

Facility Requirements Guide

# Viper™ Pro SLA® System

Preparing Your Facility to Install the Viper Pro SLA System

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**3D SYSTEMS®**

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# Introduction

This guide provides you with information on how to properly prepare your facility for the Viper™Pro SLA® system. This chapter introduces you to the Viper Pro SLA machine and other system components—including lists of other support equipment and supplies that you will find helpful in setting up your facility.

Additional chapters include guidelines for the following:

- Site Selection--gives information on how much space the Viper Pro SLA system requires and the necessary services and equipment needed for a highly efficient, ideal location for your Viper Pro SLA system and its components.
- System Delivery--provides information about preparing for the delivery of your Viper Pro SLA system.
- Third Party Equipment and Supplies--provides a summary of the optional equipment and supplies that 3D Systems recommends for efficient and complete part building, part processing, and finishing.
- System Installation--explains the process of, and requirements for, installing the Viper Pro SLA system in your facility.
- Resin Storage and Safety--gives you guidelines for proper storage, handling, and safety for Viper Pro SL resins.

## Viper™Pro SLA® System

The Viper Pro SLA system is a flexible and efficient stereolithography (SL) system that produces high fidelity parts from a broad range of plastics and composites. The Viper Pro SLA system uses an SL platform that expands the overall utilization of SL parts in prototyping and advanced digital manufacturing. Markets include automotive, service bureaus, aerospace, and consumer goods.

The *Viper Pro SLA system* is only one component of the complete system. Many accessories and other components make up a Viper Pro SLA system facility:



Figure 1:  
The Viper Pro SLA system

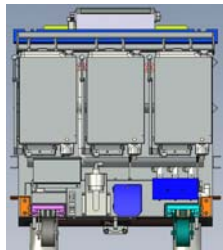
## Resin Delivery Module (RDM)

The RDM is a vital system component. It contains the resin and is rolled into the Viper Pro system to build parts.

Figure 2: RDM 750F



Figure 3: RDM



Four different RDM sizes are available:

Name	Maximum Build Volume	Fill Capacity
RDM 650M	650 x 350 x 300 mm (25.6 x 13.7 x 11.8 in)	148 liters (39.1 U.S. gal)
RDM 750SH	650 x 750 x 50 mm (25.6 x 29.5 x 1.97 in)	95 liters (25.1 U.S. gal)
RDM 750H	650 x 750 x 275 mm (25.6 x 29.5 x 10.8 in)	272 liters (71.86 U.S. gal)
RDM 750F	650 x 750 x 550 mm (25.6 x 29.5 x 21.65 in)	414 liters (109.3 U.S. gal)

Many customers order extra RDM units, particularly if they want to change resin quickly or use two materials concurrently. The Viper Pro Dual Vat system comes with two RDMs, so both sides of the Viper Pro system (Build Zone A and Build Zone B) can build jobs simultaneously. Determine the size and quantity of RDMs that you require.

## Manual Offload Cart

The manual offload cart is included in the base configuration when you purchase a Viper Pro SLA system. You can easily remove a platform from the SLA system with a large or heavy part on it (a difficult manual process). This cart moves the platform and parts to the finishing area, where supports are removed and the part is cleaned to make it ready for the curing process.



Figure 4: The Manual Offload Cart

## Automatic Offload Cart

The optional automatic offload cart automates platform removal from the SLA system even more so than the manual offload cart. It eliminates the previous requirement for a person to be on site in order to start a new build. It will remove one platform, and replace it with another, automatically.



Figure 5: The Automatic Offload Cart

## ProCure™ UV Curing Chamber

The ProCure 750 UV Chamber provides essential final part curing to create a fully solidified part with stable mechanical properties and safe part handling. After building on the SLA system, the part is placed in this unit. Subjecting the part(s) to UV light for a period of time will fully solidify the part. After the part is removed from the unit, it is fully solidified and can be handled safely without gloves.



Figure 6: ProCure™ 750UV Chamber

## Controller - Part Preparation Software

Included with the system is the part preparation (3DManage™) and controller (3DPrint™) software. These integrated modules provide part preparation and part building functionality. The 3DPrint™ software utilizes the Viper Pro controller computer which is an integrated part of the Viper Pro system. The 3DManage™ software is installed on a separate, desktop computer, which is not part of the Viper Pro system. The following are the *minimum* computer configuration requirements for the part preparation computer:

### Processor

• Pentium 4 2.4 GHz

*Recommended:*

- Core 2 Duo

### RAM

• 2 GB

*Recommended:*

- 4GB Dual Channel

### Video Card

• OpenGL 1.4

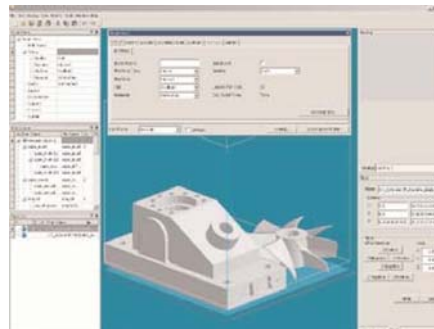
• 128 MB of graphics memory

• Native PCI Express x16 bus interface

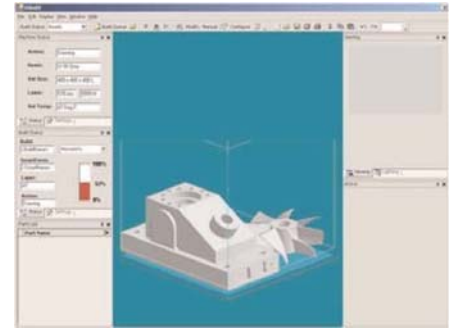
*Recommended:*

- 1280 X 1024 resolution (or higher)

### 3DManage™



### 3DPrint™



# Site Selection - Viper™ Pro SLA® system

This section provides the requirements and recommendations to determine the most appropriate location for a highly functional, efficient Viper Pro SLA system workspace, with room for other equipment and supplies.

To help you choose a location, refer to Appendix A. The “Initial Site Survey Checklist” provides the attributes that you need to select the best location for your installation.

After narrowing the list of possible locations, consider each requirement carefully before making a decision about your final placement site.

## Space Requirements

User preferences, building codes, and equipment configuration help you to define the total floor area that your Viper Pro will need. The SLA system should be located in its own environmentally controlled room. Locate the secondary post processing equipment and supplies in an adjoining room or rooms, if possible. User preferences, building codes, required storage space, and other factors influence total room area. Figure 7 shows an ideal three-room site configuration that minimizes the required movement of parts after part building. Figure 8 shows the minimum dimensions of the Viper Pro system. Your site layout will vary.

**Note:** Due to laser safety requirements, the system should be located where access to the room can be avoided during service calls.

## Floor Area/Surface

Floors and counter spaces in the SL work area should be non-porous and suitable for cleaning with solvents. The feet of the system must be on a non-resilient surface such as bare concrete. Carpeted floors must not be used. Remove any flooring where the feet of the SLA system will be placed. The system should not straddle any floor seams. The maximum permissible floor incline is 2.5 cm/12 m (1 in/40 ft).

## Floor Vibration and Shock

To ensure part quality and accuracy, choose a ground floor location with a thick concrete pad, which will minimize vibration. SLA equipment is slightly self-damping, and should not be affected by normal or incidental environmental vibration; however, the area should be isolated, either via location or some other physical or mechanical means, from any significant internal or external vibration sources such as heavy machinery, airplanes, or trains, which could cause unacceptable shock or vibration levels.

