

# CHEM-MASTER PURGE VALVES INSTALLATION & OPERATING INSTRUCTIONS

**Before installing or operating, read and comply with these instructions**

## USER RESPONSIBILITY

This equipment will perform in conformity with the description contained in this manual and accompanying labels and/or inserts when installed, operated, maintained and repaired in accordance with the instructions provided. 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. GAS-ARC GROUP LTD recommends that a telephone or written request for service advice be made to GAS-ARC GROUP LTD Customer Service Phone : 01379 652263, Fax : 01379 644235 or E-mail : mail@gas-arc.co.uk.

This equipment or any of its parts should not be altered without prior written approval by GAS-ARC GROUP LTD. 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 GAS-ARC GROUP LTD or a service facility designated by GAS-ARC GROUP LTD.

## CUSTOMER SERVICE

In the event of equipment failure, call GAS-ARC GROUP LTD Customer Service. Please be prepared to provide the model number and serial number of the equipment involved, in addition to some details regarding its application.

## GENERAL SAFETY PRACTICES

1. Comply with precautions listed in B.C.G.A Codes of Practice.
2. Consult the cylinder distributor for the proper use of cylinders and for any restrictions on their use (such as flow rate and temperature requirements).
3. Never use an open flame when leak testing.
4. Always open valves slowly when high-pressure gases are being used.
5. Always be sure that a cylinder contains the correct gas before connecting it to any regulator.
6. Always leak-test any manifold or distribution pipeline before using.
7. Always be sure that the gas in the system is the correct gas for the intended use.

## PURGING

Purges allow users to connect a purge gas to their system. Purging has the following benefits:

1. To start with and maintain a high purity gas stream – Purging allows the user to remove unwanted gases and water vapour contamination from their system. Purging has applicable benefits in processes such as pollution control calibration, doping modules and chromatography.
2. To prevent dangerous gases (toxic, corrosive or flammable) from getting into a workplace area.
3. To prevent the mixing of reactive gases – Example: air, moisture and intense acid formers may mix after cylinder changes without purging. The resultant acids formed from the mixture may react with the system equipment. Reactions with the equipment may shorten the life of equipment components.
4. To avoid the waste of valuable system gases that might have originally been used for purging.

**Note :** Be sure that your purge gas is compatible with your application and processes.

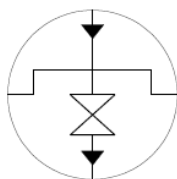
## TYPES OF PURGES

GAS-ARC GROUP LTD has three types of purges:

1. Deep Purge (used with the positive displacement purging) – The deep purge is the most effective and versatile group. This unit has a snorkel design, which forces purge gas into the cylinder valve cavity. This purge is capable of purging the inlet side of a regulator without having to purge through the regulator and system; this method will use less purge gas.
2. Tee Purge (used with pressure cycle purging) – This purge is more economical at purchase than the deep purge. This unit provides effective purging of both cavities upstream and downstream of the regulator. This purge exhausts through the regulator and system.
3. Straight Purge (used with pressure cycle purging) – This purge is connected directly to regulators equipped with an extra high-pressure port. This purge exhausts through the regulator system.

## INSTALLATION

Please refer to the schematic below (as marked on the rear of the valve) and observe the previously mentioned safety precautions before actual installation.



When installing NPT connections, use an open-end spanner not a pipe spanner to install fittings. 1/4 NPT connections require the use of PTFE tape on the threads to make a gas tight seal. On stainless steel connections, the thread sealant helps prevent the connections from galling together when tightening or loosening.

Inspect the NPT threads and if necessary clean the fitting to remove any dirt or thread sealant that remains on the threads. Start the PTFE tape on the second thread as shown above; make 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 that 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.

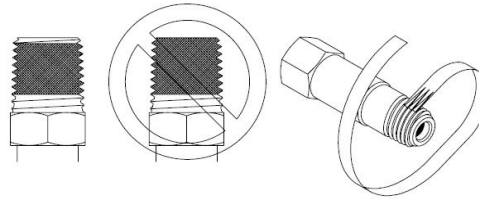


Figure 1. Tape Installation procedures.

