HP Jet Fusion 3D Powder Handling Automation Solution

Product Documentation

User Guide

SUMMARY

How to use your product.

About this edition

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Legal notices

The information contained herein is subject to change without notice.

The only warranties for HP products and services are set forth in the express warranty statement accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Safety notice

Read and follow the operating and safety instructions before turning on the equipment.

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1 Welcome to your HP Jet Fusion 3D Powder Handling Automation Solution

Your HP Jet Fusion 3D Powder Handling Automation Solution consists of:

- HP Jet Fusion 3D Loading System
- HP Jet Fusion 3D Extraction System
- Two HP Jet Fusion 3D Mini Depositories
- HP Jet Fusion 3D Operator Station
- HP Jet Fusion 3D Homogenizer (accessory)
- HP Jet Fusion 3D Depository (accessory)
- HP Jet Fusion 5200 Series 3D Automatic Unpacking System (accessory)

Documentation

Full documentation is available for your product.

The following documents are available:

- Site preparation guide
- Introductory information
- User guide (this document)
- Legal information
- Limited warranty

You can download the documentation from the HP website at:
http://www.hp.com/go/jetfusion3Dpowderhandlingautomationsolution/manuals/

Further information is available from:
http://www.hp.com/go/jetfusion3Dpowderhandlingautomationsolution/support/

The information in this guide is subject to change with new firmware versions. See additional documents and fliers for updated information. For further clarification, contact your service representative.

Product usage requirements

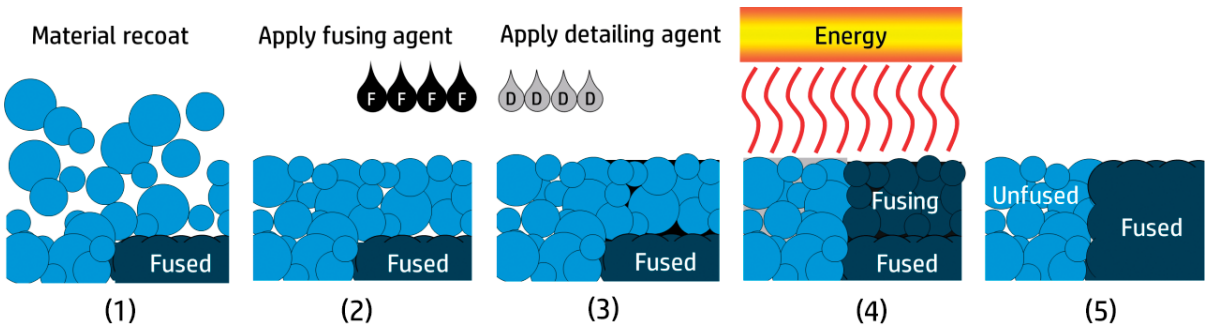
The products, services, and consumables are provided subject to various conditions.

- The customer agrees to use only HP 3D High Reusability PA12 consumables and HP 3D High Reusability PA12-certified powders in the HP product, and understands that use of any consumables other than HP consumables may cause serious product functionality and/or safety issues, including, but not limited to those outlined in the user guide. The customer agrees not to use the product and/or consumables for uses not permitted by US, EU, and/or other applicable law.
- The customer agrees not to use the product and/or consumables for the development, design, manufacture, or production of nuclear weapons, missiles, chemical or biological weapons, and/or explosives of any kind.
- The customer agrees to comply with the connectivity requirement outlined below.
- The customer may use firmware embedded in the product only to enable the product to function in accordance with its published specifications.
- The customer agrees to comply with the user guide.
- Products, services, and/or technical data provided under these terms are for the customer's internal use and not intended for further resale.

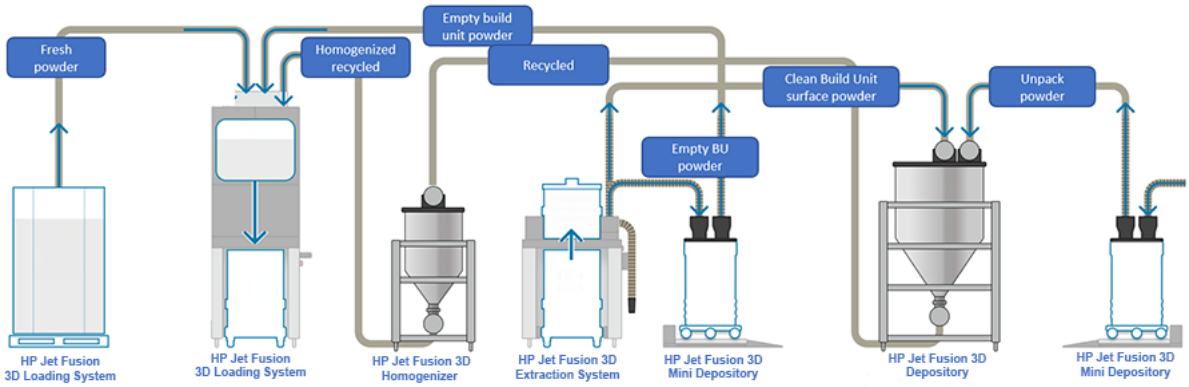
HP Multi Jet Fusion process

HP Multi Jet Fusion technology offers speed advantages and control over part and material properties beyond those found in other 3D printing processes.

HP Multi Jet Fusion technology starts by laying down a thin layer of material in the working area. Next, the carriage containing an HP Thermal Inkjet array passes from left to right, printing chemical agents across the full working area. The layering and energy processes are combined in a continuous pass of the second carriage from top to bottom. The process continues, layer-by-layer, until a complete part is formed. At each layer, the carriages change direction for optimum productivity.



Usage recommendations



1. The mix for loading a build unit is prepared in the HP Jet Fusion 3D Loading System.
2. That mix can combine:
    a. Fresh powder coming from a bulk supply.
    b. Homogenized recycled coming from the HP Jet Fusion 3D Homogenizer.
    c. Pre-mixed powder that was not used from previous builds and was reclaimed in the extraction system.
    d. An additional manual source can also be connected in case we want to incorporate powder coming from another process, for example reclaimed powder from an air-blaster device.
3. After the powder is mixed in the desired proportion, it is loaded into a build unit.
4. After the build has been printed, the build can be extracted to a natural cooling unit in the HP Jet Fusion 3D Extraction System for cooling down.
5. Once the build has been extracted, and the natural cooling unit has been removed, the powder remaining on the build-unit surface can be cleaned. This cleaning operation will pneumatically transport the powder to the HP Jet Fusion 3D Depository.
6. If there is remaining unused powder inside the build unit, it can be reclaimed in the same extraction system, and stored in the HP Jet Fusion 3D Extraction System buffer for further use (see #2).
7. Recovered unpacked powder is stored in the HP Jet Fusion 3D Mini Depository.
8. The unpacked powder can be automatically transported to the HP Jet Fusion 3D Depository for storage.
9. Once we accumulate enough recycled powder, we can create a homogenized batch by transporting the desired amount to the HP Jet Fusion 3D Homogenizer. The homogenized batch will then be ready to use as a contributor in further mixes.

2 Safety precautions

Before using the equipment, read the safety precautions and operating instructions to make sure you can use it safely.

Customer operators must have successfully obtained the HP Operator Certification and Training to operate the equipment.

Introduction

Perform the recommended maintenance and cleaning tasks to ensure the correct and safe operation of the equipment.

You are expected to have the appropriate technical training and experience necessary to be aware of hazards to which you may be exposed in performing a task, and to take appropriate measures to minimize the risks to yourself and to others.

Operations must be supervised at all times.

The equipment is stationary, and should be located in a restricted-access area, for authorized personnel only.

General safety guidelines

Follow the advice at all times for your personal safety.

Turn off all equipment, using the branch circuit breakers located in the building's Power Distribution Unit (PDU), and call your service representative in any of the following cases:

- The electrical supply cable is damaged.
- The equipment has been damaged by an impact.
- Liquid has entered the equipment.
- The heating subsystem and enclosures are damaged, the glass is missing or broken, or the sealing is defective.
- There is smoke or an unusual smell coming from the equipment.
- The built-in Residual Current Circuit Breaker (Ground Fault Circuit Interrupter) has been repeatedly tripped.
- Fuses have blown.

- The equipment is not operating normally.
- There is any mechanical or enclosure damage.

Turn off the equipment using the branch circuit breakers in either of the following cases:

- During a thunderstorm.
- During a power failure.

Operate the equipment only within the specified ranges of operating temperature and humidity; see the site preparation guide.

The equipment should always be kept in the same environmental conditions.

Use HP-certified and HP-branded agents only. Do not use unauthorized third-party agents.

The area in which the equipment is installed should be free from liquid spillage and environmental condensation.

Users and operators must be trained for explosive atmospheres and associated hazards during cleaning and maintenance operations, according to local laws and company requirements.

Ensure that there is no condensation inside the equipment before turning it on.

Take special care with zones marked with warning labels.

Use HP-certified equipment and accessories only. The use of third-party equipment and accessories can cause safety risks, powder leakages, and malfunctions in the equipment; and may affect your system warranty.

In case of unexpected malfunction, anomaly, ESD (ElectroStatic Discharges), or electromagnetic interference, press the emergency stop button and disconnect the equipment. If the problem persists, contact your service representative.

Do not repair or replace any part of the equipment or attempt any servicing unless specifically recommended in the user-maintenance instructions or in published user-repair instructions that you understand and have the skills to carry out.

Do not attempt to repair, disassemble, or modify the equipment by yourself; and do not use any part other than original HP spare parts.

To repair or reinstall the equipment, please contact your nearest authorized service provider; otherwise, you may experience electric shock, fire, problems with the product, or injury.

⚠ **WARNING!** Do not repair or replace any part of the equipment or attempt any servicing unless specifically recommended in the user-maintenance instructions or in published user-repair instructions, that you understand and have the skills to carry out. It is EHS customer responsibility to ensure that personnel carrying out any “Shared-maintenance” task, repair or servicing on the equipment, has the adequate skills and trainings required by HP and also by local laws, regarding all hazards associated to each maintenance, repair or service. Otherwise, personnel may experience electric shock, serious injuries, generate a fire or cause problems in the equipment or a serious property loss. (Hazardous Voltage and Dust containment exposed areas require specific skills on Electricity and Risk of Explosion or requiring special ATEX/HazLoc working permit. (As a reference: It is recommended to follow the standard IEC 60079-17 - Explosive atmospheres - Part 17: Electrical installations inspection and maintenance).

Final parts/builds

The customer assumes all risk relating to or arising from the 3D printed parts.

The customer is solely responsible for the evaluation of and determination of the suitability and compliance with applicable regulations of the products and/or 3D printed parts for any use, especially for uses (including but not limited to medical/dental, food contact, automotive, heavy industry, and consumer products) that are regulated by US, EU, and other applicable governments.

Warning: Read before performing any maintenance, repair or servicing

Read this section thoroughly.

- Turn off and disconnect the equipment from the Power Distribution Unit (PDU) before beginning any maintenance, repair, or servicing.
- Ensure you are equipped with all necessary Personal Protective Equipment (PPE) and tools before starting any task.
- Perform a thorough cleaning of the area prior to maintenance, repair, or service. Refer to the user guide for specific cleaning instructions.
- Safely store covers and screws; avoid loss or damage.
- Handle all electrical/electronic components and wiring carefully, and store them in a secure place during the procedure.
- Protect electrical connectors and pneumatic fittings with appropriate end-caps when disconnected to prevent contamination by dust or material residue.
- Inspect seals in replaced parts for damage. Replace damaged seals with new ones according to specifications in the Service Manual before reassembly.
- Apply the required torque or fastening methods when assembling parts and components. Refer to detailed specifications in the Service Manual or the service kit.
- Reconnect any bonding that was disconnected during the task and ensure ground continuity after reassembly at the original connection point.
- Perform grounding checks after any task that involves disassembling grounding components. Follow User Guide instructions or ensure resistance measures below 0.1 Ω if specific parts are not listed.
- Perform functional safety checks after any task involving the disassembly of parts or wiring related to functional safety. Safety-related components:
  - Inputs: Emergency-stop buttons, rearm button, build unit presence sensors, HEPA filter presence, cleaning-tool presence sensors, NCU presence sensor
  - Logics: PLC CPU, PLC CRDs, manifold
  - Outputs: Relays, contactors, shut-off valves

- Always use the specified type and model of component/part when replacing any user-repair part. Pay special attention to component specifications, particularly for those involving hazardous voltage and ATEX /HazLoc hazards.
- Ensure that the following checks are performed after each maintenance, repair, or service intervention, especially when the intervention affects any safety-related aspect or area of the equipment mentioned below.

Grounding checks

Follow the instructions under the heading “Check the earthing” in the Maintenance chapter of the user guide, which provides a detailed and graphical explanation. If the specific part is not mentioned in the user guide, ensure the resistance measures below 0.1 ohms (Ω).

RCCB checks

Follow the instructions under the heading “Check residual current circuit breakers” in the Maintenance chapter of the User Guide.

Functional safety checks

Functional safety checks: Follow the checklist provided in the “Safety commissioning” document prepared by the EE team.

Wiring, flexible hoses, and pneumatic tubes separation checks

- Check 1: Ensure that external hazardous voltage cables (e.g., orange cables to motors and ultrasound cables) and non-hazardous voltage cables (e.g., sensors, pneumatic valves, communication cables) are separated by at least 50 mm if no barrier is provided.
- Check 2: Ensure that external electrical cables and flexible hoses/pneumatic circuit tubes are separated by at least 50 mm if no barrier is provided.

Mechanical protection (cables and interconnections)

- Check 3: Ensure that conductors are enclosed in suitable ducts or installed in cable trays or on supports.
- Check 4: Verify that adequate mechanical protection is provided for external cables and flexible hoses. They must be protected to reduce the risk of damage from being run over, excessive rubbing, exposure to impacts, or heat. Consider mechanical loads, the likelihood of crushing, impacts, etc.
- Check 5: Inspect the full routing of cables and flexible hoses to ensure they do not come into contact with sharp edges, burrs, rough surfaces, or threads that could damage their insulation.
- Check 6: Verify that hoses are arranged to minimize the risk of mechanical damage. To avoid tripping hazards or damage from being run over, hoses should not be left on the floor.
- Check 7: Ensure that the distance between flexible hose supports does not exceed 0.4 m.
- Check 8: Ensure that the height of conduits is at least 2.5 meters.

Visual safety checks

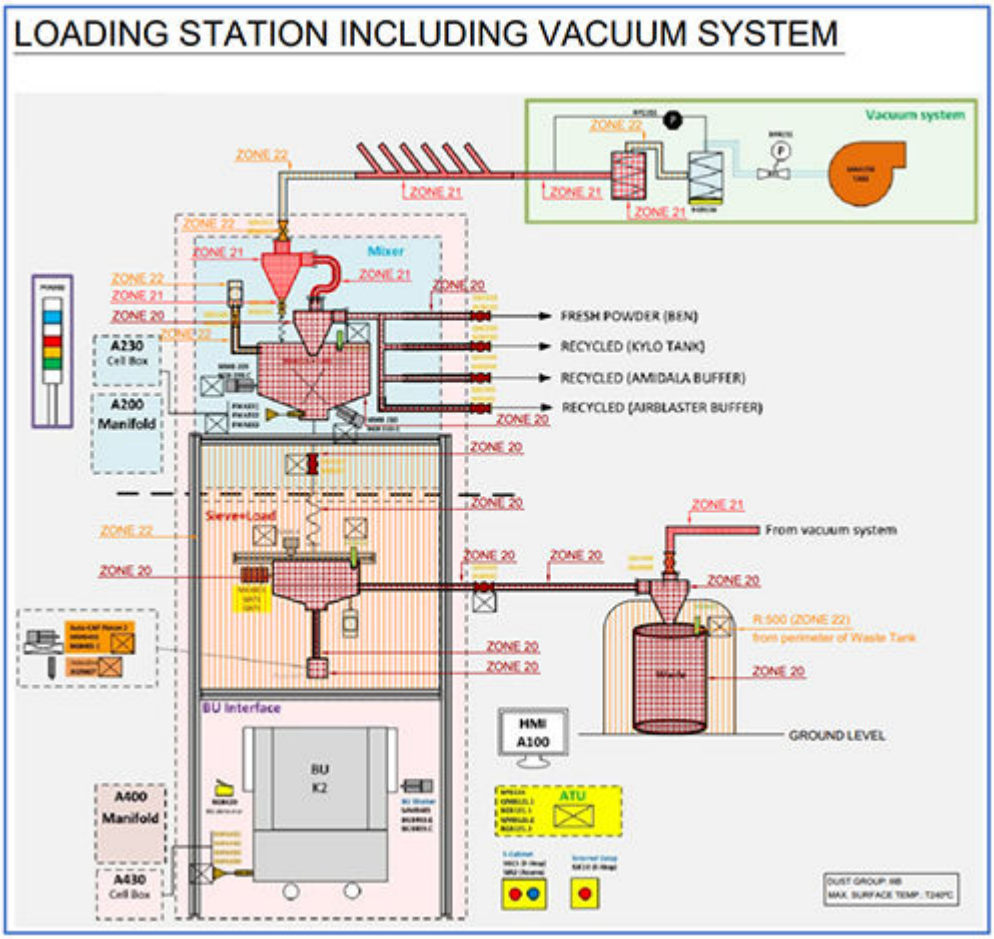
- Ensure that all seals are undamaged and provide a proper seal (including: Rey-Autonozzle circular seal, Amidala-BU perimetral seal, Amidala Empty-BU tool circular seal, and more).

No-leaks inspection

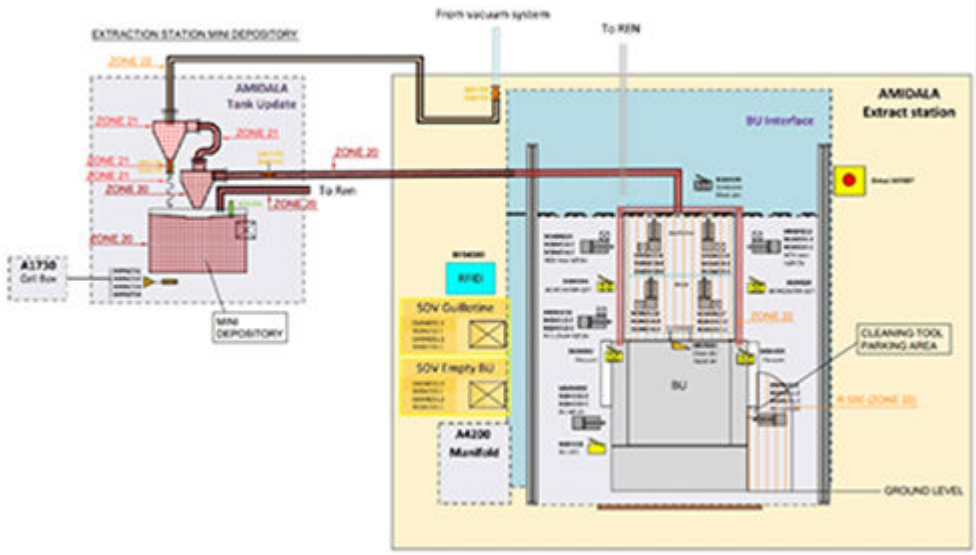
- Conduct a general inspection for leaks before, during, and after functional tests or following any repair/service intervention

ATEX/HazLoc zonification

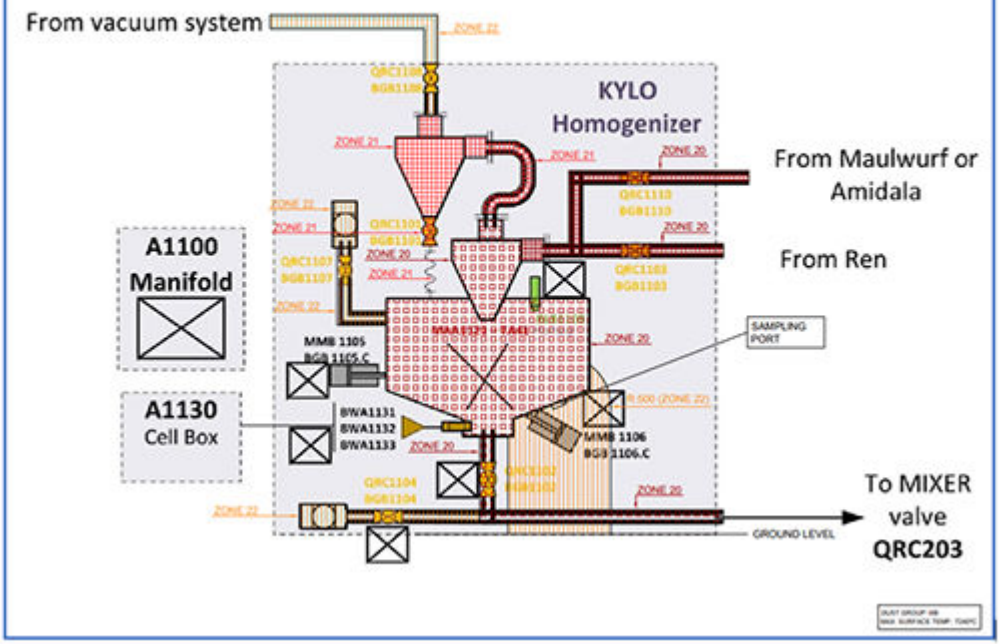
The following diagrams illustrate the ATEX/Hazloc zonification, detailing the internal classified areas of the equipment:

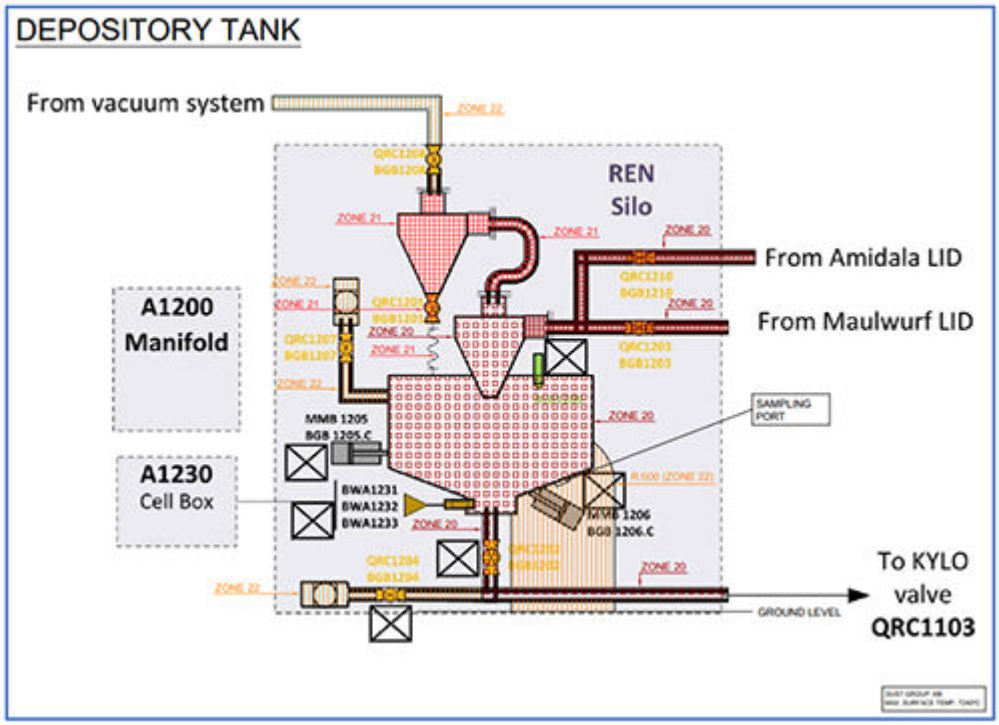


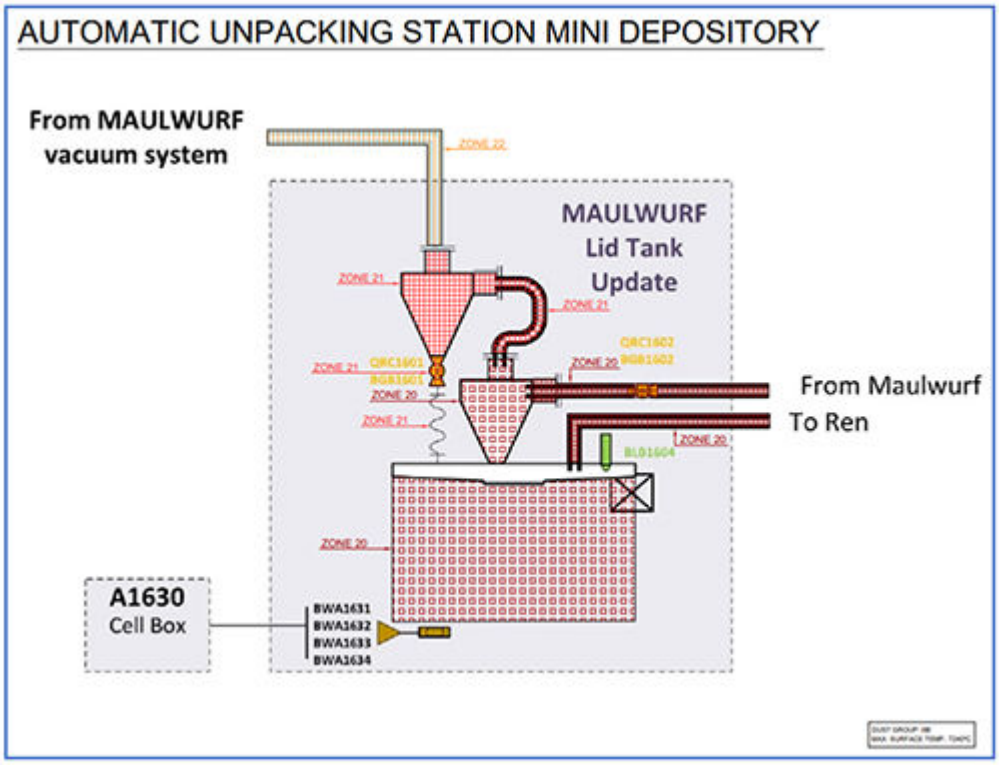
EXTRACTION STATION

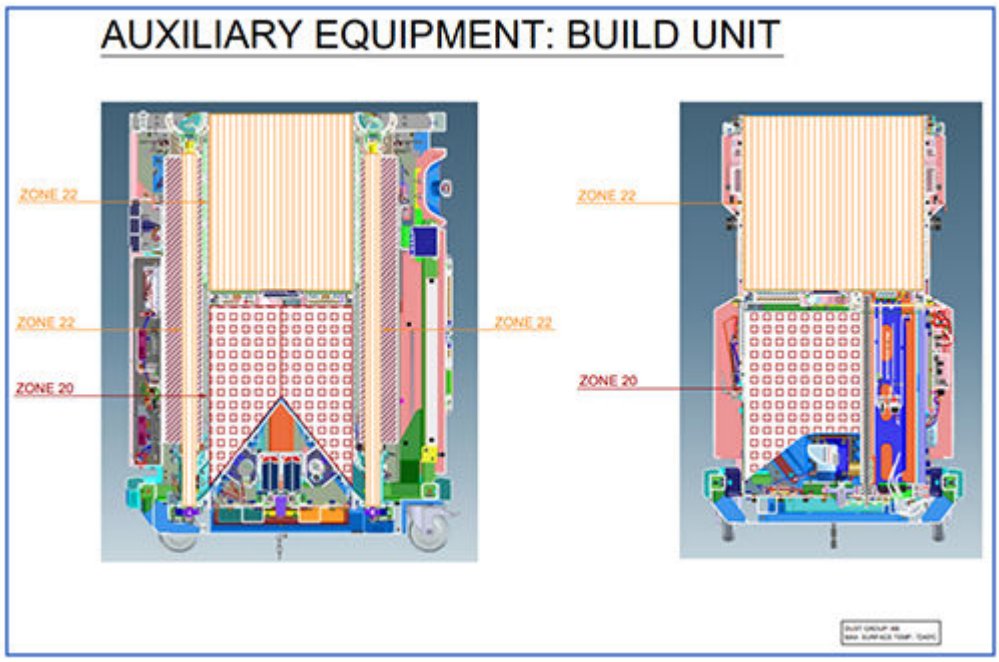


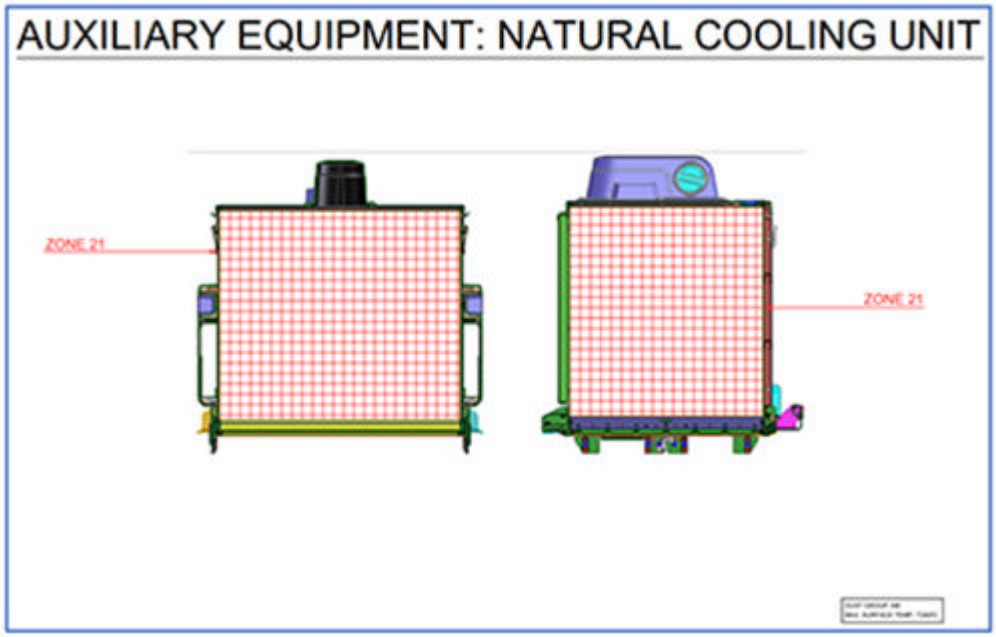
HOMOGENIZER TANK




DEPOSITORY TANK
From vacuum system
REN
Silo
From Amidala LID
From Maulwurf LID
A1200
Manifold
A1230
Cell Box
SAMPLING
PORT
To KYLO
valve
QRC1103
GROUND LEVEL


AUTOMATIC UNPACKING STATION MINI DEPOSITORY
From MAULWURF
vacuum system
MAULWURF
Lid Tank
Update
From Maulwurf
To Ren
A1630
Cell Box





Explosion hazard

Your product may produce combustible dust.

⚠ **WARNING!** Combustible dust clouds and flammable vapors can form explosive mixtures with air. Take precautionary measures against static charges, and keep away from sources of ignition (hot surfaces, hot flames or gases, mechanical sparks, electrical equipment, electromagnetic waves, exothermic reactions including self-combustion of solids, and so on).

NOTICE: The equipment is not intended for hazardous locations or ATEX classified zones: ordinary locations only.

To avoid the risk of explosion, take the following precautions:

- The customer takes full responsibility for assessing the customer's site according to the Explosion Protection Document (EPD), Dust Hazard Analysis (DHA), or any required document of the local jurisdiction of the country where the equipment is installed, to avoid the risk of explosion.
- Users and operators conducting cleaning operations must have training in explosive atmospheres and associated hazards, according to local laws and company requirements.
- Smoking, candles, welding, and open flames should be forbidden close to the equipment or powder storage area.
- Hot surfaces, hot flames and gases, and mechanical and electrical sparks, only can be generated during maintenance or repair operations (use of a permit work system according to the service manual).

⚠ **CAUTION:** If there is a massive spillage, immediately clean the bulk of the spilled powder by using conductive, non-sparking scoops and soft brushes that have natural fiber bristles. Residual amounts of material remaining after preliminary cleanup, must be removed using an explosion-protected vacuum cleaner.

- Inside and outside the equipment should be cleaned regularly with an explosion-protected vacuum cleaner to avoid dust accumulation. Do not sweep the dust or try to remove it with a compressed-air gun.
- An explosion-protected vacuum cleaner certified for collection of combustible dust is required for cleaning. Take measures to mitigate powder spillage and avoid potential ignition sources such as ESD (ElectroStatic Discharges), flames, and sparks. Do not smoke nearby.
- The explosion-protected vacuum cleaner must be compliant with the following normative specifications:
  - Europe/International Electrotechnical Commission (IEC): Zone 22 or better, temperature Class 200°C (392°F) maximum.
  - United States/National Electrical Code (NEC): Class II, division 2 or better, temperature Class 200°C (392°F) maximum.
  - Refer to the material safety data sheet (MSDS) and meet local regulations.
  - Recommended equipment fitted with High Efficiency Particulate Air (HEPA) filter grade.
- The equipment and accessories must be properly grounded at mains outlets only; do not manipulate internal bonding. If static discharges or electrical sparks are noticed, stop operation, disconnect the equipment, and contact your service representative.
- The auxiliary equipment, not provided by HP, must be explosion-protected for combustible dust and flammable vapors, according to the explosion protection document (EPD) or explosion hazard analysis covering the probability of an explosive atmosphere and presence of effective ignition sources as per local laws requirements. Refer to the safety data sheet of the powder being processed.
- The tanks and drums for powder handling must be electrically conductive or dissipative. Earthing clamps to ground the tanks and drums are required during use.
- Follow the cooling time before putting the powder into the system.

- Dust clouds generated during handling and/or storage can form explosive mixtures with air. Dust explosion characteristics vary with the particle size, particle shape, moisture content, contaminants, and other variables.
- Check that all equipment is properly grounded and installed to satisfy electrical classification requirements. As with any dry powder, pouring this powder or allowing it to fall freely or be conveyed through chutes or pipes can accumulate and generate electrostatic discharges, potentially causing ignition of the powder itself, or of any flammable materials which may come into contact with the powder or its container.
- Powder, agents and solvents storage, handling, and disposal as per local laws. See the Safety Data Sheets of your processed powder and solvent powder for adequate handling and storage. Follow your Environmental, Health, and Safety processes and procedures.
- Do not place the equipment in a hazardous location area, keep it separated from other equipment that could create a combustible dust cloud or explosive gas atmospheres during its operation.
- Auxiliary post-processing equipment must be suitable for combustible dust.
- Stop operation immediately if sparks, flames, or powder and/or liquid spillage is seen and call your service representative before continuing.
- All personnel, when handling combustible dust, should be free from static electricity by using conductive or dissipative footwear and clothing, and a conductive or dissipative floor.
- Keep the safety lid on top of the Build Unit at all times when it is outside of host equipment, especially when it is in motion.

Use HP-certified and HP-branded material and agents only. Do not use unauthorized third-party material or third-party agents.

Electric shock hazard

The internal circuits of the electrical cabinet, motors, ultrasounds converter, heating systems and Build Unit operate at hazardous voltages capable of causing death or serious personal injury.

⚠ **WARNING!** High leakage current! The equipment must be connected to earth at all times.

⚠ **DANGER!** Risk of electric shock. Power cabinet access to HP trained personnel only.

Turn off the equipment using the branch circuit breakers located in the building's Power Distribution Unit (PDU) before servicing. The equipment must be connected to earth at mains outlets only.

To avoid the risk of electric shock:

- Do not attempt to dismantle the internal circuit enclosures, Build Unit, or electrical cabinet except during hardware maintenance tasks. In that case, follow the instructions strictly.
- Do not remove or open any other closed system covers or plugs.
- Do not insert objects through slots in the equipment.
- Test the functionality of the Residual Current Circuit Breakers (RCCBs) every year.

NOTICE: A blown fuse may indicate malfunctioning electrical circuits within the system. Call your service representative, and do not attempt to replace the fuse yourself.

Heat hazard

The vacuum motor enclosure and exhaust and the Build Unit (BU) lid can operate at high temperatures and may cause burns if touched.

To avoid personal injury, take the following precautions:

- Use of appropriate personal protective equipment (i.e., heat resistant gloves) when extracting the BU from host equipment
- Take special care when accessing the printing area. Let the equipment cool down before you open the covers.
- Take special care with zones marked with warning labels.
- Do not place objects inside the equipment while operating.
- Do not cover enclosures while operating.
- Remember to let the equipment cool down before performing some maintenance operations.
- Take special care when assembling or removing the safety lid on/from the BU. Let the BU cool down before handling the safety lid.

Fire hazard

The motors, ultrasound converter, and frequency inverters of the equipment operate at high power.

Call your service representative if the built-in Residual Current Circuit Breaker (Ground Fault Circuit Interrupter) is repeatedly tripped.