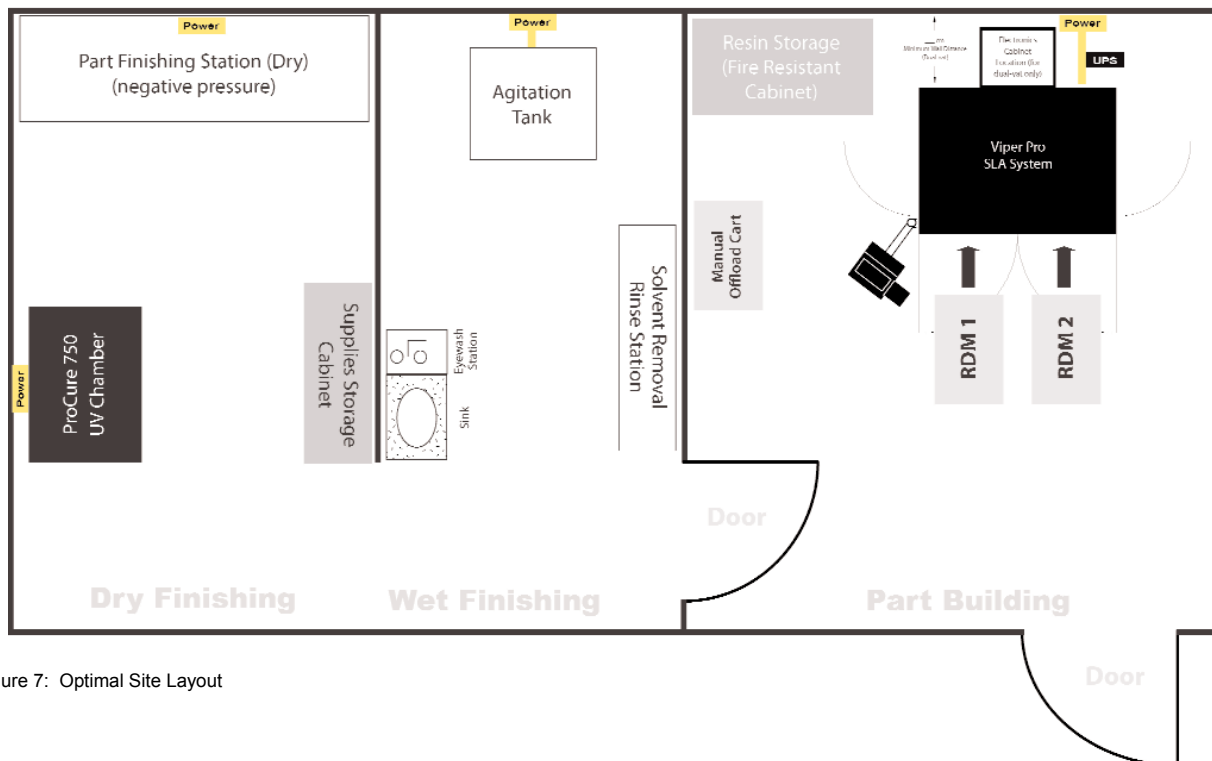


Figure 7: Optimal Site Layout

Figure 8: Viper™ Pro system space requirements (top view)

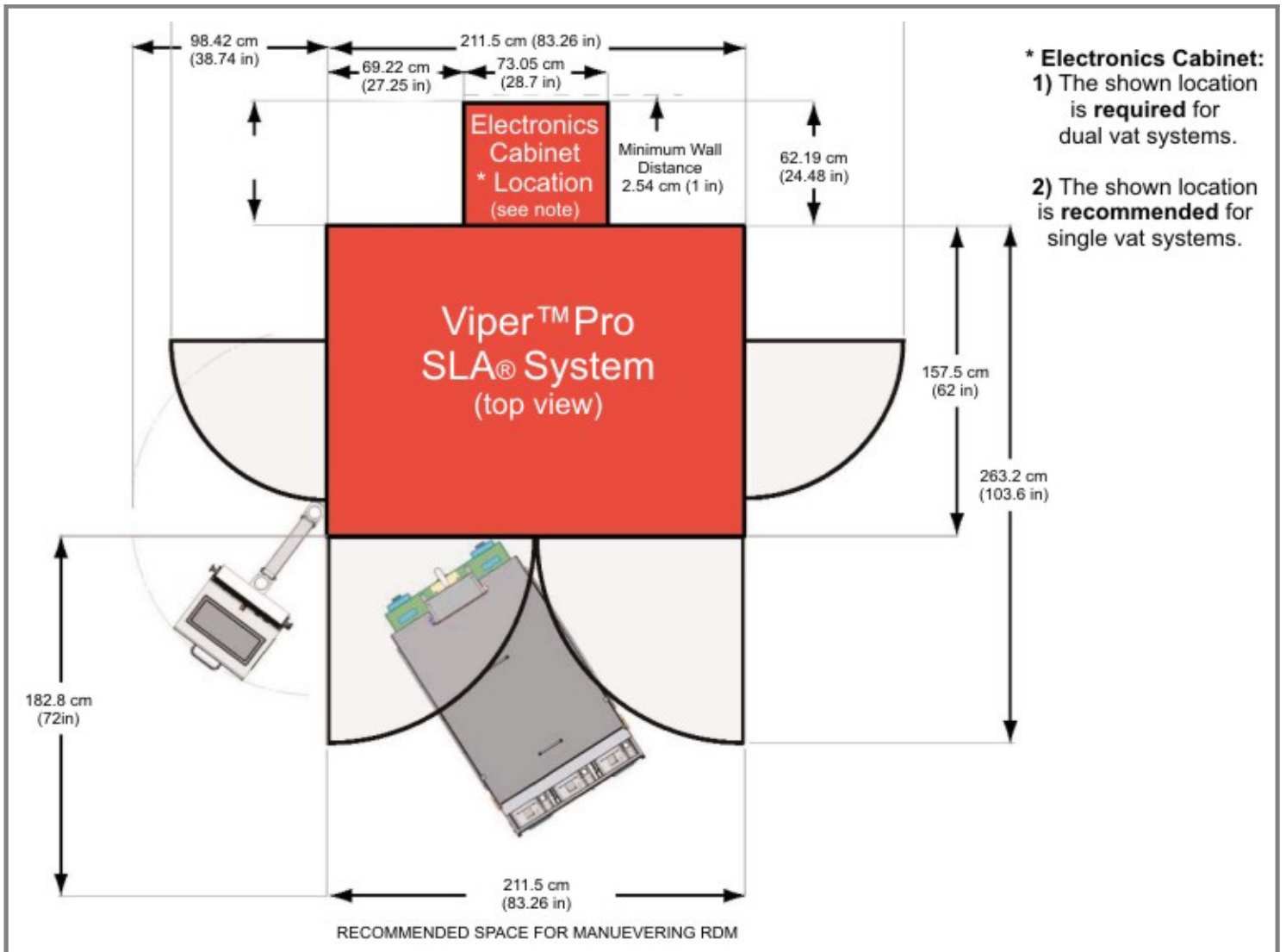
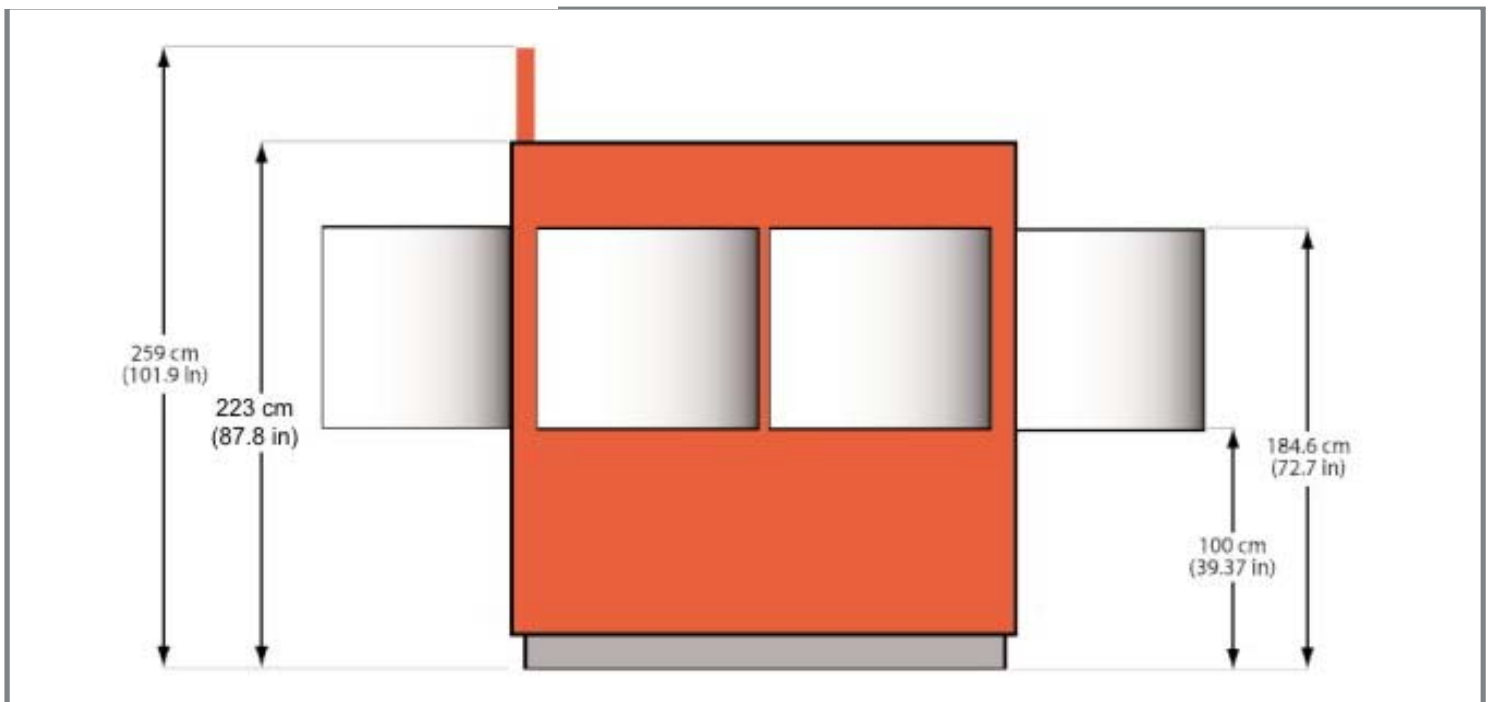


