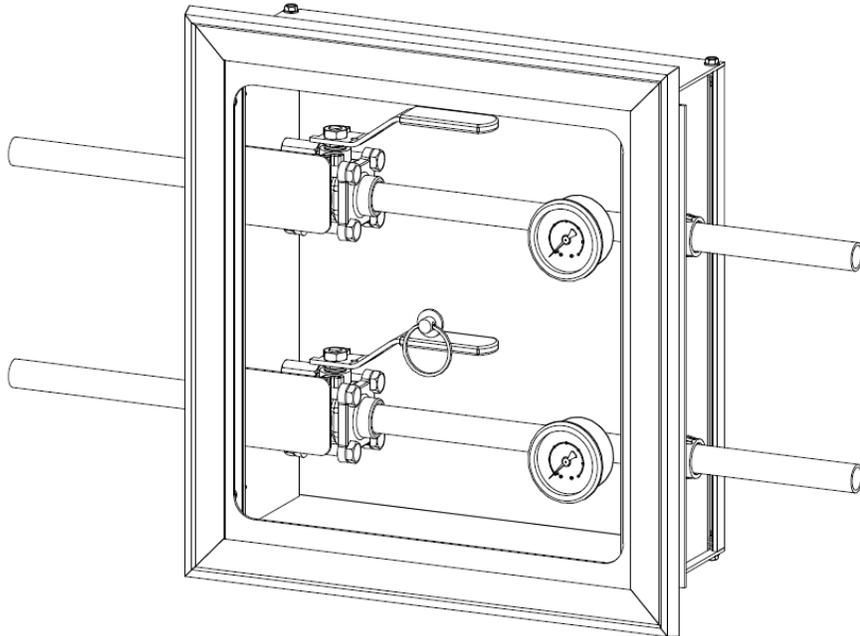


THIS BOOKLET CONTAINS PROPRIETARY INFORMATION OF BEACONMEDÆS AND IS PROVIDED TO THE PURCHASER SOLELY FOR USE IN CONJUNCTION WITH ZVBL SERIES ZONE VALVE BOXES FOR LABORATORY APPLICATIONS.



Important

These instructions are for experienced operators who know the general principles and safety precautions to be observed in handling compressed gases. If you are not certain you fully understand the safety precautions for handling gases, we urge you to obtain and read the Material Safety Data Sheet (MSDS) for each gas being used.

Do not permit untrained persons to install, operate, or maintain these manifolds. Do not attempt to install or operate these manifolds until you have read and fully understand these instructions. If you do not fully understand these instructions, contact BeaconMedæS.

Be sure this information reaches the operator. Your supplier has extra copies.

1 - General Safety Precautions

Protect yourself and others. Read and understand the following instructions before attempting to use this equipment. Failure to understand and follow these instructions could result in serious personal injury and/or damage to equipment. Because of the many potential hazards associated with gases, read the Material Safety Data Sheet for each gas you will be using.

- Know and understand the physical and chemical properties of the gas being used.
- Observe general precautions for the use of gases.
- Observe safety precautions for the gas being used.
- Read and follow precautions on cylinder labels.
- Never use this equipment with gases not compatible with the materials of construction. The use of gases not compatible with the materials of construction may cause damage to equipment or injury to personnel.
- Many gases can cause asphyxiation by displacing oxygen in the atmosphere. Make certain the area where these manifolds are operated is well ventilated. Provide a device to warn personnel of oxygen depletion in the work area.
- Use this equipment only in well ventilated areas. Vent gases to the outside atmosphere, and in an area away from personnel. Be sure that venting and disposal methods are in accordance with Federal, State, Provincial and local requirements. Locate and construct vent lines to prevent condensation or gas accumulation. Be sure the vent outlet is NOT obstructed by rain, snow, ice, insects, birds, etc. Do not inter-connect vent lines; if more than one vent is needed, use separate lines.
- Relief devices should be installed and properly vented in all gas handling systems to protect against equipment failure and over-pressurization.
- Never connect this equipment to a supply source having a pressure greater than the maximum rated pressure. Refer to the Product Specifications for maximum inlet pressures.

WARNING – COPPER ACETYLIDE

DO NOT USE COPPER PIPES IN ACETYLENE SERVICE.