To avoid the risk of fire, take the following precautions:

- Use the power supply voltage specified on the nameplate.
- Connect the electrical supply cable to a dedicated line, protected by a branch circuit breaker according to the information detailed in the site preparation guide.
- Call your service representative if the built-in Residual Current Circuit Breaker (Ground Fault Circuit Interrupter) is repeatedly tripped.
- Do not insert objects through slots in the equipment.
- Take care not to spill liquid on the equipment. After cleaning, make sure all components are dry before using the equipment again.
- Do not use aerosol products that contain flammable gases inside or around the equipment. Do not operate the equipment in an explosive atmosphere.
- Do not attempt to modify the electrical cabinet, or any enclosure of the system.
- Proper maintenance and genuine HP consumables are required to ensure that the equipment operates safely as designed. The use of non-HP consumables may present a risk of fire.
- Take special care with zones marked with warning labels.
- Do not place objects covering the enclosures or air ventilation.

- Do not leave tools or other materials inside equipment after maintenance or servicing.

⚠ **CAUTION:** Do not use a jet of water, as it could scatter and spread the fire.

⚠ **WARNING!** Depending on the powder used, some unhealthy substances can be released into the air in case of incidental fire. Wear self-contained pressure-demand breathing apparatus and full protective gear. Your EHS specialist should consult the safety data sheet (SDS) about each powder, available on the HP website at the following link: http://www.hp.com/go/msds, and advise on the appropriate measures for your location.

Mechanical hazard

The equipment has moving parts that could cause injury.

To avoid personal injury, take the following precautions when working close to the equipment.

- Keep your clothing and all parts of your body away from moving parts.
- Take special care with zones marked with warning labels.
- Avoid wearing necklaces, bracelets, and other hanging objects.
- If your hair is long, try to secure it so that it will not fall into the equipment.
- Take care that sleeves or gloves do not get caught in moving parts.
- Do not operate the equipment with components bypassed.

⚠ **WARNING!** Trapping hazard. Lock out power before opening the loading-system lateral door. Ensure that the door is closed and locked before restarting the machine.

Chemical hazard

Sufficient ventilation needs to be provided to ensure that potential airborne exposure to chemical substances is adequately controlled. Consult your usual air conditioning or Environmental Health and Safety (EHS) specialist for advice on the appropriate measures for your location.

To manipulate material (load, unpack, and so on) use protective personal equipment according to the Safety Data Sheets of your processed material.

Use HP-branded agents only. Do not use unauthorized third-party agents.

Take special care in any zones marked with warning labels.

Refer to the Safety Data Sheet of your powder, and consult your Environmental Health and Safety (EHS) specialist for advice on the appropriate measures for your location and application.

Ventilation

Fresh air ventilation is needed to maintain comfort levels.

Adequate ventilation also needs to be provided to ensure that potential airborne exposure to powders and agents is adequately controlled according to their safety data sheets.

Air conditioning and ventilation should meet local environmental, health, and safety (EHS) guidelines and regulations. Please follow these instructions carefully when designing the air-conditioning installation and placing your equipment in the room.

NOTICE: The ventilation units should not blow air directly onto the equipment.

Air conditioning

Air conditioning in the work area should take into account that the equipment produces heat. For more information, see the air-conditioning section in the site preparation guide.

Air conditioning should meet local Environmental Health and Safety (EHS) guidelines and regulations.

NOTICE: The air conditioning units should not blow air directly onto the equipment.

Sound pressure level

The emitted sound pressure level could exceed 70 dB(A) when filling the Loading System's input tanks. The maximum emitted sound pressure level is below 80 dB(A). Measurements are made according to ISO 11201.

Hearing protection may be required as per local laws; consult your Environmental Health and Safety (EHS) specialist.

Declared dual-number noise-emission values in accordance with ISO 4871:

- LpA = 78 dB(A)
- KpA = 6 dB

Transport

The customer takes full responsibility for the use of auxiliary lifting/carrying aids and providing the required personnel. See the “Moving equipment” section of the site preparation guide for more information.

Build-unit transport

Special care must be taken to avoid personal injury when moving the build unit.

- Always wear personal protective equipment including boots and gloves.
- Keep the safety lid on top of the build unit at all times, especially when it is in motion, except when it is inside another piece of equipment.
- Steer the build unit only using the handle.
- Move with care and avoid shocks during transport, which could spill the powder.
- Lock the front casters when not moving the build unit. Remember to unlock them before moving it.
- Before transporting the build unit, check that the safety lid is well attached to it.

When moving the build unit between different rooms, bear in mind that it should be kept in constant environmental conditions with its lid secured.

Ergonomic risk

Operation and maintenance tasks require handling heavy loads. For instance, build-unit transport, safety-lid handling, opening the print station’s top cover, consumables, and feedstock material, among others.

⚠ **CAUTION:** Heavy loads.

To avoid muscle strain or back injury when moving equipment or handling items, follow proper techniques for the use of auxiliary lifting/carrying aids, and use more than one person if required.

NOTICE: During daily operations, the build unit can be moved on a ramp with no more than 2° of inclination.

In case of equipment relocation, remove all material (powder) and consumables. The customer takes full responsibility for moving equipment, the use of auxiliary lifting/carrying aids, and providing the required personnel. See the “Moving equipment” section in the site preparation guide.

⚠ **CAUTION:** Work platform recommended.

Operation and maintenance tasks may require the use of a ladder or work platform to reach remote parts. For instance, accessing the print-zone area, mixer, and input tank, among others.

The customer takes full responsibility for room layout, auxiliary equipment, personal protective equipment (PPE), and working procedures, among other safety aspects, throughout the entire operation of the equipment. See the site preparation guide for more information.

3D part unpacking

Refer to the safety data sheet and meet local regulations in order to use the appropriate personal protective equipment needed, including heat- and chemical-resistant gloves when unpacking 3D printed parts.

NOTICE: Wear heat-resistant gloves when unpacking 3D printed parts.

Personal protective equipment

HP recommends the following equipment, which may be used for material handling, unpacking parts, and certain maintenance and cleaning tasks:

- A pair of heat-resistant gloves per person, flexible and resistant up to 200°C (392°F) with an irregular grabbing surface.
- Conductive or electrostatic-dissipative footwear and clothing.
- Mask or goggles if the environment is dusty.
- Hearing protection if necessary.

Use of tools

Maintenance of your product may sometimes require the use of a tool.

- **Users:** No tool is required for daily operations.
- **Maintenance personnel:** Hardware maintenance tasks and replacement of Customer Self-Replaceable (CSR) parts may require a screwdriver.

NOTICE: During installation, the designated personnel receive training for the safe operation and maintenance of the equipment. The equipment should not be used without this training.

⚠ WARNING! Hot surfaces, hot flames, gases, and mechanical and electrical sparks can be generated during maintenance or repair operations (use of a permit work system according to the service manual).

⚠ WARNING! Use appropriate tools (anti-spark, for example) in hazardous locations or ATEX classified zones.

Warnings and cautions

Warning and caution symbols are used in this manual to ensure the proper use of the equipment and to prevent it from being damaged. Follow the instructions marked with these symbols.

⚠ DANGER! Indicates a hazardous situation, that if not avoided, will result in death or serious injury.

⚠ WARNING! Indicates a hazardous situation, that if not avoided, could result in death or serious injury.

⚠ CAUTION: Indicates a hazardous situation, that if not avoided, could result in minor or moderate injury.

NOTICE: Indicates information considered important but not hazard related.

Warning labels

Labels are placed on the product for your protection. Familiarize yourself with their meaning and heed their warning at all times.

Table 2-1 Warning labels

Label	Explanation
	Equipment serial label, includes the following information: • Manufacturer • Product number • Serial number • Regulatory Model Number • Regulatory markings • Electrical ratings • Country of origin **WARNING!** Equipment must be grounded to the earth. Configure the building's electrical system used to power the equipment to meet its electrical requirements and the Electrical Code requirements of the local jurisdiction of the country in which the equipment is installed. No operator-serviceable parts inside. Refer servicing to qualified servicing personnel only.
	**CAUTION:** Main power switch With emergency switch-off function. Enable lockout/tagout before servicing. Power-cabinet access to HP trained personnel only.
	**WARNING!** Push-button energizes hazardous subsystem. Do not operate with guards removed or safety functions bypassed.
	**WARNING!** Emergency stop button. In case of unexpected malfunction, anomaly, ElectroStatic Discharges (ESD), or electromagnetic interference, press the emergency stop button and disconnect the equipment. If the problem persists, contact your service representative.

Table 2-1 Warning labels (continued)

Label	Explanation
	**DANGER!** Electric shock hazard The machine operates at hazardous voltages. Disconnect power source and wait at least five minutes before servicing. **CAUTION:** Refer servicing to qualified service personnel. **WARNING!** High leakage current. Earth connection essential before connecting supply. Equipment to be connected to earthed mains only. **WARNING!** Read instructions. Before starting, read and follow the operating and safety instructions.
	**WARNING!** High leakage current. Earth connection essential before connecting supply.
	**WARNING!** Read manuals. See installation instructions before connecting to the supply. Read and follow the operating and safety instructions before starting the equipment.
	**WARNING!** Read instructions. Read and follow repair, maintenance, and safety instructions. No operator serviceable parts inside. Refer servicing to qualified servicing personnel only.
	**DANGER!** Electric shock hazard. Authorized personnel only. Disconnect before servicing. Do not operate with guards removed, lockout/tagout before servicing.
	**CAUTION:** Risk of fire. For continued protection against risk of fire, replace **only** with same type and rating of fuse. Lockout/tagout before servicing. **NOTICE:** A blown fuse may indicate malfunctioning electrical circuits within the system, refer servicing to qualified servicing personnel only.

Table 2-1 Warning labels (continued)

Label	Explanation
	WARNING! Crush hazard. Keep hands away from moving or falling parts. Do not operate with guards removed, lockout/tagout before servicing.
	WARNING! Crush hazard. Keep hands away from moving or falling parts. Do not operate with guards removed, lockout/tagout before servicing.
	WARNING! Hand entanglement hazard. Moving parts can crush and cut. Keep body parts away from moving parts and rotating gears. Do not operate with guards removed, lockout/tagout before servicing.
	WARNING! Hazardous moving part. Moving parts can crush and cut. Keep hands away from moving parts or rotating gears. Do not operate with guards removed, lockout/tagout before servicing.
	WARNING! Light radiation hazard. Light radiation. Do not stare at the top-cover light, it may be harmful to the eyes.
	WARNING! Moving fan blades. Hazardous moving parts. Keep hands away from moving fan blades. Do not operate with guards removed, lockout/tagout before servicing.
	WARNING! Potentially explosive atmosphere. Combustible dust clouds or flammable vapors can form explosive mixtures with air. Keep the area free from any ignition source, such as static charges, open flames, or electrical equipment.

Table 2-1 Warning labels (continued)

Label	Explanation
	**WARNING!** Crush and tripping hazard. Keep body parts away from moving or falling parts or edges. Obstacle. Risk of tripping.
	**CAUTION:** Hot surface. Do not touch. Let the equipment cool down, otherwise heat-resistant gloves are required.
	**CAUTION:** Heavy loads. To avoid muscle strain or back injury while moving equipment or handling items, follow proper techniques or use auxiliary handling aids or more than one person when required.
	**WARNING!** Forklift point right. Equipment may overbalance, possibly resulting in death, severe injury, or damage to the equipment.
	**WARNING!** No ignition sources permitted nearby. Dust clouds can form explosive mixtures with air. Take precautionary measures against static charges and keep away from sources of ignition. No smoking, matches, sparks, or open flames close to equipment or material storage area.
	**CAUTION:** Do not operate with open door. Lockout/tagout before servicing.

Table 2-1 Warning labels (continued)

Label	Explanation
	**CAUTION:** Do not stand on any part of the machine. It is not intended for this use, which could result in broken parts and user injuries.
	**CAUTION:** Do not climb onto the structure or any other part of the machine.
	**CAUTION:** Personal protective equipment (PPE) required. Wear protective gloves to operate and handle the machine, supplies, or waste. See the Safety Data Sheets (SDS) of the supplies.
	**CAUTION:** Personal protective equipment (PPE) required. Wear a safety mask to operate and handle the machine, supplies, or waste. See the Safety Data Sheets (SDS) of the supplies.
	**CAUTION:** Personal protective equipment (PPE) required. Wear safety goggles to operate and handle the machine, supplies, or waste. See the Safety Data Sheets (SDS) of the supplies.
	**CAUTION:** Safety boots required, in case of feet striking or being struck by objects. Wear anti-static footwear.

Table 2-1 Warning labels (continued)

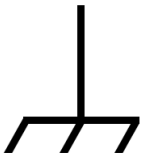
Label	Explanation
	**WARNING!** An explosion-protected vacuum cleaner certified for collection of combustible metal dust is required for cleaning. Do not sweep the dust or try to remove it with a compressed-air gun. Follow maintenance, cleaning tasks, and housekeeping to ensure correct operation and safety. Inside and outside, the equipment should be cleaned regularly to avoid dust accumulation. Refer to the material Safety Data Sheet (SDS) and meet local regulations. Dispose of it according to local laws. In addition, take measures to mitigate material spillage and avoid potential ignition sources such as ESD (electrostatic discharges), flames, and sparks. Do not smoke nearby. **CAUTION:** If a massive spillage occurs, immediately clean the bulk of the spilled powder by using conductive, non-sparking scoops and soft brushes that have natural fiber bristles. Residual amounts of material remaining after preliminary cleanup, must be removed using an explosion-protected vacuum cleaner.
	**CAUTION:** Work platform recommended. Operation and maintenance tasks may require the use of a ladder or work platform to reach remote parts. Be careful when you step down.
	**WARNING!** Protective conductor connecting point. Protective earth terminal marked with **PE** for qualified electricians during mains connection. Earth connection essential before connecting supply. Ensure proper bonding after a repair. Protective bonding conductors are identified by bi-color green and yellow combination.
	**NOTICE:** Functional bonding conductor connecting point. Bonding connection required against maloperation.
	**WARNING!** Read and understand the user guide before using this machine. Failure to follow operating instructions could result in death or serious injury.

Table 2-1 Warning labels (continued)

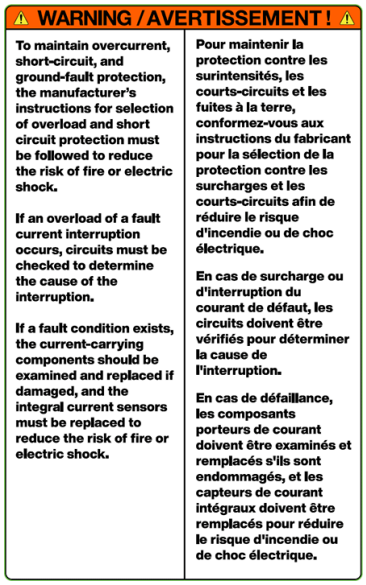
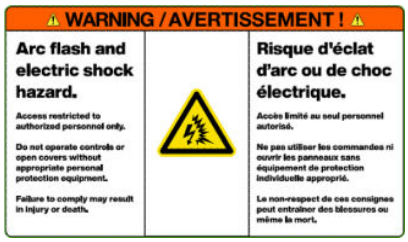
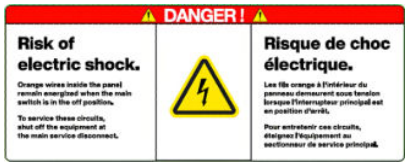
Label	Explanation
	**WARNING!** To maintain overcurrent, short-circuit, and ground-fault protection, the manufacturer's instructions for selection of overload and short-circuit protection should be followed to reduce the risk of fire or electric shock. If an overload or a fault current interruption occurs, circuits must be checked to determine the cause of the interruption. If a fault condition exists, the current-carrying components should be examined and replaced if damaged, and the integral current sensors should be replaced to reduce the risk of fire or electric shock.
	**WARNING!** Arc flash and electric shock hazard. Access restricted to authorized personnel. Do not operate controls or open covers without appropriate personal protection equipment. Failure to comply may result in injury or death.
	**CAUTION:** Burn hazard: hot surfaces. Do not touch.
	**WARNING!** Risk of electric shock. Orange wires inside the panel remain energized when the main switch is in the off position. To service these circuits, turn off the equipment at the main service disconnect.

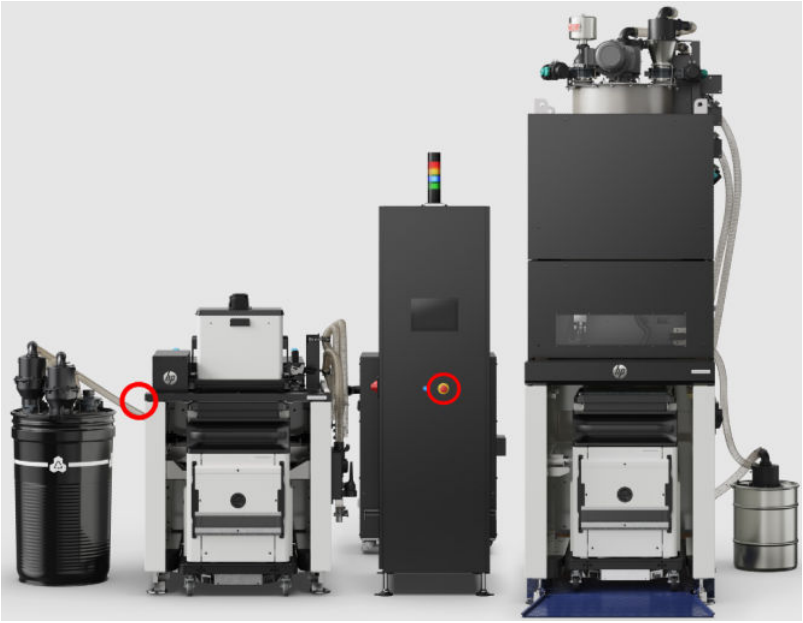
Table 2-1 Warning labels (continued)

Label	Explanation
	Lock out power before opening the door or covers.

Emergency stop buttons

There are emergency stop buttons on the system. If an emergency occurs, press an emergency stop button to stop all processes.

The emergency stop buttons are located on the e-cabinet and in the operator's area of the HP Jet Fusion 3D Extraction System; their effect is to stop the motors and the station's air pressure.



A system error message is displayed. Ensure that the emergency stop buttons are released before restarting the system.

IMPORTANT: If the emergency stop button was pressed during a process, restart the system before launching (or re-launching) another process.

To stop the system completely, turn it off.

Main power switch

The main power switch is used to turn on the equipment, and can be used in emergency to turn it off.

Enable lockout/tagout before servicing.

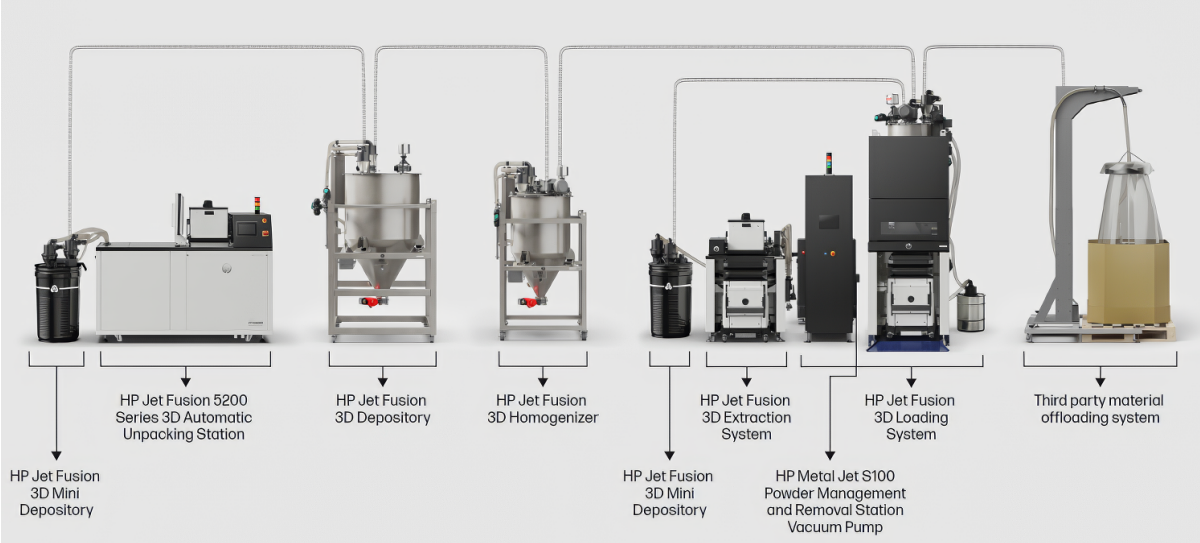


3 Main components

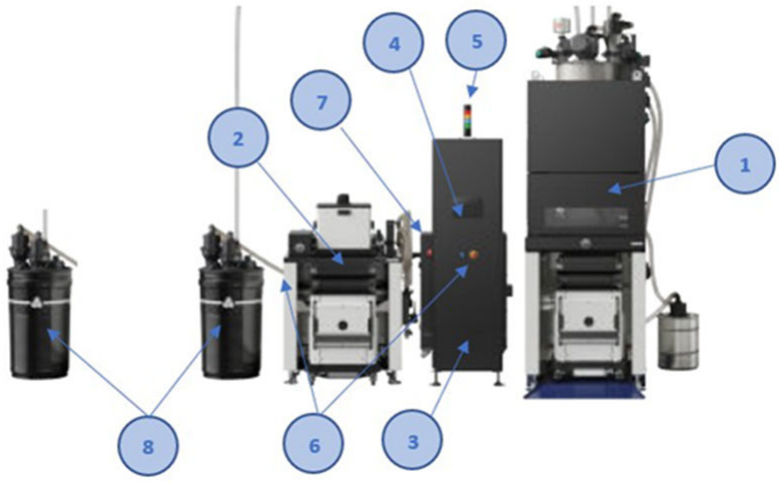
The images displayed in this document may differ from the final product.

Powder-handling automation solution

The powder-handling automation solution integrates several components. Some components are essential for the minimum configuration, and other components are optional.

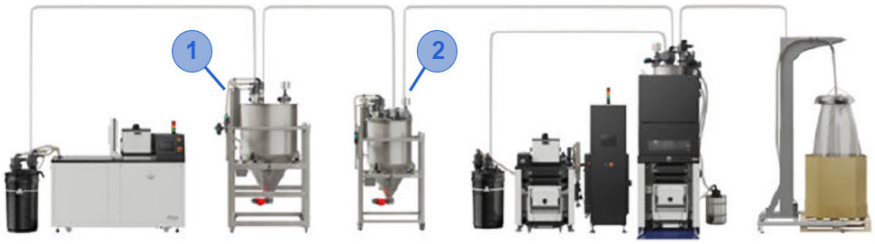


These are the main components with the minimum configuration:



1. Loading system
2. Extraction system
3. Electrical cabinet
4. Front panel
5. Beacon
6. Emergency-stop button
7. Vacuum module
8. Mini-depository

These are the optional components:

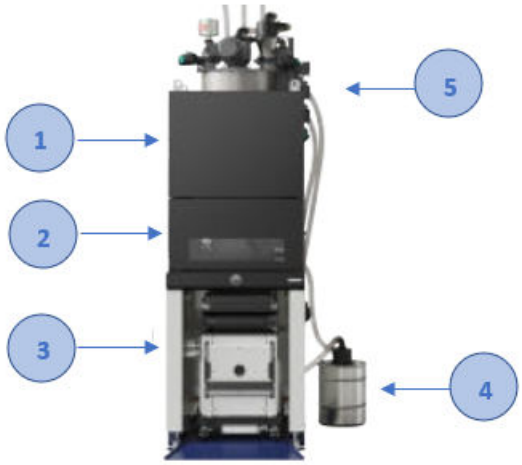


1. Homogenizer
2. Depository

Loading system

The loading system automatically blends, sieves, and loads powder into the build unit according to the user-defined job and customized parameters.

The main components of the loading system are:

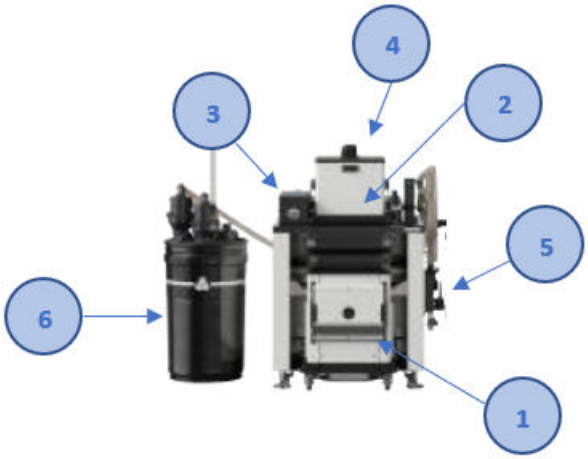


1. Mixer
2. Sieve
3. Build unit area
4. Waste tank
5. Powder inlets

Extraction system

The extraction system automatically extracts the job from the build unit into the natural cooling unit, so that the user can vacuum the remaining powder from the build-unit platform and side trays. The system automatically removes the remaining powder from inside the build unit. The powder collected during this phase is sent to the mini-depository.

Its main components include:



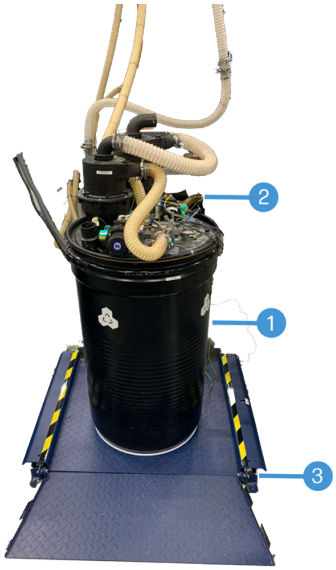
1. Build unit area
2. Natural cooling unit area

3. RFID reader
4. Guillotine
5. Empty build unit tool
6. Mini-depository

Mini-depository

Two mini-depositories are included in the powder-handling automation solution. One mini-depository collects the powder from the unpacking station, and the other one is connected to the extraction system where the powder from the empty build unit is collected. The powder in these tanks can be automatically transported to another tank. The mini-depositories include a sampling port for assessing powder for quality-control purposes.

Its main components include:



1. Tank
2. Lid with powder sampler
3. Scale

Material offloading system

The HP Jet Fusion 3D Powder Handling Automation Solution is compatible with third-party material-offloading systems. Consult your service representative for recommended options.

⚠ **CAUTION:** All offloading systems must be suitable to operate with combustible dusts.

The powder handling automation solution is used with fresh powder in bulk octabin containers. However, other solutions are also available:

- Use the HP 3D HR PA 12 300L/130 kg, connected to the HP Jet Fusion 3D Powder Handling Automation Solution with the fresh hose accessory provided with the system.

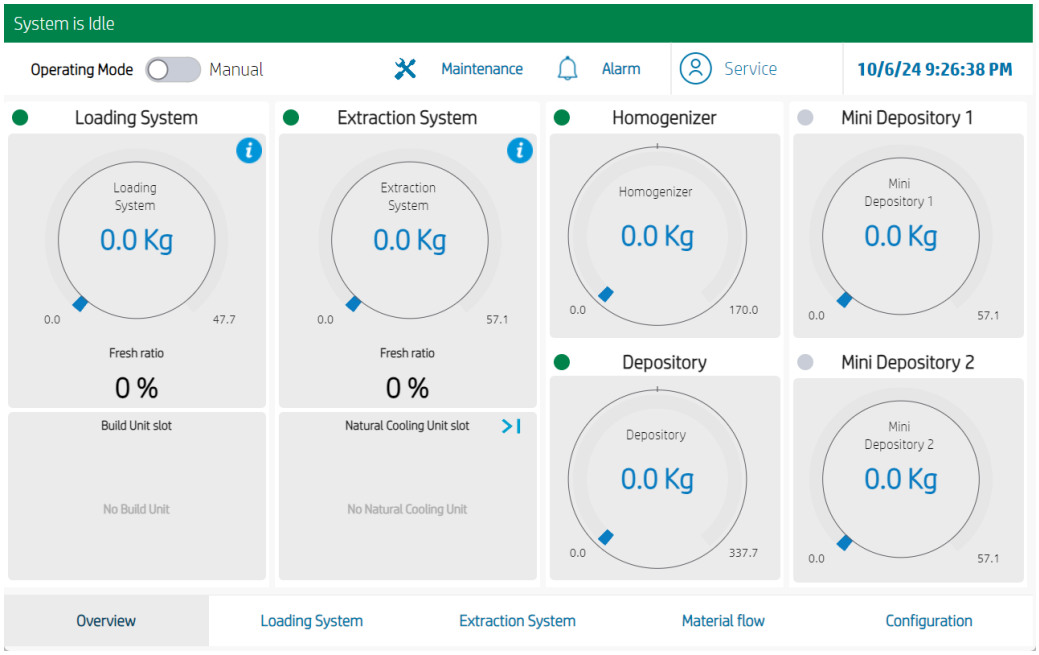
- Use HP 3D HR PA 12 1400L/600 kg powder discharged into the HP Jet Fusion 5200 Series Automatic External Tank, connected to the HP Jet Fusion 3D Powder Handling Automation Solution with the fresh hose accessory provided with the system.

Front panel

The front panel is a touch-sensitive screen with a graphical user interface.

The front panel gives you complete control of the powder management system: from the front panel, you can view information about the system, change settings, monitor status, and perform tasks such as build-unit loading. The front panel displays alerts (warning and error messages) when necessary.

Home screen



Change system options

To see how to change different system options from the front panel, refer to System operation on page 51.

Optional equipment

These accessories are not included in your purchase of the HP Jet Fusion 3D Powder Handling Automation Solution. If purchased, they should be used when operating the system, and in conjunction with each cycle.

They are intended to receive daily use and should be inspected daily to ensure that no accessory has been damaged.

The following accessories are available:

Natural cooling unit

The natural cooling unit allows the job to cool outside the processing system, freeing the build unit for another job.

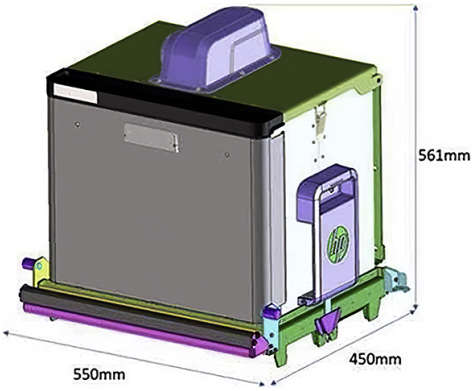


Table 3-1 Natural cooling unit specifications

Characteristic	Specification
Weight empty	11 kg (24.3 lb)
Weight full of PA12	34.5 kg (76.1 lb)

Hovmand Forklift 5200

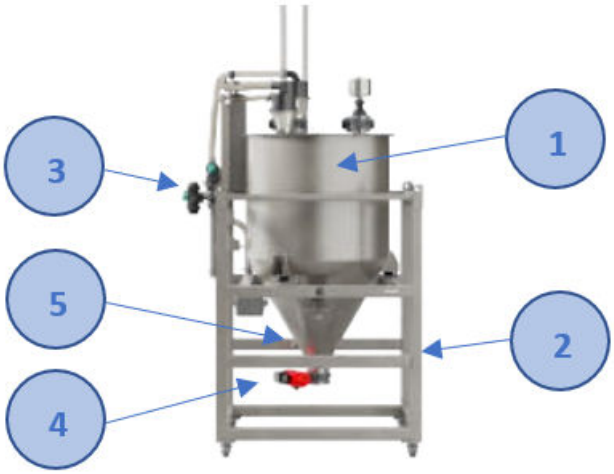
To handle the natural cooling unit, a forklift with particular characteristics is required. For this purpose, HP strongly recommends the Hovmand Forklift 5200.

- The Hovmand Forklift 5200 is specifically designed to support loading and unloading the natural cooling unit.
- The presence of at least one Hovmand Forklift 5200 per facility is strongly recommended.
- For more information on the product and to order the Hovmand Forklift 5200, consult your local HP 3D printing specialist.
- Please be aware that HP's Limited Warranty does not cover any problems that may arise from the use of non-approved third-party lifting devices.
- For more detailed information about the use of the Hovmand Forklift 5200, including an explanation of the position stops, see the user guide provided by Hovmand.

HP Jet Fusion 3D Depository

The recycled-material depository is a tank designed for gathering recycled powder sourced from multiple unpacking processes, alongside the powder accumulated during the build-unit platform cleaning, post-extraction. It has a capacity of 800 liters.

Its main components include:

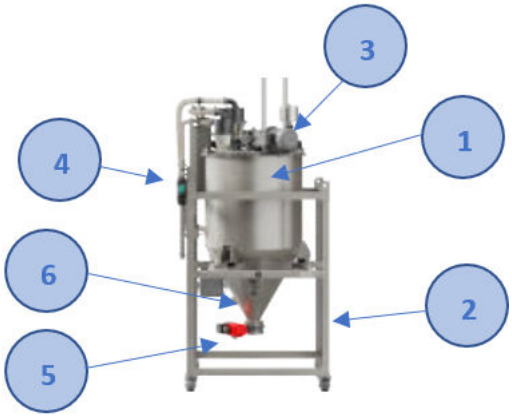


1. Tank
2. Structure
3. Powder inlet
4. Powder outlet
5. Sampling port

HP Jet Fusion 3D Homogenizer

The homogenizer serves as a mixer designed for creating a uniform batch of recycled powder obtained from multiple unpacking operations, allowing multiple loads using the same batch of recycled powder. It has a capacity of 400 liters.

Its main components include:



1. Tank
2. Structure
3. Mixer motor
4. Powder inlet
5. Powder outlet
6. Sampling port

Automatic unpacking station

The automatic unpacking station forms a part of your whole Multi Jet Fusion system.

Summary of the unpacking station process

- After cooling, the natural cooling unit is removed from the shelf by means of a forklift, and fixed onto the holder of the unpacking station.
- After the slicing blade has been manually opened, the entire contents (material and parts) are transferred to the automatic unpacking station.
- The platform is set in vibration by the vibration motors, and the material is blown off the printed parts by air nozzles.
- Below the platform, the loose material is collected and removed by a vacuum pump. The material enters the external tank through the material trap.
- The part ejection unit, which is a pneumatically operated slider, pushes the clean parts into the unloading box after opening the unloading door.

For more information, consult the HP Jet Fusion 5200 Series 3D Automatic Unpacking Station User Guide.

Explosion-protected industrial vacuum cleaner

For regular maintenance and cleaning tasks.

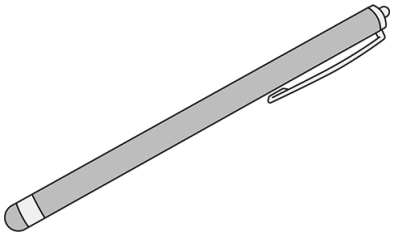
⚠ **WARNING!** See Explosion hazard on page 11 for safety precautions.



- Explosion-protected vacuum cleaner

Tablet pen

For use with the front panel if preferred to using your finger.



Sampling ports

Several assets of the Powder Handling Automation Solution are equipped with sampling ports for powder monitoring.

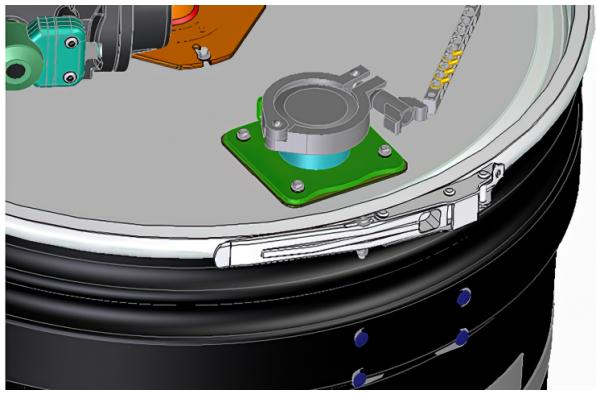
This section details the assets that include sampling ports.

HP Jet Fusion 3D Mini Depository

The mini-depository sampling port is on the lid of the tank and can easily be opened by loosening the locking clamp.

NOTE: Make sure to have a vacuum cleaner ready before opening the sampling port, as some powder may be spilled while you are taking the sample.





HP recommends using a sampling lance to take the samples.



To take the sample:

1. Loosen the locking clamp.
2. Remove the cap.
3. Insert the sampling lance through the port, making sure to reach the powder contained in the tank.
4. Open the lance by rotating the crank, and close it back.
5. Remove the lance and pour the powder into a small container.
6. Repeat steps 3 to 5 if more powder is needed.

7. Put back the cap.
8. Tighten the locking clamp.

IMPORTANT: Once the sample is taken, ensure that the sampling port is properly closed by tightening the clamp. If the sampling port is not properly closed, there may be powder leaks during machine operation.