Figure 9: Viper™ Pro system space requirements (front view)



## Floor Bearing Capacity

The heaviest piece of equipment (the Viper Pro SLA system) is 1724 kg (3800 lb). Additional equipment, such as one or more Resin Delivery Modules (RDM), will add significant weight as well. Refer to Figures 10 and 14 to determine the total weight of the equipment to be housed in your room to ensure that you don't exceed the maximum load bearing capacity that your flooring can support.

## Electrical Requirements

Electrical voltage requirements are:

- Viper Pro 750S - 220VAC, 50/60 Hz, 30A, single-phase
- Viper Pro 750D or 1500XL —220VAC, 50/60 Hz, 50A, single-phase

Power for the Viper Pro SLA system must be on a dedicated, surge protected circuit. Use of a UPS is strongly recommended in areas where power fluctuations are frequent, as surges and spikes can cause damage to electronic components and loss of power can result in failed builds or potential damage to the SLA system. Surge and spike suppression should carry a rating of at least 1000 joules with a clamping voltage of approximately 300VAC. Uninterruptible power, recommended especially in areas where circuits may be affected by lightning strikes, should be rated for 5kVA at a minimum. Make certain that no heavy equipment, especially large electric motors (greater than 1.5 kW or 2 hp) are connected to the same circuit. Use a pass through UPS with power conditioning. For specific information on a suitable UPS, contact a UPS manufacturer and provide the voltage rating, current draw, and desired backup time. The manufacturer can recommend an appropriate model.

## Connection to AC Power

The Viper Pro system is designed to be connected to primary AC power directly from the facility's power circuit to the machine's input power line filter. This task must be performed by a qualified electrician. The machine is shipped with a 6 gauge, 3 wire, power cord (13 feet long) with no connector.

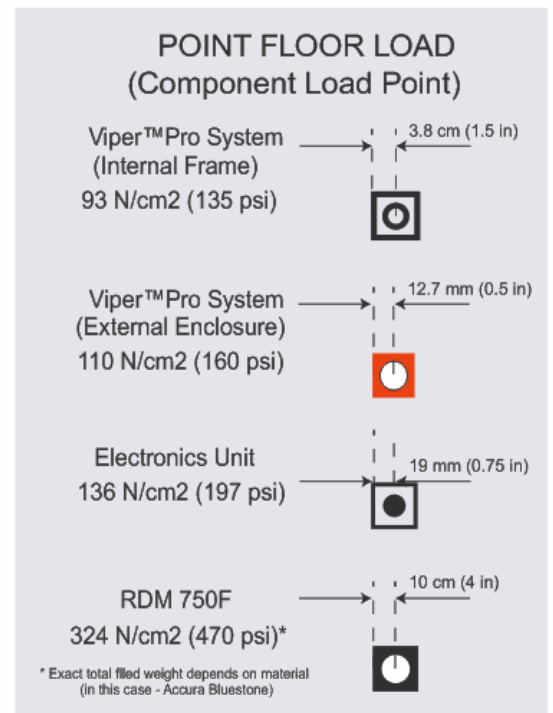
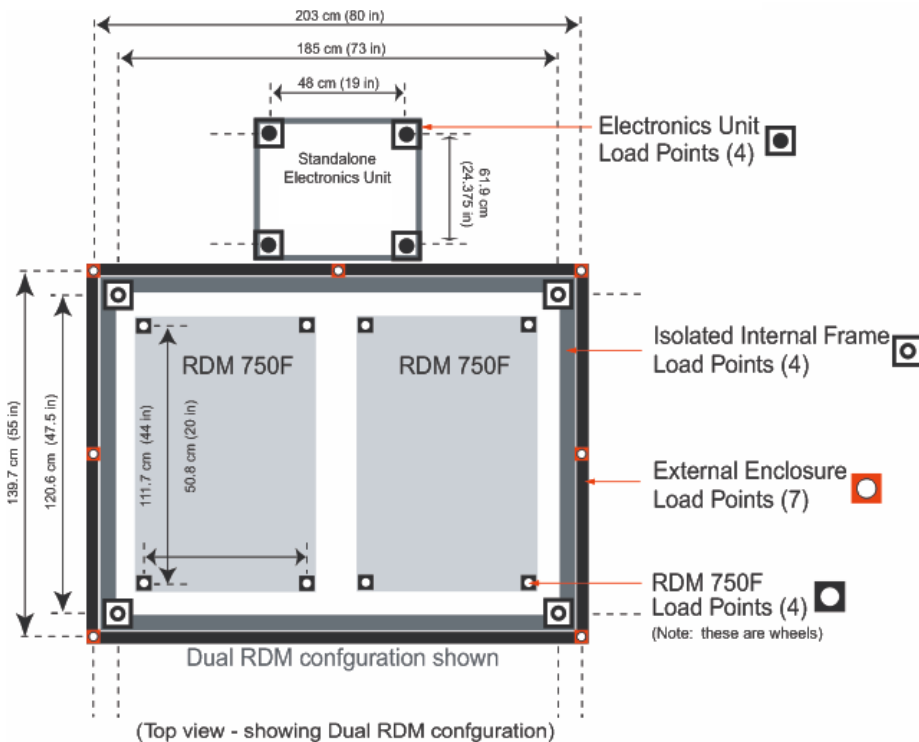
## Temperature

