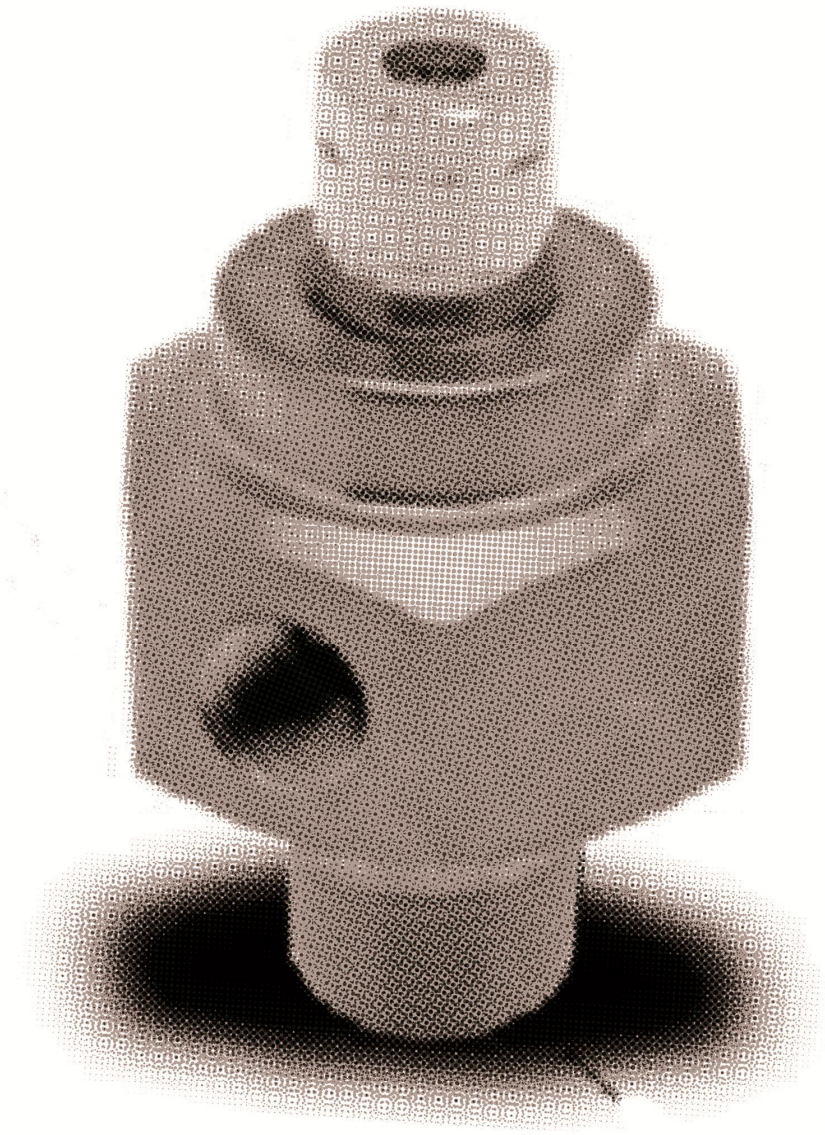

# CNG ADDITIONAL THERMAL SAFETIES

## ASSEMBLING PROCEDURE AND MAINTENANCE. ACCORDING TO ECE R110

# ASSEMBLING PROCEDURE AND VALVE MAINTENANCE

# ASSEMBLING PROCEDURE AND VALVE MAINTENANCE IN ACCORDING TO ECE R 110

Pressure classification: “Class 0”
Temperature Range: -40°C to 85°C
Thermal pressure relief device (TPRD) activation: 110°C ± 10°C
Max Working Pressure: 26MPa
Certified to: ECE R110
Fuel: Compressed Natural Gas per Recommended Practice for Compressed Natural Gas Vehicle Fuel, SAE J1616

**⚠ DANGER** Read this entire manual before proceeding with the installation of any OMB CNG Valve. Installation of compressed natural gas (CNG) Valve on a Tank or in a system should only be performed by qualified system installers. Failure to do so, may cause death, serious injury, and property damage. Keep these Instructions for future reference.