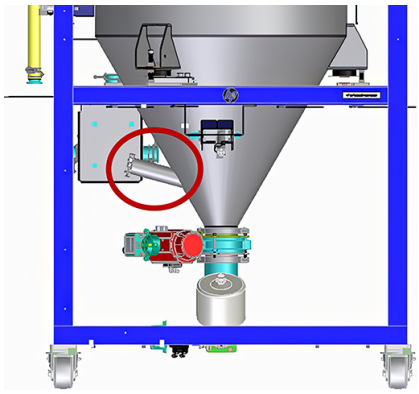
9. Vacuum any spilled powder in the surrounding area.

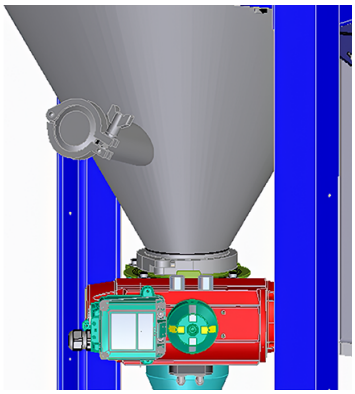
HP Jet Fusion 3D Homogenizer

The homogenizer sampling port is on the left side of the tank's cone and can easily be opened by loosening the locking clamp.

CAUTION: It is important to ensure that the homogenizer is turned off before opening the sampling port and taking samples from it.

NOTE: Make sure to have a vacuum cleaner ready before opening the sampling port, as some powder may be spilled while you are taking the sample.





HP recommends using a sampling lance to take the samples.



To take the sample:

1. Loosen the locking clamp.
2. Remove the cap.

3. Vacuum any spilled powder, and some of the powder remaining in the sampler pipe, to ensure that the sampling lance can be inserted properly.
4. Insert the sampling lance through the port, making sure that the first sample from the lance is taken from inside the tank (not from the sampling pipe).
5. Open the lance by rotating the crank, and close it back.
6. Remove the lance and pour the powder into a small container.
7. Repeat steps 4 to 6 if more powder is needed.
8. Put back the cap.
9. Tighten the locking clamp.

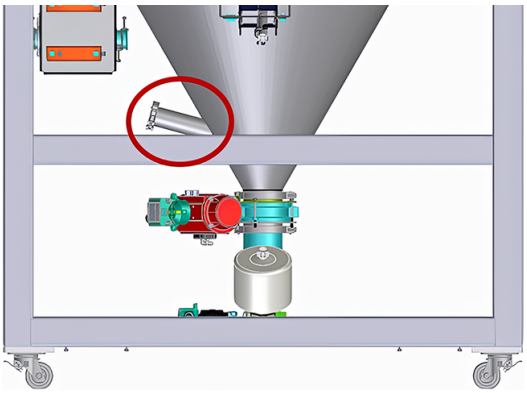
IMPORTANT: Once the sample is taken, ensure that the sampling port is properly closed by tightening the clamp. If the sampling port is not properly closed, there may be powder leaks during machine operation.

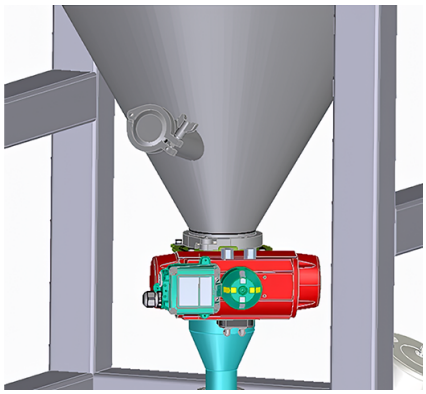
10. Vacuum any spilled powder in the surrounding area.

HP Jet Fusion 3D Depository

The depository sampling port is on the left side of the tank's cone and can easily be opened by loosening the locking clamp.

NOTE: Make sure to have a vacuum cleaner ready before opening the sampling port, as some powder may be spilled while you are taking the sample.





HP recommends using a sampling lance to take the samples.



To take the sample:

1. Loosen the locking clamp.
2. Remove the cap.
3. Vacuum any spilled powder, and some of the powder remaining in the sampler pipe, to ensure that the sampling lance can be inserted properly.
4. Insert the sampling lance through the port, making sure that the first sample from the lance is taken from inside the tank (not from the sampling pipe).
5. Open the lance by rotating the crank, and close it back.
6. Remove the lance and pour the powder into a small container.
7. Repeat steps 4 to 6 if more powder is needed.
8. Put back the cap.
9. Tighten the locking clamp.

IMPORTANT: Once the sample is taken, ensure that the sampling port is properly closed by tightening the clamp. If the sampling port is not properly closed, there may be powder leaks during machine operation.

10. Vacuum any spilled powder in the surrounding area.

4 Networking

The product provides a single RJ-45 port for a network connection. In order to meet Class B specifications, the use of shielded I/O cables is required. For optimal performance, you are recommended to use Cat 5/5e or Cat 6 cabling and gigabit-capable local network equipment.

A correct network setup is required to use the service provided, as all communication with printing and management software happens through the network.

Configuration

To access the network settings, open your browser and connect to the device via HTTPS.

You can use the default hostname at https://hp-powder-01, or alternatively, use the IP address assigned by your DHCP server at https://device_ip.

Default username: admin

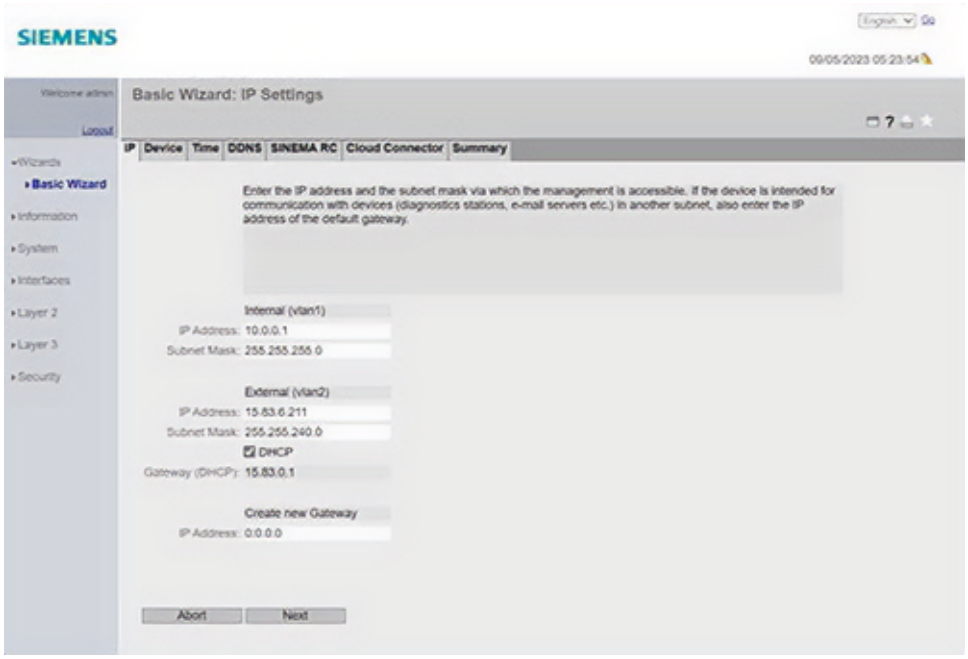
Default password: Powder01

Basic Wizard

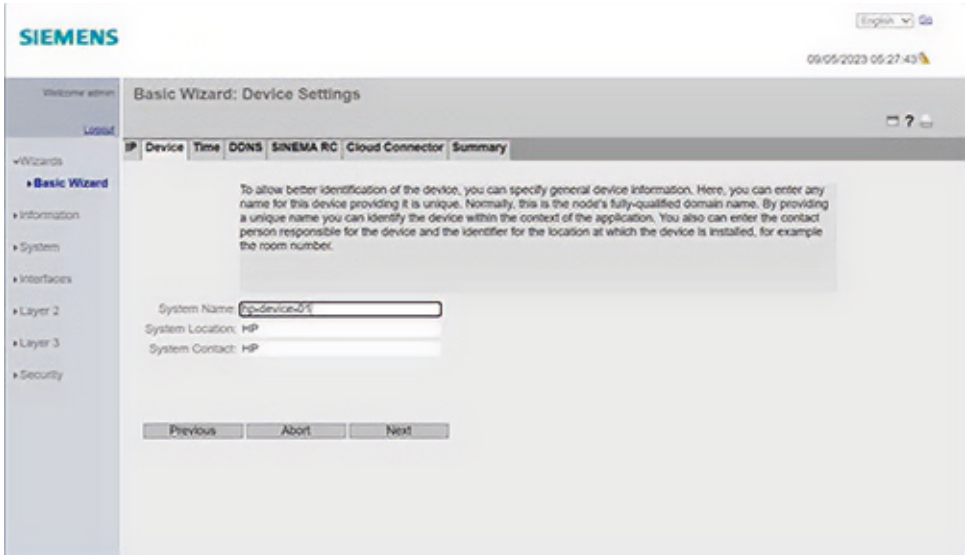
For a basic network configuration, follow the recommended method outlined below. Follow the steps until the process is complete.

1. Configure both the internal and external networks.

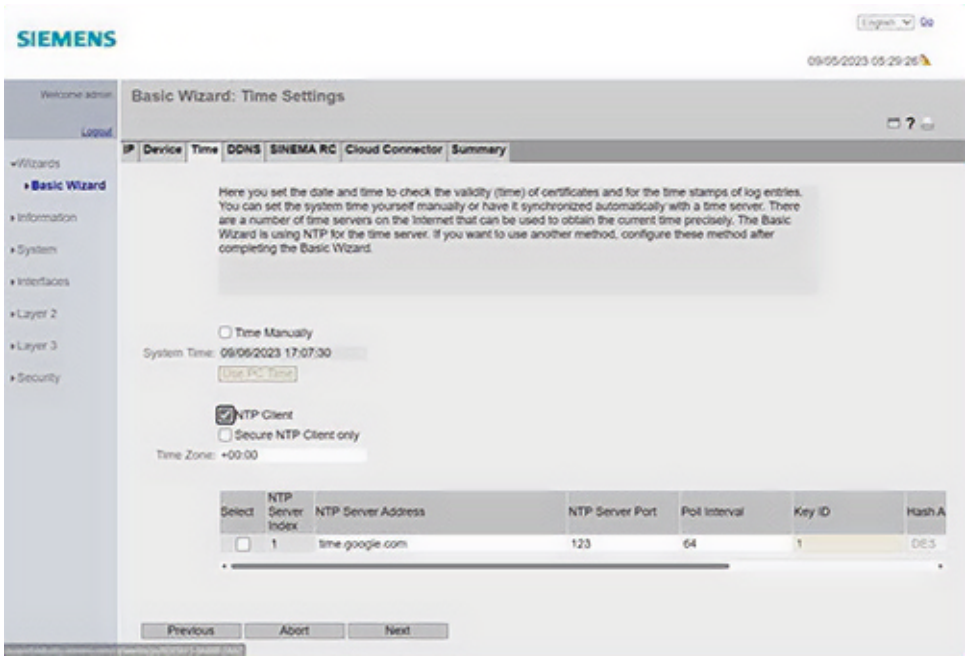
NOTE: It is mandatory to set the internal IP address to `10.0.0.0/24`.



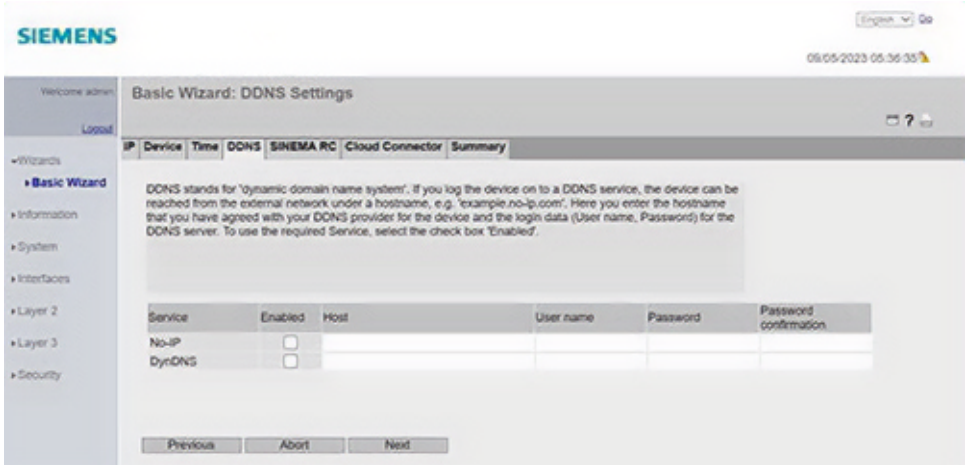
2. Set device information.



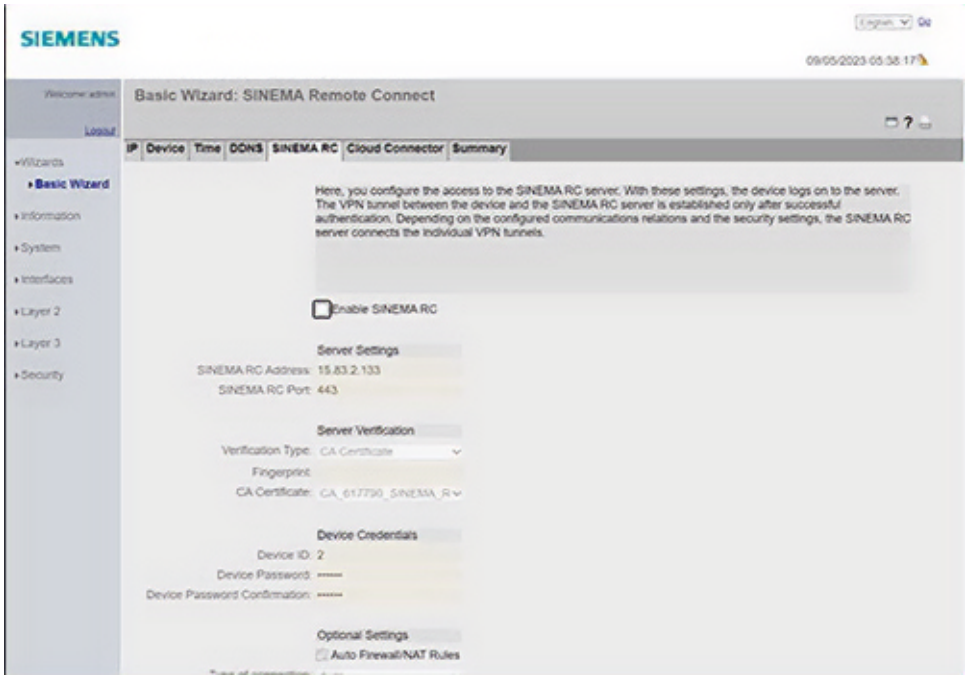
3. Configure the NTP server. Initially, it is advisable to manually set the time using the PC's time. Once this is done for the first time, configure the NTP server for the device to synchronize time.



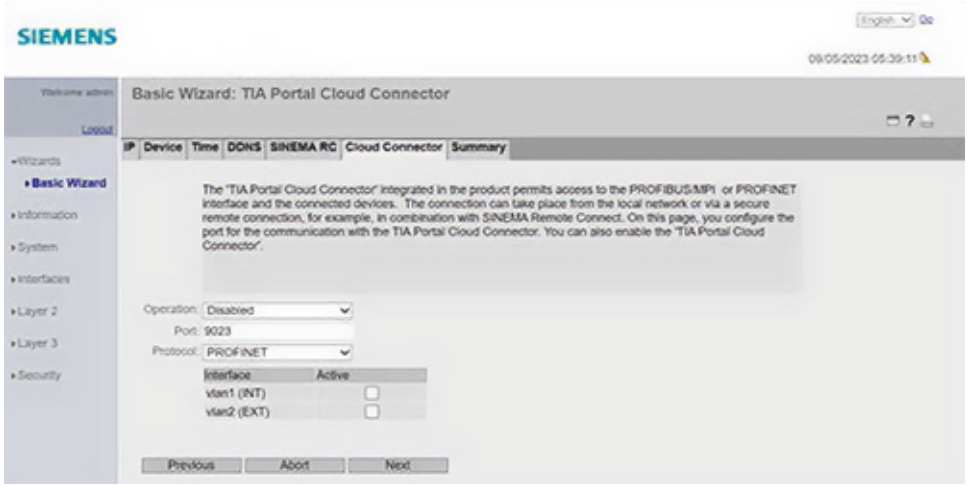
4. Set the DDNS. Click **Next** to skip this configuration if necessary.



5. Set the SINEMA RC. Skip the configuration of the SINEMA RC if necessary.



6. Configure the Cloud Connector. Skip the configuration of the Cloud Connect if necessary.



7. Go to the summary. Click on **Set Values** to enable the configuration.

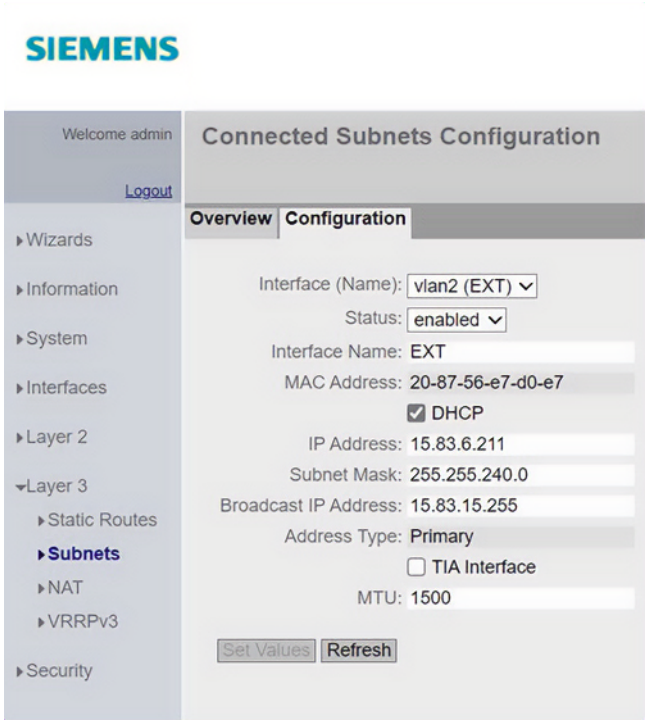
Manual configuration

There are several network parameters that can be configured manually. The parameters that are supported by HP are as follows:

- Hostname
- IP address
- DHCP
- NTP server

Hostname

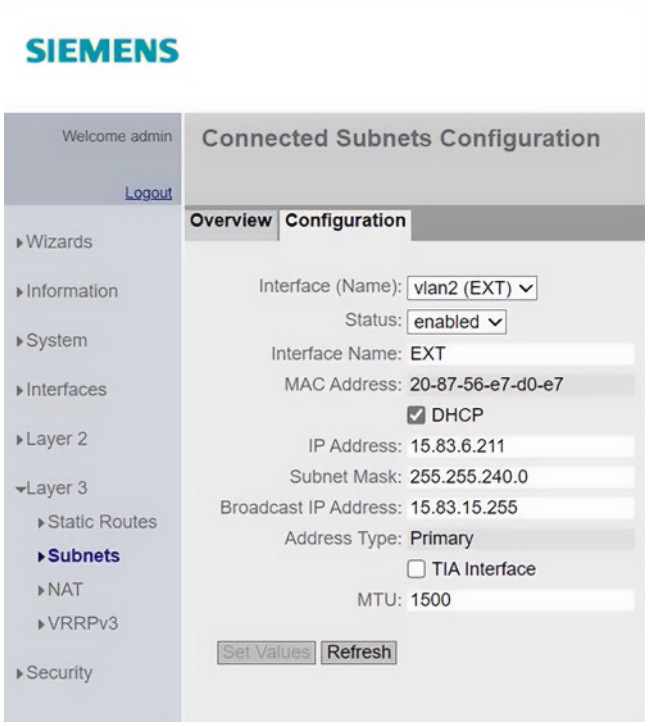
Go to **System** > **General** > **Device**. Add the desired **System Name** and click **Set Values**.



Set the default IP address

The device can have a fixed IP address or one assigned by DHCP.

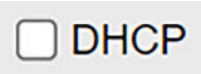
1. To change the settings of the external VLAN, go to **Layer3** > **Subnets** > **Configuration**.
2. Modify the network settings according to the desired network configuration.



Set a fixed IP address

This topic provides the instructions.

1. Change the **IP address**, the **Subnet mask** and **Broadcast IP address**fields to the desired ones and uncheck de DHCP checkbox.



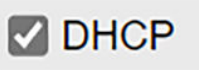
2. Click **Set Values**.



Enable DHCP

The topic provides the instructions.

1. To enable DHCP, skip the **IP address**, the **Subnet mask** and **Broadcast IP address**fields, and check the **DHCP** field.



2. Click the **Set Values** button.



Set the NTP servers

The topic provides the instructions.

1. Go to **System** > **System Time** > **NTP Client**.
2. To use only Secure NTP clients, click the checkbox.



3. Set the NTP Server address to `time.google.com` or any other suitable address.

   If the client has internet access within their local network, they have the option to use either an external NTP server or a local network NTP server for time synchronization.

4. Click the **Set Values** button.



5 Supplies

Powder and storage conditions

Material extracted must be kept within the storage conditions of the material.

The equipment should be stored at a temperature of –25°C to 55°C (–13°F to 131°F) and humidity of less than 90% (without condensation). Before using it again, allow at least 4 hours for it to acclimatize to operating conditions, and check for condensation before turning it on. For a shorter period (one weekend), if you want to keep material inside the product, the product operating conditions must be met.

Ordering information

This chapter lists the available supplies and accessories, and their part numbers, at the time of writing.

Contact your service representative and check that what you want is available in your area and for your model.

Table 5-1 Supplies and accessories

Part number	Name
7L4S6A	HP Jet Fusion 3D Loading System
7L4S9A	HP Jet Fusion 3D Extraction System
7L4S5A	HP Jet Fusion 3D Mini Depository
6L053A	HP Metal Jet S100 Powder Management and Removal Station Vacuum Pump
7L4S3A	HP Jet Fusion 3D Depository
7L4S4A	HP Jet Fusion 3D Homogenizer
7Q9X2A	HP 3D Powder Handling Automation Control Solution
U67P4E	HP Jet Fusion 3D Powder Handling Automation Uptime Kit
U67P5E	HP Installation service for HP Jet Fusion 3D Powder Handling Automation Solution
U67SBE	HP 1 year PW NBD Onsite HW Support w/Production Care for JF 3D Powder Handling Automation Solution
U23HJE	HP Installation Service for HP JF 5200 Series 3D Automatic Unpacking Station
U23HNE	HP Train to Maintain Training for HP JF 5200 Series 3D Automatic Unpacking Station
U67PBE	HP Jet Fusion 3D Powder Handling Automation Discovery Service
U67P9E	HP Jet Fusion 3D Powder Quality Control and Optimization Service

Table 5-1 Supplies and accessories (continued)

Part number	Name
3FW29A	HP Jet Fusion 5200 3D Build Unit
6ER17A (virtual)	HP Jet Fusion 5210 Pro 3D Build Unit
4QG10A	HP Jet Fusion 5200 3D Series Natural Cooling Kit
4QG11A	HP Jet Fusion 5200 3D Series Automatic External Tank Starter Kit
V1R10A	HP 3D HR PA 12 30 L / 13 kg Material
V1R16A	HP 3D HR PA 12 300 L / 130 kg Material
V1R34A	HP 3D HR PA 12 300 L / 130 kg P Material
V1R20A	HP 3D HR PA 12 1400 L / 600 kg Material
2W883A	HP Jet Fusion 5200 Series 3D Automatic Unpacking Station
2M7W6A	HP Jet Fusion 5200 Series 3D Automatic External Tank
6ER17A (virtual)	HP Jet Fusion 5210 Pro 3D Build Unit
4QG10A	HP Jet Fusion 5200 3D Series Natural Cooling Kit
4QG11A	HP Jet Fusion 5200 3D Series Automatic External Tank Starter Kit
V1R10A	HP 3D HR PA 12 30 L / 13 kg Material
V1R16A	HP 3D HR PA 12 300 L / 130 kg Material
V1R34A	HP 3D HR PA 12 300 L / 130 kg P Material
V1R20A	HP 3D HR PA 12 1400 L / 600 kg Material
2W883A	HP Jet Fusion 5200 Series 3D Automatic Unpacking Station
2M7W6A	HP Jet Fusion 5200 Series 3D Automatic External Tank

6 System operation

How to use the system.

User interface overview

The HP Jet Fusion 3D Powder Handling Automation Solution has two user interfaces.

- The Operator Station (OS) can be used for daily operations, remote monitoring, reporting, and monitoring powder quality.
- The Human-Machine Interface (HMI) can be used for daily operation or to initiate maintenance, access low-level controls, and perform diagnostics.

You can find a detailed description below of how to launch each process, based on the interface used.

Table 6-1 Available workflows

Workflow	OS/HMI	Can be parallelized?	Preconditions			
			BU inserted	Enough powder in tanks	Tank not full	NCU inserted
Mix & load BU	OS & HMI	Yes	X	X		
Prepare mix BU	OS & HMI	Yes		X	X	
Load BU	OS & HMI	Yes	X	X		
Empty internal tank	HMI	No				
Fill internal tank	HMI	Yes		X	X	
Clean sieve	HMI	No			X	
Create homogenized lot	OS & HMI	Yes			X	
Retrieve unpack material	OS & HMI	Yes			X	
Extract to NCU	OS & HMI	Yes	X			X
Clean BU surface	OS & HMI	Yes	X		X	
Empty BU	OS & HMI	No	X		X	
Install fresh supply	OS	No				
Install removable drum	OS	No				

Operator station

The operator station is the default user interface for production operations, remote monitoring, reporting, and monitoring powder quality.

User roles and access

The HP 3D JF Powder Handling Automation Solution offers various user roles within its operator station, each designed for specific responsibilities and access levels.

Table 6-2 **User roles and access descriptions**

Default user	Role	Access description
Default user	–	Default user with no privileges. Can only monitor device status and navigate.
Operator	HMI operator	Launch and cancel workflows.
Maintenance	Maintenance	Access to maintenance activities and the operator role. As maintenance activities are executed in the local user interface, this user has the same access as an operator.
ProcessEngineer	Process engineer	Access to operation settings, powder-tracking settings, and general settings.
Admin	Administrator	User management.
Service	Service (HP)	Permissions for service tasks.
OperatorStationOpcUa	OPC-UA access	Special user for remote connection to the system through the OPC-UA protocol.

These distinct roles ensure that users have appropriate access based on their responsibilities, promoting efficient and secure operation of the HP 3D Powder Handling Automation Solution.

The operator station provides a default user for each role (shown in the table above). Additional users can be created with the pre-defined roles.

User management

The following actions can be performed by an Admin user:

- Create users
- Delete users
- Modify users' permissions

Operator station interface

The operator station interface consists of the following areas and navigation elements:

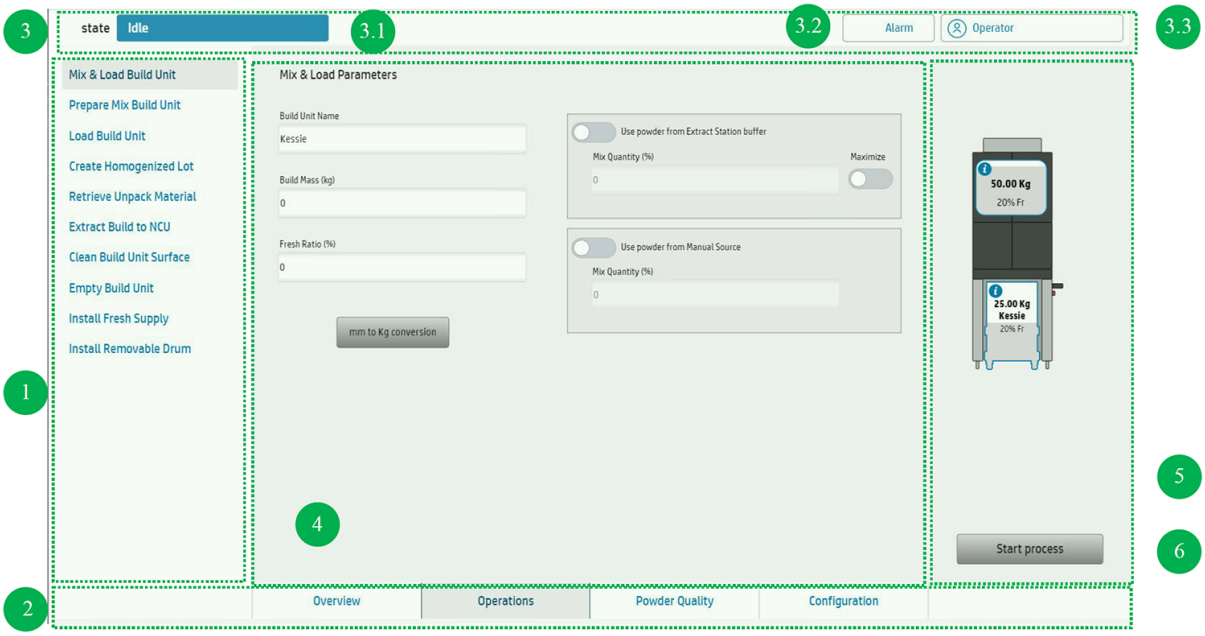
1. **Side menu**: Switches between different functions within the selected application.

NOTE: Not all applications have a side menu.

2. **Tabs**: Switches between Overview, Operations, Powder Quality, and Configuration.

NOTE: Not all applications and side-menu items have tabs.

3. **System header**: Provides visual feedback of the state of several key system properties. The system header is visible in every situation.
    - 3.1 **Status indicator**: Provides a color-coded visual and textual feedback of the operation status of the device. The status indicator is visible in every situation.
    - 3.2 **Alarm toggle**: Provides a list of system notifications.
    - 3.3 **Login status**: Provides visual feedback of the user login state. It can be used to log in or log out.
4. **Content area**: If a workflow is selected, this area displays the editable properties of the workflow.
5. **Visualization area**: If a workflow is selected, this area provides key data for the selected workflow.
6. **Action buttons**: If a production or utility workflow is selected, these buttons will either start, stop, or cancel the operation.

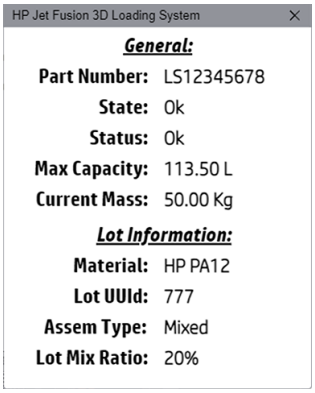


Overview tab

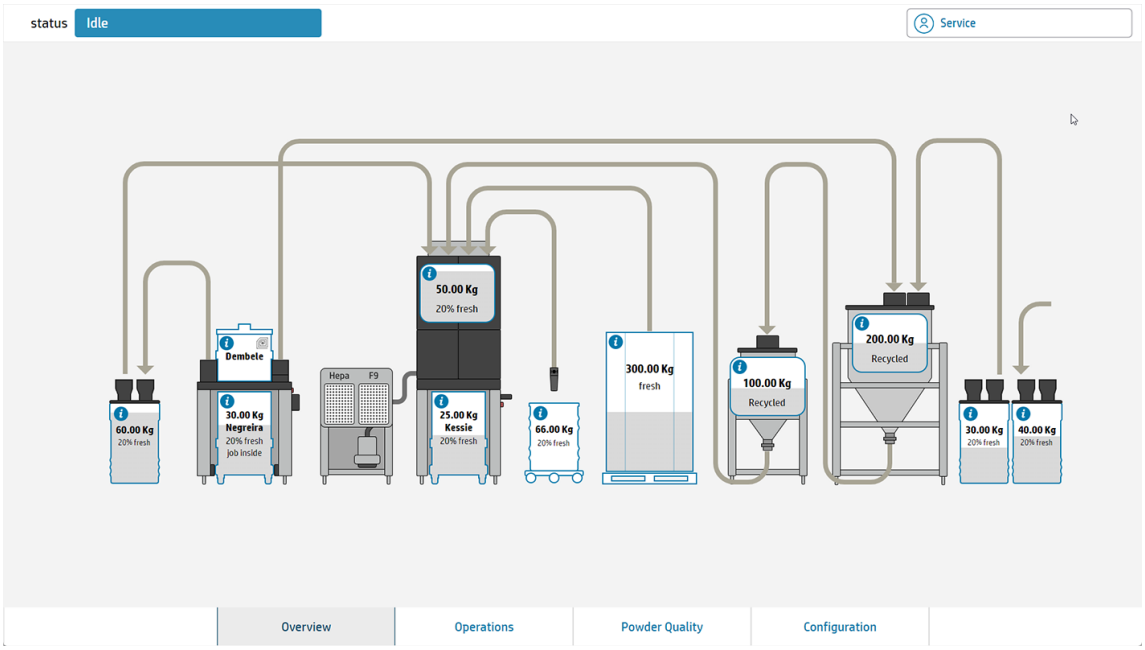
The Overview tab provides a synoptic representation of the system.

It contains the following elements:

- Asset display: Shows real-time information about the system's assets.
- System synoptic panel: Representation of the whole installed system.
    - Asset status: Provides color-coded visual feedback of the state of the asset. The status indicator is visible in every situation.
    - Asset basic information: Current mass, fresh percentage, and material type.
- Asset's detailed information pop-up: Provides identification and detailed data about a specific asset.



- Asset's connections: Provides a visual representation of the asset's connections and material flow between them.



The Overview tab is always accessible and is for status checks only: no operations are launched for the Overview tab. It's also the default tab that is shown when the operator station is connected to the system.

Powder types

The assets displayed on the overview screen can contain different types of powder depending on the process that generates or transforms that powder.

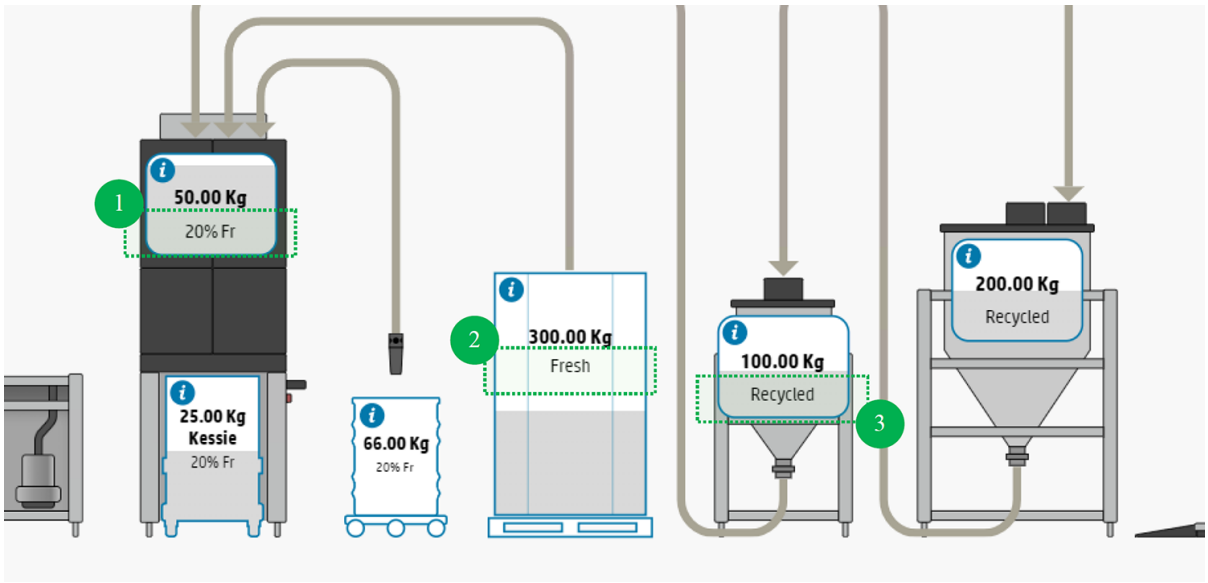
The system can contain the following types of powder:

1. Mixed unused: This is the powder contained by the extraction system mini-depository, the removable drum, the loading system mixer, and the build unit.

   The quality of the mix is indicated by the percentage of fresh material it contains.

2. Fresh: This is the new powder contained in the fresh powder supplies connected to the system.

3. Recycled: This is the powder reinserted from the build unit, removable drums, or other depositories with a specific mix ratio.



Operations tab

The Operations tab provides access to the production operator workflows.

It contains the following:

- List of production operations
- Detailed information and input parameters to run the operations

Workflow: Mix & load build unit

This process allows you either to create a powder mix with a selected fresh percentage and load it into a build unit, or simply to load a created mix into a build unit.

There should be no other operation running that requires any of the assets involved (vacuum system, loading system, homogenizer).

To mix & load a build unit, follow these steps:

1. Select **Operations** on the bottom menu to display the production workflows.
2. Select **Mix & Load** on the left-hand side of the screen.
3. Enter the required target amount of mixed powder in kilograms.

