Xtreme 8K™ Site Prep Guide





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Document Information

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History of Changes

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About This Guide

This document serves as a comprehensive guide to prepare your site for the Xtreme 8K 3D printer.

Xtreme 8K Site Prep Guide: X8K-SPG-00028-Rev04-EN, January 2023.

User Information

Product Overview

The Xtreme 8K is the world's largest high-speed DLP printer on the market. With the ability to print thousands of parts per day, the Xtreme 8K makes volume production of 3D-printed parts a reality. With wide material compatibility, including hard plastics, high-temperature plastics, elastomers, and rubbers, the Xtreme 8K enables the production of the broadest possible range of parts.

The Xtreme 8K leverages long-chain polymer chemistry to create fully isotropic, stable, enduse parts, and features a heated vat allowing users to process highly viscous materials. Visit <u>etec.desktopmetal.com</u> for more information.

Customer Responsibilities



Risk of equipment damage, risk of injury, and void warranty: comply with the below responsibilities.

Prior to installation, the customer is required to ensure the site is ready for the Xtreme 8K. These responsibilities are:

- 1. Provide a location to receive crated packages per individually listed shipping dimensions.
- 2. Provide a clear pathway from the receiving site to the installation site.
- 3. Provide resources to move the equipment from the receiving site to the installation location, with respect to:
 - a. The dimensions and weight of each system component.
 - b. A path where the unit does not tip more than 10°.
 - c. Thresholds and corners.
- 4. A professional mover or customer employee is required to unload and move the crated printer. ETEC employees are not responsible for moving the crated printer.
 - a. The printer requires a forklift with a 1.83 m (6 ft) fork extension to move the pallet to the site.
 - b. The printer has a high center of gravity which is towards the front of the machine.
 - c. The Xtreme 8K is equipped with casters and can be rolled to its final position for installation and leveling.
- 5. Create a component layout based on the system requirements included in this document.
- 6. Select a location that provides all services listed on each component page as necessary for operation.
 - a. Distance the printer from climate control systems. Do not direct airflow onto or within the printer's footprint. This includes air conditioning (window, wall, or similar), fans (ceiling, tabletop, or similar), heaters (space heaters, or similar).
 - b. Do not expose the printer to any direct sunlight or UV radiation
 - c. Keep the printer away from water sources such as sinks, tubs, wash stations, etc.
 - d. Do not place the printer near any vibration source, or on a wooden surface that can easily transfer vibrations.
 - e. Do not place the printer near finishing stations.
- 7. Meet all National/Governmental or Environmental Health and Safety (EHS) regulations.
 - a. See <u>Product Safety</u> for an overview of potentially applicable codes and standards.
 - b. Review material storage as well as processing/operation guidelines.
 - c. Confirm noise levels in the environment do not exceed regulatory limits or provide appropriate PPE.

- 8. Perform workplace risk analysis and address deficiencies.
- 9. Operate the Xtreme 8K indoors, as designed.

Note: If you have questions, please contact <u>Technical Support</u>.

Xtreme 8K Process Flow-Recommendation

Process Steps

Part Processing:

- 1. Prepare the .stl file in CAD software.
- 2. Import the .stl file into Envision One RP Software.
- 3. Use automatic placement to place parts.
- 4. Generate supports, if required.
- 5. Generate the job in Envision One RP.
- 6. Send the build job to the printer.

At the Printer:

- 1. Ensure the build platform is clean and free of any cured material and/or debris.
- 2. Prepare the material to print. Follow instructions in the Material Best Practice guide.
- 3. On the control monitor, navigate to the required build job in the Job List tab.
- 4. Click print. Wait for the job to finish.
- 5. Using a scraper to remove the part(s) from the build platform. Place the part(s) in a container to transport to the cleaning station.

Cleaning Station:

- 1. Follow instructions in the Material Best Practice guide to clean parts.
- 2. Dry parts in the Drying Oven, if required. Follow instructions in the Material Best Practice guide to dry parts.
- 3. Thermal Cure/Anneal parts in the Thermal Cure/Annealing Oven, if required. Follow instructions in the Material Best Practice guide to thermal cure/anneal parts.

4. Remove supports, if required.

Post Curing:

- 1. Bring the clean and dry part(s) to the curing unit and place it in the unit.
- 2. Set the timer as per the recommended cure times (material dependent).