The temperature in the room or location where the SLA system resides should remain stable to allow optimal system operation and optimal part quality. The working range is  $23^{\circ} \pm 3^{\circ}\text{C}$  ( $73^{\circ} \pm 5^{\circ}\text{F}$ ). Any temperature fluctuations greater than  $3^{\circ}\text{C}$  ( $5^{\circ}\text{F}$ ) may adversely affect parts built on the system. The rate of temperature change should not exceed  $1^{\circ}\text{C}$  ( $1.8^{\circ}\text{F}$ ) per hour. The air conditioning system should maintain a temperature change of less than  $1^{\circ}\text{C}$  per hour. The stereolithography room should have a minimum cooling capacity of 1.4 kW. The air should change two to five times per hour. Avoid exposure of the SLA system to direct air flow from the local air conditioning system to avoid the possibility of adversely affecting part quality.

## Humidity

The optimal humidity in the SLA system build chamber and lab will depend to a certain degree on the SL material selection. Regardless, the humidity should always be non-condensing and should not vary outside the range of 20-50%. Review your SL material information (M.S.D.S./S.D.S, product datasheet, and product labeling) for specific information on recommended humidity levels.

Figure 10: Distributed Floor Load - Viper™Pro and system components



## Altitude

The SLA system is capable of operating correctly up to an altitude of 1000m above mean sea level.

## Air Cleanliness

The room housing the SLA system should be well ventilated. Reasonable care should be taken to minimize dust and smoke which could contaminate the SL material and cause deterioration of optical surfaces. Avoid temperature fluctuation. Since dust, smoke and temperature fluctuations can affect the performance of the machine and the quality of the parts, a restricted area with positive pressure filtered air flow is recommended. Avoid proximity to machine shop areas, or where milling, grinding, or sanding is performed.

## Lighting

Standard fluorescent lamps with clear plastic diffusers are recommended to minimize ultraviolet exposure, which could negatively affect the SL material. Sunlight, quartz-halogen lamps, and high-intensity incandescent lamps are not suitable, and UV-intensive lighting or ultraviolet exposure through windows should be avoided. UV filters are available for windows and exposed fluorescent lamps.

## Door or Other Method of Preventing Access to Room

The site should be able to be isolated from other employees or personnel during installation or future service calls. A separate room or area that can be closed to others is necessary. The system is safe and does not present hazards to properly trained personnel operating the system in accordance with our specifications. However, the system should be installed in an area that can be cleared of untrained personnel during service and maintenance of the machine due to laser safety requirements.

## Network Access

The SLA system controller computer includes a Class A Ethernet interface, which can be connected to an Ethernet 10/100/1000 Gigabit Ethernet network to offer network access to the SLA system. A cable that is 6 m long is supplied with the Viper Pro system. To remotely operate the Viper Pro SLA system or to remotely run service engineer diagnostics, a VPN network access is required.

## Remote Operation using Web Cam (optional)

With the Viper Pro SLA system, a Web cam, or network camera, can monitor the build status or assist in remotely operating the system. The build chamber provides two Web cam mounting locations. See Appendix C for recommended Web cam providers.



Figure 11: Recommended Panasonic Web Cam

## Telephone Service

Dedicated telephone lines are not required for normal operation of an SLA system. You may wish to install a dedicated telephone line in the SLA system installation area to facilitate discussions with 3D Systems Customer Service personnel while the machine is in operation, should the need arise. In addition, the onboard SLA system control computer has PCI slots available for installation of a modem.



# Site Selection - ProCure™ UV Chamber

Locating the ProCure 750 UV Chamber is similar in many respects to the Viper Pro system. The following abbreviated site specifications are for the ProCure UV Chamber:

## Space and Location Selection

The ProCure UV Chamber should be located in an appropriate room or location adjoining the Viper Pro system. Refer to Figure 7 for a suggestion for overall layout. Consider the following additional specifications when selecting the location for your ProCure unit. Refer to Figure 14 on Page 8 for weights and measurements of this unit.

Recommended floor space	7 m by 4.5 m	12 ft by 15 ft
Minimum ceiling height	244 cm	96 in
Recommended ceiling height	305 cm	120 in

## Floor Surfaces

Flooring under the ProCure UV Chamber should be non-porous and suitable for cleaning with solvents. Carpeted floors are not recommended.

## Electrical Requirements

Specification - either of these two power configurations:

- 110 VAC, 50/60 Hz, 13A
- 220 VAC, 50/60 Hz, 7A



Figure 12: IEC 60320 C13 connector and C14 inlet are rated 10A (VDE) and 15A (UL & CSA)

The ProCure UV Chamber is equipped with a standard IEC 60320 C14 3-wire power cord inlet, and a USA plug with an IEC 60320 C13 outlet. See Figure 12. Electrical power for the ProCure UV Chamber must be on a dedicated, surge protected circuit. We strongly recommend an Uninterruptible Power Supply (UPS) in areas with frequent power fluctuations; surges and spikes can damage electronic components and power loss can damage the unit.

