

GUIDES

formlabs

Preparing for the Fuse Series Ecosystem

This guide will help ensure that your site is ready to receive, set up, and use your Fuse Ecosystem before your order ships.

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Introduction

Congratulations and thank you for purchasing the Fuse Series SLS 3D printing ecosystem. While we prepare your order, Formlabs would like to ensure that your site meets the minimum requirements necessary to start printing as soon as possible.

Please review the following sections to confirm that your site is ready to receive your order. If your site does not currently meet a specific requirement, please contact your Formlabs representative or reseller. We will work with you and our partners to address any complications or issues before your order arrives.

If your site meets the requirements outlined below, please let us know so we can schedule your delivery and subsequent remote training sessions.

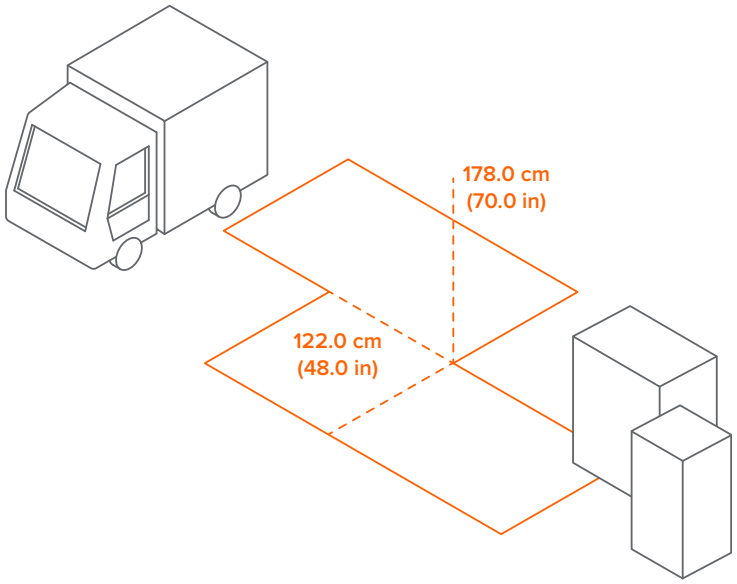
Should you have any questions, you can contact Formlabs directly by emailing support@formlabs.com.

All dimensions are provided in the width (W) x depth (D) x height (H) format.

Delivery & Reception

The Fuse 1+ 30W and, Fuse Sift are heavy devices that must be removed from their packaging with the provided assistive lifting straps (e.g., those commonly used for moving large appliances). For this reason, we recommend purchasing Ready To Plug delivery so that our partners can unpack everything for you. Fuse Blast's packaging includes a ramp for easy removal and does not require lifting straps.

Please ensure there is ample space to maneuver between the delivery zone and the desired setup location. Our partners will also need access to an elevator if traveling between multiple stories, and to a loading dock or a receiving bay for At Your Dock delivery options.