Copper acetylide can form inside pipes made of copper or an alloy with high copper content.

When dry, copper acetylide is a heat and shock sensitive high explosive.

2 - Abbreviations

C	Common	OSHA	Occupational Safety & Health Administration
CGA	Compressed Gas Association	PSIG	Pounds per Square Inch Gauge
FT-LBS	Foot-Pounds	SCFH	Standard Cubic Feet per Hour
IN-LBS	Inch-Pounds	VAC	Voltage, Alternating Current
N/C	Normally Closed	VDC	Voltage, Direct Current
N/O	Normally Open	PCB	Printed Circuit Board
NPT	National Pipe Taper		

3 - Disclaimer

BeaconMedæS shall not be liable for errors contained herein or incidental or consequential damages in connection with providing this manual or the use of material in this manual.

4 - Manufacturer Statement

The information contained in this instruction booklet has been compiled by BeaconMedæS, from what it believes are authoritative sources, and is offered solely as a convenience to its customers. While BeaconMedæS believes that this information is accurate and factual as of the date printed, the information, including design specifications, is subject to change without prior notice.

5 - Introduction

In single and multiple configurations, valve box assemblies for concealed piping installation should be installed at specific locations per NFPA 99, Standard for Health Care Facilities or CAN/CSA-Z305.1, Canadian Standard for Nonflammable Medical Gas Piping Systems. All valves are supplied clean for oxygen service. Care should be taken to keep debris out of valves and pipelines during installation.

FASCIA AND LABELS – COLORS, WORDING AND LAYOUT FOR GASES OTHER THEN FOR MEDICAL APPLICATIONS

BeaconMedæS has chosen the color coding as published by SEFA for valves other than medical gas applications. For valves used for medical purposes installed in a ZVBL Series zone valve box, color coding published by NFPA 99 is used. The SEFA color coding is different from the color coding normally used in the medical industry for medical wall outlets. The SEFA color coding is extensively used in laboratories for all kinds of equipment including turrets and faucets.

ABOUT SEFA

The Scientific Equipment and Furniture Association is a voluntary international trade association representing members of the laboratory furniture, casework, fume hood and related equipment industry. The Association was founded to promote the industry with improved quality, safety and timely completion of laboratory facilities in accordance with customer requirements. SEFA uses its best effort to promote Recommended Practices for the benefit of the public in light of available information and accepted industry practices.