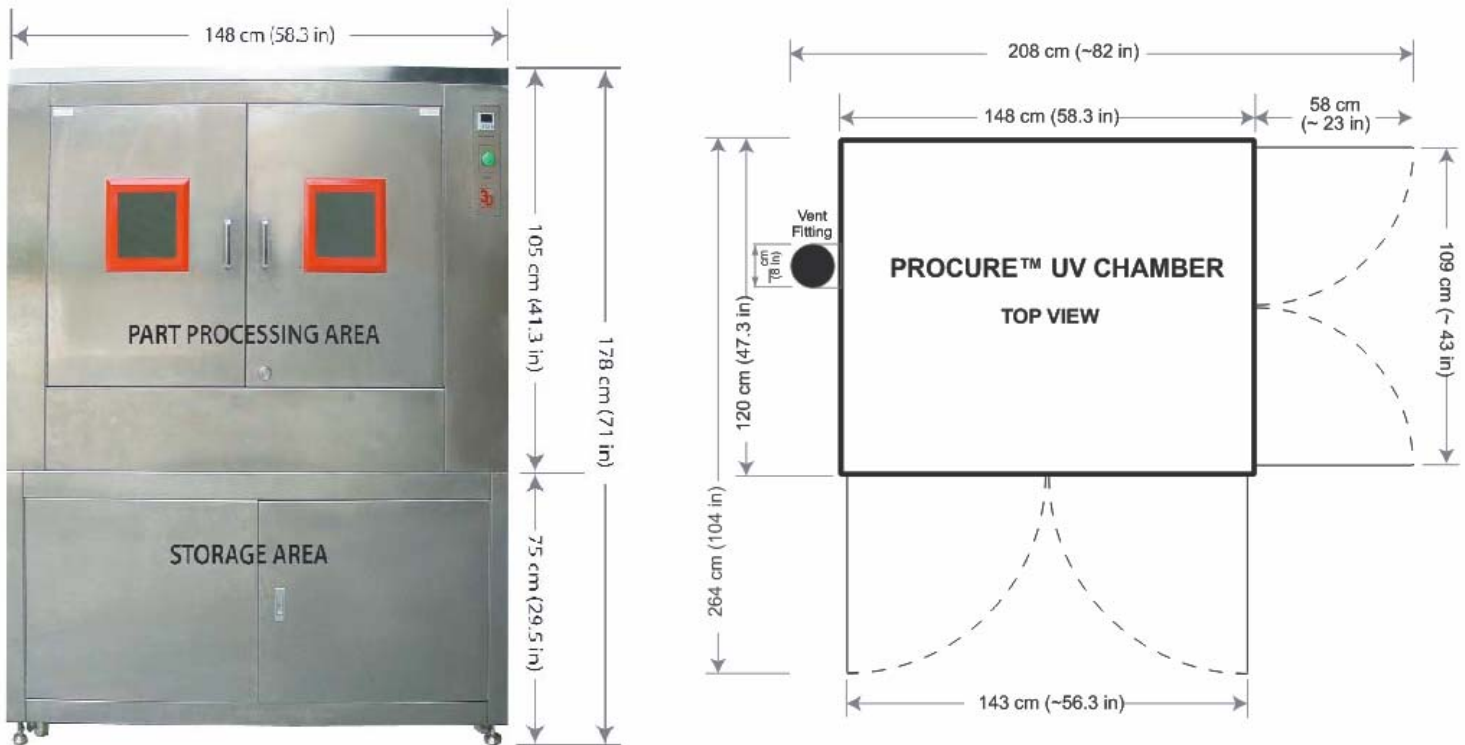
## Ventilation (Ductwork)

The ProCure UV Curing Chamber may be vented outside if required or appropriate. The left side of the unit has a built-in exhaust fan, and includes an 8" diameter duct connector.

If the PCA curing chamber duct is joined to a duct that has positive pressure, an extraction system should be installed, regardless of duct length. Flow restriction from a 90 degree elbow equals 5.1 m (17 ft) of duct. If the exhaust run exceeds the 60 m (200 ft) limit, an extraction system or auxiliary fan should be installed. Contact your Facilities Manager for your requirements.

**Caution: Never disconnect a ducting system that is connected to an external extraction system.**

Figure 13. ProCure™ 750 UV Chamber dimensions



# System Delivery

After placing your order, a 3D Systems™ representative will contact you to schedule your shipment delivery date. Ensure that the area you intend to place your SLA® system is ready to move the system in to, and that you have appropriate forklifts or other lifting devices before scheduling the installation of your system by a 3D Systems representative. The following information will guide you through this preparation phase.

## Preparation for Receiving

Being that the Viper Pro SLA system crate is quite large, have an adequate forklift available before you begin to unload the crate from the shipping truck. Make sure that the available forklift, or other lifting device, can handle the load during unloading and during de-crating. (See Figure 15)

**NOTICE: Crates can only be unpacked by, or under the supervision of, a 3D Systems Customer Support Engineer. 3D Systems™ accepts no responsibility for missing items if crates are opened without an authorized 3D Systems employee present and supervising this procedure.**

Inform your receiving personnel that these crates will be arriving and arrange for a location to store them until your appointment with a 3D Systems Customer Support Engineer.

Inform your receiving personnel that the crates allow forklift access from the side to make sure they can be properly unloaded or moved to your warehouse until the 3D Systems representative is scheduled to install the systems.

If you do not have an adequate forklift on-site, contact the shipping company in advance of the shipment to discuss whether one is needed for receiving the shipment. The forklift must have a minimum of 1.8m (6 ft) forks for safe and stable transport, but we recommend 2m (6.5 ft). It must be rated for the weight of any of the components you ordered. The lift loops are designed to accept 1.5 in (38 mm) thick, 4 in (approximately 100 mm) wide forks. Fork extensions will not fit in the lift loops on the machine frame. Review the charts below for crated dimensions and weights of the components.

## Shipment Arrival

The Viper Pro SLA system facility will arrive in a variety of crates and/or pallets - the largest crate being the Viper Pro system.

Once your shipment arrives, first inspect the crates for any physical damage. Then, after inspection, receive the crates.

The following charts list both crated and uncrated dimensions and weights for every possible crate that you may have ordered. Verify your order and compare to the listed items below. Crates or pallet dimensions and weights may vary.

Figure 14: Weight and Dimensions - System Components

Description	Crated Specifications						Uncrated Specifications									
	Width		Depth		Height		Weight		Width		Depth		Height		Weight	
	cm	in	cm	in	cm	in	kg	lb	cm	in	cm	in	cm	in	kg	lb
Viper™ Pro SLA® System*	242	95	173	68	242	95	1951	4300	212	83.3	158	62	221	87	1724	3800
Chiller Unit	89	35	59	23	59	23	91	200	22.5	8.9	17.2	6.8	38	15	36.3	80
Laser Unit	89	35	59	23	59	23	91	200	19	7.5	53	20.9	17	6.7	22.7	50
User Interface Crate	122	48	115	45	105	41	136	300	47	18.5	101.5	40	58	22.8	26.3	60
Auto Offload Cart	131	51.6	175	69	136	53.5	284	625	97	38.2	150	59	105	41.3	215	473
Manual Offload Cart	127	50	174	68.5	157.5	62	160	350	76	29.8	140	55.1	118	46.3	90	200
ProCure™ 750 UV Chamber	154	60.8	138	54.5	172.7	68	-	-	148	58.3	120	47.2	178	70.1	30	950
RDM 650M - 148 Liter capacity	165	65	117	46	110	44	182	400	78	30.7	143	56.3	78	30.7	136	300
RDM 750H - 272 Liter capacity	182	72	136	54	110	44	182	400	78	30.7	143	56.3	78	30.7	136	300
RDM 750F - 414 Liter capacity	182	72	136	54	110	44	182	400	77.3	30.4	82	32.3	102	40.2	136	300
RDM 1500XL - 935 Liter capacity	182	72	136	54	110	44	386	850	159	62.6	80	31.5	102	40.2	340	750

\* Includes Viper™ Pro SLA® system without RDM or other components.

## Transporting the Viper™Pro system

When the 3D Systems Field Engineer arrives, and the crate is opened, use a forklift to lift the system. Refer to the following diagram illustrating the fork lift points.

