

This document is intended to provide instructions for the following GASARC products:

Published by GASARC

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Pressure Regulator

Tech Master	Lab Master	Spec Master	Chem Master
GPE 400 Series	LGE500 Series	HPE600 Series	SGE600 Series
GPS400/410/420 Series	LGS500/510 Series	HPS600/620 Series	SGS600/620 Series
GPT400/410/420 Series	LGT500/510 Series	HPT600/620 Series	SGT600/620 Series
GPL400/410/420 Series	LGL500/510 Series	HPL600/620 Series	SGL600/620 Series
GPP400/410 Series	LGP500/510 Series		

1 INTENDED USE OF PRODUCT

The Tech Master Product range is designed for use with non-corrosive or non-toxic, technical gases up to grade 4.5 purity (99.995%).

The Lab Master Product range is designed for use with non-corrosive or non-toxic, high purity gases up to grade 5.0 purity (99.999%).

The Spec Master Product range is designed for use with non-corrosive or non-toxic, high purity gases up to grade 6.0 purity (99.9999%).

The Chem Master Product range is designed for use with corrosive, toxic and high purity gases up to grade 6.0 purity (99.9999%).

Please note the safety information shown in the later sections.

WARNING

An appropriately sized pressure relief device downstream of the regulator should be installed in your system to prevent damage to equipment and/or injury to personnel should an internal failure of the regulator occur.

WARNING

For regulators with tube fittings, select the appropriate tubing. Use seamless tubing with the proper consideration given to wall thickness and material. Please contact your gas supplier for more information.

2 USER RESPONSIBILITY

This equipment will perform in conformity with the description contained in this manual and accompanying marking, labels and/or inserts when installed, operated and maintained in accordance with the instructions provided. It is the user's responsibility to ensure that the regulator is suitable for the gas being used. This equipment must be checked periodically. Improperly working equipment should not be used. Parts that are broken, missing, worn, distorted or contaminated should be replaced immediately. For further information please contact GASARC customer services department.

Website: <http://esabspecgas.com/contact/>

email: specgasmail@esab.com

This equipment or any of its parts should not be altered without prior written approval by GASARC. The user of this equipment shall have the sole responsibility for any malfunction that results from improper use, faulty maintenance, damage, improper repair or alteration by anyone other than GASARC or a service facility designated by GASARC.

3 CUSTOMER SERVICE

In the event of equipment failure, contact the GASARC customer services department. Please be prepared to provide the model number of the equipment involved, in addition to some details regarding its application.

4 GENERAL SAFETY INFORMATION

- 4.1 Read and understand this entire manual and your employer's safety procedures before installing, operating or servicing the equipment. While the information contained in this manual represents the manufacturer's judgement, the manufacturer assumes no liability for its use.

NOTE

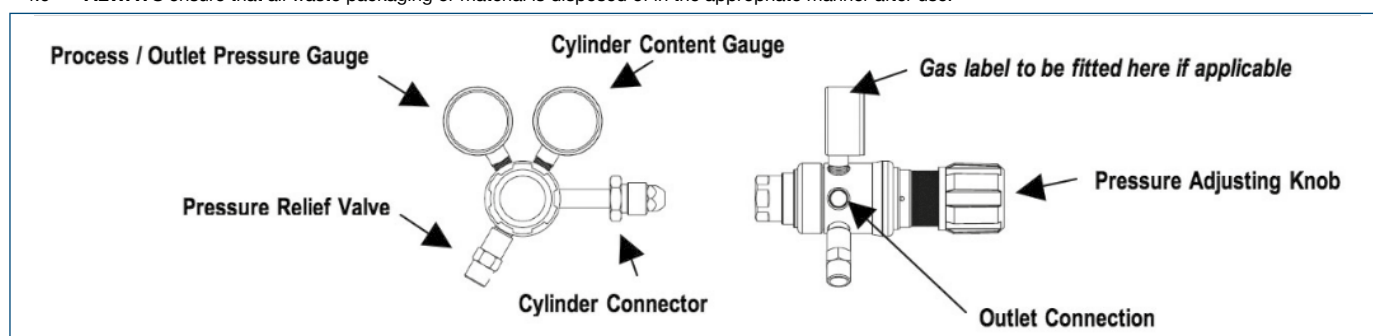
- 4.2 NEVER use oil or grease on or around Oxygen equipment.