6 - Description

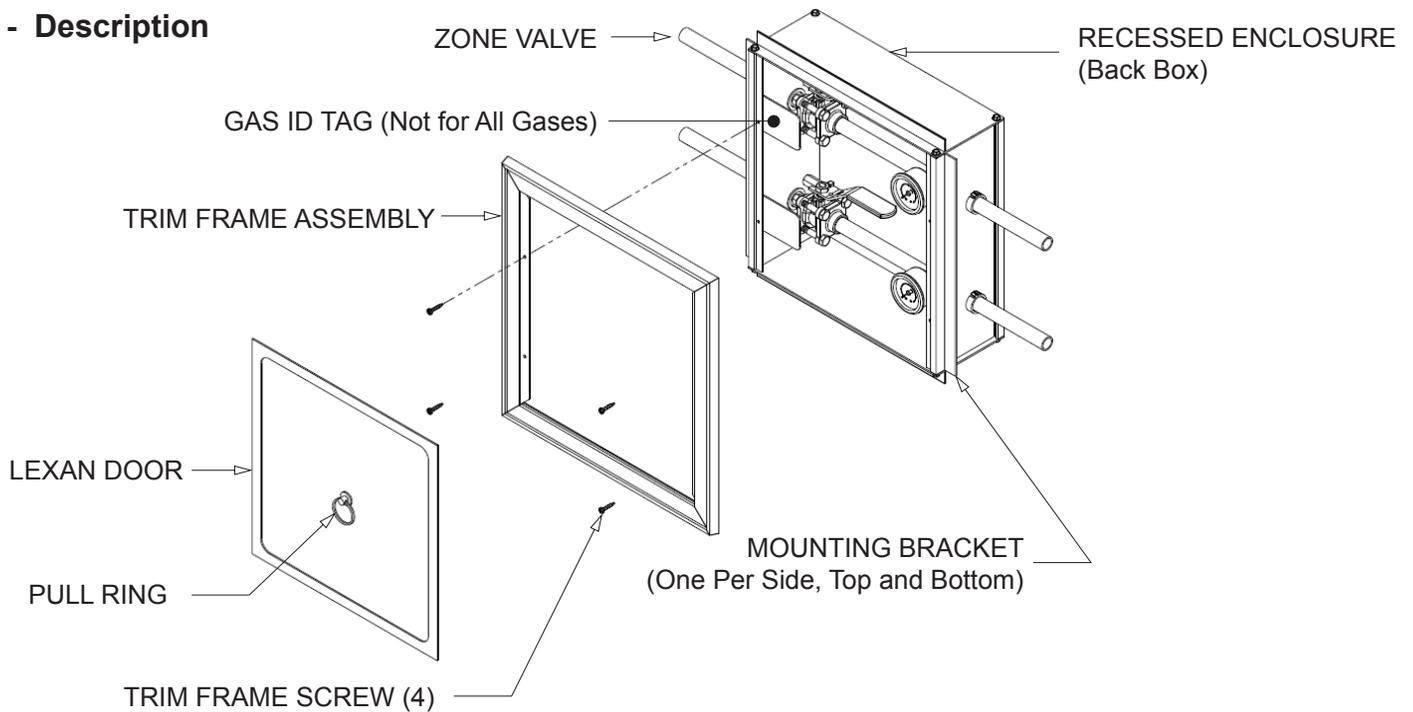


Figure 1 – Zone Valve Box Components

WARNING!

The socket quick connect shall always be on the gas supply side.
DO NOT remove the isolation ball valve.

6.1 - Lexan Door: Unless otherwise specified, the door is a clear Lexan with nothing written on it (unlike medical zone valve boxes). The Lexan door sits in the trim frame assembly.

6.2 - Pull Ring: Unlike BeaconMedaes medical zone valve boxes, the ZVBL Series zone valve box for laboratory applications is equipped with a door that you have to pull to open. There will be one or two pull rings depending on the box size.

6.3 - Trim Frame Assembly : The trim frame assembly is permanently attached to the recessed enclosure (screws supplied by BeaconMedaes). It is made out of aluminum and covers any dry wall imperfections surrounding the recessed enclosure.

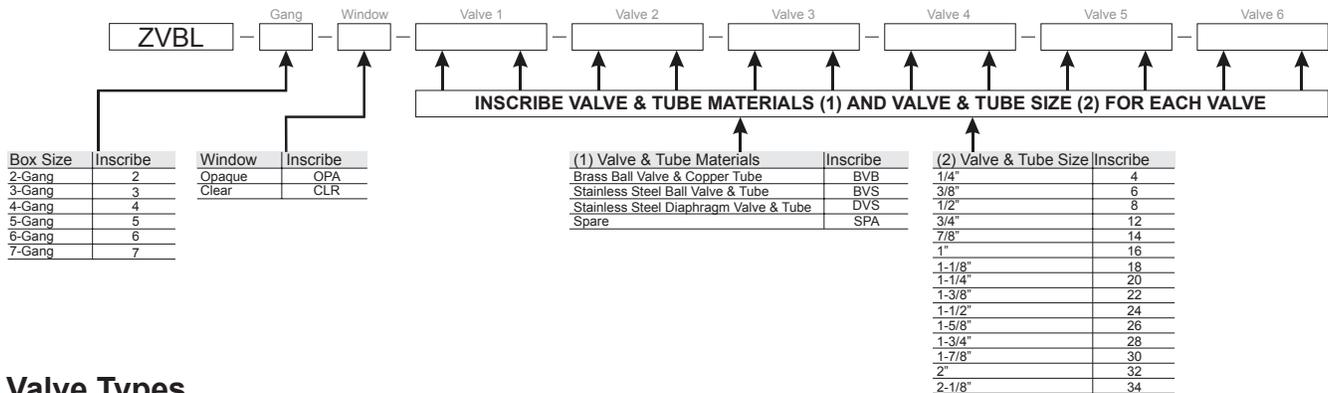
6.4 - Recessed Enclosure: The recessed enclosure is installed in the wall between studs. Its aluminum extrusion construction make it corrosion (rust proof). Each zone valve box is made to order. Therefore, the openings are made to the location and size required by each valve. In order to prevent any galvanic reaction between the aluminum and the valve pipe (primarily copper pipes), each opening is protected by a plastic or rubber grommet.