**⚠ DANGER** OMB CNG Valves that appear to be damaged during shipping must not be installed. Contact OMB for further instructions. Failure to do so, may result in death or serious injury and property damage.

**⚠ DANGER** Tank and Valves must be assembled in such a way to assure the gas tightness and to prevent accidental removal of the valve during normal operations. Failure to do so may result in death or serious injury and property damage.

**⚠ DANGER** Screwing Torque must be conform to the one indicated on the Table A. Dynamometric wrench must be pre-calibrated. Failure to do so may result in death or serious injury and property damage

**⚠ DANGER** Do not attempt to service or remove any valves from pressurized tank. Failure to do so may result in death or serious injury and property damage. See important safety information in Section 1.0

**CONTACT INFORMATION:**

**OMB SALERI SpA**
Via Rose di Sotto 38/C 25126 Brescia (BS) Italy
Tel. +39 030 31 95 801 Fax. +39 030 37 32 872
www.omb-saleri.it quality@omb-saleri.it

# 1.0 Safety Information

**DANGER**: Read, understand, and follow all the safety information contained in these instructions before to the installation and use of the CNG Valve. Failure to do so can result in death, serious injury and property damage. Keep these instructions for future reference.

### 1.1 Intended Use

**DANGER**: OMB CNG Valves are designed to be installed on Tanks or in a system storing CNG (compressed natural gas) fuel for vehicles used for transportation. OMB CNG Valve are designed and manufactured per ECE R-110 Standard for Compressed Natural Gas Vehicle Fuel, and must only be used within the conditions and applications for which they were designed. Use in any other application or condition has not been evaluated by OMB and may lead to an unsafe condition. It is expected that all the users will be fully trained in the safe handling, installation and operation of OMB CNG Valves.

| Explanation of Signal Word Consequences |
|---|
| **DANGER**: Indicates a hazardous situation which, if not avoided, **will result in death or serious injury** |
| **WARNING**: Indicates a hazardous situation which, if not avoided, **could result in death or serious injury** |
| **CAUTION**: Indicates a hazardous situation which, if not avoided, **could result in minor or moderate injury or property damage.** |

**DANGER**: Proper matching of Valves to tanks or in a CNG system is critical for safe function. This is the responsibility of the tank manufacturer or of the system integrator. After-market integrators shall consult with the appropriate tank manufacturer for approved Valve tank and fittings combinations. Mismatch Valve and Tank can result in death or serious injury.

**DANGER** Do not drop Valve. Do not drill the valve. Do not modify the delivery system in any way. Never expose Valve to temperatures exceeding 85°C

**DANGER** The pressure relief device (PRD) must not be shielded in any way. Shielding will prevent the PRD from functioning properly in a fire situation which may result in fuel tank failure.

**DANGER** Do not attempt to disassemble the valve from pressurized tank or pressurized system. The valve contain no user serviceable parts.

**DANGER** Never use an open flame or ignition source to test for gas leaks.

**WARNING** To reduce the risk of impact and fire, which if not avoided may result in death or serious injury and property damage:

- Installation of Compressed Natural Gas (CNG) Valve should be performed only by qualified Natural Gas Vehicle (NGV) system installers following applicable federal, state, and local codes and regulations.
- Store Valves only in a clean, dry, location, out of sunlight, at temperatures between -40°C and 85°C
- When connecting a high pressure line to the safety valve, only use approved hoses and fittings.
- Tools used to screw the valve to the cylinder must perfectly adapt to the valve and prevent the cylinder from rotating during tightening. Tools must not damage the valve and the cylinder. Small dents on valve body may be acceptable.
- Do not use pipe wrenches on the valve. Do not allow any type of tool damage the valve.
- The Valve must be torqued on the Tank to a specific setting. Do not over-tighten or loosen. Doing this could result in gas leakage and associated fire hazards.
- Always ensure that the Valve installed on the tank or in a CNG system when mounted on vehicle, is properly enclosed to prevent exposure to damaging road debris, cargo, and sunlight.
- Allow the valve, fuel tank and all mounting hardware to acclimate to ambient indoor workspace temperature, before the installation and pressurization.
- Reject and remove from service any Valve on which the mandatory information are illegible.