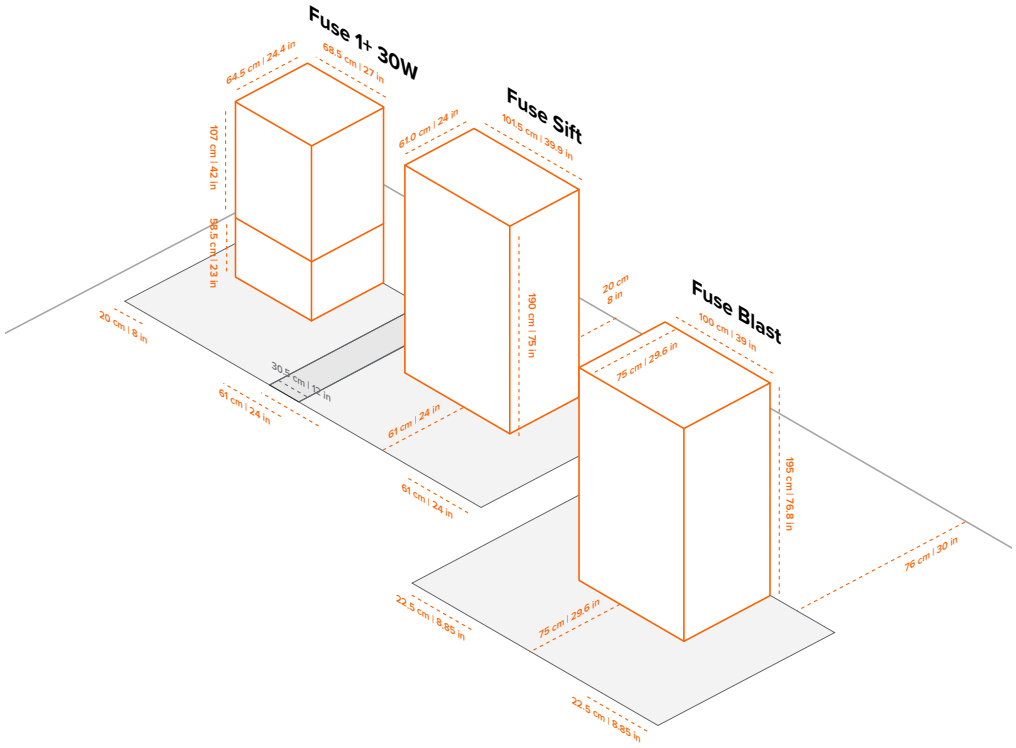
For receiving your Fuse 1+ 30W, Fuse Sift, and Fuse Blast:

- Ensure there is ample maneuvering space of at least **122.0 x 122.0 x 178.0 cm (48.0 x 48.0 x 70.0 in)** between the delivery and setup points.
- With Ready To Plug delivery, please provide our partners access to a freight or service elevator if the desired setup location is on a different level than the delivery point. Please relocate any obstacles that may get caught on dolly wheels such as carpets, hoses or cables.
- With At Your Dock delivery, please provide our partners access to a **loading dock** or **delivery bay** capable of receiving palletized freight deliveries.

Check for damages before accepting the delivery. Reject the delivery if you experience any of the following issues:

- **Pallet:** The wooden pallet is crushed or splintered, especially if pieces are piercing the cardboard packaging.
- **Packaging:** The cardboard packaging is ripped, torn, or dented.
- **Straps:** The two tie-downs securing the package to the pallet are missing or loose.

Footprints



The Fuse 1+ requires:

- **149.5 × 125.5 × 167.5 cm (59.0 × 49.4 × 66.0 in)** for a footprint of 68.5 × 64.5 × 107.0 cm (27.0 × 25.4 × 42.0 in), 165.5 cm (65.0 in) with the stand. Leave at least 20.0 cm (8.0 in) to the left of the printer and 61.0 cm (24.0 in) to the front and right of the printer free for access.
- At least **20.0 cm** (8 in) away from nearby walls.
- Allow additional space for an appropriate nitrogen system if you plan to print with an inert gas atmosphere.

Nitrogen system requirements:

Select and procure a nitrogen source if you plan to print with an inert gas atmosphere. When printing with an inert gas atmosphere, the printer requires approximately 14 L (0.5 cu ft) of nitrogen gas per minute. When using a nitrogen generator, which requires a compressed air source, select an air compressor with a sufficient capacity to prevent simultaneous use by other products (e.g. media blaster) from causing under-pressure during printing. Connect the air compressor to a separate electrical circuit from the printer. Install an oxygen monitor with an alarm located in the same room as the Fuse 1+ if you plan to use a nitrogen supply to print with an inert gas atmosphere.

