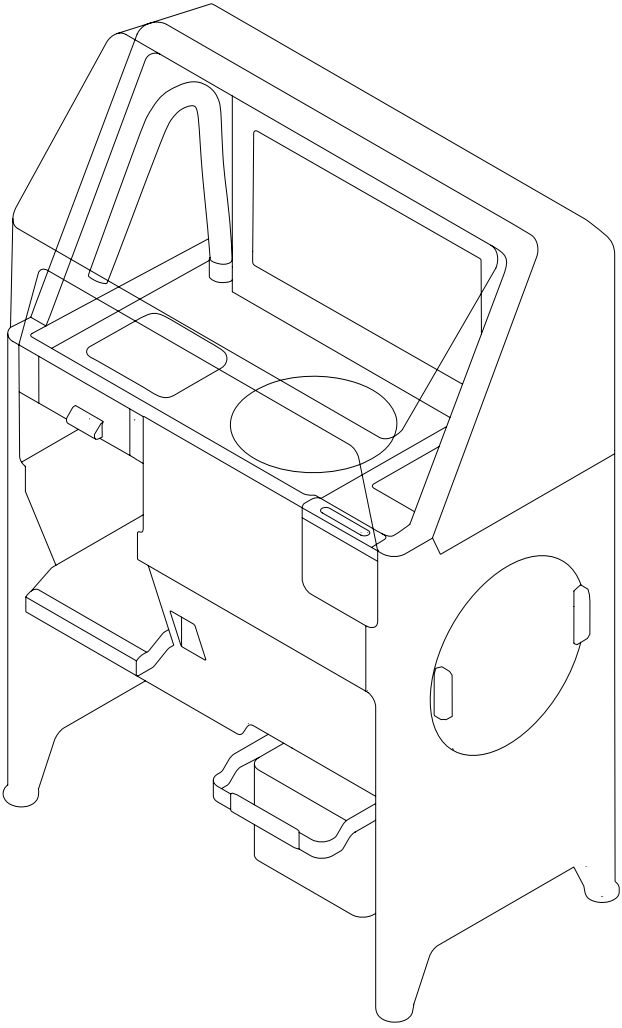
Manual | Fuse Sift

ADDITIVE X



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Installation and Usage Instructions

Fuse Sift

Powder recovery station for the Fuse 1 (SLS) 3D printer

Original English instructions
Read this manual carefully and keep it for future reference.
April 2021
REV 02

formlabs

Table of Contents

WARNING

Read and understand this manual and its safety instructions before using the Fuse Sift. Failure to do so can result in serious injury or death.

DISCLAIMER

Formlabs has made every effort to make these instructions as clear, complete, and correct as possible. The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation, and testing of the products with respect to the relevant specific application or use thereof. Neither Formlabs nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information that is contained herein. Notify us if you have any suggestions for improvements or amendments or have found errors in this publication.

support.formlabs.com

TRADEMARKS

DOCUMENT REVISIONS

Date	Version	Document changes
Jan 2021	REV 01	Initial publication
Apr 2021	REV 02	Minor text updates

1 Preface

Congratulations on purchasing the Fuse Sift. On behalf of the Formlabs team, we thank you for your purchase. The Fuse Sift is the powder recovery station for the Fuse 1, a Selective Laser Sintering (SLS) 3D printer.

When a print is finished, the resulting parts are buried in loose, unsintered powder and need to be extracted. The workspace provided by the Fuse Sift allows users to extract parts from a build chamber, reclaim unsintered powder, store both reclaimed and fresh powder, as well as combining powder streams for printing. An air handling system helps reduce plumes from free floating powder, and integrates a vacuum for easy cleanup.

This manual explains how to set up, use, and properly maintain the Fuse Sift, as well as provides design guidance for optimizing print results.

The manual is intended for anyone who is installing, operating, maintaining, or otherwise interacting with the Fuse Sift. Supervise young or inexperienced users to ensure enjoyable and safe operation.

1.1 Read and retain instructions

Read and understand this manual and its safety instructions before using the Fuse Sift. Failure to do so can result in serious injury or death. Keep all safety information and instructions for future reference and provide them to subsequent users of the product.

Follow all instructions to avoid fire, explosions, electric shocks, or other hazards that may result in damage to property and/or severe or fatal injuries.

The Fuse Sift shall only be used by persons who have fully read and understand the contents of this manual. Ensure that each person who uses the Fuse Sift has read these warnings and instructions and follows them. Formlabs is not liable for cases of material damage or personal injury caused by incorrect handling or non-compliance with the safety instructions. In such cases, the warranty will be voided.

1.2 Obtaining documentation and information

Visit **formlabs.com** to:

- Access your **Formlabs store (formlabs.com/store)** and **Dashboard** accounts **(formlabs.com/dashboard)**.
- Find **certified service providers** in your region **(formlabs.com/company/partners)**.
- Access the **Terms of Service (formlabs.com/terms-of-service)** and the **Privacy Policy (formlabs.com/privacy-policy)**.

Visit **support.formlabs.com** to:

- Access the latest version of all Formlabs product documentation.
- Contact Formlabs Support to request documentation, manuals, repair guides, and technical information.
- Submit any comments or feedback regarding what is good and what can be improved. Formlabs values comments from its users.
- Request additional training.

1.2.1 *Support and service*

Retain a record of the original purchase to request warranty services. Service options depend on the status of the specific product's warranty. Include the serial name of the product when contacting Formlabs Support or a certified service provider for product support.

Instead of a serial number, Formlabs products have a serial name, which is a unique identifier to track the history of manufacturing, sales, and repair, and to distinguish usage when connected to a network. The serial name is on the back panel of the machine in the format **AdjectiveAnimal**.

Service providers of Formlabs products also provide support and service. To the extent that Formlabs or a certified service provider offers other or extended warranties, the terms of the separate offer may apply.

For products purchased from certified service providers, contact the original service provider for assistance before contacting Formlabs Support.

For any support or service requests, including product information, technical assistance, or assistance with instructions, contact Formlabs Support:

support.formlabs.com

USA
Formlabs, Inc.
35 Medford St.
Somerville, MA, USA, 02143

Germany
Formlabs GmbH
Nalepastrasse 18
12459 Berlin, Germany

1.2.2 Warranty

This product is protected under warranty. Formlabs offers a warranty for all Formlabs branded hardware. Unless otherwise expressly stated, the **Terms of Service**, including the **Warranty**, constitute the entire agreement between you and Formlabs with respect to the **Service** and any product you purchase from Formlabs and supersedes all prior or contemporaneous communications, proposals, and agreements, whether electronic, oral, or written, between you and Formlabs.

Read the warranty for more details on the Formlabs warranty for your region:

US	**formlabs.com/terms-of-service**
EU (EN)	**formlabs.com/eu/terms-of-service**
EU (DE)	**formlabs.com/de/terms-of-service**
EU (FR)	**formlabs.com/fr/terms-of-service**
EU (ES)	**formlabs.com/es/terms-of-service**
EU (IT)	**formlabs.com/it/terms-of-service**

2 Introduction

2.1 Intended use

The Fuse Sift is a commercial, precision tool intended for use in the additive manufacture of end-user supplied designs from SLS powder. The final performance characteristics of sintered SLS powder may vary according to your compliance with the instructions for use, application, operating conditions, material combined with, end use, or other factors.

NOTICE

In some cases, the additive manufacturing process may inherently result in variable performance characteristics between manufacturing runs or within a specific part. Such variances may not be apparent and may result in unexpected defects in additively fabricated parts.

WARNING

You shall independently verify the suitability of additive manufacturing, Selective Laser Sintering (SLS), the Fuse Sift, and any specific designs or materials employed for the application and intended purpose before use. In no event shall Formlabs be liable for any loss, death, or bodily injury that you suffer, or that you cause to any third party, in connection with your use of Formlabs products. To the fullest extent legally permitted Formlabs EXPRESSLY DISCLAIMS ANY IMPLIED OR EXPLICIT WARRANTY OF FITNESS for a particular usage, the particular nature and circumstances of said usage being unforeseen and unforeseeable to Formlabs.

WARNING

Formlabs is not a manufacturer of medical devices. Formlabs provides tools and materials that may be used in many applications, but makes no claims as to the safety or effectiveness of any specific devices made using Formlabs products. Certain Formlabs products, such as those commonly known in the industry as “biocompatible” materials, have been engineered to comply with relevant industry standards. The specific standards and most relevant technical specifications may be identified within the technical data sheets and have been tested according to relevant testing protocols for those standards and specifications. Biocompatible materials are a speciality product, developed for use by medical professionals, and should be used in accordance with the instructions for use.

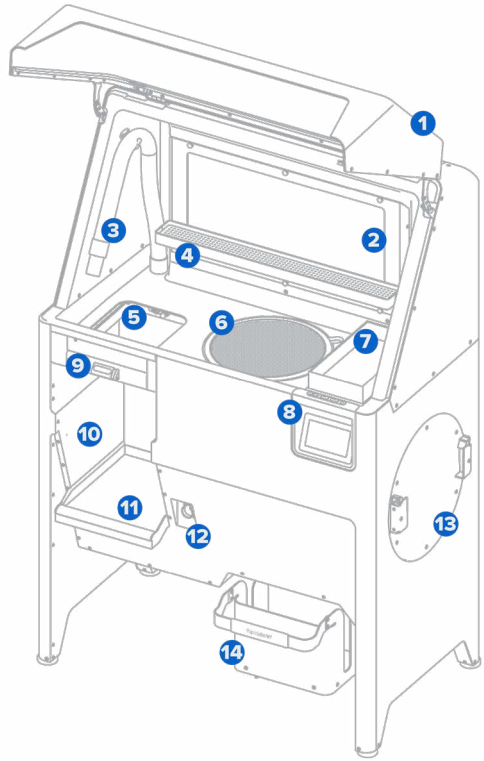
WARNING

Do not modify. The Fuse Sift is intended for use as-is. Modifying the machine without explicit approval and directions from Formlabs or a certified service provider will void your warranty, and could potentially ruin the machine and cause you bodily harm.