Finishing:

1. Finish the printed parts to achieve the desired surface finish. Final finishing processes are material dependent.



Note: The Xtreme 8K printer, curing unit, and thermal oven can be purchased through ETEC. All other items to be purchased from third party suppliers. See <u>Shopping List</u> for recommendations.

Site Information

Environmental Conditions Xtreme 8K

Distance the printer from climate control systems. Do not direct airflow onto or within the printer's footprint. This includes air conditioning (window, wall, or otherwise), fans (ceiling, tabletop, or similar), heaters (space heaters, or otherwise).

- Do not expose the printer to direct sunlight or UV radiation.
- Do not place the printer near a doorway.
- Avoid temperature changes.
- Keep the printer and concentrator away from water sources such as sinks, tubs, wash stations, etc.
- Do not place the printer near polishing stations.
- Ensure the room temperature remains within the following range:
 - Minimum temperature of 22° C (71.5° F).
 - Maximum temperature of 27° C (80.5° F).

Ensure the room humidity is below 50%.

Follow the temperature instructions for each material being used.

- These instructions can be found on the label of the material bottle.
- Extended instructions are located in the Material Best Practice guide.

<u>í</u>

Important: The humidity should be below 50%.

Air Quality Considerations

Use the Xtreme 8K in a clean atmosphere. High levels of impurities in the air may find their way into printed parts.

- The room must be equipped with an air conditioning system able to maintain the proper temperature range.
- The room must be ventilated at the rate required by US ASRAE 62 standard for laboratories or equivalent National Requirement.

Xtreme 8K Printer is designed for work in Pollution Degree 2, free from dust, smoke and steam.

Xtreme 8K Footprint

NOTICE

Incorrect positioning of the printer can cause damage to the printer and/or to the printed parts. Please follow the positioning guidelines.

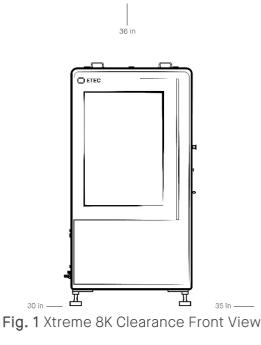
Printer: 907.18 kg (2000 lb).

Dimensions: 142 x 105 x 208 cm (55.91 x 41.34 x 81.89 in).

The Xtreme 8K must be installed on a sturdy surface that can hold over the weight of the Printer and the ancillary devices with loading factor per National Building Code requirements. The room should be a minimum of 215 square feet and meet ventilation requirements of 0.18 cfm/sq. ft. (3.2 m^3/hr/m^2).

The printer requires a minimum amount of space for operation, maintenance, and heat dissipation.

- A minimum of 121.92 cm (48 in) in front of the printer.
- A minimum of 91.44 cm (36 in) above the printer.
- A minimum of 90 cm (35.43 in) behind the printer.
- A minimum of 88.90 cm (35 in) on the right side of the printer.
- A minimum of 76.2 cm (30 in) on the left side of the printer.



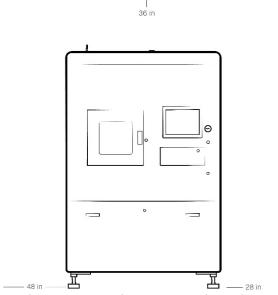


Fig. 2 Xtreme 8K Clearance Right Side View

Product Safety

ETEC's Xtreme 8K has been designed to comply with safety standards. See the <u>Xtreme 8K Compliance and Safety Guide</u> > Product Safety Warnings for a description of all safety warnings associated with the Xtreme 8K printer. General Safety

All general workplace safety rules should be followed when operating the printer. It is the responsibility of the user to ensure compliance with all local, regional, and national regulations. Additionally, it is the responsibility of the user to ensure that the system is installed and maintained properly by ETEC.

Material Safety

Safety data sheets (SDS) for materials used in the printing process are available in the ETEC website: <u>Safety Data Sheets</u>. Read and understand the information provided in these documents prior to attempting to operate the printer or handle any media.