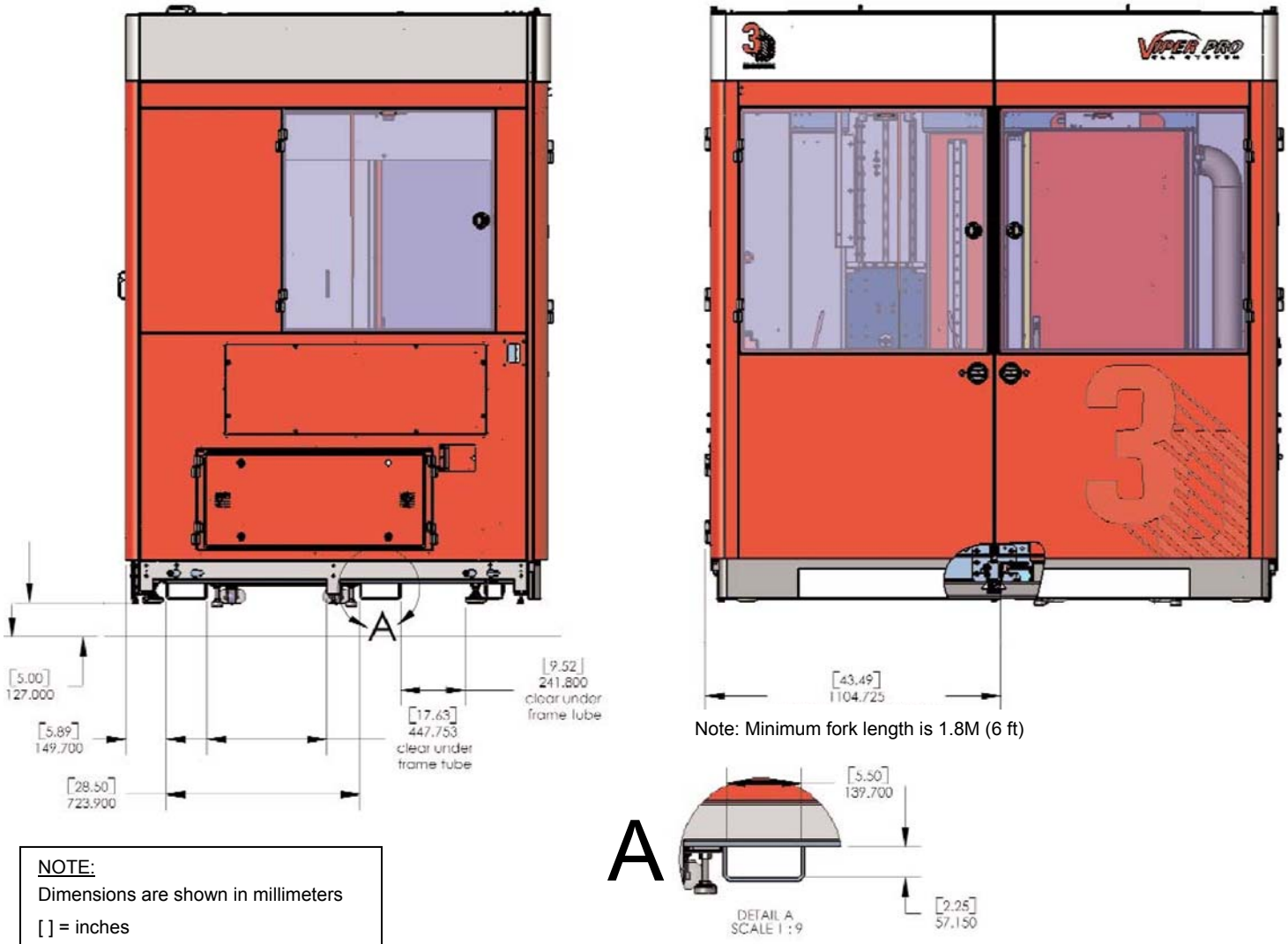


Figure 15: Forklift lift points - Viper™Pro SLA® system

# Third Party Supplies and Equipment

Third party supplies and equipment are purchased from parties other than 3D Systems™. These components are recommended or required for full post-processing capability. These items should be found and delivered prior to the installation of your Viper™Pro SLA® system. Your 3D Systems representative can offer guidance regarding optimal placement and location of this equipment.

For a partial list of providers for this equipment, refer to Appendix C - Third Party Supplies and Equipment Sources.

These supplies, accessories, and equipment provide SLA system owners with complete part-building, processing, and finishing capability.

### Required equipment includes:

- Uninterruptible Power Supply (UPS) and any miscellaneous cables or cords - minimum rating of 5KVA for the Viper Pro SLA system
- SL part post-processing equipment and supplies (see accompanying sidebar for a complete list)
- Safety equipment (see sidebar)
- One or more Windows XP Professional-equipped workstations. At least one system must be available at installation time to load this computer with 3D Systems' 3DManage™ software. Ask your 3D Systems representative about loading this software in advance of your installation appointment.

### Optional equipment includes:

- Functioning network connection of a computer to the SLA system. If no network is available, ensure a computer is in close proximity to the SLA system during your installation appointment.
- Web Cam — with the Viper Pro SLA system, a web cam may be installed to monitor the build status. Recommended Web Cam is Panasonic KX-HCM280.

### Support equipment which includes, but is not limited to:

- Part cleaning and finishing equipment - this may be a very simple system, or more complex, depending on your needs and space. Minimally, two covered tubs are needed to accommodate Viper Pro system platforms so the parts may be washed and rinsed after building.
- Sink(s)
- Resin storage cabinet (fire resistant)
- Workbench —for processing parts and removing supports —“green” area and clean area with down-draft table for sanding
- Any desired post-processing equipment — to sand, join, paint booth, grind, polish, paint or plate SL parts
- Compressed air connection with pressure controller and fast closing connection for parts finishing, if desired.

### Recommended safety equipment and supplies:

- Fire extinguishers
- Eyewash stations
- Protective clothing, including chemical-resistant nitrile gloves and lab coats with long sleeves
- Safety eye glasses with side shields and UV coating
- Hazardous waste cans for chemicals

# System Installation

Installation of your system encompasses four separate steps:

- Purchase and arrival of third party equipment or supplies you may have ordered
  - Scheduling your installation with a 3D Systems representative
  - Delivery of your SLA system shipment
  - De-crating and installation of your SLA system components
- 

## System De-crating

Your 3D Systems Field Service Representative will supervise or perform all crate unpacking. A 3D Systems representative will contact you and schedule an appointment to install your system; do not open crates until the 3D Systems representative arrives to personally de-crate and install the system.

**Note: 3D Systems cannot assume responsibility for contents of the crates if they are opened without 3D Systems' supervision.**

## Scheduling Your Installation

The 3D Systems authorized representative will schedule an appointment with you to install all the components and products purchased with your Viper Pro SLA system. Allow a minimum of one week for your system installation, but discuss the expected installation duration with your 3D Systems representative; every situation is unique and installation depends on equipment, location, and other factors.

## Preparing for System Installation

In making your facility ready for SLA system placement, you must consider four main factors:

- Make sure that you have the necessary doorway and passageway clearance to move either the crated or uncrated components to their final destinations.
- Make sure that you have an adequate forklift or other lifting equipment that can move oversized system components - either crated or uncrated.
- Verify that the lifting equipment is rated for the load from the system components.
- Do not allow the system weight load to exceed your floor's load rating maximum.

## Availability of Adequate Forklift or Lifting Equipment

You must have a forklift available during installation. Make sure that the forklift is rated to a weight capacity that is equal to or greater than the crated weight of the SLA system. Refer to Figure 14.

The Viper Pro SLA system is crated so that it can be lifted from the narrow end. Regardless, the forklift must meet minimum weight requirements and be equipped with 1.8 m (6 ft) forks (2.0 m (6.5 ft) is recommended) and typically carry a rating of at least 1951 kg (4300 lb).

The center of gravity for the Viper Pro SLA system is located at approximately the center of the shipping crate.

## Minimum Passageway and Door Openings

Most standard doorways and halls provide adequate access for moving the system. Considering the Viper Pro system (crated) is lifted on its narrow side, each passageway and doorway must be wide enough to move and turn a crate measuring 242 cm (95 in) long and 173 cm (68 in) wide, in addition to the forklift.