2.2 Technical specifications

Parameter	Unit
Powder recovery station	Fuse Sift
3D printing technology	Selective Laser Sintering (SLS)
Minimum dimensions for convenient access (W × D × H)	221.1 × 122.0 × 218.0 cm | 87.1 × 48.0 × 85.8 in
Powder recovery station dimensions (W × D × H)	99.1 × 61.0 × 157.0 cm (188.8 cm with hood open) 39.0 × 24.0 × 61.8 in (74.3 in with hood open)
Powder recovery station weight	93 kg | 205 lb (without build chamber or powder)
Build chamber dimensions (W × D × H)	27.9 × 34.2 × 48.9 cm | 11.0 × 13.5 × 19.3 in
Build chamber weight	11 kg (17.6 kg, full with 20% packed powder) 24.3 lb (38.8 lb, full with 20% packed powder)
Build volume (W × D × H)	16.5 x 16.5 x 30.0 cm | 6.5 × 6.5 × 11.8 in (with radiused corners)
Material refresh rate	Print with up to 70% recycled powder
Hopper capacity, fresh powder	10.7 kg PA12 nylon | 23.6 lb PA12 nylon
Hopper capacity, used powder	9.8 kg PA12 nylon | 21.6 lb PA12 nylon
Operating environment	18–28 °C | 68–81 °F
Air handling	Negatively pressurized hood with replaceable HEPA filter
Power requirements	With a vacuum that draws less than 6 A (230 VAC)/12 A (120 VAC): EU: 230 VAC, 7.5 A (dedicated circuit) US: 120 VAC, 15 A (dedicated circuit) With a vacuum that draws more than 6 A (230 VAC)/12 A (120 VAC): EU: 230 VAC, 10 A (dedicated circuit) US: 120 VAC, 20 A (dedicated circuit)
Vacuum requirements	Auxiliary vacuum that is grounded and bonded (e.g., a Class II, Division 2 vacuum)
Connectivity	Wi-Fi: 2.4 GHz Ethernet: 1000 Mbit USB: 2.0
Wi-Fi connectivity	Protocol: IEEE 802.11 b/g/n Frequency: 2.4 GHz Supported security: WPA/WPA2
Ethernet connectivity	RJ-45 Ethernet (10BASE-T/100BASE-TX/1000BASE-T) LAN port Connect with a shielded Ethernet cable (not included): minimum Cat5, or Cat5e or Cat6 for 1000BASE-T.
USB connectivity	USB (rev 2.0) B port with a USB A-B cable
Sound emission	Does not exceed 84 dB(A).
Powder recovery station control	Interactive touchscreen, physical buttons
Cartridge filling system	Automated
Alerts	Touchscreen alerts

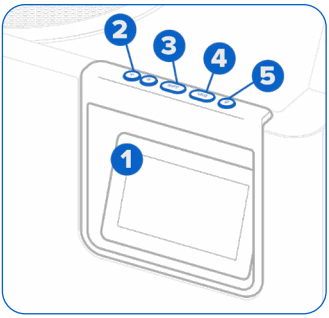
2.3 Product components



2.3.1 Fuse Sift

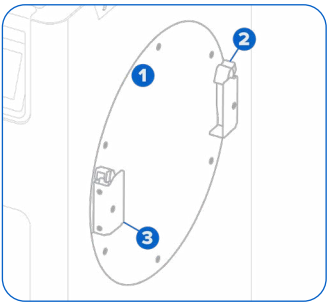
1. **Hood**: Prevents powder and debris from leaving the Fuse Sift's workspace.
2. **Vent**: Collects pluming powder.
3. **Vacuum**: For cleaning the Fuse 1 and Fuse Sift after use.
4. **Tool shelf**: Storage for break-out tools and brushes.
5. **Build chamber port**: Access port for cooled cake to enter workspace.
6. **Surface grate**: Protective grate covering the sifter.
7. **Fresh powder hopper lid**: Access point for filling the fresh powder hopper.
8. **Control panel**: A touchscreen and physical controls for interfacing with the Fuse Sift.
9. **Build chamber latch**: Secures the build chamber.
10. **Build chamber enclosure**: Area for housing the build chamber with prints ready to be ejected. The powder catch at the bottom of the build chamber enclosure is a removable tray for catching loose powder.
11. **Powder catch**: Removable tray for catching loose powder.
12. **Build chamber socket**: For the build chamber's plug.
13. **Mixer**: For mixing powder cartridges after filling.
14. **Cartridge drawer**: For storing and filling a powder cartridge.

2.3.2 Control panel



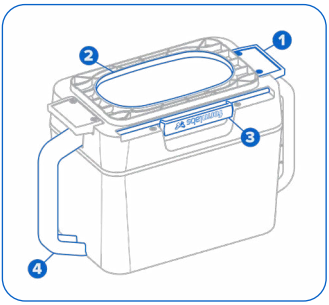
1. **Touchscreen**: Interactive touchscreen for controlling subsystems and settings of the Fuse Sift.
2. **Chamber bed controls**: Physical controls for raising and lowering the print bed into and out of the workspace.
3. **Sifter button**: Physical control for starting and stopping the sifter.
4. **Vacuum button**: Physical control for turning on and off the auxiliary vacuum.
5. **Light button**: Physical control for turning on and off the workspace light and vent.

2.3.3 Mixer



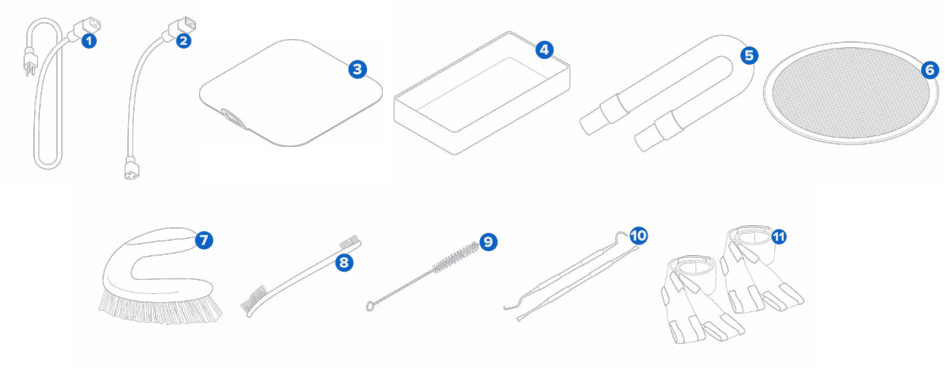
1. **Mixer turntable**: The exterior face of the mixer that turns with the cartridge.
2. **Locking tabs**: Two spring-loaded tabs for securing the cartridge into the mixer.
3. **Cartridge wing couplers**: Two brackets that guide the cartridge's wings into place.

2.3.4 Powder cartridge



1. **Cartridge wings**: Two brackets for locking the cartridge to the mixer.
2. **Cartridge valve**: The primary opening for filling and depositing powder.
3. **Valve knife**: Used to close off and open the cartridge valve.
4. **Handles**: For holding and lifting the cartridge.

2.3.5 Additional Fuse Sift package components



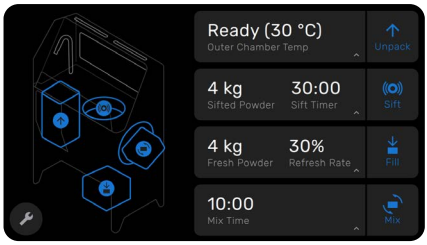
1. **Power cable**: Compatible with both the Fuse Sift and the Fuse 1.
2. **Vacuum adapter cable**: Adapter for connecting the vacuum directly to the Fuse Sift.
3. **Build chamber port cover**: Prevents airflow through the bed port in the workspace.
4. **Parts basket**: Storage container for extracted parts while processing a cake.
5. **Vacuum hose**: For using the vacuum within the workspace.
6. **Surface grate**: Covers the sifter to prevent objects from falling through.
7. **Large brush**: Main scrubbing brush for large or well-buried parts.
8. **Double-sided brushes**: Set of two, each with a medium and small head.
9. **Wire brushes**: Set of five. Best for cleaning out cavities, slots, tubes, or hard-to-reach features.
10. **Picks**: Best for removing powder from pockets, seams, or channels.
11. **Lifting straps**: For two individuals to lift and move the Fuse Sift.

2.4 Fuse Sift user interface

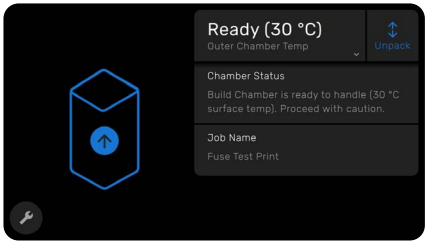
For detailed guidance and visual assistance, visit **support.formlabs.com**.

The Fuse Sift's display includes a touchscreen and physical buttons for controlling the print bed height, sifter, and vacuum. The touchscreen displays system information, settings, status of the sifter, build chamber, fresh and used powder levels, and error messages. The touchscreen serves as the user interface for the powder recovery station.

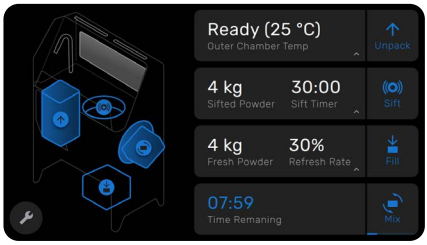
The Fuse Sift allows you to control its subsystems by either tapping their respective graphics on the left, or the cards on the right.



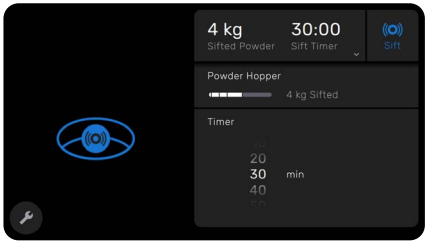
Tapping a card brings up the specific subsystem's current status and settings. In this case, the inserted build chamber is cool and ready for part recovery.



Tapping the icon next to a card activates the subsystem. When a subsystem is running, its card and icon are highlighted blue. A progress bar indicates the state of a current operation.



The filling and mixing subsystems allow you to access settings of each operation by tapping their respective cards. The sifter, for example, allows setting a desired run time while also displaying the amount of used powder that has been sifted and recaptured.



3 Safety

Read and understand this manual and its safety instructions before using the Fuse Failure to do so can result in serious injury or death.

Supervise young or inexperienced users to ensure enjoyable and safe operation.
The instructions contain warnings and safety information, as explained below:

DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

NOTICE indicates information considered important, but not hazard-related.

CAUTION: Mixing powder cartridges poses entanglement and pinch hazards. Keep hands, loose clothing, and cables away from the mixer while running.

