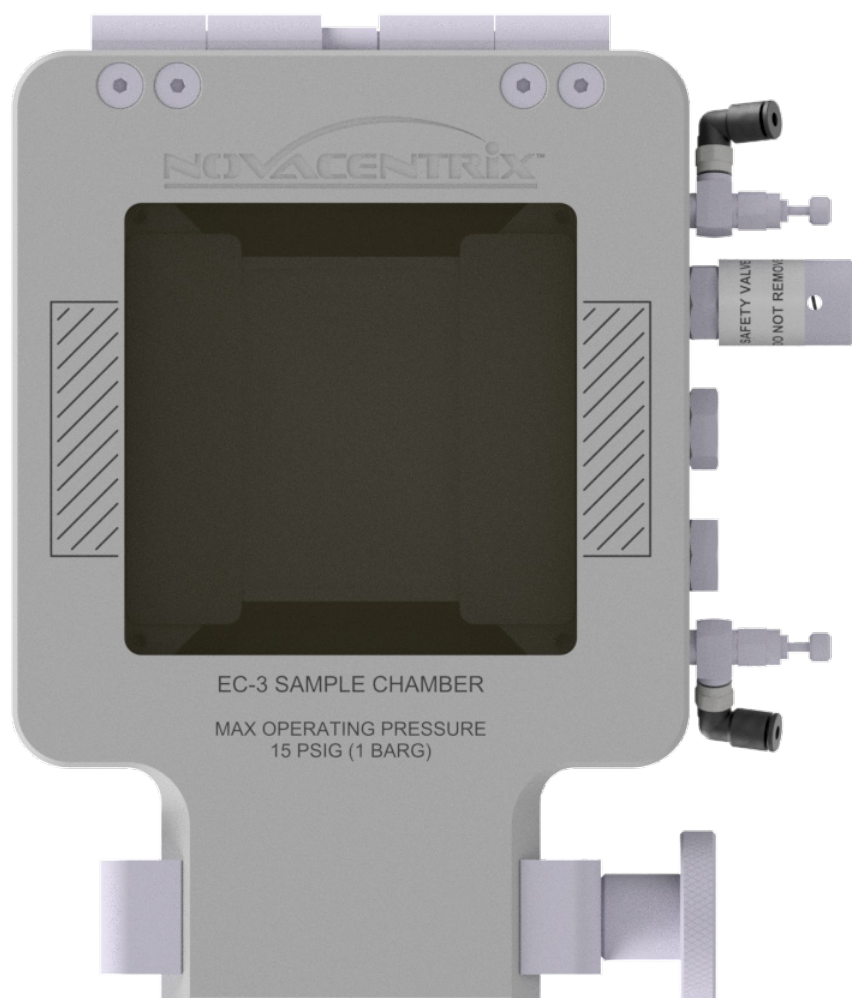


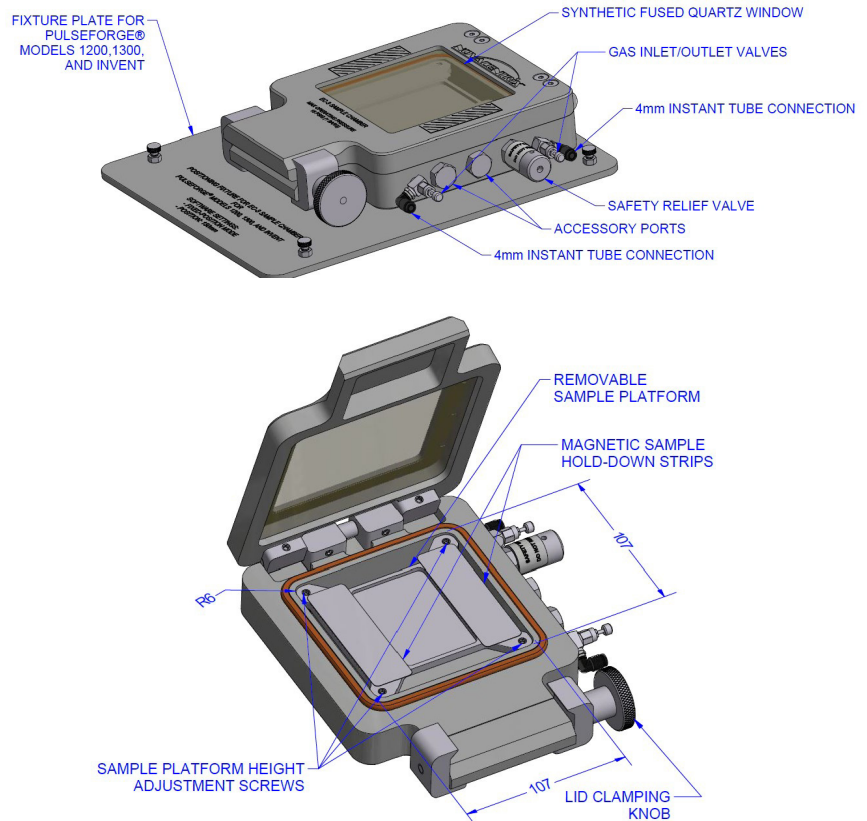


EC-3 Sample Chamber

The EC-3 chamber is an accessory item to the PulseForge® lab tools. When integrated with PulseForge® models 1200, 1300, and Invent, the EC-3 Sample Chamber enables sample processing under a controlled chamber environment. The chamber can be pumped down for vacuum conditions or purged with inert or reactive gases to provide different environmental conditions. The chamber is suitable for use in glove box transfer operations, and is adjustable to accommodate samples of various sizes.



Overview of System Components



Fixture Plate: Provided for mounting to the sample stage on PulseForge Models 1200, 1300, and Invent curing systems.

Quartz Window: UV-resistant synthetic fused quartz. 100mm x 100mm. Silicone rubber window seal. Clean as needed with a cotton cloth or steel wool. Avoid highly abrasive cloths like Scotch-Brite. Chemical solvents such as isopropanol, methanol, or sodium hydroxide can also be used. Only use chemicals on the uncoated surface of the window if your installation includes a coated window.

Sample Platform: Removable and height-adjustable with magnetic hold-down strips for suspending thin samples. Increasing the height of the platform relative to the window increases the energy transmitted to the sample.

Easy-Open Lid: Includes large clamping knob for ease of use in glove box transfer operations.