6.5 - Mounting Bracket: The mounting brackets are part of each side, top and bottom extrusions. Therefore, they are not adjustable. They are made to fit 1/2" and 5/8" thick gypsum sheets. Aluminum is easy to drill through so that the installer can locate the stud mounting screws (supplied by installer) anywhere it is appropriate.

6.6 - Gas ID Tags: Gas ID tags has shown in Figure 1 are normally supplied with medical style ball valves. For high purity valves, "gas service (I.D.)" stickers are supplied for each valve.

6.7 - Valves: Valves come in various combinations of size, material (brass or stainless steel), style (ball or diaphragm), pattern (straight or angle) along with different type of extensions (pipe or tube – copper or stainless steel).

7 - Ordering Information



8 - Valve Types

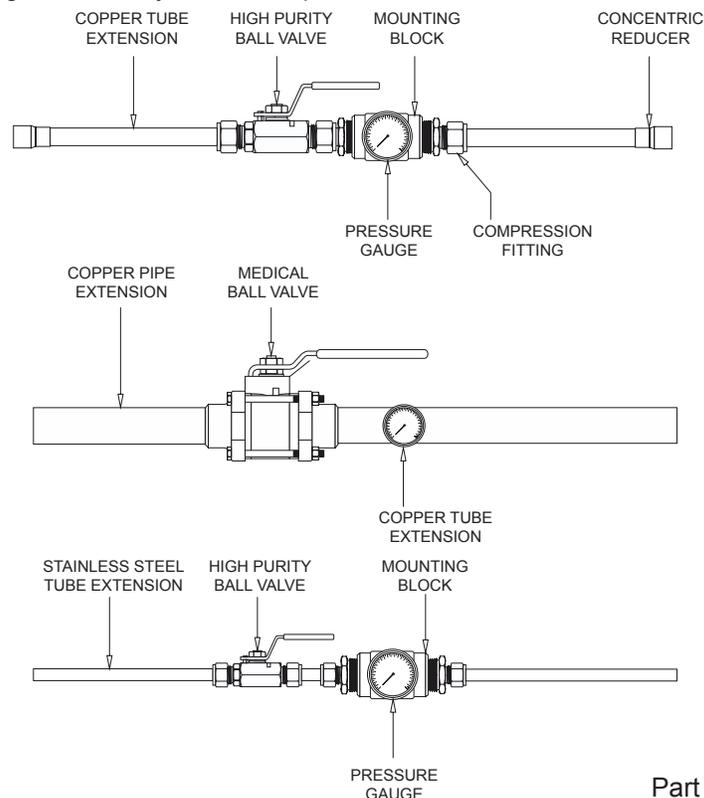
The type of valve used for a given gas service is determined by several factors such as material compatibility, flow, purity, pressure and function. The different valve configurations shown below is a very small sample of all the possible valve configurations. Below are few important technical points:

8.1 - Mounting Block : The mounting block is always installed in high purity applications. It is used as a mounting block to attach the valve assembly to the recessed enclosure. It is also used to hold the pressure. The inlet and outlet of that block is 1" F.NPT.

8.2 - Valves : Medical ball valves are used only on non-high purity gas service and for vacuum. For high purity applications, two valves can be used: high purity ball valves and diffusion resistant packless diaphragm valves.

8.3 - Tubes and Pipes: Tubing and/or piping are selected based on flow and to match the wall pipes. Tubing and piping wall thickness is obviously guided by the working pressure or the gas system to which it is connected.

8.4 - Pressure Gauges: The pressure gauges is selected based on the pressure requirement of the system to which it is attached to. The pressure gauge is normally the lowest pressure device in the valve assembly.