Xtreme 8K Printer

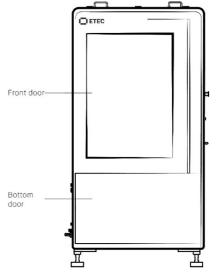
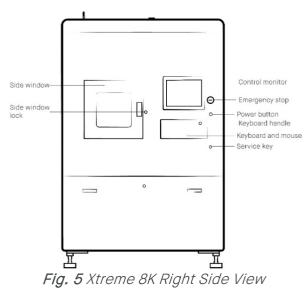


Fig. 3 Xtreme 8K Front View



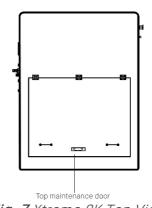


Fig. 7 Xtreme 8K Top View

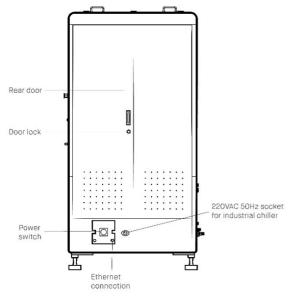
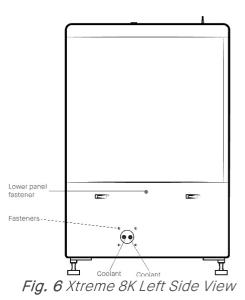


Fig. 4 Xtreme 8K Back View



| Printer Technical Specifications | | |
|----------------------------------|--|--|
| Dimensions | Printer: 1.42 x 1.05 x 2.08 m (4.66 x 3.45 x 6.83 ft) Shipment (estimate): 1.70 x 1.27 x 2.52 m (5.58 x 4.17 x 8.25 ft) | |
| Weight | Printer: 907.18 kg (2000 lb) Shipment: 997.9 kg (2200 lb) | |
| Electrical | US Printer: 208V 3ph+PE (no neutral), 60Hz, 20A, NEMA L15-20P plug | |
| Ethernet | Cable: Cat 6 or better | |
| USB | Type: USB 2.0 Standard A | |

Software

Overview Envision One RP Software

Envision One RP automatically orients your part, adds supports, if necessary, and sends the file to the printer, resulting in your three-dimensional part. Everything that is printed using ETEC printers must pass through this software successfully.

System Requirements Envision One RP

For the best performance, the following computer specifications are recommended. The software is not compatible with macOS.



Note: Envision One RP requires Windows Operating System. The software is not compatible with macOS.

| Operating System | Windows 10 or higher |
|---------------------|---|
| Working Memory | >= 128GB RAM recommended |
| Hard Drive | 400 MB Free space |
| CPU | Multi Core Processor e.g. Core i5, >= 3GHz, >= 6MB Cache |
| Graphics | Dedicated 3D graphics card with >= 1 GB memory and OpenGL 4.3 and higher. |

Install Envision One RP Software

Install Envision One RP software prior to the arrival of your Xtreme 8K Printer.

- 1. <u>Download</u> Envision One RP Software.
- 2. Open the **Downloads** folder on your computer.
- 3. Find a file named *EnvisionOneRP.exe* and double-click it to start the installation. \rightarrow *A setup window opens.*
- 4. Follow instructions on the screen to complete the installation.

License Envision One RP Software

Licensing Envision One RP provides access to the software's full functionality. There are two license types available:

- The **Standard license** allows you to use the whole software functionality for 12 months. After its expiration, you will have to request a new license.
- The **Trial license** allows you to use the whole software functionality for 60 days. After its expiration, you will have to request the **Standard license**.



Important: It is not possible to use the software without a license. If no license is available, the software is blocked.

See the ETEC Knowledge Base for further licensing instructions, software knowledge articles, and the Envision One RP User Guide.

External Components

Removable Material Vat with Lid

The Removable Material Vat is installed in the printer and holds the material required for the printing process. The Removable Material Vat can hold up to 140 L (36.98 gal) of material. The Removable Material Vat was designed to allow you to quickly switch materials between prints by removing one material vat and quickly replacing it with a spare material vat. A spare Removable Material Vat is available for purchase.





Fig. 8 Removable Material Vat Front View

Fig. 9 Removable Material Vat Side View

| Dimensions (full vat) | Footprint: 78.31 x 71.93 x 78.61 cm (30.83 x 28.32 x 30.95 in) Shipping dimensions: 83.82 x 88.9 x 76.2 cm (33 x 35 x 30 in) | |
|--------------------------|---|--|
| Weight | Unit: 83.46 kg (184 lb) Shipment: 96.16 kg (212 lb) | |
| Electrical | N/A | |

Technical Specifications:

Industrial Chiller

The Industrial Chiller is a compressor-based refrigeration chiller that can achieve a cooling capacity of up to 1800W. The industrial chiller is required to maintain proper operating temperature for the Xtreme 8K's projector. The chiller connects to the Xtreme 8K and must be installed within 121.90 cm (48 in) of the printer.

