of the material. Instead use a small amount of isopropyl alcohol on a paper towel to clean up spills. Accidental contamination of resins may change the material's performance characteristics to such an extent that acceptable parts can no longer be reliably created.

Polymerization
Signs of polymerization of stored resin include container bulging, leaking, and the emission of heat, or an unusual odor from the container. If you notice this, do not use the material and dispose of it properly.

ELECTRICAL SAFETY
To prevent electrical shock, the ProJet™ 6000 will not operate unless all external panels are installed and all electrical safety interlock circuits are closed. The ProJet™ 6000 was designed to minimize operator exposure to electrical hazards during normal operations. All exposed electrical circuits are contained within limited-access cabinets. This is to separate the operator from service and maintenance areas.

WARNING: Hazardous voltage exists inside the enclosures of the ProJet™ 6000. Injury or death from electrical shock can result if you remove external panels or try to defeat safety interlocks. Panels should only be removed and safety interlocks should only be defeated by certified service personnel.
EMERGENCY SHUT DOWN USING THE E-STOP

**ALERT:** In the event of an emergency, immediately press the Emergency Stop switch (E-Stop).

The emergency stop switch is pressed any time the operator experiences or suspects a machine malfunction. Pressing the E-Stop disables the laser and all motors. Pressing the E-Stop does not switch off all power to the machine.

To restart the system after an emergency shut down, rotate the E-Stop switch clockwise to reset it.

---

FIRST AID AND PROTECTIVE EQUIPMENT

**First Aid and Protective Equipment**

The following paragraphs provide general first aid procedures and recommendations for protective equipment to minimize the risks from print material exposure. If professional medical attention is necessary, take the Material Safety Data Sheet (MSDS) for the exact print material involved to the attending physician.

**Skin Contact**

Wear 100% nitrile gloves and lab coats to avoid skin contact. Should print material come in contact with skin, wash thoroughly with soap and cold water and immediately remove contaminated clothing and shoes. If skin is irritated, get medical attention. Dry-clean contaminated clothing. Discard contaminated shoes and leather products.

**Eye Contact**

Safety goggles should be worn to prevent accidental splashes into the eyes. If print material comes in contact with the eye, flush immediately with large amounts of water for 15 minutes, avoid sunlight, fluorescent light, and other ultraviolet light, and obtain immediate medical attention. Eye wash facilities and a first aid kit should be readily available and close to the print material.

**Contact Lenses**

If print material splashes into the eye when contact lenses are worn, flush the eye with water immediately. Verify that flushing has removed the contact lens from the eye. Protect eyes from light and obtain immediate medical attention. Discard contact lenses that come into contact with liquid print material.
Fume Inhalation

Remove the person to fresh air. Give artificial respiration or cardiopulmonary resuscitation (CPR) if required. If breathing is difficult, give oxygen. Obtain immediate medical attention.

SAFETY NOTICE

⚠️ CAUTION: Use of controls or adjustments, or performance of procedures other than those contained in the operation, maintenance or any other manual provided with this machine may result in hazardous radiation exposure.

This laser process machine is certified as a CLASS 1 laser product to the requirements of the US Federal Product Performance Standard for Laser Products contained in the regulations in 21 CFR Subchapter J except for specific deviations described in FDA Laser Notice #50.

NOTE: Class 1 laser products are not considered to be hazardous.

This machine incorporates a Class 4 laser and optical system which, by itself, may be hazardous. However, this machine incorporates a protective housing, laser protective viewing window, and safety interlocks in the machine design such that there is no exposure or human access to the laser radiation generated by the laser during operation.

All service to the laser process machine, the embedded laser system and optics requiring interlock override shall only be performed by 3D Systems Corporation service personnel, their authorized agents, or personnel trained by 3D Systems Corporation. The manufacturer’s user information for the incorporated laser products are supplied with this process machine.

UNDER NO CIRCUMSTANCE shall attempts be made by the user to operate the laser with safety interlocks bypassed or tool removable access panels that allow access to laser radiation removed. Labels are provided on the products that indicate hazards. Reproductions of these labels and diagrams showing their location are provided in this manual.