## INSTALLING DEEP AND TEE PURGES

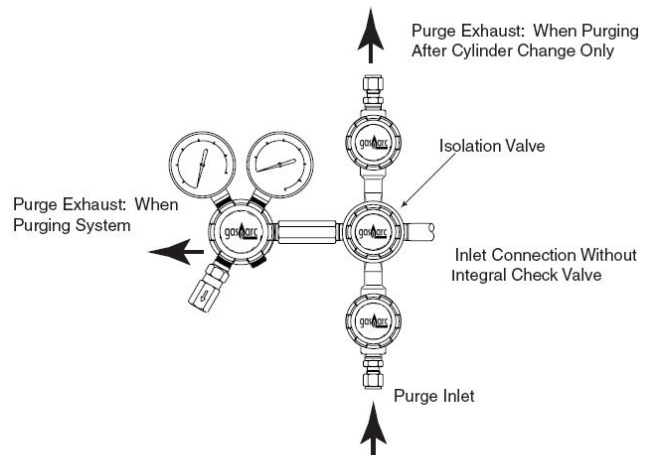


Figure 2. Deep Purge.

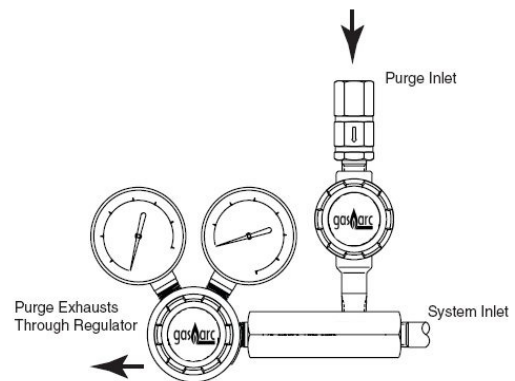


Figure 3. Tee Purge.

1. **Deep Purge:** If necessary, remove the regulator's inlet fitting and carefully remove the brass protector piece from the inlet of the purge. Install the inlet fitting into the purge's system inlet connection (1/4 female NPT port). Do not damage the snorkel tube when installing the inlet connection.  
**Tee Purge:** If necessary, remove the regulator's inlet fitting. Install the inlet fitting into the purge's system inlet connection (1/4 female NPT port).  
Note: Glands without spanner flats on the gland stem should be removed with a 6 point hex socket to prevent damage to the seating surface of the gland. Otherwise remove and install the gland using an open-ended spanner; do not use a pipe wrench.
2. Install the Deep Purge or Tee Purge into the regulators female 1/4 NPT inlet port (marked HP) as shown below.
3. **Deep Purge:** The purge inlet is located on the bottom of the Deep Purge: it is a 1/4" compressed tube fitting. Using 1/4" tubing, connect the Deep Purge to a high purity purge gas regulator.
4. Pipe the purge exhaust (1/4" compression tube fitting) to a safe discharge area.

**Tee Purge:** The purge inlet (¼" female NPT) is located at the top of the Tee Purge. Connect the Tee Purge to your high purity purge gas regulator or flowmeter as described in the paragraph above.

- Using an inert gas, leak test all connections before use. Note that even inert gases can build up in a confined area to reach hazardous levels when the oxygen in the air is reduced to less than 19%.

#### INSTALLING STRAIGHT PURGES

- If necessary, remove the pipe plug from the high pressure port (typically marked HP) on the regulator. Install the straight purge into the open port.
- The purge inlet is located at the end of the Straight Purge; the connection is female, ¼" NPT port. Connect the Straight Purge to a high purity gas regulator.
- Using an inert gas, leak test all connections before use. Note that even inert gases can build up in a confined area to reach hazardous levels when the oxygen in the air is reduced to less than 19%.

