

RECHARGE MANUAL



**Inert Gas Suppression System Cylinders
With IG-55, IG-100, and IG-541 Agents
200 and 300 Bar**

**Underwriters Laboratories (UL) and
Underwriters Laboratories Canada (ULC) Listed
Factory Mutual (FM) Approved**

National Fire Protection Assoc. (NFPA) 2001 Standard Applied



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Fike®

SOLUTIONS

- / Fire Protection
- / Explosion Protection
- / Overpressure Protection
- / Pressure Activation

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1.0 INTRODUCTION

1.1 Scope

After a system discharge, it is imperative that the PROINERT® container be recharged and returned to service as soon as possible (within 48 hours) to ensure continued protection. The information contained in this manual is prepared for the use and guidance of Fike authorized sales outlets and will be strictly followed to ensure the PROINERT container functions properly throughout its life.

1.2 Purpose

This manual is intended to provide Fike authorized filling stations and refill facilities the information necessary to properly recondition and recharge PROINERT Cylinder Assembly IG71-089 and PROINERT Cylinder Assembly IG71-103-XXX-XX for service.

1.3 Safety Precautions

An understanding of the physical properties of inert gas clean agents (gas mixtures of argon, nitrogen, and carbon dioxide) –and the safe and proper use of techniques for handling high pressure compressed gases– allow safe recharge of PROINERT containers. Before handling inert gas clean agents and the PROINERT container, all supplementary manuals, relevant Safety Data Sheets (SDSs), and the safety precautions listed below must be read and understood by all individuals handling the product.

WARNING: Containers associated with this procedure will be filled with a non-liquefiable gas under high pressure. Safe handling procedures associated with pressurized containers must be observed at all times.

CAUTION: Suitable pressure relief devices will be incorporated into the charging system to prevent accidental over-pressurization of the system. In pipe sections where high-pressure inert gas could become trapped, suitable pressure relief devices will be provided.

CAUTION: PROINERT filling areas must be well ventilated at all times.

CAUTION: Safety glasses and gloves will be worn at all times when handling high-pressure inert gas.

CAUTION: All containers will be inspected for evidence of weak or corroded areas before filling, and the date of the last hydrostatic pressure test or inspection will be noted on the container. See Section 3.1 for testing details.

CAUTION: The discharge port recoil cap will be installed on the cylinder valve at all times except during the fill process.

CAUTION: The pressure gauge port plug and blanking plug will be installed in the cylinder valve at all times except during the reconditioning process.

CAUTION: The shipping/safety cap will be installed on the cylinder at all times except during the filling process.

2.0 EQUIPMENT

The following equipment is required for the proper filling of PROINERT containers:

- Item 1. Bulk Supply of Inert Gases – Stock of argon, nitrogen, and/or carbon dioxide gas. Maximum allowable water content is 0.005% by weight per NFPA 2001.
- Item 2. Pump – Device compatible with both argon and nitrogen that is capable of supplying the gases at a pressure of 5,000 psi (345 bar) or greater.
- Item 3. Actuator Port Blanking Plug (P/N IG71-0152) – Plug required to blank off the actuation port and keep the valve in the “open” position during filling.
- Item 4. Blanking Plug Removal Tool (P/N IG71-0166) – Tool required to remove the actuator port blanking plug. An M4x0.7 screw may be used as a substitute.
- Item 5. Retaining Clip (P/N 02-11755) – Clip required to secure the blanking plug into the cylinder valve.
- Item 6. Pressure Gauge Port Plug (P/N IG71-0106) – Plug required to protect the pressure gauge port from debris.
- Item 7. Discharge Port Recoil Cap (P/N IG71-0128) – Baffle cap to seal the discharge outlet.
- Item 8. Molykote 55 or Equivalent O-Ring Lubricant – Substance used for minimizing friction and engineered to save wear and tear on equipment. Must be applied on the O-ring inside the actuation port and on the O-ring in the actuator port blanking plug before installation into the cylinder valve.
- Item 9. Isopropyl Alcohol – Cleaning agent required to adequately clean the actuation port before replacing the blanking plug.
- Item 10. Discharge Tool (P/N IG71-243) – Tool used to safely discharge the container.
- Item 11. High-Pressure Valve Core (P/N 02-13887) – Component used to control product flow. Must be replaced before refilling.
- Item 12. Valve Core Insertion/Removal Tool (P/N IG71-099) – Tool required to remove high-pressure valve cores during reconditioning.
- Item 13. Valve Core Torque Wrench (P/N 02-14930) – Pre-set torque wrench used for installing and tightening valve cores to 7.1 lb-in (0.8 N-m) when fitted with the Valve Core Insertion Tool and a 1/4" Drive Socket (02-13773).
- Item 14. Valve Core Depth Gauge (P/N IG71-0244) – Electronic go/no-go gauge to verify proper installation of the high-pressure valve core in the actuator port only.
- Item 15. Valve Filling Adapter (P/N IG71-064) – Adaptor required to keep the valve in the “open” position during the filling operation.
- Item 16. Fill Adapter (FasTest® METHPO198A or equivalent) – Adaptor required to connect the fill hose to the PROINERT container valve.
- Item 17. Fittings, Valves, and Hoses – Components essential to the functionality of PROINERT cylinders. Must have a minimum working pressure of 6,000 psi (415 bar).
- Item 18. High-Quality Thermometer – Instrument used to measure temperature. Must be accurate to $\pm 2.0^{\circ}\text{F}$ (1.0°C) and located in the PROINERT filling area.
- Item 19. Pressure Gauge Assembly (P/N IG71-125) – Assembly that includes a 0-5,000 psi (0-345 bar) pressure gauge with an accuracy of 0.1% of full scale reading, calibrated in 5 psi (.4 bar) increments or less, with all the fittings, adapters, and O-rings attached to properly connect to the container.

- Item 20. Pressure vs. Temperature Chart – Chart detailing the pressure vs. temperature relationship of IG-55, IG-100, and IG-541. See Appendix A.2 for information.
- Item 21. Valve Lockout Tool (P/N IG71-235) – Tool required to mechanically lock the valve in a “closed” position to prevent a discharge when removing the fill hose and installing the recoil cap.
- Item 22. Log Book - Permanent record containing the following information (See Appendix A.3 for example):
- Date filled
 - Customer
 - Valve Lot Number
 - Container Serial Number
 - Initial fill or recharge
 - Container pressure
 - Leak test results
 - Name/initials of person performing the initial fill/recharge procedure
- Item 23. Leak Detector – Device capable of detecting a minimum leak rate of 1.26×10^{-3} cc/sec argon.
Suggested: Laco Technologies Model LHHLD-3000 Leak Detector or equivalent.
- Item 24. Leak Standard – Criterion for calibrating the leak detector, capable of being set to the minimum required leak rate of 1.26×10^{-3} cc/sec.
- Item 25. Scale – Apparatus capable of accurately weighing to within ± 0.5 lbs (0.2 kg), with a total range greater than the maximum charged container weight of approximately 600 lbs (272 kg).
- Item 26. Vacuum Pump – Device capable of pulling a vacuum of 25" to 27" water column.

2.1 Equipment Calibration

A program will be established by the Fike-authorized filling station to assure that testing and measuring equipment used in the production and/or inspection process is kept clean, is maintained in good working order, and is within calibration.

The following calibration frequencies must be adhered to at a minimum:

Calibration Schedule	Frequency	
	Once every 6 months	Once every 12 months
Scales		X
Pressure gauges	X	
Leak standards	X	
Thermometers		X
Thermocouples		X
Wrenches		X
Equipment	When subjected to abuse, such as being dropped or struck with an object, or when its accuracy is questionable.	

Calibration may be performed by the sales outlet or an outside laboratory. Calibration will be by comparison with a standard that is traceable to the applicable US or foreign national standard. The Fike-authorized filling station will maintain certification of calibration until the next succeeding certification.

3.0 CONTAINER AND VALVE PREPARATION

3.1 Test and Inspection

PROINERT cylinders that are UN-rated or DOT 3AA-rated and stamped **WITH** a special five-point star immediately following the test date will require a hydrostatic pressure re-test before recharge if more than 10 years have elapsed since the date of the last test and inspection, in compliance with DOT and TPED regulations.

Containers that are DOT 3AA-rated **WITHOUT** the five-point star symbol will require a hydrostatic pressure re-test before recharging if more than five years have elapsed since the date of the last test and inspection, in compliance with DOT regulations.

3.2 Valve Reconditioning

After a system discharge, the PROINERT container valve will need to be reconditioned before it can be recharged.

WARNING: PROINERT container contents are under high pressure. Never attempt to fill the container until the contents have been discharged and the pressure gauge reads 0 psi (0 bar).

WARNING: Properly and safely secure all cylinders before checking pressure, discharging, reconditioning, and refilling according to acceptable standards.

CAUTION: Take care when handling valve components to avoid damage of any kind.

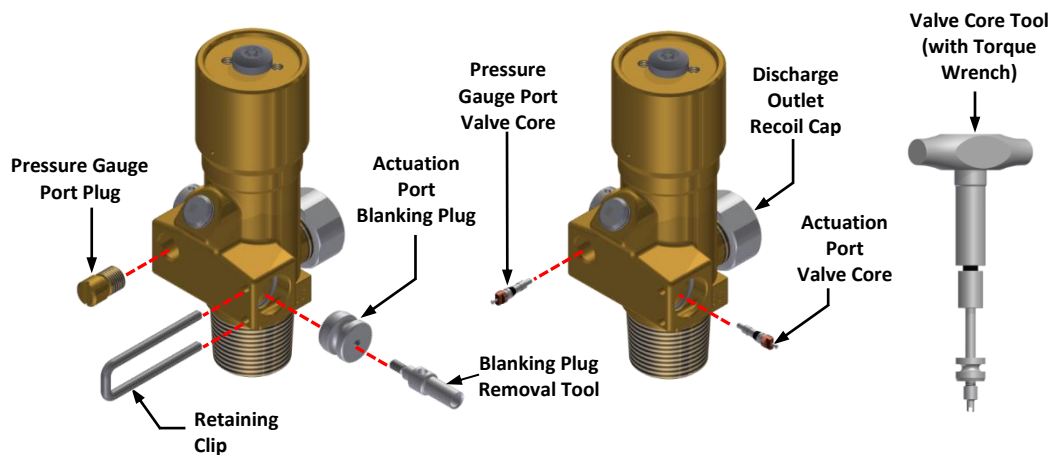


Figure 3.2-1 Valve Components

3.2.1 Container Discharge Procedure

The cylinder valve can only be reconditioned if the cylinder is empty and uncharged. If pressurized gas remains inside the cylinder, perform the following to safely discharge the PROINERT container (refer to Figure 3.2.1-1):

WARNING: The discharge port recoil cap must be installed on the valve at all times during this process.

Step 1: Install the discharge port recoil cap.

Step 2: Carefully remove the pressure gauge port plug from the cylinder valve.

Step 3: Thread the discharge tool into the pressure gauge port until the valve core is engaged or the tool bottoms out.

CAUTION: Ensure the attached ball valve is in the closed position when installing the discharge tool.

Step 4: Slowly open the ball valve and allow the pressure to bleed.

Step 5: Once container is fully discharged, remove the discharge tool from the pressure gauge port and turn the ball valve to the closed position.

NOTE: The discharge tool will bleed enough pressure from the cylinder to allow the valve to self-activate. Upon activation, pressure will begin to bleed from the discharge outlet through the recoil cap.