> NOTE: If you would like a mass estimate based on the build height, you can use the **Build height to mass conversion**.
>
> This calculation is based on the build height and packing density of your application. It is a rough estimate that does not consider how the parts will be printed; you can fine-tune this amount as you develop your production process further.

4. Enter the required target fresh percentage of the mixed powder.

5. Optionally, you can activate the toggle **Use powder from extraction system mini-depository** (A) if you want to use the powder stored in the extraction system as a source to achieve the target values.

NOTE: Bear in mind that the type of powder stored in the extraction system mini-depository is mixed, unused powder that has also a fresh percentage.

   a. If you activate toggle A: Enter the percentage of powder of the total mix you want to use from the extraction system mini-depository. For example, enter the value 20 if you want the powder from the extraction system mini-depository to be 20% of your total mix.

   b. If you activate toggle (B): Activate the toggle **Maximize** (c) if you want the system to use the maximum possible amount of powder from the extraction system mini-depository. This option is convenient if you want to make sure you consume already premixed powder from this source first, before incorporating more fresh or recycled powder into your mix from other sources.

6. Optionally, activate the toggle **Use powder from removable drum** (C) if you want to use powder from the manual, removable drum (this requires a previous installation).

   If you activated toggle C, enter the percentage of powder of the total mix you want to use from the removable drum.

7. Tap **Start process** to start the mix & load process.

8. The system checks to ensure all the conditions to execute the operation are met, after which the operation will start.

9. You can monitor the progress of the operation by occasionally checking the workflow screen (A), the system light beacon (B), or the overview screen.

10. If you have powder-quality tracking enabled in the system (check powder quality settings in the **Configuration** tab), a powder-quality dialogue will appear.

    - If powder-quality tracking is **Mandatory**, you must enter the following values:
      - B*Fresh powder value
      - B*Used powder value
    - If powder-quality tracking is **Optional**, you do not need to enter the values.
    - If powder-quality tracking is **Disabled**, no dialogue will appear.

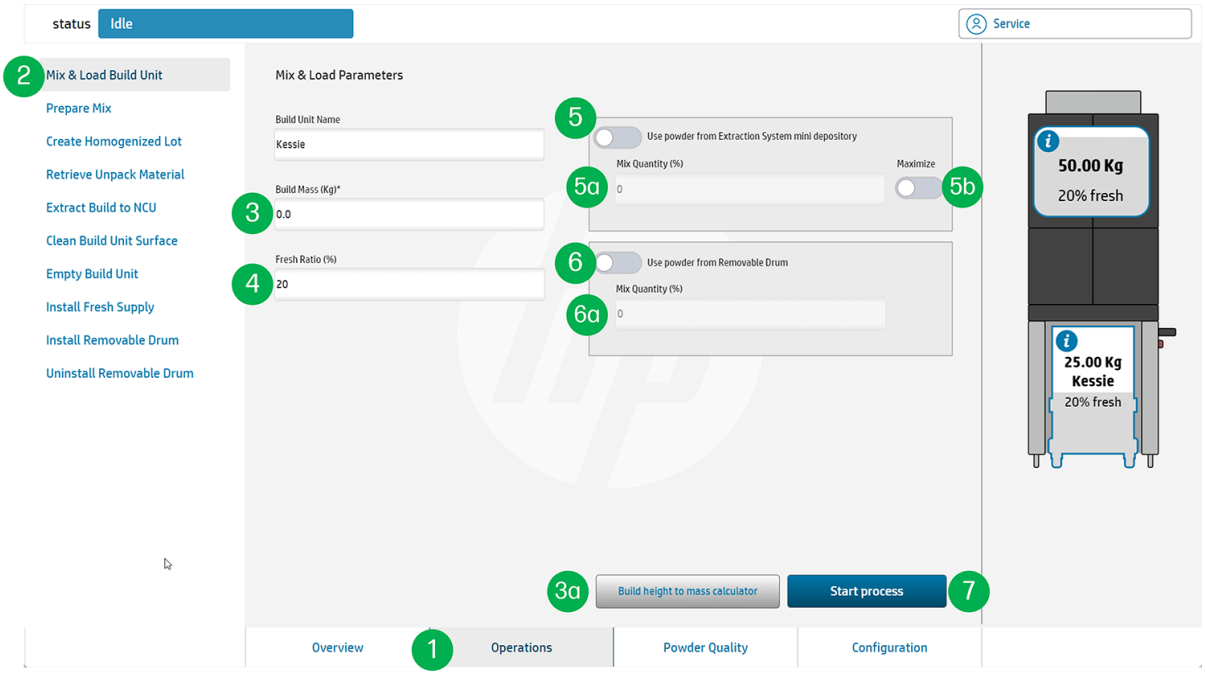
11. Once the operation is complete, a confirmation dialogue will appear.

NOTE: The exact amount taken from the selected source will be determined by the system and will depend on the amount available in the source container and the required target values. When the **Maximize** toggle is enabled, the amount can be limited by either the amount in the source container or by the combination of the target amount and target fresh percentage.

NOTE: *The build-unit name is filled in automatically when the build unit is inserted. This field can be edited, but the system will check the match when the operation starts.

NOTE: The powder quality input requirement depends on the settings that have been configured for the mix & load operation in the powder-quality settings menu, switching between **Optional**, **Mandatory**, and **Disabled**.

The steps in the workflow are illustrated below.



Workflow completion

If the workflow has been completed successfully, it means that the following criteria have been met:

- The build unit has been loaded with the requested amount and fresh percentage.
- No errors occurred during execution.

If the workflow failed to complete successfully, the reasons will be displayed on the operation result screen.

Workflow: Prepare mix

Use this operation to create a powder mix with the selected fresh percentage. The created mix will be stored in the load-system mixer container.

The following powder sources can contribute to the mix:

- Fresh powder from a fresh supply
- Unused premixed powder from the extract system mini-depository
- Recycled powder from the homogenizer (if available)
- Powder from a removable drum (if installed)

To create a powder mix, follow these steps:

1. Select **Operations** on the bottom menu to display the production workflows.
2. Select **Prepare Mix** on the left-hand side of the screen.

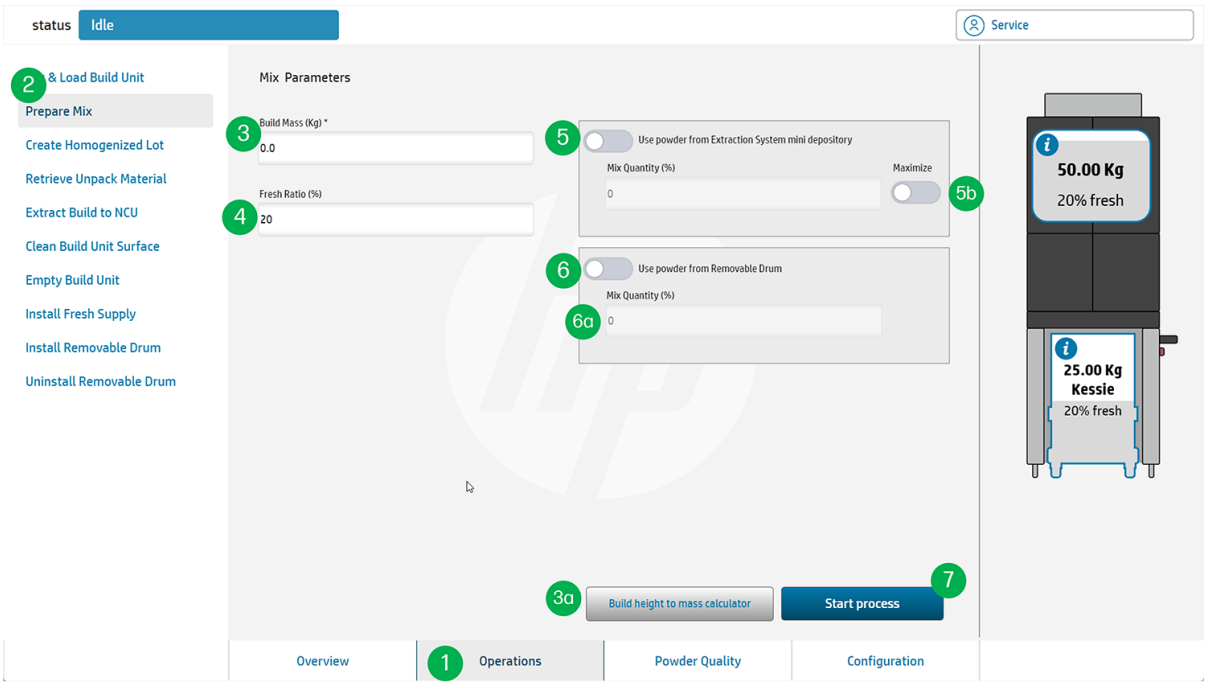
3. Enter the required target amount of mixed powder in kilograms.

> **NOTE:** If you would like a mass estimate, use the **Calculator** tool.
>
> This calculation is based on the build height and packing density of your application. It is a rough estimate that does not consider how the parts will be printed; you can fine-tune this amount as you develop your production process further.

4. Enter the required target fresh percentage of the mixed powder.
5. Optionally, you can activate the toggle **Use powder from extract system buffer** (A) if you want to use the powder stored in the extraction system as a source to achieve the target values.
   a. If you activate toggle A: Enter the percentage of powder of the total mix you want to use from the extraction system mini-depository.
   b. If you activate toggle (B): Activate the toggle **Maximize** (B) if you want the system to use the maximum possible amount of powder from the extraction system mini-depository.
6. Optionally, activate the toggle **Use powder from removable drum** (C) if you want to use powder from the removable drum.

   If you activated toggle C, enter the percentage of powder of the total mix you want to use from the removable drum.
7. Tap **Start process** to start the mix process.
8. You can monitor the progress of the operation by occasionally checking the operation screen.
9. Once the operation is complete, a confirmation dialogue will appear.

The steps in the workflow are illustrated below.



Workflow completion

If the workflow has been completed successfully, it means that the following criterion has been met:

- The mixer container of the load system contains the requested amount of powder, with the requested fresh percentage.

If the workflow failed to complete successfully, the reasons will be displayed on the operation result screen.

Workflow: Create homogenized lot

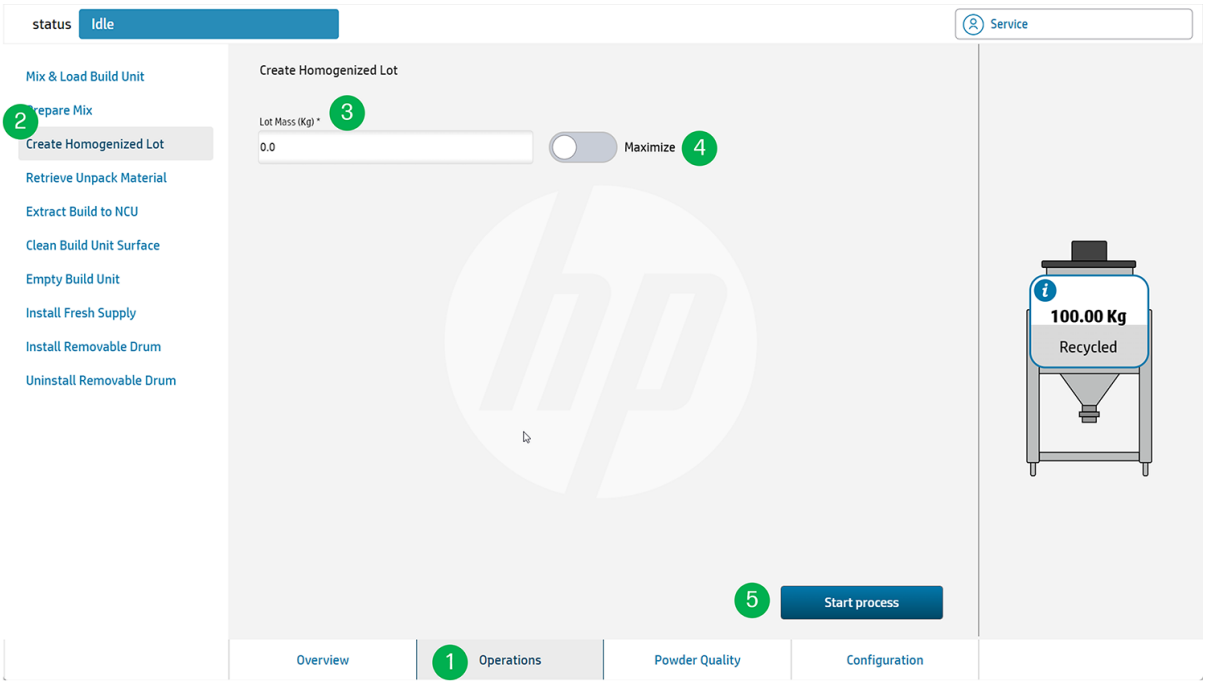
Use this operation to create a lot of up to 170 kg of homogenized recycled powder in the homogenizer by transporting recycled powder from the depository.

NOTE: The maximum weight of powder depends on the material type used.

To create a homogenized lot, follow these steps:

1. Select **Operations** on the bottom menu to display the production workflows.
2. Select **Create Homogenized Lot** on the left-hand side of the screen.
3. Enter the required mass of the lot in kilograms.
4. Optionally, you can activate the **Maximize** toggle if you want to fill the homogenizer to its maximum capacity or move all the powder available in the depository to the homogenizer.
5. Tap **Start process** to start the process.
6. You can monitor the progress of the operation by occasionally checking the workflow screen (A), the system light beacon, or the overview screen.
7. Once the operation is complete, a confirmation dialogue will appear.

The steps in the workflow are illustrated below.



Workflow completion

If the workflow has been completed successfully, it means that the following criteria have been met:

- No active errors were reported during the operation.
- The system is back to idle, and we can see on the screen that the homogenizer contains the requested amount of powder.

If the workflow failed to complete successfully, the reasons will be displayed on the operation result screen.

Workflow: Retrieve unpack material

Use this operation to retrieve unpacked material.

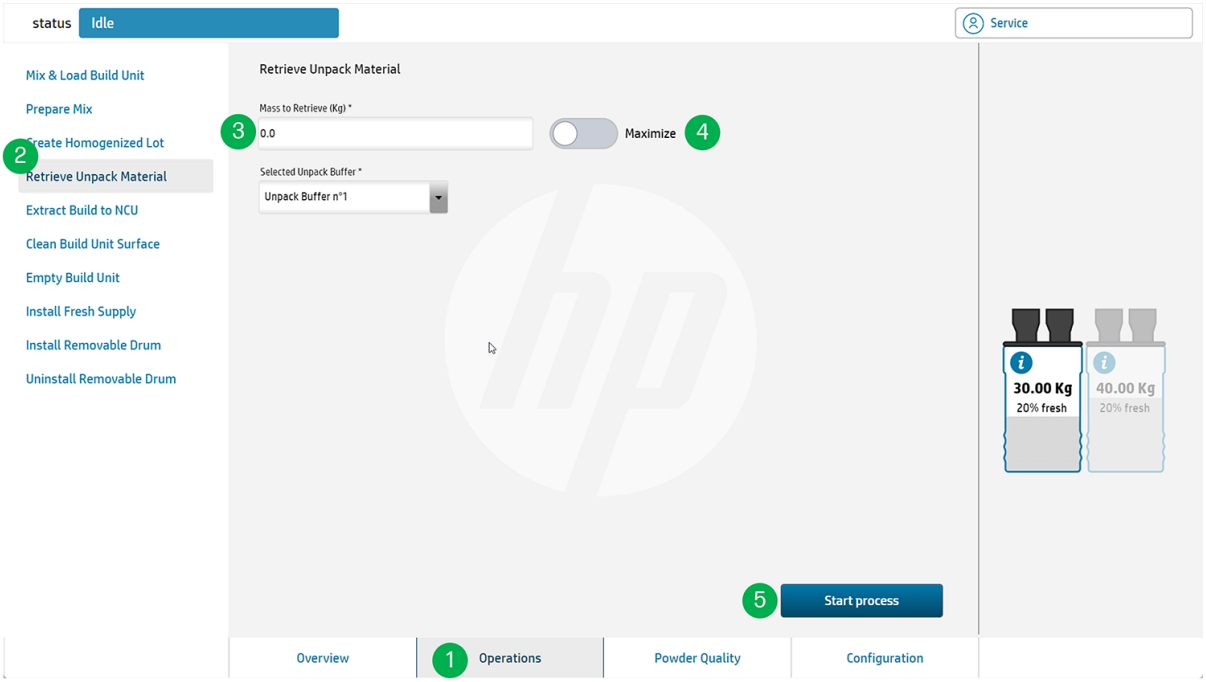
To move the powder from the unpacked powder container to the depository, follow these steps:

1. Select **Operations** on the bottom menu to display the production workflows.
2. Select **Retrieve Unpack Material** on the left-hand side of the screen.
3. If powder-quality sampling has been configured as required for this workflow, enter the following values:
   - B* value corresponding to the fresh powder (control value)
   - B* value corresponding to the measured unpacked powder (evaluation value).
4. Optionally, you can activate the **Maximize** toggle if you want to empty the mini-depository.
5. Tap **Start process** to start the process.
6. You can monitor the progress of the operation by occasionally checking the workflow screen (A), the system light beacon, or the overview screen.

7. Once the operation is complete, a confirmation dialogue will appear.

NOTE: The specific amount taken from the selected source will be determined by the system and will depend on the amount available in the source container and the required target values. When the **Maximize** toggle is enabled, the amount will be determined by either the amount in the unpack buffer or the capacity of the recycled depository.

The steps in the workflow are illustrated below.



Workflow: Extract build to NCU

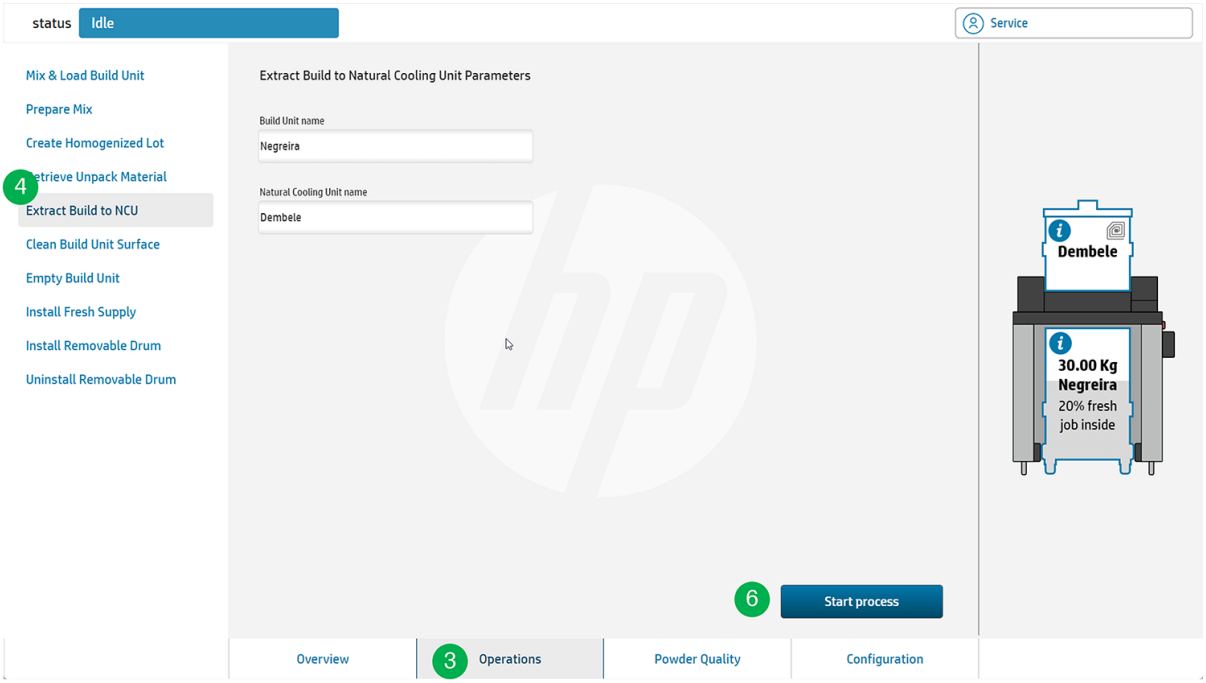
Use this operation to transfer a printed job to a Natural Cooling Unit (NCU).

To extract a build to an NCU, follow these steps:

1. Insert a build unit with a printed job (the build unit will auto-connect once inserted).
2. Connect the NCU, and check that it is correctly positioned and oriented. Its presence will be reported on the overview screen.

   The guillotine should be placed in the inner part of the machine, opposite to the user.
3. Select **Operations** on the bottom menu to display the production workflows.
4. Select **Extract Build to NCU** on the left-hand side of the screen.
5. Wait for the build-unit name and NCU name to appear on the screen.
6. Tap **Start process** to start the process.
7. You can monitor the progress of the operation by occasionally checking the workflow screen (A), the system light beacon, or the overview screen.
8. Once the operation is complete, a confirmation dialogue will appear.

The steps in the workflow are illustrated below.



Workflow: Clean build-unit surface

Use this operation to vacuum the remaining powder that can be seen on the build-unit platform and trays after the Extract Build to NCU workflow. All elements that need cleaning are listed on the workflow screen.

This operation can be activated automatically after Extract Build to NCU if configured in the Operations setting of the **Configuration** tab.

The following preconditions must be met before cleaning the build-unit surface:

- The build unit is correctly installed.
- No error alarms are reported affecting the build unit, the extraction system, or the vacuum system.
- The recycled depository is not full.

To clean the build-unit surface, follow these steps:

1. With a build unit correctly installed, select **Operations** on the bottom menu to display the production workflows.
2. Select **Clean Build Unit Surface** on the left-hand side of the screen.
3. Tap **Start process** to start the process.
4. Clean the areas covered with powder. Remove the vanes to clean them.
5. You can monitor the progress of the operation by occasionally checking the workflow screen (A), the system light beacon, or the overview screen.

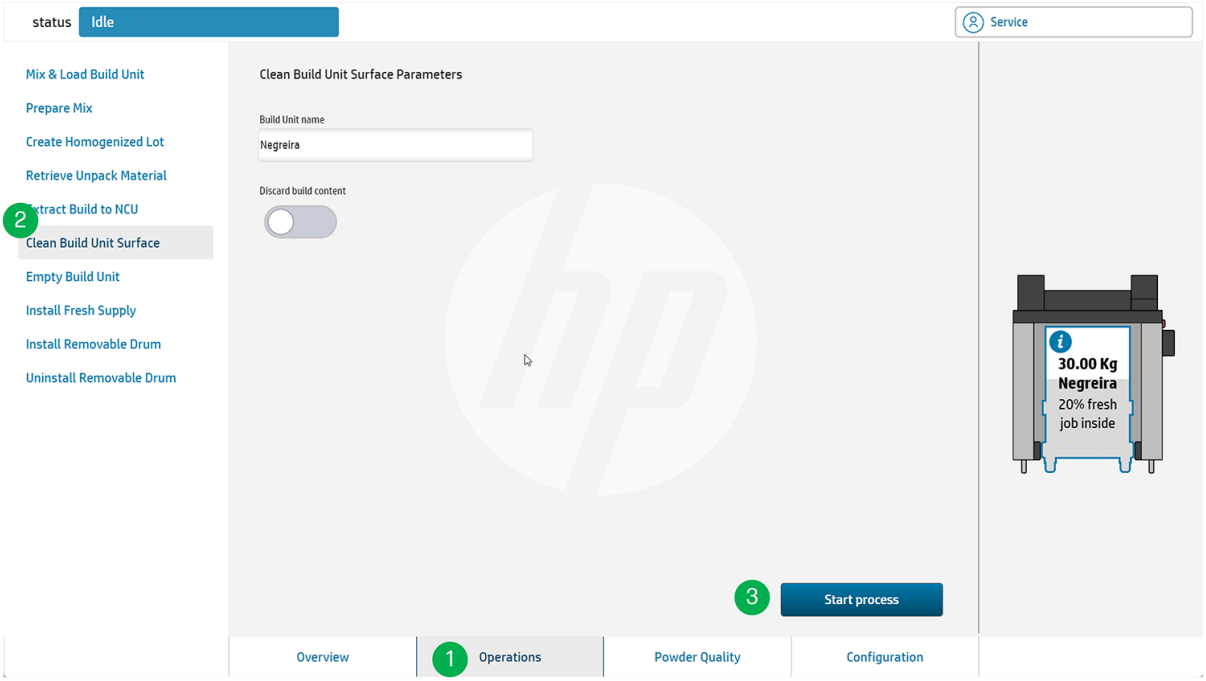
6. When all areas have been cleaned, put back the vanes that you removed earlier.

⚠ **CAUTION:** Take care to position the vanes correctly when putting them back onto the build unit.

7. Tap **Finish** on the progress screen.

8. Once the operation is complete, a confirmation dialogue will appear.

The steps in the workflow are illustrated below.



Workflow: Empty build unit

Use this operation to reclaim the unused powder remaining inside the build-unit container. This powder will be stored in the extraction system mini-depository, so that it can be used later for future mixes.

The following preconditions must be met before emptying the build unit:

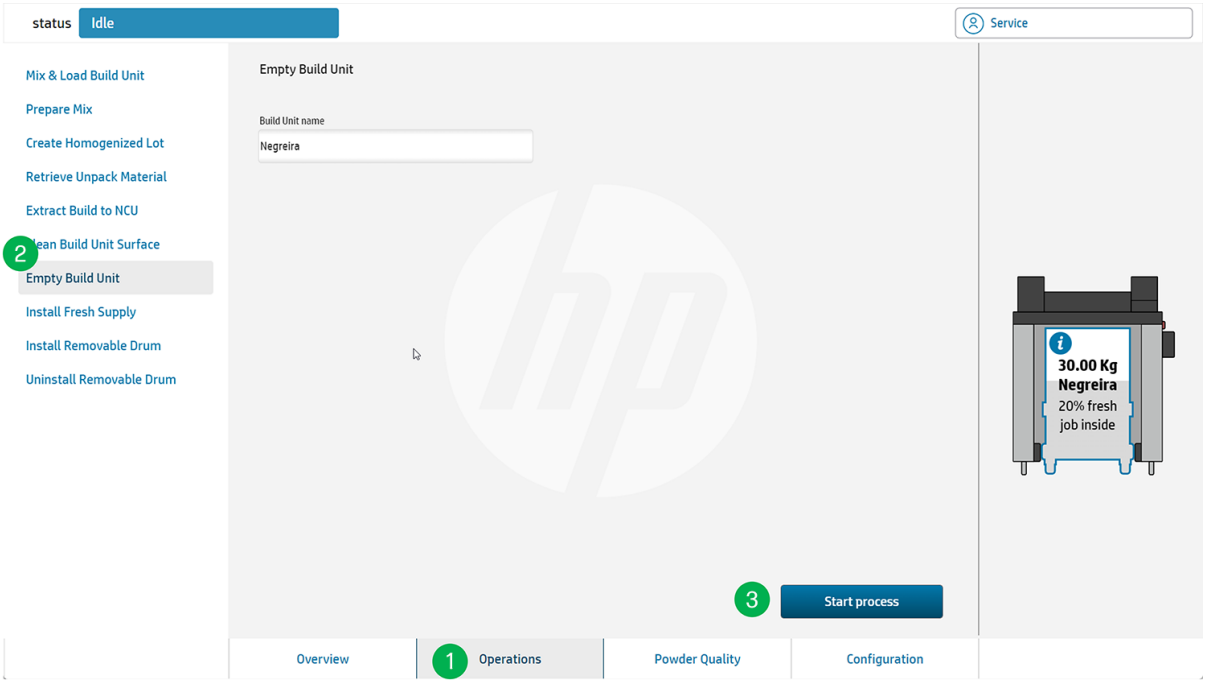
- Build unit is inserted and installed in the extraction system.
- Build-unit vanes have been removed and stored in the lateral vane holder of the extraction system.
- Build-unit cap has been removed and stored in the lateral cap holder of the extraction system.
- Empty-build-unit tool is correctly positioned on top of the build unit.
- No error alarms have been detected in the extraction system or the vacuum system.
- No other process is currently running in the system that requires the use of the vacuum System or the extraction system.

To empty the build unit, follow these steps:

1. With a build unit correctly installed in the extraction system, select **Operations** on the bottom menu to display the production workflows.

2. Select **Empty Build Unit** on the left-hand side of the screen.
3. Tap **Start process** to start the process.
4. Connect the empty-build-unit tool to the build unit.
5. When the operation is complete, tap **OK** on the confirmation screen.
6. You can monitor the progress of the operation by occasionally checking the workflow screen (A), the system light beacon, or the overview screen.
7. Once the operation is complete, a confirmation dialogue will appear.

The steps in the workflow are illustrated below.



Workflow: Install fresh supply

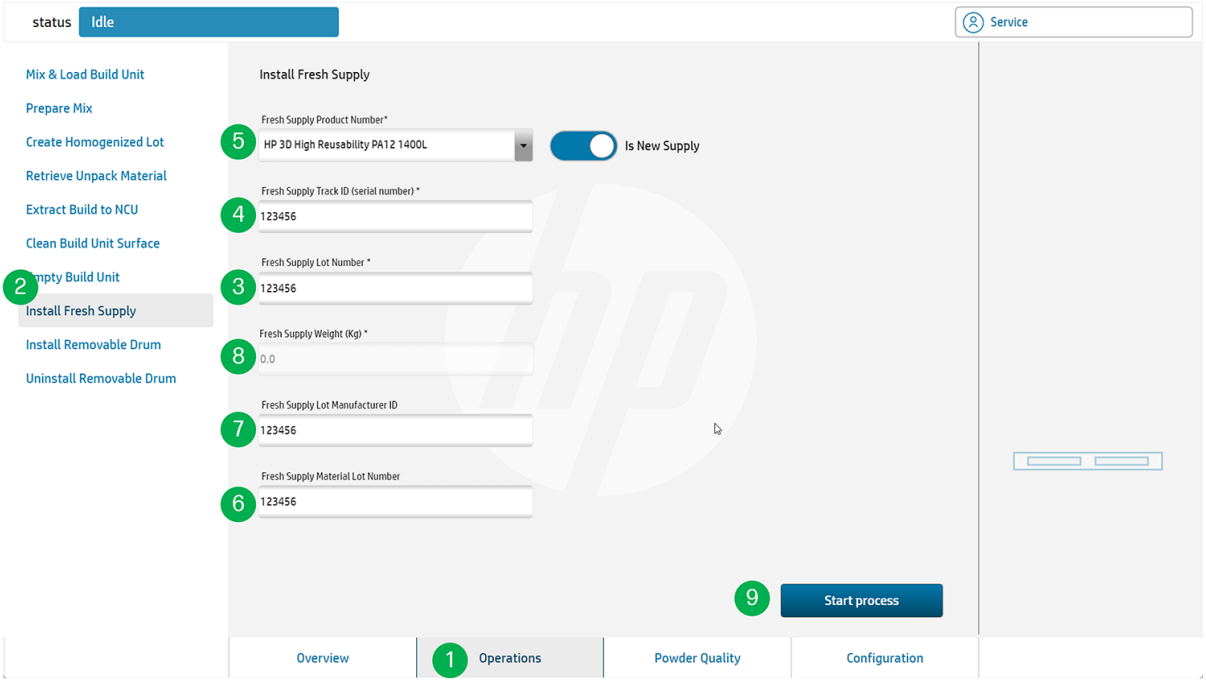
Use this operation to install a fresh supply.

To install a fresh supply, follow these steps:

1. Select **Operations** on the bottom menu to display the production workflows.
2. Select **Install Fresh Supply** on the left-hand side of the screen.
3. Enter the fresh-supply lot number.
4. Enter the fresh-supply track ID (serial number).
5. Optionally, enter the fresh-supply product number.
6. Optionally, enter the fresh-supply material lot number.
7. Optionally, enter the fresh-supply lot manufacturer ID.
8. Enter the fresh-supply weight in kilograms.

9. Tap **Start process** to start the process.
10. You can monitor the progress of the operation by occasionally checking the workflow screen (A), the system light beacon, or the overview screen.
11. Once the operation is complete, a confirmation dialogue will appear.

The steps in the workflow are illustrated below.



Workflow completion

If the workflow has been completed successfully, it means that the following criteria have been met:

- The bulk source has been installed properly and now appears on the overview system with the determined amount.
- No alarms or errors have been detected during execution.

Workflow: Install removable drum

Use this operation to install a removable drum.

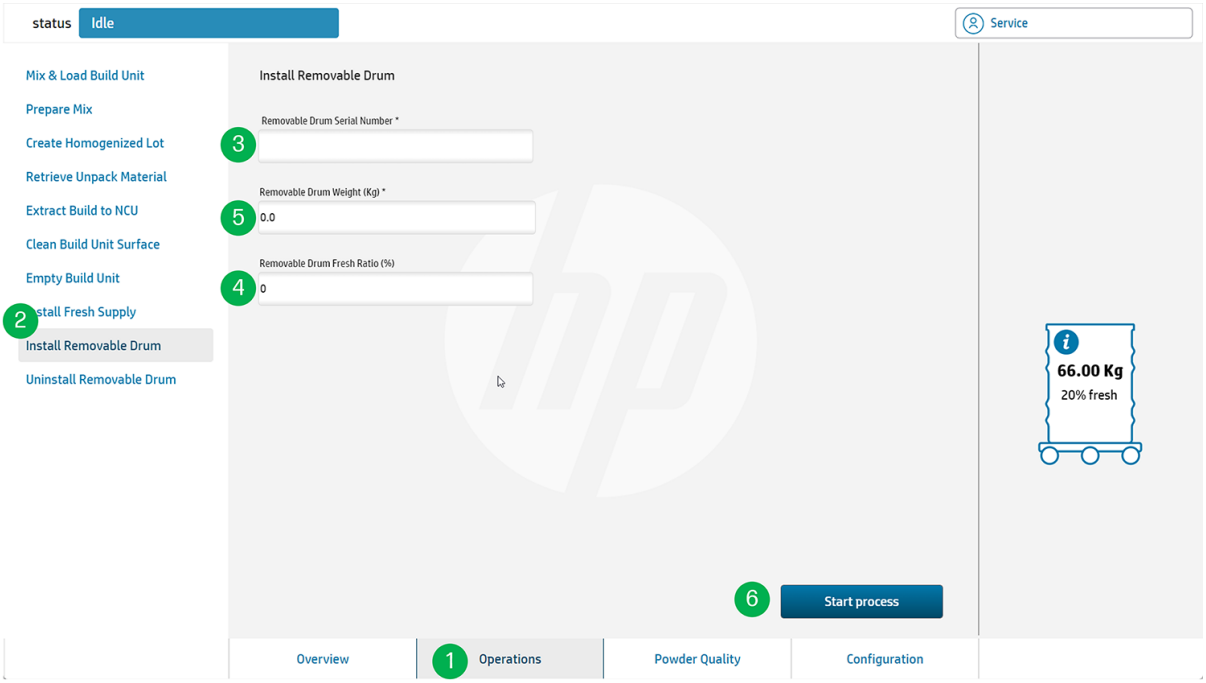
To install a removable drum, follow these steps:

1. Select **Operations** on the bottom menu to display the production workflows.
2. Select **Install Removable Drum** on the left-hand side of the screen.
3. Enter the removable-drum serial number.
4. Enter the removable-drum fresh percentage.
5. Enter the removable-drum weight in kilograms.
6. Tap **Start process** to start the process.

7. You can monitor the progress of the operation by occasionally checking the workflow screen (A), the system light beacon, or the overview screen.

8. Once the operation is complete, a confirmation dialogue will appear.

The steps in the workflow are illustrated below.



Workflow completion

If the workflow has been completed successfully, it means that the following criteria have been met:

- The removable-drum source has been installed properly and now appears on the overview system with the determined amount.
- No alarms or errors have been detected during execution.

Powder quality

The HP 3D JF Powder Handling Automation Solution allows the operator to enable, visualize, and track the powder quality of the different operations.

Powder sample tracking

To monitor powder quality accurately, the operator should take samples of the powder before or after certain operations.

Table 6-3 Powder sampling

Workflow	Sample before	Sample after
Mix and load	-	Recommended
Load	-	Recommended
Create homogenized lot	-	Optional

Table 6-3 Powder sampling (continued)

Workflow	Sample before	Sample after
Retrieve unpack	Recommended	-

The quality attribute the system can track is called B* (B star), and it is used to monitor the powder whiteness.

The field 'B* fresh' refers to the fresh powder, used as a control value.

The field 'B* used' refers to the recycled or the mixed powder we want to measure.

Powder-quality graphs

The graphs are interactive and provide tools for zooming in/out, panning timeline, and so on.