The laser should not be operated if the laser protective window material installed onto the front of the process chamber is damaged or removed. The window material has a measured minimum optical density (OD) of 5+ @ 355nm. Contact the manufacturer for replacement information.
<table>
<thead>
<tr>
<th>Item</th>
<th>P/N</th>
<th>Description</th>
<th>Qty</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>282530-01</td>
<td>System Label, ProJet™ 6000</td>
<td>1</td>
<td><img src="image1" alt="System Label" /></td>
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<td>2</td>
<td>203373-00</td>
<td>Laser Interlocks Defeated Sticker</td>
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<td><img src="image2" alt="Laser Interlocks Defeated Sticker" /></td>
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<td>3</td>
<td>203375-00</td>
<td>Laser Warning When Open Sticker</td>
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<td>283148-00</td>
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<td>5</td>
<td>203019-00</td>
<td>Electrical hazard Sticker</td>
<td>1</td>
<td><img src="image5" alt="Electrical hazard Sticker" /></td>
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<tr>
<td>6</td>
<td>17976-001-01</td>
<td>Electrical Panel Sticker</td>
<td>3</td>
<td><img src="image6" alt="Electrical Panel Sticker" /></td>
</tr>
<tr>
<td>7</td>
<td>19965-001-01</td>
<td>CE declaration label</td>
<td>1</td>
<td><img src="image7" alt="CE declaration label" /></td>
</tr>
<tr>
<td>Item</td>
<td>P/N</td>
<td>Description</td>
<td>Qty</td>
<td>Label</td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
<td>---------------------</td>
<td>-----</td>
<td>-------</td>
</tr>
<tr>
<td>8</td>
<td>19984-001-00</td>
<td>Heat Hazard Sticker</td>
<td>3</td>
<td><img src="image" alt="Heat Hazard Icon" /></td>
</tr>
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</table>
The ProJet™ 6000 is a 3-D solid modeler that generates plastic models or prototype parts from computer data. The system builds parts by processing a three-dimensional CAD file to represent cross sections, or slices. The ProJet™ 6000 creates models by profiling each slice as a layer on the surface of a print material. A laser beam solidifies each layer of material. After each layer is profiled, the vertical elevator system lowers the prototype part into the print tray, and immerses the part beneath the surface of the material to a predefined depth. Additional print material is added by a print applicator, which ensures consistent layer thickness. This process is repeated for each layer until all of the data for the model is processed. The part is then removed from the ProJet™ 6000 for post-processing.

ProJet™ 6000 COMPONENTS

<table>
<thead>
<tr>
<th>Item</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Stop Button</td>
<td>The emergency stop button (E-Stop), is pressed any time the operator experiences or suspects a machine malfunction. Pressing the E-Stop disables the laser and all motors. Pressing the E-Stop does not switch off all power to the machine.</td>
</tr>
<tr>
<td>Graphical User Interface</td>
<td>The graphical user interface (GUI), provides a touch screen which allows operator to perform all functions needed to operate the machine and build parts.</td>
</tr>
<tr>
<td>Status Indicators</td>
<td>The three LEDs on the front panel indicate the readiness of the machine and the laser.</td>
</tr>
<tr>
<td>Upper Build Chamber Door</td>
<td>Used to access the build chamber. This door can be opened only during certain times, as indicated by the status indicators. The door is provided with interlock switches which will disable the machine and switch the laser off if the door is opened.</td>
</tr>
<tr>
<td>Lower Build Chamber Door</td>
<td>Used to access the material cart area. This door can be opened only during certain times, as indicated by the status indicators. The door is provided with interlock switches which will disable the machine and switch the laser off if the door is opened.</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Ethernet cable connection.</td>
</tr>
<tr>
<td>Power On/Off Switch</td>
<td>Switch power to the machine On or Off.</td>
</tr>
<tr>
<td>Chamber Lights Switch</td>
<td>Switches the build chamber lights On or Off.</td>
</tr>
<tr>
<td>Internal PC Power On/Off switch (and Indicator)</td>
<td>This switch is used to reset the PC or power the PC On/Off. The switch is illuminated to indicate the PC is powered on.</td>
</tr>
<tr>
<td>USB Ports</td>
<td>Allows the connection of an external mouse and keyboard</td>
</tr>
</tbody>
</table>
### UPPER BUILD CHAMBER