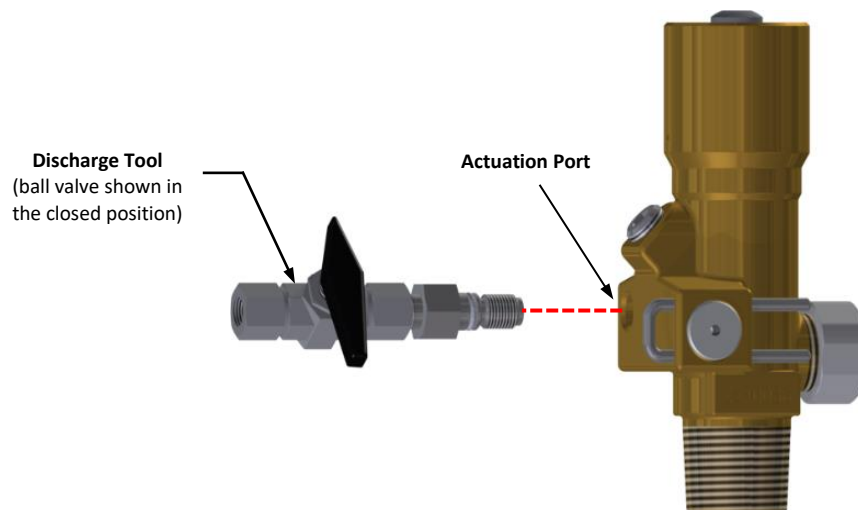


Figure 3.2.1-1 Discharge Tool Placement

3.2.2 Valve Reconditioning Procedure

To recondition the PROINERT container valve for refilling, only the two high-pressure valve cores in the actuation port and pressure gauge port need to be replaced (refer to Figure 3.2-1):

Step 1: Remove both high-pressure valve cores with the valve core insertion/removal tool.

Step 2: Gently clean the actuation port with isopropyl alcohol using a clean cloth or cotton swab.

Step 3: Install new high-pressure valve cores and tighten with a wrench to a torque of 7.1 lbf-in (0.8 N-m).

Step 4: Check valve core installation height using valve core depth tool. Refer to Section 3.3 for detailed instructions.

Step 5: Apply Molykote 55 or an equivalent on to the O-rings inside the actuation port and on the blanking plug.

Step 6: Insert the blanking plug and pressure gauge port plug into the cylinder valve.

Step 7: Secure the blanking plug using the retaining clip.

CAUTION: Care should be taken when inserting the retaining clip. Do NOT use excessive force as this may damage the blanking plug or valve, and may even prevent future removal of the plug. If necessary, use a clamping device to compress the blanking plug into the port, then insert the retaining clip while the plug is compressed.

If the valve is found to be faulty (leaking, threads are damaged, etc.), do not attempt to repair it. In these instances, remove the valve from the container and replace it with a new valve (P/N IG71-001-1 or IG71-001-2) per instructions found in Section 3.2 of manual 06-312, *Fill and Packaging Procedures*. Return the faulty valve to Fike for evaluation.

3.3 Valve Core Depth Tool

The Valve Core Depth Tool is an electronic go/no-go gauge used to ensure the high-pressure valve core is installed to the proper depth in the actuation port. The tool verifies that the valve core is not recessed or protruding beyond the engineered limits. This tool **MUST** be used on every reconditioned PROINERT valve with a replaced valve core. Refer to Figure 3.2.2-1 for tool specifications.

NOTE: The valve core installed in the pressure gauge port does NOT need to be checked using this tool.

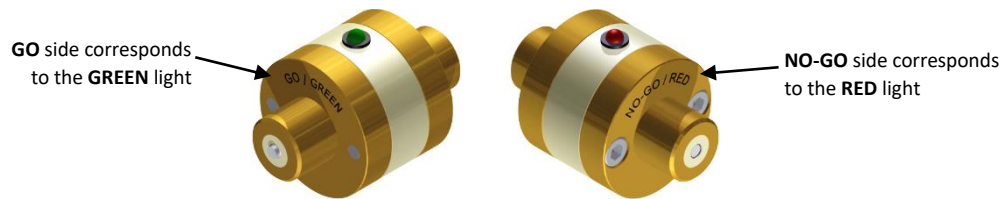


Figure 3.2.2-1 Valve Core Depth Tool

3.3.1 Pass-Fail Criteria

- ✓ A valve core is **installed properly** if both the green light illuminates and the red light does not.
- ✗ A valve core is **installed improperly or is defective** if the green light does not illuminate or the red light does.

3.3.2 Valve Core Check Procedure

Step 1: Check both sides of the valve core depth tool against the included calibrated standard block to ensure the tool is in proper working order. To do this, insert the “Go” and “No-Go” sides of the gauge into both sides of the standard block (each block has the pass-fail criteria permanently marked on the surface).

NOTE: The valve core depth tool should be checked against the standard blocks before each day of use. The tool may be rechecked more frequently if operator gauge accuracy or functionality is suspect. If the valve core depth tool fails the standard block calibration, contact Fike technical support at 1-800-979-3453 or PROINERTvalve@fike.com for assistance.

- Step 2: Insert the “Go” end of the tool (the end with a protruding pin) into the actuator port. If the green light illuminates, the valve core is not installed too deep and the operator can proceed to Step 3. If the green light does not illuminate, proceed to Step 4.
- Step 3: Insert the “No-Go” end of the tool (the end with a recessed pin) into the actuator port. If the red light illuminates, the valve core is not installed deep enough and the operator must proceed to Step 4. If the red light does not illuminate, the valve core is installed within the required limits and the PROINERT container is ready for refilling.

Step 4: If the green light fails to illuminate or the red light illuminates, replace the valve core per Section 3.2.1 and repeat Steps 2 and 3. If the gauge indicates an improperly installed valve core a second time, remove the valve from the cylinder and replace with a new valve entirely. Refer to Fill and Packaging Manual 06-312 Section 3.0 for valve installation instructions. For more information, contact Fike technical support.

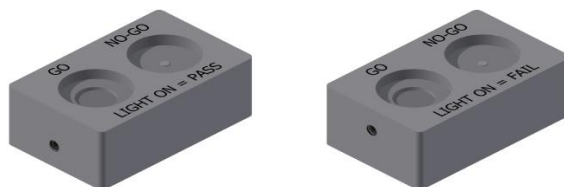


Figure 3.3.2-1 Valve Core Check Tool

4.0 CONTAINER FILLING

The table below details the fill pressures available per container size and assembly number:

Container Size (Liters)	Model	Assembly Number	Fill Pressure (bar @ 15°C)	Fill Pressure (psi @ 59°F)
80	PROINERT	IG71-089-200	200	2,900
80	PROINERT2	IG71-103-200-55 IG71-103-200-100 IG71-103-200-541	200	2,900
80	PROINERT2	IG71-103-300-55 IG71-103-300-100 IG71-103-300-541	300	4,351

The following is a step-by-step procedure for the refilling the PROINERT containers, as suggested by Fike. Refer to Appendix A.2 for the pressure vs. temperature charts for the various inert gases being filled.

NOTE: Containers and valves to be recharged must be reconditioned in accordance with Section 3.0 of this manual.

CAUTION: Suitable precautions, such as wearing safety glasses and gloves, must be taken. For additional information, refer to CGA P-1 *Safe Handling of Compressed Gases in Containers*.

CAUTION: Prior to filling the container, verify that both the valve and container are suitable for the filling pressure. For a 200 bar fill, the marking on the valve must read “WP 200 BAR” or “WP 300 BAR”, while the marking on the container must indicate a minimum allowable service pressure of 200 bar (2,900 psi).

For a 300 bar fill, the marking on the valve must read “WP 300 BAR”, while the marking on the container must indicate a minimum allowable service pressure of 300 bar (4,351 psi).

CAUTION: Prior to filling, verify that the container has no residual pressure by installing a pressure gauge into the gauge port.

CAUTION: The maximum fill pressure must not exceed 3,333 psi (229 bar) at a temperature of 104°F (40°C) for PROINERT IG71-089 containers.

CAUTION: The maximum fill pressure must not exceed 5,308 psi (366 bar) at a temperature of 122°F (50°C) for PROINERT IG71-103-XXX-XXX containers.

CAUTION: Filling gases at high pressure causes the container temperature to rise. DO NOT exceed a container temperature of 122°F (50°C) during the filling process.

CAUTION: Do not leave container unattended while filling.

4.1 Container Valve Preparation

There are two methods available for filling the containers, either by pressure or by weight. The preferred method is to fill by weight, as this is more accurate and not temperature-dependent.

Detailed below are the steps necessary to prepare the container valve assembly for filling:

Step 1: Connect the fill adapter (FasTest® METHP0198A or equivalent) to the valve outlet port (valve outlet is a G 5/8" male thread and the fill adapter is G 5/8" female thread with a swivel on one end and a 3/8" NPT on the other end). The fill adapter should be connected to the fill manifold via the 3/8" NPT port.

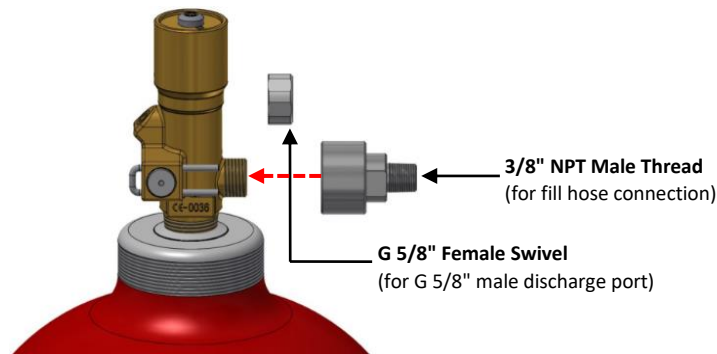


Figure 4.1-1 Fill Adapter Connections

Step 2: Connect the filling hose to the fill adapter.

Step 3: Assemble the valve filling tool to the spring washer on top of the valve (see Figure 4.1-2). Ensure both screws on the bottom half of the filling tool sit flat on top of the valve body. Secure the top cap onto the base assembly with the 1/4-20 UNC cap screw. Ensure the base assembly is fully engaged, with the cap screw head resting firmly against the top thrust washer and the bottom thrust washer resting firmly against the top cap.

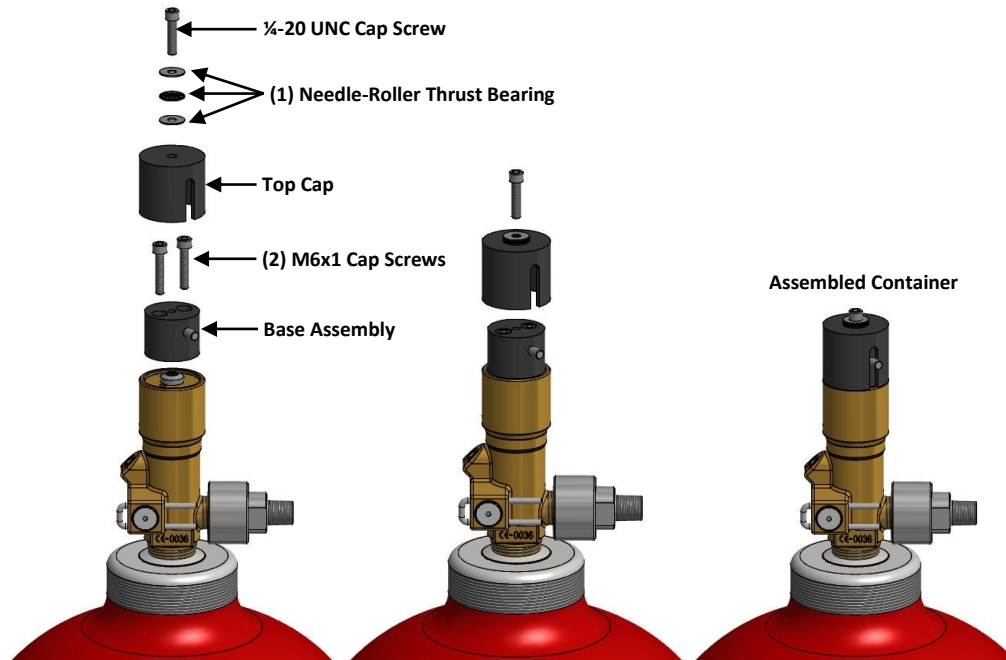


Figure 4.1-2 Valve-Filling Components

4.2 Fill by Weight

4.2.1 IG-55 (50% Argon and 50% Nitrogen Mixture)

IG-55 inert gas mixture consists of 50±5% nitrogen and 50±5% argon. Detailed below are the steps necessary to fill the PROINERT container assembly with IG-55.