Four graphs are available:

- **Evolution of b* all**: This view combines the three charts of b* measurements corresponding to the three operations with which powder samples can be associated.
- **Evolution of b* Load**: Detailed view of the b* values associated with build-unit load operations.
- **Evolution of b* Create Lot**: Detailed view of b* values associated with create homogenized lot operations.
- **Evolution of b* Retrieve Unpack**: Detailed view of b* values associated with retrieve unpack operations.

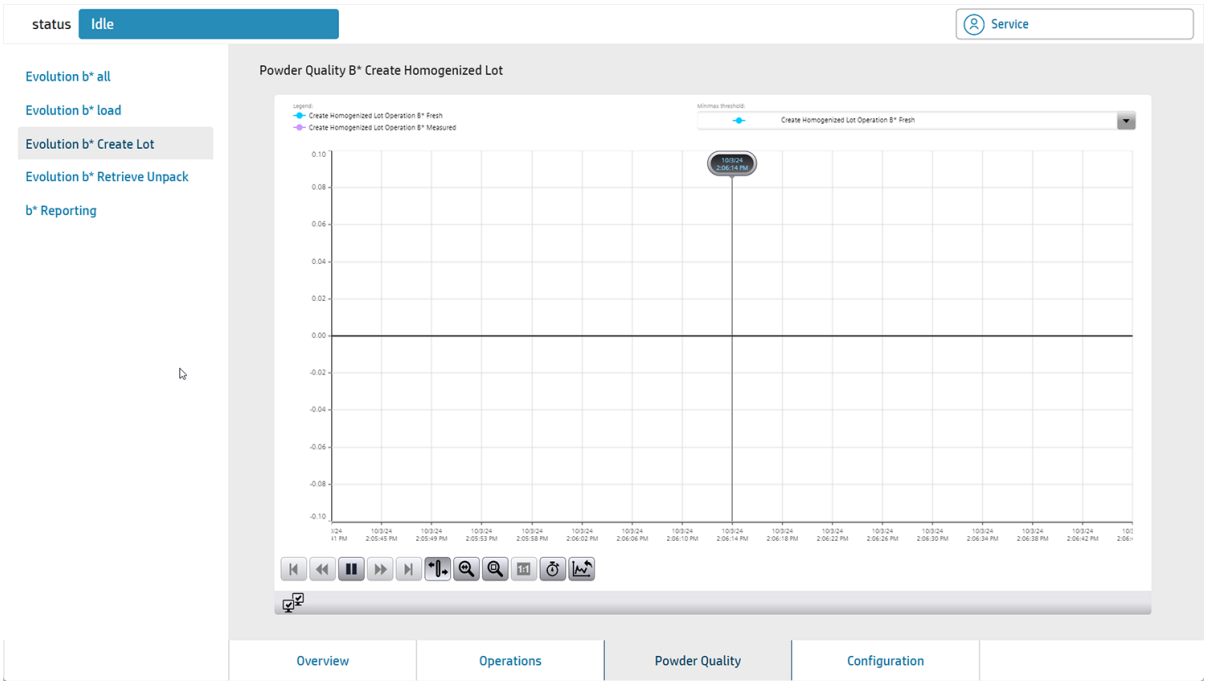
Table 6-4 Graph actions

Button	Name	Function
	First record	Shows the trend direction starting with the first logged value.
	Previous record	Shows the trend direction of the previous time interval.
	Start/stop	Stops and starts the trend update. Started: The trend is continuously updated. It always shows the latest values. Stopped: New values are buffered and updated as soon as you start the trend update again.
	Next record	Shows the trend direction of the next time interval.
	Last record	Shows the trend direction up to the last logged value.
	Ruler	Determines the coordinates of a point of the trend.

Table 6-4 Graph actions (continued)

Button	Name	Function
	Zoom time axis +/–	Enlarges or reduces the time axis display.
	Zoom value axis +/–	Enlarges or reduces the value axis display.
	Zoom area	Increases the size of any section of the trend window.
	Original view	Switches from the magnified trend control back to the normal view.
	Select time range	Opens the dialogue for setting the time range displayed in the trend window.
	Export	Opens the dialogue for saving the trend data in CSV format.

NOTE: To see a specific value in the timeline, you need to press the stop button and then move.



Configuration tab

The Configuration tab provides access to system settings, which are grouped into several categories.

- General settings
- Operation settings
- Powder-quality settings

Access to these settings is restricted to users with ProcessEngineer permissions or higher.

General settings

These settings include language, units of measurement, and so on.

Operation settings

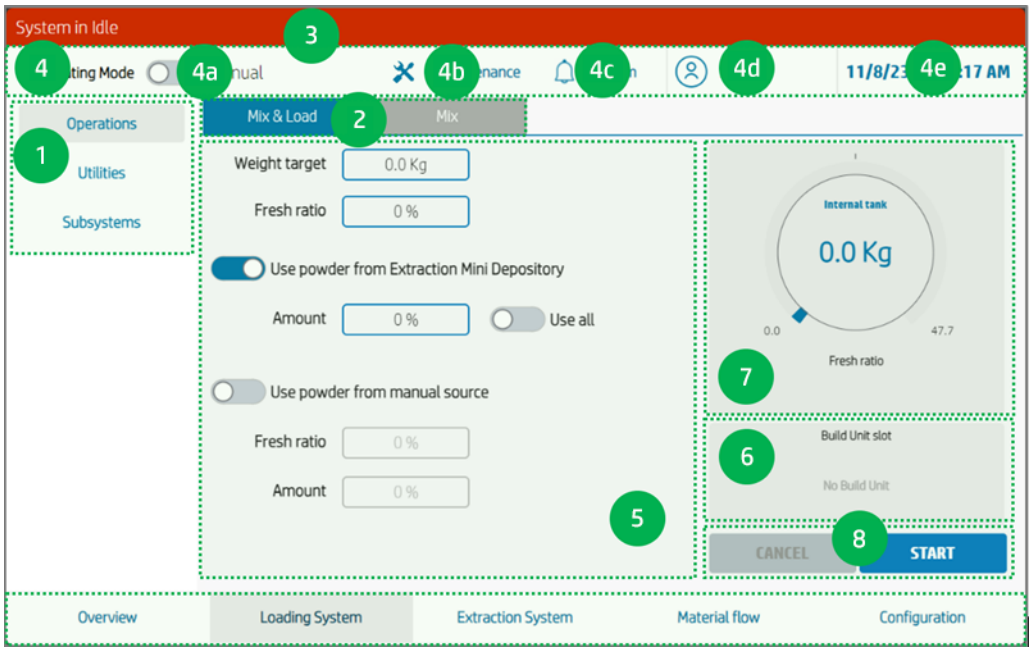
These are settings related to operations, such as automatically cleaning the build-unit surface after extracting a build to the NCU.

Powder-quality settings

These are settings related to powder quality, such as b* acceptable ranges, or whether tracking is enabled in various operations.

Human-machine interface

The human-machine interface is operated by touch.



It contains the following functions and navigation elements:

1. **Application switcher** switches between Overview, Loading System, Extraction System, Material Flow, and Configuration applications. The side menu switches between various functions within the selected application.

NOTE: Not all applications have a side menu.

2. **Tabs** switch between different options of the selected function in the side menu.

NOTE: Not all applications have a side menu.

3. **Status indicator** provides a color-coded visual and textual feedback of the state of the device. The status indicator is visible in every situation.
4. **System header** provides visual feedback of the state of several key system properties. The system header is visible in every situation.
    a. Operation mode: Alternates between production mode (subsystems are operated by automatic processes) and manual mode (subsystems are operated independently from the HMI by the user). Manual mode is used for maintenance/service interventions or repairs.
    b. Maintenance toggle: Displays an overview of maintenance actions and their required service interval. See Hardware maintenance on page 96.
    c. Alarm toggle: Provides a list of system notifications.
    d. Login status: Provides visual feedback of the user login state.
    e. Date and time.
5. **Content area** displays the editable properties of a selected workflow.
6. **Build-unit slot indicator** indicates whether a build unit is inserted and provides relevant data.
7. **Visualization area** displays the key data of the selected workflow.
8. **Action buttons**: If a production or utility workflow is selected, these buttons can start, stop, or cancel the operation.

Overview screen

The overview screen provides a visual overview of the following elements:

- All solution assets and their statuses.
- Detailed information on a selected asset.

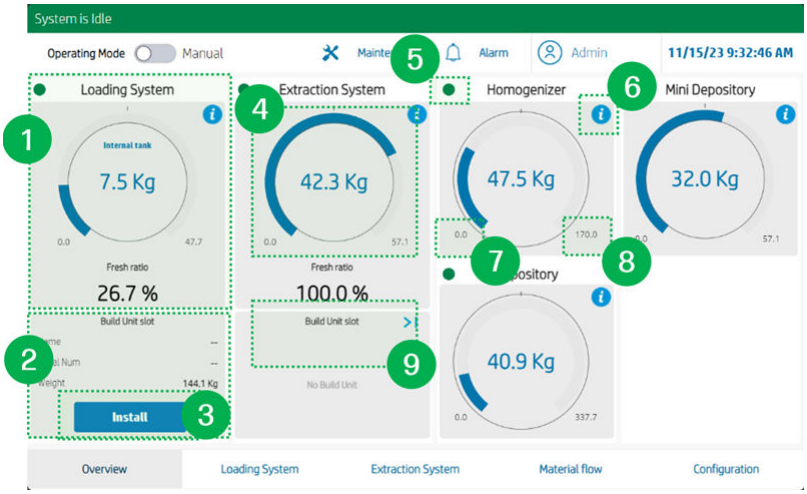
Preconditions

The overview screen can always be accessed and will not start any operations. Therefore, preconditions do not apply.

Screen overview

The overview screen displays the status of the system components.

1. **Asset display**: Provides information about a specific asset of the system.
2. **BU slot indicator**: Indicates whether a build unit is inserted and provides relevant data.
3. **BU Installation button**: If a build unit is inserted, this button installs or uninstalls it.
4. **Asset current mass**: Provides a color-coded visual and text feedback of the amount of material stored in the asset. The status indicator is visible in every situation when there is powder in the system. It also indicates the powder's fresh ratio.
5. **Asset status**: Provides color-coded visual feedback of the state of the asset. The status indicator is visible in every situation.
6. **Asset detailed information**: Provides detailed information on the asset.
7. **Min mass**: Minimum capacity of the asset in kilograms.
8. **Max mass**: Maximum capacity of the asset in kilograms.
9. **Installed unit**: Alternates between the build unit and natural cooling unit information.



Powder types

The assets displayed on the overview screen can contain different types of powder depending on the process that generates or transforms that powder.

The types of powder contained in the system are the following:

- Mixed unused: This is the powder contained by the extraction system mini-depository. It is recovered by the empty-build-unit operation.
- Fresh: This is the powder contained in the fresh powder supplies connected to the system.
- Recycled: This is the powder contained in the mini-depository and the 800 L recycled depository. This powder is brought to the 800 L depository by the retrieve-unpack and clean-build-unit-surface operations, respectively.

- Homogenized recycled: This is the powder contained in the recycled homogenizer, and it is transported there from the 800 L depository whenever the create-homogenized-lot operation is performed.
- Mixed: This is the powder contained in the load-system mixer container, ready to be loaded into a build unit. It is transported there and mixed when the mix (or mix & load) operation is performed.

Loading system

Workflow: Mix & load

Use this operation to create a powder mix with a selected fresh ratio and/or load it into a build unit in the same operation.

Workflow preconditions

Various preconditions must be met to initiate the mix-and-load workflow.

- Build unit inserted.

IMPORTANT: The build unit must be inserted without the central cap, otherwise the process will fail. The cap can be stored in the parking location at the right side of the machine.

- System status is reported as idle.
- Enough powder in the containers to create the mix.
- No other operation running that requires any of the assets involved (vacuum system, loading system, homogenizer).

Steps overview

Follow these steps to mix and load a build unit.

1. Tap the **Loading System** tab at the bottom of the front-panel screen to display workflows that apply to the loading system.
2. Tap **Operations** on the left-hand menu to display workflows that apply to production.
3. Tap the **Mix & Load** tab at the top of the screen to display the properties for Mix & Load.
4. Enter the required target amount of mixed powder in kilograms.

NOTE: The target is the amount of powder that you want inside the build unit at the end of the load; not the amount of powder to have in the mixer.

- Optional. To get a mass estimation, use the **Calculator** tool.

NOTE: This calculation will be based on the build height and packing density of your application. This is a default estimate that does not consider how the parts will be printed; you may fine-tune this amount as you develop your production process further.

5. Enter the required target fresh ratio of the mixed powder in percentage.
6. Optional: Activate the toggle to use powder from the extraction mini-depository (A) if you want to use the powder in the extraction system mini-depository as a source to achieve the target values.

NOTE: Bear in mind that the type of powder stored in the extraction system mini-depository is mixed unused powder that has also a fresh ratio.

a. If you activate toggle A: Enter the amount of powder of the total mix you want to use from the extraction system in percentage. For example, enter the value 20 if you want the powder from the extraction system to be 20% of your total mix.

b. If you activate toggle A and **Maximize** (B) the system will use the maximum possible amount of powder from the extraction system. This option is convenient if you want to make sure you consume already premixed powder from this source first before incorporating more fresh powder into your mix.

7. Optional: Activate the toggle **Use powder from manual source** (C) if you want to use powder from the manual source.

   If you activated toggle C: Enter the amount of powder of the total mix you want to use from the manual source in percentage, and also enter the fresh ratio of powder that you want to use from the manual source as a percentage.

8. Tap **Start** to start the mix & load process.

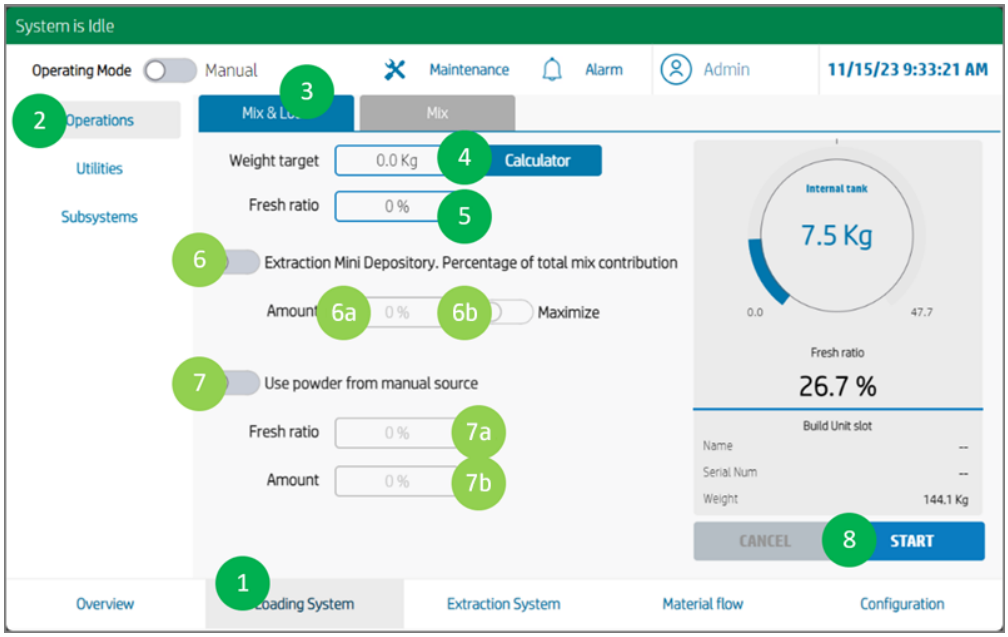
9. Monitor the progress by occasionally checking the workflow screen or the system light beacon.

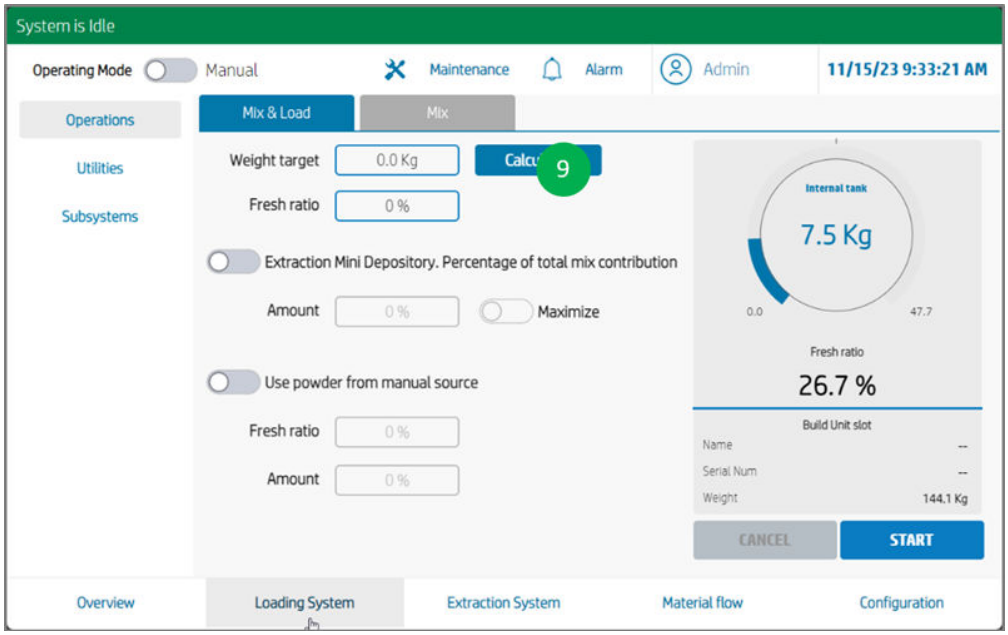
10. When the process has finished, a confirmation dialog will be displayed.

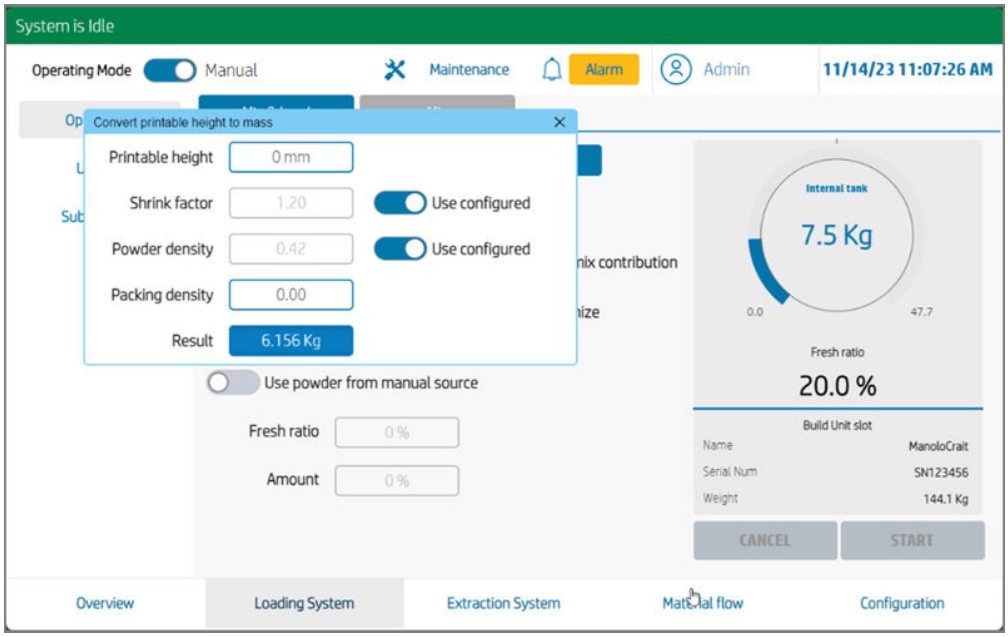
⚠ CAUTION: The exact amount from the selected source will be determined by the system and will depend on the amount available in the source container and the required target values. When enabling the **Maximize** toggle, the amount may be limited by either the amount in the source container or by the combination of the target amount and target fresh ratio

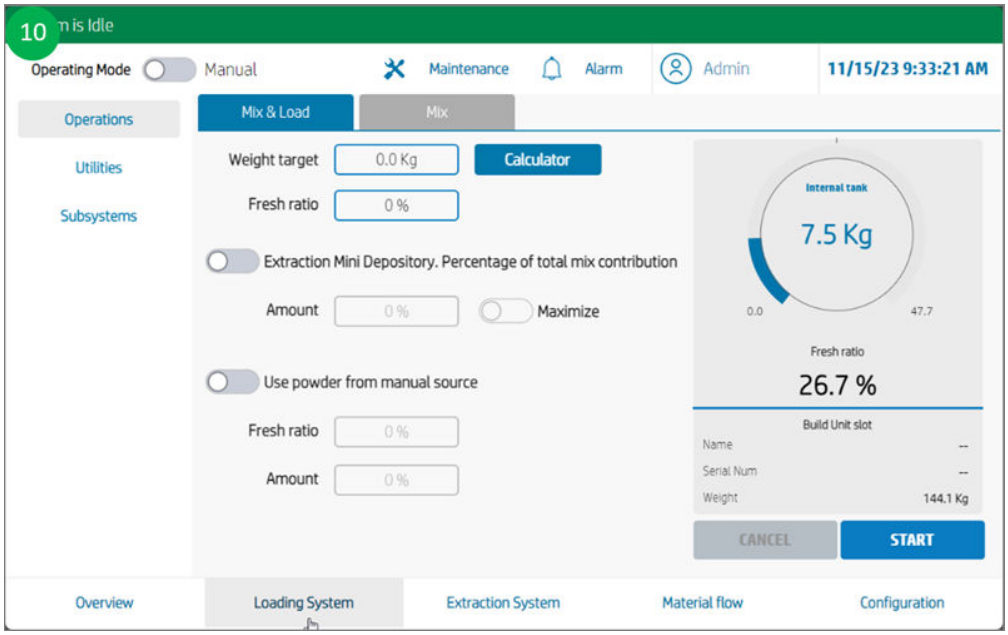
Workflow illustration

These are the steps in the workflow.




System is Idle
Operating Mode
Manual
Maintenance
Alarm
Admin
11/15/23 9:33:21 AM
Operations
Utilities
Subsystems
Mix & Load
Mix
Weight target
0.0 Kg
Calcu
9
Fresh ratio
0 %
Extraction Mini Depository. Percentage of total mix contribution
Amount
0 %
Maximize
Use powder from manual source
Fresh ratio
0 %
Amount
0 %
Internal tank
7.5 Kg
0.0
47.7
Fresh ratio
26.7 %
Build Unit slot
Name
--
Serial Num
--
Weight
144.1 Kg
CANCEL
START
Overview
Loading System
Extraction System
Material flow
Configuration


System is Idle
Operating Mode
Manual
Maintenance
Alarm
Admin
11/14/23 11:07:26 AM
Convert printable height to mass
Printable height
0 mm
Shrink factor
1.20
Use configured
Powder density
0.42
Use configured
Packing density
0.00
Result
6.156 Kg
Use powder from manual source
Fresh ratio
0 %
Amount
0 %
Internal tank
7.5 Kg
0.0
47.7
Fresh ratio
20.0 %
Build Unit slot
Name
ManoloCrait
Serial Num
SN123456
Weight
144.1 Kg
CANCEL
START
Overview
Loading System
Extraction System
Configuration



Workflow success

If these criteria are met, the workflow has been completed successfully.

- The build unit has been loaded with the requested fresh ratio.
- No alarms or errors have been raised during execution.

Workflow: Mix

Use this operation to create a powder mix with the selected fresh ratio. The created mix will be stored in the load-system mixer container.

The following powder sources can contribute to the mix:

- Fresh powder from a fresh supply
- Unused premixed powder from the extraction system mini-depository
- Recycled powder from the homogenizer (if available)
- Powder from a removable drum (manually indicating the contained fresh ratio)

Workflow preconditions

Various preconditions must be met to initiate the mix workflow.

- The system has no active error alarms.
- The system is not in maintenance manual control mode.
- The contributing containers (powder sources) contain the required amount of powder for the mix.
- The mixer is not already full.

Steps overview

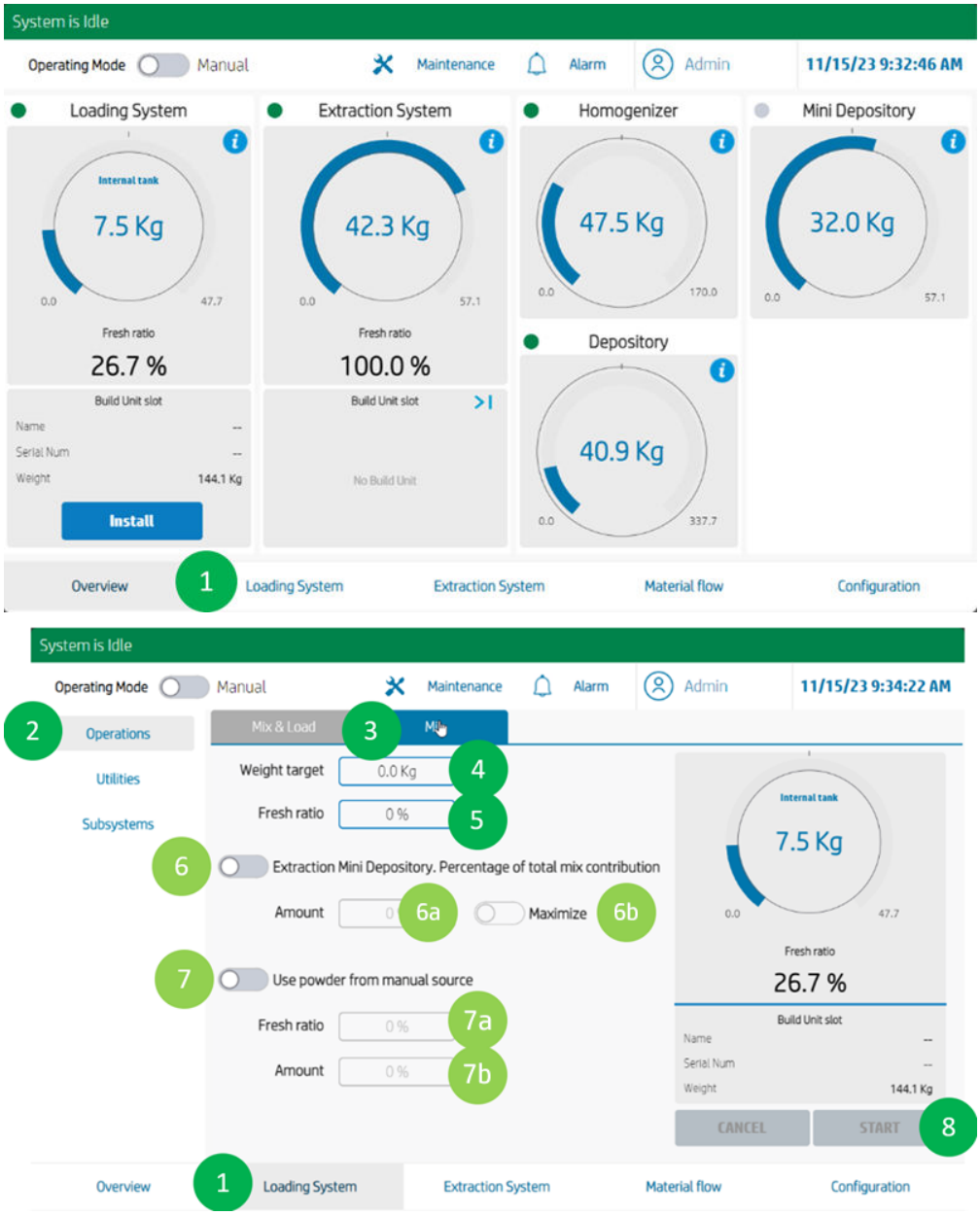
Follow these steps to create a powder mix.

1. Tap the **Loading System** tab at the bottom of the front-panel screen to display workflows that apply to the loading system.
2. Tap **Operations** on the left-hand menu to display workflows that apply to production.
3. Tap the **Mix** tab at the top of the screen to display the properties for the mix.
4. Enter the required target amount of mixed powder in kilograms.
5. Enter the required target fresh ratio of the mixed powder in percentage.
6. Optional: Activate the toggle **Use powder from Extraction System buffer** (A) if you want to use the powder in the extraction system as a source to achieve the target values.
    a. If you activated toggle A: Enter the amount of powder that you want to use from the extraction system in percentage.
    b. If you activated toggle A and **Maximize** (B), the system will use the maximum possible amount of powder from the extraction system.
7. Optional: Activate the toggle **Use powder from Manual Source** (C) if you want to use powder from the manual source.

    If you activated toggle C: Enter the amount of powder that you want to use from the manual source in percentage and also enter the fresh ratio as a percentage of the powder stored in the manual source.
8. Tap **Start** to start the mix process.
9. Monitor the progress by occasionally checking the operation screen.
10. When the process has finished, a dialog with the confirmation message will be displayed.

Illustrated overview

These are the steps in the workflow.



Workflow success

The workflow has been completed successfully if the mixer container of the load system contains the requested amount of powder with the requested fresh percentage.

Workflow: Empty internal tank

Use this operation when you need to empty the contents of the loading-system mixer to a removable drum.

Workflow preconditions

Various preconditions must be met to initiate the empty-internal-tank operation.

- The system has no active error alarms affecting the load system.

- The system is not set in Maintenance ‘manual subsystem control’ mode.
- The empty removable drum is inserted in the load-system build-unit slot.
- The load-system mixer contains some powder you want to remove.

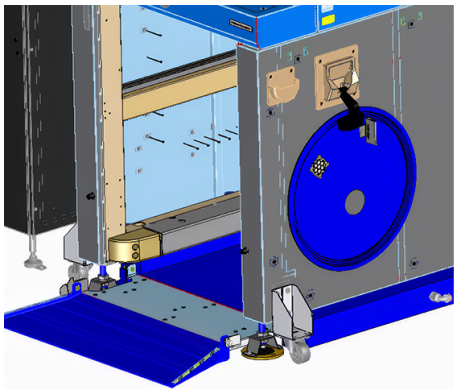
Steps overview

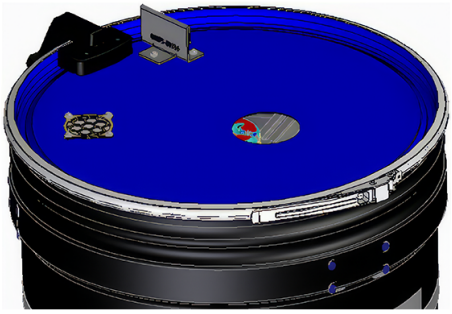
Follow these steps to empty the internal tank.

⚠ **WARNING!** Explosion hazard. Hot surface, mechanical and electrical sparks, static electricity may be generated.

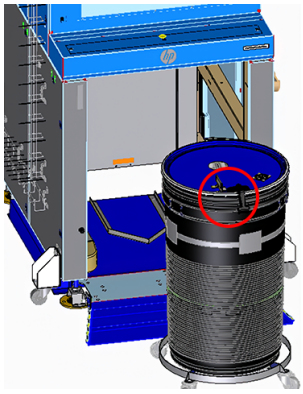
⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

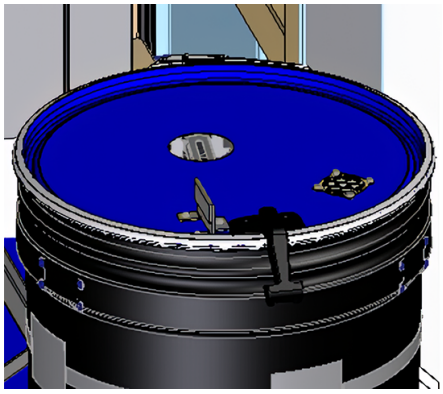
1. Ensure that you have an empty tank ready to be inserted in the system.
2. Place the lid located at the right side of the loading station on top of the tank and close the clamp.

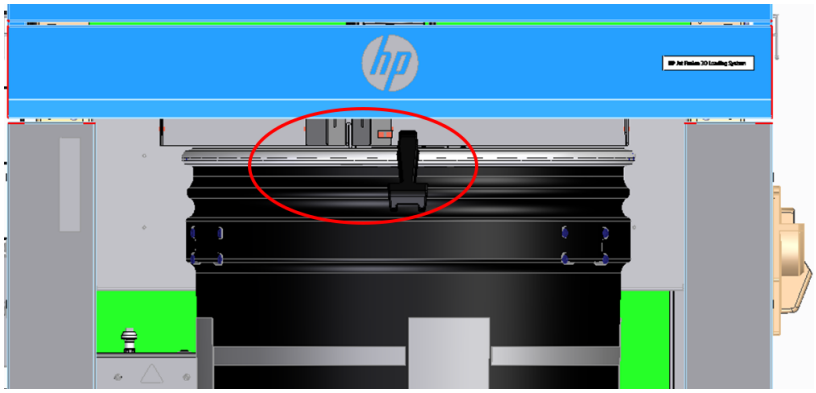




3. Insert the tank into the loading system, ensuring that the metal fin on the lid is inserted into the guides located in the structure.



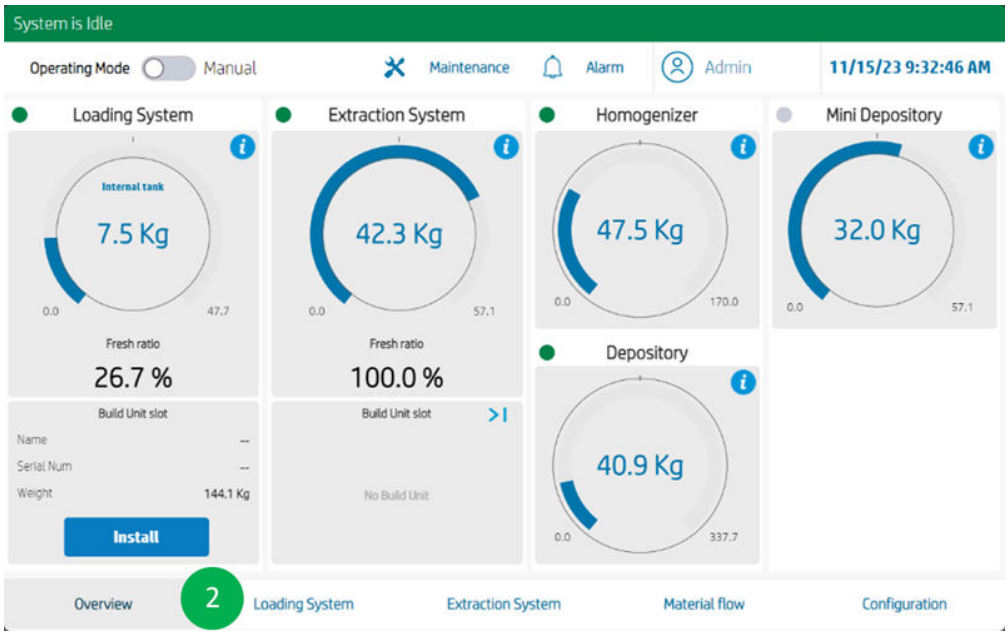


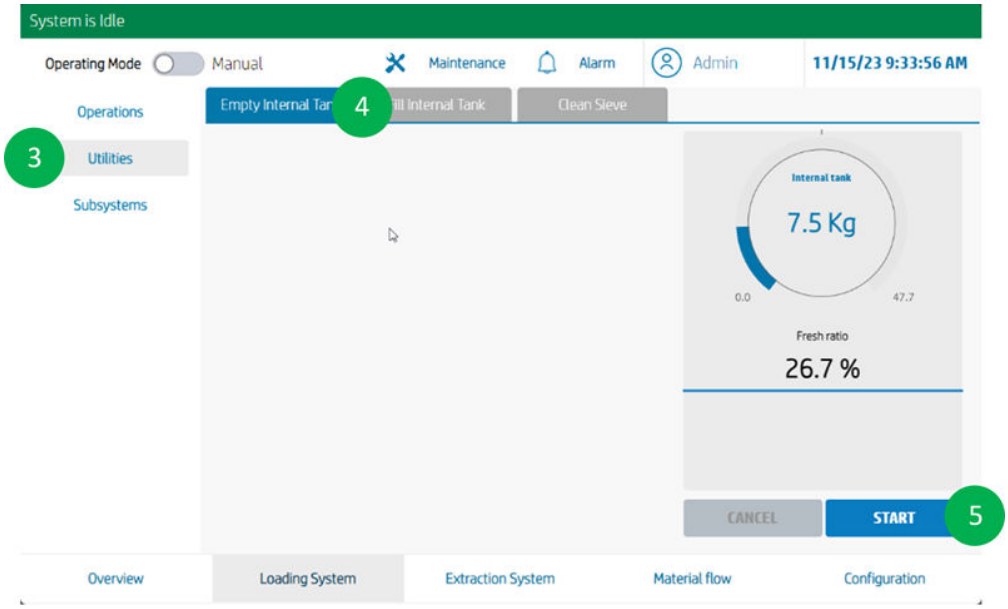


4. Tap the **Loading System** tab at the bottom of the front-panel screen to display workflows that apply to the loading system.
5. Tap **Utilities** on the left-hand menu.
6. Tap the **Empty internal tank** tab.
7. Tap **Start** to start the empty-internal-tank operation.
8. Tap **OK** when the process is finished.
9. Once the **Process completed** message has been displayed by the front panel, remove the tank from the loading system.
10. Open the clamp to remove the empty lid. Put a blind lid onto the tank and close the clamp.
11. Using an external vacuum cleaner, clean the empty lid and park it at the side of the loading system.
12. Empty or store the tank.