The industrial chiller requires coolant to operate and has a tank capacity of 10 L (2.64 gal).

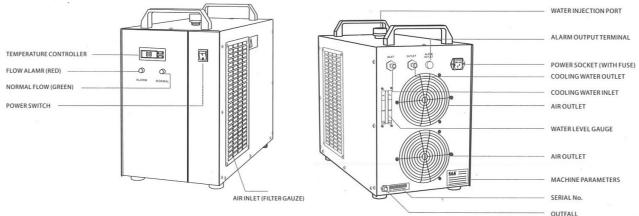


Fig. 11 Industrial Chiller Front View

Fig. 12 Industrial Chiller Back View

Industrial Chiller Clearance

The industrial chiller requires a minimum amount of space for operation, maintenance, and heat dissipation.

- A minimum of 150 cm (59.05 in) behind the chiller (exhaust air)
- A minimum of 100 cm (39.37 in) to the right and left of the chiller (inlet air)

Technical Specifications:

| Dimensions | Footprint: 59 x 38 x 74 cm (23.23 x 14.96 x 29.13 in) Shipping dimensions: 67 x 51 x 93 cm (26.38 x 20.08 x 36.61 in) |
|------------|--|
| Weight | Unit: 44 kg (97 lb) Shipment: 50 kg (110.23 lb) |

Electrical Specifications:

| | US Version | Universal Power Version |
|--------------------|------------|-------------------------|
| Voltage | AC 1P 110V | AC 1P 220V |
| Frequency | 60Hz | 50/60 Hz |
| Current | 0.45~7.5A | 0.25~3.9A |
| Machine Power | 0.71kW | 0.86kW |
| Refrigerant charge | 350 g | 480 g |

Accessories

Washing Unit

| | Fire hazard: Note that if IPA is used for washing, the equipment must be certified for use with flammable liquid and Washing Unit manufacturer instruction for classification of surrounding areas must be respected. |
|--|--|
|--|--|

Orbital Shaker

One option for a large parts washing solution is an Orbital Shaker with:

- a maximum greater than or equal to 200 RPM,
- an amplitude greater than or equal to 20 mm (0.79 in), and
- a platform size of at least 300 x 200 mm (11.81 x 7.87 in).

A plastic container will need to be purchased separately. The platform size with the container will determine the maximum allowable part size.



Note: The ELMI S-3.02 20L Analog Orbital Shaker 20mm Amplitude with Large Platform is recommended. See <u>website</u> for details.

Ultrasonic Cleaner

A second option for a large parts washing solution is an Ultrasonic Cleaner with:

- a frequency between 37-40 Hz,
- power/volume greater than or equal to 18W/L, and
- a tank size greater than or equal to 327 x 300 x 200 mm (12.87 x 11.81 x 7.87 in).

The tank size will determine the maximum allowable part size.



Note: The ELMA Ultrasonic Cleaner: 4.7 gal Tank Capacity, 11 51/64 in Tank Dp, 7 7/8 in Tank Ht is recommended. See <u>website</u> for details.

Drying, Thermal Curing, and Annealing Oven

Desktop Metal's Shop System Drying Oven The Shop System Drying Oven from Desktop Metal is recommended for all drying, thermal curing, and annealing purposes.

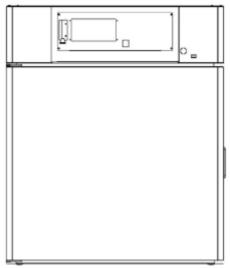


Fig. 13 Shop System Drying Oven Front View

Technical Specifications:

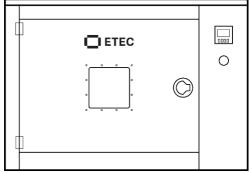
| Dimensions | Product: 110 x 107 x 74 cm (43.31 x 42.13 x 29.13 in) Shipment: 140 x 120 x 120 cm (55.12 x 47.24 x 47.24 in) |
|-------------|--|
| Weight | Oven: 116 kg (255 lb) Shipment: 166 kg (365 lb) |
| Electrical | 240 V, 12.7 A (15A or above circuit), 50/60 Hz, 3 kW |
| Plug type | NEMA 6-15P or IEC Type F Plug |
| Noise level | Estimated operational maximum: 80 dB(A) @ 1m |
| Heat load | Operational maximum: 3 kW (10,236 BTU/hr) |
| Exhaust | Flow (adjustable): 9.4-23.6 Lps (20-50 CFM) Maximum temperature: 200°C (392°F) Connection type: 10.2 cm (4") Diameter duct Condensate trap: Trap to prevent condensate from flowing into oven exhaust. Use T fitting or similar. |