**CAUTION** To reduce the risk of impact, which if not avoided may result in minor or moderate injury:

- Always wear appropriate personal protective equipment according to your local workplace practices when handling, storing, installing, or inspecting OMB CNG Valves.

•

## 1.2 MOUNTING LOCATION

**DANGER** It is critically important that the PRD be mounted near the tank, and exposed to the same fire conditions as the tank. The PRD must see the same conditions as the tank. As well, both the tank and PRD must be shielded from normal non-fire heat sources such as exhaust or engine components, as these can damage the tank or PRD, or activate the PRD. Failure to do so may result in death or serious injury and property damage.

If mounting directly to tank or tank frame, expansion of the tank with pressure cycles must be taken into account.

The PRD must be protected from road debris and overhead hazards such as tree branches.

The PRD have a brass body, Or nickel phosphorous plating, and corrosion must be considered in mounting locations. Galvanic corrosion between the brass body and other materials to which the PRD is attached must be considered. The PRD has been tested to the requirements of ECE R-110 standard, but not to the strictest OEM corrosion requirements.

The PRD must be mounted securely, considering vehicle or system dynamics. This should include vibration, frame movement, thermal effects and other considerations. Since OMB does not control the mounting, vehicle or system, this is the responsibility of the system integrator. As a guideline, OMB recommends fixing the TPRD every 24” or 600mm, and within 6” or 150mm of the end furthest from the body. This reflects the baseline conditions for component certification testing.

The PRD uses nickel phosphorous plated Brass or Brass, which are generally resistant to typical automotive fluids, but care must be taken in environments with other corrosive chemicals. In particular, chemicals used in industrial applications or carried in vehicles must be considered.

If mounted in a trunk or other cargo area, the PRD should not be in a location where it will be obstructed or damaged by cargo. It should not be in a location where it may be used to hang or attach cargo or other items.

## 1.3 TANK CONNECTION TO THE PRD

**DANGER** The PRD should be connected to the tank contents through a connection that cannot be closed or isolated from the tank. Any valve or excess flow device between the tank and PRD could be left closed and this would make the PRD ineffective. Failure to do so may result in death or serious injury and property damage.

These fuel lines need to be able to withstand fire exposure until the PRD has vented the tanks. This is usually accomplished with stainless steel tubes, but other methods may work. There are specific requirements in various standards.

Since tanks change length when filled, there may be one end of a tank that moves during normal operation. Any connections from the tank to the PRD must therefore take this into account so that the PRD and lines are not damaged by tank expansion.

To prevent accidental disconnections, the tubing and connections should be marked as being pressurized even when the tank valve is closed.

The size and geometry of the connections to the tank must be selected so that they do not restrict flow from the tank to the PRD. In no case should the connection between the tank and PRD be more restrictive than has been tested and approved.

Water, oil or debris, as is sometimes found in compressed natural gas must not be allowed to accumulate in the PRD. Water can freeze and damage tubes, fittings, or the PRD. Ice in tubes can block flow into the PRD when it is activated. Debris can block the PRD during activation. In particular, the connection to the PRD should not branch off the bottom of the fill or outflow tubes, or should not be from the bottom of a vertical tank. Having the inlet to the PRD pointing above horizontal should be avoided. As OMB is not responsible for the connections to the PRD, how this is done remains the responsibility of the system integrator.

## 1.4 VENTING CONNECTION

**DANGER** Water, insects, and debris must not be allowed to accumulate in the outlet of the PRD or in vent lines. Ice in vent lines can prevent activation or can damage PRDs, causing unintended activation or inability to activate in a fire. Failure to do so may result in death or serious injury and property damage.