ENVIRONMENTAL HAZARD: Unsintered SLS powder is classified as a microplastic, a group of plastics that are hazardous to aquatic life..

MANDATORY ACTION: Refer to instruction manual/booklet.

MANDATORY ACTION: Wear a respirator (N95 or better).

MANDATORY ACTION: Wear thermal-insulating silicone gloves when handling hot build chambers.

MANDATORY ACTION: Disconnect before carrying out maintenance or repair.

MANDATORY ACTION: Grounding required.

3.1 Component and subsystem safety

3.1.1 General

The Fuse Sift requires a 230 VAC (50 Hz), 7.5 A power supply (EU) or 120 VAC (60 Hz), 15 A power supply (US) for nominal operation. Unless explicitly instructed by Formlabs Support or a certified service provider, do not disassemble or tamper with the product beyond what is explicitly outlined for typical maintenance. Tampering with, or disassembling the Fuse Sift prior to disconnecting the power cable and waiting approximately ten minutes can subject users to potentially fatal electrical hazards.

The Fuse 1's print enclosure is designed to operate at up to 200 °C (392 °F) and incorporates high-intensity heaters. Do not open the print enclosure or any other access doors on the printer during or immediately after a print. Do not handle parts from a build chamber without allowing the entire print enclosure to cool for several hours, or until the build chamber temperature has reached ≤ 100 °C (212 °F). Use the provided thermal-insulating silicone gloves when handling a hot build chamber. Failure to follow these procedures will result in serious injuries, including burning and/or scalding of skin.

Due to its size and weight, do not move or reposition the Fuse Sift alone. If the machine needs to be moved, at least two individuals should unlock the casters and push the entire unit by the metal frame. Avoid using the workspace hood as a push-off point.

Do not lift or reposition the Fuse Sift:

- By grabbing or pulling on the workspace hood, workspace lip, build chamber enclosure, build chamber latch, or power cable.
- By pushing on any side of the unit while stationary.
- When the build chamber that is still hot inside is loaded in the build chamber enclosure.

The Fuse Sift requires an operating environment that is low in ambient humidity and static electricity. Refer to section 4.1 Location and environs for the recommended operating environs. When performing maintenance or testing with the exterior paneling of the machine removed, ground equipment to the grounding stud marked with this protective earth symbol.

3.1.2 Vacuum

A typical Fuse Sift operation requires the use of a compliant vacuum that is grounded and bonded, such as a Class II, Division 2 vacuum, which typically utilizes disposable bags for collecting debris. Formlabs recommends that Fuse Sift operators regularly check the accumulation of debris inside the vacuum's collection chamber.

3.1.3 Powder

Dust deposits should not be allowed to accumulate on surfaces. Clean dust residues at regular intervals. Do not use brooms or compressed air hoses to clean surfaces. Only use a compliant vacuum that is grounded and bonded, such as a Class II, Division 2 vacuum, for dust collection. Use only non-sparking tools. Keep powder containers tightly closed when not in use.

In case of powder inhalation, swallowing or contact with eyes, follow these instructions:
AFTER INHALATION: If inhaled, remove person to fresh air and place in a position comfortable for breathing. Keep person at rest. If breathing is difficult, administer oxygen. If breathing has stopped, provide artificial respiration. If symptoms develop or persist, seek medical advice/attention.
AFTER SKIN CONTACT: Remove contaminated clothing and shoes. Rinse skin with copious amounts of water [shower] for several minutes. Launder contaminated clothing before reuse. If symptoms develop or persist, seek medical advice/attention.
AFTER SWALLOWING: If swallowed, DO NOT induce vomiting unless told to do so by a physician or poison control center. Rinse mouth with water. Never give anything by mouth to an unconscious person. If spontaneous vomiting occurs, place on the left side with head down to prevent aspiration of liquid into the lungs. If symptoms develop or persist, seek medical advice/attention.

Use appropriate personal protective equipment when handling loose or unsintered powder. Wear non-reactive nitrile gloves and safety glasses. Wear a respirator (N95 or better) if the occupational threshold limit value for airborne particle concentration has been exceeded, if you are sensitive to dust or pollen, or you are concerned about your respiratory health. Refer to section 3.2 Personal protective equipment (PPE) for additional information. Handle loose or unsintered powder only with adequate ventilation. Avoid breathing mist/vapor/spray/dust. Do not eat, drink, smoke, or use personal products when handling powder. Avoid contact with skin, eyes, and clothing.

Consult the safety data sheet (SDS) as the primary source of information to understand safety and handling of Formlabs powders. Respect Formlabs powder like any household chemical. Follow standard chemical safety procedures and Formlabs powder handling instructions. In general, Formlabs powder is not approved for use with food, drink, or medical applications on the human body. Refer to the safety data sheet (SDS) for each specific powder as well as support.formlabs.com for more detail.

3.1.4 Radio interference

Note: 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 own expense.

Changes or modifications to this product not authorized by Formlabs could void the electromagnetic compatibility (EMC) and wireless compliance and negate your authority to operate the product.

This product has demonstrated EMC compliance under conditions that included the use of compliant peripheral devices and shielded cables between system components. It is important that you use compliant peripheral devices and shielded cables between system components to reduce the possibility of causing interference to radios, televisions, and other electronic devices.

3.2 Personal protective equipment (PPE)

Safe operation of the Fuse Sift can be achieved by implementing the following equipment:

- **Particulate filtering respiratory protection (N95 or better)**
  Wear a respirator (N95 or better) if the occupational threshold limit value for airborne particle concentration has been exceeded, if you are sensitive to dust or pollen, or you are concerned about your respiratory health.
- **Non-reactive nitrile gloves**
  Recommended when handling loose or unsintered powder, as it may draw moisture and oils out of skin. If powder is handled at room temperature, it is not necessary to wear protective gloves.
- **Safety glasses**
  Required when performing maintenance on the Fuse Sift, as well as handling loose or unsintered powder at any time. Polycarbonate-based lenses, including prescription glasses, are acceptable so long as they provide peripheral protection.

3.3 Specification of tools to be used

The Fuse Sift shall only be used with supplied accessories and additional tools recommended by Formlabs or a certified service provider. Third-party accessories and materials may cause damage. Refer to sections **3.2 Personal protective equipment (PPE)** and **6.1 Tools and supplies** for more information.

- **Nylon wire brushes**
  Various sizes and shapes are provided to ease in the removal of parts from a cake. Avoid using any metallic or ceramic tools for post-processing, as they may damage parts in the process.
- **Compliant vacuum that is grounded and bonded (e.g., Class II, Division 2 vacuum)**
  Certified for use with materials whose fine particles present an explosive risk when in the vicinity of potentially malfunctioning electrical equipment.

3.4 Emergency and exceptional situations

Formlabs has made every effort to provide updated safety data sheets (SDS) for every powder product, in accordance with the latest government guidelines. Always consult the safety data sheet (SDS) as the primary source of information to understand safety and handling of Formlabs materials and required accessories.

3.4.1 Fire

Do not use water to extinguish an electrical fire. Dousing an electrical fire with water increases the risk of electrocution, and may cause the fire to spread by allowing electricity to conduct across additional flammable surfaces.

If a localized fire develops near the Fuse Sift, e.g., inside or outside the Fuse 1, immediately take the following actions.

If the fire is inside the print enclosure:

1. Immediately disconnect the printer from its power source.
2. Open the filter door and locate the emergency chamber door release cable. Pull the cable away from the printer until the print enclosure door unlocks.
3. Use an ABC fire extinguisher to cover the affected area generously.

If the fire is too large to control:

1. Immediately leave the area and close the door of the room behind you.
2. Evacuate the building according to your organization's emergency protocols.
3. Call emergency services once you have reached a safe distance from the fire.

3.4.2 Powder

In an emergency involving powder, always refer to the safety data sheet (SDS) and/or seek help from a medical professional.

4 Preparation and setup

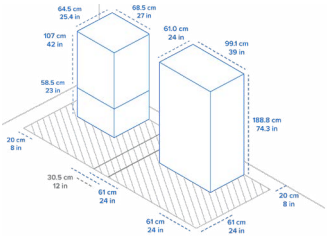
4.1 Location and environs

Prepare a space to install and operate the Fuse Sift and house the necessary accessories and consumables.

To prepare the workspace for the Fuse Sift:

1. Choose a location separate from any machinery or tooling that generates dust or sparks, such as wood or metal working equipment.
2. Maintain low ambient humidity. When printing with Nylon 12, keep the relative humidity of the environment around the printer, the Fuse Sift 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. If 50% RH cannot be achieved, remove the debris catcher at the bottom of the printer's hopper (though this will remove protection against debris entering the print chamber). For SLS powders, humidity affects shelf life significantly. For optimal results, follow Formlabs guidelines for storing and handling powder.
3. The Fuse Sift, build chamber, vacuum, and powder cartridge are free standing components. Reserve the following minimum dimensions for the most convenient access:

- **Fuse Sift**: 221.1 × 122.0 × 218.0 cm (87.1 × 48.0 × 85.8 in)
  - The Fuse Sift footprint is 99.1 × 61.0 × 157.0 cm (39.0 × 24.0 × 61.8 in). With the hood open, the Fuse Sift is 188.8 cm (74.3 in) in height. Leave at least 61 cm (24 in) to the left, front, and right of the unit free for access.
  - Place the Fuse Sift at least 20.0 cm (8.0 in) from nearby walls.
  - Do not overlap with the Fuse 1 access footprint by more than 30.5 cm (12.0 in).



4. Ensure proper ventilation is installed.

CAUTION

Sintering nylon powder produces laurolactam, a white powder that accumulates within the print enclosure, filter mediums, and exhaust. Proper ventilation is required whenever the Fuse 1 or Fuse Sift is operating.

5. Purchase additional supplies:

- Compliant vacuum that is grounded and bonded (e.g., Class II, Division 2 vacuum)
- Particulate filtering respiratory protection (N95 or better)
- Non-reactive nitrile gloves
- Safety glasses

4.2 Power and networking

For detailed guidance and visual assistance, visit **support.formlabs.com**.

NOTICE

The Fuse Sift requires a dedicated AC circuit, providing at least 7.5 A at 230 VAC (EU)

or 15 A at 120 VAC (US) , as well as reliable grounding. This circuit must be separate from other devices—including the corresponding Fuse 1, fans, vacuums, power tools, space heaters, or any large appliances. Power surges may disrupt mixing or filling operations and/or permanently damage sensitive components, jeopardizing the reliability of the product.