NOTE

- 4.3 NEVER attempt to use this equipment if you see any signs of damage, or if you are not appropriately trained, or under adequate supervision.
- 4.4 All operations should conform to applicable International, Regional, Country, Federal State, County or City regulations for use, operation, ventilation, fire prevention, contamination and protection of personnel and the environment. You must understand all safety Standards, Codes and Industry Practices.
- 4.5 **CYLINDER** – Always inspect the cylinder for oil, grease, contaminants and damage prior to use. NEVER use the cylinder if you find oil, grease or contaminants or damage. Secure the cylinder in a vertical position to a trolley, stand or appropriate wall/bench mounting support bracket.
- 4.6 **REGULATOR** – Only use a regulator for the gases, pressure and application for which it is designed, following the manufacturer's instructions. NEVER alter the design of a regulator or use it on unsuitable gases. Always ensure that the regulator is rated with the correct maximum inlet and outlet pressure, and built from the correct materials of construction.
- 4.7 Some pressure regulators come with pressure gauge labels to assist the user in identifying some of the common industrial /technical grade gases used. However, it is the user's responsibility to ensure the correct gas label is selected, in line with the materials of construction and suitable for the process gas used.

DANGER

- 4.8 NEVER use Chem-Master stainless steel regulators in conjunction with high pressure Oxygen gas cylinders or systems.
- 4.9 ALWAYS ensure that all waste packaging or material is disposed of in the appropriate manner after use.



Pressure Regulator

LAB11092_Issue 4

5 INSTALLATION

- 5.1 Position the gas cylinder/vessel in the desired location, ensuring it is secured correctly. Note, all gas cylinders should be vertically positioned or installed in line with the manufacturers/suppliers instructions.
- 5.2 Before installing your pressure regulator ensure that it and the connection to the cylinder/system show no signs of damage or contamination, in particular the presence of oil or grease. Ensure your pressure regulator is in its fully closed position (pressure adjusting knob fully unwound anti-clockwise).
- 5.3 Install the regulator by connecting the inlet connection to the cylinder/vessel/system in the appropriate manner using the correct torque settings as laid out in the applicable cylinder connection 'Regional Standard'. Note, the direction of thread could be either left or right handed, normally indicated by a 'Notching' applied to left hand threaded connections.
- 5.4 If connecting a pipeline regulator to a piped system, install the regulator by applying the correct PTFE (Teflon) tape to the male connecting 1/4 NPT thread. Please note that on stainless steel connections the thread tape helps prevent the connections from galling together when tightening or loosening.
- 5.5 Start the PTFE tape on the second thread as shown below in **figure 1**; making sure the tape does not overlap the end of the fitting. As the tape is wrapped in the direction of the thread spiral, pull tightly on the end of the tape so the tape conforms to the threads. Wrap the tape around the threads twice, cut off the excess tape and press the end firmly into the threads as shown in **figure 1**.
- 5.6 Once the PTFE tape is applied and the mating female connection is ready for installation, screw the connections together (clockwise) until tight. Please note that 1/4 NPT joint torque setting = 20 Nm (15 lbf-ft), however slight adjustment may be needed to ensure the regulator is in an up-right position

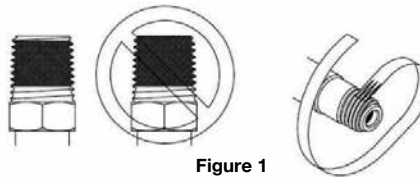


Figure 1

6 OPERATION

- 6.1 After connecting your equipment to the inlet feed and before opening the cylinder/isolation valve, connect the appropriate downstream equipment, if applicable using the PTFE tape jointing guidance in **section 5.4 and 5.5**.
- 6.2 Ensuring that the pressure regulator is in the fully closed position (pressure adjusting knob fully unwound anti-clockwise), open the cylinder/isolation valve slowly allowing the gas to enter the high pressure chamber of the regulator, which will indicate on the cylinder content gauge if fitted.
- 6.3 To pressurise your system or downstream equipment, gradually increase the outlet pressure by turning the pressure adjusting knob clockwise, increasing the outlet pressure of the regulator in small stages of around 1 – 2 bar, ensuring the integrity of the regulator valve seat is not compromised.
- 6.4 When set at the desired pressure and the system is in a dynamic state (flowing), adjustments may be required to the operating pressure of the regulator to allow for pressure decay over large systems or peaks in flow demand.