9 - Installation

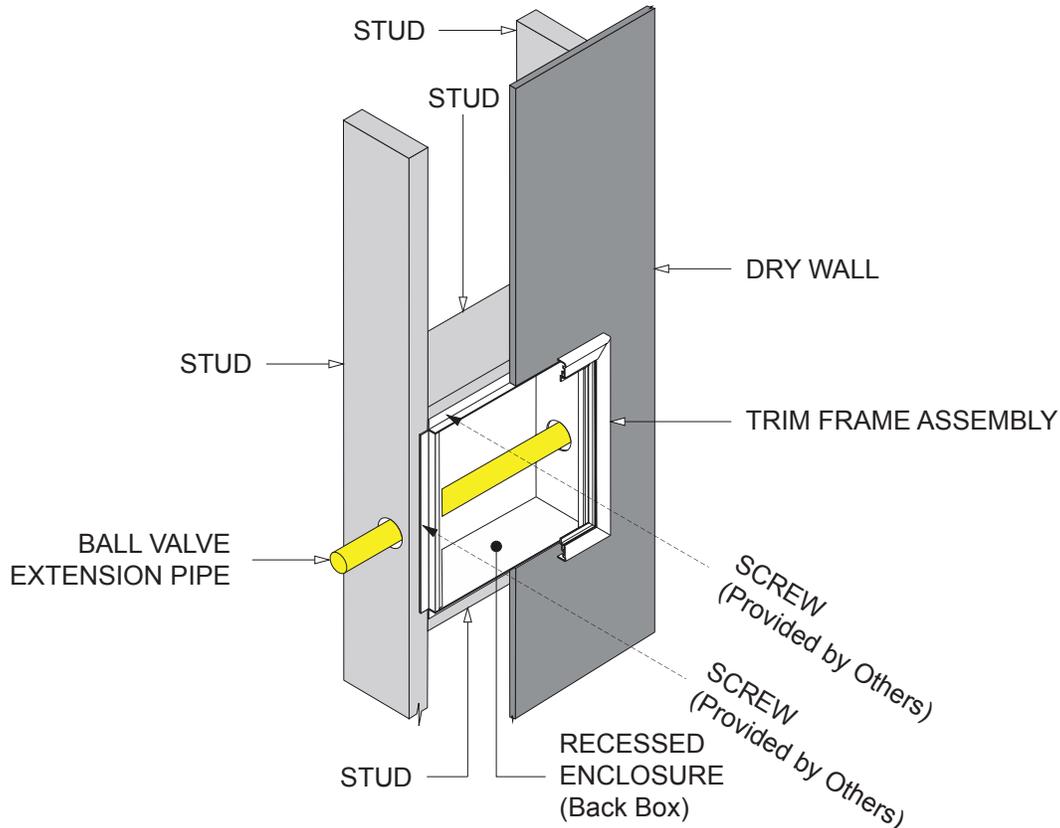


Figure 2 – Identification of the Two Assemblies

9.1 - LOCATION

It is important to plan sufficient space to accommodate valve box assembly installation and future access.

9.2 - EQUIPMENT RECEPTION

The zone valve box assembly is shipped pre-assembled and tested at the factory. It should contain a Lexan door, a trim frame assembly, the recessed box and the zone valve(s) with or without pressure gauges. Please make sure that all units have not been damaged during transportation from the factory to the delivery point. You must report any damaged to BeaconMedaes in writing within 5 days of reception of the damaged unit.

