
Galiso[®] Hydraclose[®] Test Head Instruction Manual

GHH-6G, GHH6-H, OTH-6G, Multi-Port, & other OTH-6H Test Heads

Manual Part # 21-11-1063



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!!!DANGER!!!

**DO NOT USE THIS EQUIPMENT TO
PURGE TOXIC OR FLAMMABLE GAS**

AND

**DO NOT USE THIS EQUIPMENT UNDER
FLAMMABLE, VOLATILE OR TOXIC
ENVIRONMENTAL CONDITIONS**

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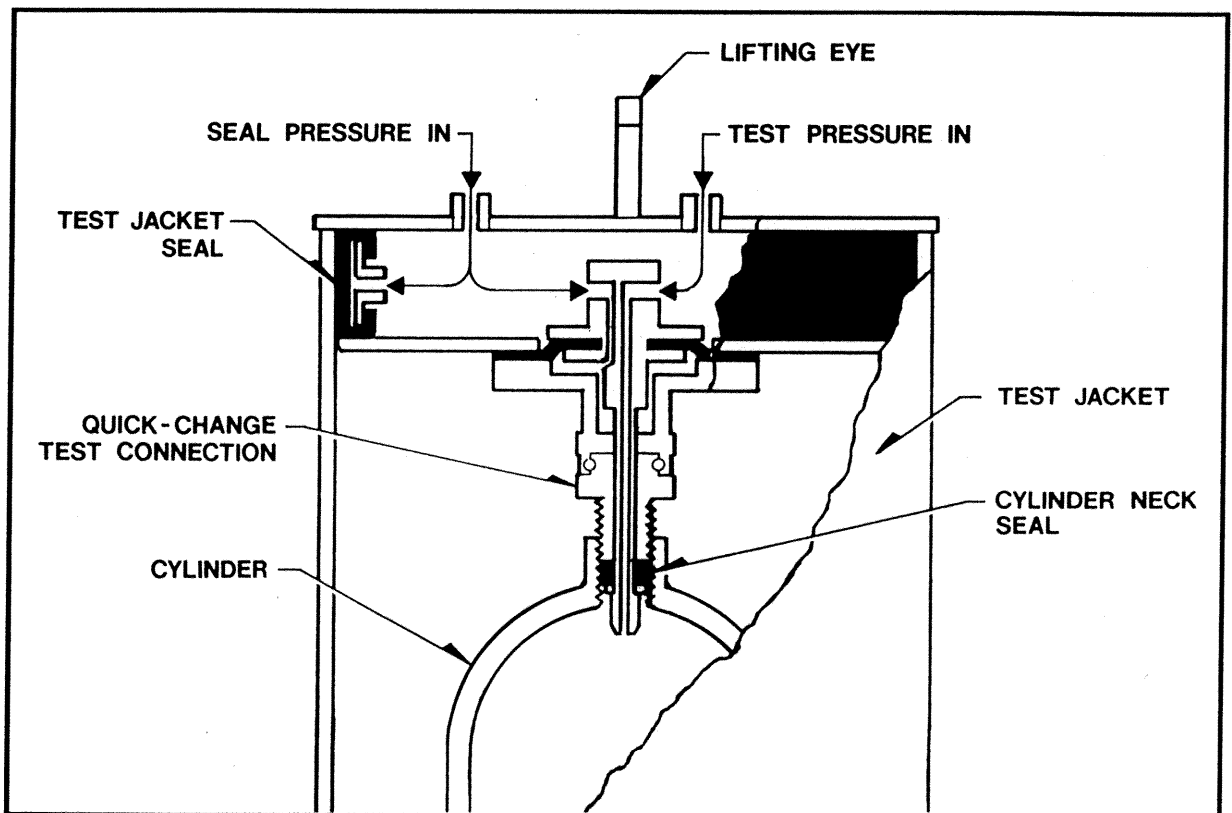
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PART 1) INTRODUCTION

The Hydraclose Test Head uses water pressure or air pressure to automatically seal the test jacket and cylinder neck for hydrostatic testing. The patented Hydraclose sealing method speeds cylinder testing by reducing the time required to seal the cylinder in preparation for the test.

The unique design of the Hydraclose test head eliminates the time consuming acts of wrenching the test connection into the cylinder and clamping toggles to seal the cylinder within the test jacket. The cylinder neck and test jacket are sealed automatically by pressure activated sealing mechanisms. Air or water pressure is used to expand a rubber boot, which seals the test head within the jacket. At the same time, pressure is applied to compress the "Speed Seals", squeezing them into the cylinder neck threads and effectively sealing the cylinder interior.