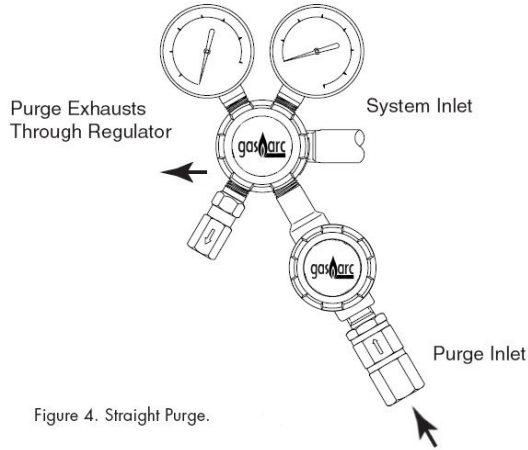


Figure 4. Straight Purge.

#### PURGE OPERATION

These instructions cover methods commonly used with GAS-ARC GROUP LTD speciality equipment. The next section provides a general guideline of the methods and procedures to follow when venting and purging the gas in a simple system to a safe discharge area. Note: complex systems may require different procedures to remove the unwanted gas, and the procedures need to be evaluated on an individual basis. For higher purity systems and corrosive gases use a pure dry inert gas such as grade 4.5 nitrogen. Do not unnecessarily leave the system open to the atmosphere after purging. Otherwise, additional purging may be required to remove the atmospheric contamination.

**POSITIVE DISPLACEMENT PURGING (deep purge only)** – Positive displacement purging removes unwanted gases and contaminants from the system by physically pushing the gases out the purge exhaust. This method is suitable for systems with long runs of tubing and little or no dead space. Purge gas flow should be slow to avoid mixing with the system gases to be removed. Positive displacement purging requires the Deep Purge.

#### Cylinder change purging:

- Close the cylinder valve on the supply cylinder.
- Close the centre isolation valve on the Deep Purge. This will shut off the gas supply from the purge to the regulator.
- Slowly open the purge gas outlet valve. Vent the gas in the system to a safe discharge area.
- Open the purge gas inlet valve. Allow the purge gas to flow for 2 to 5 minutes to reach the desired system purity.
- Close the purge gas inlet valve and vent the purge gas. Close the purge gas outlet valve after venting the purge gas.
- Change the process gas cylinder.
- Repeat steps 2-5 to remove the air trapped in the system after changing the cylinder.
- If it is necessary to purge the purge gas, open the purge exhaust valve and then open the process gas cylinder valve a small amount. This will allow the process gas to push the purge gas from the system. Close the purge exhaust valve when purging is complete.
- After all purging has been accomplished; open the isolation valve on the Deep Purge.

#### Complete system purging:

For extended periods of shut down, it is recommended that the complete system be purged. The downstream vent valve must be placed so the system can be fully swept with the purge gas. Do not install the vent valve so a dead volume is created when purging. Use the following procedure to perform a positive displacement purge on the entire system with the Deep Purge assembly.

- Close the cylinder valve on the supply cylinder.
- Turn the adjusting knob on the regulator clockwise to open the regulator seat.
- Keep the centre isolation valve on the Deep Purge open.
- Open the downstream vent valve and vent the system gas to a safe location.
- After venting the gas in the system, carefully open the purge gas inlet valve. Allow the gas to flow for 2 to 5 minutes to reach the desired level of purity.
- Upon completion of the purge, close the downstream vent valve, the Deep Purge isolation valve and the purge gas inlet valve. Closing the valves in this order will maintain a positive pressure in the system and prevent back flow of air into the system. This procedure will maintain an inert atmosphere within the system.

**PRESSURE CYCLE PURGING (tee purge and straight purge only)** – Pressure cycle purging is used on complex systems with dead end passages where a steady flow of gas cannot flush all areas of the system. This method of purging on a regulator is best suited for a Straight or Tee Purge. When these two purges are connected to a regulator with a cylinder connection, the cylinder connection is a dead end passage that can only be purged by pressure cycle purging. A typical system designed for pressure cycle purging will include either a Straight or Tee Purge upstream of the regulator and a block valve and bleed valve downstream from the regulator.