9.3 - ASSEMBLE GANGED BOXES

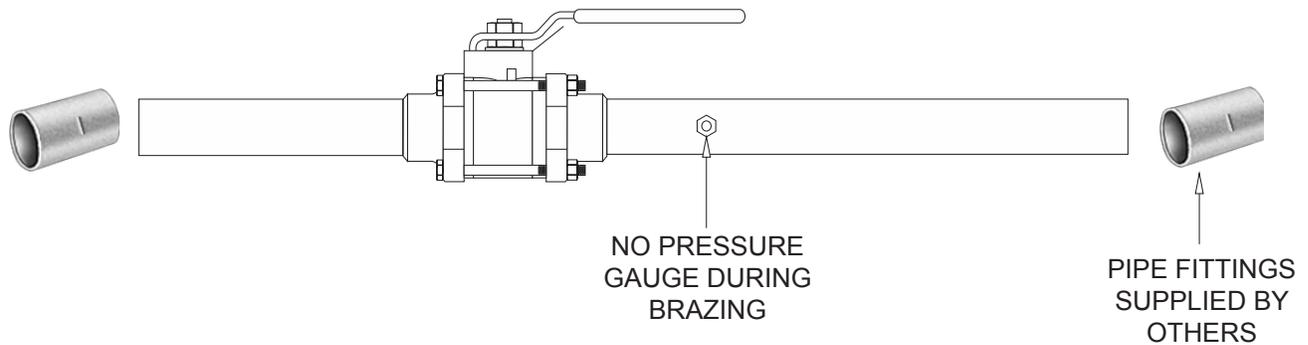
Unlike the BeaconMedaes zone valve boxes, the ZVBL Series zone valve boxes for high purity applications come pre-assembled in one enclosure. Therefore, there is no need to gang several boxes in the field.

IMPORTANT

It is of paramount importance to make sure that all protective caps and plugs are installed at all times. The plugs and caps are preventing dust, scale and other contaminants to enter this wall outlet or the pipeline system. Particles and contaminants are the primary source of leaks and check valve malfunctions.

9.4 - SECURE BOX TO STRUCTURAL SUPPORTS (Refer to Figure 2)

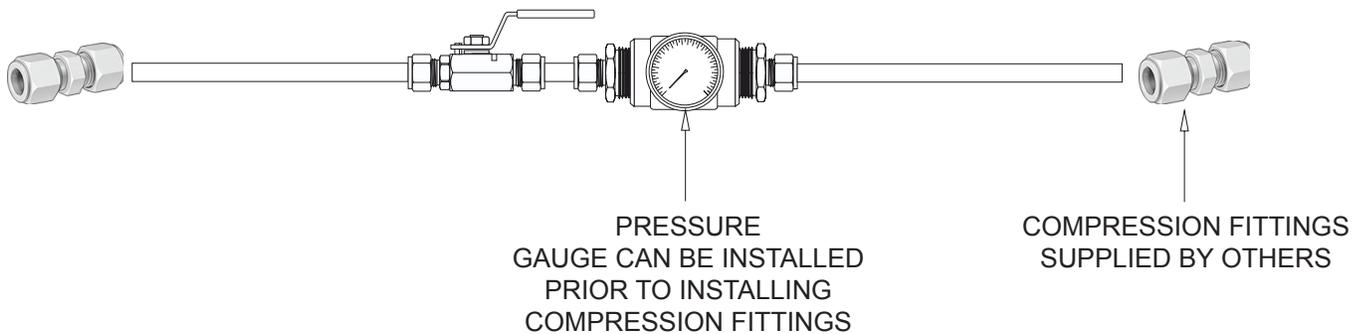
Secure box mounting brackets, located on top, bottom and both sides, to wall structural frame supports (supplied by others). It is not necessary to use all sides. You can either use the top and bottom brackets or the two sides. Position valve box so front edge of box is flush or slightly below finished wall surface. Box should be level and installed at specific height/location on wall.

9.5 - CONNECT VALVES TO SYSTEM PIPING – BRAZED COPPER PIPES)

Figure 3 – Typical Brazed Ends Valve

Braze tube/pipe extensions to piping system, per NFPA 99, while using heat sink techniques appropriate for protection of sealing materials in both valve and gauge port plug. Unbolting and removing valve for heat protection during installation is not recommended. During brazing, joints shall be continuously purged with oil-free dry nitrogen.

IMPORTANT

Excessive heat may destroy valve seals. If damage occurs, repair kit must be installed.

9.6 - CONNECT VALVE TO SYSTEM PIPING – COMPRESSION FITTINGS

Figure 4 – Typical Compression End Fittings

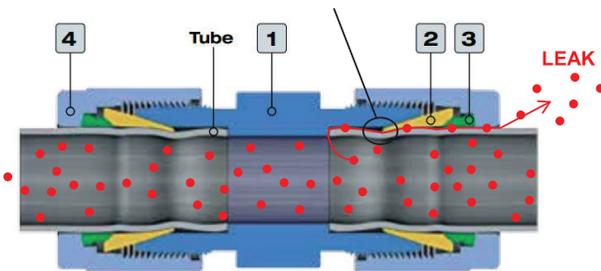
Compression fittings are required for copper tubing and stainless steel tubing. The tube is measured by its outside diameter. Tube sizes are either 1/4" O.D., 3/8" O.D., 1/2" O.D., 3/4" O.D. or 1" O.D. A compression tube fitting is a mechanism used both to seal and to grip tubing. The mechanical advantage and geometry of this kind of fitting produces a leak-tight assembly.