Determine the pathway to where your SLA system will be installed from where the crated components are stored. Walk the path from the storage location to the final destination of the system, and measure any critical doorways or passageways to ensure that the equipment can be moved through the area.

If a passageway or doorway is too small for the crated SLA system, it may be necessary for the 3D Systems Field Service Engineer to remove the SLA system from its crate before moving the unit.

The minimum height of the doorway must be 226 cm (89 in), which will allow a 1.3 cm (0.5 in) clearance when the iPro™ SLA® Center is lifted 1.3 cm (0.5 in.) off the floor. Any lift requirements greater than 1.3 cm (0.5 in) will require additional door height.

# Resin Storage and Safety

You are responsible for ensuring that the facility where your SLA® system and stereolithography (SL) materials are housed is properly configured for safe operation of the SLA system and of the materials used in that system. Personnel who operate the equipment or use the materials must comply with all relevant safety codes and applicable regulatory requirements and laws, particularly those that relate to usage of hazardous chemicals, laser radiation, and to disposal of regulated material. The system conforms to *Federal Laser Product Performance Standards 21CFR1040.10 Class I laser* in normal operation and/or bypass mode. During field service, emission levels correspond to a *Class IV laser* product. The Viper™ Pro SLA system complies with CE requirements.

**Note: You are responsible for determining whether additional supplies and equipment are necessary according to local, state, federal or other regulatory laws that govern your location.**

## Stereolithography (SL) Material Usage

SL resins in the liquid state require use of approved surgical-type 100% nitrile gloves and other equipment to protect the user from direct contact with the uncured, or liquid, material. In general, resin is fully cured only after adequate exposure in the ProCure™ UV chamber; only after being fully cured, do the parts no longer require protective gloves to handle.

## SL Material Storage

Prior to actual use of the SL material, read the Material Safety Data Sheet (MSDS) for the material(s) that you have selected; follow the instructions and guidelines that those documents provide. You may also refer to the resin manufacturers' material safety and handling guides for more information about resin handling.

## Resin Disposal

Because stereolithography materials are regulated, they are subject to special disposal requirements by your local, federal, or other regulatory agencies. Follow applicable disposal guide-lines. Contact a local waste management company for recommendations on disposal requirements that affect your facility.

Do not leave uncured, or liquid, resins in an area where persons who are not knowledgeable about their handling or use may have access to them. If your area requires a regulated waste disposal, consult with and retain a waste management company to periodically pick up regulated waste. Your local waste management company may recommend that you set up a drum, or other approved container, to dispose of liquid resin and of any materials (such as paper towels or gloves) that may have come into contact with the uncured liquid resin.

After part building in the SLA system, the parts are not yet fully cured, and must be post-cured using the ProCure UV Chamber. After an adequate period of UV light exposure in the ProCure chamber, the parts should be fully solidified and then may be handled without the precaution of gloves.

### Note:

**Inspect your parts after curing in the ProCure™ UV chamber to ensure they are fully solidified. Part surface tackiness, visible or discernable areas of liquid resin indicate the part is not fully cured.**

## Storage and Usage Guidelines

- Always wear appropriate safety equipment, such as 100% nitrile gloves when handling uncured liquid resin. Protect your body from any direct contact with uncured liquid SL resin.
- Always read the Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) prior to use of any SL resin material.
- Always use the oldest SL material first. All SL materials have a shelf life, usually one year from the date of manufacture. Using the oldest material first helps you to use all your purchased materials within that period of time.
- During storage, shield the SL material from sunlight or other sources of actinic radiation, such as fluorescent or mercury vapor lights. Exposing the resin to UV radiation increases product viscosity and polymerization, making the SL material unsuitable for part building. Storing resin above the maximum recommended temperature can make the resin unsuitable for part building.
- Store containers of SL materials indoors at temperatures between 16 C (60 °F) and 27 °C (80 °F). Storing at temperatures above this maximum could render the material unusable for part building.
- We recommend storing your SL materials in a fire-resistant storage cabinet.

Appendix A:

# Initial Site Survey Checklist:

Survey the areas where you have considered placing your new SLA® system. Consider the following factors before you decide on your Viper™Pro SLA system facility.

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- Option 1 \_\_\_\_\_
  - Option 2 \_\_\_\_\_
  - Option 3 \_\_\_\_\_
- 

## Option

1 2 3

- Is there enough space for all equipment in that area, or will you separate the SLA system from the secondary finishing equipment? (See page 3)
- Is the flooring a solid, nonporous surface suitable for cleaning with isopropyl alcohol? (See page 3)
- Can the location be isolated, as a laser safety precaution? Can closing and locking the door during installation or a service call prevent access to the location by unauthorized personnel? (See page 3)
- Can the required equipment and accessories be located either in the same room or in an adjoining room to the Viper Pro system? (See page 3)
- Is the air conditioning adequate for that area? (See page 5)
- Can humidity be maintained at an appropriate non-condensing level for the SL material (20-50%)? (See page 5)
- Is adequate electrical power available to the site? Are there at least two 220 V circuits; two outlets, each with its own circuit and at least one additional 110/220 V outlet for servicing the system? (See pages 5 and 7)
- Is there minimal UV-intensive lighting or natural sunlight? (See page 6)
- Is 10/100/1000 BASE-T Ethernet network and cabling installed to the location? (See page 6)
- Is the room clean? Is construction of floors, ceilings, and walls complete? (See page 6)
- Does the location offer network access to connect an optional Web cam for remote viewing? (See page 6)
- Is an appropriate forklift available during the installation appointment to move the system and its accessories to their designated location? (See page 11)
- Are the hallways and doorways adequate to allow passage of a forklift carrying a crated or un-crated SLA system? (See page 11)
- ProCure UV Chamber?
- Bench for cleaning parts?
- Green part rinsing and finishing area?
- Sink and eyewash station?
- Is there a compressed air connection with pressure controller and fast closing connection? (Optional)

Appendix B:

# Pre-Installation Preparation Checklist

The following list helps you to prepare for installation of your Viper™ Pro system. Prior to scheduling the installation appointment with a 3D Systems representative, complete the checklist and fax it to your 3D Systems Customer Support Engineer.

## Moving Equipment and Site Accessibility

- Is there an adequately rated forklift available during installation to move the equipment to its destination?
- Have you coordinated the move with your shipping department?
- Is there adequate doorway and hallway clearance to move system components using available moving equipment?

## SLA® System Area

- Is adequate space available for the equipment and supplies? (See "Site Selection" starting on Page 3)
- Is the site prepared properly (according to the "Site Selection" on Page 3 of this guide)?
- Are the following electrical power outlets in place?
  - For the Viper Pro system: Do the electrical power requirements meet the specifications in "Site Selection" on Page 5 of this guide?
  - For service and other uses: Are there two additional outlets, 110/220 V?
- In the room where the Viper Pro system will be installed, does the air conditioning meet the following requirements?
  - Is there a minimum cooling capacity of 3.6 kW in the room?
  - Is the temperature change less than 1°C (1.8°F) per hour?
  - Is humidity maintained at an appropriate non-condensing level for the resin (20-50%)?
  - Does the air change two to five times per hour?
- Is 10/100/1000BASE-T Ethernet network cabling installed and in working order?
- Is a cabinet available to store resin containers?
- Does the room have a door that can be closed and locked during installation?
- Is there a network connection? (Optional)
- Is there a telephone line? (Optional)

## Part Finishing Area

- Is adequate space available for the equipment and supplies? (See Space Requirements section)
- Is all construction to floors, ceilings, and walls complete and does it meet local building code specifications? Are floors clean and free of debris? Are floors easily cleanable with solvents?
- Have you decided what other equipment, accessories, and supplies that you want to have with the Viper Pro system? Have you decided on a location for these items? (Refer to Figure 7 on Page 3)
- Has a compressed air connection with a pressure controller and fast closing connection been installed? (Optional for parts finishing)
- Is a workbench available that has negative pressure and electricity for power hand tools?
- Are electrical outlets and power available?
  - Is there a 110/220 V outlet available for the ProCure UV Curing chamber?
  - Are there enough 110/220 V outlets available in the room for equipment and tools?
- Have you installed the duct (if required) for ventilation of the ProCure UV Chamber?
- Is all the recommended safety equipment available, including nitrile gloves and wipes?