Maximum vacuum current draw	Required circuit amperage
<6 A (230 VAC) <12 A (120 VAC)	7.5 A (230 VAC) 15 A (120 VAC)
≥6 A (230 VAC) ≥12 A (120 VAC)	10 A (230 VAC) 20 A (120 VAC)

For remotely monitoring the Fuse Sift, ensure that the machine maintains a constant connection to a secured network. Refer to section **4.6 Setting up a network connection** for more information.

4.3 Unboxing the machine

For detailed guidance and visual assistance, visit s**upport.formlabs.com**.
Prior to unboxing, ensure that the suitable workspace has been prepared according to section **4.1 Location and environs**.

CAUTION

The Fuse Sift is a heavy object. A two person lift is required to prevent injury and avoid damage to the machine.

4.3.1 Receiving

The standard Fuse Sift package ships on one pallet and contains the Fuse Sift powder recovery station, surface grate, and parts basket. Powder cartridges and accessory boxes ship separately from the Fuse Sift's packaging.

NOTICE

Depending on the package you purchase, the accessories may ship together on a pallet. If you are in a building with palletized deliveries, ensure you have access to the loading dock.

	Powder recovery station	Vacuum	Pallet including product and boxes (if applicable)
Shipping dimensions	99 × 57 × 156 cm 39 × 22.4 × 61.4 in	50 × 50 × 80 cm 19.7 × 19.7 × 31.5 in	111 × 71 × 178 cm 44 × 28 × 70.1 in
Shipping weight	138 kg 304.2 lb	44 kg 97 lb	154 kg 340 lb
Product weight	93 kg 205 lb	25 kg 55 lb	n/a

4.3.2 Unboxing

The custom packaging the powder recovery station arrives in is specially designed to

protect the machine during shipping. During unboxing, inspect the product for any damage or missing items. In the case of damage or missing items, contact Formlabs Support or a certified service provider.

CAUTION

Removing the machine from its packaging requires at least two people that are comfortable lifting large and heavy objects.

To unbox the machine:

1. Position the Fuse Sift's packaging near the designated area, leaving enough room for two people to comfortably maneuver throughout the area. Stand the packaging upright to ensure it is level.
2. Open the Fuse Sift's box from the top by removing the lid, then consecutively remove the two C-shaped shells.
3. Locate the accessories box sitting on the pallet underneath the Fuse Sift. Open the accessories box and remove the lifting straps and wrench inside.
4. Locate the four steel brackets holding the unit's feet to the pallet. Use the included wrench to remove the 12 bolts, then disengage the brackets from the Fuse Sift. Retain all fastening hardware for future use.
5. Loop both lifting straps under the machine from left-to-right, ensuring that the straps are not crossed. With one person on each side, insert your forearms into each loop so they do not go past your elbows.
6. With your back straight and knees slightly bent, brace against the machine with your palms as you and a second person lift the unit up.
7. Carefully move the machine into its workspace and set the unit down gently.

NOTICE

If you need to readjust the machine, use the lifting straps to pick it back up. Do not pick up the machine without lifting straps.

8. Remove any additional wrapping and packaging from the outside of the Fuse Sift before connecting the machine to power.
9. Open the hood and remove the top foam ring from the sifter cavity.
10. Turn the turnbuckles to release the filter mesh and remove the bottom foam ring.
11. Place the filter mesh back inside the cavity and turn the turnbuckles to reinstall.
12. Remove the Fuse Sift tool shelf from the pallet. Hang the tool shelf from the pegs running along the bottom of the vent at the back of the Fuse Sift workspace.
13. Remove the surface grate from the accessories box and place it over the sifter.
14. Remove the vacuum hose from the accessories box. Plug it into the vacuum port on the inside-left wall of the Fuse Sift.
15. Remove the parts basket and cleaning tools from the accessories box and place them in the workspace.
16. Remove the powder catch from the accessories box and place it on the bottom of the build chamber enclosure.
17. Remove the build chamber port cover from its sleeve and place it over the build chamber port, closing the space at the top of the build chamber enclosure.

18. Remove the power cord from the accessories box and connect the machine to power.

NOTICE

The original packaging is designed to be kept and reused for transporting or shipping the machine for service. Save the complete packaging including any inserts for your convenience.

4.4 Accessing the serial name

For detailed guidance and visual assistance, visit **support.formlabs.com**.

The serial name is a unique identifier used to track the history of manufacturing, sales, and repair. The serial name for the Fuse Sift is located on a sticker next to the A/C input on the back panel in the format **AdjectiveAnimal**. For a Fuse Sift, the serial name is also available on the touchscreen.

To access the serial name on the touchscreen:

1. Tap the wrench icon in the bottom-left corner to enter the **Settings** menu. The **Settings** menu appears.
2. Tap **System**. The **System** screen appears.
3. Tap **Sift Details**. The **Sift Details** screen appears.
4. The serial name is listed in the top-left corner.

4.5 Installing the machine

For detailed guidance and visual assistance, visit **support.formlabs.com**.

After selecting a location for the Fuse Sift, install the accessories if you did not do so during the unboxing process: insert the sifter mesh and surface grate, connect the vacuum hose, then connect the Fuse Sift to a power source to turn on the machine.

4.5.1 Inserting the sifter mesh and surface grate

Open the workspace hood. Insert the sifter mesh into the sifter cavity, then turn all eight (8) retention clamps so they point into the center. Insert the surface grate into the recess above the sifter cavity.

4.5.2 Installing the tool shelf

Hook the tool shelf over the pegs on the vent at the back of the work area. When installed correctly, the tool shelf sits level and is flush against the vent.

4.5.3 Installing the powder catch tray

Place the powder catch tray in the build chamber enclosure. When installed correctly, the powder catch tray sits flat and is flush against the back wall of the enclosure.

4.5.4 Set up the build chamber port cover

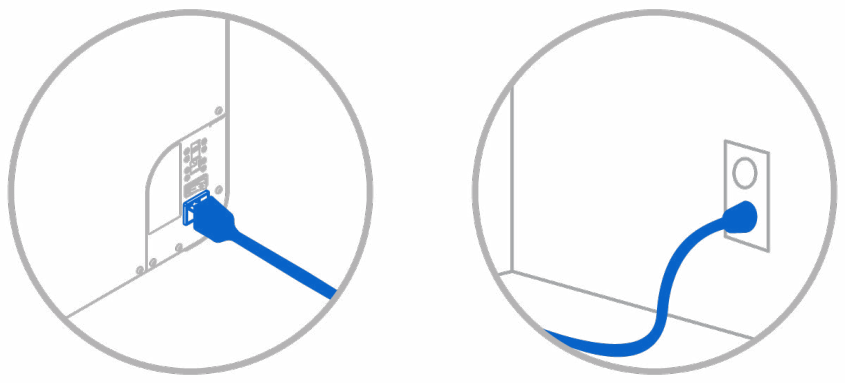
The build chamber port cover is a removable cover that sits at the top of the build chamber enclosure. Place the build chamber port cover over the build chamber port whenever a build chamber is not installed to prevent tools, printed parts, or loose powder from escaping the work area.

4.5.5 Connecting the vacuum

Assemble the vacuum, then connect its hose and power cable to the port in the back-left corner of the workspace. Loop the hose around the hook located above the port. Flip the breaker switch on the vacuum to the **ON** position.

4.5.6 Connecting the cables

Plug the included power cable into the power port on the back of the unit and connect the power cable to a dedicated circuit.



4.5.7 **Installing the Wi-Fi antenna**

Install the Wi-Fi antenna to connect the machine to a wireless network.

To install the Wi-Fi antenna, screw the Wi-Fi antenna onto the jack on the back of the unit, next to the power, USB, and Ethernet ports.

4.5.8 **Turning on**

To turn on the machine:

1. Plug the included power cable into the power port on the back of the unit and connect the power cable to a dedicated circuit.
2. Flip the breaker switch on the back of the Fuse Sift to the **ON** position to turn on the machine.
3. As the Fuse Sift initiates, the Formlabs logo with a progress bar appears on the touchscreen, followed by the onboarding process. Follow the on-screen prompts to finish setting up the machine.

To turn off the machine, refer to section **5.6.2 Turning off**.

4.6 Setting up a network connection

For detailed guidance and visual assistance, visit **support.formlabs.com**.

Connect the Fuse Sift to a secure network via Wi-Fi or Ethernet, providing it internet access for remote troubleshooting, sending diagnostic logs, and receiving firmware updates. The Fuse Sift can connect directly to a computer with a USB cable.

4.6.1 **Connecting with Wi-Fi**

The Fuse Sift's built-in Wi-Fi (IEEE 802.11 b/g/n) supports WPA/WPA2 security. Use the touchscreen to configure a wireless network connection.

To connect with Wi-Fi:

1. Tap the wrench icon on the **Home** screen. The **Settings** screen appears.
2. Tap **Connectivity > Wi-Fi**. The **Wi-Fi** screen appears.
3. Toggle **Use Wi-Fi** to **ON**. The toggle turns blue.
4. Tap the desired wireless network.
5. If prompted, enter your network password and tap the checkmark to confirm.

4.6.2 **Connecting with Ethernet**

The rear of the unit is equipped with a RJ-45 Ethernet (10BASE-T/100BASE-TX/1000BASE-T) 1000 Mbit LAN Port. Use a shielded Ethernet cable (not included): minimum Cat5, or Cat5e or Cat6 for 1000BASE-T.

To connect with Ethernet:

1. Plug one end of the Ethernet cable into the Ethernet port on the back of the unit.

2. Connect the other end of the Ethernet cable to your LAN.

4.6.3 Connecting with a manual IP configuration

When connected to an active Ethernet connection or available wireless network, the Fuse Sift can be configured with a static IP address. Use the touchscreen to configure a manual IP connection.

To connect with Wi-Fi or Ethernet using a manual IP configuration:

1. With an established Ethernet or available Wi-Fi connection, tap the wrench icon on the **Home** screen. The **Settings** screen appears.
2. Tap **Connectivity**. The **Connectivity** screen appears.
   - For Wi-Fi networks, tap **Wi-Fi**, then the desired wireless network. A new screen appears. Tap the **Manual IP** button in the lower-left corner. The **Manual IP Settings** screen appears.
   - For Ethernet connections, tap **Ethernet**. The **Manual IP Settings** screen appears.
3. Toggle **Use Manual IP** to **ON**. The toggle turns blue.
4. Enter the appropriate **IP Address, Subnet Mask, Default Gateway**, and **Name Server**.