- Purity: >99.5%
- Nitrogen line fittings: ¼" quick disconnect
- Pressure: 36–125 psi
- Continuous flow rate: 0.5 SCFM

The Fuse Sift requires:

- **221.1 × 142.0 × 218.0 cm (87.0 × 55.9 × 85.83 in)** for a footprint of 61.0 × 99.1 × 188.8 cm (24.0 × 39.0 × 74.3 in). Leave at least 61 cm (24 in) to the left, front, and right of the unit free for access.
- At least **20 cm (8 in)** away from nearby walls.
- Any overlap with the Fuse 1+ access footprint to not exceed more than **30.5 cm (12.0 in).**

The Fuse Blast requires:

- **145 × 150 × 175 cm (57.4 × 59.6 × 69 in)** for a footprint of 100 × 75 × 175 cm (39 × 29.6 × 68.7 in)
- At least **76 cm (30 in)** in clearance from walls and machinery, including at the back
- Allow additional space for an appropriate air compressor system.
- Compressed air line fitting: 1⁄4" quick disconnect (preinstalled in the Fuse Blast)
  - NW 7,2 to G3/8" male thread adapter (European standard adapter to replace Fuse Blast's ¼" quick connect if compatible fittings are not available, supplied by the user)

Air compressor system

Select and procure an air compressor system that matches the Fuse Blast requirements for airflow and pressure as listed below, equivalent to a 4HP compressor. Fuse Blast is supplied with two different component sizes: 3 mm and 4 mm. Smaller sizes can work with lower air consumption but may take longer or clean less effectively.

Requirements:

- Recommended Supply Capacity: 10 SCFM @ 90 PSI / 285 SLPM @ 6 bar.
- Recommended Blasting Pressure: 30 PSI
  - Air consumption (3 mm): 7.6 SCFM
  - Air consumption (4 mm): 11.3 SCFM
- Fittings for the air compressor recommended in the US/Canada (other air compressors or regions may require different fittings):
  - 3/8" NPT Female to ¼" Industrial Quick disconnect hose socket for air (1x)
  - ½" male to ⅜" female NPT reducer (1x)
  - EPDM air hose, ⅜ NPT male (1x)
  - Compressed air filter (1x, if applicable)
  - Pressure regulator (1x, if applicable)

Power & Networking

Formlabs leverages remote access via point-to-point encryption to Fuse 1+ 30W, Fuse Sift, and Fuse Blast in order to collect diagnostic logs and provide remote assistance for troubleshooting. Please check with your network administrator if there are specific procedures for registering new devices to your network.

United States:

- The Fuse 1+ 30W and Fuse Sift each require their own dedicated 120 volt 15 amp circuit via a NEMA 5-20R socket, as well as access to the internet via Ethernet or Wi-Fi.
- A circuit for Fuse Blast that can supply 120 volts and 6 amps (can be shared). The circuit does not have to be dedicated to the unit, but it cannot share a circuit with a Fuse 1 generation printer or Fuse Sift.

European Union:

- The Fuse 1+ 30W and Fuse Sift each require a 230 volts and 7,5 amps to a "schuko" type CEE 7/3 plug (The Fuse 1+ 30W and Fuse Sift cannot share a single circuit with each-other, or any other appliance.)
- A circuit for Fuse Blast that can supply 230 volts and 3 amps (can be shared). The circuit does not have to be dedicated to the unit, but it cannot share a circuit with a Fuse 1 generation printer or Fuse Sift.

United Kingdom:

- The Fuse 1+ 30W and Fuse Sift each require their own dedicated 230 V and 13 A, Type G BS 1363 socket, as well as access to the internet via Ethernet or Wi-Fi.
- A circuit for Fuse Blast that can supply 230 volts and 3 amps (can be shared). The circuit does not have to be dedicated to the unit, but it cannot share a circuit with a Fuse 1 generation printer or Fuse Sift.

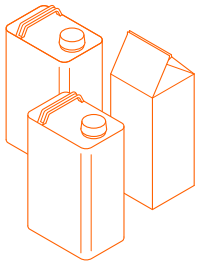
Cleaning Supplies

The Fuse 1+ has an optical component that will need to be cleaned regularly in order to maintain print quality. Formlabs recommends a three-step cleaning process that consists of Alconox detergent, distilled water and lab-grade ethyl alcohol.