Illustrated overview

These are the steps in the workflow.





Workflow success

The workflow has been completed successfully if these criteria are met.

- The loading-system mixer is empty.
- The removable drum can be removed from the loading-system slot.

Workflow: Fill internal tank

Use this utility when you need to transport powder manually to the internal tank in the loading system from one of the sources available in the system.

Workflow preconditions

Various preconditions must be met to initiate the fill-internal-tank operation.

- No active error alarms affecting the load system.
- Powder available in the selected source for transport.
- The load-system mixer is not full of powder.

Steps overview

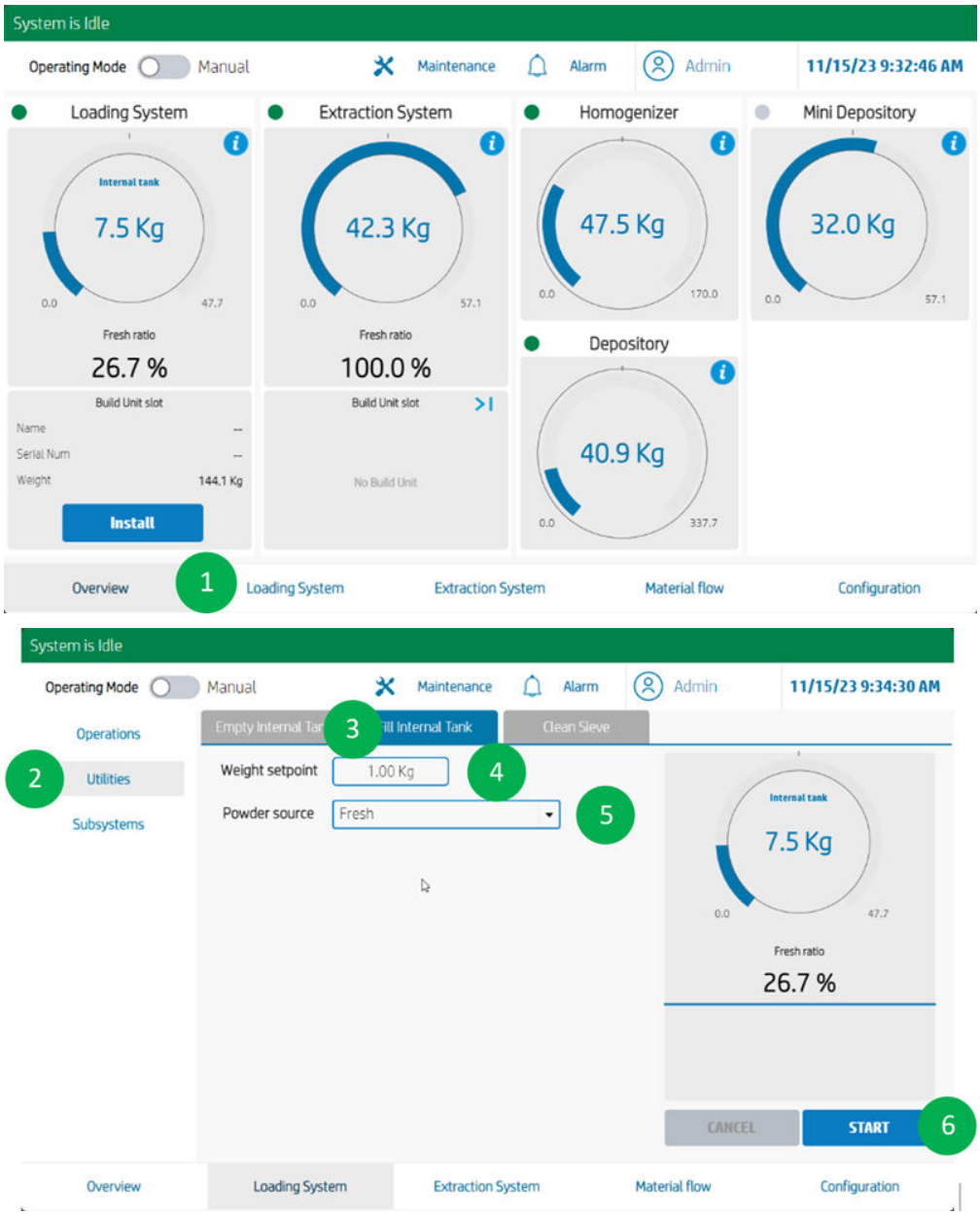
Follow these steps to fill the internal tank.

1. Tap the **Loading System** tab at the bottom of the front-panel screen to display the corresponding workflows.
2. Tap **Utilities** on the left-hand menu.
3. Tap the **Fill Internal Tank** tab.
4. Select the desired target weight to transport.
5. Select the powder source.

6. Tap **Start** to start the mix-internal-tank process.

Illustrated overview

These are the steps in the workflow.



Workflow success

The workflow has been completed successfully if the selected amount of powder has been successfully transported to the loading-system mixer container.

Workflow: Clean sieve

Use this utility to self-vacuum the sieve mesh of the loading system. Note that this operation is performed automatically after every build-unit load operation. However, it is also available as a utility that can be started manually if needed.

Workflow preconditions

These preconditions must be met to initiate the clean-sieve operation.

- No active error alarms affecting the loading system.
- No other operation using the vacuum system is running.
- The loading-system sieve waste bin is not full.

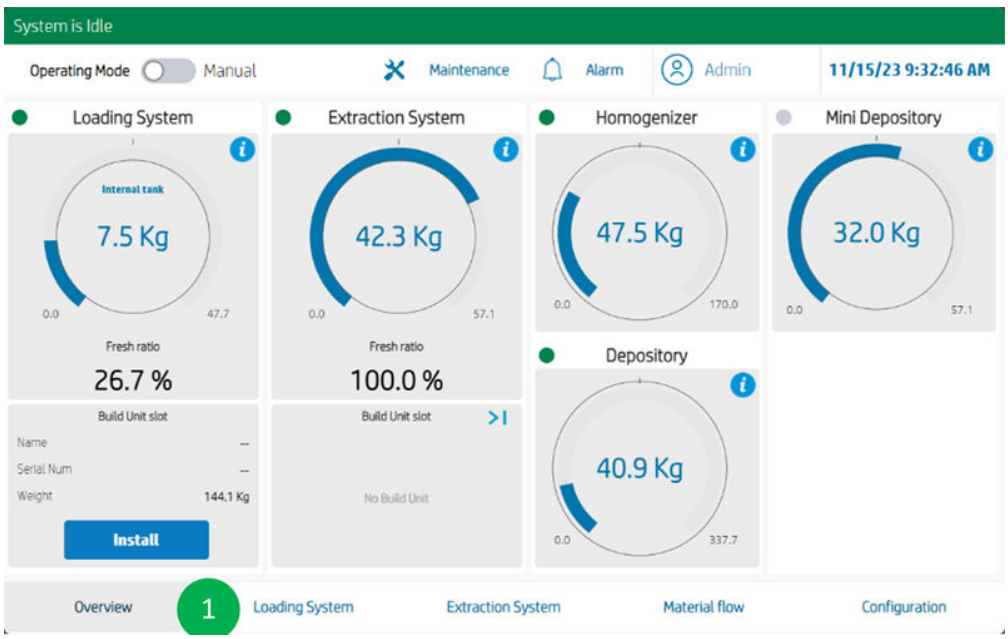
Steps overview

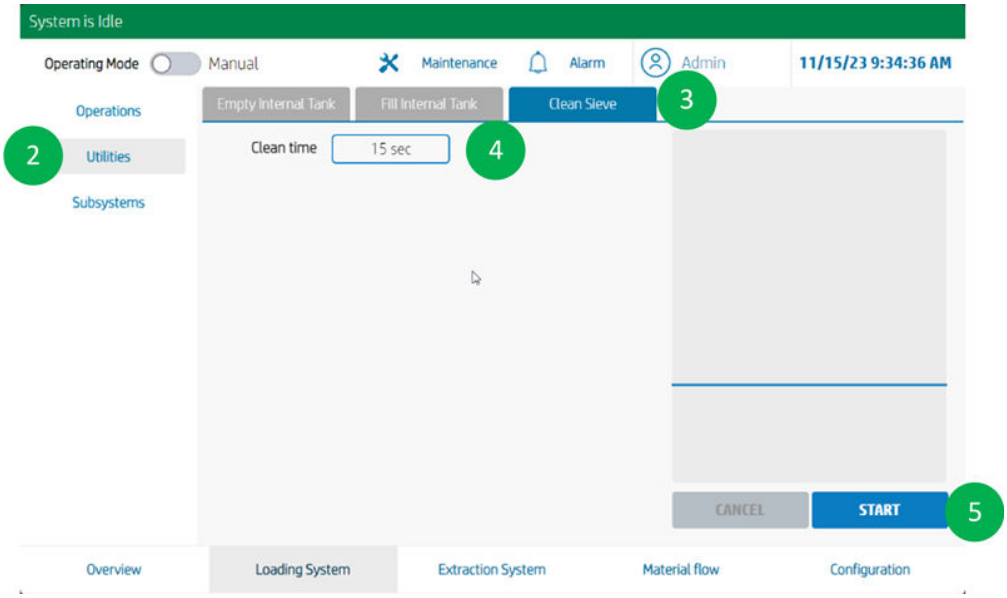
Follow these steps to run the clean-sieve utility.

1. Tap the **Loading System** tab at the bottom of the front-panel screen to display the corresponding workflows.
2. Tap **Utilities** on the left-hand menu.
3. Tap the **Clean Sieve** tab at the top of the screen.
4. Enter the desired cleaning time in seconds.
5. Tap **Start** to start the mix-internal-tank process.

Illustrated overview

Follow these steps to clean the sieve.





Workflow success

The workflow has been completed successfully if the system returns to idle status, and no new active alarms are raised.

Extraction system

Workflow: Extract job to NCU

Execute this workflow to transfer a printed job to an HP Jet Fusion 5200 Natural Cooling Unit (NCU).

Workflow preconditions

Various preconditions must be met to initiate the extract-job-to-NCU workflow.

- No other process running in the extraction system.
- No hardware error detected.
- A build unit with a printed job is correctly installed in the extraction system.
- An empty NCU is correctly installed in the extraction system.

Steps overview

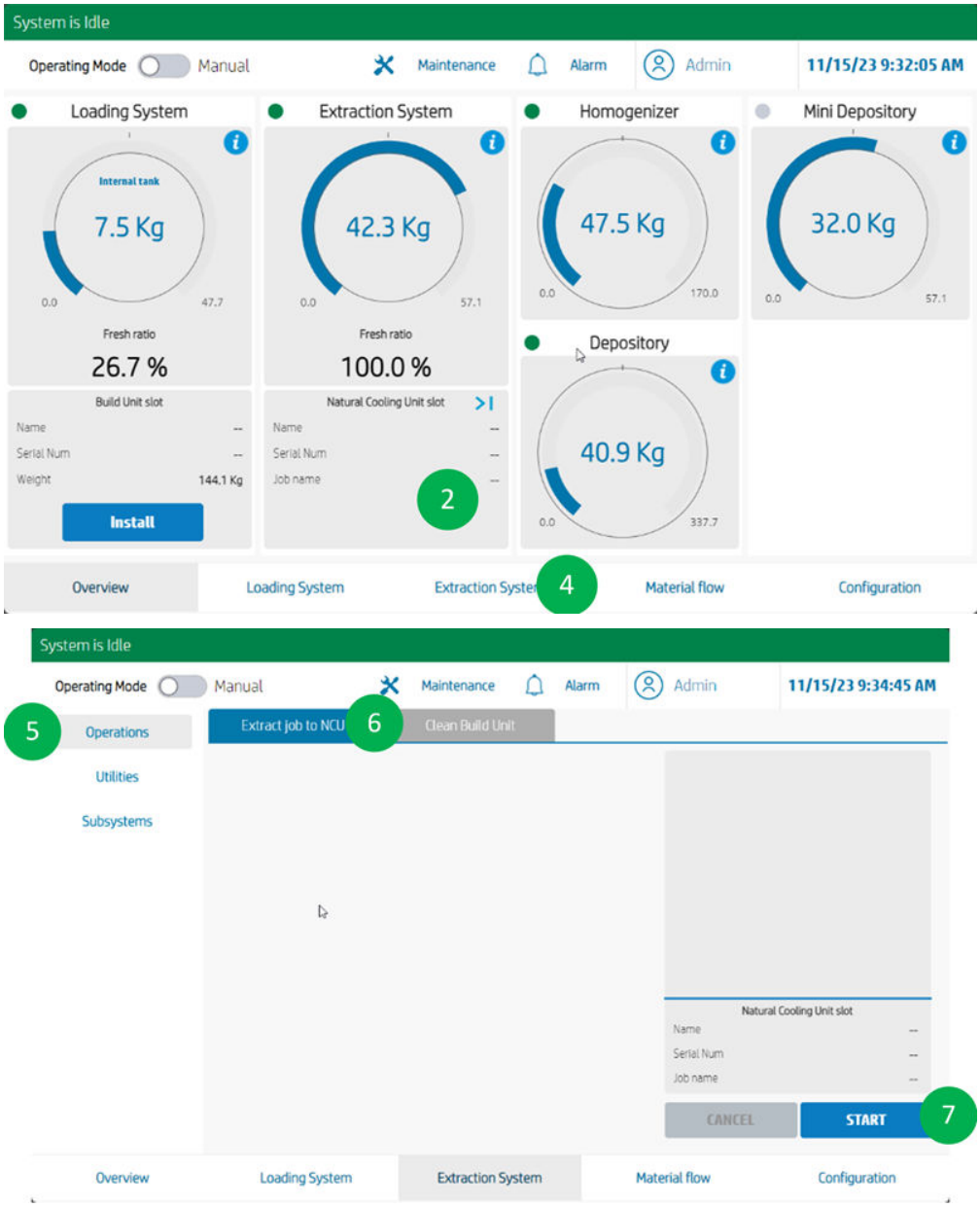
Follow these steps to extract a job to the NCU.

1. Insert a build unit with a printed job (the build unit will auto-connect upon insertion).
2. Once installed, proceed to connect the NCU, check that the NCU is correctly oriented. Its presence will be reported on the overview screen.
3. Tap the **Extraction System** tab at the bottom of the front-panel screen to display the corresponding workflows.
4. Tap **Operations** on the left-hand menu to display workflows that apply to production.
5. Tap the **Extract to NCU** tab at the top of the screen.
6. Tap **Start** to initiate the process.
7. Once the process is finished and you are presented with a confirmation dialog, tap **OK** to continue.

IMPORTANT: Please pay attention to the correct positioning of the NCU when installing it on the extraction system. From where you are standing, the guillotine should be on the opposite side.

Illustrated overview

Follow these steps to extract a job to the NCU.



Workflow success

If these criteria are met, the workflow has been completed successfully.

- The build has been removed from the build unit and transferred to the NCU.
- The NCU is ready for removal from the extraction system.

NOTE: An operation to clean the build-unit surface is automatically launched when the NCU is removed from the extraction system.

- No errors have been reported during the process.

Workflow: Clean build-unit surface

Use this operation to vacuum the remaining powder that can be seen in the build-unit platform and vanes after the extract-to-NCU workflow. All elements that need cleaning are listed on the workflow screen.

Workflow preconditions

These preconditions must be met to initiate the clean-build-unit-surface operation.

- The build unit is correctly installed.
- No error alarms are reported affecting the build unit, the extraction system, or the vacuum system.
- The recycled depository is not full.

Steps overview

Follow these steps to clean the build-unit surface.

1. Ensure that the build unit is correctly installed.
2. Tap the **Extraction System** button at the bottom of the front-panel screen to display workflows that apply to the extraction system.
3. Tap **Operations** on the left-hand menu.
4. Tap the **Clean Build Unit Surface** tab.

NOTE: There is a new option in this process called **Discard build content**. This option should be used only when the job fails and there are no parts inside the build unit, only powder, so a normal extraction or unpacking cannot be performed.

5. Tap **Start** to initiate the process.
6. Clean the areas covered with powder. Remove the vanes for cleaning them.

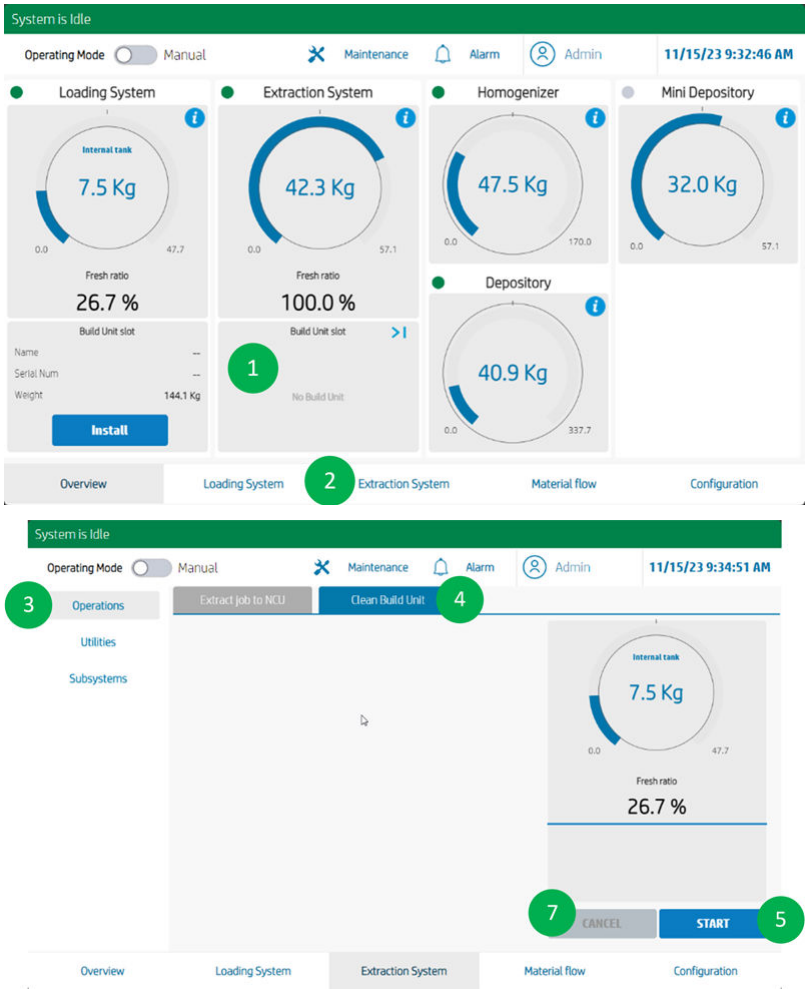
NOTE: Remember to put the vanes back after all the areas have been correctly cleaned.

7. When all the areas have been correctly vacuumed, tap the **Cancel** button to stop the vacuuming process.

CAUTION: Please pay attention to the correct positioning of the vanes when putting them back on the build unit.

Illustrated overview

Follow these steps to clean the build-unit surface.



Workflow success

If the following criteria are met, the workflow has been completed successfully.

- The build-unit surface and vanes are clean.
- The vacuum system is stopped.
- No error alarms have been reported during the process.

Workflow: Empty build unit

Use the empty-build-unit operation to reclaim the unused powder remaining inside the build-unit container. This powder will be stored in the extraction system mini-depository, so that you can use it for future mixes.

Workflow preconditions

These preconditions must be met to clean the build-unit surface.

- Build unit inserted and installed in the extraction system.
- Build-unit vanes removed and stored in the lateral vane holder of the extraction system.
- Build-unit cap removed and stored in the lateral cap holder of the extraction system.

- Empty-build-unit tool correctly positioned on top of the build unit.
- No error alarms detected in the extraction system or the vacuum system.
- No other process running in the system that requires using the vacuum system or the extraction system.

Steps overview

Follow these steps to empty the build unit.

1. Ensure that the build unit is correctly installed in the extraction system.
2. Tap the **Extraction System** tab at the bottom of the front-panel screen to display corresponding workflows.
3. Tap **Utilities** on the left-hand menu.
4. Tap the **Empty BU** tab at the top of the screen.
5. Tap **Start** at the bottom right.
6. Connect the empty-build-unit tool to the build unit.
7. When the operation is finished, tap **OK** on the confirmation screen.

⚠ CAUTION: If a significant amount of powder has accumulated on the build-unit platform at the end of the process, check that the vacuum works properly and that there are no issues with the powder hoses.

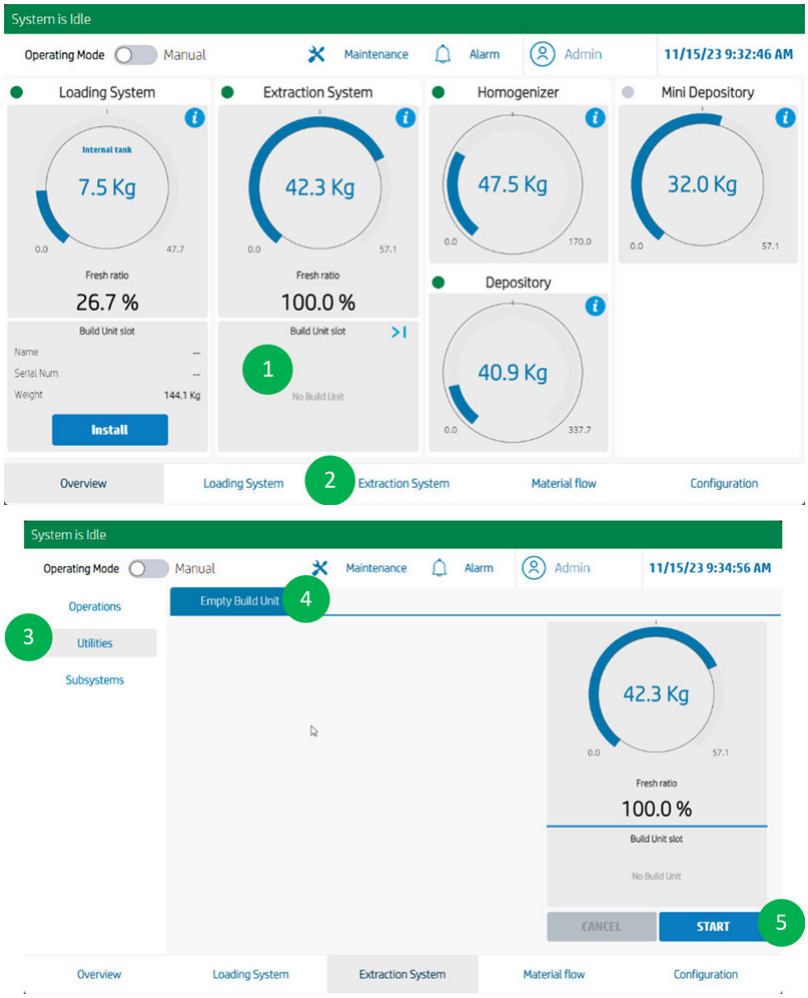
NOTE: If the process finishes because the emergency stop button was pressed, be careful when removing the build-unit tool, as there could be powder spillages.

NOTE: If no powder flow from the build unit to the tank is detected, you may be asked to confirm that the build unit is empty. Remove the build-unit cleaning tool, look through the main platform inlet, and ensure that the powder container is completely clean and its bottom surface is visible before confirming the message.

⚠ WARNING! Explosion hazard. Do not confirm the message without checking that the powder container is completely empty and clean.

Illustrated overview

Follow these steps to empty the build unit.



Workflow success

If these criteria are met, the workflow has been completed successfully.

- Process completed: The target will be considered as completed when all the pressurized air cycles are done.

Workflow failure modes

This workflow may sometimes fail to complete successfully, for several possible reasons.

- **Hardware error or stop request**: If during the process, any hardware error is detected, the process will be stopped. If this happens, the process will finish as stopped.
- **Extraction system mini-depository is full**: The process will be stopped if the mini-depository is full.
- **Empty-build-unit tool not in position**: The process will be stopped if the sensor of the injection tool detects that the tool is not in the right position.

Material flow

Workflow: Create homogenized lot

Use this operation to create a lot of up to 150 kg of homogenized recycled powder in the homogenizer by transporting recycled powder from the depository.

Workflow preconditions

These preconditions must be met to create a homogenized lot.

- No other process is running that needs the vacuum system, the recycled depository, or the homogenizer.
- No errors affecting those subsystems are present.
- Enough powder is contained in the recycled depository.
- There is enough capacity in the homogenizer to receive the powder and create the desired lot.

Steps overview

Follow these steps to create a homogenized lot.

1. Tap the **Material flow** tab at the bottom of the front-panel screen to display the corresponding workflows.
2. Tap **Processes** on the left-hand menu.
3. Tap the **Create Homogenized Lot** tab at the top of the screen.
4. Select the lot size.

NOTE: This will be the total size of the lot at the end of the process. If there is already 5 kg and you select 11 kg, then the system will add 6 kg to make a total of 11 kg.

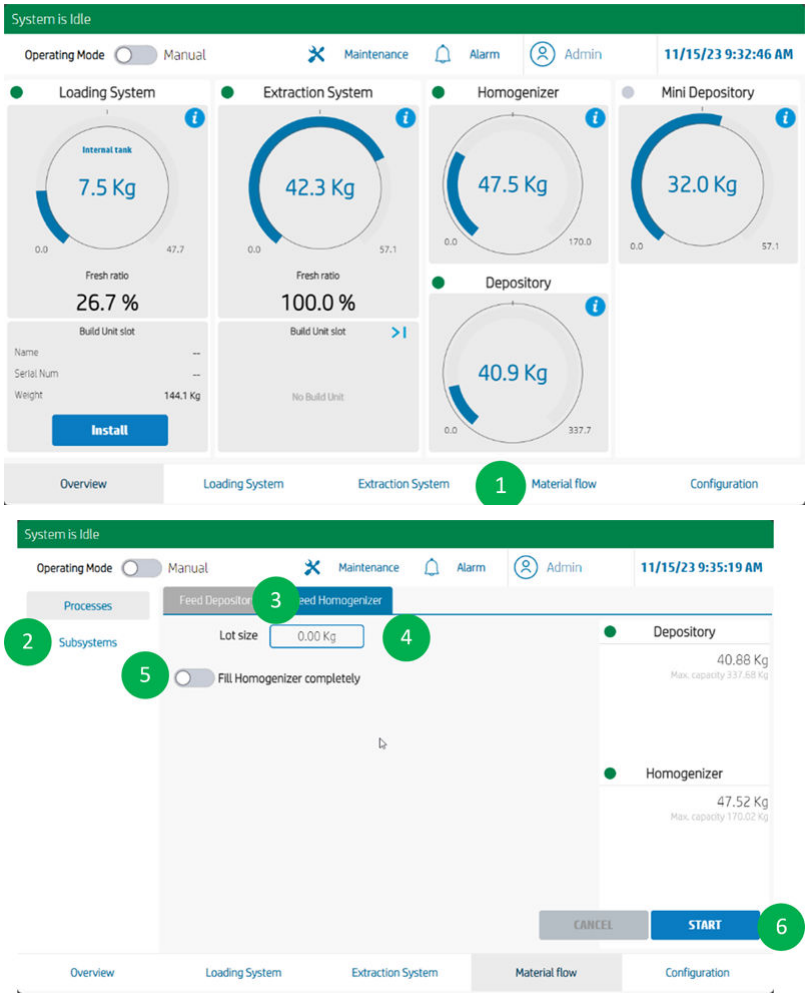
5. Optional: Activate the toggle **Fill homogenizer completely** if you want to fill the homogenizer to its maximum capacity.

NOTE: If the powder in the depository is not enough to fill the homogenizer completely, the depository will be completely emptied.

6. Tap **Start** to start the process.

Illustrated overview

Follow these steps to create a homogenized lot.



Workflow success

If these criteria are met, the workflow has been completed successfully.

- No active errors are reported during the operation.
- The system returns to idle status, and you can see on the screen that the homogenizer contains the requested amount of powder.

Workflow: Retrieve unpack powder

Use this operation to retrieve the reclaimed powder from unpack operations. The powder will be transported from the unpack mini-depository to the recycled depository.

Workflow preconditions

These preconditions must be met to initiate the feed depository operation.

- There is unpack powder to transport in the unpack mini-depository.
- The recycled depository is not full.
- There is no other operation running that requires using the vacuum system, the unpack mini-depository, or the recycled depository assets.

- No errors affecting the involved assets are reported.

Steps overview

Follow these steps to retrieve unpack powder.

1. Tap the **Material flow** tab at the bottom of the front-panel screen to display the corresponding workflows.
2. Tap **Processes** on the left-hand menu.
3. Tap the **Retrieve Unpack Powder** tab at the top of the screen.
4. Select the amount of unpack powder you want to retrieve.
5. Optional: Activate the toggle **Feed until source is depleted** if you want to retrieve all the unpack powder available.

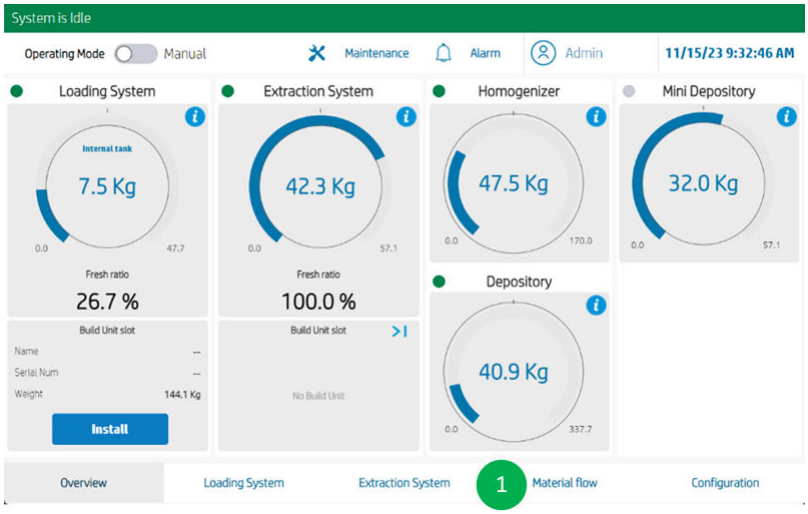
NOTE: The system will stop automatically once there is no more material to transport or when the recycled depository is full.

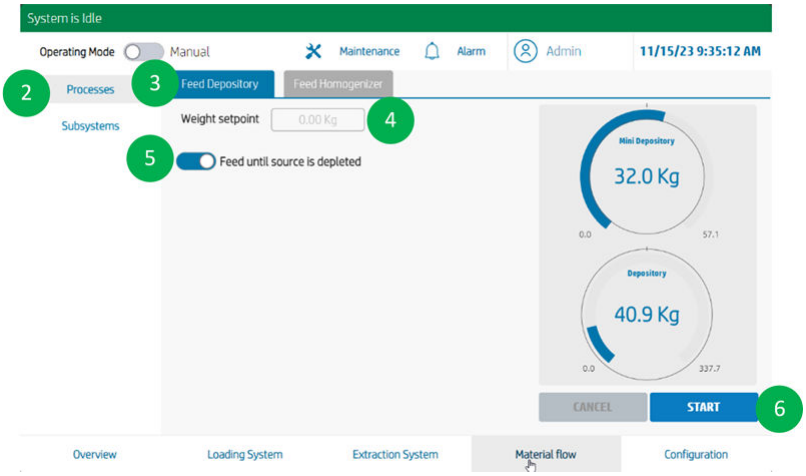
6. Tap **Start** to start to run the operation.

CAUTION: HP recommends that you inspect the unpack powder in the mini-depository before performing this operation, to ensure that the properties of your powder are within your quality limits.

Illustrated overview

Follow these steps to retrieve unpack powder.





Workflow success

If these criteria are met, the workflow has been completed successfully.

- The specified amount of unpack powder has been transported and the weight reading of the recycled depository and the unpack mini-depository are reporting accordingly.
- No errors have been reported during the operation.

Start-up process

This section explains how to feed the system with powder for the first time. Two alternatives are considered: starting only with fresh powder and starting with fresh and recycled powder.

Starting with only fresh powder

Follow these steps if there is no recycled powder in the system.

1. Place the fresh supply in the offloading system or ensure that the hose is connected to the fresh supply if no offloading system is available.
2. Insert a build unit in the loading system and perform a load with 100% fresh powder.
3. After printing with this build unit, extract the job to the natural cooling unit and, once the cooling time is completed, the unpack is available in the automatic unpacking station of the unpacking device.
4. Once the unpack is completed, move the powder collected during the unpack to the depository by launching a feed-depository process from the front panel. The target of the process should be to empty the mini-depository.
5. Repeat steps 2 to 4 until enough recycled powder is available in the system to create a homogenized powder lot. Select the **Fill homogenizer completely** toggle. At this point, the system is ready to start loading the build units with the needed ratio of fresh and recycled powder.
6. Before loading a build unit that contains fresh powder with a ratio containing recycled powder, empty the build unit, ensuring that all the fresh powder inside the build unit is removed.
7. Prepare the mix of powder to load into the build unit, selecting the option of using the powder available in the mini-depository, to use the fresh powder extracted from the build unit in the following load. Keep this option selected until the powder from the mini-depository is depleted.

Starting with fresh and recycled powder

Follow these steps if recycled powder is already available.

1. Ensure that the recycled powder is stored in external tanks.
2. Place the external tank with powder in the mini-depository to collect powder from the unpack (located next to the automatic unpacking station or whatever unpacking system is available). Clean or replace the mini-depository.
3. Launch a feed-depository process from the front panel. The target of the process should be to empty the mini-depository.
4. Repeat steps 2 and 3 until all the tanks with unpack powder have been depleted.
5. Replace the mini-depository tank to place the original tank again.
6. Select the **Fill homogenizer completely** toggle.
7. Place the fresh supply in the offloading system or ensure that the hose is connected to the fresh supply if no offloading system is available.

   At this point, the system is ready to load build units, so you can prepare a powder mix of fresh and recycled powder to load into a build unit with the required mix ratio.

7 Hardware maintenance

Hardware maintenance is sometimes needed to keep your product operating safely and efficiently.

Preventive maintenance

Performing maintenance as a preventive measure lessens the likelihood of a failure.

Safety precautions

Read and follow the safety precautions in this guide to make sure you use the equipment safely.

See Safety precautions on page 4.

You are expected to have the appropriate technical training and experience necessary to be aware of hazards to which you may be exposed in performing a task, and to take appropriate measures to minimize the risks to yourself and to others.

⚠ **WARNING!** Hardware maintenance may be performed by trained personnel only. During equipment installation, the designated personnel receive training for safe operation and maintenance of the product. No-one should use the product without this training.

The customer takes full responsibility for room layout, auxiliary equipment, personal protective equipment (PPE), and working procedures, among other safety aspects, when processing powder and performing the maintenance tasks specified in this chapter.

General cleaning instructions

Users and operators conducting cleaning operations must have training in explosive atmospheres and associated hazards, according to local laws and company requirements.

For general cleaning, a lint-free cloth dampened with distilled water is recommended. Allow to dry, or use a cloth to dry the cleaned part completely.

Do not spray fluids directly onto the HP product. Spray the fluid on the cloth used for cleaning.

To remove stubborn dirt or stains, moisten a soft cloth with water and a neutral detergent, or a general-purpose industrial cleaner (such as Simple Green industrial cleaner). Remove any remaining soap foam with a dry cloth.

For glass surfaces, use a soft, lint-free cloth lightly moistened with a non-abrasive glass cleaner or with general-purpose glass cleaner (such as Simple Green glass cleaner). Remove any remaining soap foam with a lint-free cloth dampened with distilled water and dry it with a dry cloth to prevent spotting.

⚠ **CAUTION:** Do not use abrasives, acetone, benzene, sodium hydroxide, or carbon tetrachloride on the glass; they can damage it. Do not place or spray liquid directly onto the glass, as the liquid might seep under the glass and damage the device.

⚠ **CAUTION:** Do not use water-based cleaners for parts with electrical contacts, as they may damage electrical circuits.

⚠ **CAUTION:** Do not sweep the dust or try to remove it with a compressed-air gun. Use an explosion-protected vacuum cleaner for cleaning operations.

NOTICE: Do not use wax, alcohol, benzene, thinner, ammonia-based cleaners, or other chemical detergents, to prevent any damage to the product or the environment.

NOTICE: In some locations the use of cleaning products is regulated. Ensure that your cleaner follows federal, state, and local regulations.

