



HOW TO PRESSURIZE A 1000 LB. (454 KG) CYLINDER USING NITROGEN

Honeywell

PREFACE

Solstice blowing agents are based on Honeywell's hydrofluoro-olefin (HFO) technology and provide ultra-low global warming potential alternatives to HFC and HCFC blowing agents.

To dispense these blowing agents from the cylinders used to transport and store the material, correct pressurization is essential to their successful and safe use. This guide provides information on how to pressurize a 1,000 lb. (454 kg) or half-ton cylinder – among the packages widely used for all three products. Similar pressurization guides are available for other common cylinder sizes. If you require assistance, contact your Honeywell representative.

We recognize that the information provided does not include all circumstances. Pressurization requirements and processes may vary. **This brochure is intended as guidance only.**

PRECAUTIONS AND SAFETY

At the outset, it is important to note that anyone working with liquid or gas under pressure should carefully follow instructions provided in the safety data sheet (SDS), including information provided on the addition of dry nitrogen.

Temperature

Cylinders should be protected from direct sunlight and should not be exposed to temperatures exceeding 131°F (55°C).

Personal Protective Equipment

Proper personal protective equipment must be worn.

This includes but is not limited to:

- Safety glasses with side shields
- Solvent-resistant gloves
- Long pants
- Long-sleeve shirt

Ventilation

The product should be dispensed in a well-ventilated area. Care should be taken to avoid contact with eyes, skin, and clothing, and to avoid inhaling mist or vapors.

HONEYWELL PROVIDES THE FOLLOWING FOAM BLOWING AGENT SOLUTIONS:

- Solstice® Liquid Blowing Agent
- Solstice® Gas Blowing Agent
- Enovate® 245fa



Safety glasses with side shields and solvent-resistant gloves are included among the PPE that must be worn. See additional PPE listed on this page.



CHECKS AND PREPARATION

All equipment should be checked before pressurization to ensure everything needed is present, working, and meets materials compatibility requirements.

CHECK THE CYLINDERS

Begin by checking the blowing agent cylinder:

- 1,000 lb. (454 kg) cylinders are designed to be used vertically
- The maximum recommended service pressure is 260 psi (1800kPa)
- There is no practical need for cylinder pressure to exceed 100 psi (690kPa) and this should not be exceeded.

CHECK CONNECTIONS

Users must ensure they have proper connections for the cylinder fittings. Lifting the hinged cap on the cylinder will reveal the valve used to discharge the liquid blowing agent.

In North America, this should conform to Compressed Gas Association (CGA) standards. The fitting used on the liquid discharge valve is a CGA-660 connection.

For the nitrogen supply, the vapor valve is also a CGA-660 connection.

In other regions, connections required may vary depending on cylinder size and fittings. If you have questions or don't have the proper connections or hose assemblies, contact your Honeywell representative. You can call your local Honeywell office or 1-800-631-8138 (U.S. and Canada). You can also refer to the product's technical brochure or conversion manual available at www.honeywell-blowingagents.com.

THE NITROGEN CYLINDER AND LIQUID DISCHARGE

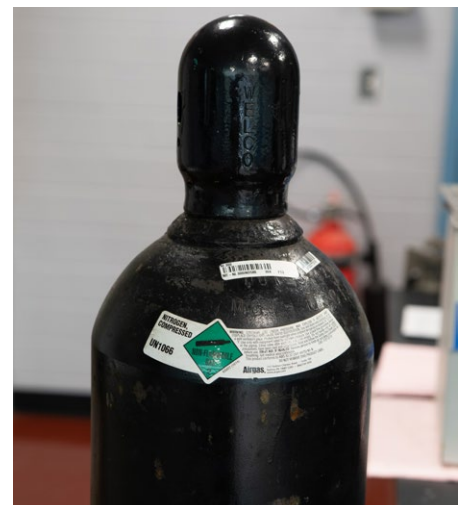
It is recommended that dry nitrogen be used to pressurize these cylinders. **Do not mix with oxygen or air above atmospheric pressure because this mixture can be combustible.**

A two-stage nitrogen regulator is also required to set and monitor pressure levels, while a nitrogen needle valve can be used to shut off the flow, and a check valve used to prevent backflow.

To connect the nitrogen, use an appropriate gas hose rated for nitrogen use. This may also have a valve for an additional shut-off location.

In North America, a liquid discharge line with a CGA-660 connection and a gasket is required. This connects to the blowing agent cylinder and is used to dispense the blowing agent into a suitable process container.

As mentioned earlier, connections may vary by region so contact your Honeywell representative if you require assistance.



Check nitrogen cylinder



A liquid discharge line with a CGA-660 connection and gasket is required



A two-stage nitrogen regulator is required.

PRESSURIZATION AND DISPENSING

With the correct equipment and supplies in place, you can commence pressurization. This process is designed to ensure the cylinder has a consistent, regulated pressure of 100 psi (690 kPa) while dispensing to ensure a constant flow.