<table>
<thead>
<tr>
<th>Item</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chamber Lights</td>
<td>Illuminate the inside of the build chamber.</td>
</tr>
<tr>
<td>Upper Chamber Heater</td>
<td>Provides a controlled temperature for the build chamber and material.</td>
</tr>
<tr>
<td>Vacuum Adjustments</td>
<td>Adjust the vacuum delivered to the print applicator.</td>
</tr>
<tr>
<td>Elevator Motor</td>
<td>Raises and lowers the elevator.</td>
</tr>
<tr>
<td>Laser Window</td>
<td>Laser is projected through the laser window to the material surface.</td>
</tr>
</tbody>
</table>
# ELEVATOR AND PRINT APPLICATOR MECHANISM

<table>
<thead>
<tr>
<th>Item</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Applicator Motor</td>
<td>Moves the print applicator.</td>
</tr>
<tr>
<td>Elevator</td>
<td>The elevator forks and parts platform are attached to the elevator. The elevator travels in the Z axis.</td>
</tr>
<tr>
<td>Material Temperature Sensor</td>
<td>Monitors the temperature of material in the print tray.</td>
</tr>
<tr>
<td>Print Applicator Arm</td>
<td>Moves front to back across the print tray (not shown). The print applicator travels in the Y axis.</td>
</tr>
<tr>
<td>Material Level Window</td>
<td>Provides a visible check of the material within the print applicator blade.</td>
</tr>
<tr>
<td>Print Applicator Blade</td>
<td>The part of the print applicator that contacts the material in the print tray.</td>
</tr>
<tr>
<td>Item</td>
<td>Function</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Omron Sensor Display</td>
<td>Displays the measurements obtained by the omron sensor.</td>
</tr>
<tr>
<td>Omron Sensor</td>
<td>Detects the level of the material in the print tray. Used for fine adjustment only.</td>
</tr>
<tr>
<td>Cosense Sensor</td>
<td>Detects the level of material in the print tray. Used for coarse leveling only.</td>
</tr>
<tr>
<td>Beam Rest</td>
<td>Beam is projected onto the beam rest during the print leveling cycle.</td>
</tr>
<tr>
<td>Beam Profiler</td>
<td>A UV-sensitive detector used for beam calibration and adjustment.</td>
</tr>
</tbody>
</table>
LOWER BUILD CHAMBER

<table>
<thead>
<tr>
<th>Item</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Tray</td>
<td>Contains the print material used during the build process.</td>
</tr>
<tr>
<td>Lower Chamber Heater</td>
<td>Provides a controlled temperature for the build chamber and material.</td>
</tr>
<tr>
<td>Material Cart Umbilical</td>
<td>Provides power and control signals to the material cart.</td>
</tr>
</tbody>
</table>
**MATERIAL CART**

<table>
<thead>
<tr>
<th>Item</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handle</td>
<td>Can be raised and lowered for moving the material cart.</td>
</tr>
<tr>
<td>Connector Latch</td>
<td>Secures umbilical from the machine to the material cart connector.</td>
</tr>
<tr>
<td>Umbilical Connector</td>
<td>Umbilical from the machine is connected here to provided power and control signals to the material cart.</td>
</tr>
<tr>
<td>Material Hose</td>
<td>Connects the material cart to the print tray. Material is pumped through the material hose to add or remove material from the print tray.</td>
</tr>
<tr>
<td>Release Button</td>
<td>Press to extend the material bottle holder. Allows user to change material bottles without removing the material cart from the machine. See figure below.</td>
</tr>
<tr>
<td>Material Bottle</td>
<td>Material bottles provide new material for the system. The material cart pump transfers material from the material bottles to the material reservoir.</td>
</tr>
<tr>
<td>Material Bottle Holder</td>
<td>Holds material bottles. Material bottles are seated onto the coupling in the bottom of the holder. Flexible tubing connects the material bottle to the material reservoir.</td>
</tr>
<tr>
<td>Material Reservoir</td>
<td>Holds the material needed to fill the print tray for initial filling and during normal operation.</td>
</tr>
</tbody>
</table>
Material Cart with Bottle Holder Extended
FRONT PANEL INDICATORS

Blue LED - Laser

<table>
<thead>
<tr>
<th>State</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Laser is off.</td>
</tr>
<tr>
<td>Flashing</td>
<td>Blue LED does not flash.</td>
</tr>
<tr>
<td>On</td>
<td>Laser is enabled.</td>
</tr>
</tbody>
</table>

Green LED - Control

<table>
<thead>
<tr>
<th>State</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Control systems are not enabled. The machine is not ready for use.</td>
</tr>
<tr>
<td>Flashing</td>
<td>Machine is in Bypass Mode.</td>
</tr>
<tr>
<td>On</td>
<td>Control systems are enabled. The machine is ready for use.</td>
</tr>
</tbody>
</table>