The axis of the Venting port of the PRD must not be above Horizontal. The vent tube should incorporate a bend or other features so that the PRD is not the lowest point in the vent line. Note that this applies to the PRD itself, and not necessarily the outlet of the tube, in order to protect the PRD from becoming a water trap.

The outlet of the PRD vent tube should be in a direction to limit damage or danger when the PRD Vents.

Since tanks change length when filled, there may be one end of a tank that moves during normal operation. Any connections from tank-mounted PRD to a frame-mounted vent line must therefore take this into account so that the PRD and lines are not damaged by tank expansion.

Vent line closures should be incorporated at the end of the vent tube. Any device used should keep water from rain or vehicle washing out of the vent tube. Vent systems must allow for escape of any gas that leaks or permeates through the PRD (or other sources) without losing effectiveness.

Vent line must be sufficient to vent the rated flow without restricting flow through the PRD. In no case should the vent line be more restrictive than tested and approved.

COMBINED OR MANIFOLDED VENT OUTLETS

If multiple PRDs or other devices are vented into a common manifold, the manifold must be able to withstand the combined flow and pressure of all connected devices without restricting flow.
The effect of backpressure on other devices, such as pressure relief valves or regulator vents should be considered.

# 2.0 INTRODUCTION

This manual describes the operation of OMB CNG Valves, which are designed to be installed on CNG (compressed natural gas) fuel Tank or in a CNG system for vehicles used for transportation.

These high pressure Valves are designed to withstand the normal usage they will receive. However, like all compressed gas equipment they must be properly installed, and used. This manual is intended to support trained personnel in installing, and using, CNG Fuel Valves. Refer to Safety Instructions in Sect. 1.0.

The vehicle operator must be familiar with the equipment, and with all applicable guidelines, requirements, regulations, and laws of all appropriate federal, state and local authorities. The CNG fuel system installer must be trained and must be employed competent personnel who will comply with the applicable laws, codes and standards, including but not limited to ECE R110, Compressed Natural Gas per Recommended Practice for Compressed Natural Gas Vehicle Fuel, SAE J1616 and any other applicable federal, state and local codes and standards.

The rights, obligations, and/or duties of the upfitter, installer and/or customer are set forth in the original purchase agreement and warranty. OMB assumes no liability for errors or for any damage that results from the use of this instruction manual. OMB reserves the right to cancel, change, or alter any parts and assemblies, described in this manual, without prior notice.

### 2.1 Distribution and proper use of this manual

It is intended that this manual will be provided to all the parties involved in the handling, installation, and inspection of OMB CNG Safety Valves. The manual may be reproduced to provide enough copies on this purpose, but its content must not be altered in any way. OMB accepts neither responsibility nor liability for consequences resulting from unauthorized alterations to this manual or for failure to follow the instructions herein.

# 3.0 VARIATIONS

| Valve Model | External thread for bracket | Tank connection | Live Port / connection | Venting Port |
|---|---|---|---|---|
| BULL Model | / | 1" 1/8 -12 UNF 2A | / | 9/16" – 18 UNF |
| BULL Model | / | 1" 1/8 -12 UNF 2A | / | 5/8" -18 UNF |
| BULL Model | / | 1" 1/8 -12 UNF 2A | / | ¾" – 16 UNF |
| YORK Model | / | / | 9/16" – 18 UNF (x2) | 9/16" – 18 UNF (x2) |
| YORK Model | / | / | ¾" – 16 UNF (x2) | ¾" – 16 UNF (x2) |
| RHEA Model | M27x1 | / | 9/16" – 18 UNF | 9/16" – 18 UNF |
| RHEA Model | M27x1 | / | 1/2" – 20 UNF | 1/2" – 20 UNF |
| RHEA Model | / | / | 9/16" – 18 UNF (x2) | 9/16" – 18 UNF |
| RHEA Model | / | / | 1/2" – 20 UNF (x2) | 1/2" – 20 UNF |
| RHEA Model | / | 1" BS341 (1962) | M12x1 | M12x1 |
| RHEA Model | / | ¾ NGT | M14x1 | M14x1 |
| RHEA Model | / | ¾ NPT | G ¼" | G ¼" |