Step 1: Connect to the valve outlet and pull 25-27" of the vacuum to remove any residual atmosphere and moisture.

Step 2: Fill the container via the valve inlet with argon and then nitrogen per the table below for the system pressure required:

Size (liters)	Argon (kg)	Nitrogen (kg)	Resultant IG-55 (kg)	System Pressure (bar @ 15°C)	System Pressure (psi @ 59°F)
80	12.87 – 13.43	9.43 – 9.79	22.66 – 22.87	200	2,900
80	18.91 – 19.73	13.23 – 13.73	32.64 – 32.96	300	4,350

NOTE: Perform a preliminary leak check at the neck of the cylinder with a soap solution (SwageLok Snoop or its equivalent) once it has been filled with argon. If a leak is detected, discontinue the fill for that particular cylinder.

Step 3: Verify the container by ensuring the final fill pressure is as detailed above at 59°F (15°C). If required, refer to the pressure vs. temperature chart for IG-55 in Appendix A.2.

Step 4: Close the valve by unscrewing the central screw on the filling adaptor and removing the top half of the adaptor. Notice how the dowel on the internal piece of the filling adaptor moves downward during this operation.

Step 5: Proceed with removal of the bottom half of the filling adaptor by unscrewing the two M6 cap screws. Remove this adaptor from the valve and check that the spring washer has dropped lower than its original depth.

Step 6: Vent the filling hose and check that there is no flow from the valve outlet.

Step 7: Fit the valve lockout assembly onto the valve (see figure below) prior to removing the filling hose.

Step 8: Remove the filling hose and screw the recoil cap onto the discharge outlet.

Step 9: Remove the valve lockout assembly from the valve after the recoil cap has been fitted.

Step 10: Proceed to leak checking (refer to Section 5.0).

Step 11: Check the container pressure (refer to Section 6.0).

Step 12: Once testing is complete, screw the shipping/safety cap on to the cylinder.

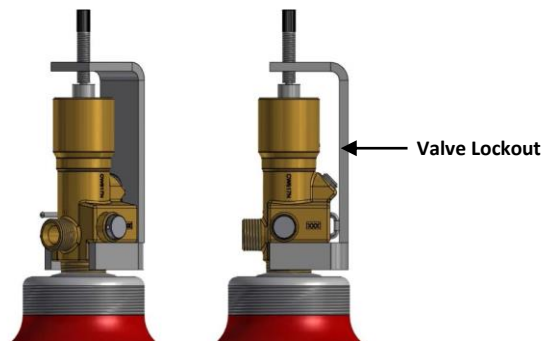


Figure 4.2.1-1 IG-55 Valve Lockout Assembly (Fill by Weight)

4.2.2 IG-100 (100% Nitrogen)

The IG-100 inert gas consists of 100% nitrogen.

Detailed below are the steps necessary to fill the PROINERT container with IG-100 by pressure:

Step 1: Connect the valve outlet and pull 25" to 27" of the vacuum to remove residual atmosphere and moisture.

Step 2: Fill the container with nitrogen to the pressure and weight indicated in the table below for system pressure required. If required, refer to the pressure vs. temperature chart for IG-100 in Appendix A.2.

Size (liters)	Final Pressure @ 59°F (15°C)	Fill Weight
80	2,900 psi (200 bar)	18.34 kg
80	4,350 psi (300 bar)	24.97 kg

NOTE: Perform a preliminary leak check at the cylinder's neck with a soap solution (SwageLok Snoop or its equivalent) once it has been filled. If a leak is detected, discontinue the fill for that particular cylinder.

Step 3: Verify the gases by ensuring the final fill pressure is as detailed above at 59°F (15°C). If required, refer to the pressure vs. temperature chart for IG-100 in Appendix A.2.

Step 4: Close the valve by unscrewing the central screw on the filling adaptor and remove the top half of the adaptor. Notice the dowel on the internal piece of the filling adaptor move downwards during this operation.

Step 5: Proceed with removing the bottom half of the filling adaptor by unscrewing the two M6 set screws. Remove this adaptor from valve and check that the spring washer has dropped lower than its original depth.

Step 6: Vent filling hose and check that there is no flow from the valve outlet.

Step 7: Fit the Valve Lockout Assembly (P/N IG71-235; Figure 4.2.2-1) on to the valve prior to removal of the filling hose.

Step 8: Remove the filling hose and screw the recoil cap onto the discharge outlet.

Step 9: Remove the valve lockout assembly from the valve after the recoil cap has been fitted.

Step 10: Check the container pressure (Section 6).

Step 11: Once testing is complete, screw the shipping/safety cap onto cylinder.

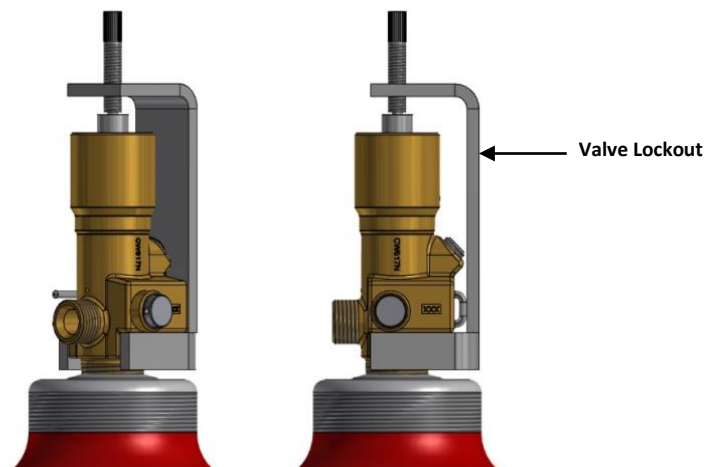


Figure 4.2.2-1 IG-100 Container with Valve Lockout Assembly Installed

4.2.3 IG-541 (52% Nitrogen, 40% Argon, and 8% Carbon Dioxide Mixture)

The IG-541 inert gas mixture consists of 52±5% nitrogen, 40±4% argon, and 8-9% carbon dioxide. Detailed below are the steps necessary to fill the PROINERT container assembly with IG-541.

Step 1: Connect to the valve outlet and pull 25-27" of vacuum to remove any residual atmosphere and moisture.

Step 2: Fill the container via the valve inlet with the individual gases in the following order: Carbon dioxide, then argon, and then nitrogen, as detailed in the table below for the system pressure required:

Size (liters)	Carbon Dioxide (kg)	Argon (kg)	Nitrogen (kg)	Resultant IG-541 (kg)	System Pressure (bar @ 15°C)	System Pressure (psi @ 59°F)
80	2.47 – 2.49	10.76 – 11.66	9.81 – 10.63	23.04 – 24.78	200	2,900
80	3.50 – 3.54	14.82 – 16.06	13.49 – 14.61	31.81 – 34.21	300	4,350

NOTE: Perform a preliminary leak check at the cylinder neck with a soap solution (SwageLok Snoop or equivalent) once it is filled with argon. If a leak is detected, discontinue the fill for that particular cylinder.

- Step 3: Verify the container by ensuring the final fill pressure is as detailed above at 59°F (15°C). If required, refer to the pressure vs. temperature chart for IG-541 in Appendix A.2.
- Step 4: Close the valve by unscrewing the central screw on the filling adaptor and remove the top half of the adaptor. Notice how the dowel on the internal piece of the filling adaptor moves downward during this operation.
- Step 5: Proceed with removal of the bottom half of the filling adaptor by unscrewing the two M6 cap screws. Remove this adaptor from the valve and check that the spring washer has dropped lower than its original depth.
- Step 6: Vent the filling hose and check that there is no flow from the valve outlet.
- Step 7: Fit the valve lockout assembly onto the valve (Figure 4.2.3-1) prior to removing the filling hose.
- Step 8: Remove the filling hose and screw the recoil cap onto the discharge outlet.
- Step 9: Remove the valve lockout assembly from the valve after the recoil cap has been fitted.
- Step 10: Proceed to leak checking (refer to Section 5.0).
- Step 11: Check the container pressure (refer to Section 6.0).
- Step 12: Once testing is complete, screw the shipping/safety cap onto the cylinder.

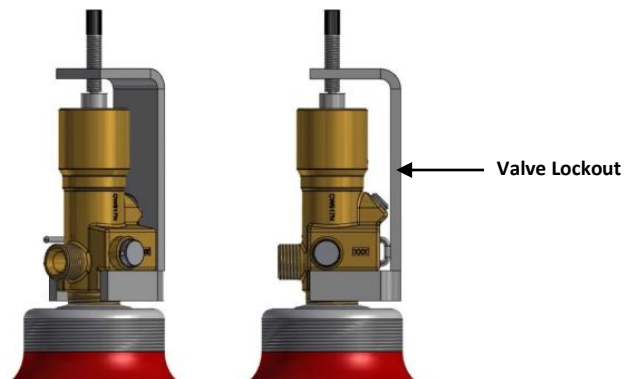


Figure 4.2.3-1 IG-541 Container with Valve Lockout Assembly Installed

4.3 Fill by Pressure

4.3.1 IG-55 (50% Argon and 50% Nitrogen Mixture)

The IG-55 inert gas mixture consists nominally of 50% argon and 50% nitrogen. The mixture specification is argon 50±5% nitrogen 50±5%.

Detailed below are steps necessary to fill the PROINERT container with IG-55 by pressure:

- Step 1: Connect to the valve outlet and pull 25-27" of vacuum to remove any residual atmosphere and moisture.
- Step 2: Fill the container via the valve inlet with argon to the pressure indicated in the table below for the system pressure required.
- Step 3: Top off the container with nitrogen to the final fill pressure per the table below. If necessary, refer to the pressure vs. temperature chart for IG-55 in Appendix A.2.

Size (Liters)	Argon Pressure at 59°F (15°C)	Final Fill Pressure at 59°F (15°C) (Top off with Nitrogen)
80	1,450 – 1,670 psi (100 – 111.5 bar)	2,900 psi (200 bar)
80	2,045 – 2,263 psi (141 – 156 bar)	4,350 psi (300 bar)

NOTE: Perform a preliminary leak check at the cylinder neck with a soap solution (SwageLok Snoop or its equivalent) once it has been filled with argon. If a leak is detected, discontinue filling the cylinder.

- Step 4: Verify the container by ensuring the final fill pressure is as detailed above at 59°F (15°C). If required, refer to the pressure vs. temperature chart for IG-55 in Appendix A.2.
- Step 5: Close the valve by unscrewing the central screw on the filling adaptor and removing the top half of the adaptor. The dowel on the internal piece of the filling adaptor should move downward during this operation.
- Step 6: Proceed with removal of the bottom half of the filling adaptor by unscrewing the two M6 cap screws. Remove this adaptor from the valve and check that the spring washer has dropped lower than its original depth.
- Step 7: Vent the filling hose and check that there is no flow from the valve outlet.
- Step 8: Fit the valve lockout assembly onto the valve (Figure 4.3.1-1) prior to removing the filling hose.
- Step 9: Remove the filling hose and screw the recoil cap onto the discharge outlet.
- Step 10: Remove the valve lockout assembly from the valve after the recoil cap has been fitted.
- Step 11: Proceed to leak checking (refer to Section 5).
- Step 12: Check the container pressure (refer to Section 6).
- Step 13: Once testing is complete, screw the shipping/safety cap onto the cylinder.