4.6.4 Connecting with USB

Use a USB A-to-B cable for connecting a computer directly to the machine.

To connect with USB:

1. Plug one end of the USB cable into the USB port on the back of the unit.
2. Connect the other end of the USB cable to a computer's USB port.

4.7 Updating firmware

Formlabs regularly releases updated firmware to fix bugs and improve functionality. Download the latest firmware version for your Formlabs device with PreForm, then upload and install the firmware file on the machine. Review the firmware downloads and release notes to learn more about the improvements that come with each version's release.

To update the firmware via PreForm:

1. Open PreForm.
2. Connect the machine to the computer via USB or connect the device to an Ethernet network.
3. Click **File > Devices**. The **Device List** window opens.
4. Click the machine's serial name. The **Device Details** window opens.
5. Click **Update** in the upper-right corner of the **Device Details** window. The **Firmware Update** window opens.
6. Follow the on-screen instructions to download the latest firmware and then upload the file to the machine. To upload firmware, the device must be connected to the computer via USB or the machine must be connected to an Ethernet network.
7. The machine may automatically recognize that you have sent a firmware update. Tap **Continue** on the touchscreen to finish the installation.
8. If you are not prompted to **Continue**, continue the firmware update manually. Tap **Settings > System > Firmware Update**.
9. After the firmware update installs, confirm the system restart on the touchscreen or wait 30 seconds for an automatic restart.

4.8 Transporting the machine

For detailed guidance and visual assistance, visit **support.formlabs.com**.

Refer to section **4.3.1 Receiving** for product weight and dimensions. Keep the packaging for

transportation or shipping.

The complete packaging kit consists of:

• one (1) pallet, wood and foam	• one (1) inner C-fold, cardboard
• four (4) tie down brackets, steel	• one (1) outer C-fold, cardboard
• twelve (12) M6 × 45 mm lag bolts	• one (1) topper, cardboard
• one (1) protective bag, plastic	• two (2) lifting straps

4.8.1 Preparing for transportation

Before repackaging, vacuum the workspace and empty the hoppers. Remove the powder cartridge, parts bin, surface grate, tool shelf, build chamber, power catch, and all tools.

CAUTION

The Fuse Sift is a heavy object. A two person lift is required to prevent injury and avoid damage to the machine.

NOTICE

Do not ship the machine with the powder cartridge inserted in the drawer or mixer. Powder left inside the machine can leak during transit, which may lead to additional fees or void the warranty.

To prepare the machine for transport:

1. Vacuum the Fuse Sift's workspace and the hoppers.
2. Open the hoppers. Scoop all powder out of the hoppers using a clean, dry scoop. The powder can be reintroduced into your powder stream by running it through the sifter on the Fuse Sift.

NOTICE

Powder that comes into contact with fibers or other contaminants (e.g., in a vacuum cleaner) cannot be filtered and should be disposed of.

3. Remove the powder cartridge from the cartridge drawer or mixer.
4. Remove the parts bin and surface grate.
5. Remove and empty the powder catch.
6. Remove all tools from the tool shelf and uninstall the tool shelf.
7. Unplug the vacuum hose from the port on the inside-left wall of the machine.
8. Remove the build chamber port cover and powder catch from the build chamber enclosure.
9. Flip the breaker switch on the back of the unit to the **OFF** position to turn off the machine.
10. Unplug all cables (power, Ethernet, and USB) from the back of the unit.

4.8.2 Packaging

Thoroughly read and follow the instructions to properly package the machine. Skipping any of the following steps may result in shipping damage and void the warranty.

To package the machine:

1. Loop both orange lifting straps under the machine from left-to-right, ensuring that the straps are not crossed. With one person on each side, insert your forearms into each loop so they do not go past your elbows.
2. With your back straight and knees slightly bent, brace against the unit with your palms as

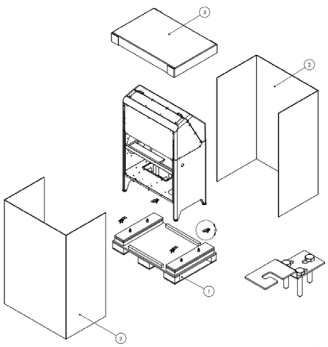
you and a second person lift the machine up.

3. Lift the machine onto the pallet using the lifting straps, aligning the unit's feet with the black markings. Each person should push at an upward angle when lifting to keep the machine steady and level.

CAUTION

The Fuse Sift is a heavy object. Use appropriate precautions and correct lifting form when moving the machine.

4. Remove the lifting straps.
5. Turn the turnbuckles to release the filter mesh and insert the bottom foam ring.
6. Place the filter mesh back inside the cavity and turn the turnbuckles to reinstall.
7. Place the top foam ring on top of the sifter mesh.
8. Wrap the hood with stretch wrap at least four times, sealing the hood closed.
9. Wrap the cartridge drawer with stretch wrap at least four times, securing the drawer in place.
10. Place the included protective bag over the machine.
11. Extend the unit's feet by unscrewing them from the leg until there is a gap of approximately 13 mm (0.5 in) between the top of each foot and the bottom of its respective leg.
12. Orient the tie down brackets facing diagonally inwards, hooking the brackets around the unit's feet bolts.
13. Secure the machine to the pallet using the included M6 × 45 mm lag bolts.
14. Encase the front and the back of the machine with a C-fold segment (2), respectively.
15. Place the topper (3) on top of the C-fold segments.
16. Wrap a nylon binding strap (commercially available) horizontally around the C-folds. Position the strap approximately 50 cm (20 in) up from the bottom of the C-fold. Tighten and crimp the strap.
17. Loop two nylon binding straps vertically around the machine, passing them underneath the pallet. Position the two straps approximately 25 cm (10 in) from the left and right sides of the machine, respectively. Tighten and crimp the straps.



5 Recovering powder and filling powder cartridges

Use appropriate personal protective equipment when handling loose or unsintered powder. Wear non-reactive nitrile gloves and safety glasses. Wear a respirator (N95 or better) if the occupational threshold limit value for airborne particle concentration has been exceeded, if you are sensitive to dust or pollen, or you are concerned about your respiratory health. Refer to section **3.2 Personal protective equipment (PPE)** for additional information. Handle loose or unsintered powder only with adequate ventilation. Avoid breathing mist/vapor/spray/dust. Do not eat, drink, smoke, or use personal products when handling powder. Avoid contact with skin, eyes and clothing.

5.1 Operational environment

The operating temperature for the Fuse Sift is 18–26 °C (64–80 °F), with low ambient humidity. For optimal post-processing, and particularly for recovering powder, do not exceed these limits. When printing with Nylon 12, keep the relative humidity of the environment around the printer, the Fuse Sift 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. If 50% RH cannot be achieved, remove the debris catcher at the bottom of the printer's hopper (though this will remove protection against debris entering the print chamber). For SLS powders, humidity affects shelf life significantly. For optimal results, follow Formlabs guidelines for storing and handling powder.

5.2 Cooling a print

For detailed guidance and visual assistance, visit **support.formlabs.com**.

After printing, parts need to cool in the Fuse 1's print enclosure before being moved into the Fuse Sift to alleviate thermal stresses so your final geometry can be achieved. The Fuse 1 automatically starts cooling parts after printing completes, and indicates the recommended time a print should remain inside the print enclosure. This is indicated by an on-screen notification, as well as the status card in the top-right of the **Home** screen.

The Fuse 1's print enclosure is designed to operate at up to 200 °C (392 °F), and incorporates high-intensity heaters. Do not open the print enclosure or any other access doors on the Fuse 1 during or immediately after a print. Do not handle parts from a build chamber without allowing the entire print enclosure to cool for several hours, or until the print bed temperature has reached ≤ 100 °C (212 °F). Use the provided thermal-insulating silicone gloves when handling a hot build chamber. Failure to follow these procedures will result in serious injuries, including burning and/or scalding of skin.

A full build chamber or a build chamber with many printed parts will be heavy. Use

appropriate precautions and correct lifting form when moving the build chamber.

5.2.1 Cooling the build chamber in the Fuse 1

After a print has completed, a message on the touchscreen displays the recommended cooling time required for each print. All prints are subject to a subsequent cooling phase that allows parts to steadily cool down to 100 °C (212 °F). Removing a build chamber from the printer before parts have completed their initial cooling may result in warpage and deformation.

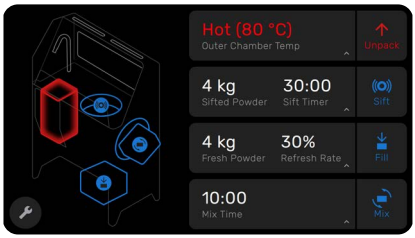
To cool the build chamber in the Fuse 1:

1. Check the estimated cooling time on the touchscreen or on Dashboard. Allow the print to remain inside the printer until the estimated time has elapsed.
2. Once a print has completed the in-printer cooling, open the print enclosure door.
3. Unplug the build chamber plug from the printer and stow it in the plug holster on the build chamber.
4. Use the silicone gloves to remove the build chamber from the print enclosure and load it into the Fuse Sift.
5. Connect the build chamber plug to the Fuse Sift. The touchscreen displays the build chamber status.
6. Close the build chamber latch on the Fuse Sift.

5.2.2 Cooling the build chamber in the Fuse Sift

After a print has completed, leave the build chamber in the printer until the internal temperature has fallen below 100 °C (212 °F). At that point, the build chamber can be safely transferred to Fuse Sift to finish cooling. Removing a build chamber from the printer before parts have completed their initial cooling may result in warpage and deformation.

To cool the build chamber in the Fuse Sift:



1. Check the status of the build chamber on the touchscreen. If the build chamber graphic and icon are highlighted red and the touchscreen displays the status **Hot**, allow the build chamber to continue cooling before ejecting the cake.
2. When the touchscreen displays the status **Ready**, it is safe to recover and process your printed parts.
3. Open the print enclosure door on the printer.
4. Open the build chamber latch on the printer and Fuse Sift.
5. Unplug the build chamber plug from the printer and stow it in the plug holster on the build chamber.
6. Use the silicone gloves to remove the build chamber from the print enclosure and load it into the Fuse Sift.