- Close the cylinder valve on the process gas cylinder.
- Turn the adjusting knob on the regulator clockwise to open the regulator seat.
- Close the downstream block valve and carefully open the bleed valve to vent the gas from the system to a safe discharge area.
- Close the bleed valve and open the purge gas valve on the Straight or Tee Purge. Allow gas pressure to equalise in the system. This may take 15 seconds or more. Once the pressure has equalised close the purge gas valve on the Straight or Tee Purge. Wait an additional 15 seconds to allow the gases in the system to completely mix.
- Open the bleed valve to exhaust the gases from the system to a safe discharge area.
- Repeat steps 3-5 as many times as needed to reach the desired gas purity.

Vacuum assisted exhaust purging may be done at the end of each purge cycle to improve the efficiency of the purge process. If a cylinder change is made following the purge cycle, repeat steps 1-6 to remove the atmospheric contamination that has entered the system. Additional purging with the process gas may be required if removal of the purge gas from the system is desired.

#### MAINTENANCE

At regular intervals, the purge assembly should be checked for leaks and proper function (see TROUBLE SHOOTING). Any leaks in the system should be corrected immediately.

A unit which is not functioning properly should not be used until all required repairs have been completed and the unit has been tested to ascertain that it is in proper operating order.

#### SERVICE

Gas-Arc Chem-Master products are designed to work with corrosive and toxic gases. To protect our staff and to comply with the Control of Substance Hazardous to Health regulations (COSHH), we must be fully informed of all gases and substances that have been in contact with the product. If you wish to return a product to us, for any reason, you must contact Gas-Arc to obtain a "Chem-Master Range Request for Authorisation to Return Product" form (QC23). Once the completed form has been returned to us we will consider your request. Where gases and substance that have been in contact with the product are unknown to us, we will require you to supply us with the appropriate safety data before we can decide if we can grant authorisation for you to return the product. If authorisation is granted for the product to be returned to us, we will supply you with a returns number and instructions on how to send it back to us.

**We will not accept any Chem-Master products returned to us without prior authorisation**

#### TROUBLE SHOOTING

Typical symptoms listed below indicate malfunctions needing rectification. Replace system components immediately.

- Gas leakage from any joint.
- Diaphragm valve(s) fail to cut off gas supply when closed.
- The system makes a noise or hums

#### WARRANTY INFORMATION

Gas-Arc Group Ltd sells this equipment under the warranties set forth in our Standard Terms & Conditions of Sale (available on request).

With the following exception:

In regard to equipment in corrosive service for a period of 90 days to buyer or to buyer's order, this equipment is warranted to be free from functional defects in materials and workmanship and to conform to the description of this equipment contained in this manual and any accompanying labels and/or inserts, provided that the same is properly operated under conditions of normal use and that regular periodic maintenance and service is performed or replacements made in accordance with the instructions provided. The foregoing warranties shall not apply if the equipment has been repaired: other than by Gas-Arc Group Ltd or a designated service facility or in accordance with written instructions provided by Gas-Arc Group Ltd, or altered by anyone other than Gas-Arc Group Ltd or if the equipment has been subject to abuse, misuse, negligence or accident.

Gas-Arc Group Ltd's sole and exclusive obligation and Buyer's sole and exclusive remedy under the above warranties is limited to repairing or replacing free of charge, at Gas-Arc Groups option, the equipment or part, which is reported to its Authorised Distributor from whom purchased, and which if so advised, is returned with a statement of the observed deficiency, and proof of purchase of equipment or part not later than seven (7) days after the expiration date of the applicable warranty, to the nearest designated service facility during normal business hours, transportation charges pre-paid, and which upon examination, is found not to comply with the above warranties. The Buyer shall pay return trip transportation charges for the equipment or part.

GAS-ARC GROUP LTD SHALL NOT BE OTHERWISE LIABLE FOR ANY DAMAGES INCLUDING BUT NOT LIMITED TO: INCIDENTAL DAMAGES, CONSEQUENTIAL DAMAGES OR SPECIAL DAMAGES, WHETHER SUCH DAMAGES RESULT FROM NEGLIGENCE, BREACH OF WARRANTY OR OTHERWISE.

THERE ARE NO EXPRESS OR IMPLIED WARRANTIES WHICH EXTEND BEYOND THE WARRANTIES HEREIN ABOVE SET FORTH. GAS-ARC GROUP LTD MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE EQUIPMENT OR PARTS THEREOF.