Accessory Ports: Two 9/16-20 accessory ports for optional vacuum connections or user-supplied electrical pass-thru connections, adaptable for connection to 3/8" Swagelok type compression fittings.

Inlet/Outlet Isolation Valves: Two valves for purge gas filling and venting. Connects to 1/8" OD flexible tubing via instant tube connections. Can be used simultaneously or individually.

Internal Chamber Dimensions: 107mm x 107mm x 28mm.

Max Internal Pressure: 15 PSIG (1 bar), limited to 10 PSIG (0.7 bar) by included stainless steel safety relief valve.

Max Vacuum: Millitorr (mTorr) of pressure is achievable depending on external vacuum pump and hose configuration; vacuum pump is not included.

External Dimensions: 219mm x 187mm x 47mm.

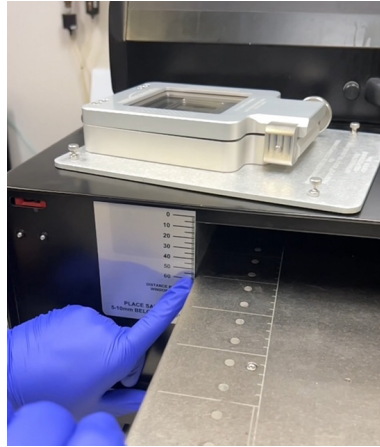
Chamber Weight: 2.8kg.

Installation Instructions

Follow these directions to quickly and safely install the sample chamber on the PulseForge® tool. Please review **Chapter 3, “Safety”** in your device’s Operations Manual before performing any operation.

Directions:

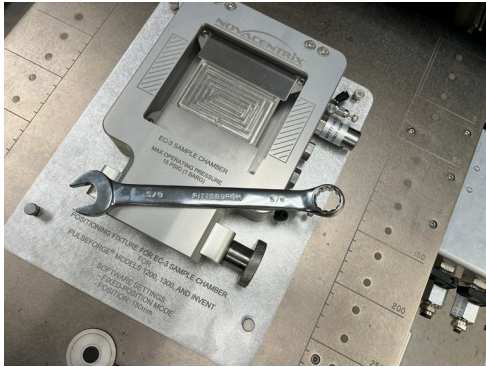
1. Turn off the PulseForge® via the software and press the e-stop.
2. Use the hand crank on the front of the sample table drawer to raise/lower the platform and ensure enough clearance for the chamber as the drawer is opened and closed. The appropriate height should be around 55mm.