5.2.3 Cooling a build chamber outside of the Fuse 1 or Fuse Sift

If you are unable to cool the build chamber in the Fuse 1 or Fuse Sift, you can allow the build chamber to cool in the ambient air.

To cool a build chamber outside of the Fuse 1 or Fuse Sift:

1. When the build chamber temperature has fallen below 100 °C (212 °F), open the Fuse 1's print enclosure door.
2. Remove the build chamber from the printer. Hold the build chamber by the coated handle. Avoid coming into contact with the bare metal of the build chamber.
3. Place the build chamber on a heat proof surface in a safe location.
4. Allow the build chamber to cool for 30–50% of the original print time.
5. Insert the build chamber into the Fuse Sift and begin the part recovery process.

5.3 Unpacking a powder cake

For detailed guidance and visual assistance, visit **support.formlabs.com**.

Once the build chamber has fully cooled, raise the powder cake out of the build chamber using the Fuse Sift.

WARNING

If the build chamber graphic and icon are highlighted red and the touchscreen displays the status **Hot**, allow the build chamber to continue cooling before ejecting the cake.

To unpack a cake:

1. Insert the build chamber into the Fuse Sift and close the build chamber latch.
2. Connect the build chamber plug to the Fuse Sift.
3. Check the build chamber status on the touchscreen. When the touchscreen displays the status **Ready**, push the **Light** button on the control panel. This turns on the light and vents the workspace.
4. On the touchscreen, tap Unpack to lift the print bed and eject the cake.

5.4 Extracting parts:

For detailed guidance and visual assistance, visit **support.formlabs.com**.

After lifting the powder cake out of the build chamber with the Fuse Sift, extract your printed parts from the powder cake.

To extract parts:

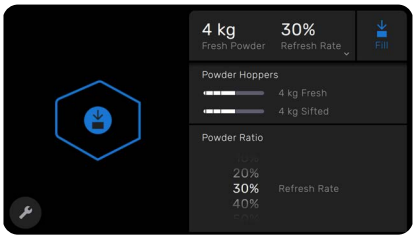
1. Move the majority of the cake to the center of the workspace, then tap **Sift** on the touchscreen or push the **Sift** button on the control panel. This vibrates the workspace, causing loose powder to fall through the grate and into the sifter mesh below, then ultimately into the used powder hopper.
2. While recovering powder, use nylon wire brushes to remove remaining powder. Brush the loose powder into the grate to reclaim as

much powder as possible.

3. Remove clean parts from the workspace. Move as much of the remaining powder as possible into the grate using the nylon wire brushes.
4. Turn on the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.
5. Lift the hood for easier access. Vacuum the loose powder inside the workspace and under the hood.
6. Vacuum any remaining powder on the print bed and the surrounding port. The print bed and build chamber must be free of all powder before beginning the next print.
7. Turn off the vacuum by pushing the Vac button on the control panel or by tapping the vacuum hose icon on the touchscreen.

5.5 Filling a powder cartridge

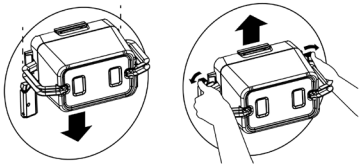
For detailed guidance and visual assistance, visit **support.formlabs.com**.



The Fuse Sift is used to store and eventually fill powder cartridges, which are used to refill the printer's hopper as needed. Used powder captured by the Fuse Sift can be recycled with new powder for future prints. Each powder cartridge holds 3 kg (6.6 lb) of powder. The hopper can hold 9 kg (19.8 lb) of powder, or three full powder cartridges.

To fill a powder cartridge:

1. Open the cartridge drawer at the bottom of the Fuse Sift and insert an empty cartridge.
2. Ensure that the cartridge valve is open and the knife handle is facing the front of the Fuse Sift.
3. Slide the cartridge drawer into the Fuse Sift.
4. Check that the **Refresh Rate** is set to your desired ratio, then tap **Fill** on the touchscreen.
5. The Fuse Sift fills the cartridge with powder and runs its vacuum to capture loose powder. This completes after about one minute.
6. Open the cartridge drawer, close the cartridge valve, and remove the cartridge.



- Ensure that the valve knife is fully pushed into the cartridge before removing it from the drawer, otherwise powder may leak out during mixing.

7. Slide the cartridge onto the mixer on the right side of the Fuse Sift until the locking tabs click into place around the cartridge.

Mixing powder cartridges poses entanglement and pinch hazards. Keep hands, loose clothing and cables away from the mixer while running.

8. On the touchscreen, tap **Mix** to begin mixing. A clock begins counting down the time remaining.

9. Once mixing is complete, eject the cartridge. Pry the two blue tabs outward with your thumbs, then lift the cartridge up by the handles.

5.6 Managing the machine

For detailed guidance and visual assistance, visit **support.formlabs.com**.

During and between recovering powder, you can track your Fuse Sift's usage, and prepare for future powder recovery.

5.6.1 Registering on Dashboard

Dashboard (**formlabs.com/dashboard**) allows individuals and teams to remotely monitor Formlabs devices, track material usage, and explore past and future Formlabs purchases. Register your Formlabs SLS printers to Dashboard through the touchscreen and use the reported metrics to plan or schedule your usage of the Fuse Sift.

5.6.2 Turning off

The Fuse Sift is designed to remain powered on when not in use. Flip the breaker switch on the back of the unit to the **OFF** position to turn off the machine completely and conserve power. When moving or storing the machine, unplug the unit from its power source in addition to flipping the breaker switch.

6 Maintenance

To maintain the most efficient and long-lasting machine, ensure regular conservation. Formlabs provides instructions to advise in installing, operating, and maintaining the machine. It shall only be maintained by a qualified and trained person. Unauthorized disassembly or repair procedures may damage the machine.

There are two groups of maintenance procedures: regular, which should be done after every print, and intermittent maintenance, which only needs to be done occasionally. Please keep a log detailing when each intermittent maintenance procedure was last performed.

DANGER

Tampering with, or disassembling the Fuse Sift prior to disconnecting the power cable and waiting approximately ten minutes can subject users to potentially fatal electrical hazards.

WARNING

Wear personal protective equipment (PPE) when performing maintenance tasks. Use tools only as described.

CAUTION

When removing the exterior paneling, disconnect the power cable before maintenance. Moving parts present crushing and tangling hazards.

NOTICE

Formlabs provides instructions to advise skilled and unskilled persons in installing, operating, and maintaining the Fuse Sift. The Fuse Sift shall only be maintained by a qualified and trained person.

- Do not open the Fuse Sift and/or investigate internal components unless under the guidance of Formlabs Support or a certified service provider. Contact Formlabs Support or a certified service provider for any additional guidance.
- Unauthorized disassembly or repair procedures may damage the machine and void the warranty.

6.1 Tools and supplies

Only use tools, chemicals, or procedures to maintain the Fuse Sift that are outlined in this manual, by prompts on the touchscreen, and on **support.formlabs.com**.

Do not use any tools, chemicals, or unapproved procedures with the Fuse Sift unless otherwise instructed to do so by Formlabs or a certified service provider.

- **Fresh powder**
  The raw printing material for the Fuse 1. Add fresh powder to the Fuse Sift to mix with recaptured powder in a powder cartridge. The level of available powder is indicated on the touchscreen.
- **Recaptured powder**
  Collected from previous prints and accumulates in a second hopper below the Fuse Sift's workspace. The level of available powder is indicated on the touchscreen.

- **Powder cartridge**
  Used to collect, mix, and transport unsintered powder from the Fuse Sift's hopper to the printer's hopper as needed.
- **Compliant vacuum that is grounded and bonded (e.g., Class II, Division 2 vacuum)**
  Used to regularly remove loose SLS powder from the Fuse 1's and Fuse Sift's workspace.
- **Vacuum tools**
  These include the crevice tool for removing powder from narrow or hard to reach corners of the Fuse Sift, as well as the brush tool.
- **2.5 mm Allen wrench or hex driver**
  Used to remove the screws holding the Fuse Sift's body paneling to the frame.

6.2 Inspection and maintenance

6.2.1 Before each use

Inspect	Refer to	Section
Installation environment	Operational environment	5.1
Sifter mesh	Inspecting the sifter mesh	6.3.1

6.2.2 Periodic maintenance

Inspect	Refer to	Section
Fresh powder level	Adding fresh powder to the Fuse Sift	6.4.1
Vent filter	Vacuuming the vent filter	6.4.2
Sifter mesh	Cleaning the sifter mesh	6.4.3
Powder cartridge	Maintaining the powder cartridge	6.4.4

6.2.3 Intermittent maintenance

Inspect	Refer to	Section
Doser assembly	Cleaning the doser assembly	6.5.1
Fresh powder hopper	Cleaning the fresh powder hopper	6.5.2
Used powder hopper	Cleaning the used powder hopper	6.5.3
Vent filter	Replacing the vent filter	6.5.4
Sifter mesh	Replacing the sifter mesh	6.5.5

6.3 Tasks between uses

Recovering sintered nylon powder mobilizes loose powder and byproducts of SLS printing such as off-gases and laurolactam, which collect onto Fuse Sift's sifter mesh and vent filter. In order to preserve the reliability of Fuse Sift, it is important to regularly inspect and clean affected components and assemblies.

6.3.1 Inspecting the sifter mesh

Clumps of powder can accumulate in the sifter's mesh screen below the grate, eventually preventing reclaimed powder from passing through to be collected.

To inspect the sifter mesh:

1. If the sifter is on, tap **Sift** on the touchscreen or push the **Sift** button on the control panel to turn off the sifter.
2. Lift the white grate up using the depression in the back-right corner of the workspace and set it aside.
3. Turn on the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.
4. Vacuum any debris, clumps, or loose powder from the sifter mesh. Be very careful not to damage the sifter mesh with the vacuum or vacuum hose.
5. Turn off the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.
6. Examine the sifter mesh for signs of clogging or stuck powder. If the sifter mesh needs additional cleaning, follow the instructions in section **6.4.4 Cleaning the sifter mesh**.
7. Reinsert the grate.

6.4 Periodic maintenance

The Fuse Sift requires regular maintenance and care. The standard cycle for the following procedures is every 10–20 hours of use.