Curing Unit

ETEC's UVCA 3000

The UVCA 3000 UV is the UV light flood lamp for the post-processing of UV sensitive curing materials for industrial and consumer goods applications. This final step after 3D printing and cleaning a printed part results in higher strength and stability as well as ensuring a thorough cure. The UV Light Curing Box for Xtreme 8K includes a rotating inner table to maximize exposure of all parts of the model to the UV light.





Technical Specifications:

| Dimensions | Product: 71.12 x 88.9 x 71.12 cm (28 x 35 x 28 in) Shipment: 93.98 x 106.68 x 101.6 cm (37 x 42 x 40 in) |
|-----------------------------|---|
| Weight | Curing unit: 83.9 kg (185 lb) Shipment: 115.67 kg (255 lb) |
| Electrical | 120-240V, 1 ph, 50/60Hz, 3A |
| Model Size (maximum) | 86.4 x 68.6 x 66 cm (34 x 27 x 26 in) |
| Front Loading Door Size | 60.9 x 45.7 cm (24 x 18 in) |
| Viewing Window Size | 12.7 x 12.7 cm (5 x 5 in) |
| Turntable Speed | 2 RPM |
| Turntable Plate Diameter | 48.3 cm (19.5 in) |
| UV Source | UV lamp, quantity: 9 |

Shopping List

Primary Supplies

Primary supplies should be acquired prior to printer delivery. Obtain the proper tools to prepare for successful printing and post-processing.

- Parts Washing Solvent: Removes uncured material from the surfaces of printed parts. Required solvents might include 99% Isopropyl alcohol (IPA) and/or Glycol Ether. The Parts Washing Solvent is material dependent. Follow instructions in the <u>Material Best</u> <u>Practice guide</u>.
- Shop towels (Starter Kit item): Used to clean the printer and the build platform. Interfolded paper towel, found in labs or offices, is not as effective as a standard roll of absorbent paper towel.
- ETEC's curing unit: 3D printed parts must be post-cured to achieve the final, end-use state. ETEC offers the UVCA 3000 curing unit for large parts. See ETEC's Knowledge Base for more information: <u>UVCA 3000</u>.



Note: ETEC only supports ETEC curing units.

- **Digital calipers:** Required during printer calibration. The printer may need to be calibrated when new material is purchased, or for maintenance reasons. Digital calipers are used to check the accuracy of printed parts against the computer's measurements. Find calipers from major manufacturers only. Look for accuracy of ± 0.02 mm.
- **Coolant:** Required for the industrial chiller. The industrial chiller requires coolant to operate and has a tank capacity of 10 I (2.64 gal). Keep coolant on hand to add to the industrial chiller as needed.
- Industrial chiller water filter replacements, quantity of 4 (Starter Kit item): The industrial chiller requires new water filters on a quarterly basis as a part of regular component maintenance.
- **Paint scraper (Starter Kit item):** Required to remove printed parts from the build platform.
- **Personal Protective Equipment (PPE):** Including disposable gloves (such as Nitrile Gloves, Starter Kit item), safety glasses, and lab coats. PPE is required when working with the printer or prior to touching anything that may come into contact with uncured material. See the <u>Safety Data Sheets</u> for proper handling guidelines.
- **Precision knife (Starter Kit item):** Required to remove printed parts from the build platform.
- USB drive (Starter Kit item): A back-up for transferring print information from the operating computer to the printer. Between 8 and 32 GB size is recommended.
- Washing unit: 3D printed parts must be washed prior to post-curing. Large parts require an Orbital Shaker or an Ultrasonic cleaner. ETEC recommends: ELMI S-3.02 20L Analog Orbital Shaker 20mm Amplitude with Large Platform or the ELMA Ultrasonic Cleaner: 4.7 gal Tank Capacity, 11 51/64 in Tank Dp, 77/8 in Tank Ht.



Note: The washing unit for use with the Xtreme 8K Printer is in development.