Amber LED - System

<table>
<thead>
<tr>
<th>State</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>All safety and interlock systems have not been satisfied. Laser safety shutter is not operational.</td>
</tr>
<tr>
<td>Flashing</td>
<td>Amber LED does not flash.</td>
</tr>
<tr>
<td>On</td>
<td>All safety and interlock systems have been satisfied. Laser safety shutter is operational.</td>
</tr>
</tbody>
</table>
OPENING SCREEN AND LOGIN

1. After the machine is powered up, the opening screen is displayed. To begin the login process, touch the Login icon.

2. The login screen is displayed. Touch the Username field.
3. A keyboard is displayed. Enter your username and password.
   a. Key in your username.
   b. Press Enter.
   c. Key in your password.
   d. Press Enter.
   e. Touch the Submit icon.

4. After logging in, the Status screen is displayed initially.
   This screen provides the operational status of the machine. The details of this screen are explained in section Status.
   The six icons located at the bottom of the screen provide access to all of the functionality of the ProJet™ 6000. The sections that follow (see below), provide a detailed description of all functions, controls and indicators which are available on the ProJet™ 6000.
Controller/Indicator | Function
---|---
Air Temperature | Air temperature inside the build chamber.
Current Material | Material type presently in the cart and print tray.
Model Name | Specific model of ProJet™ 6000.
Material Temperature | Temperature of the material in the print tray.
Print Height | Height of print job in the Z axis.
Print Name | Name of print file presently building.
Printer Status | Present status of the ProJet™ 6000.
Estimated End Time | Estimated time the present build will end.
Print Preview | Allows you to view the current layer and delete parts if the build is paused.
Printer Action | Displays the present action of the printer (Profiling, Drawing, etc.)
Stop Print | Stop building the present print job.
Start Print | Starts a print job or re-starts a suspended build job
Start becomes Resume when paused.
SETTINGS

The following sections describe the functionality of the Settings Screen.
PRINTER

**Printer Settings** provides access to **Global Print Settings, Network** and **Display Settings** for the ProJet™ 6000.

---

### Global Print Defaults

1. Touch **Global Print Defaults** to display the Global Print Settings for the ProJet™ 6000.

<table>
<thead>
<tr>
<th>Controller/Indicator</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Drain Default</td>
<td>The <strong>Auto Drain</strong> function automatically moves the print platform to the offload position at build completion. This control sets the default for the Auto Drain function to On or Off.</td>
</tr>
<tr>
<td>Remove Bubbles Default</td>
<td>The <strong>Remove Bubbles</strong> function utilizes the print applicator to remove bubbles from the print material at the beginning of a build. This control sets the default for the Remove Bubbles function to On or Off.</td>
</tr>
</tbody>
</table>
Scale Factors

**NOTE:** Scale Factors are specific adjustments made for each individual machine.

2. Touch **Print Scale Factors** to display the scale factors for the X, Y and Z axis.

3. The scale factors can be changed from this screen. For example, to change the scale factor for the X axis from 1 to 1.2:
   a. On the display, touch the 1 displayed for X. The keyboard appears.
   b. Touch the decimal point and then the 2.
   c. Touch the return key.

4. The scale factors can be changed from this screen. For example, to change the scale factor for the X axis from 1 to 1.2:
Network
5. Touch **Network** to display the network settings for the ProJet™ 6000. Only the **Ethernet MAC Address** and the **Hostname** can be changed from this display. The remainder of the panel is for information only and those settings must be changed in Windows.

Display Settings
6. Touch **Display Settings** to display the display settings for the ProJet™ 6000. This panel is for information only. The settings must be changed in Windows.
USER SETTINGS

The User Settings screen is accessed from the Settings screen as shown.

1. To add new users to the ProJet 6000, press Add New User.
2. Add the new user name.
   a. The Login is the username when logging in but the display name is displayed everywhere else.
   b. Press the Login field.
3. A keyboard is displayed.
   a. Enter the name of the new user.
   b. Press Enter
   c. Press Add User
4. Press the **Password** field and the keyboard is displayed.
   a. Key in the password.
   b. Press **Enter**.
   c. Select the type of user from the **Role** pull-down.
   d. Press **Save Changes**.

5. The screen will return to the **Users** screen with the new user displayed.
Heater Settings

Each control allows the user to set the **Setpoint** for that particular system.