Task	Frequency	Refer to	Section
Filling the fresh powder hopper	When there is insufficient powder in the fresh powder hopper to fill a powder cartridge at the selected refresh rate	Adding fresh powder to the Fuse Sift	6.4.1
Vacuuming the vent filter	After 10 hours of use	Vacuuming the vent filter	6.4.2
Cleaning the sifter mesh	After 20 hours of use	Cleaning the sifter mesh	6.4.3
Cleaning and maintaining the powder cartridge	After 50–100 prints, or if powder starts leaking, whichever comes first	Maintaining the powder cartridge	6.4.4

Do not use compressed air or an air gun to clean the Fuse Sift's vent, surface grate, build chamber enclosure, or any other component. Mobilizing loose powder increases the risk of unintentional inhalation or ingestion.

6.4.1 Adding fresh powder to the Fuse Sift

The Fuse Sift dispenses a mix of fresh and used powder into powder cartridges. Add fresh powder to the Fuse Sift whenever the fresh powder hopper runs low.

To add fresh powder to the machine:

1. Put on a new, clean pair of nitrile gloves.
2. Turn on the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.
3. Vacuum off the top of the fresh powder hopper lid (under the Fuse Sift's hood on the right side) so used powder cannot fall inside upon opening.
4. Turn off the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.
5. On the control panel, push the **Light** button to turn on the light and vent.
6. Open the fresh powder hopper lid.
7. Open a new package of powder.
8. Remove the container of powder, unscrew the lid and engage the spout with the rubber inlet, then pour it into the fresh powder hopper.
9. Close the fresh powder hopper lid.
10. Turn off the vent on the control panel.

6.4.2 Vacuuming the vent filter

During regular use, the vent filter becomes saturated with powder and needs to be cleaned. The vent filter should be cleaned after processing approximately ten prints.

To vacuum the vent filter:

1. Turn off the vent on the control panel.
2. Turn on the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.
3. Starting from the top and moving from left-to-right, vacuum powder out of the filter pleats. Note any loose powder that falls down into the workspace.
4. Move down and across until the entire vent filter has been covered, and loose powder stops falling out.
5. Vacuum the powder that fell into the workspace below the tool shelf.
6. Turn off the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.

6.4.3 Cleaning the sifter mesh

Clumps of powder can accumulate in the sifter's mesh screen below the grate, eventually preventing reclaimed powder from passing through to be collected.

To clean the sifter mesh:

1. If the sifter is on, tap **Sift** on the touchscreen or push the **Sift** button on the control panel to turn off the sifter.
2. Lift the grate up using the depression in the back-right corner of the workspace and set it aside.
3. Turn on the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.
4. Vacuum any debris, clumps, or loose powder from the sifter mesh. Be very careful not to damage the sifter mesh with the vacuum or vacuum hose.
5. Turn off the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.
6. Turn the turnbuckles to release the sifter mesh.

7. Remove the sifter mesh.
8. Hold the sifter mesh over a trash can or other receptacle and brush vigorously with a brush to remove stuck powder. Be very careful not to damage the sifter mesh with the brush.
9. Place the sifter mesh back within the Fuse Sift and refasten all the turnbuckles.
10. Place the sifter grate back over the sifter mesh.

6.4.4 Maintaining the powder cartridge

During regular use, the powder cartridge becomes saturated with powder and needs to be cleaned. The powder cartridge should be cleaned after processing approximately 50–100 prints, or if powder starts leaking, whichever comes first.

To maintain the powder cartridge:

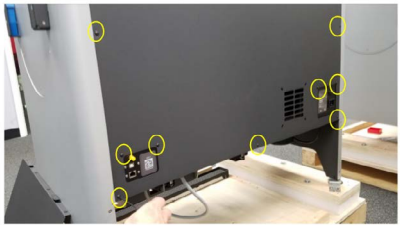
1. Open the cartridge valve.
2. Attach the vacuum crevice tool to the vacuum hose in the Fuse Sift.
3. Wedge the vacuum crevice tool under the middle-left of the valve knife.
4. Turn on the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.
5. Hold the vacuum crevice tool in place for approximately one minute.
6. Move the vacuum crevice tool to the middle-right of the valve knife and hold in place for approximately one minute.
7. Move the vacuum crevice tool to the far right of the valve knife and hold in place for approximately 30 seconds.
8. Move the vacuum crevice tool to the far left of the valve knife and hold in place for approximately 30 seconds.
9. Remove the vacuum crevice tool from underneath the valve knife and close the cartridge valve.
10. Turn off the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.

6.5 Intermittent maintenance

Task	Frequency	Refer to	Section
Cleaning the powder dosing assembly	After 100 powder cartridges filled	Cleaning the doser assembly	6.5.1
Cleaning the fresh powder hopper	As needed, if you suspect powder contamination or are transporting the Fuse Sift	Cleaning the fresh powder hopper	6.5.2
Cleaning the used powder hopper	As needed, if you suspect powder contamination or are transporting the Fuse Sift	Cleaning the used powder hopper	6.5.3
Replacing the vent filter	After 50 hours of use	Replacing the vent filter	6.5.4
Replacing the sifter mesh	After 200 hours of use	Replacing the sifter mesh	6.5.5

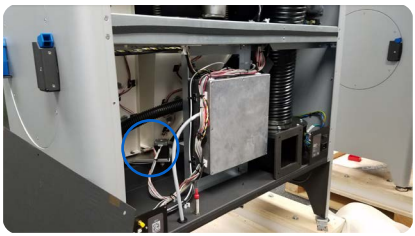
6.5.1 Cleaning the doser assembly

During regular use, powder collects around and in the powder dosing assembly. This can cause the doser gear to jam or slip, followed by an error message on the touchscreen. The powder doser assembly should be cleaned after completing approximately 100 powder cartridge fillings, or if cartridge filling is repeatedly interrupted by doser jamming errors.



To clean the doser assembly:

1. Turn off the machine by flipping the breaker switch on the back of the unit to **OFF**. Unplug the power cable from the Fuse Sift.
2. Disconnect the vacuum's hose and power cable from the Fuse Sift, then plug the vacuum directly into a mains power outlet.
3. Remove the nine cap screws holding the rear panel in place with a 2.5 mm Allen wrench or hex driver. Set the rear panel aside.
4. Locate the doser assembly. When facing the back of the Fuse Sift, the doser assembly is located toward the left, below the two powder hoppers.



5. Turn on the vacuum. Clean up any powder that has settled on top of, next to, and behind the doser assembly. Be very careful not to damage or dislodge the doser motor cable or doser encoder cable while cleaning. Use the vacuum's brush attachment to clean up the larger powder deposits. Use the vacuum's crevice tool to access the gap between the base of the doser assembly and the hoppers.
6. Turn off the vacuum and unplug it from the mains power outlet.
7. Reinstall the Fuse Sift's rear panel and secure it with the nine cap screws.
8. Reconnect the vacuum hose and power cable to their respective side ports on the Fuse Sift, then set the vacuum's breaker switch to the **ON** position.
9. Connect the Fuse Sift to power. Turn on the machine by flipping the breaker switch on the back of the unit to **ON**.

6.5.2 Cleaning the fresh powder hopper

When transporting the Fuse Sift, performing certain maintenance tasks, or if you suspect that your powder is contaminated with fibers or other debris, you may need to empty and clean the fresh powder hopper.

To clean the fresh powder hopper:

1. If there is clean powder in the hopper that you plan to reuse, empty the hopper by dosing powder with a 100% refresh rate into one or more empty powder cartridges.
2. Turn on the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.
3. Vacuum any debris, clumps, or loose powder on top of the fresh powder hopper lid.
4. Remove the screws holding the fresh powder hopper lid in place using a 2.5 mm Allen wrench or hex driver. Remove the lid.
5. Vacuum out any remaining powder from the fresh powder hopper.
6. Turn off the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.
7. Reinstall the fresh powder hopper lid and fasten it in place with the six 2.5 mm hex screws.

6.5.3 Cleaning the used powder hopper

When transporting the Fuse Sift, performing certain maintenance tasks, or if you suspect that your powder is contaminated with fibers or other debris, you may need to empty and clean the used powder hopper.

To clean the used powder hopper:

1. If there is clean powder in the hopper that you plan to reuse, empty the hopper by dosing powder with a 0% refresh rate into one or more empty powder cartridges.
2. If the sifter is on, tap **Sift** on the touchscreen or push the **Sift** button on the control panel to turn off the sifter.
3. Lift the grate up using the depression in the back-right corner of the workspace and set it aside.
4. Turn on the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.
5. Vacuum any debris, clumps, or loose powder from the sifter mesh. Be very careful not to damage the sifter mesh with the vacuum or vacuum hose.
6. Turn the turnbuckles to release the sifter mesh.
7. Remove the sifter mesh.
8. Vacuum out any remaining powder from the used powder hopper.
9. Turn off the vacuum by pushing the **Vac** button on the control panel or by tapping the vacuum hose icon on the touchscreen.
10. Place the sifter mesh back within the Fuse Sift and refasten all the turnbuckles.
11. Place the sifter grate back over the sifter mesh.

6.5.4 Replacing the vent filter

After extended use, the filter behind the vent becomes clogged with powder and cannot be adequately cleaned. Formlabs recommends replacing the vent filter after every 50 hours of use.

To remove and replace the vent filter:

1. Turn off the vent on the control panel.
2. Unscrew and remove the six thumb screws that hold the filter grate in place.
3. Pull out the filter grate that sits above and around the filter.
4. Pull out and remove the filter that sits behind the grate.
5. Dispose of the filter according to your local environmental regulations.

6. Insert a new filter with the gasket pressed against the sheet metal receiver.
7. Place the filter grate back in place above and around the filter, then tighten the six thumb screws until hand tight.

6.5.5 Replacing the sifter mesh

Clumps of nylon can accumulate in the mesh screen below the collection grate, eventually preventing reclaimed powder from passing through to be collected. Formlabs recommends replacing the sifter mesh after every 200 hours of use.

To remove and replace the sifter mesh:

1. Remove the collection grate to gain access to the sifter mesh beneath.
2. Turn the turnbuckles to release the sifter mesh.
3. Place the new sifter mesh within the Fuse Sift and refasten all the turnbuckles.
4. Place the sifter grate back over the sifter mesh.

7 Troubleshooting

For detailed guidance and visual assistance, visit **support.formlabs.com**.

7.1 Collecting diagnostic logs

The Fuse Sift maintains diagnostic logs to provide detailed information about the machine that may expedite issue investigation. After experiencing any error or unusual behavior on the Fuse Sift, include the diagnostic logs with other relevant observations and details when contacting Formlabs Support or a certified service provider. The options for sharing diagnostic logs vary depending on the machine's connection type.