It is a four-step process:

Step 1 – Prepare the nitrogen cylinder

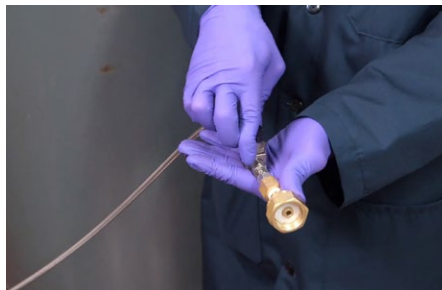
To complete this step, attach the pressure regulator to the nitrogen cylinder and secure this tightly using an appropriate wrench.

Then, check that the gas hose is attached and tightly secured to the nitrogen regulator discharge connection. Remember, it is essential that the gas hose is rated for nitrogen use.



Prepare the nitrogen cylinder

Step 2 – Prepare the blowing agent cylinder to be pressurized and to dispense product



1. To prepare the 1,000 lb. (454kg) half-ton cylinder for pressurization, start by lifting the cap. This should reveal two handles and two ports on the cylinder's top.
2. Before connecting the nitrogen gas hose to the blowing agent cylinder vapor port, check again that the CGA-660 connection has the required gasket.
3. Remove the cap from the blue vapor port, which will be used for the nitrogen vapor to enter the blowing agent cylinder. Connect the nitrogen gas hose to the blue vapor port and secure tightly.



4. The final step is to connect the liquid discharge line. Remove the cap from the red liquid discharge port on the blowing agent cylinder. Before attaching the liquid discharge line to the port on the blowing agent cylinder, make sure to check for the required gasket. It is also critical to ensure that the line is rated for the desired pressure and the hose material is compatible with the blowing agent.
 5. If both these requirements are met, connect the liquid discharge line and secure tightly.
- If you have questions, refer to the materials compatibility section in the product's technical brochure, conversion manual, or contact your Honeywell representative.

Step 3 – Pressurize the blowing agent cylinder with nitrogen



1. With the lines connected, the blowing agent cylinder can be pressurized. This is done by turning the handle on the top of the nitrogen cylinder to the open position and adjusting the regulator to dispense the nitrogen gas at a pressure of 100 psi (690 kPa). Remember not to exceed this pressure.
2. You can then open the needle valve at the nitrogen regulator to start the flow of nitrogen.
3. Next, open the valve on the nitrogen line near the blowing agent cylinder.



4. Finally, open the vapor valve on the blowing agent cylinder to allow the nitrogen gas to flow into the cylinder, pressurizing it.

Typically, the pressure equalization will happen very quickly.

Step 4 – Dispense the blowing agent into a process container

Dispensing Solstice LBA and Enovate 245fa:

With the blowing agent cylinder now pressurized, you are ready for the final step in the process -liquid blowing agent into an appropriate process container.

First, check that the end of the liquid discharge line is securely placed in the process container. Then open the liquid valve of the blowing agent cylinder to dispense the blowing agent into the container.

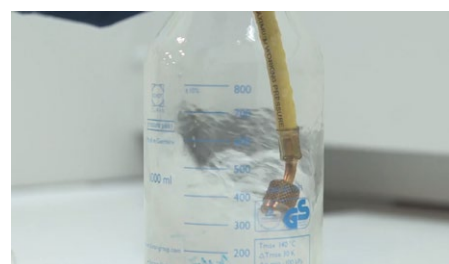
Be sure to carefully monitor the flow of liquid blowing agent into the container to avoid over filling and spillage. Once complete, securely close the liquid valve on the blowing agent cylinder to stop any further dispensing of liquid.

Dispensing Solstice GBA:

This dispensing process differs from that used for Solstice LBA or Enovate 245fa.

It is important to remember that Solstice GBA is a gas at room temperature when not pressurized and will flash off if dispensed into an open container.

Therefore, dispense Solstice GBA directly into an appropriate pressure-rated container or process line of a closed system. If you have questions, refer to the Solstice GBA conversion manual or contact your Honeywell representative.



*Image shows Solstice LBA being dispensed into an open container. NOTE: Solstice GBA **MUST** be dispensed into an appropriate pressure-rated container or process line of a closed system.*

DISCONNECTING AND COMPLETING THE PROCESS

To conclude the process and disconnect the cylinders, you should take the following steps:

- First, close the vapor valve on the blowing agent cylinder
- Close the valve on the nitrogen gas hose connected to the blowing agent cylinder
- Close the needle valve at the nitrogen regulator
- Close the valve on top of the nitrogen cylinder to stop the flow of gas

When all valves are closed, slowly and carefully disconnect the nitrogen gas hose from the blowing agent cylinder to relieve pressure. Finally, once the nitrogen hose is disconnected, slowly open the valve on the nitrogen gas line and the needle valve at the nitrogen regulator to relieve pressure.

RETURNING EMPTY CYLINDERS

Empty returnable cylinders can be sent to Honeywell. Check for cylinder return instructions for your region. For additional information, you can reference the technical brochure or conversion manual available for each product.

Learn More

To learn more, call 1-800-631-8138
(U.S. and Canada) or your local
Honeywell office
Visit www.honeywell-blowingagents.com

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