NOTE

Not all compression fittings are created equal. We strongly recommend precision double-ferrule compression fittings made by companies such as Swagelok, Parker Hannifin, Ham-Let, Tylok, Hylok to name a few. Single ferrule brass compression fittings (plumbing grade) normally used for water service are known to leak in compressed gas service.

IMPORTANT TECHNICAL TIP

ENGRAVED LETTERS
IN COPPER TUBING
CREATED A LEAK PATH
FOR THE MOLECULES TO ESCAPE



- 1 – Compression Fitting Body
- 2 – Front Ferrule
- 3 – Back Ferrule
- 4 – Compression Nut

Compression fittings rely on smooth surface of the tubing to seal tight. Any scratches on the tube surface could create a leak path. Copper tubing specifications are normally written two ways; printed (ink) letters on the tube wall and engraved (grooved) letters into the tube wall. The installer is required to detect the engraved letters in the copper tubing wall and make sure not to swage any compression fittings where such letters are engraved. Compression fittings seal on the front ferrule where it bites in the tube. The engraved letter creates a leak path as the gas molecules will escape between the front ferrule and pipe and will be released to atmosphere.

Stainless steel tubing does not have engraved letters.

Step 1 – Insert tubing into the compression fitting

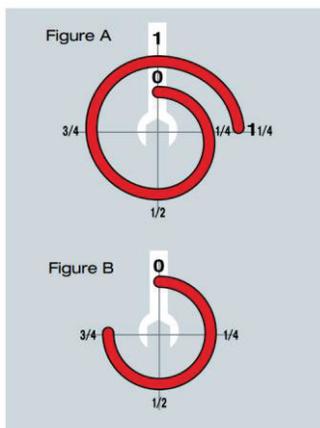
Check that the tube rests firmly on the fitting shoulder and that the nut is finger tight. At this point, it is recommended that a scribe mark be drawn on the hex of the nut extending onto the fitting body. This mark will serve as an indicator for the starting point and proper pull-up.



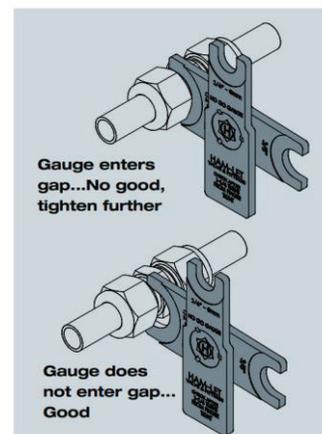
Figure 5 – Tubing Insertion into Compression Fitting

Step 2 – Tighten the nut

1- $\frac{1}{4}$ turns of the nut are required for $\frac{1}{4}$ " and higher (see Figure A).
 $\frac{3}{4}$ turn of the nut is required for $\frac{3}{16}$ " and lower (see Figure B).


Step 3 - Verification

Use an Inspection Gauge to make sure your installation has been done properly.



9.7 - CONNECT VALVE TO SYSTEM PIPING – ORBITAL WELDING

Orbital welded joints is probably the best joint technique to use for a permanent leak tight gas delivery system. It is the preferred choice for pipe joints that are concealed behind closed walls. The goal of this section is certainly not to provide welding techniques as this procedures should be left to qualified professionals. We would like to provide basic data to the operator/welder. Unless otherwise specified...

9.7.1 - Tubing Material

Consider that tubing base material to be ASTM A269 Type 316/L seamless stainless steel tube.

9.7.2 - Cleanliness

Each tube complies with ASTM G93, Level A requirement for nonvolatile residue levels and also meets requirements of CGA 4.1.

9.7.3 - Tube Ends

The tube ends have been cut with a tube cutter and deburred. Proper facing of tubing shall be done by the installer in the field.