7.2 Performing a factory reset

NOTICE

Do not perform a factory reset immediately before contacting Formlabs Support or a certified service provider. The stored diagnostic information may be helpful to Formlabs Support or a certified service provider to assist with troubleshooting. A factory reset erases diagnostic information, custom settings, and networked connections.

7.3 Troubleshooting errors or abnormal activity

In the case of an error or abnormal activity with the Fuse Sift, reference the following errors, causes, and proposed solutions. Complete the initial troubleshooting steps and carefully document all results. Contact Formlabs Support or a certified service provider for additional guidance. Provide diagnostic logs if requested.

7.3.1 Resolving abnormal functions and errors

Error	Cause	Solution
Unresponsive machine The Fuse Sift does not turn on.	• The power cable is disconnected • The breaker switch on the machine is set to **OFF**	1. Check whether the circuit has power, and that the power cable is securely connected to the outlet. 2. Check whether the breaker switch on the back of the unit is in the **ON** position. If the machine still does not turn on, contact Formlabs Support or a certified service provider for additional guidance.
Unresponsive touchscreen or control panel Controls on the touchscreen or control panel do not respond to input.	• One-off firmware glitch • Loose connection with the touchscreen	1. Power cycle the machine by flipping the breaker switch on the back of the unit to **OFF** and then **ON**. 2. Check whether the machine is running the latest firmware and update the firmware if needed. If the touchscreen repeatedly stops responding after trying these steps, contact Formlabs Support or a certified service provider for additional guidance.

Error	Cause	Solution
Unresponsive vacuum The vacuum does not turn on when using the control panel.	• The breaker switch on the vacuum is set to **OFF** • The vacuum is not connected to the machine	1. Check whether the breaker switch on the vacuum is in the **ON** position. 2. Check whether the vacuum hose is attached to the port on the side of the machine.
Unresponsive vent fan The vent fan does not turn on.	• The vent filter is not installed correctly • One of the vent filter occupancy switches is not being triggered	1. Remove the vent filter. 2. Reinsert the vent filter.
Error message Used Hopper Full	Too much powder has accumulated in the used powder hopper, preventing the sifter from running.	1. Run at least one cartridge filling operation at a 0% refresh rate. 2. Deposit the excess used powder into a large container with a lid. Do not dispose of excess unsintered used powder in general or recycling waste streams.
Error message Bad Cartridge Weight Error: The Cartridge weight is not reasonable	A powder cartridge inserted into the drawer either weighs too much or too little to be accurately filled.	1. Check whether the powder cartridge is completely empty before loading it into the cartridge drawer. 2. Clean out any powder that has collected in the cartridge drawer itself. 3. After confirming both the powder cartridge and cartridge drawer are clean, tare the cartridge drawer scale. Tap the wrench icon on the touchscreen. The **Settings** screen appears. Tap **Maintenance > Tare Fill Scales > Tare.** 4. Place the powder cartridge in the cartridge drawer and try filling the cartridge again.
Error message Mixer Error Mixer stops running after a few minutes with an error message on the touchscreen.	The mixer is blocked by an obstruction. The drive belt or pulley for the mixer is loose or misaligned.	Check the mixer for obstructions. If the error persists, contact Formlabs Support or a certified service provider for additional guidance.

8 Disassembly and repair

WARNING

All steps that involve opening the machine and/or investigating internal components should be done by skilled persons under the guidance of Formlabs Support or a certified service provider. Any damage resulting from attempting disassembly and/or repair without prior authorization from Formlabs Support or a certified service provider is not covered by warranty.

8.1 Tasks

Contact Formlabs Support or a certified service provider to receive repair instructions and authorization, including how to disassemble or remove the exterior paneling.

Task	Frequency
Replacing the doser gear	When advised by Formlabs Support or a certified service provider
Servicing the mixer assembly	When advised by Formlabs Support or a certified service provider

Any maintenance or repair not listed in section 6 Maintenance requires servicing the machine. Contact Formlabs Support or a certified service provider to request in-field service or an RMA (short for “return to manufacturer authorization”).

9 Recycling and disposal

9.1 Disposal of powder

9.1.1 Unsintered powder

Unsintered used SLS powder must be disposed of in accordance with applicable ordinances and environmental regulations for plastic waste. Particular caution must be taken with powdered plastic, as it is a microplastic and poses severe environmental repercussions.

Unsintered SLS powder is classified as a microplastic, a group of plastics that are hazardous to aquatic life. Do not dispose of unsintered used powder into drains or household waste streams. Safe and appropriate disposal methods of unsintered used powder vary by location. Consult the safety data sheet (SDS) from the powder supplier as the primary source of information to understand safe disposal of unsintered material.

9.1.2 Sintered powder or cleaned parts

Discard cleaned parts and sintered powder with household items as trash. Cleaned parts and sintered powder cannot be recycled.

9.2 Recycling of powder

9.2.1 Unsintered powder

Unsintered used SLS powder can be recaptured using the Fuse Sift for use in future prints. The Fuse 1 can print with up to 70% recycled powder.

Formlabs does not operate a recycling program.

9.2.2 Sintered powder or cleaned parts

Discard cleaned parts and sintered powder with household items as trash. Cleaned parts and sintered powder cannot be recycled.

9.3 Disposal of electronic components

The symbol on the product, the accessories, or packaging indicates that this device shall not be treated as nor disposed of with household waste. When you decide to dispose of this product, do so in accordance with local environmental laws and guidelines. Dispose of the device via a collection point for the recycling of waste of electrical and electronic equipment. By disposing of the device in the proper manner, you help avoid possible hazards for the environment and public health that could otherwise be caused by improper treatment of waste equipment. The recycling of materials contributes to the conservation of natural resources. Therefore do not dispose of your old electrical and electronic equipment with the unsorted municipal waste.

9.4 Disposal of packaging waste

The packaging is made of cardboard and plastic-based materials. Dispose of packaging through waste and recycling facilities. By disposing of the packaging waste in the proper manner, you help avoid possible hazards for the environment and public health.

The original packaging is designed to be kept and reused for transporting or shipping the machine for service. Save the complete packaging including any inserts for your convenience.

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10 Glossary

Term	Meaning
Build chamber	An interchangeable component of the Fuse 1 that contains the print bed, heaters, and temperature sensors, and encapsulates the sintered parts and loose powder from a print. The accompanying plug allows the Fuse Sift and the Fuse 1 to monitor the build chamber, and differentiate one build chamber from another.
Build chamber enclosure	The area in the Fuse Sift for housing the build chamber with prints ready to be ejected.
Build chamber port cover	A removable plate that prevents airflow through the bed port in the workspace and keeps powder, printed parts, and tools from falling into the build chamber enclosure.
Build volume	The total cubic dimensions in which 3D models can be printed. The Fuse 1 has a build volume of 16.5 × 16.5 × 30.0 cm (6.5 × 6.5 × 11.8 in).
Cake	The final product of a print, containing both loose unsintered SLS powder and the printed part.
Cartridge drawer	The cartridge drawer holds a powder cartridge to be filled with powder from the Fuse Sift. Sensors in the cartridge drawer ensure that the powder cartridge is filled to the proper level.
Cartridge valve	The primary opening for filling and depositing powder. The cartridge valve is opened and closed via the valve knife.
Hood	A transparent covering that prevents powder and debris from leaving the Fuse Sift's workspace.
Hopper	A fixed container that holds powder in a tapered basin for dispensing into a powder cartridge. The Fuse Sift has two hoppers: one for fresh, unused powder, and one for unsintered powder recovered from previous prints.
Laurolactam	An organic compound used as a monomer to produce nylon. It is also a byproduct of SLS nylon printing.
Micron (µm)	An SI derived unit of length equalling $1{\times}10^{-6}$ meter, or one millionth of a meter (or one thousandth of a millimeter, 0.001 mm, or about 0.000039 inch).
Mixer	The mixer spins a filled powder cartridge to ensure a homogeneous distribution of fresh and used powder.
Nylon	An industrial thermoplastic that bends before returning to its original form without fracturing, making it suitable for structural, load bearing, or mechanical parts.
Personal protective equipment (PPE)	Garments or articles of clothing designed to protect individuals from physical, electrical, heat, chemicals, biohazards, and airborne particulate matter.
Plume	A localized emission of pulverized material.
Powder cartridge	The container in which SLS powder is mixed and transported to from the Fuse Sift to the printer's hopper.

Term	Meaning
Powder catch	The powder catch at the bottom of the build chamber enclosure is a removable tray for catching loose powder.
PreForm	Formlabs' print preparation software that uses advanced, proprietary calculations to generate support structures and optimize print settings for each model.
Print bed	An aluminum plate onto which powdered nylon is deposited in 110 micron layers and sintered to form 3D parts.
Selective Laser Sintering (SLS)	An additive manufacturing process that uses a high-powered laser to sinter uniform beads of plastic together, drawing out individual 2D layers (or slices) that eventually form a 3D part.
Sifter	The sifter agitates and breaks up clumps of unsintered powder from previous prints before it is recaptured for reuse.
Sifter mesh	A fine sieve mesh that sifts unsintered powder before it is recaptured in the used powder hopper.
Surface armor	A print process component of the Fuse 1 that surrounds parts with a semi-sintered shell of material to alleviate thermal inconsistencies which may adversely affect the accuracy of a part.
Surface grate	A protective grate that prevents large objects from falling into and damaging the sifter mesh. Clumps of unsintered powder pass through the surface grate before being separated by the sifter mesh.
Vacuum	An external vacuum connects to the Fuse Sift for cleaning the Fuse 1 and Fuse Sift after use.
Valve knife	The valve knife is a flat plate used to close off and open the cartridge valve.
Vent	The vent in the back of the Fuse Sift workspace collects pluming powder, preventing it from escaping the unit.

11 Product compliance

The Fuse Sift complies with the following machinery, electromagnetic, and waste safety standards:

European Machinery Directive 2006/42/EC

- A-Type Standards: EN ISO 12100:2010
- B-Type Standards: EN 60204-1:2018
- C-Type Standards: None

Electromagnetic Compatibility (2014/30/EU)

- IEC 61000-6-2
- IEC 61000-6-4

Chemicals and waste

- Restriction of Hazardous Substances Directive (2011/65/EU)
- (EC) No 1907/2006 Chemical Substances (REACH) Regulation

ADDITIVE X

formlabs PLATINUM PARTNER