⚠ **CAUTION:** Do not use aerosol products that contain flammable gases inside or around the equipment.

Maintenance kit

The maintenance kit contains replacement parts for the equipment.

⚠ **WARNING!** Use adequate PPE, see Personal protective equipment on page 18 and Warning labels on page 19.

Table 7-1 Powder management station maintenance kit

Description	SKU	Replace	Quantity required
HP Metal Jet Powder Vac. Pre Filter	5S375A	When required	1
HP Metal Jet Powder Vac. H.E.P.A. Filter	5S376A	When required	1
HP Metal Jet Powder Sieve Inlet Filter	791A0A	Yearly	2
HP Metal Jet Powder Vac Inlet Filter	7P3A9A	Yearly	3

Maintenance key

The maintenance key provides access to machine areas that are reserved solely for HP trained maintenance personnel.

NOTICE: Only HP-trained personnel must be in possession of the maintenance key. Users should not have access to the maintenance key.



⚠ **CAUTION:** Additional training or authorizations may be required. Please consult your EHS specialist to ensure compliance with local regulations.

Maintenance tools recommended but not provided

Table 7-2 Recommended tools

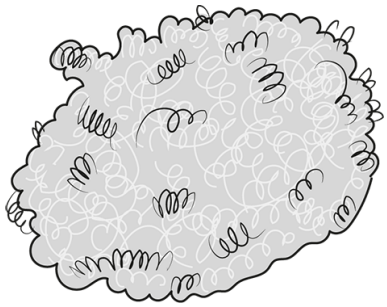
Description	Tool
Spiral scourer, for some cleaning operations **NOTICE:** Use a scourer that does not scratch glass; test it on a corner if in doubt. **WARNING!** Explosion hazard, static discharges and mechanical sparks could appear during usage of spiral scourer in metallic surfaces.	
Absorbent all-purpose cloth, for cleaning covers and general cleaning	

Table 7-2 Recommended tools (continued)

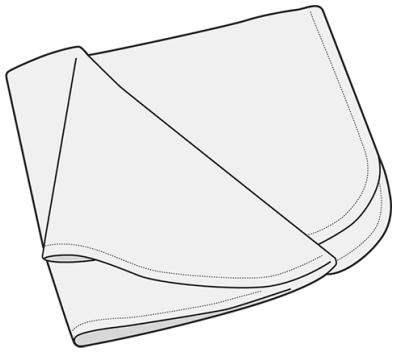
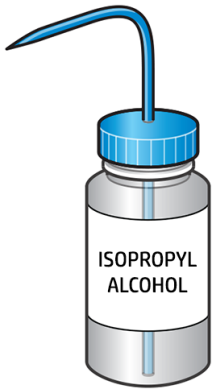
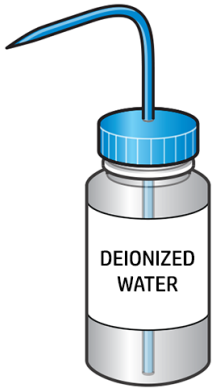
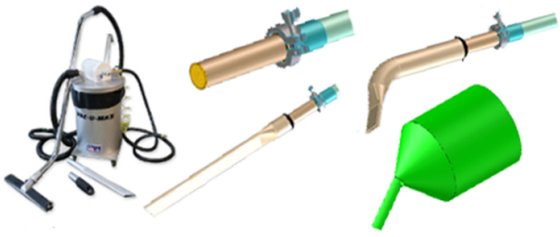
Description	Tool
Lint-free cloth or all-cotton cloth, for cleaning covers and general cleaning	
Isopropyl alcohol for cleaning **WARNING!** Explosion hazard. In case of the use of flammable solvents, ensure that the concentration of flammable vapors is less than the lower explosive limit (LEL) before switching on the equipment.	
Deionized water, for general cleaning.	
Explosion-protected vacuum cleaner, with attachments for general cleaning (see Explosion-protected industrial vacuum cleaner on page 37)	

Table 7-2 **Recommended tools (continued)**

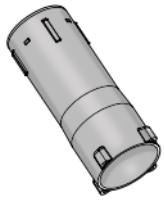
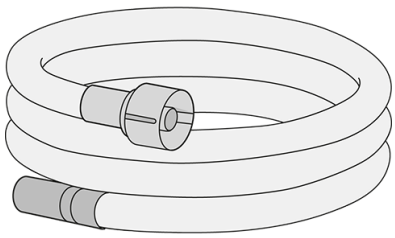
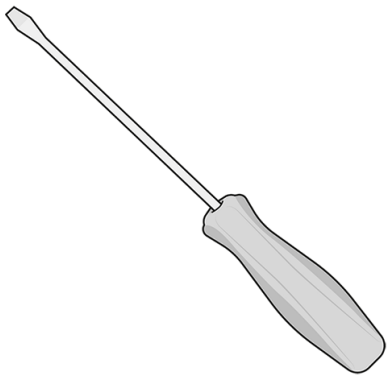
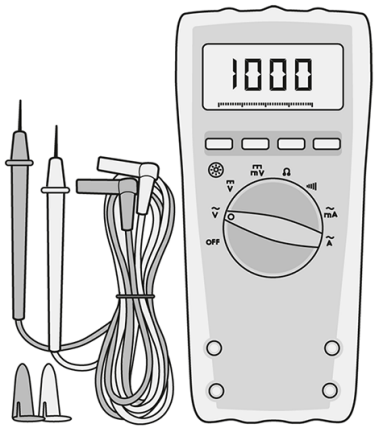
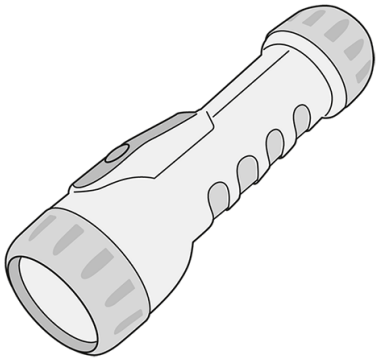
Description	Tool
Standard adapter for material and powder **WARNING!** Explosion hazard. Conductive or dissipative material required to prevent electrostatic discharges.	
Hose for cleaning material (recommended) **WARNING!** Explosion hazard. Conductive or dissipative material required to prevent electrostatic discharges.	
Flat screwdriver **WARNING!** Explosion hazard, if the flat screwdriver falls, mechanical sparks can be produced. Ensure that the concentration of flammable vapors is less than the lower explosive limit (LEL) in the location that the flat screwdriver will be used. Vacuum any powder in area before using a flat screwdriver.	
Set of Torx screwdrivers **WARNING!** Explosion hazard, if the flat screwdriver falls, mechanical sparks can be produced. Ensure that the concentration of flammable vapors is less than the lower explosive limit (LEL) in the location that the flat screwdriver will be used. Vacuum any powder in area before using a flat screwdriver.	

Table 7-2 Recommended tools (continued)

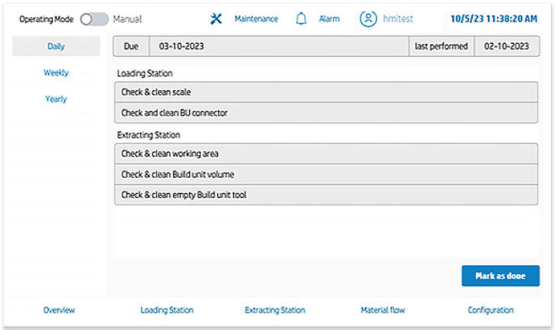
Description	Tool
Multimeter	
Flashlight **WARNING!** Explosion hazard. Hot surfaces and electrical sparks may be generated. It is recommended that the flashlight is explosion-protected or ensure that the concentration of flammable vapors is less than the lower explosive limit (LEL). Vacuum any powder before using the flashlight in a potentially explosive atmosphere.	

Preventive maintenance alerts and actions

Check for alerts at the Maintenance Tasks screen

When there are maintenance tasks that need to be done, an alarm will appear on the cabinet panel's alarm screen (the bell icon at the top will change color when alarms are raised). For example, when the weekly maintenance tasks need to be completed, an alarm stating “Weekly tasks pending” will be raised.

Click on the maintenance icon to access the Maintenance Tasks screen.



Maintenance periods are shown in the vertical navigation bar on the left.

Select the period (daily, weekly, yearly) corresponding to the tasks you need to complete, and the list of tasks will be shown, grouped by the system elements involved.

You can see the date when those tasks are due for completion in the upper left corner of the tasks panel, in the “Due” field.

Mark maintenance tasks as done

When you have completed all the tasks listed for the corresponding period, you can indicate this to the system by selecting the “Mark as done” button. After that, the date of completion will be displayed in the “last performed” field (top right).

Summary of maintenance operations

The powder management station needs proper maintenance to keep it operating in optimum condition. Follow the recommended maintenance procedures to prevent any impact on your business operations.

Table 7-3 Once a day

Maintenance operation	Tools
Check the loading system and clean the scale on page 105	Vacuum cleaner, lint-free cloth, general-purpose industrial cleaner
Check the loading system and clean the build-unit volume on page 106	Vacuum cleaner, lint-free cloth, general-purpose industrial cleaner
Check the extraction system and clean the working area on page 108	Vacuum cleaner, lint-free cloth, general-purpose industrial cleaner
Check the extraction system and clean the build-unit volume on page 110	Vacuum cleaner, lint-free cloth, general-purpose industrial cleaner
Check the extraction system and clean the empty-build-unit tool on page 112	Vacuum cleaner, lint-free cloth, general-purpose industrial cleaner

Table 7-4 Once a week

Maintenance operation	Tools
Check the loading system and clean the sieve zone on page 113	Vacuum cleaner, lint-free cloth, general-purpose industrial cleaner
Clean the loading system’s nozzle zone on page 115	Vacuum cleaner, lint-free cloth, general-purpose industrial cleaner
Extraction system: Clean guillotine impelling area on page 118	Vacuum cleaner, lint-free cloth, general-purpose industrial cleaner
Clean system and surroundings on page 120	Vacuum cleaner, lint-free cloth, general-purpose industrial cleaner

Table 7-5 Once a year

Maintenance operation	Tools
Replacing the filters on page 120	Filters, screwdriver, vacuum cleaner
Clean system top surfaces on page 125	Vacuum cleaner, lint-free cloth, general-purpose industrial cleaner, Multimeter
Check the earthing on page 128	Multimeter/ohmmeter (not provided by HP)
Check Residual Current Circuit Breakers on page 136	N/A

Table 7-6 When required

Maintenance operation	Tools
Clean the sieve waste tank on page 139	Vacuum cleaner, lint-free cloth, general-purpose industrial cleaner
Clean the vacuum system pre-filter on page 141	Vacuum cleaner
Replace the vacuum system pre-filter (5S375A) on page 144	F9 prefilter, vacuum cleaner
Replace the vacuum system HEPA filter (5S376A) on page 144	HEPA filter, vacuum cleaner
Clean or replace the mini-depository on page 147	Vacuum cleaner, screwdriver, extra tank (if the tank is replaced)

Maintenance operations

The customer is required to take safety and security measures, such as wearing personal protective equipment, when directly exposed to powders. See the powder's safety data sheet for more information.

Once a day

Check the loading system and clean the scale

Always follow the steps of the procedure in the order presented.

Safety warnings

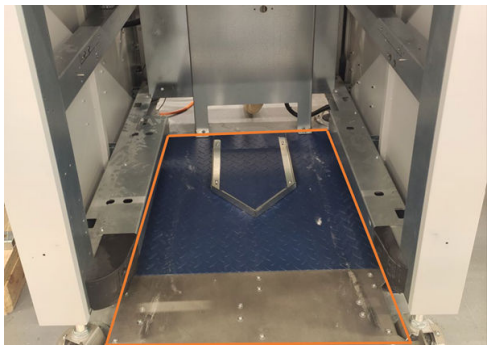


For more safety information, see Safety precautions on page 4

1. Remove the build unit and portable tanks.
2. Turn off the loading system.
3. Ensure that you have an explosion-protected vacuum cleaner, an absorbent all-purpose cloth and/or a lint-free cloth dampened with a general-purpose industrial cleaner, such as Simple Green industrial cleaner. These items are not provided by HP.
4. You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

5. Check the designated area. If there is evidence of powder on the surface, clean using the explosion-protected vacuum cleaner with a soft-brush nozzle.



6. You can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).

7. Additionally, clean the debris on the floor between the scale and the structure.

NOTICE: Disposal should be handled according to local laws.

Check the loading system and clean the build-unit volume

Safety warnings



For more safety information, see Safety precautions on page 4

Prepare for cleaning

Always follow the steps of the procedure in the order presented.

1. Remove the build unit and portable tanks.
2. Turn off the loading system and lockout/tagout the power.
3. Ensure that you have an explosion-protected vacuum cleaner, an absorbent all-purpose cloth, and/or a lint-free cloth dampened with a general-purpose industrial cleaner, such as Simple Green industrial cleaner. These items are not provided by HP.
4. You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

⚠ WARNING! Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

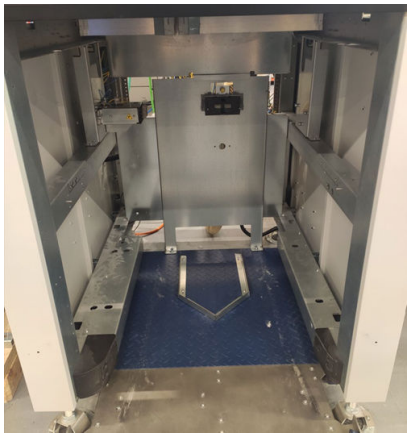
5. Check the designated areas and if there is evidence of powder on them, clean using the explosion-protected vacuum cleaner with a soft-brush nozzle.
6. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).

NOTE: Disposal should be handled according to local laws.

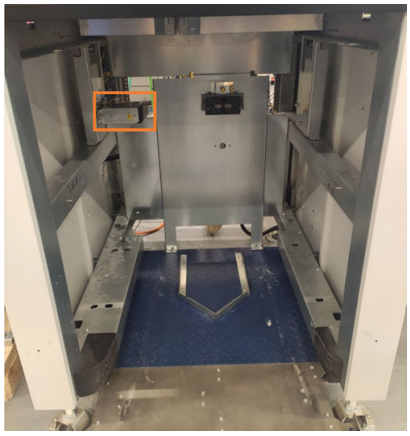
Cleaning

Always follow the steps of the procedure in the order presented.

1. Clean all inner surfaces of the build-unit housing and on both sides of the structure beams. You can use a vacuum cleaner with the narrow nozzle to help remove powder from the small areas. If there is persistent dust or debris accumulation, you can remove it with a damp cloth.



2. Locate the latching sub-assembly inside the build-unit housing volume.

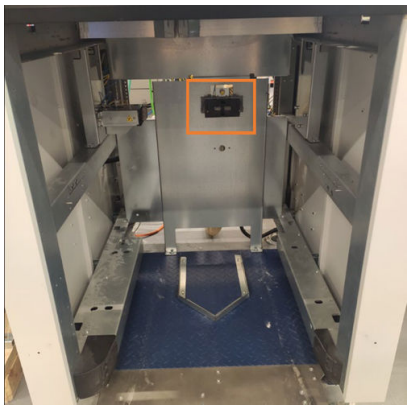


3. Clean the build-unit latching sub-assembly with the vacuum cleaner with a soft-brush nozzle. Be extremely careful when cleaning the latching system as there are sensors and electronics that can be damaged.



⚠ **WARNING!** Mechanical hazard. Ensure that the power is deactivated to the machine. Keep your fingers away from the mechanism.

4. Locate the build-unit connector inside the build-unit housing volume.



5. Clean the build-unit connector with the vacuum cleaner with a soft-brush nozzle. Be extremely careful when cleaning the connector as there are sensors and electronics that can be damaged. Vacuum the connector plate.

6. Ensure that there is no powder inside the connector pins.

IMPORTANT: Do not use a wet cloth to clean the connector.



Check the extraction system and clean the working area

Always follow the steps of the procedure in the order presented.

Safety warnings



For more safety information, see Safety precautions on page 4

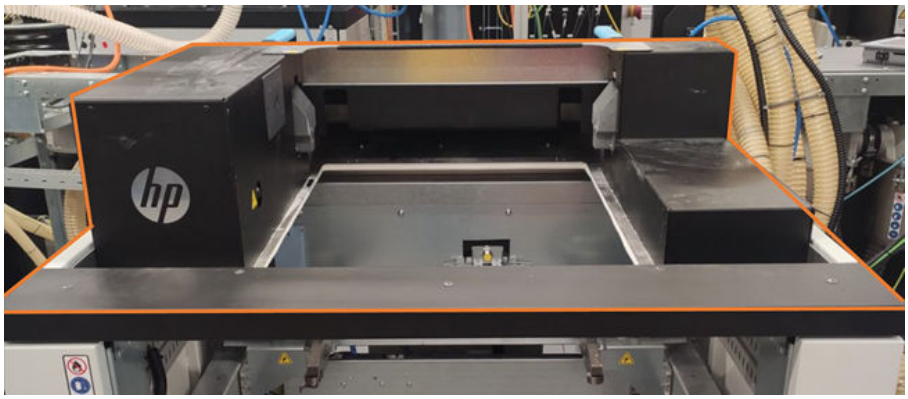
1. Turn off the extraction system.

2. Ensure that you have an explosion-protected vacuum cleaner, and absorbent all-purpose cloth and/or a lint-free cloth dampened with a general-purpose industrial cleaner, such as Simple Green industrial cleaner. These items are not provided by HP.

3. You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

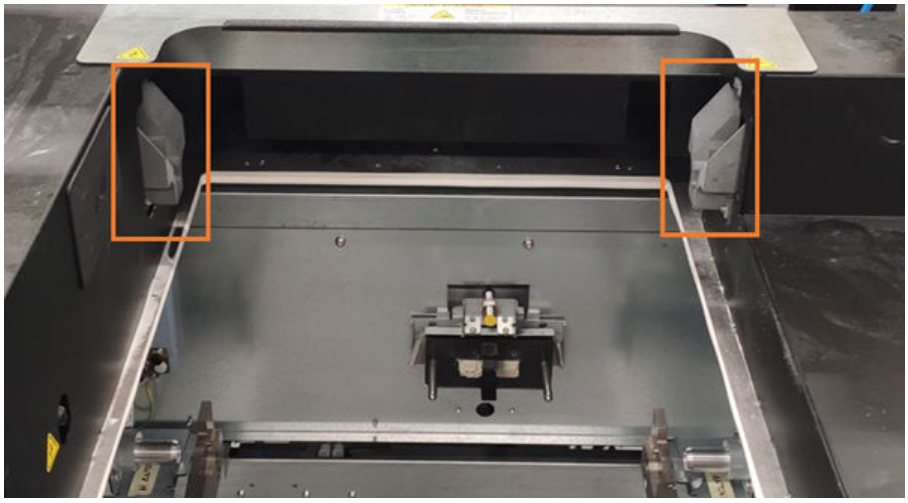
⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

4. Check the designated area and if there is evidence of powder on any surface, clean using the explosion-protected vacuum cleaner with a soft-brush nozzle.



5. You can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).

6. Vacuum any possible remaining powder inside holes of the natural cooling unit retention system. You can use a vacuum cleaner with the narrow nozzle to help remove powder from the small areas.



NOTICE: Disposal should be handled according to local laws.

Check the extraction system and clean the build-unit volume

Safety warnings



For more safety information, see Safety precautions on page 4

Prepare for cleaning

Always follow the steps of the procedure in the order presented.

1. Remove the build unit.
2. Turn off the extraction system and lockout/tagout the power.
3. Ensure that you have an explosion-protected vacuum cleaner, an absorbent all-purpose cloth, and/or a lint-free cloth dampened with a general-purpose industrial cleaner, such as Simple Green industrial cleaner. These items are not provided by HP.
4. You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

> ⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

5. Check the designated areas. If there is evidence of powder on them, clean using the explosion-protected vacuum cleaner with a soft-brush nozzle.
6. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).

> **NOTE:** Disposal should be handled according to local laws.

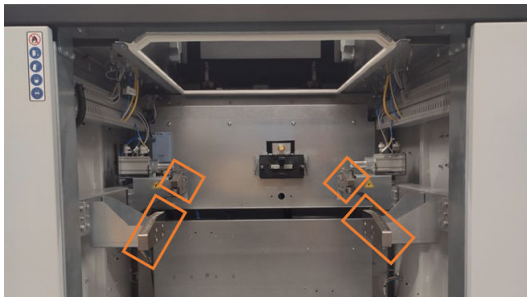
Cleaning

Always follow the steps of the procedure in the order presented.

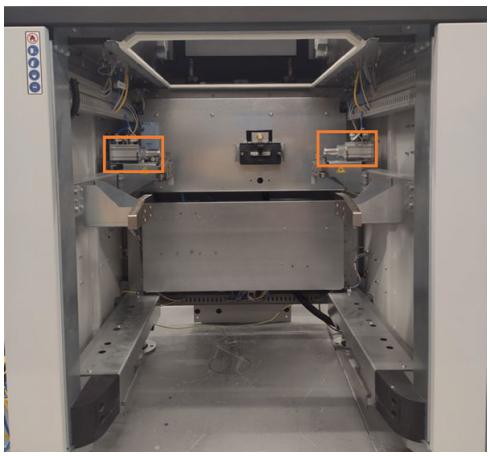
1. Clean all inner surfaces of the build-unit housing and on both sides of the structure beams. You can use a vacuum cleaner with the narrow nozzle to help remove powder from the small areas. If there is persistent dust or debris accumulation, you can remove it with a damp cloth.



2. Clean both sides of the build-unit ramps. You can use a vacuum cleaner with the narrow nozzle to help remove powder from the small areas. If there is persistent dust or debris accumulation, you can remove it with a damp cloth.

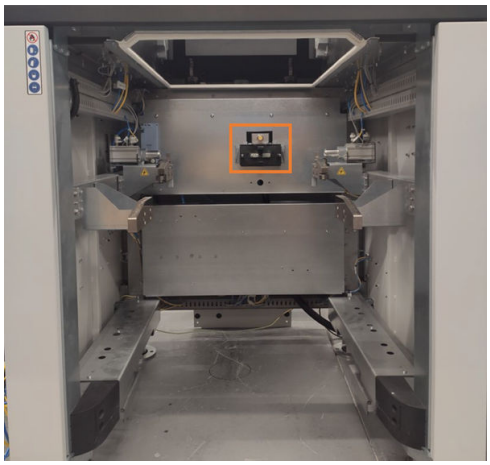


3. Locate the latching sub-assembly inside the build-unit housing volume.



4. Clean the build-unit latching sub-assembly with the vacuum cleaner with a soft-brush nozzle. Be extremely careful when cleaning the latching system as there are sensors and electronics that can be damaged.

5. Locate the build-unit connector inside the build-unit housing volume.



6. Clean the build-unit connector with the vacuum cleaner with a soft-brush nozzle. Be extremely careful when cleaning the connector as there are sensors and electronics that can be damaged. Vacuum the connector plate. Ensure that there is no powder inside the connector pins.

IMPORTANT: Do not use a wet cloth to clean the connector.



Check the extraction system and clean the empty-build-unit tool

Always follow the steps of the procedure in the order presented.

Safety warnings



For more safety information, see Safety precautions on page 4

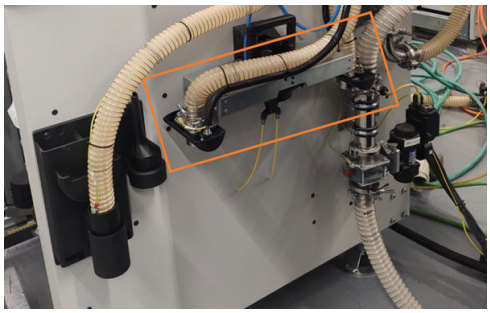
1. Ensure that you have an explosion-protected vacuum cleaner, an absorbent all-purpose cloth, and/or a lint-free cloth dampened with a general-purpose industrial cleaner, such as Simple Green industrial cleaner. These items are not provided by HP.

2. You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

NOTICE: Disposal should be handled according to local laws.

3. Check the empty-build-unit tool, and if there is evidence of powder, clean all the inner and outer surfaces of the tool. You can use a vacuum cleaner with the narrow nozzle to help remove powder from the small areas.



4. Use the vacuum cleaner to remove any debris on the floor, underneath the cleaning tool.

Once a week

Check the loading system and clean the sieve zone

Safety warnings



For more safety information, see Safety precautions on page 4

Prepare for cleaning

Always follow the steps of the procedure in the order presented.

⚠ **WARNING!** This operation requires access into the machine enclosure. HP-trained maintenance personnel are required. Make sure that your maintenance personnel are appropriately trained to carry out this operation.

1. Make sure you have a work platform or ladder to reach remote parts.

2. Turn off the loading system and lockout/tagout the power.

⚠ **CAUTION:** Make sure that the machine is not in operation and power is locked out before opening the door.

3. Open the service door located on the right side of the loading system using the maintenance key provided.



4. Ensure that you have an explosion-protected vacuum cleaner, an absorbent all-purpose cloth and/or a lint-free cloth dampened with a general-purpose industrial cleaner, such as Simple Green industrial cleaner. These items are not provided by HP.

5. You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

6. Check the designated areas. If there is evidence of powder on them, clean using the explosion-protected vacuum cleaner with a soft-brush nozzle.

⚠ **CAUTION:** Use an explosion-protected vacuum cleaner during cleaning tasks. Do not use the manual aspiration hose.

7. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).

NOTICE: Disposal should be handled according to local laws.

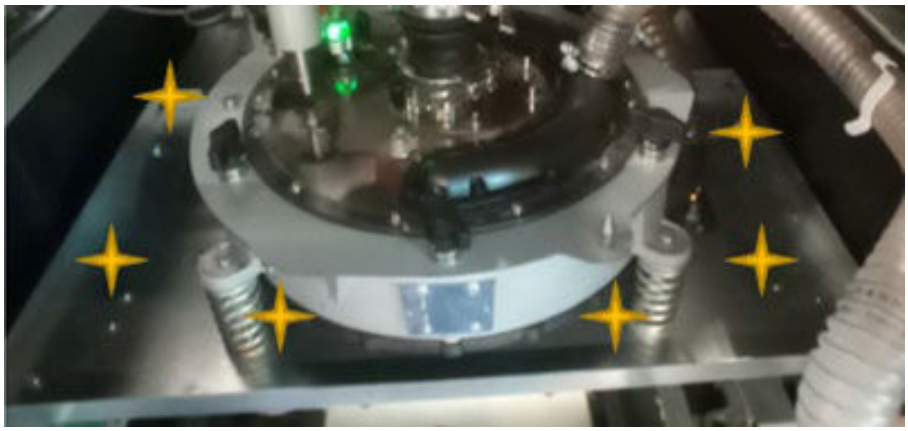
Cleaning

Always follow the steps of the procedure in the order presented.

1. Clean the sieve lid area. Be careful when cleaning the sieve lid as there are sensors and electronics that can be damaged.

IMPORTANT: Do not use a wet cloth to clean the sieve lid.

2. Clean the sieve's bottom plate area.



3. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).

4. Close the service door located on the right side of the loading system using the specific key provided.

⚠ CAUTION: Use an explosion-protected vacuum cleaner during cleaning tasks. Do not use the manual aspiration hose.

NOTICE: Do not disconnect the earthing connection during this task.

⚠ WARNING! Explosion hazard. Mechanical sparks and static electricity may be generated.

Clean the loading system's nozzle zone

Safety warnings



For more safety information, see Safety precautions on page 4

Prepare for cleaning

Always follow the steps of the procedure in the order presented.

⚠ WARNING! This operation requires access into the machine enclosure. HP trained maintenance personnel are required. Make sure that your maintenance personnel are appropriately trained to carry out this operation.

1. Make sure you have a work platform or ladder to reach remote parts.
2. Turn off the loading system and lockout/tagout the power.

⚠ **CAUTION:** Make sure that the machine is not in operation and power is locked out before opening the door.

3. Open the service door located on the right side of the loading system using the maintenance key provided.



4. Ensure that you have an explosion-protected vacuum cleaner, an absorbent all-purpose cloth and/or a lint-free cloth dampened with a general-purpose industrial cleaner, such as Simple Green industrial cleaner. These items are not provided by HP.
5. You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

6. Check the designated areas. If there is evidence of powder on them, clean using the explosion-protected vacuum cleaner with a soft-brush nozzle.

⚠ **CAUTION:** Use an explosion-protected vacuum cleaner during cleaning tasks. Do not use the manual aspiration hose.

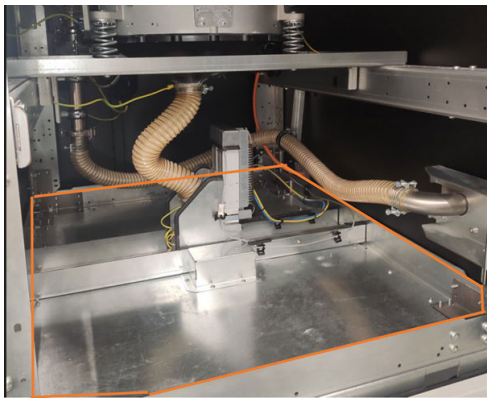
7. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).

NOTICE: Disposal should be handled according to local laws.

Cleaning

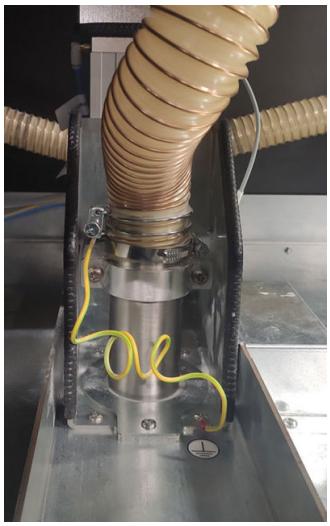
Always follow the steps of the procedure in the order presented.

1. Clean the bottom plate area with the vacuum cleaner with a soft-brush nozzle.



2. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).

3. Clean the nozzle inner side with the vacuum cleaner with a soft-brush nozzle. Be careful when cleaning this zone as there are sensors and electronics that can be damaged. You can use a vacuum cleaner with the narrow nozzle to help remove powder from the small areas.



4. Close the service door located on the right side of the loading system using the specific key provided.

⚠ **CAUTION:** Use an explosion-protected vacuum cleaner during cleaning tasks. Do not use the manual aspiration hose.

NOTICE: Do not disconnect the earthing connection during this task.

⚠ **WARNING!** Explosion hazard. Mechanical sparks and static electricity may be generated.

Extraction system: Clean guillotine impelling area

Safety warnings



For more safety information, see Safety precautions on page 4

Prepare for cleaning

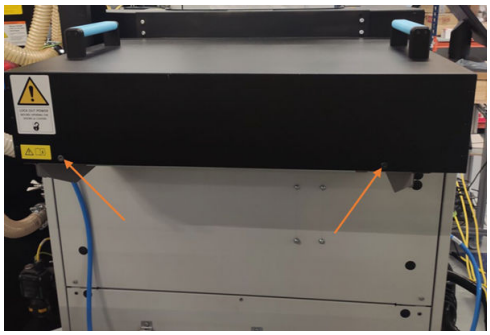
Always follow the steps of the procedure in the order presented.

⚠ **WARNING!** This operation requires access into the machine enclosure. HP trained maintenance personnel are required. Make sure that your maintenance personnel are appropriately trained to carry out this operation.

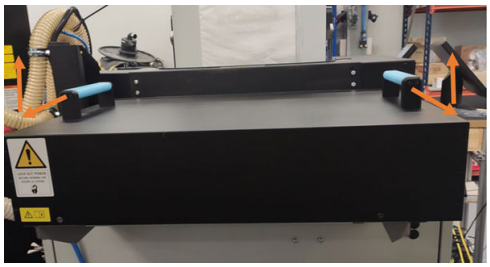
1. Turn the extraction system off and lockout/tagout the power.

   ⚠ **CAUTION:** Make sure that the machine is not in operation and power is locked out before opening the cover.

2. Locate the guillotine impelling area cover from the rear side of the device and remove the two attaching screws.



3. Remove it by holding the handles on both sides and pulling back and up gently.



4. Ensure that you have an explosion-protected vacuum cleaner, an absorbent all-purpose cloth, and/or a lint-free cloth dampened with a general-purpose industrial cleaner, such as Simple Green industrial cleaner. These things are not provided by HP.

5. You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

6. Clean the designated areas using the explosion-protected vacuum cleaner with a soft-brush nozzle.

⚠ **CAUTION:** Use an explosion-protected vacuum cleaner during cleaning tasks. Do not use the manual aspiration hose.

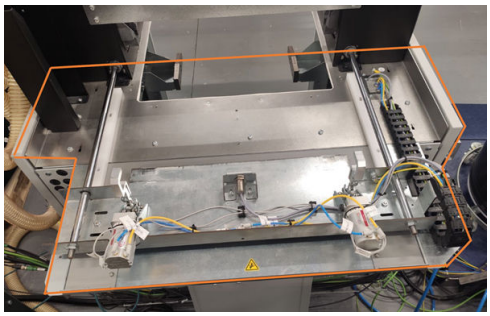
7. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).

NOTE: Disposal should be handled according to local laws.

Cleaning

Always follow the steps of the procedure in the order presented.

1. Clean the area with the vacuum cleaner with a soft-brush nozzle.



2. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).

3. Be extremely careful when cleaning this zone as there are sensors and electronics that can be damaged. You can use a vacuum cleaner with the narrow nozzle to help remove powder from the small areas.

4. Relocate the guillotine impelling area cover.

5. Clean the cover surface with the vacuum cleaner with a soft-brush nozzle. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).

⚠ CAUTION: Use an explosion-protected vacuum cleaner during cleaning tasks. Do not use the manual aspiration hose.

NOTICE: Do not disconnect the earthing connection during this task.

⚠ WARNING! Explosion hazard. Mechanical sparks and static electricity may be generated.

Clean system and surroundings

Always follow the steps of the procedure in the order presented.

Safety warnings



For more safety information, see Safety precautions on page 4

1. Turn off the system.
2. Ensure that you have an explosion-protected vacuum cleaner, an absorbent all-purpose cloth, and/or a lint-free cloth dampened with a general-purpose industrial cleaner, such as Simple Green industrial cleaner. These items are not provided by HP.
3. You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

⚠ WARNING! Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

4. Clean all external covers using the explosion-protected vacuum cleaner with a soft-brush nozzle.
5. You can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).
6. Additionally, clean debris from the floor around the devices.

NOTICE: Disposal should be handled according to local laws.

Once a year

Replacing the filters

There are several filters included with the Powder Handling Automation Solution. This section provides the instructions on replacing the filters.

Loading system



- Top inlet filter
- Sieve inlet filter

Recycled-material homogenizer and recycled-material depository



- Top inlet filter
- Bottom inlet filter

Replace the top inlet filters

This section provides the instructions on replacing the filters. The filters are located in the loading-system mixer, the homogenizer, and the depository lids.



For more safety information, see Safety precautions on page 4

Prepare for replacement

Always follow the steps of the procedure in the order presented.

Required tools and parts:

- Replacement kit
- Ladder or platform to reacher the filter's position
- You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

- Ensure that the entire system is not in operation

Replace the top inlet filter

Always follow the steps of the procedure in the order presented.

1. Place the ladder of platform at the front of the Loading System or the Tank (the recycled powder homogenizer or depository) to access the filter that needs to be replaced.
2. Locate the filter position. Then, unscrew and remove the filter cover.



3. Remove the old filter and dispose of it according to local regulations.



4. Vacuum the filter container and the tank lid area with an explosion-protected vacuum cleaner.
5. Insert the new filter between the filter container and the central tube.
6. Screw the filter cover into place.

NOTE: Do not disconnect the grounding connection during this task. After the replacement, make sure that the connections are secure.

Finish replacement

NOTICE: Inspect for dust, if there is any present, remove it with an explosion-protected vacuum cleaner.

- Ensure that all windows, covers, and doors are closed and in their original positions.

Replace the bottom inlet filters

This section provides the instructions on replacing the filter. The filters are located in the discharge area of the homogenizer and the depository lids.

Safety warnings



For more safety information, see Safety precautions on page 4

Prepare for replacement

Always follow the steps of the procedure in the order presented.

Required tools and parts:

- Replacement kit
- You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

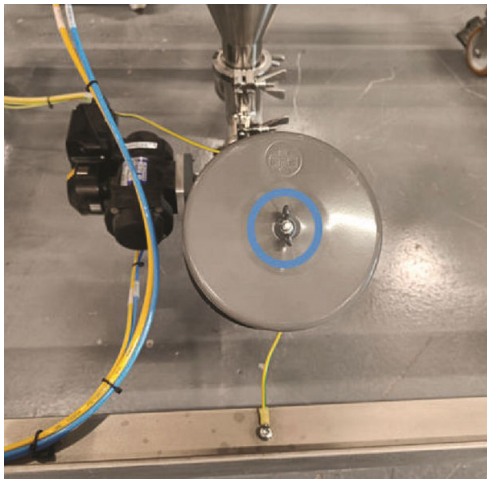
⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

- Ensure that the entire system is not in operation

Replace the bottom inlet filter

Always follow the steps of the procedure in the order presented.