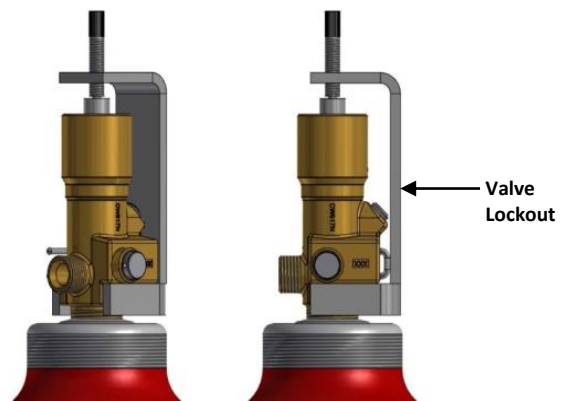


Figure 4.3.1-1 IG-55 Valve Lockout Assembly Installed

4.3.2 IG-100 (100% Nitrogen)

The IG-100 inert gas consists of 100% nitrogen.

Detailed below are the steps necessary to fill the PROINERT container with IG-100 by pressure:

Step 14: Connect the valve outlet and pull 25" to 27" of the vacuum to remove residual atmosphere and moisture.

Step 15: Fill with nitrogen to the pressure indicated in the table below for system pressure required. If required, refer to the pressure vs. temperature chart for IG-100 in Appendix A.2.

Size (Liters)	Final Pressure @ 59°F (15°C)
80	2,900 psi (200 bar)
80	4,350 psi (300 bar)

NOTE: Perform a preliminary leak check at the cylinder's neck with a soap solution (SwageLok Snoop or equivalent) once it has been filled. If a leak is detected, discontinue the fill for that particular cylinder.

Step 16: Close the valve by unscrewing the central screw on the filling adaptor, then remove the top half of the adaptor. Notice the dowel on the internal piece of the filling adaptor move downwards during this operation.

Step 17: Proceed with removing the bottom half of the filling adaptor by unscrewing the two M6 set screws. Remove this adaptor from the valve and check that the spring washer has dropped lower than its original depth.

Step 18: Vent the filling hose and check that there is no flow from the valve outlet.

Step 19: Fit the valve lockout assembly onto the valve (Figure 4.3.2-1) prior to removing the filling hose.

Step 20: Remove the filling hose and screw the recoil cap onto discharge outlet.

Step 21: Remove the valve lockout assembly from the valve after the recoil cap has been fitted.

Step 22: Check the container pressure (Section 6).

Step 23: Once testing is complete, screw the shipping/safety cap onto cylinder.

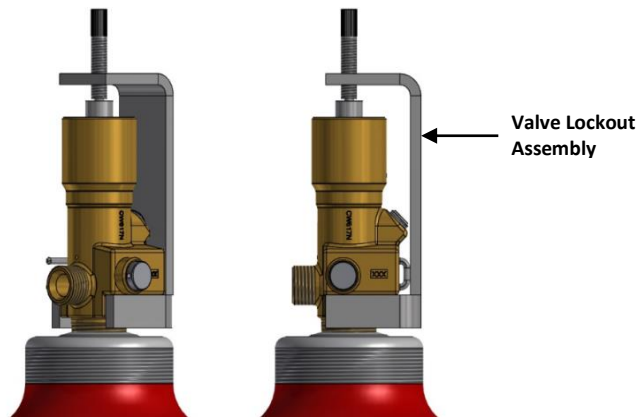


Figure 4.3.2-1 IG-100 Container with Valve Lockout Assembly Installed

5.0 LEAK DETECTION

After the container has been filled with the required quantity of agent, it must be carefully checked for leaks. All potential leak points on each container must be carefully inspected with an argon leak detector checked against a calibrated leak standard to the minimum leak rate of 1.26×10^{-3} cc/sec. Be sure to pay particular attention to the valve recoil cap vent holes, the ports containing high-pressure valve cores, and the valve NGT threads. Soap solutions (e.g., SwageLok Snoop or its equivalent) can be used in conjunction with the argon leak detector as a secondary leak detection method to help isolate leaks picked up by the detector.

NOTE: Valve must be dry prior to using the argon leak detector, since standing soap solution can cause a false positive reading on the argon leak detector.

Containers with NO indication of leakage are acceptable for shipment and system use. Record the container acceptance date, any comments or remarks, and the inspector's initials in the fill station log book.

Containers with leaks will be inspected and repaired or rebuilt after they have been emptied safely via a pipe network that is terminated with a controlled orifice.

6.0 CONTAINER PRESSURE CHECK

Once leak testing is complete, verify that container pressure is within the limits detailed in the pressure vs. temperature chart for the appropriate agent in Appendix A.2. The container fill pressure must be within ± 43 psi (3 bar) of the nominal fill pressure.

6.1 Procedure to Install Pressure Gauge

Step 1: Remove and retain the plug from the pressure gauge port.

Step 2: Prior to installing the pressure gauge, lubricate the O-ring on pressure gauge assembly with Molykote 55 or its equivalent. Use care not to get lubricant into the pressure gauge port (Figure 6.1-1).

NOTE: DO NOT apply PTFE tape to the external threads on the pressure gauge assembly.

Step 3: Screw in the pressure gauge assembly by hand until resistance is felt and pressure registers on gauge. Use a wrench to screw in the pressure gauge assembly two additional turns, then check the pressure.

CAUTION: DO NOT cross-thread the pressure gauge assembly during installation.

Step 4: Remove the pressure gauge assembly and reinstall the plug into the pressure gauge port.

WARNING: When removing the pressure gauge assembly from a pressurized PROINERT valve, a "pop" sound will be heard. This is normal and the result of a minor amount of gas being trapped in the pressure gauge port.

Step 5: Secure the shipping/safety cap to the cylinder.

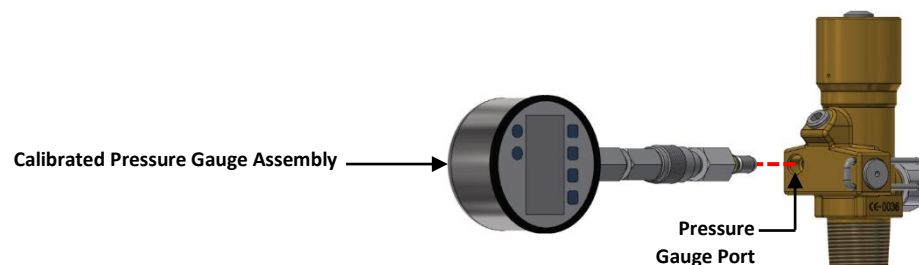


Figure 6.1-1 Pressure Gauge Assembly Installation

7.0 CYLINDER IDENTIFICATION LABEL

The fill station will update the cylinder identification label with the information shown below using a medium- or fine-point permanent black marker.

OPERATION, AND MAINTENANCE MANUAL FOR COMPLETE DETAILS. SYSTEM MUST BE MAINTAINED BY TRAINED AND AUTHORIZED PERSONNEL ONLY.		RECHARGED IF THE LOSS IN PRESSURE, ADJUSTED FOR TEMPERATURE, EXCEEDS 5%.	
ASSEMBLY NUMBER: IG71-103-200-55 CHARGE PRESSURE: 2960 PSI @ 70°F [204 BAR @ 21°C] [200 BAR @ 15°C] GROSS WEIGHT: 278.3 lb [126.2 kg] TARE WEIGHT: 228.0 lb [103.4 kg] AGENT WEIGHT: 50.3 lb [22.8 kg] YEAR OF MFG:	UN 1956 COMPRESSED GAS N.O.S. IG-55 (NITROGEN, ARGON)	RECHARGE: IF CONTAINER MUST BE REMOVED FOR SERVICE, PRIOR TO REMOVAL, CONTACT YOUR LOCAL INSTALLER OR MANUFACTURER FOR INSTRUCTIONS CONCERNING THE EQUIPMENT AND THE CLEAN AGENT.	
		FILL RECORD	
		DATE	FILL STATION CODE NO.
		↑	↑
WARNING: CONTAINS GAS UNDER HIGH PRESSURE; MAY EXPLODE		SUPPLEMENTARY INFORMATION: MUST BE INSTALLED BY AUTHORIZED PERSONNEL. DO NOT MOVE.	

Figure 7.0-1 Sample Cylinder Identification Label

7.1 Label Replacement

A new replacement label will be required when:

- All rows in the fill record table are occupied.
- The existing label does not comply with OSHA's GHS Hazard Communication Standard (i.e., does not have a red/white diamond pictogram).
- The existing label is damaged.

Remove the existing label, clean the surface, and apply the replacement label in the same place as the original.

8.0 CYLINDER PACKAGING

Cylinders must not be shipped with any stray marks, missing paint, or scratches. Any marks must be wiped off with a non-solvent based cleaner. Any missing paint, scratches, or marks that cannot be removed will be touched-up using touch-up paint of the same color (RAL 3001) and sheen. These requirements do not apply to the bottom of the cylinder.

Cylinder dents and dings shall be evaluated and sorted per EN ISO 9809-2, Annex A.

8.1 Packaging Materials

Cylinders will be shipped using the following materials:

- Wood pallet, heat-treated per ISPM 15
- Corrugated cardboard and nylon sleeves
- 2x4 lumber, heat-treated per ISPM 15
- 8-penny (8D) ring shank nails
- 3" drywall or wood screws
- 1.25"-wide steel banding
- 2"-wide ratchet strap
- DOT Class 2 label
- UN label
- OVERPACK label
- SDS with plastic pouch

8.2 Packaging Procedure

Step 1: Prior to palletizing PROINERT container assemblies, validate the strength and quality of the skid and wooden frame. All boards will be joined using a minimum of three equally spaced nails per joint.

Step 2: Palletize the PROINERT container assemblies per the configurations below or a Fike-approved configuration (not shown).

NOTE: One or two cylinder orders may be packaged individually without a pallet; however, 3+ cylinder orders cannot.

Step 3: One (1) DOT label, one (1) UN label, and one (1) OVERPACK label must be applied to the corrugated cardboard sleeve of one container per pallet, as shown in Figure 8.2-1. Labels must be prominently displayed when finished.

Step 4: Place a copy of the PROINERT agent SDS in a plastic pouch and secure the pouch to the outside of the corrugated cardboard. The SDS must be prominently displayed when finished.

Step 5: Continue to the horizontal and vertical packaging configurations for wood and steel pallets.



OVERPACK

**Figure 8.2-1
Packaging Label
Specifications**

AGENT	UN LABEL
IG-55	UN 1956 COMPRESSED GAS N.O.S. IG-55 (NITROGEN, ARGON)
IG-100	UN 1066 NITROGEN, COMPRESSED
IG-541	UN 1956 COMPRESSED GAS N.O.S. IG-541 (NITROGEN, ARGON, CARBON DIOXIDE)