| | | | | |
|---|---|---|---|---|
| RHEA Model | / | W28.8 – DIN 477 equivalent to 1”<br>BS341 – 25T (1991) | 9/16” – 18 UNF<br>7/16” – 20 UNF | 9/16” – 18 UNF<br>7/16” – 20 UNF |
| RHEA Model | / | 25E EN 629-1 | ½” – 14 NPT | ½” – 14 NPT |
| RHEA Model | / | 1/2” – 14NPT | ½ - 20 UNF<br>¼” - NPT | ½ - 20 UNF<br>¼” - NPT |

# 4.0 ASSEMBLING PROCEDURE FOR THE STEM

## 4.1 GENERAL REQUIREMENTS AND RECOMMENDATIONS

**DANGER**: Proper matching of Valves to tanks is critical for safe function. This is the responsibility of the tank manufacturer or the system integrator. After-market integrators shall consult with the appropriate tank manufacturer for approved Valve tank combinations. Mismatch Valve and Tank can result in death or serious injury.

**DANGER** Cylinders and valves must be assembled in such a way to assure the gas tightness and to prevent accidental removal of the valve during normal operation. Failure to do so may result in death or serious injury and property damage.

**DANGER** Tools used to screw the valve to the cylinder must perfectly adapt to the valve and prevent the cylinder from rotating during tightening. Tools must not damage the valve and the cylinder. Failure to do so may result in death or serious injury and property damage. Small dents on valve body may be acceptable.

**DANGER** The applied driving torque must not exceed the values given in Table A, not even to align the valve with the protection cap

**WARNING** Gauging of all tools and equipment used for valve tightening must be periodically checked and measurement must be compared with the reference standard sample.

**WARNING** In case of aluminium-alloyed cylinders, valves must be assembled at a temperature not exceeding the room temperature.

**WARNING** Installation of Compressed Natural Gas (CNG) fuel Valve should be performed only by qualified Natural Gas Vehicle (NGV) system installers following applicable federal, state, and local codes and regulations. In case of any doubt about installation, contact OMB Saleri Spa.

## 4.2 PREPARATION

Check valve and cylinder threads in order to verify that they are of the same size and comply with the same reference standard.
Visually check the state of valves, cylinders and of O-ring surface. Check that lower threads on valve stem and on cylinder neck are perfectly shaped and free from irregular edges or burrs. Verify that valve and cylinder threads are clean. Completely remove any residues of previous sealing materials and prevent the debris from falling into the cylinder.

## 4.3 CONICAL STEM THREAD VALVE ASSEMBLING INSTRUCTIONS

### General requirements:

Sealing thread can be obtained with lubricant tape in conformity with point 1 or with lead coating in conformity with point 2. It is possible to use sealing alternative procedures such as lubricant. Be careful about the gas compatibility.

Remove protection caps from the threads assuring not to damage sealing sites.

1- Wrapping up with lubricant tape:

Stem Valve wrapping up with tape must start from the smallest cone beginning; tape must be wrapped clockwise looking at the cone base.
Wrapping must start just a little over the minor extremity of the cone, in order to exceed maximum 3 mm and minimum 1 mm. During the wrapping, the tape must be put until reaching a double and uniform thickness onto all the stem valve length. Anyway, three thickness must be wrapped on the minor extremity of the cone.
During the wrapping, the tape must not be extremely tensed and must be broken or cut carefully.
Tape must be inserted carefully in the valve thread profile (a good adherence between valve and tap must be reached)

Before screwing, valve has to be manually inserted after having bent the tap on the thread in such a way to let the valve free from the tape.