**FIGURE 1) HYDRACLOSE TEST HEAD**

(continued)

PART 1) INTRODUCTION, (Continued)

In order to meet the requirements of a variety of different types of cylinder test facilities, the Hydraclose test head is offered with a wide range of optional features. There are two basic models of the Hydraclose Test Head. The standard GHH Hydraclose Test Head is designed for general cylinder testing applications and the OTH Hydraclose head is designed to prevent cross contamination when testing oxygen service cylinders.

In addition, all Hydraclose heads are available with either "Quick-Change" test spuds or standard threaded test spuds. Hydraclose test heads are available with either 12", 14", 18", or 30" nominal diameter, other diameters are available per special order. Hydraclose heads are designed for test pressures up to 11,000 PSI.

"GHH" SERIES HYDRACLOSE TEST HEADS

GHH series Hydraclose test heads are designed for general hydrostatic test applications. The GHH-6G test head uses "Quick-Change" test spuds and the GHH-6H test head uses standard threaded test spuds. All GHH Hydraclose heads are available with a convenient option package which includes 1/2", 3/4", and 1" NPT test spuds, "Speed Seals", and retaining hardware.

"OTH" SERIES HYDRACLOSE TEST HEADS - FOR OXYGEN SERVICE

OTH series Hydraclose test heads are designed for testing oxygen service cylinders, which must be kept free of oil and contaminants. The OTH Hydraclose head is used in conjunction with a special terminal block assembly and an additional GHH series test head. The terminal block assembly provides a separate bleed system to prevent cross contamination of oxygen cylinders. The OTH-6G test head uses "Quick-Change" test spuds and the OTH-6H test head uses standard threaded test spuds. OTH test heads are designed to satisfy either Airco or UCC Linde test specifications for oxygen cylinders. All OTH series Hydraclose test heads are available with a convenient option package which includes test spuds, "Speed-Seals", and retaining hardware. When the OTH test head is intended for Airco specification testing, the option package includes test spuds for 1/2" NPT, 3/4" NPT, and 3/4" SGIT cylinder neck threads. When the OTH test head is intended for UCC Linde specification testing, the option package includes test spuds for 1/2" NPT, 3/4" NPT, and 3/4"-2 NGT cylinder neck threads.

PART 1a) INTRODUCTION, HYDROSTATIC TESTING

In accordance with D.O.T. regulations, certain cylinders must be periodically re-qualified and certified safe for use. The re-qualification procedure and regulations are discussed in detail in the Code Of Federal Regulation (CFR), Title 49, Section 173.34. Copies of the CFR may be obtained from Galiso or by writing to the following address:

**Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402**

All Galiso Hydraclose test systems will perform fast, efficient water-jacket (hydrostatic) testing of compressed gas cylinders. The specifications and procedure for hydrostatic testing are outlined in Compressed Gas Association Pamphlet C-1, "Methods for Hydrostatic Testing of Compressed Gas Cylinders". Copies of Compressed Gas Association Pamphlets are available from Galiso or by writing to the following address:

**Compressed Gas Association
1235 Jefferson Davis Highway
Arlington, Virginia 22202**

In general, the water jacket method for hydrostatic testing consists of loading a water filled cylinder into a sealed chamber (the test jacket), which is also filled with water and is connected to a calibrated glass tube (burette), or Galiso's patented Recortest expansion measuring device. The burette (or other measuring device) is first zeroed, and the cylinder is then pressurized to 5/3 of it's DOT or ICC rating, which is stamped on the shoulder of the cylinder. In most cases, the test pressure is held for thirty seconds.

As pressure is applied to "inflate" the cylinder, the cylinder expands and forces water out of the test jacket and up into the burette. The burette is then read to determine the **Total Expansion** (in cubic centimeters) of the cylinder under test pressure. After the test time (usually thirty seconds) has elapsed, the test pressure is then released and the cylinder "deflates". As the cylinder shrinks to it's approximate original size, water is allowed to drain back into the test jacket from the burette. In most cases, the cylinder will not return to its exact original size, having been slightly stretched by the pressurization process. This post-test stretching is called the **Permanent Expansion**. The difference between the Total Expansion and the Permanent Expansion is called the **Elastic Expansion**.

