HOW TO PRESSURIZE A 100 LB. (45.4 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 agent technologies.

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 100 lb. (45.4 kg) cylinder – among the packages widely used for these 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.**

HONEYWELL PROVIDES THE FOLLOWING FOAM BLOWING AGENT SOLUTIONS:

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

PRECAUTIONS AND SAFETY

At the outset, it's important to note that anyone working with liquid under pressure should carefully follow instructions provided in the safety data sheet (SDS). Since the process involves adding dry nitrogen to the blowing agent cylinder, the proper SDS guidance should also be followed for the non-pressurized or pressurized packages, depending on which package you have received.

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 (PPE) 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.

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:

- 100 lb. (45.4 kg) cylinders are designed to be used vertically and secured with a strap, chain, or clamp designed specifically for securing cylinders
- The maximum recommended service pressure is 260 psi (1800 kPa)
- There is no practical need for cylinder pressure to exceed 100 psi (690 kPa) and this should not be exceeded.

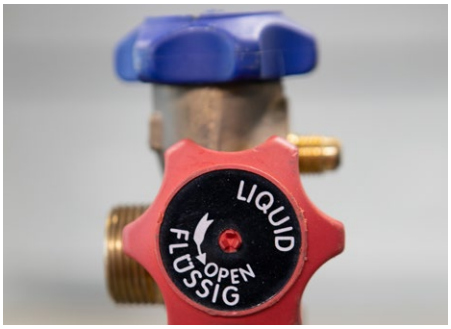
Check the cylinders

CHECK CONNECTIONS

Users must ensure they have proper connections for the cylinder fittings. In North America, the cylinder valve used to discharge the liquid blowing agent must 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 connection is to the vapor valve, which is a ¼ inch flare.

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 (US and Canada). You can also refer to the product's technical brochure or conversion manual available at www.honeywell-blowingagents.com



Check connections

THE NITROGEN CYLINDER AND LIQUID DISCHARGE

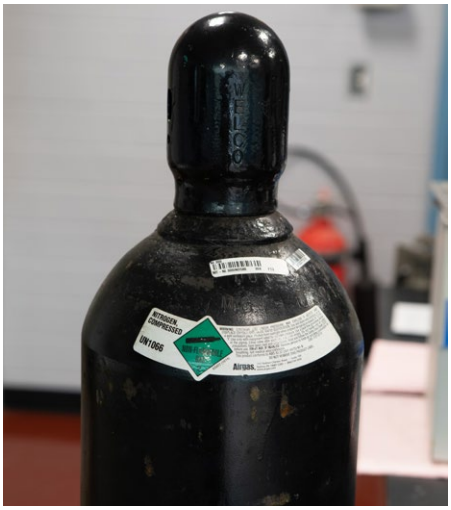
It is recommended that dry nitrogen be used to pressurize these cylinders. **Do not mix with oxygen or air above atmospheric pressure because this mixture can be combustible.**

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

To connect the nitrogen cylinder to the blowing agent cylinder, you will require an appropriate gas hose rated for nitrogen use.

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 two-stage nitrogen regulator is required

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

PRESSURIZATION AND DISPENSING

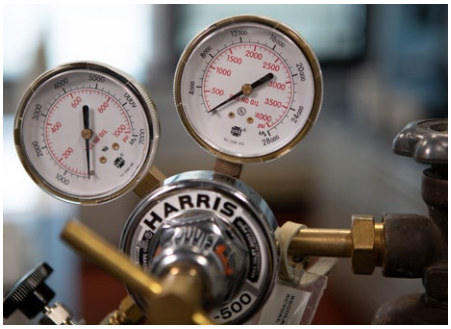
With the correct equipment and supplies in place, you can commence pressurization. This process is designed to ensure the blowing agent cylinder has a consistent, regulated pressure of 100 psi (690 kPa) during dispensing to ensure a constant flow.

Pressurization 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 the regulator tightly using an appropriate wench.

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 blowing agent cylinder, start by removing the cap.

2. This should reveal two handles and two ports at the top of the cylinder. Remove the cover from the smaller port, which will be used for the nitrogen gas to enter the blowing agent cylinder.

   Connect the nitrogen gas hose to this smaller port and secure tightly.

3. Next, remove the cap from the larger liquid discharge port on the blowing agent cylinder.

   Before attaching the liquid discharge line to the large 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.

4. If both these requirements are met, connect the liquid discharge line and secure tightly.

5. 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 follow 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, under 20 seconds in most circumstances.

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 -dispensing liquid 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 blowing agent.

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 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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