<table>
<thead>
<tr>
<th>Controller</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chamber Heater</td>
<td>Set the Setpoint temperature for the build chamber.</td>
</tr>
<tr>
<td>Cart Reservoir Heater</td>
<td>Set the Setpoint temperature for the resin in the cart reservoir.</td>
</tr>
<tr>
<td>Vat Resin Heater</td>
<td>Set the Setpoint temperature for the resin in the print tray.</td>
</tr>
<tr>
<td>Cart Reservoir Safety Heater</td>
<td>This is a safety setting. This sets the upper limit allowed for the resin temperature in the cart reservoir. When the resin temperature reaches the upper limit, the cart reservoir heater is switched off.</td>
</tr>
</tbody>
</table>
### Drawing Settings

<table>
<thead>
<tr>
<th>Control</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform Center X</td>
<td>Allows the user to manually enter an offset for the center of the build platform in the X axis</td>
</tr>
<tr>
<td>Platform Center Y</td>
<td>Allows the user to manually enter an offset for the center of the build platform in the Y axis</td>
</tr>
</tbody>
</table>
Printer

<table>
<thead>
<tr>
<th>Control/Indicator</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unregister Printer</td>
<td>Removes all customer information from the printer.</td>
</tr>
<tr>
<td>Reboot Printer</td>
<td>Reboots (restarts) the printer.</td>
</tr>
<tr>
<td>Shutdown Printer</td>
<td>Switches the printer off.</td>
</tr>
<tr>
<td>Start Remote Diagnostics</td>
<td></td>
</tr>
</tbody>
</table>
## Elevator-Leveler

![Elevator-Leveler Interface](image)

<table>
<thead>
<tr>
<th>Control/Indicator</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevator Positioning</td>
<td>Shows the current position of the elevator relative to the home position.</td>
</tr>
<tr>
<td>Velocity</td>
<td>Specifies the elevator speed in inches per second during manual motion; it does not affect motion during the move.</td>
</tr>
<tr>
<td>Distance</td>
<td>Specifies distance, in inches, from current position; negative moves elevator down, positive moves elevator up.</td>
</tr>
<tr>
<td>Move Elevator</td>
<td>Manually moves elevator at the Distance specified.</td>
</tr>
<tr>
<td>Home</td>
<td>Moves the elevator to the home switch and redefines the home position (relative zero position of the elevator).</td>
</tr>
<tr>
<td>Start</td>
<td>Moves the elevator to the Start position, as defined by Set Start.</td>
</tr>
<tr>
<td>Offload</td>
<td>Moves the elevator to the Offload position.</td>
</tr>
<tr>
<td>Level Print Tray</td>
<td>Levels the material in the print tray. If empty, fills the print tray with material.</td>
</tr>
<tr>
<td>Drain Print Tray</td>
<td>Drains all material from the print tray.</td>
</tr>
<tr>
<td>Set Start</td>
<td>Saves the elevator’s current location as the Start position.</td>
</tr>
<tr>
<td>Set Offload</td>
<td>Saves the elevator’s current location as the Offload position.</td>
</tr>
</tbody>
</table>
### Print Applicator

<table>
<thead>
<tr>
<th>Control/Indicator</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Print Applicator</strong></td>
<td>Shows the current position of the print applicator relative to the home position.</td>
</tr>
<tr>
<td><strong>Positioning</strong></td>
<td>Specifies the applicator speed, in inches per second, during manual motion. This setting does not affect the applicator speed during the build.</td>
</tr>
<tr>
<td><strong>Velocity</strong></td>
<td>Distance in inches to move.</td>
</tr>
<tr>
<td><strong>Distance</strong></td>
<td>Velocity specifies the applicator speed, in inches per second, during manual motion. This setting does not affect the applicator speed during the build.</td>
</tr>
<tr>
<td><strong>Vacuum</strong></td>
<td>Switch vacuum for the applicator On or Off.</td>
</tr>
<tr>
<td><strong>Move Applicator</strong></td>
<td>Manually moves print applicator as specified by the user, with velocity/distance.</td>
</tr>
<tr>
<td><strong>Home</strong></td>
<td>Moves the applicator motion axis to the home position and redefines the home position (relative zero position of the applicator).</td>
</tr>
<tr>
<td><strong>Remove Bubbles</strong></td>
<td>Manually starts the routine for removing bubbles.</td>
</tr>
</tbody>
</table>

