

# PROVER SPHERE (Prover Accessories)

## TRG-PS-XX



### Products:

- 1- Bi-Directional Pipe Prover
- 2- 4Way Valve
- 3- Detector Switch for Prover Application
- 4- **Prover Sphere**
- 5- Basket Type Strainer
- 6- Straightener
- 7- Sampling System
- 8- Automatic Backwash Strainer
- 9- Air Eliminator
- 10- Flow Switch
- 11- High Frequency Pulse Generator
- 12- Master Meter Prover Package
- 13- Inflation Pump
- 14- Removal Tools
- 15- Static Mixer

Tehran Rezvan Gostar Engineering Company

HEAD OFFICE :

Unit 2 ,2<sup>nd</sup> Floor No. 71

North Sheakh Bahaee St. , Tehran - IRAN

Tel & Fax : +98 21 88335725/ 88335726/ 88002217/ 88013383

Website : [www.trg.ir](http://www.trg.ir) Email : [info@trg.ir](mailto:info@trg.ir)

*TRG Engineering has the experience and knowledge to provide the best and most economical solution for your sphere applications.*

*In many situations, TRG Engineering Spheres are more economical and versatile than conventional pigs. They will pass through out-of-round pipe, pipe of varying wall thickness, short radius bends, full open through conduit valves, properly designed tees and other obstacles difficult, if not impossible for conventional pigs to pass.*

### **Typical Applications**

TRG Engineering has developed a modern line of high quality, heavy duty spheres for meter prover and pipeline applications. TRG Engineering spheres have been designed to lessen or eliminate problems which the pipeline industry has encountered in the past. A strong effort has been made to improve the compounds and the structural design of its spheres.

TRG Engineering Pipeline Spheres are used in the various stages of pipeline construction, acceptance testing, commissioning, batch separation, and pipeline maintenance/cleaning operations. Maintaining and cleaning pipelines with spheres reduces pressure loss, increases efficiency.

### **New Construction**

Offshore pipelines preinstall spheres into the initiation head used to start-up pipelay. During the laying of the underwater lines, when major physical damage occurs to the pipeline such as a wet buckle, spheres are run to dewater the partially built pipeline prior to recovery, repair, and reinitiation of pipelay.

### **Acceptance Testing (Hydrostatic Testing)**

TRG Engineering spheres are used during the filling of pipelines with water to insure any trapped air is removed prior to hydrostatic testing.

### **Commissioning (Dewatering)**

TRG Engineering spheres are used to dewater pipelines after successful completion of the hydrostatic testing.

### **Operational Applications**

#### **Product Separation**



**Prover Sphere Model T-IP-2 to 36**

TRG Engineering spheres are used for product separation during batching of multiple products in pipelines to minimize interface mixing.

#### **Liquid Condensate Removal**

In natural gas pipelines, variations in the temperature and pressure can cause liquid drop-out. This drop-out varies with the process condition and whether the gas is raw or processed. Some gas pipelines are designed to transport condensate as two phase flow.

This liquid formation can cause a number of adverse effects such as corrosion reduced efficiency, increased operating cost of overloading of downstream processing plants.

Using TRG Engineering spheres and developing a routine sphering operation can greatly reduce or control these adverse effects.

#### **Pipeline Maintenance**

Controlling wax buildup on the pipe walls of crude oil pipelines is effective using TRG Engineering spheres in a routine maintenance program.

Batching of corrosion inhibitors in the pipeline is another ideal application for TRG Engineering spheres.

**Sphere Filling and Sizing Instructions and Recommendations**

For efficient operation, spheres must be filled with liquid and sized to a proper diameter.

**Fluid Recommendations**

Clean water is the most commonly used liquid used for filling a TRG Engineering sphere. If there is any possibility of freezing, a mixture of 50% water and 50% glycol is recommended. Where there may be extreme temperatures changes, the 50/50 water-glycol mixture should be considered. In certain instances 100% glycol is used where operators have determined it best for their particular circumstance.

**IMPORTANT:**

A sphere should never be placed under pressure in a meter prover or pipeline until the cavity has been completely filled with liquid. No attempt should ever be made to size a sphere with air or gas as the filling media.

**Sizing Recommendations**

The size of a sphere, the diameter, required for use in a meter prover loop or a pipeline should be determined before beginning the sizing procedure. The diameter to which the sphere is to be sized should be considered in relationship to the internal diameter of the meter prover loop or pipeline. General sizing recommendations are as follows and apply to both meter provers and pipelines:

All Neoprene Spheres - 2% to 5% larger than the internal diameter. Note that these are general recommendations only. Experience will determine if the sphere should be larger or smaller in order to provide the best results. Dry, nonlubricating liquids may require looser fits in the pipe.

**Sizing Rings**

TRG Engineering Sizing Rings should be used to accurately measure the diameter of the spheres. TRG Engineering Sizing Rings are made of material which will not expand or shrink thereby maintaining their accuracy.

Temperature Range	Liquid Fillers
Below 32°F (0°C)	50% Glycol and Water
(32°F to 150°F) (0°C to 65°C)	Water
Above 150°F (65°C)	Glycol

**CAUTION:** Do not use hydrocarbon as a filling liquid.

**Filling The Sphere**

The steps below should be followed to properly fill a TRG Engineering sphere with liquid.

**Step 1 - Remove Valves**

Remove valve caps and depress valve core to assure no pressure is inside the sphere.

**Step 2 - Inspect Valves**

Remove both valves and make certain that the o-rings are not damaged (replace if necessary). Be sure that the valve cores are tight and the stems are seating properly. Replace the valve cap and reinstall one of the valve bodies and valve caps hand tight. Over tightening may damage the o-ring. Use the core extractor to remove or tighten the stem if necessary. Do not install second valve at this time. Valve Wrench - The small end fits the valve cap and the large end fits the hex on the valve body.