Prior to receiving your Fuse 1+, you will need to source these three cleaning agents from a supplier of your choice. If you are unable to source ethyl alcohol, isopropyl is an acceptable substitute.

To clean your Fuse 1+ optical cassette, you will need:

- x1 carton of **Alconox 1104-1** powdered precision cleaner.
- x1 gallon of **distilled water,** laboratory grade.
- x1 gallon of **anhydrous ethyl** or **isopropyl alcohol,** laboratory grade.



Post-Processing

Media blasting is a critical step to remove residual powder and surface armor from printed parts. Media blasting can also be used for an optional polishing step to achieve a smooth, semi-gloss surface finish.

Fuse Blast is fully sealed and ensures the powder is contained and can be placed near the Fuse 1+ 30W printer, as shown on page 4. If you are using a third-party media blaster, especially a manual media blaster, it is important to separate blasting media from your equipment and consumables. If blasting media is found inside the print chamber, your print quality and success rate may be adversely affected. This will be explained during the training sessions in more detail.

- Do not store printing powder near or with blasting media. Maintain separate dedicated tools for media blasting.
- Refer to the relevant material SDS for recommended protective measures for each powder.
- **When using a third-party media blaster:** Standard media blasting cabinets are not adequately sealed for close proximity to 3D printing equipment, and must be kept in a separate workspace from the Fuse 1+ 30W and Fuse Sift.

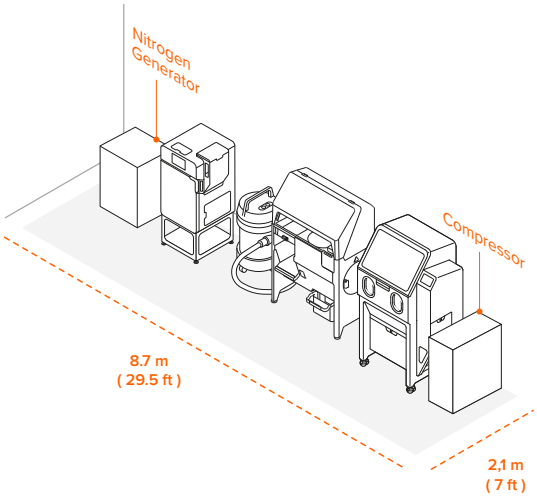
Recommended Setups

These setups are suggested configurations and can be used as a starting point to set up your own Fuse Series ecosystem.

Basic Setup
~18.3m² (206 sq/ft)

1x Fuse 1+ 30W
1x Fuse Sift
1x Fuse Blast

This example setup is ideal for low-volume prototyping or production (3-5 builds per week) and can occupy a corner of an existing workspace or multi-purpose space, with ample room for maneuvering throughout the workspace.



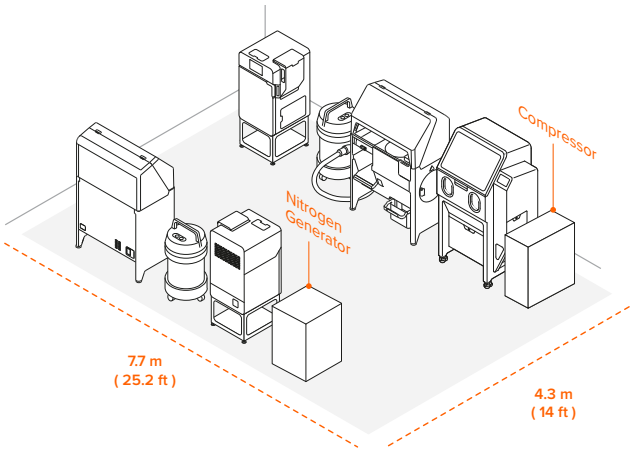
Optional: Include a nitrogen generator or or suitable nitrogen source to print with an inert gas atmosphere.