8.2.1 Packaging Configuration 1 – Horizontal Method, Wood Pallet

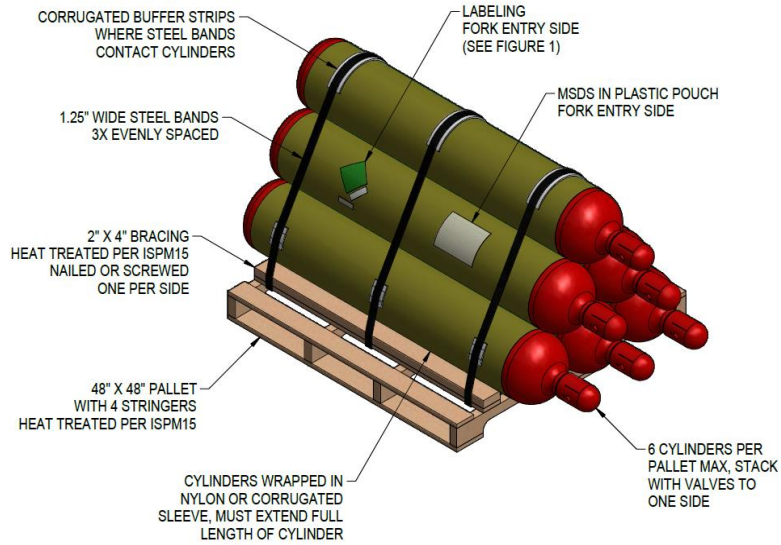


Figure 8.2.1-1 Packaging Configuration 1

8.2.2 Packaging Configuration 2 – Vertical Method, Wood Pallet

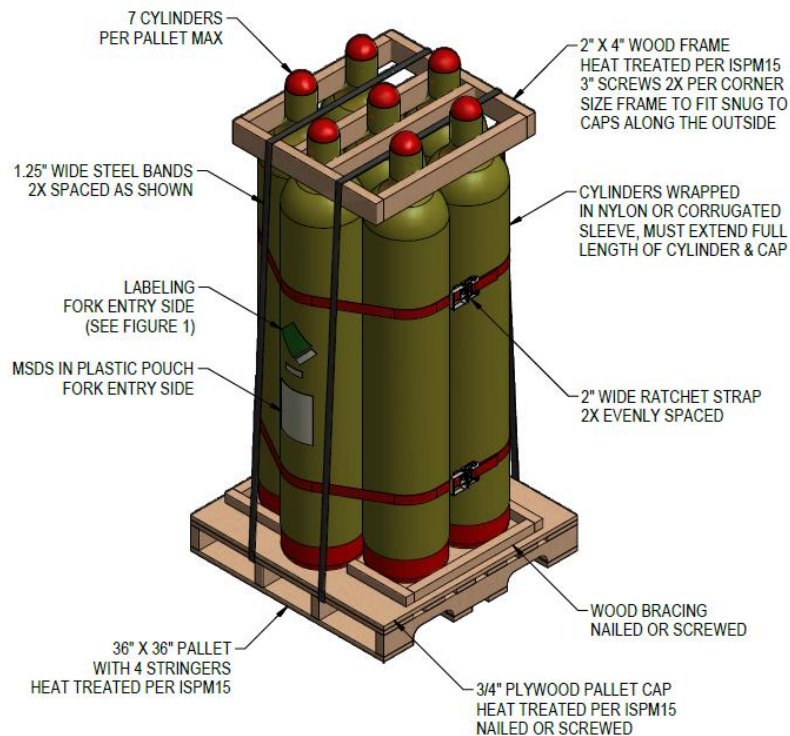


Figure 8.2.2-1 Packaging Configuration 2

8.2.3 Packaging Configuration 3 – Vertical Method, Steel Pallet

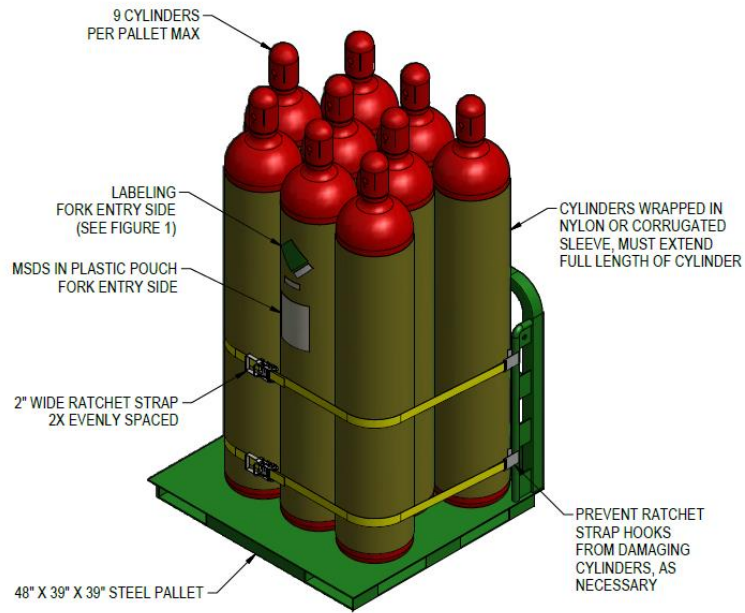



Figure 8.2.3-1 Packaging Configuration 3

APPENDIX A – Support Information

This appendix contains details that are referred to throughout this manual.

A.1 Safety Data Sheets

A.1.1 PROINERT IG-55

PROINERT IG-55	
SECTION 1: Identification of the substance/mixture and of the company/undertaking	
Product identifier PROINERT IG-55	
Use of the substance/preparation Fire extinguishing agent	
Company/undertaking identification Fike Corporation 704 SW 10th Street P.O. Box 610 Blue Springs Missouri 64013-0610 USA Tel : +1 816 229 3405	
SECTION 2: Hazards identification	
Classification of the substance or mixture Gases under pressure H280 : Contains gas under pressure; may explode if heated.	
Label elements	
	
Warning	
H280	: Contains gas under pressure; may explode if heated.
P410 + P403	: Protect from sunlight. Store in a well-ventilated place.
Other Hazards	
The gas mixture is heavier than air and can cause suffocation by reducing oxygen available for breathing.	
SECTION 3: Composition/information on ingredients	
Mixture of 50-52% Nitrogen and 48-50% Argon	

SECTION 4: First aid measures

General advice

If person is unconscious, place in recovery position and seek medical advice. Never give anything by mouth to an unconscious person. If breathing is irregular or stopped, administer artificial respiration. If symptoms persist, call a physician.

Inhalation

May cause asphyxiation at high concentrations. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to an uncontaminated area wearing self-contained breathing apparatus. Keep person warm and at rest. Seek medical assistance. Apply artificial respiration if breathing has stopped.

Skin/eye contact

Compressed gas directed at the skin can enter the body through small wounds or even penetrate the skin, causing serious or fatal injuries. Seek medical advice immediately.

Ingestion

Ingestion is not considered a potential route of exposure.

SECTION 5: Fire-fighting measures

Suitable extinguishing media

All known extinguishants can be used.

Specific methods

If possible, stop the flow of product. Move the container away or cool with water from a protected position.

Specific hazards during firefighting

- Pressure buildup
- Fire of intense heat may cause violent rupture of containers.
- No hazardous combustion products.

Advice for fire fighters

In confined spaces, use a self-contained breathing apparatus. Use personal protective equipment.

SECTION 6: Accidental release measures

Personal precautions

Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where the mixture might collect. Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Provided it is safe to do so, try to stop release. Prevent from entering sewers, basements, and work pits or any place where accumulation can be dangerous.

Methods for cleaning up

Ventilate area.

Disposal

Refer to Section 13 for disposal instructions.

SECTION 7: Handling and storage

Precautions for Safe Handling

- Substance is heavier than air and may spread along floors.
- Compressed gas cylinders are heavy and contain considerable stored energy. Use equipment specified as suitable for this product, its supply pressure and temperature. Handle with appropriate caution. Contact supplier if in doubt.
- Backflow of any contaminating substance into container must be prevented

Conditions for Safe Storage

Do not drag, slide, or roll containers. Never attempt to lift cylinder by its cap. Use a check valve in the discharge line to prevent hazardous back flow into the container.

Storage temperature

Keep containers in a dry, cool, and well-ventilated place at a temperature not below -4°F (-20°C) and not exceeding 122°F (50°C).

Containers should be stored in designated racks or secured to a rigid surface with straps or chains.

SECTION 8: Exposure controls/personal protection**Exposure limits**

No exposure limit specified, but atmosphere must have a minimum of 18% free oxygen.

Exposure controls

- Ensure adequate ventilation, especially in confined areas.
- Eye protection - Wear safety glasses complying with EN 166 or ANSI Z87.1
- Hand protection – Wear leather gloves that are resistant to low temperature complying with EN 374 or US OSHA guidelines. The choice of the gloves also depends on other quality features other than material and is different from one manufacturer to another. Consideration must be given to specific local conditions, such as the danger of cuts, abrasion, and contact time with the substance.
- Skin and body protection – Wear suitable protective equipment.
- Protective measures – Required to wear a self-contained breathing apparatus if a large release is experienced.
- Respiratory protection – For rescue, use a self-contained breathing apparatus. The mixture is heavier than air and can cause suffocation by reducing the oxygen concentration available for breathing. Apparatus must comply with EN 137 or OSHA 29 CFR 1910.134.

SECTION 9: Physical and chemical properties**Physical and chemical properties**

Form	:	Colorless gas
Odor	:	None
Molecular weight	:	33.95
Melting point	:	-199.7°C
Boiling point	:	-190.1°C
Critical temperature	:	-134.7°C
Relative density gas	:	Heavier than air
Relative density liquid	:	Not applicable
Vapor pressure @ 20°C	:	Not applicable
Solubility in water	:	Negligible
Auto ignition temperature	:	Not applicable
Flammability range	:	Not applicable

SECTION 10: Stability and reactivity**Reactivity and chemical stability**

Stable under normal conditions

Possibility of hazardous reactions

Stable

Hazardous decomposition products

None

SECTION 11: Toxicological information	
General No toxicological effects from this product.	
Acute toxicity No acute toxicity.	
SECTION 12: Ecological information	
No ecological damage is caused by this product. Nitrogen and argon are natural components of air, with nitrogen constituting approximately 78% and argon approximately 0.9% of the earth's atmosphere.	
SECTION 13: Disposal considerations	
Dispose to atmosphere in a well-ventilated area. Consider noise and pressure hazards. Do not discharge into any place where accumulation could be dangerous. Contact your Fike Corporation supplier if guidance is required or you are unsure of the best disposal method.	
SECTION 14: Transport information	
UN No.	: 1956
Class	: 2.2
Proper shipping name	: Compressed gas, N.O.S.
ADR/RID Item No.1	: 2.1a
Other transport information	: Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in an emergency.
Before transporting product containers ensure:	
<ul style="list-style-type: none"> • Cylinder valve is closed and not leaking. • Valve outlet recoil cap, actuation port blanking plug and, shipping/safety cap is correctly fitted. • Adequate ventilation. • Compliance with applicable regulations. 	
SECTION 15: Regulatory information	
United States: Nitrogen, argon and carbon dioxide are listed on the United States Toxic Substance Control Act (TSCA) Inventory.	
Canada: Nitrogen, argon and carbon dioxide are listed on the Canadian Domestic Substance List (DSL).	
Europe: Nitrogen, argon and carbon dioxide are listed on the European Inventory of Existing Commercial Chemical Substances (EINECS).	

SECTION 16: Other information

Refer to Section 3.

H280 Contains gas under pressure; may explode if heated.


The hazard of asphyxiation is often overlooked and must be stressed during operator training.

Before using this product in any new processes or experiment, a thorough material compatibility and safety study should be carried out.

The information provided in this document is correct at the date of publication. The information is designed only as a guide for safe handling, use, storage, transportation, disposal, and release, and is not to be considered as a warranty or quality specification.

While great care has been taken in the preparation of this information, no liability for injury, damage, or non-compliance with any legislation or directive arising from its use can be accepted. This sheet does not constitute or substitute for the user's own assessment of workplace risk as required by other health and safety legislation.

A.1.2 PROINERT IG-100

PROINERT IG-100	
SECTION 1: Identification of the substance/mixture and of the company/undertaking	
Product identifier	PROINERT IG-100
Use of the substance/preparation	Fire extinguishing agent
Company/undertaking identification	Fike Corporation 704 SW 10th Street P.O. Box 610 Blue Springs Missouri 64013-0610 USA Tel : +1 816 229 3405
SECTION 2: Hazards identification	
Classification of the substance or mixture	Gases under pressure H280 : Contains gas under pressure; may explode if heated.
Label elements	 <p>Warning H280 : Contains gas under pressure; may explode if heated. P410 + P403 : Protect from sunlight. Store in a well-ventilated place.</p>
Other Hazards	The gas can cause suffocation by reducing oxygen available for breathing.
SECTION 3: Composition/information on ingredients	
100% nitrogen.	

SECTION 4: First aid measures

General advice

If person is unconscious, place in recovery position and seek medical advice. Never give anything by mouth to an unconscious person. If breathing is irregular or stopped, administer artificial respiration. If symptoms persist, call a physician.

Inhalation

May cause asphyxiation at high concentrations. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to an uncontaminated area, wearing self-contained breathing apparatus. Keep person warm and at rest. Seek medical assistance. Apply artificial respiration if breathing has stopped.