7 DECOMMISSION

- 7.1 Firstly ensure there is adequate ventilation or the appropriate waste/vent facility.
- 7.2 Slowly close the cylinder/isolation valve feeding the regulator allowing the gas to purge through the regulator and out via the downstream equipment or system. Note, all fitted pressure gauges must read '**Zero**' pressure before the regulator can be removed.
- 7.3 If the gas is a corrosive, toxic or a pyrophoric gas, an inert purge gas may be required, fed in through the high pressure side of the regulator as detailed in the '**Deep Purge Section**'.
- 7.4 When the regulator is de-pressurised and/or purged free of any hazardous gases, fully close the regulator (turn Pressure adjusting knob anti-clockwise) and remove from the cylinder/system.
- 7.5 When a pressure regulator is removed from a cylinder, vessel or system, it should be stored in a dry safe location protected from contamination.
- 7.6 Dispose in accordance with applicable International, Regional, Country, Federal State, County or City laws/regulations.

8 PURGING

Purging allows the user to maintain gas purity, reduce the risk of corrosion and dilute any moisture, impurities, toxic or pyrophoric gases trapped within equipment prior to use or decommissioning. This is achieved by fitting the appropriate waste/vent facility, or by installing a purge gas system fitted to the high pressure feed of any regulator or system. When installing equipment or a full system for the first time, a full system purge or vacuum is required to remove any moisture, impurities or contamination prior to use. Note, a downstream vent point will be needed to totally purge a fully installed system.

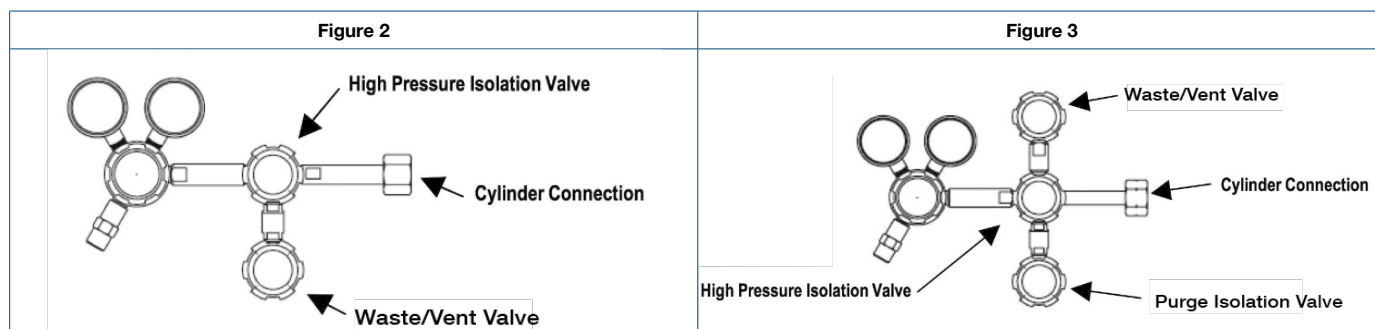
8.1 Tee Purge: Installation

- 8.1.1 To install a 'Tee Purge' to a pressure regulator, it may be necessary to remove the regulators inlet connection. This is achieved by securing the regulator firmly in an appropriate manner (Gas-Arc Universal Cradle: **Part No. TOL01938**), and unscrewing (rotate anti-clockwise) the connection free from the body of the regulator (1/4 NPT joint).
- 8.1.2 When the connection is removed, clean the 1/4 NPT male and female parts, ensuring existing PTFE tape is removed and they are free from contamination and/or damage.
- 8.1.3 Fit the inlet connection to the inlet of the 'Tee Purge' as shown below in **figure 2**, using the PTFE jointing guidance detailed in **section 5.4 and 5.5** (clockwise).
- 8.1.4 Again using the above PTFE jointing guidance given, fit the outlet of the 'Tee Purge' to the inlet of the regulator (clockwise).

8.2 Tee Purge: Operation

When installed, the 'Tee Purge' facility allows the user to isolate the regulator or system and purge any air, moisture or impurities out of the high pressure feed without contaminating the regulator or process. The user must ensure that the waste/vent valve discharges via a piped or contained system into a well-ventilated area.

- 8.2.1 When fitting the regulator and 'Tee Purge' assembly to a cylinder/vessel/system use the instructions detailed in **section 5.0**
- 8.2.2 After the equipment is installed, but before opening the cylinder/isolation valve, ensure that both the high pressure isolation valve and the waste/vent valve are closed. Slowly open the cylinder/isolation valve allowing the high pressure gas to enter the 'Tee Purge' assembly.
- 8.2.3 To purge any contamination free from the equipment, open the waste/vent valve for around 3 – 5 seconds allowing the process gas to purge out any impurities. When purged, close the waste/vent valve and open the process valve allowing pure gas to enter the process line.