**NOTE:** The default VisiJet material heater settings can be found in the VisiJet® SL Materials for ProJet™ 6000 Systems - Part Building and Post-Processing.
Printhead

<table>
<thead>
<tr>
<th>Control/Indicator</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Position</strong></td>
<td>Current X Position and Y Position of the beam in mirror counts.</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>Requested laser power.</td>
</tr>
<tr>
<td><strong>Printhead</strong></td>
<td>Switch the laser On or Off.</td>
</tr>
<tr>
<td><strong>Shutter</strong></td>
<td>Open and close the shutter.</td>
</tr>
<tr>
<td><strong>Spot</strong></td>
<td>Set the IPM to the small or large spot focus position.</td>
</tr>
<tr>
<td><strong>Res.</strong></td>
<td>System Mode, select High or Low.</td>
</tr>
<tr>
<td><strong>Motion Actions</strong></td>
<td>Select <strong>Motion Actions</strong> mode. See table below for more information.</td>
</tr>
<tr>
<td><strong>Profiling</strong></td>
<td>Select <strong>Beam Profiling</strong> mode. See table below for more information.</td>
</tr>
<tr>
<td><strong>Move to Rest</strong></td>
<td>Moves the beam to the rest position.</td>
</tr>
<tr>
<td><strong>Set Rest</strong></td>
<td>Set the rest position for the beam.</td>
</tr>
<tr>
<td><strong>Calibrate Mirrors</strong></td>
<td>Presently not enabled.</td>
</tr>
</tbody>
</table>

When **Motion Actions** is selected, the panel displays the functions outlined in red.

<table>
<thead>
<tr>
<th>Control/Indicator</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>X</strong></td>
<td>Specifies the absolute coordinate for X in mirror counts.</td>
</tr>
<tr>
<td><strong>Y</strong></td>
<td>Specifies the absolute coordinate for Y in mirror counts.</td>
</tr>
<tr>
<td><strong>Move Print Spot</strong></td>
<td>Move beam to the position specified by X and Y.</td>
</tr>
<tr>
<td><strong>Distance</strong></td>
<td>Defines the distance increment when moving the beam with the arrow buttons. To move the beam faster, use a larger value. For fine movement, use a smaller value.</td>
</tr>
</tbody>
</table>

Arrow keys move the beam in the specified direction.
When **Profiling** is selected, the panel displays the functions outlined in red.

<table>
<thead>
<tr>
<th>Control/Indicator</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>X Width</td>
<td>Shows the beam width, in mils, in the X direction.</td>
</tr>
<tr>
<td>Y Width</td>
<td>Shows the beam width, in mils, in the Y direction.</td>
</tr>
<tr>
<td>Max ADC</td>
<td>Shows the maximum intensity of the beam.</td>
</tr>
<tr>
<td>Peak Sum</td>
<td>Indicates how well the beam is focused; the higher the value, the better the focus.</td>
</tr>
<tr>
<td>Profile at pinhole</td>
<td>Perform a profile of the Printhead's drawing spot at the specified pinhole.</td>
</tr>
<tr>
<td>Find Pinholes</td>
<td>Call this action once the Printhead's drawing spot is on the profiler to have the Printer find all the profiler pinholes.</td>
</tr>
</tbody>
</table>
Prints
After print jobs have been submitted to the printer, the user may use the front panel to select, start and view information about a particular print job.

1. Press the Prints key.

2. The system will display the Prints screen. The screen below shows a sample screen with multiple print jobs submitted to the printer. The color and icon associated with each print job indicate the following:
   • Red with caution icon - Print job was aborted.
   • Green with check mark - Print job printed successfully.
   • Blue with blue build box - Print job is ready and next to be built.
3. To view additional information about each print job, press the Edit key at the bottom of the screen. A right arrow key appears beside each print job. Press this key to view details about a print job.
4. For example, pressing the right arrow key beside the aborted (red) print job will display the following information.
ALERTS
Pressing the Alerts icon and the front panel will display any error conditions that require the user to take action.
In the sample shown below, the hostname was changed and the system provides the user an alert that indicates that this is a condition that requires the system to reboot.

1. To see additional information or recommended actions to take, press the arrow next to the alert message.
2. Although there is no additional information for this particular condition, the action the user needs to take is indicated by the presentation of the OK key. Pressing the OK key will acknowledge the message and subsequently reboot the machine.