9.7.4 - Heat Sink and Purging

During the welding process, the operator/welder is required to use proper heat sink technique to tube extensions appropriate for protection of sealing materials in both valve and gauge port plug. Unbolting and removing valve for heat protection during installation is not recommended. During welding, joints shall be continuously purged with oil-free dry argon.

9.8 - GAS SERVICE IDENTIFICATION

Install appropriate gas identification label on each valve in box assembly.

9.9 - STANDING PRESSURE TEST

Perform standing pressure test on each system as specified by either NFPA 99 or ASME B31.3 whichever is better suited for each piping system.

9.10 - DUST COVER

After system pressure test has been completed, install dust cover to keep out dirt and debris during wall finishing.

9.11 - GAUGE INSTALLATION (after walls are finished)

When pressure gauge is required, remove gauge port plug from valve tube extension. Install gauge using Teflon tape on gauge threads. Be certain gauge is positioned upright for ease of observation.

9.12 - INSTALL TRIM FRAME AND DOOR

Secure trim frame in place with four screws provided. Put door in place by inserting door into bottom slot first and then into the top slot. For emergency access, door can be removed completely by pulling ring on door.



10 - Warning

Our equipment is primarily intended for use in compressed gas systems. BeaconMedæs products are designed for use by persons technically trained in the proper use and safe handling of gas delivery systems. Due to the high pressure and hazardous gases employed in these processes, misapplication could result in injury or death. BeaconMedæs expressly warns against the sale to, or use of our products by, anyone other than professionally trained personnel. Do not use this equipment where pressures and temperatures can exceed those listed under the « Specifications » section.

Through misuse, age, or malfunction, components used with inert, combustible, corrosive, toxic, or oxidizing gases can fail in various modes. The system designer is warned to consider the failure modes of all component parts used with the above mentioned gases and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure modes. Adequate safeguards can be, but are not limited to:

- Pressure relief devices adequately piped to a safe location;
- Gas detection devices connected to a proper warning audible and visual alarm;
- Automatic shutoff valves and/or manual shutoff valves with an emergency stop push button;
- Self-contained breathing apparatus;
- Pipeline purge system with inert gas;
- Fire extinguishers and/or automatic sprinklers.

System designers must provide a warning to end users in the systems instructional manual if protection against a failure mode cannot be adequately provided for.

It should be recognized that warnings are valid for any equipment, regardless of manufacturer, and are not restricted to equipment manufactured by BeaconMedæs. BeaconMedæs's reputation for equipment quality performance is well established. We feel we have the additional obligation to provide information or warnings to customers to assist them in applying our equipment in a reasonable and safe manner.

11 - Design Changes

In line with our commitment to continuous improvement, BeaconMedæs reserves the right to make design modifications or discontinue manufacture of any equipment without prior notice.



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LIMITED WARRANTY

WARRANTY: The Seller expressly warrants that the products manufactured by it will be free from defects in material, workmanship and title at the date of shipment. This warranty is exclusive and is IN LIEU OF ALL IMPLIED OR STATUTORY WARRANTIES (INCLUDING WITHOUT LIMITATION, WARRANTIES AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR ARISING FROM COURSE OF DEALING OF USAGE OR TRADE) or any other express or implied warranties or representations. All claims under this warranty must be made in writing and delivered to the seller prior to the expiration of 1 year from the date of shipment from the factory, or be barred. Upon receipt of a timely claim, the seller shall inspect the item or items claimed to be defective, and seller shall, at its option, modify, repair, or replace free of charge, any item or items which the seller determines to have been defective at the time of shipment from the factory, excluding normal wear and tear. Inspection must be performed at the seller's plant and in such event, freight for returning items to the plant shall be paid by Buyer. Seller shall have no responsibility if such item has been improperly stored, installed, operated, maintained, modified and/or repaired by an organization other than the seller. Adjustment for products not manufactured by Seller shall be made to the extent of any warranty of the manufacturer or supplier thereof. The foregoing shall be the Seller's sole and exclusive liability and buyer's sole and exclusive remedy for any breach of warranty or for any other claim based on any defect in, or non-performance of, the products whether based on breach of contract or in tort, including negligence or strict liability.