1. Locate the filter position. Then, unscrew and remove the filter cover.



2. Remove the old filter and dispose of it according to local regulations.



3. Vacuum the filter container and the tank lid area with an explosion-protected vacuum cleaner.
4. Insert the new filter between the filter container and the central tube.
5. Screw the filter cover into place.

NOTE: Do not disconnect the grounding connection during this task. After the replacement, make sure that the connections are secure.

Finish replacement

NOTICE: Inspect for dust, if there is any present, remove it with an explosion-protected vacuum cleaner.

- Ensure that all windows, covers, and doors are closed and in their original positions.

Clean system top surfaces

Safety warnings



For more safety information, see Safety precautions on page 4

Prepare for cleaning

Always follow the steps of the procedure in the order presented.

1. Make sure you have a work platform or ladder to reach remote parts.
2. Turn off the system.
3. Ensure that you have an explosion-protected vacuum cleaner, an absorbent all-purpose cloth, and/or a lint-free cloth dampened with a general-purpose industrial cleaner, such as Simple Green industrial cleaner. These items are not provided by HP.
4. You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

5. Clean the designated areas using the explosion-protected vacuum cleaner with a soft-brush nozzle.

⚠ **CAUTION:** Use an explosion-protected vacuum cleaner during cleaning tasks. Do not use the manual aspiration hose.

6. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).

NOTICE: Disposal should be handled according to local laws.

Cleaning

Always follow the steps of the procedure in the order presented.

1. Clean the top surface of the e-cabinet with the vacuum cleaner with a soft-brush nozzle. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).



2. Clean the top area of the loading system component-by-component with the vacuum cleaner with a soft-brush nozzle. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).



3. Be extremely careful when cleaning this zone as there are sensors and electronics that can be damaged. You can use a vacuum cleaner with the narrow nozzle to help remove powder from the small areas.
4. Clean the top area of the recycled-material homogenizer system component-by-component with the vacuum cleaner and a soft-brush nozzle. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).
5. Be careful when cleaning this zone as there are sensors and electronics that can be damaged. You can use a vacuum cleaner with the narrow nozzle to help remove powder from the small areas.
6. Clean the top area of the rcycled-material depository system component-by-component with the vacuum cleaner with a soft-brush nozzle. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).
7. Be extremely careful when cleaning this zone as there are sensors and electronics that can be damaged. You can use a vacuum cleaner with the narrow nozzle to help remove powder from the small areas.
8. Clean the top surface of the vacuum module with the vacuum cleaner with a soft-brush nozzle. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).

9. Clean the top surface of the waste tank with the vacuum cleaner with a soft-brush nozzle. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).



10. Clean the top surface of the external buffer with the vacuum cleaner with a soft-brush nozzle. Additionally, you can wipe the areas with a lint-free cloth dampened with a general-purpose industrial cleaner (such as Simple Green industrial cleaner).

⚠ **CAUTION:** Use an explosion-protected vacuum cleaner during cleaning tasks. Do not use the manual aspiration hose.

NOTICE: Do not disconnect the earthing connection during this task.

⚠ **WARNING!** Explosion hazard. Mechanical sparks and static electricity may be generated.

Check the earthing

Check that the resistance between specific parts and the building's earth is less than 1 Ω.

Safety warnings



For more safety information, see Safety precautions on page 4

⚠ **CAUTION:** If the resistance is more than 1 Ω, check the earth connection from the machine to the building's installation. If the problem persists, stop the operation and call your service representative.

Prepare for earthing test

Always follow the steps of the procedure in the order presented.

⚠ **WARNING!** This operation requires access into the machine enclosure. HP trained maintenance personnel is required. Make sure that your maintenance personnel is appropriately trained to carry out this operation.

1. Ensure that the machine is switched off at the mains switch.
2. Make sure you have a multimeter/ohmmeter (not provided by HP).
3. Check that the areas of the machine to be tested are clean before proceeding with the earthing test.

Check earthing

Always follow the steps of the procedure in the order presented.

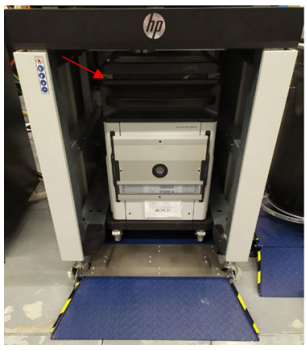
Safety warnings

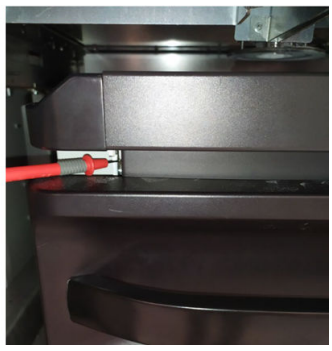


For more safety information, see Safety precautions on page 4

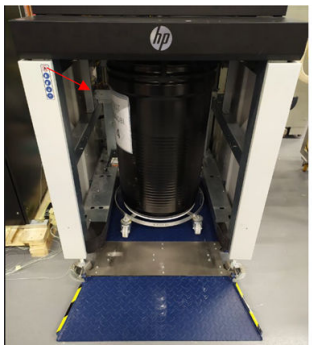
Check the machine's earthing between the parts listed below and the building's earth.

1. Build Unit metal structure while it is inside the Loading System.





2. The Extraction Tank while it is inside the Loading System.

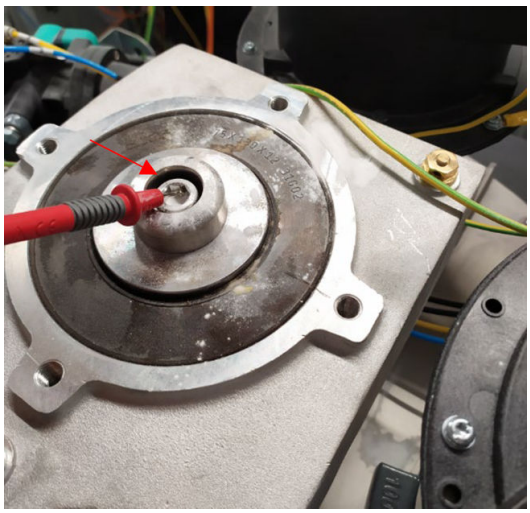




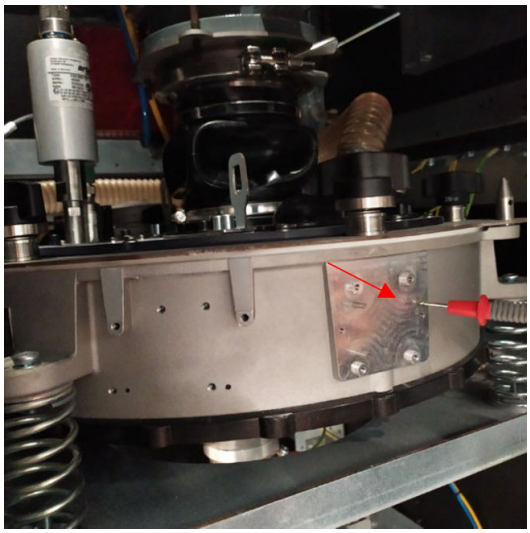
3. The Loading System internal tank.



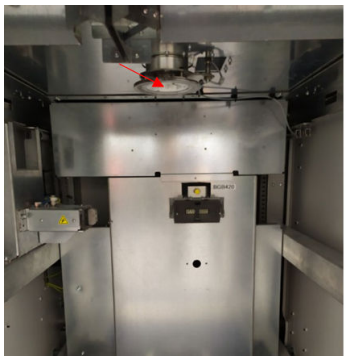
4. The Loading System mixer shaft.

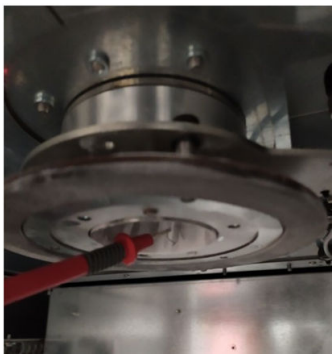


5. The Loading System sieve.

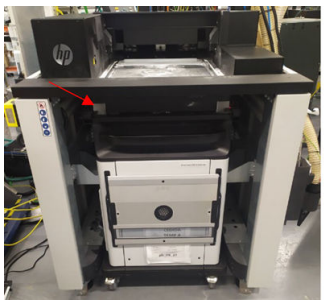


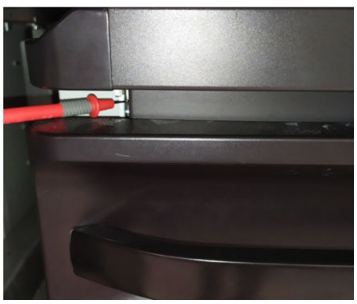
6. The Loading System nozzle.



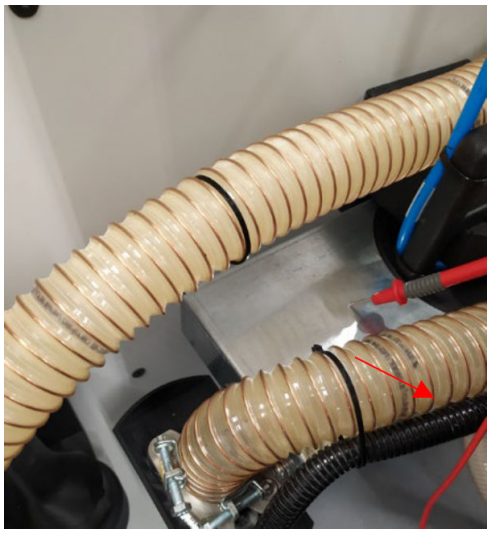


7. The Build Unit's metal structure while it is inside the Extraction System.

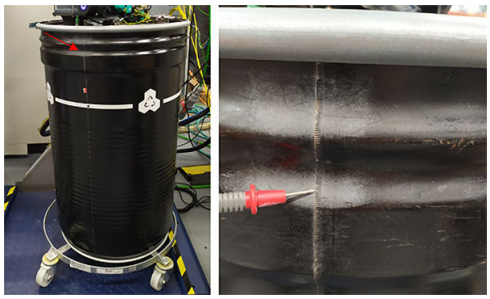




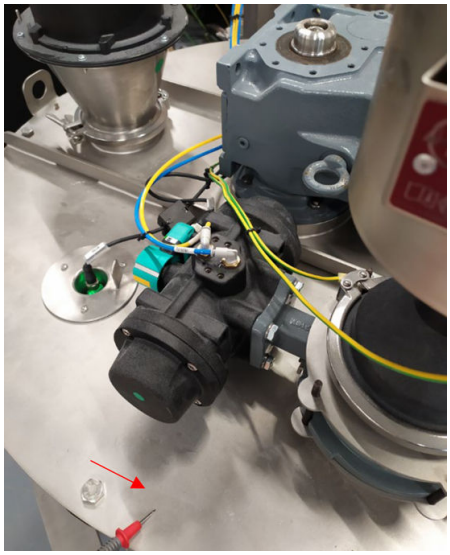
8. The Extraction System cleaning tool.



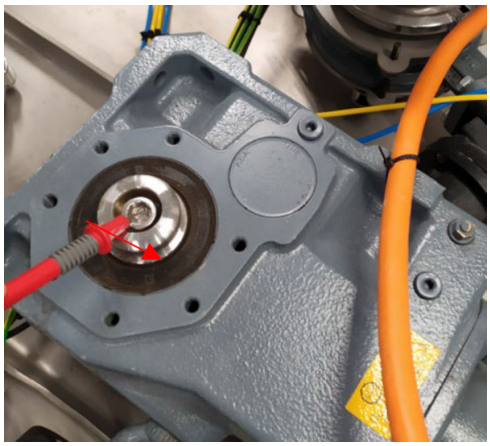
9. The Extraction System external tank.



10. The Homogenizer tank.



11. The Homogenizer tank mixer shaft.



12. The depository tank.



13. The vacuum pump prefilter enclosure.



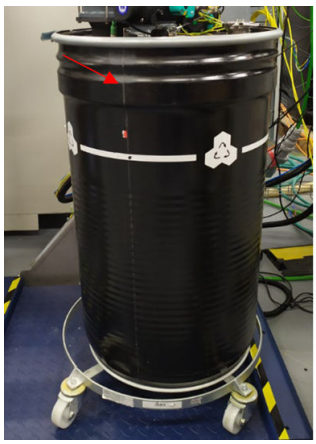
14. Vacuum pump HEPA filter enclosure.



15. The waste tank.

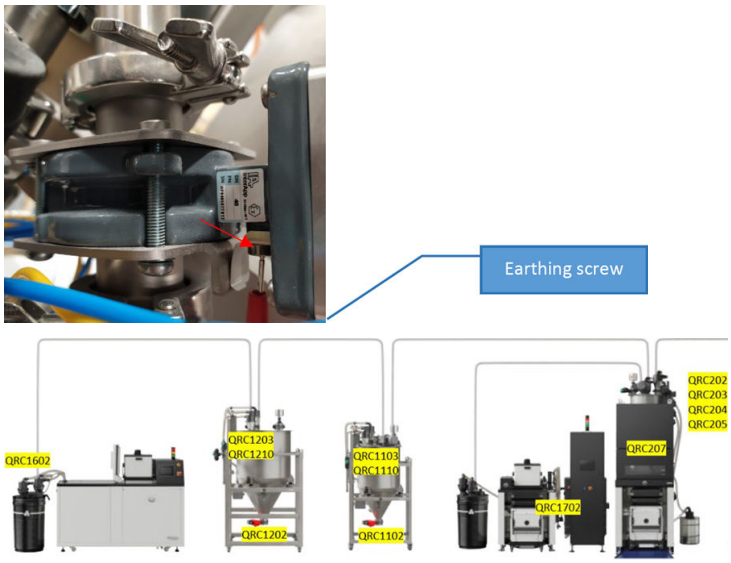


16. Automatic Unpacking Station external tank.





17. Butterfly valves (QRC202-QRC205, QRC207, QRC401, QRC1110, QRC1102, QRC1103, QRC1210, QRC1202, QRC1203, QRC1602, QRC1702).



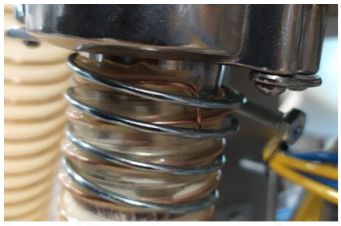
18. Additionally, perform a visual inspection of the flexible hoses and the grounding connection points. Flexible hoses metal wire must be appropriately grounded at both ends. If hose ends on a metal fitting, check if the hose metal wire is correctly connected to the fitting:



Correct: hose wire firmly pressed under the metal clamp, directly against the fitting.



Incorrect: hose wire out of the metal clamp.

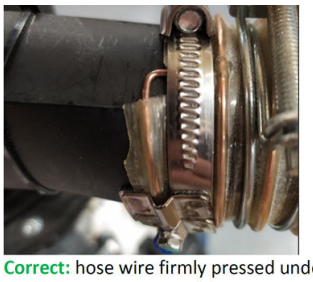


Incorrect: hose wire pressed on hose plastic.

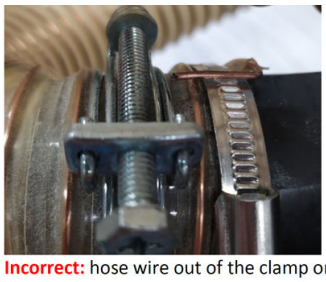


Incorrect: metal clamp loosen.

19. If the hose ends with a non-metal fitting, check if the hose metal wire is correctly connected to the earthing wire:



Correct: hose wire firmly pressed under the metal clamp and earthing cable correctly connected.



Incorrect: hose wire out of the clamp or clamp loosen.



Incorrect: connection screw loosen.



Incorrect: cable/terminal damaged or disconnected.

⚠ **CAUTION:** The hose wire connection to earth is essential for the safety. If any connection is incorrect, stop operation, and, if necessary, call your service representative.

Check Residual Current Circuit Breakers

Following standard Residual Current Circuit Breaker (RCCB) recommendations, it is recommended that the RCCBs are tested on a yearly basis.

Safety warnings



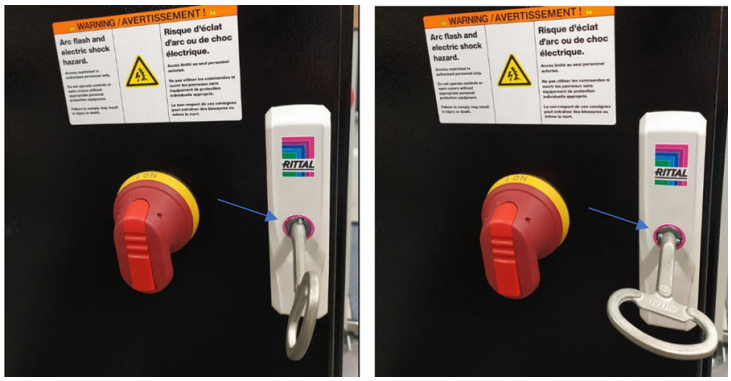
For more safety information, see Safety precautions on page 4

⚠ **WARNING!** This check requires access to the internal electrical-cabinet electrical enclosure. An electrician is required for this electrical system check. Make sure that your electrician is appropriately certified according to local regulations and supplied with all the information about the electrical configuration (see below).

Always follow the steps of the procedure in the order presented.

1. Turn off the equipment from the front panel. Do not use the electrical cabinet main switch.

2. With the main switch still switched on, unlock the electrical cabinet door by using the maintenance key.



3. When the electrical cabinet door is unlocked, the main switch safety-interlock prevents the door from being opened.

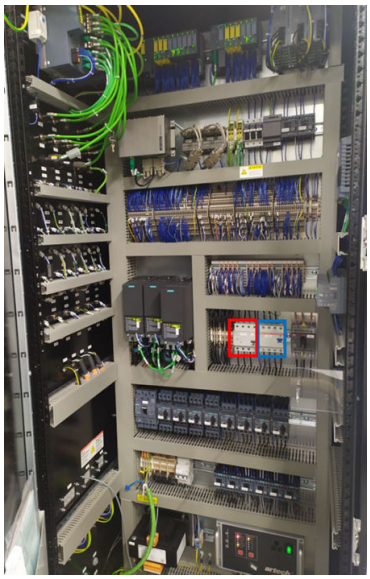
NOTE: Risk of electric shock. The internal components inside electrical cabinet operate at hazardous voltages. Do not touch any internal component, except for the RCCB's test button.



4. While switched on, open the electrical cabinet door using a narrow pin or a thin screwdriver to release the interlock-bypass, then pull the door handle to open it.



5. Before continuing, check the Front Panel. Then, test that the RCCB works correctly by pressing the test button.

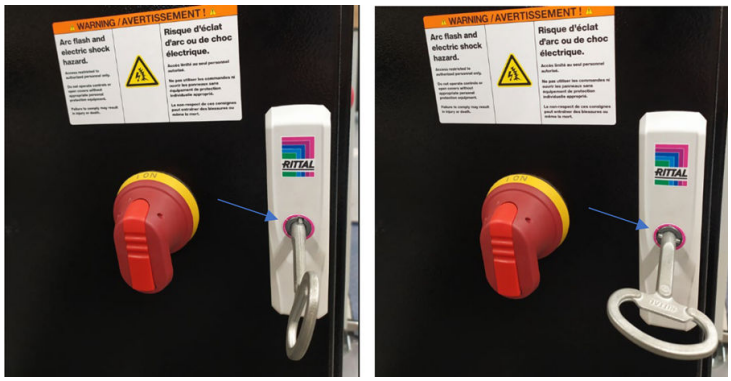




NOTE: The RCCB marked in red is not energized in 480 V configuration. Therefore, do not check the RCCB marked in red in 480 V configuration.

- If the RCCB does not trip when the test button is pressed, this indicates that it has failed. The RCCB must be replaced for safety reasons; call your service representative to remove and replace the RCCB.
- If the RCCB trips, this indicates it is working correctly; reset the RCCB to its normal, turned-on state and complete the check for all the RCCBs.

6. Close the electrical cabinet door, by ensuring the switch bar is inserted into the handle, then use the service key to lock it.



When required

Clean the sieve waste tank

This section provides the instructions on cleaning the sieve waste tank.

Safety warnings



For more safety information, see Safety precautions on page 4

Prepare for cleaning

Always follow the steps of the procedure in the order presented.

NOTICE: The machine will detect that the waste tank is full through a level sensor. At that point, it will not be possible to do any other loading process until the tank has been emptied or cleaned.

⚠ WARNING! Explosion hazard. Hot surface, mechanical and electrical sparks, static electricity may be generated.

1. Ensure that the entire system is not in operation.
2. You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

⚠ WARNING! Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

Clean the waste tank

Always follow the steps of the procedure in the order presented.

1. Release the clamp and open the tank lid.




2. Clean the tank lid with an explosion-protected vacuum cleaner.
3. Place the lid on the ground, next to the tank.

⚠ CAUTION: When positioning the lid on the ground, take extra care to prevent any damage to the level sensor. Impairment of safety may result from sensor damage. If such damage occurs, refrain from operating the machine and contact your service representative.



4. Clean the inside of the container with an explosion-protected vacuum cleaner.

⚠ WARNING! Do not use a compressed air gun.

5. When finished, place the lid on top of the tank and secure it with the clamp.
6. Clean the area with an explosion-protected vacuum cleaner.

Finish cleaning

NOTICE: Inspect for dust, if there is any present, remove it with an explosion-protected vacuum cleaner.

- Ensure that all windows, covers, and doors are closed and in their original positions.

Clean the vacuum system pre-filter

This section provides the instructions on cleaning the vacuum system pre-filter.

Safety warnings



For more safety information, see Safety precautions on page 4

Prepare for cleaning

Always follow the steps of the procedure in the order presented.

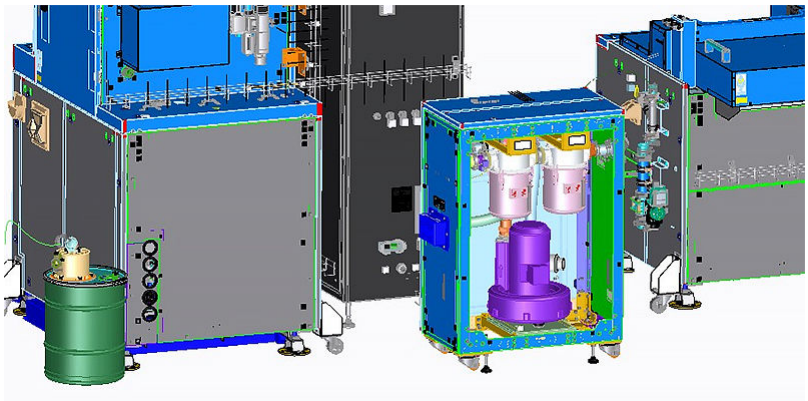
1. Ensure that the loading system is not in use.
2. You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

> ⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

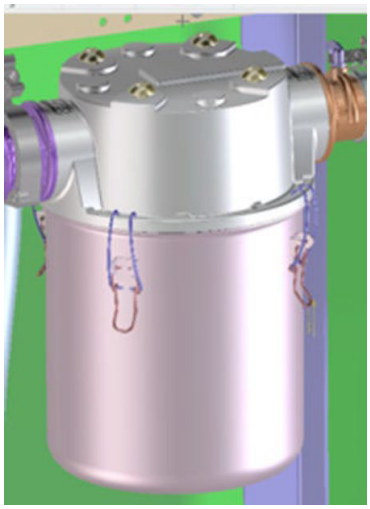
Clean the pre-filter

Always follow the steps of the procedure in the order presented.

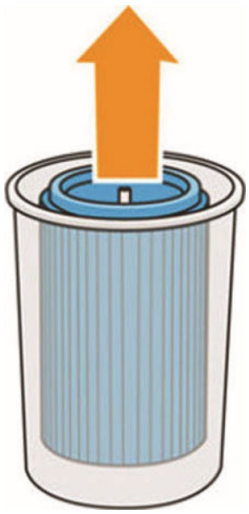
1. Locate the vacuum system pre-filter.



2. Completely unlatch the filter body to release the filter.



3. Remove the filter and dispose of it according to local regulations.



4. Clean the filter with an explosion-protected vacuum cleaner, paying special attention to the top and bottom areas.

NOTE: Clean the filter carefully, so as not to damage it. If there is any damage to the filter, replace it with a new one.

5. Clean the inside of the container with an explosion-protected vacuum cleaner.



6. Reinsert the filter between the container and the central tube, with the closed end at the top and the open end at the bottom.



7. Align the filter in its housing and relatch the filter body.
8. Clean the bottom area cover with an explosion-protected vacuum cleaner.

⚠ **WARNING!** Explosion hazard. Hot surface, mechanical and electrical sparks, static electricity may be generated.

Finish cleaning

NOTICE: Inspect for dust, if there is any present, remove it with an explosion-protected vacuum cleaner.

- Ensure that all windows, covers, and doors are closed and in their original positions.

Replace the vacuum system pre-filter (5S375A)

To replace the vacuum system pre-filter, you need the 5S375A - HP Metal Jet Powder Vac. Pre Filter, provided in the yearly maintenance kit.

To replace the filter, follow the procedure described in Clean the vacuum system pre-filter on page 141, but replace the filter with a new one instead of cleaning the old one.

Replace the vacuum system HEPA filter (5S376A)

This section provides the instructions on replacing the vacuum system HEPA filter.

Safety warnings



For more safety information, see Safety precautions on page 4

Prepare for replacement

Always follow the steps of the procedure in the order presented.

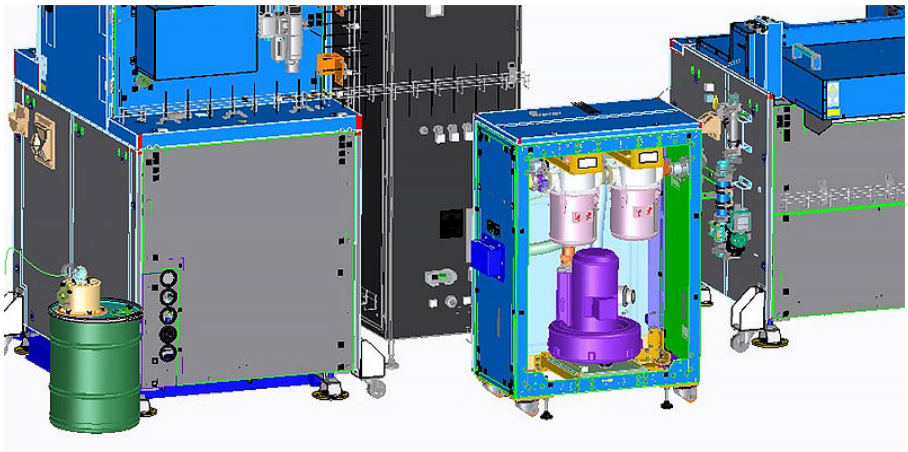
1. Ensure that the loading system is not in use.
2. To replace the vacuum system HEPA filter, you need the 5S376A - HP Metal Jet Powder Vac. H.E.P.A. Filter provided in the yearly maintenance kit.
3. You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

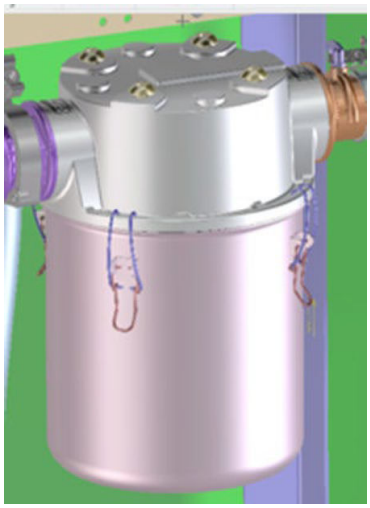
Replace the HEPA filter

Always follow the steps of the procedure in the order presented.

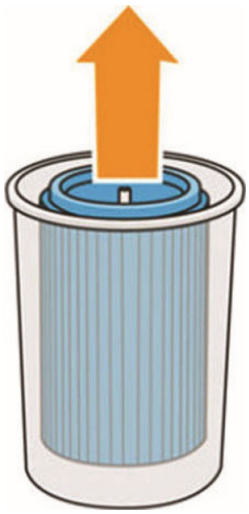
1. Locate the old vacuum system HEPA filter.



2. Completely unlatch the filter body to release the filter.



3. Remove the filter and dispose of it according to local regulations.



4. Clean the inside of the container with an explosion-protected vacuum cleaner.



5. Insert the new filter between the container and the central tube, with the closed end at the top and the open end at the bottom.



6. Align the filter in its housing and relatch the filter body.

⚠ **WARNING!** Explosion hazard. Hot surface, mechanical and electrical sparks, static electricity may be generated.

NOTICE: Do not disconnect the earthing connection during this task.

Finish replacement

NOTICE: Inspect for dust, if there is any present, remove it with an explosion-protected vacuum cleaner.

- Ensure that all windows, covers, and doors are closed and in their original positions.

Clean or replace the mini-depository

This section provides the instructions on cleaning or replacing the mini-depository

Safety warnings



For more safety information, see Safety precautions on page 4

Prepare for cleaning or replacing

Always follow the steps of the procedure in the order presented.

⚠ **WARNING!** Explosion hazard. Hot surface, mechanical and electrical sparks, static electricity may be generated.

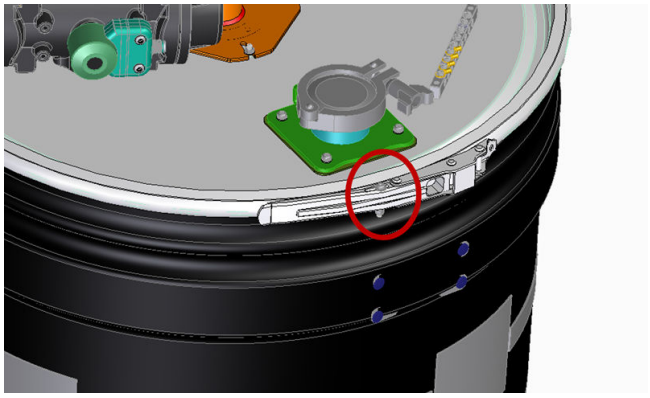
1. Ensure that you have an explosion-protected vacuum cleaner as specified in the site preparation guide.
2. You are recommended to wear safety goggles, gloves, a safety mask, and safety boots. The area is marked with warning symbols.

⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

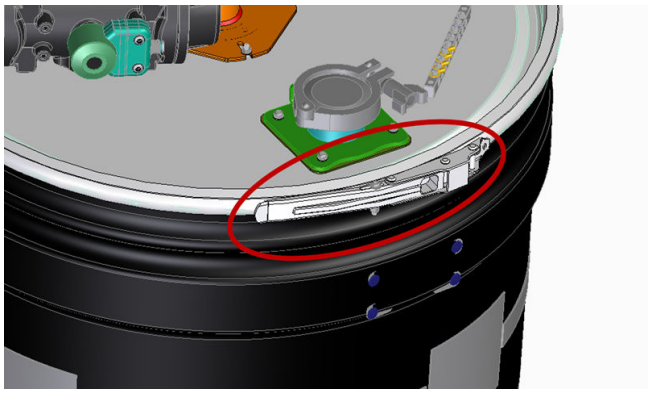
Clean or replace the tank

Always follow the steps of the procedure in the order presented.

1. Loosen the screw that secures the tank clamp.



2. Release and open the clamp.



3. Lift the lid to open the tank.
4. Place the lid on the ground, next to the scale.
5. Move the tank to replace out of the scale.
6. Place an empty tank on top of the scale if needed.
7. Clean the tank lid with an explosion-protected vacuum cleaner.
8. Clean the inside of the tank with an explosion-protected vacuum cleaner.

⚠ **WARNING!** Do not use a compressed-air gun.

9. If the tank has not been replaced, place the clean tank on top of the scale
10. Place the tank clamp in the tank.
11. Place the lid back on top of the tank
12. Close the clamp

13. Tighten the locking screw to secure in place.



Finish cleaning or replacement

- Ensure that all windows, covers, and doors are closed and in their original positions.

⚠ **WARNING!** Explosion hazard. Mechanical sparks, static electricity may be generated.

Empty the homogenizer

This section provides the instructions on emptying the homogenizer.

Prepare for emptying

Always follow the steps of the procedure in the order presented.

⚠ **WARNING!** Explosion hazard. Hot surface, mechanical and electrical sparks, static electricity may be generated.

1. Ensure that you have several empty tanks ready to be inserted in the system.
2. Place the lid located at the side of the loading system on top of the tank and close the clamp.

⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

Empty the tank

Always follow the steps of the procedure in the order presented.

1. Select the feed-internal-tank process and set the quantity to 45 kg or, if there is less than 45 kg in the homogenizer, the amount of powder available in the homogenizer.
2. Launch the process.

3. Once the process is completed, insert the tank in the loading system, ensuring that the metal fin on the lid is inserted in the guides located in the structure.
4. Select the empty-mixer-tank process in the front panel and launch the process.
5. Wait for the process to be completed.

Finish the empty process

Always follow the steps of the procedure in the order presented.

1. Once the **Process Completed** message is shown on the front panel, remove the tank from the loading system.
2. Open the clamp to remove the empty lid. Put a blind lid on the tank and close the clamp.
3. Using an external vacuum cleaner, clean the empty lid and park it at the side of the loading system.
4. Empty or store the tank.
5. Repeat the whole process as many times as needed to ensure that the homogenizer is empty.

⚠ **WARNING!** Explosion hazard. Mechanical sparks, static electricity may be generated.

Empty the depository

This section provides the instructions on emptying the depository.

Prepare for emptying

Always follow the steps of the procedure in the order presented.

NOTE: In this procedure, the depository is emptied through the homogenizer. If you need to empty the depository without emptying the homogenizer, contact your service representative.

⚠ **WARNING!** Explosion hazard. Hot surface, mechanical and electrical sparks, static electricity may be generated.

1. Ensure that you have several empty tanks ready to be inserted in the system.
2. Place the lid located at the side of the loading station on top of the tank and close the clamp.

⚠ **WARNING!** Failure to follow the guidelines marked with warning symbols could result in serious personal injury or damage to the product.

Empty the tank

Always follow the steps of the procedure in the order presented.

1. Select the feed-homogenizer process and the **Fill homogenizer completely** toggle.
2. Launch the process and wait until the process is completed.
3. Select the feed-internal-tank process and set the quantity to 45 kg or, if there is less than 45 kg in the homogenizer, the amount of powder available in the homogenizer.
4. Launch the process.

5. Once the process is completed, insert the tank in the loading system, ensuring that the metal fin on the lid is inserted in the guides located in the structure.
6. Select the **Empty the Mixer Tank** process from the front panel and launch the process.
7. Wait for the process to be completed.

Finish the empty process

Always follow the steps of the procedure in the order presented.

1. Once the **Process Completed** message is shown in the front panel, remove the tank from the loading system.
2. Open the clamp to remove the empty lid. Put a blind lid on the tank and close the clamp.
3. Using an external vacuum cleaner, clean the empty lid and park it at the side of the loading system.
4. Empty or store the tank.
5. Repeat the whole process as many times as needed to ensure that the depository is empty.

⚠ **WARNING!** Explosion hazard. Mechanical sparks, static electricity may be generated.

8 Move or store the product

This topic explains the storage and transport of the product.

IMPORTANT: If you need to relocate your HP Jet Fusion 3D Printing Solution to a different location or room, please reach out to your reseller for assistance. This product contains sensitive components that can be vulnerable to damage during transportation, requiring specialized transportation features and tools.

Do not move the machine without service assistance. Additional packing precautions and installation calibrations are required for significant equipment relocations.

To store the device for an extended period, first empty each asset, ensuring that no powder remains.

Extracted powder must be kept within storage specifications. The equipment should be stored at a temperature of –25°C to 55°C and humidity of less than 90% (without condensation). Before using the machine again, allow at least 4 hours for it to acclimatize to operating conditions, and check for condensation before turning it on. If you want to keep powder inside the product during shorter periods of storage, the product operating conditions must be met.

To move or store your HP Jet Fusion 3D Printing Solution, first clean each device, ensuring that there is no material left inside.

Follow these steps to empty the machine:

1. Clean or replace the two mini-depositories (Clean or replace the mini-depository on page 147).
2. Empty the depository (Empty the depository on page 150).
3. Empty the homogenizer (Empty the homogenizer on page 149).
4. Empty the loading-system mixer (Workflow: Empty internal tank on page 78).
5. Clean the sieve waste tank (Clean the sieve waste tank on page 139).

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