• Waste containment: Such as foot actuated garbage cans and/or liquid solvent waste containers. Please advise your local regulations for Hazardous Waste disposal.

Secondary Supplies

Secondary supplies are recommended for the 3D printing workflow and may be acquired after printer delivery.

- **Compressed air cleaning cabinet:** Option for drying parts during post processing. Forced air can be helpful when removing excess material and solvent from part surfaces.
- Ethernet cable (Starter Kit item): Connects the printer to the local network. The cable inserts into the I/O panel behind the printer. The other end plugs into the network or operating computer. The printer can be operated by other Windows computers on the network if the CAT 6 is plugged into a modem or into a network outlet. If it is directly connected to the operating computer, it can only be accessed by the connected printer.
- Feeler gauge (Starter Kit item): Used to perform calibrations as directed by an ETEC certified technician.
- Hand drill with mixing attachment: Used to carefully mix the material in the bucket prior to adding material to the vat.
- Makeup or quality paint brush: Used to clean part(s) during post processing. Do not use a toothbrush as they are too rigid and can scratch printed parts.
- Metric Allen key set (Starter Kit item): Used to perform calibrations as directed by an ETEC certified technician.
- Microfiber cloth (Starter Kit item): Required to clean the projector lens as a part of regular machine maintenance.
- Lens cleaner (Starter Kit item): Required to clean the projector lens as a part of regular machine maintenance.
- **Post-processing tools:** Electric hand-tools, files, rasps, needle-nose pliers, sandpaper (220 grit +), and snips are all helpful tools for removing supports and polishing supported surfaces.



Note: <u>Contact your ETEC Sales Representative</u> for more information on any Shopping List item.

Appendix A – Site Prep Checklist

| Contact Information: | |
|----------------------|--|
| Company name: | |
| Street address: | |
| City: | |
| Postal Code: | |
| Country: | |
| Phone: | |
| Printer Operator: | |
| Email: | |
| Phone: | |
| IT administrator: | |
| Email: | |
| Phone: | |

General Items

Receiving & Site Access

| Receiving location meets requirement for size and weight of equipment | Υ/ | ′ N |
|---|----|-----|
| Clear path to install location (clear corners, doors, etc.) | Υ/ | ′ N |
| Fork lift forklift with a 1.83 m (6 ft) fork extension available to move items | Υ/ | ′ N |
| Two individuals to lift 50 kg (110.23 lb) industrial chiller | Υ/ | ′ N |
| Room accessible and ETEC staff access permitted | Υ/ | ′ N |
| General Facility Requirements | | |
| Space available meets minimum footprint requirements | Υ/ | ′ N |
| Room meets ventilation requirements for safe operation | Υ/ | ′ N |
| Room is able to maintain 22-27°C (71.5-80.5°F) operational temperature | | |
| No vibration that will impact performance | Υ/ | ′ N |
| Air conditioning system is able to maintain less than 50% humidity | Υ/ | ′ N |
| All necessary corporate, local, regional, or national approvals for operation | | |
| Room Layout | | |
| Required component clearances available 121.92 cm (48 in) in front of the printer | Υ/ | ′ N |
| Required component clearances available 91.44 cm (36 in) above the printer | | |
| Required component clearances available 90 cm (35.43 in) behind the printer | Υ/ | ′ N |
| Required component clearances available 88.90 cm (35 in) on the right side | | |
| of the printer | Υ/ | ′ N |
| Required component clearances available 76.20 cm (30 in) on the left side | | |
| of the printer | Υ/ | ′ N |
| Safety | | |
| Completed a preinstall safety review | Υ/ | ′ N |
| Installed fire extinguishers as required by local code | Υ/ | ′ N |

Printer

| US printer power: 208V 3ph+PE (no neutral), 60Hz, 20A, NEMA L15-20P plug Y / N |
|--|
| Materials |
| Printing material arrived on site and is undamaged Y / N |
| Material Best Practice, mixing procedure, and SDS all located and understood Y / N |
| Primary Supplies |
| Coolant procured for the industrial chillerY / N |
| 99% Isopropyl alcohol procured for post processing Y / N |
| Ethernet cable on site and internet connection available Y / N |

Checklist Signoff

Sign below to acknowledge that the checklist is complete, accurate, and the site is ready for install:

Name of signatory:

Signature:

Title:

Date:

Note: If you have questions, please reach out to <u>Technical Support</u>.

🛄 ЕТЕС

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