Skin/eye contact

Compressed gas directed at the skin can enter the body through small wounds or even penetrate the skin, causing serious or fatal injuries. Seek medical advice immediately.

Ingestion

Ingestion is not considered a potential route of exposure.

SECTION 5: Fire-fighting measures

Suitable extinguishing media

All known extinguishants can be used.

Specific methods

If possible, stop flow of product. Move container away or cool with water from a protected position.

Specific hazards during firefighting

Pressure buildup

Fire of intense heat may cause violent rupture of containers.

No hazardous combustion products.

Advice for fire fighters

In confined spaces use self-contained breathing apparatus. Use personal protective equipment.

SECTION 6: Accidental release measures

Personal precautions

Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where the mixture might collect. Refer to protective measures listed in sections 7 and 8.

Environmental precautions

Provided it is safe to do so, try to stop release. Prevent from entering sewers, basements and work pits or any place where accumulation can be dangerous.

Methods for cleaning up

Ventilate area.

Disposal

Refer to section 13 for disposal instructions.

SECTION 7: Handling and storage

Handling

- Substance is heavier than air and may spread along floors.
- Compressed gas cylinders are heavy and contain considerable stored energy. Use suitable equipment and handle with appropriate caution. Contact supplier if in doubt.

Storage

Do not drag, slide or roll containers. Never attempt to lift cylinder by its cap. Use a check valve in the discharge line to prevent hazardous back flow into the container.

Storage temperature

Keep containers in a dry, cool, and well-ventilated place at a temperature of between -20°C and 50°C.

SECTION 8: Exposure controls/personal protection

Exposure limits

No exposure limit specified, but the atmosphere must have a minimum of 18% free oxygen.

Exposure controls

- **Ventilation** - Ensure adequate ventilation, especially in confined areas.
- **Eye protection** - Wear safety glasses complying with EN 166 or ANSI Z87.1
- **Hand protection** – Wear leather gloves that are resistant to low temperature complying with EN 374 or US OSHA guidelines. The choice of the gloves also depends on other quality features other than material and is different from one manufacturer to another. Consideration must be given to specific local conditions, such as the danger of cuts, abrasion, and contact time with the substance.
- **Skin and body protection** – Wear suitable protective equipment.
- **Protective measures** – Wear a self-contained breathing apparatus if a large release is experienced (required!).
- **Respiratory protection** – Use a self-contained breathing apparatus for rescue. **The gas can cause suffocation by reducing the oxygen concentration available for breathing.** Apparatus must comply with EN 137.

SECTION 9: Physical and chemical properties

Physical and chemical properties

Form	:	Colorless gas
Odor	:	None
Molecular weight	:	28.2
Freezing point	:	-210.0°C
Boiling point	:	-196°C
Relative density gas	:	Approximately same as air
Relative density liquid	:	Not applicable
Vapor pressure @ 20°C	:	Not applicable
Solubility in water	:	Negligible
Auto ignition temperature	:	Not applicable
Flammability range	:	Not applicable

SECTION 10: Stability and reactivity

Reactivity and chemical stability

Stable under normal conditions

Possibility of hazardous reactions

Stable

Hazardous decomposition products

None

SECTION 11: Toxicological information**General**

No toxicological effects from this product

Acute toxicity

No acute toxicity

SECTION 12: Ecological information

No ecological damage is caused by this product. Nitrogen is a natural component of air, constituting approximately 78% of the earth's atmosphere.

SECTION 13: Disposal considerations

This product must be discharged to the atmosphere in a well-ventilated area. Consider noise and pressure hazards when discharging this product. Do not discharge into any place where product accumulation could be dangerous.

Contact your Fike Corporation supplier if guidance is required or if you are unsure of the best disposal method.

SECTION 14: Transport information

UN No. : 1066

Class : 2

Proper shipping name : Nitrogen, compressed.

ADR/RID Item No.1 : 2.1a

Other transport information : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in an emergency.

Before transporting product containers ensure:

- Cylinder valve is closed and not leaking.
- Valve outlet cap is correctly fitted.
- Adequate ventilation.
- Compliance with applicable regulations.

SECTION 15: Regulatory information**United States:**

Nitrogen is listed on the United States Toxic Substance Control Act (TSCA) Inventory.

Canada:

Nitrogen is listed on the Canadian Domestic Substance List (DSL).

Europe:

Nitrogen is listed on the European Inventory of Existing Commercial Chemical Substances (EINECS).

SECTION 16: Other information

Refer to Section 3.

H280 Contains gas under pressure; may explode if heated.

The hazard of asphyxiation is often overlooked and must be stressed during operator training.


Before using this product in any new processes or experiment, a thorough material compatibility and safety study should be carried out.

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A.1.3 PROINERT IG-541

PROINERT IG-541	
SECTION 1: Identification of the substance/mixture and of the company/undertaking	
Product identifier	PROINERT IG-541
Use of the substance/preparation	Fire extinguishing agent
Company/undertaking identification	Fike Corporation 704 SW 10th Street P.O. Box 610 Blue Springs Missouri 64013-0610 USA Tel : +1 816 229 3405
SECTION 2: Hazards identification	
Classification of the substance or mixture	
Gases under pressure H280 : Contains gas under pressure; may explode if heated.	
Label elements	
	
Warning	
H280	: Contains gas under pressure; may explode if heated.
P410 + P403	: Protect from sunlight. Store in a well-ventilated place.
Other Hazards	
The gas mixture is heavier than air and can cause suffocation by reducing oxygen available for breathing.	
SECTION 3: Composition/information on ingredients	
Mixture of 48.8-55.2% nitrogen, 37.2-42.8% argon, and 7.6-8.4% carbon dioxide.	

SECTION 4: First aid measures

General advice

If person is unconscious, place in recovery position and seek medical advice. Never give anything by mouth to an unconscious person. If breathing is irregular or stopped, administer artificial respiration. If symptoms persist, call a physician.

Inhalation

May cause asphyxiation at high concentrations. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to an uncontaminated area, wearing self-contained breathing apparatus. Keep person warm and at rest. Seek medical assistance. Apply artificial respiration if breathing has stopped.

Skin/eye contact

Compressed gas directed at the skin can enter the body through small wounds or even penetrate the skin, causing serious or fatal injuries. Seek medical advice immediately.

Ingestion

Ingestion is not considered a potential route of exposure.

SECTION 5: Fire-fighting measures

Suitable extinguishing media

All known extinguishants can be used.

Specific methods

If possible stop flow of product. Move container away or cool with water from a protected position.

Specific hazards during firefighting

Pressure buildup

Fire of intense heat may cause violent rupture of containers.

No hazardous combustion products.

Advice for fire fighters

In confined spaces use self-contained breathing apparatus. Use personal protective equipment.

SECTION 6: Accidental release measures

Personal precautions

Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where the mixture might collect. Refer to protective measures listed in sections 7 and 8.

Environmental precautions

Provided it is safe to do so, try to stop release. Prevent from entering sewers, basements and work pits or any place where accumulation can be dangerous.

Methods for cleaning up

Ventilate area.

Disposal

Refer to section 13 for disposal instructions.

SECTION 7: Handling and storage

Precautions for safe handling

- Substance is heavier than air and may spread along floors.
- Compressed gas cylinders are heavy and contain considerable stored energy. Use suitable equipment and handle with appropriate caution. Contact supplier if in doubt.

Conditions for safe storage

Do not drag, slide or roll containers. Never attempt to lift cylinder by its cap. Use a check valve in the discharge line to prevent hazardous back flow into the container.

Storage temperature

Keep containers in a dry, cool and well ventilated place at a temperature of between -20°C and 50°C.

SECTION 8: Exposure controls/personal protection

Exposure limits

No exposure limit specified, but atmosphere must have a minimum of 18% free oxygen.

Exposure controls

- Ensure adequate ventilation, especially in confined areas.
- Eye protection - wear safety glasses complying with EN 166 or ANSI Z87.1
- Hand protection - Leather gloves that are resistant to low temperature complying with EN 374 or US OSHA guidelines. The choice of the gloves also depends on other quality features other than material and is different from one manufacturer to another. Consideration must be given to specific local conditions such as the danger of cuts, abrasion and contact time with the substance.
- Skin and body protection – Wear suitable protective equipment.
- Protective measures – Self-contained breathing apparatus is required if a large release is experienced.
- Respiratory protection – For rescue use self-contained breathing apparatus. The mixture is heavier than air and can cause suffocation by reducing the oxygen concentration available for breathing. Apparatus must comply with EN 137.

SECTION 9: Physical and chemical properties

Physical and Chemical Properties

Form	:	Colorless gas
Odor	:	None
Molecular weight	:	34.0
Freezing point	:	-78.5°C
Boiling point	:	-196°C
Relative density gas	:	Heavier than air
Relative density liquid	:	Not applicable
Vapor pressure @ 20°C	:	Not applicable
Solubility in water	:	Negligible
Auto ignition temperature	:	Not applicable
Flammability range	:	Not applicable

SECTION 10: Stability and reactivity

Reactivity and chemical stability

Stable under normal conditions

Possibility of hazardous reactions

Stable

Hazardous decomposition products

None

SECTION 11: Toxicological information**General**

No toxicological effects from this product.

Acute toxicity

No acute toxicity.

SECTION 12: Ecological information

No ecological damage is caused by this product. Nitrogen, argon, and carbon dioxide are natural components of air. Nitrogen constituting approximately 78%, argon approximately 0.9%, and carbon dioxide 0.03% of the earth's atmosphere.

SECTION 13: Disposal considerations

To atmosphere in a well-ventilated area. Consider noise and pressure hazards. Do not discharge into any place where its accumulation could be dangerous.

Contact your Fike Corporation supplier if guidance is required or you are unsure of the best disposal method.

SECTION 14: Transport information

UN No. : 1956

Class : 2

Proper shipping name : Compressed gas, N.O.S.

ADR/RID Item No.1 : 2.1a

Other transport information : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in an emergency.

Before transporting product containers ensure:

- Cylinder valve is closed and not leaking.
- Valve outlet cap is correctly fitted.
- Adequate ventilation.
- Compliance with applicable regulations.

SECTION 15: Regulatory information**United States:**

Nitrogen, argon and carbon dioxide are listed on the United States Toxic Substance Control Act (TSCA) Inventory.

Canada:

Nitrogen, argon and carbon dioxide are listed on the Canadian Domestic Substance List (DSL).

Europe:

Nitrogen, argon and carbon dioxide are listed on the European Inventory of Existing Commercial Chemical Substances (EINECS).

SECTION 16: Other information

Refer to Section 3.