8.3 Deep Purge Installation

- 8.3.1 To install a 'Deep Purge' to a pressure regulator, it may be necessary to remove the regulator's inlet connection. This is achieved by securing the regulator firmly in an appropriate manner (Gas-Arc Universal Cradle: **Part No. TOL01938**) and unscrewing (anti-clockwise) the connection free from the body of the regulator (1/4 NPT joint).
- 8.3.2 When the connection is removed, clean the 1/4 NPT male and female parts, ensuring existing PTFE tape is removed and they are free from contamination and/or damage.
- 8.3.3 Fit the inlet connection to the inlet of the 'Deep Purge' as shown above in **figure 3**, using the PTFE jointing guidance detailed in **sections 5.4 and 5.5** (rotate clockwise).
- 8.3.4 Again using the above PTFE jointing guidance given, fit the outlet of the 'Deep Purge' to the inlet of the regulator (clockwise).

8.4 Deep Purge: Operation

When installed a 'Deep Purge' facility allows the user to introduce a purge gas into the high pressure feed of the regulator/system, enabling the dilution or purging of corrosive, toxic or pyrophoric gases prior to use or decommissioning. The user must always ensure that the waste/vent valve discharges via a piped or contained system into a well-ventilated area. When introducing a purge gas, this must be done via a separate supply system or regulator delivering a **MAXIMUM of 10 bar (150 PSI)**.

- 8.4.1 When fitting the regulator and 'Deep Purge' assembly to a cylinder/vessel/system use instructions detailed in **section 5.0 – Installation**
- 8.4.2 Connect the purge gas feed line to the inlet of the inlet isolation valve and the vent line from the outlet of the Waste/Vent using the PTFE jointing guidance given in **sections 5.4 and 5.5**.
- 8.4.3 After the equipment is installed, but before opening the cylinder/isolation valve, ensure that the high pressure isolation valve, inlet isolation valve and the waste/vent valves are closed.
- 8.4.4 Open the inlet isolation valve, allowing the purge gas to fill the 'Deep Purge' assembly diluting any impurities, corrosive, toxic or pyrophoric gases **DO NOT EXCEED 10 bar (150 PSI)**.
- 8.4.5 When charged, first close the inlet isolation valve, then open the waste/vent valve allowing the purge gas to escape. Continue this process 5 – 8 times, pulse purging the 'Deep Purge' assembly.
- 8.4.6 When complete ensure the inlet isolation valve and the purge valve are closed, then slowly open the cylinder/isolation valve allowing the process gas to enter the 'Deep Purge' assembly. When charged open the purge/vent valve allowing the process gas to purge out the purge gas for a period of around 3 to 5 seconds.
- 8.4.7 The pulse purging process should be completed every time a cylinder is changed, or when the equipment is decommissioned.

9 BONNET VENT CAPTURE KIT

- 9.1 If the regulator is connected to a cylinder/vessel/system, remove the regulator as detailed in **section 7**.
- 9.2 To remove the pressure adjusting knob and fit the 'Bonnet Vent Capture Kit', fully open the pressure regulator (turn pressure adjusting knob clockwise) to lock the set lock nut in place.
- 9.3 Remove the label and locking screw from the pressure adjusting knob and pull free from the spindle, ensuring the pressure set lock has not moved.
- 9.4 Fit the 'Bonnet Vent Capture Kit' and lock nut onto the bonnet of the regulator, replace the pressure adjusting knob to its original position and replace the locking screws.
- 9.5 When fitted, the 'Bonnet Vent Capture Kit' can be rotated around the circumference of the regulator bonnet to the desired position and locked in place with locking nut provided.
- 9.6 Install the regulator to cylinder/vessel/system as detailed in **section 5** and pipe the 'Bonnet Vent Capture Kit' away to a well-ventilated area using the PTFE jointing guidance detailed in **sections 5.4 and 5.5** (1/8 NPT).
- 9.7 Before pressurising the full system, check the set outlet pressure of the regulator to ensure it has been re-assembled correctly.
- 9.8 If the set outlet pressure of the regulator has moved outside of its set limit, remove the pressure adjusting knob as detailed above and proceed to re-set the outlet pressure. To reduce the outlet pressure turn the set lock nut clockwise, to increase the outlet pressure turn the set lock nut anti-clockwise. When complete align the flats on both the set lock nut and spindle head and replace the pressure adjusting knob, locking screw and label.

! NOTE

- 9.9 **NEVER** increase the outlet pressure of a regulator outside of its stated pressure service.