**LOGOUT**

1. To logout from the ProJet™ 6000, press the Logout icon as shown.

2. The following pop-up will appear:
3. Press Yes. The ProJet™ 6000 will then display the opening screen.
INSTALL PRINT TRAY AND MATERIAL CART

1. Open the upper and lower chamber doors.
2. Install an empty print tray by placing the print tray tab onto the lower guide of the print tray holder.
3. Hold the print tray level and slowly push the print tray toward the back of the machine. The support tabs on the front of the print tray will engage the upper guide of the print tray holder.
4. Roll the material cart directly in front of the machine and lower the handle.
5. Slowly push the material cart into the machine until it is positioned as shown.

6. Press the coupling release and disconnect the material hose from the cart.
7. Move the cart further into the machine to allow the material hose to be routed inside the frame support and up to the print tray. See figure below.
8. Press fit the hose onto the print tray connector.
CAUTION: In the next step, make certain to move the cart very slowly to prevent damage to the cart and the machine.

9. Slowly push the cart completely into the machine so the umbilical connector is positioned directly under the umbilical cable.
10. Connect the umbilical cable to the umbilical connector. Press down on the cable to make certain it is seated, then lift up on the connector latch to secure the cable in place.

11. After connecting the umbilical, push against the cart and make certain it is resting against the back of the machine.
INSTALL ELEVATOR FORKS AND PRINT PLATFORM

1. The figure below shows a detailed view of the elevator block. The elevator forks are installed on the elevator block and supported by the elevator forks support pins (left and right side).

2. Install the elevator forks onto the elevator block as shown. Do not tighten the arresting screw at this time.
3. The print platform has two cutouts located on the right side (top and bottom).

4. Install the print platform onto the elevator forks. Make certain the cutouts are positioned under the clamps located on the right side of the elevator forks.

**NOTE:** The figures in the following steps show the elevator forks and print platform isolated on a bench, not on the machine. This is for the clarity of the figures only.
5. Pull the handle for the latch to the left, lower the left side of the print platform and release the handle. Make certain the left edge of the print platform is securely held under the latch.

6. Lower the latch handle so it does not interfere with the print applicator. Make certain the platform is pushed against the pins at the front of the elevator forks.

7. If this is the first time the elevator forks and platform have been installed, proceed to 5.5 Level Print Platform.
POWER UP AND LOGIN

1. Make certain the upper and lower chamber doors are closed.
2. Set the power switch on the back of the machine to 1 (On).

3. The machine will take approximately 3.5 minutes to start.
4. After the machine is powered up, the opening screen is displayed. To begin the login process, touch the Login icon.
5. The login screen is displayed. Touch the **Username** field.

6. A keyboard is displayed. Enter your username and password.
   a. Key in your username.
   b. Press **Enter**.
   c. Key in your password.
   d. Press **Enter**.
   e. Touch the **Submit** icon.
7. After logging in, the **Status** screen is displayed initially.
FILL MATERIAL CART AND PRINT TRAY WITH MATERIAL

1. Open the lower chamber door.
2. Press the release button and extend the material bottle holder.
3. Install a full bottle of material. Make certain to press down firmly on the material bottle so the connector on the bottom of the bottle fully engages the coupler located in the bottom of the holder.
4. Push the holder back into place.
5. Close and lock the lower and upper chamber door.
6. On the GUI, select Advanced > Elevator/Leveler.
7. Press Level Print Tray.
8. The system will pump material from the bottle into the cart reservoir and into the print tray. The GUI will notify the user as additional bottles of material are needed.

9. Fill times when starting with an empty cart and print tray:
   - Large print tray - Approximately 45 minutes
   - Small print tray - Approximately 30 minutes

LEVEL PRINT PLATFORM

1. Lower the print platform to the Start position as follows:
   a. On the front panel, select Advanced
   b. Select Elevator/Leveler.
   c. Press the Start key.

2. To adjust the platform in the X axis, loosen both Y axis locking screws.
3. Turn the X axis adjustment screw clockwise (or counter-clockwise) to achieve level in the X axis.

4. Tighten the X axis locking screws.

5. To adjust the platform in the Y axis, slightly loosen the Y axis locking screw.
6. Turn the Y axis adjustment screw clockwise (or counter-clockwise) to achieve level in the Y axis.