**Step 3 - Fill Sphere With Liquid**

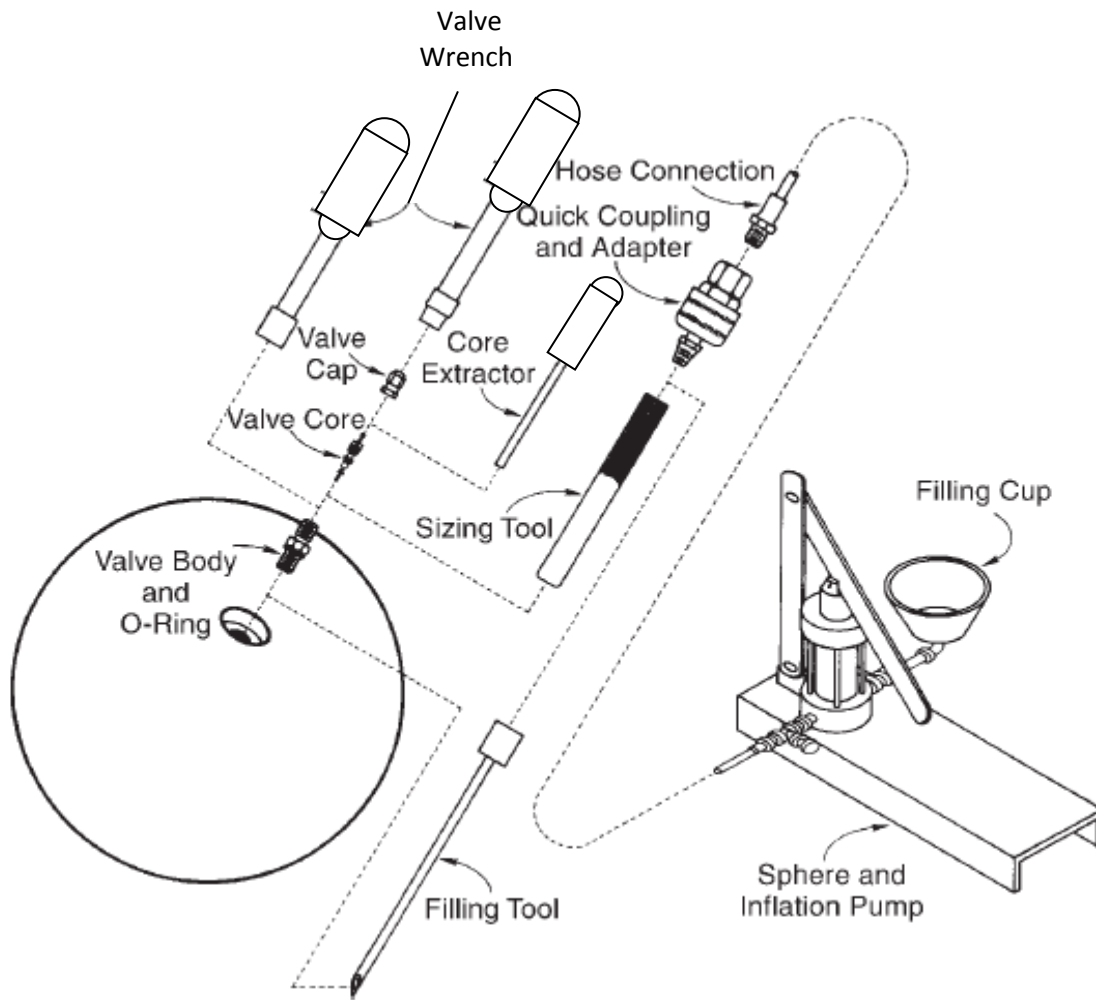
Attach the filling tool to the pump hose and insert into the sphere through the valve hole. Fill the cup on the inflation pump with the liquid you have decided to use (water, glycol, water and glycol) and pump the liquid into the sphere until the sphere is full -i.e. liquid is running out of the valve hole.

**Note:** You will have to keep refilling the filling cup on the pump until the sphere is full.

When the sphere appears to be full, it is important to make sure there are no air pockets trapped in the sphere cavity. If the sphere is small enough to pick up, gently bump it on a hard surface. Watch to see if the liquid in the valve hole settles into the sphere. If it does, pump in more liquid and again bump sphere. Repeat until the liquid remains outside the sphere cavity. In the sphere is too large to pick up, tap it on the side with something which will not damage the surface of the sphere. It is important that all air pockets be removed and replaced with liquid.

**Step 4 - Install Other Valve**

When the sphere is completely filled with liquid and ensuring that all the air has been displaced from the cavity, it is ready to be sized to the predetermined diameter. Reinstall the valve body, first making sure that its o-ring is not damaged and the valve stem is tight and seating properly. Leave the cap off.



### **Sizing The Sphere**

Screw the sizing tool down over the valve body and attach the pump hose. Pump more liquid into the sphere until it expands to the proper diameter. Replace the cap with the small end of the valve wrench. The sphere is now be ready for use. In the case of pipelines, each time the sphere is loaded into a launching barrel the valve wrench should be used to make certain both the valve body and the cap are secure.

### **The Sphere Pump**

Before storing or using the sphere pump again, be certain to remove any pressure build-up in the pump hose by simply inserting the filling tool into the quick coupler on the end of the hose. Keep the filling tool pointed away from you. Operate pump handle a few strokes to remove any remaining fluid.