2- Lead coating application:

Lead coating must not be applied on aluminium cylinder.
Lead coating must be of the right dimensions
After application on the valve stem coating has to be carefully adapted on the thread with a tool or with a leather glove to prevent that inferior extremity of the lead coating is broken when valve is installed
Before screwing, the valve must be inserted manually into the cylinder.

After having screwed the valve the more it is possible to use maximum threads number, use a specific gauge dynamometric wrench.

Torque must be conformed to the one indicated on the Table A. Dynamometric wrench must be pre-calibrated.

In order to verify the torque applied, the value must be measured unscrewing the valve. Minimum value measured must be in the range indicated in Table A. In case of hardening sealants use, the torque must be measured before the sealants hardens.

Table A – Torque to be applied for valve assembling on cylinder

| **Application** | **Size of valve parallel stem** | **Torque Force Nm** | |
|---|---|---|---|
| | | **Min.** | **Max.** |
| **Steel cylinder without welding** | 25E EN 629-1 | 200*) | 300*) |
| | 1" BS 341 (1991) / W28.8 – DIN 477 | 200*) | 300*) |
| | 1" BS 341 (1962) | 200*) | 300*) |
| | ¾ NPT | 200*) | 300*) |
| | ¾ NGT | 200*) | 300*) |
| Note: User must know that exceeded torque imposed must deform and damage the stem valve thread<br>*) For stainless steel all the value must be reduced of 2/3 in the present table | | | |

| **Application** | **Size of valve parallel stem** | **Min.** | **Max.** | **Max.** |
|---|---|---|---|---|
| **Aluminium alloyed cylinder** | 25E EN 629-1 | 95 | **Without cylinder neck enforcement** | **With cylinder neck enforcement** |
| | | | 110 | 180 |
| | 1" BS 341 (1991) / W28.8 – DIN 477 | 95 | 110 | 180 |
| | 1" BS 341 (1962) | 95 | 110 | 180 |
| | ¾ NPT | 95 | 110 | 180 |
| | ¾ NGT | 95 | 110 | 180 |
| Note: A way to reduce stress traction on the cylinder neck is to apply an enforced collar fastened on the cylinder neck (this compresses the neck). Collar material should be chosen carefully to assure compatibility with cylinder material, in such a way to avoid galvanic corrosion ecc. This process to reduce local stress should be used only by the fabricant or with his precise instruction | | | | |

## 4.4 CYLINDRICAL STEM THREAD VALVE ASSEMBLING INSTRUCTIONS

1) Remove thread protection caps (when present); pay attention not to damage the sealing seats

2) Take the toroidal O-ring and the venting seal from the bag. Apply the toroidal sealing ring to the valve stem and position it correctly inside the sealing area and repeat the same operation for the venting seal. Pay attention not to damage the rings during positioning operations.

3) If necessary, spread an appropriate lubricant, compatible with the gas, on 3 or 4 threads, the most far from the sealing ring. Use a very small quantity of lubricant and clean any excess away. The lower surface of valve stem must be perfectly clean.

4) Threading on cylinder neck adjoining the sealing area must be free from debris, burrs, notches etc.

5) With the cylinder fixed so as to prevent any rotation, assemble the valve to the cylinder by hand. Pay attention not to damage the sealing ring when it touches the cylinder sealing area

6) Screw the valve by hand, as tight as possible, then tighten it up by an appropriate tooling.

7) The torque applied must comply with the values shown in Table B. Use an appropriate gauged dynamometric wrench.

8) In order to verify the torque applied during assembling, torque measurement must be taken while unscrewing the valve. The minimum torque needed to start unscrewing the valve must be within the limits specified in Table A. Use an appropriate gauged dynamometric wrench. If hardening sealants are used, the torque must be measured before the sealant hardens.