Note: Fuse Blast requires adequate compressed air supply to operate. If your compressor must be located near Fuse Blast, allocate sufficient floor space for operation.

Multi-Material ~33.1m² (351 sq/ft)

2x Fuse 1+ 30W
2x Fuse Sift
1x Fuse Blast

This setup is ideal for low volume prototyping or production (6-10 builds per week) in more than one material and occupies a dedicated space for SLS 3D printing and post-processing.



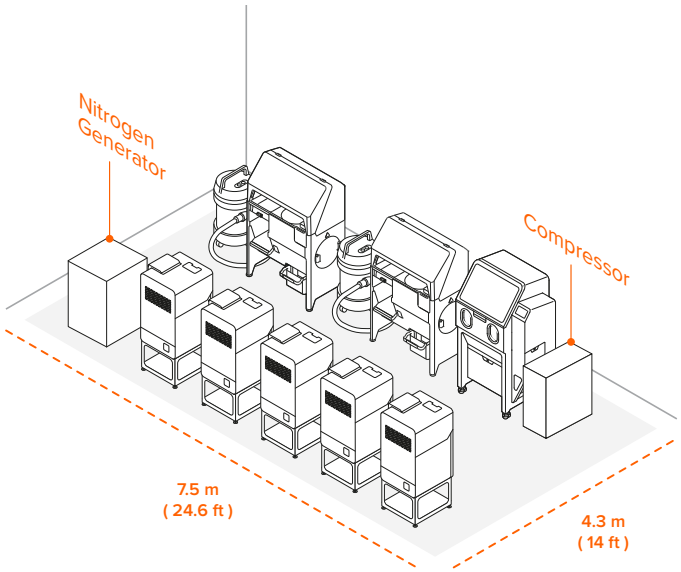
Optional: Include a suitable nitrogen source to print with an inert gas atmosphere.

Note: Fuse Blast requires adequate compressed air supply to operate. If your compressor must be located near Fuse Blast, allocate sufficient floor space for operation.

Medium Volume Production ~32.25m^2 (344 sq/ft)

5x Fuse 1+ 30W
2x Fuse Sift
1x Fuse Blast

This setup is ideal for medium volume end-use manufacturing (15-25 builds per week) and occupies a dedicated space for SLS 3D printing and post-processing.

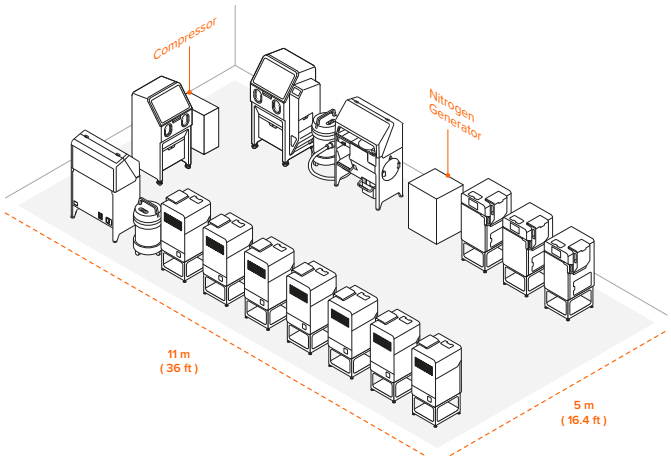


Optional: Add another Fuse Blast to streamline your workflow, by having one unit dedicated to cleaning and one dedicated to polishing.

Optional: Reserve additional space for an industrial nitrogen source that can provide nitrogen to multiple printers

Note: Fuse Blast requires adequate compressed air supply to operate. If your compressor must be located near Fuse Blast, allocate sufficient floor space for operation.