## Waste Disposal and Safety

- Has a local waste disposal company been arranged for periodic pickup of waste materials?

## Job Submission (Workstations and Network access)

- Has 3D Systems software been loaded on at least one workstation so that we can submit a build job to the SLA system?
- Is the software loaded?
- Is the computer on the network?

Completed by:

\_\_\_\_\_  
Customer Representative

\_\_\_\_\_  
Date

\_\_\_\_\_  
Assigned 3D Systems Customer Support

\_\_\_\_\_  
Engineer Forwarded Date

**FAX this completed page to (803) 324-4311**



## Appendix C:

# Third Party Supplies and Equipment

3D Systems™ provides this partial list of equipment and supplies of relevant accessories or supplies that are useful for handling, processing or finishing SL parts. Equipment and supplies are not limited to this list, and other vendors may provide similar or like products.

**Note: Customers are responsible for consulting local health, safety, and environmental regulations to determine additional site requirements. No information that is contained in this document constitutes legal advice regarding such requirements. 3D Systems™ has no responsibility to determine whether or not the customer is in compliance with applicable laws, nor do we guarantee the accuracy or quality of the supplier product.**

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### Part Washing Systems

Custom large/oversize washers, or off-the-shelf models  
from RAMCO Equipment Corporation:

32 Montgomery St.

Hillside, NJ 07205

Tel: 908-687-6700

Fax: 908-687-0653

Refer to these RAMCO products:

MK36CSSX/TPM TPM Wash Unit

MK36CSSX/WRU Water Rinse Unit

SA-WRU Water Recycling Unit

### Web Cam

Panasonic Model KX-HCM280 is recommended.

### Uninterruptible Power Supply

American Power Conversion or Toshiba, 5KVA

### Hand-Held UV Guns

DDU Enterprises, 2909 Oregon Ct, Ste A2

Torrance, CA 90503

Tel: 310.781.1199 Fax: 310.781.9223

### Model Finishing Tools and Supplies

Micro-Mark

340 Snyder Ave.

Berkeley Heights, NJ 07922

Tel: 800.225.1066 Fax: 908.665.9383

AirDesk (Omega Environmental Technology)

2057 Cedar Ave

Ontario, CA 91761

Tel: 714.923.3338 Fax: 714.923.7934

Dremel Tools - Dremel

4915 21st St,

Racine, WI 53406

Tel: 414.554.1390 Fax: 414.554.7654

### UV Filter Screens (For Lights and Windows)

UV Process Supply, Inc.

1229 E. Courtland St.

Chicago, IL 60614

Tel: 800.621.1296 Fax: 312.880.6647

### Wipes

TexWipe Co. (TexSwab)

POB 308

650 E Crescent Ave,

Upper Saddle River, NJ 07458

Tel: 201-327-9100

### Miscellaneous Supplies (available from many lab safety companies):

- Cellulose Wadding (drain pads)
- Chemically Resistant Gloves (3D Systems recommends surgical-type 100% nitrile gloves)
- Eye Wash Stations
- Fire Extinguisher
- Fire Proof Waste Can
- Fire-resistant Storage Cabinets
- Lab Coats
- Neoprene Coated Gloves (for working with TPM)
- Tri-Propylene Glycol Monomethyl Ether (TPM)
- Safety Glasses (300-400 nm UV-blocking) —with side shielding

## Appendix D:

# Obtaining Assistance

When you need assistance with the installation of your SLA® system, contact your 3D Systems Field Service Engineer or your 3D Systems Sales Representative.

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## France

3D Systems  
49, rue du BoisChaland  
91090 Lisses  
FRANCE  
Tél. : (+33) 01 60 87 88 77  
Fax : (+33) 01 60 87 07 66  
Email : [marketing@3dsystems.fr](mailto:marketing@3dsystems.fr)

## Germany

3D Systems GmbH  
Guerickeweg 9  
D-64291 Darmstadt,  
GERMANY  
General Inquiries: +49-6151-357 0  
Material Orders: +49-6151-357 234  
Customer Support: +49-6151-357 357  
E-mail: [hotline.de@3dsystems.com](mailto:hotline.de@3dsystems.com)

## Hong Kong

3D Systems  
21st Floor  
Honest Motor Building  
9-11 Leighton Road Causeway  
Hong Kong  
General Inquiries: (+852) 29 23 50 77  
Material Orders: (+852) 29 23 50 77  
Customer Support: (+852) 29 23 50 77  
E-mail: [asiainfo@3dsystems.com](mailto:asiainfo@3dsystems.com)

## Italy

3D Systems  
Via Archimede 42  
20041 Agrate Brianza  
(MI)  
ITALY  
General Inquiries: (+39) 039 68904 00  
Material Orders: (+39) 039 68904 00  
Customer Support: +49 (0) 6151 357 357  
E-mail: [marketing.it@3dsystems.com](mailto:marketing.it@3dsystems.com)

## Japan

3D Systems Japan K.K.  
4-6-8 Tsurumaki  
Setagaya-ku,  
Tokyo 154-0016  
JAPAN  
General Inquiries: (+81) 3 5451 1690  
Material Orders: (+81) 3 5451 1690  
Customer Support: (+81) 3 5451 1690  
E-mail: [japaninfo@3dsystems.com](mailto:japaninfo@3dsystems.com)

## U.K.

3D Systems Europe Ltd  
Mark House, Mark Road  
Hemel Hempstead  
Herts HP2 7UA  
UNITED KINGDOM  
General Inquiries: +44 1442 282600  
Material Orders: +44 1442 282665  
Customer Support: +44 1442 282665  
E-mail: [marketing.uk@3dsystems.com](mailto:marketing.uk@3dsystems.com)

## Switzerland

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PO Box 259  
1723 Marly  
Switzerland  
Tel. +41-26-439 95 90

## U.S.A.

3D Systems, Inc.  
333 Three D Systems Circle  
Rock Hill, SC 29730  
U.S.A.  
General Inquiries: (803) 326-3900  
Material Orders: (800) 889-2964  
Customer Support: (800) 793-3669  
E-mail: [moreinfo@3dsystems.com](mailto:moreinfo@3dsystems.com)

## Thank You...

We at 3D Systems sincerely hope you will be happy with the purchase of your Viper™ Pro SLA® system. As a company, we are dedicated to developing a relationship with customers that extends beyond the terms of the sale. We are in the business of devising solutions to our customers needs.

Please take the time to contact us with any questions, problems, suggestions, or other comments while working with our products, services, and people. Tell us about your applications, your successes, and your difficulties. We are constantly striving for higher quality, better products, and comprehensive services to benefit our customers.