Table B – Torque to be applied for valve assembling on cylinders

| Application | Size of valve parallel stem | Torque Force Nm | |
|---|---|---|---|
| | | Min. | Max. |
| Steel cylinder without welding | 1" 1/8 - 12 UNF | 100 | 130 |
| Aluminium-alloy cylinders | 1" 1/8 - 12 UNF | 95 | 130 |

# 5.0 ASSEMBLING PROCEDURE FOR CONNECTIONS AND VENTING PORT

## 5.1 GENERAL REQUIREMENTS AND RECOMMENDATIONS

**⚠ DANGER**: Proper matching of fittings on valve connections is critical for safe function. This is the responsibility of the system integrator. After-market integrators shall consult with the appropriate fittings manufacturer for approved Valve combinations. Mismatch Valve and fittings can result in death or serious injury.

**⚠ DANGER** Fittings and valves must be assembled in such a way to assure gas tightness and to prevent accidental removal of the connections and safety devices during normal operation. Failure to do so may result in death or serious injury and property damage.

**⚠ DANGER** Tools used to screw the connections to the valve must perfectly adapt to the valve. Tools must not damage the valve and the fittings. Failure to do so may result in death or serious injury and property damage. Small dents on valve body may be acceptable.

**⚠ DANGER** The applied driving torque must not exceed the values given in Table C.

**⚠ WARNING** Gauging of all tools and equipment used for fittings tightening must be periodically checked and measurement must be compared with reference standard sample.

**⚠ WARNING** Sealing materials used between fittings and valve must be compatible with the gas stored in the cylinder.

**⚠ WARNING** Installation of Compressed Natural Gas (CNG) fuel Valve should be performed only by qualified Natural Gas Vehicle (NGV) system installers following applicable federal, state, and local codes and regulations. In case of any doubt about installation contact OMB Saleri Spa.

## 5.2 PREPARATION

Check the valve connections and connection plant installation threads in order to verify that they are of the same size and comply with the same reference standard.
Visually check the state of threads and, if necessary, of O-ring surfaces. Check that lower threads of installation connections and valve connections grooves are perfectly shaped and free from irregular edges or burrs. Verify that threads are clean. Completely remove any residues of previous sealing materials.

### 5.3 ASSEMBLING INSTRUCTIONS

1) Remove thread protection caps (when present); pay attention not to damage the sealing seats

2) Screw the connector by hand, as tight as possible. Then tighten it up by an appropriate tightening tool.

3) The torque applied to the connector must comply with the values shown in Table C. Use an appropriate gauged dynamometric wrench.

4) In order to verify the torque applied during assembling, torque measurement must be taken while unscrewing the connector. The minimum torque force needed to start unscrewing the connector must be within the limits specified in Table C. Use an appropriate gauged dynamometric wrench. If hardening sealants are used, the torque must be measured before the sealant hardens.

Table C– Torque to be applied when assembling the connectors to the connections of the valve

| Connector size | Torque Nm | |
|---|---|---|
| | Min. | Max |
| 9/16" UNF | 40 | 50 |
| ¾" – 16 UNF | 50 | 60 |
| 1/2" – 20 UNF | 25 | 27.5 |
| M12X1 | 20 | 30 |
| M14X1 | 25 | 35 |
| ¼ " NPT | 30 | 40 |
| G ¼ " | 25 | 35 |
| G ½ " | 20 | 30 |
| 7/16" UNF | 18 | 20 |

# 6.0 PROCEDURE TO APPLY IN CASE OF VALVE MAINTENANCE

**⚠ DANGER** There are no serviceable parts in the PRD. Fittings attached to the inlet and outlet can be reused or replaced at the discretion of the system integrator if the threads and sealing surfaces are undamaged.

**⚠ DANGER** If the PRD has been activated or exposed to fire, it cannot be reset or reused. It must be removed from service and either destroyed or returned to the manufacturer.

**⚠ DANGER** A PRD removed from service and otherwise fully functional can only be returned to the vehicle it was removed from. It cannot be used in any other vehicle or application.

**⚠ DANGER** A PRD that is removed must only be replaced by an identical part unless approved otherwise by the tank manufacturer.

**⚠ WARNING**

**OMB Saleri SpA declines any responsibility over the incorrect use or application of the maintenance procedures of its products.**