High Volume Manufacturing ~55m² (590sq/ft)



10x Fuse 1+ 30W
2x Fuse Sift
2x Fuse Blast

This setup is ideal for high volume end-use manufacturing in one material (~50 builds per week) and occupies a dedicated space for SLS 3D printing and post-processing. Having 2 Fuse Blast allows you to streamline your post-processing workflow, by having one dedicated to cleaning with 200-300µm glass media (adapted for parts with tight corners or very small gaps), and another one for polishing with Formlabs Polishing Media, and cleaning parts with more simple geometries. This configuration requires a compressed air supply that can support at least 20 SCFM at 90 PSI to supply both Fuse Blasts.

Optional: Reserve additional space for an industrial nitrogen source that can provide nitrogen to multiple printers. Bulk liquid nitrogen tanks are a cost-effective option for high volume printer fleets.

Optional: If you're printing with multiple materials, add 1 Fuse Sift per material for each 5 printers

Note: Fuse Blast requires adequate compressed air supply to operate. If your compressor must be located near Fuse Blast, allocate sufficient floor space for operation.

Next Steps

Please contact your Formlabs representative after confirming your site meets the requirements listed above. Be sure to retain this guide for future reference. If there are any requirements that your site does not yet currently meet or you are unsure of, please contact your Formlabs representative for further assistance.

If you would prefer to delay or reschedule delivery of your order, please let your Formlabs representative know as soon as possible. Formlabs will not require additional payment for holding your order.

Any additional updates about your order will be emailed to you by Formlabs directly or your representative.



Site Preparation & Safety FAQ

What safety measures or site requirements need to be followed when using the Fuse 1+ 30W and SLS powders?

Please reference our Safety Data Sheet (SDS) for the most complete information on safety and site requirements. Restrictions and regulations will vary based on your situation and region.

The Fuse 1+ 30W is most often used in a workshop or machine shop setting, though it can be used in an office environment. If you have a large open office environment with consistent housekeeping practices, it should be fine to install the Fuse Ecosystem there. When in doubt, we recommend completing your own air quality assessment to fulfill your target requirements.

Powder handling and safety are covered in our Fuse 1+ 30W training sessions, included as part of our Fuse Ecosystem service plans.

Once printed parts are fully post-processed, there is no need for use of personal protective equipment when handling.

What are the environmental requirements for the Fuse Series printer?

Fuse Series printer should be operated at room temperature (64 – 84 °F / 18 – 28 °C), with an HVA/C system that actively moves air into and out of the space 24/7 and low ambient humidity. Place the printer stand on a flat, smooth floor. When printing with Nylon Powders, keep the relative humidity of the environment around the ecosystem and other post- processing tools, and anywhere unsintered powder is stored to 50% or less at all times. Higher humidity will lead to clumping, under-dosing, and print failures. For SLS powders, humidity affects shelf life significantly. For optimal results, follow Formlabs guidelines for storing and handling powder.

How many Fuse Sifts should I run per Fuse 1+?

The ratio of Fuse Sifts to Fuse 1+ printers is dependent on your unique workflow, how you plan to use the printer, and the materials you will be using. If you need help figuring out how many Fuse Sifts to purchase, our 3D printing specialists can help you configure the best setup for you.

If you are using multiple materials on a regular basis, Formlabs recommends dedicating a Fuse 1+, a Fuse Sift and x2 build chambers for each material. While cycling different materials through a single Fuse 1+ and Fuse Sift is possible, it is laborious and will require at least one and up to 5 hours to complete, depending on the materials you're switching to and from.

How may Fuse Blast should I run per printer?

One Fuse Blast can service at least 8 printers and is compatible with multimaterial operation. Having 2 Fuse Blast units allows you to streamline your post-processing workflow, by having one dedicated to cleaning with 200-300µm glass media (adapted for parts with tight corners or very small gaps), and another one for polishing with Formlabs Polishing Media, and cleaning parts with more simple geometries.

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