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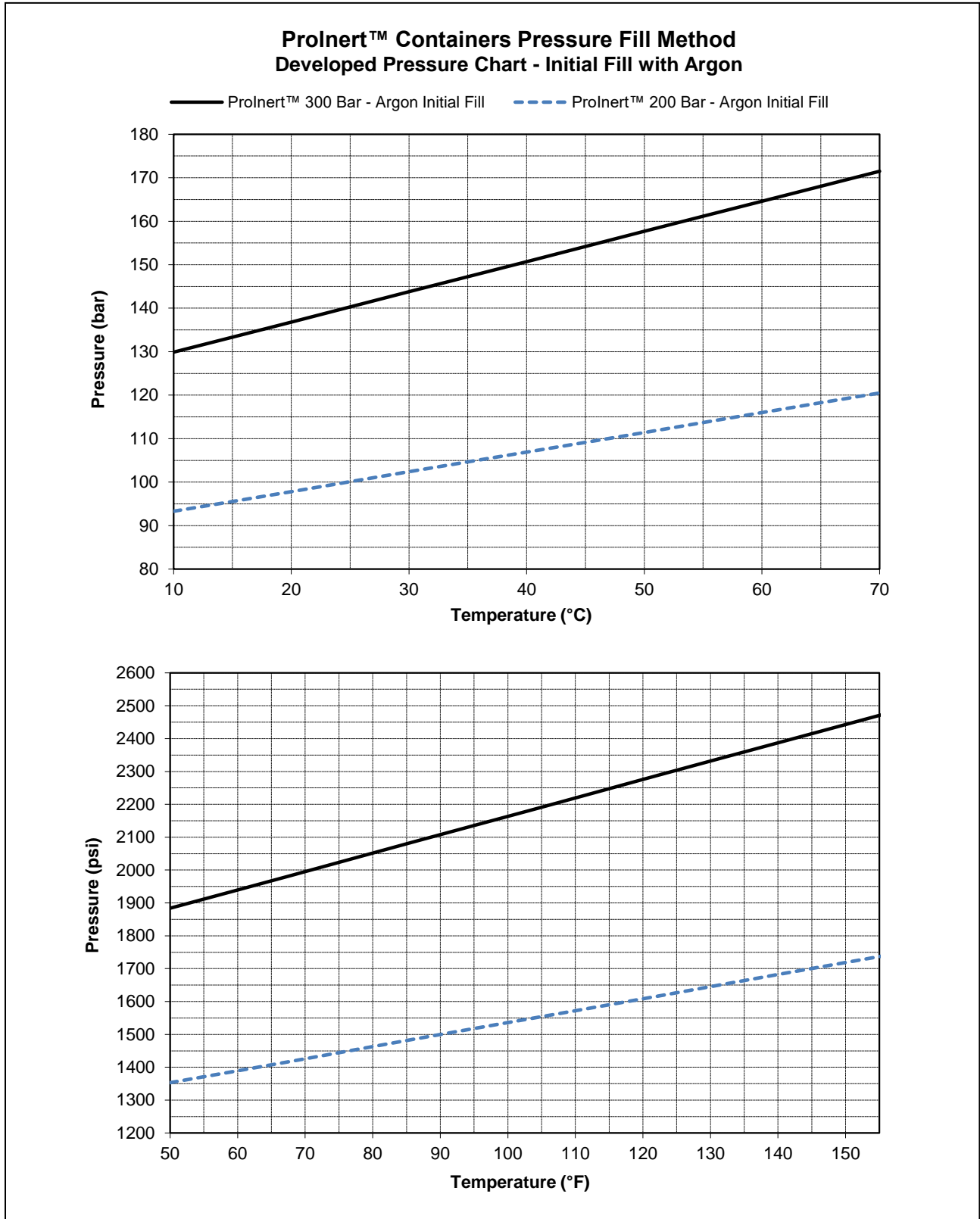
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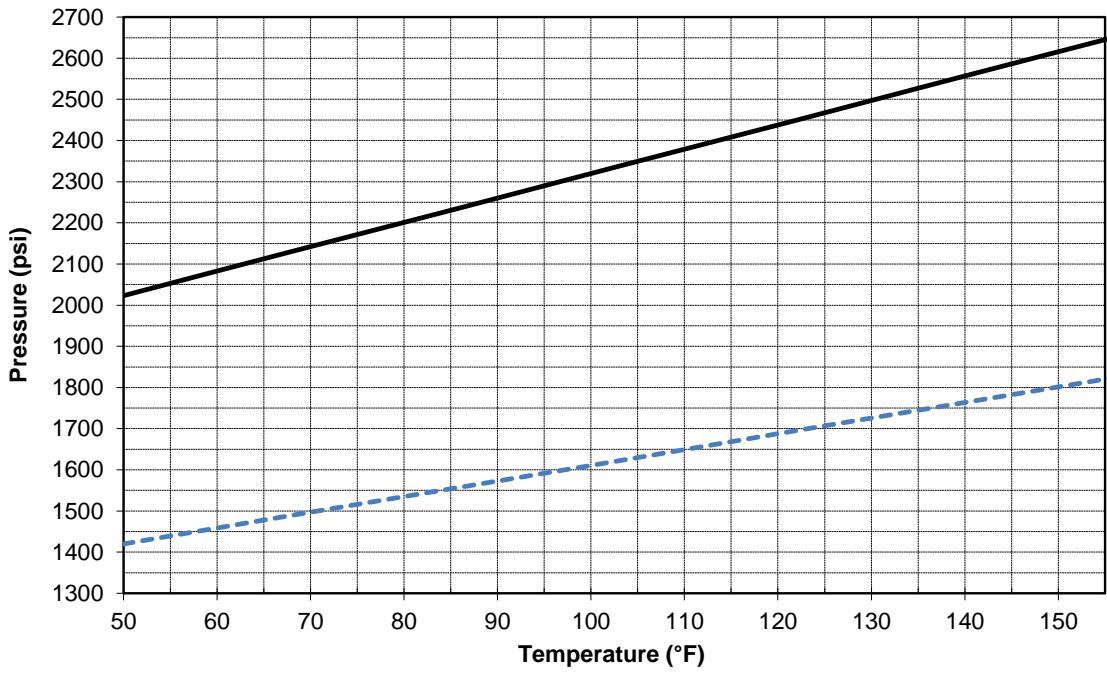
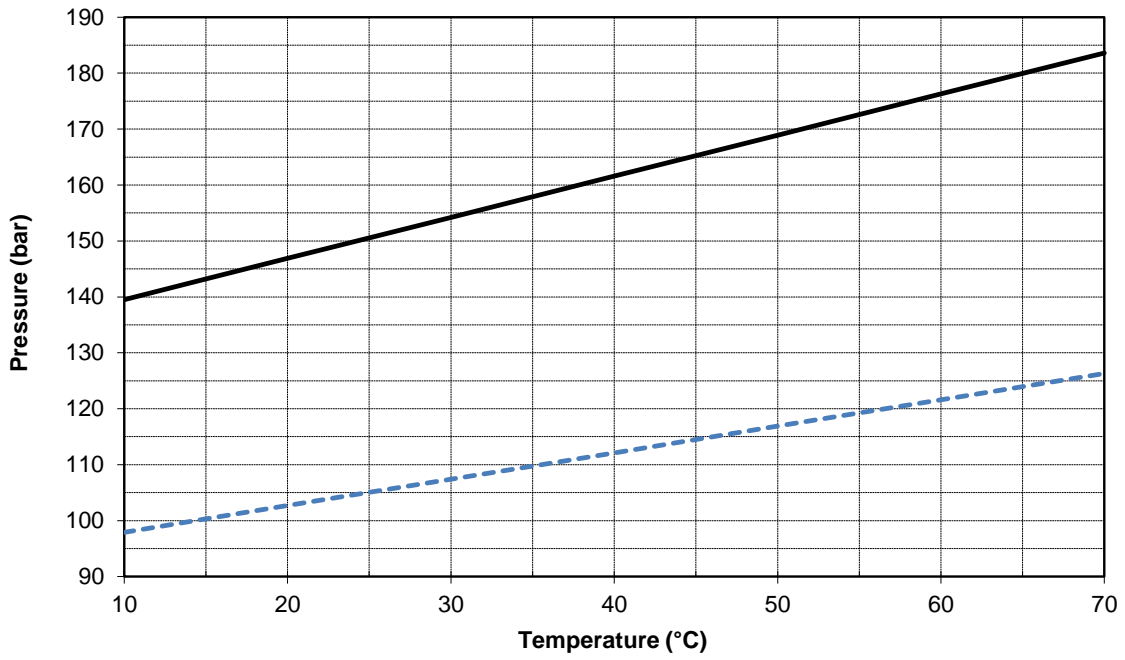
This sheet does not constitute or substitute for the user's own assessment of workplace risk as required by other health and safety legislation.

A.2 Pressure/Temperature Chart for Containers Based on Fill at @ 59°F (15°C)

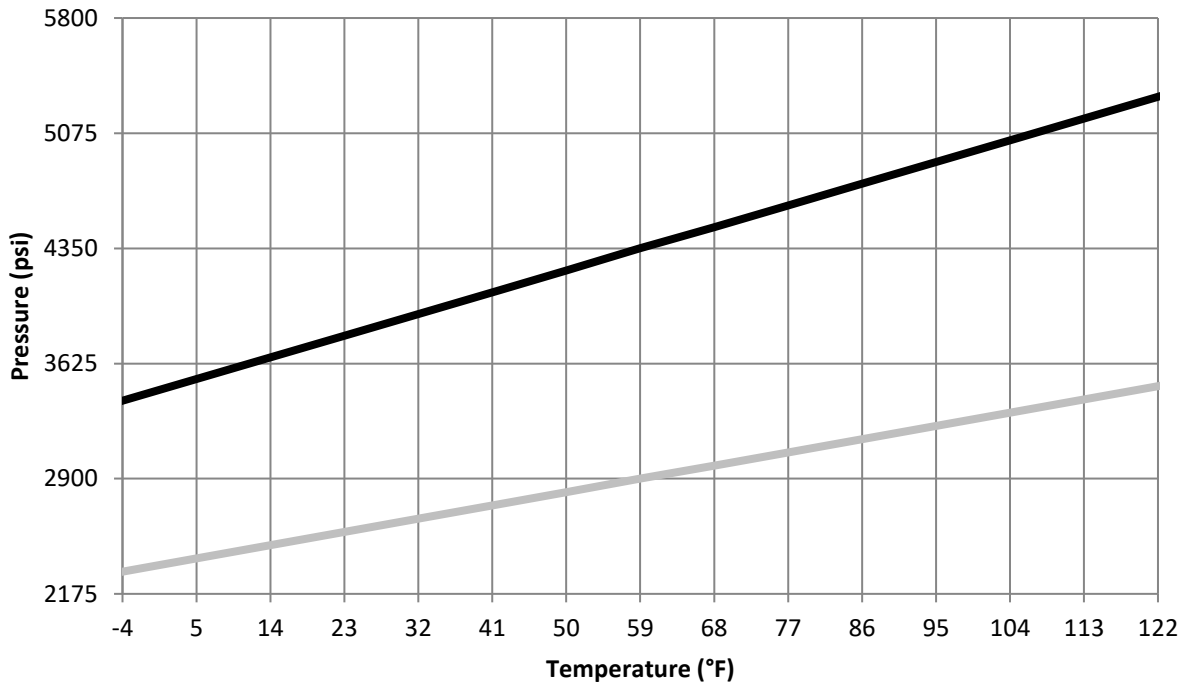
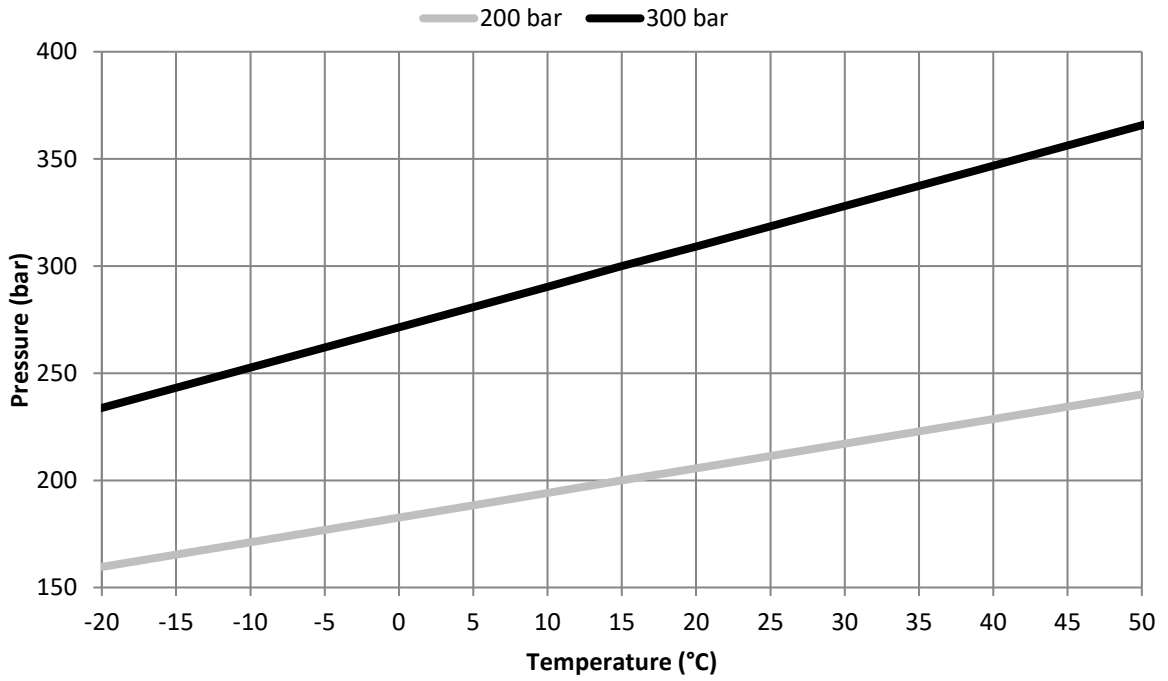
A.2.1 IG-55 (50% Argon and 50% Nitrogen mixture)