7. Tighten the Y axis locking screw.

8. Repeat steps 2 through 7 until the print platform is level with the surface of the print material.
INSTALL THE PROJET™ 6000 IN 3D MANAGE

1. Open 3D Manage.
2. Select File > 3D Printer Setup.

3. Click Add 3D Printer.

4. Enter the following information:
   a. Host Name or IP Address of the printer you wish to install
   b. User Name and password you will use to access the printer.
   c. Click OK.
5. 3D Manage will show the printer as installed and available.

SUBMIT A PRINT JOB
1. Start 3D Manage.
2. Select File > Send to 3D Printer.

3. The system will ask you to select a printer.
4. The system will ask you to select a part to build.

5. The following screen is displayed after selecting a part.

6. The system will request a username and password before displaying the ProJet™ 6000 Printer Status screen.
7. The **ProJet™ 6000 Printer Status** screen is displayed with the `block.bff` part displayed in the print queue.

### START A PRINT JOB

After print jobs have been submitted to the printer, the user may use the front panel to select and start a particular print job.

1. Press the **Prints** key.
2. The system will display the **Prints** screen.
3. Select a print job by touching the name on the display.
4. Press the **Start Print** key.
PRINT JOB COMPLETE - MOVE PLATFORM TO OFFLOAD POSITION

1. When a print job completes, the system will display the message **100% Complete** and the system will also indicate an alert. Press the **Alert** key to display the alert screen.

2. Press the right arrow key beside the print job.

3. Press the **Yes** key to raise the print platform to the offload position. Do not open the chamber door until instructed to do so.

4. Open the chamber door and release the print platform from the forks.

5. Notches in the forks allow you to position the platform as shown. To allow all excess resin to drain, leave the platform in this position for approximately five minutes.
6. Carefully tilt the platform forward to drain print material that may be trapped in recessed areas or cavities within the parts.
7. Remove the print platform for post processing.

**Move Print Platform to Offload Position using Elevator Controls**

1. On the status screen, press **Advanced**.

2. Press **Elevator/Leveler > Offload**. Do not open the chamber door until instructed to do so.
1. To remotely access the ProJet™ 6000, enter the IP address or the system name for the printer into the internet browser. The default system name is *pj6k-xxxxx*, where xxxxx is the last five digits of the printer’s serial number.

2. The printer will require you to enter a user name and password. Use the same user name and password you would use if logging in on the front panel of the printer.
3. The system will display the screen shown below. The display provides three tabs you can view. The first screen displayed is the **Status tab** which contains the same information displayed on the printer GUI.
4. The **Prints** tab displays all print jobs that have been submitted to the printer. Clicking the key adjacent to a print job will provide detailed information about that print job. Although the remote access allows you to view detailed information, you cannot modify print jobs (delete, parameter modification, etc.) through this feature.
5. The **Messages** tab provides the same information that is provided on the **Alerts** screen of the printer GUI. Similar to the **Prints** tab, you can view information but you cannot “acknowledge” the alert messages.
POST PROCESSING

EC Declaration of Conformity
La Déclaration de CE de Conformité

We, 3D SYSTEMS, INC. hereby declare that the following described machine in our delivered version complies with the basic safety and health requirements of the EC Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006, based on its design and type, as brought into circulation by us. In case of alteration of the machine, not agreed upon by us, the declaration will lose its validity.

Nous, 3D SYSTEMES, INC. ci-joint déclarer que le suivre a décrit la machine dans notre version livrée se conforme à la sûreté fondamentaux et aux conditions de santé des Directive de CET 2006/42/EC du Parlement européen et du Conseil 17 Mai 2006, a basé au dessous sa conception et son type, comme amené dans la circulation par nous. En cas du changement de la machine, pas consenti sur par nous, la déclaration perdra sa validité.

Description of the machine:
La description de la machine:

STEROLITHOGRAPHY APPARATUS

Machine type:
Usiner le type:

ProJet™ 6000 Production Modeling System

Serial Number:
Numéro de série

Applicable EC Directives:
Les Directives applicables de CE:


Applicable Harmonized EC Standards:
Les Normes de CET Harmonisé applicables:

EN/IEC61010-1, 2nd Edition, EN/IEC60825-1:2007,
EN/IEC55022, EN/IEC55024

Manufactured in USA for
Fabriqué dans l'USA pour

Company Name:
Nom de compagnie:

Brian Alexander
Director, Manufacturing
Le directeur, les fabriquant

Date

3D Systems, Inc.