3. Once the sample table is at the appropriate height, line up the four spring pins on the fixture plate with the holes in the center of the sample table. They will snap into place.



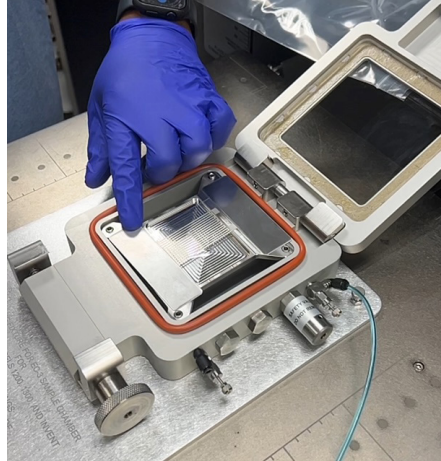
4. Line the pins on the bottom of the chamber up with the fixture plate and it will click as it is seated in place.



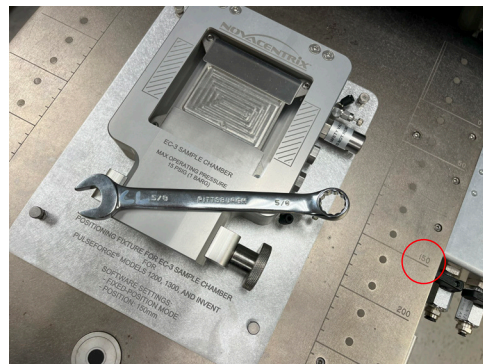
-
5. Open the chamber by turning the large knob on the bottom right toward the user and lifting the lid.
-
6. Adjust the height of the removable sample platform as needed to accommodate the sample using the adjustment screws on each corner of the platform and test that the chamber door will close fully. Be aware that increasing the height of the platform relative to the window increases the energy transmitted to the sample.



- Place the sample in the chamber and secure it using the two magnetic hold-down strips.



- Close the sample chamber door and tighten the seal by turning the large knob on the bottom right away from the user.
- The position listed in the **Operate** window in software should read 150mm (corresponding to the position on the table circled below). The chamber can only be used in **Fixed Position** mode. Be aware when using any tool supplied with a 12" lamp, the area flashed will be larger than the size of the quartz window. Care is advised to prevent burns by touching exposed areas. Shadow masks should be used to block any unwanted heating. A sheet of aluminum foil with a window cut out to align with the quartz window is sufficient.



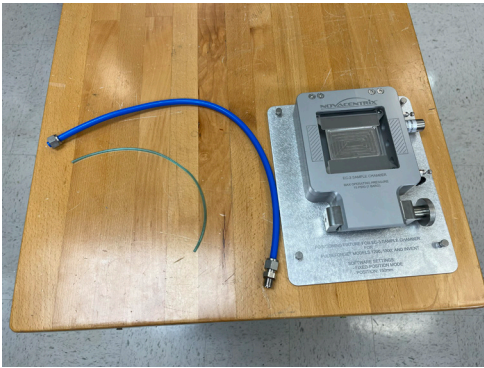
Processing Samples Using Gas and Vacuum Connections

Tools Required:

- Latex or nitrile gloves
- 5/8" socket wrench
- Masking material such as aluminum foil

Directions:

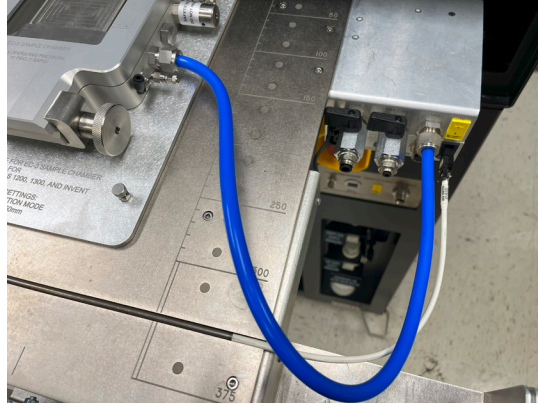
Depending on the type of environment required for processing, the sample chamber can be connected to the PulseForge® with two types of available hosing, one for gas and the other for a vacuum pump. If processing a sample requiring glove box handling (no gas or vacuum), the chamber can be sealed and carried between the PulseForge® and the glove box for flashing.