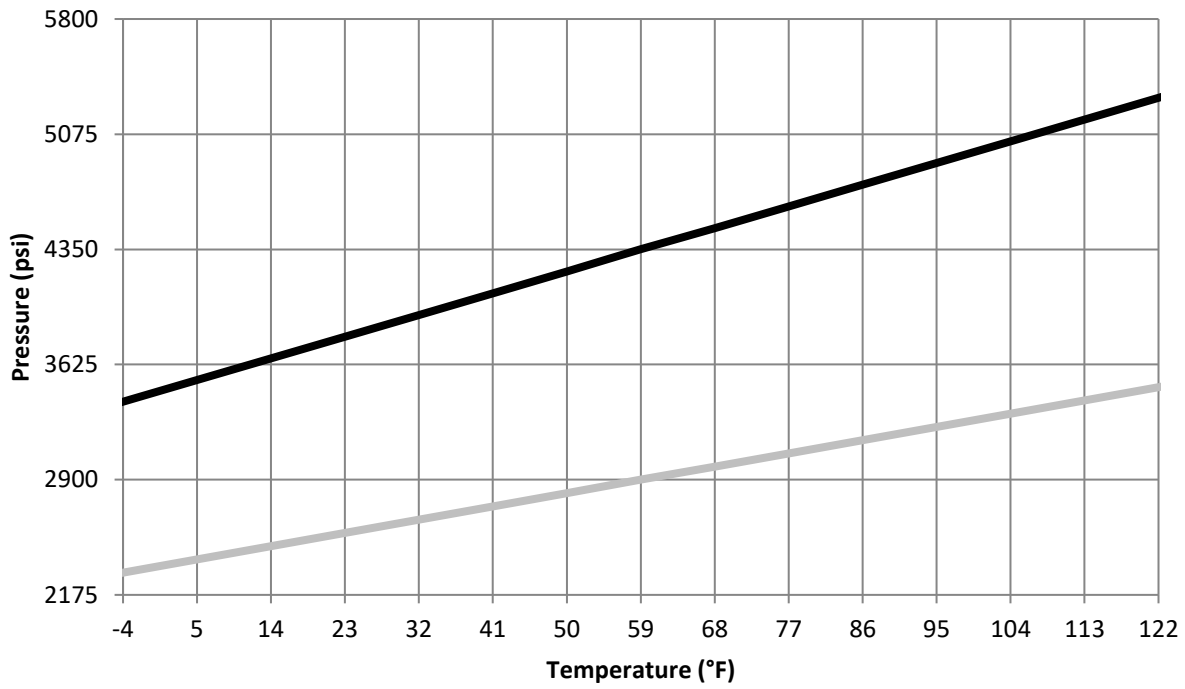
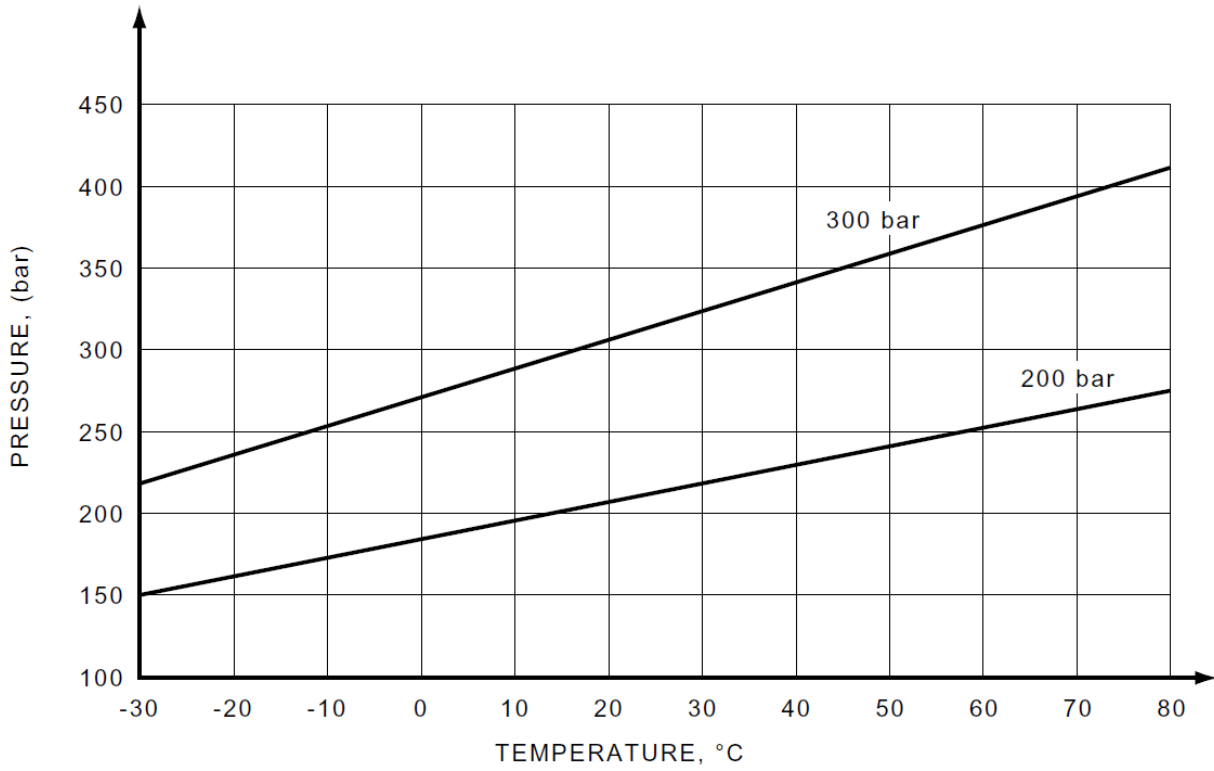
**Prolnert™ Containers Pressure Fill Method
Developed Pressure Chart - Initial Fill with Nitrogen**



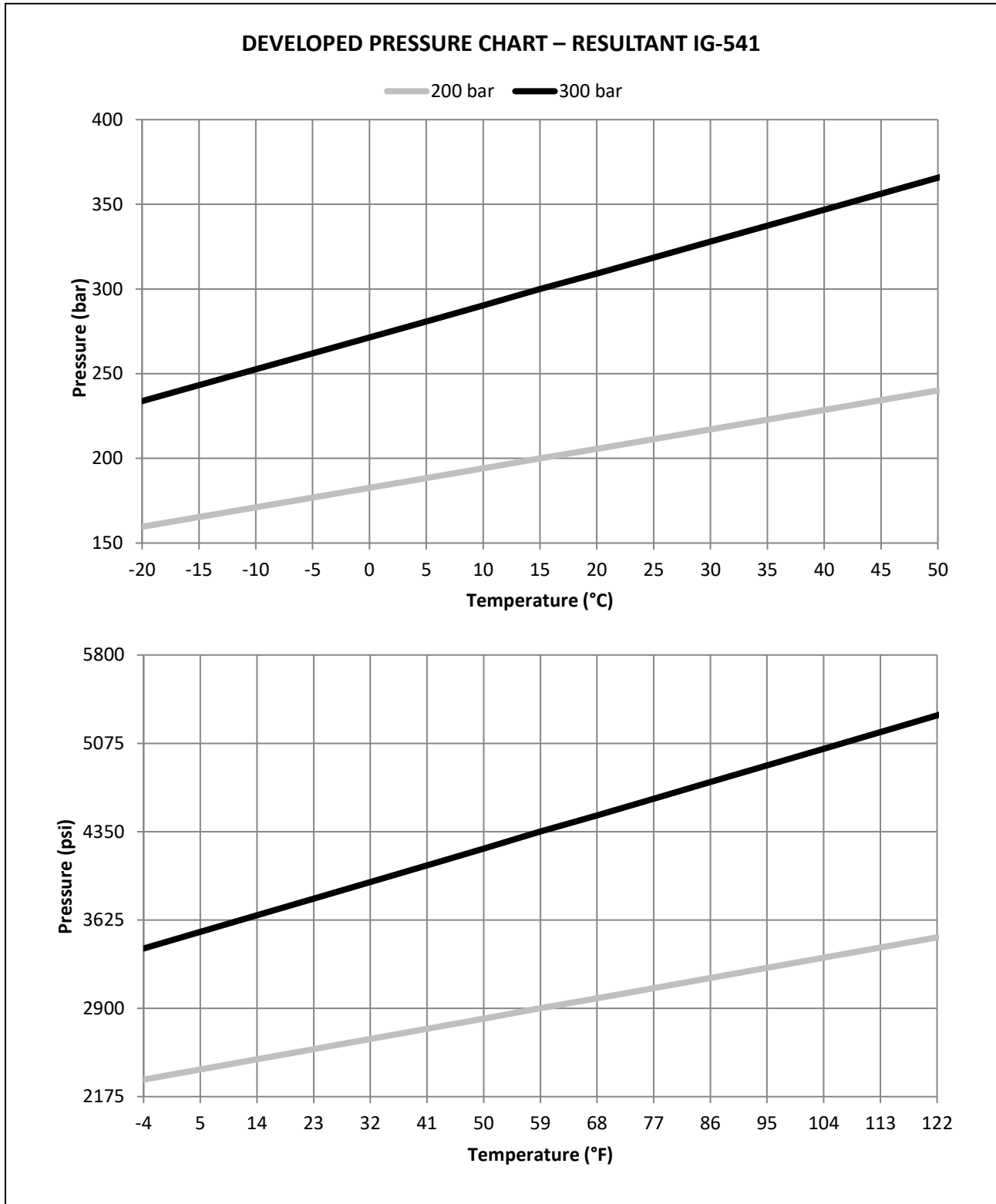
DEVELOPED PRESSURE CHART – RESULTANT IG-55



A.2.2 IG-100 (100% Nitrogen)



A.2.3 IG-541 (52% Nitrogen, 40% Argon and 8% Carbon dioxide)



A.3 Sample Log Book

Container Serial No.	Customer	Date	Initial or Recharge	Container Size	Filled By	Leak Test-Pass/Fail	Ambient Shop Temp.	Cycle Temp.	Cycle Pressure	Comments

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REVISION HISTORY

ORIGINAL RELEASE DATE: December 2015

REVISION / DESCRIPTION OF CHANGE	REVISION DATE
Revision 1.....	December, 2016
1) Added “-The existing label is damaged.” to Section 7.1	
2) Added Section 8.2.3 PACKAGING CONFIGURATION 3	
Revision 2.....	March 2020
1) Replaced current Section A.1.2 with PROINERT IG-100 Safety Data Sheet.	
2) Renumbered former A.1.2 to A.1.3 for IG-541.	
3) Replaced current A.2.2 with IG-100 Pressure/Temperature Chart.	
4) Renumbered former A.2.2 to A.2.3 for IG-541.	
5) Inserted regulatory information in Appendix A, Section 15, for consistency.	
6) Updated overall document to current Fike standard template.	
7) Updated content for inaccuracies where needed.	
8) Updated TOC, List of Figures, and List of Appendices.	
9) Grammar, spelling, and/or punctuation as needed.	
10) Modified text and figures to align with P/N 06-312.	



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