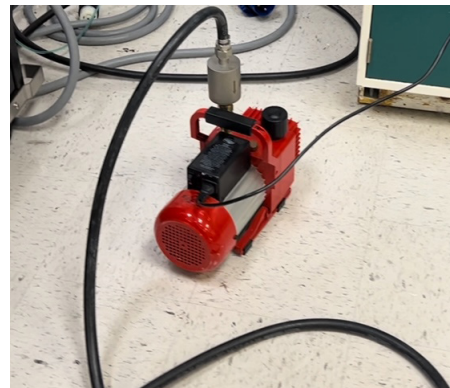
To connect a vacuum pump, use a 5/8" socket wrench to remove the cap on one of the two accessory ports on the side of the chamber.



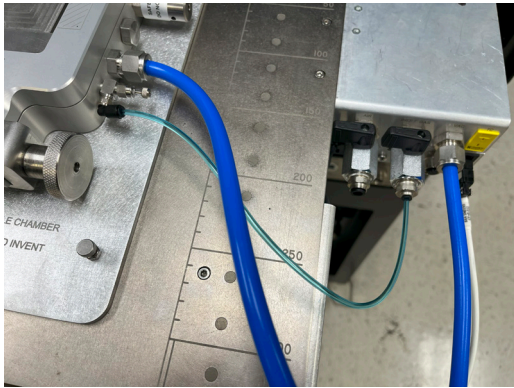
Connect the vacuum hosing from the accessory port to the associated port on the side of the PulseForge® sample table.



Then connect the vacuum pump directly to vacuum port on the PulseForge® sample table interface and make sure the vacuum pump is plugged into an outlet. The vacuum pump can be run without the introduction of gas to create a vacuum environment. Be aware that depending on the pump and hosing configuration, the maximum vacuum will be in mTorr range.



To introduce gas to the chamber, connect the thinner tubing between one of the 1/8" instant tube connections on the chamber, and one of the two gas connections on the sample table. In order for gas to flow, both the valve on the chamber and the valve on the sample table (black plastic handle) should be open. The valve is closed in the image below.



If desired, both the vacuum and gas can be engaged simultaneously to remove any oxidizers from the process environment. The pressure inside the chamber can be adjusted using the needle valve on the input.

It is important to protect the vacuum and gas lines from exposure to flash intensity by protecting them using aluminum foil or tape during the processing. Caution should be exercised during sample removal of hot surfaces to avoid burns.

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Declaration of Patents

UNITED STATES

7,220,936	7,820,097	8,410,712	8,557,642
8,674,618	8,907,258	8,945,686	8,916,796
9,006,047	9,095,874	9,237,637	9,494,068
9,599,397	9,631,283	9,643,208	9,743,516
9,839,139	9,907,183	10,011,104	10,150,230
10,244,636	10,422,578	10,537,029	10,553,450
10,667,405	10,849,239	10,986,698	11,089,690
11,172,579	11,230,036	11,317,517	11,358,381

CANADA

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2,787,430	2,787,451	2,801,900	2,893,584
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CHINA

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ZL 2011 8 0011046.5	ZL 2011 8 0037944.0
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EUROPE

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2,555,879	2,556,594	2,576,860	2,695,254
2,855,148	3,465,778	3,465,778	3,711,948

JAPAN

5,408,878	5,560,272	5,974,045	5,401,550
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6,258,303	6,277,253	5,780,682	6,359,484
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6,830,279	7,118,463		

REPUBLIC OF KOREA

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10-1648101	10-1655879	10-1742772	10-1852024
10-2270021	10-2239833	10-2239854	10-2405231

INDIA

270,169	339,629
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Other US and international patents pending.

The Photonic Curing process is patented by PulseForge. Use of this equipment is contingent upon PulseForge granting a license for the use of Photonic Curing technology to the user. If such a license has not been granted explicitly for the intended use of this tool, contact PulseForge to arrange for the appropriate license and stipulated field of use. Use of the tool without the appropriate license constitutes a violation of patent protection laws. Violators will be prosecuted to the fullest extent allowable.