(continued)

PART 1a) INTRODUCTION, HYDROSTATIC TESTING, (Continued)

The "Percent Expansion" of the cylinder is determined by the following formula:

$$\text{Percent Expansion} = \text{Permanent Expansion} / \text{Total Expansion} \times 100$$

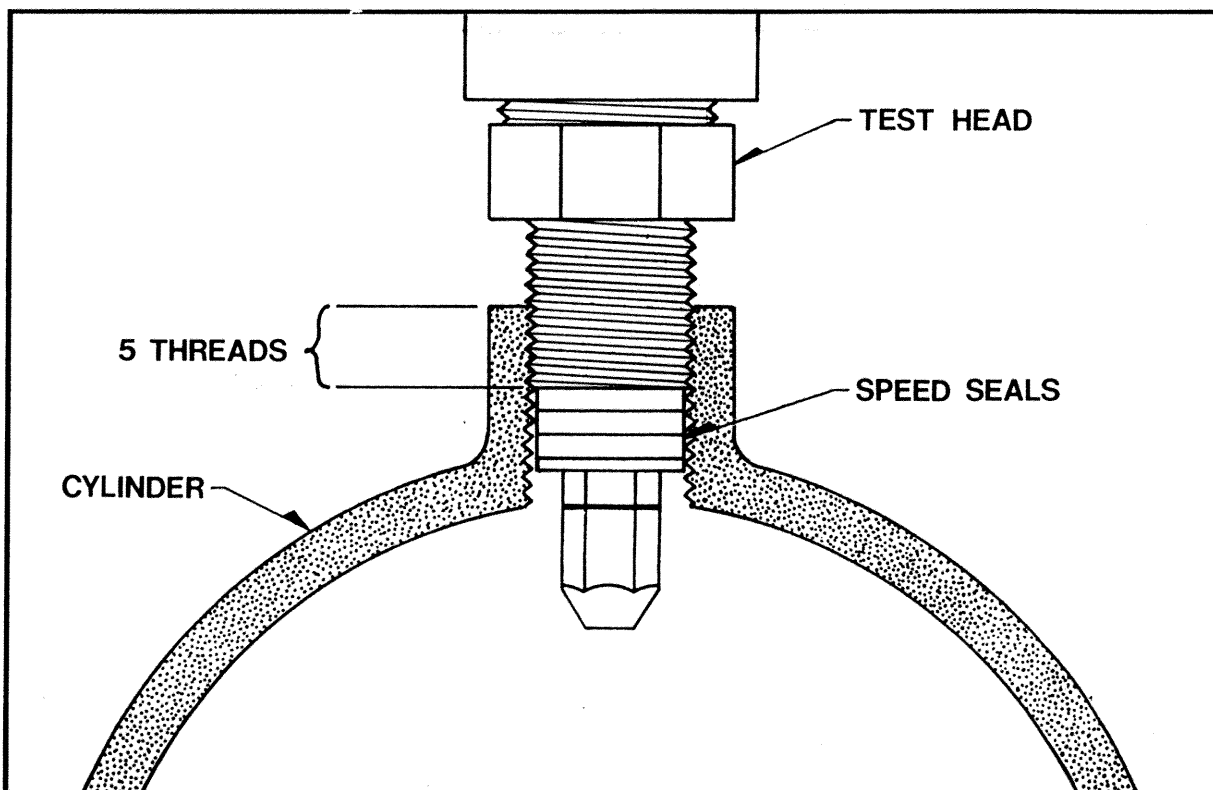
When the Percent Expansion is excessive, the cylinder must be condemned and removed from service. A high percent expansion value is an indication that the cylinder metal has lost its elasticity, or that there has been excessive thinning of the cylinder wall and that the cylinder is no longer safe for use.

All test data, such as test pressure, cylinder serial number, expansion results and etc. must be recorded on an appropriate test log. The test log must then be filed and maintained for the life of the test, in the event that there is any future problem with the cylinder.

Cylinders which will receive a plus (+) stamp or a star (*) stamp require additional test specifications and calculations. Plus (+) stamping allows the cylinder to be filled to an additional 10 percent beyond the rating which is stamped on the cylinder shoulder. Star (*) stamping makes the cylinder eligible for an extended ten year retest interval. The procedure and requirements for plus stamping and star stamping are discussed in Compressed Gas Association Pamphlet C- 5, "Cylinder Service Life, Seamless High Pressure Cylinders". CGA pamphlet C-5 is available from Galiso, or from the Compressed Gas Association at the address that was indicated previously.

PART 2) SAFETY

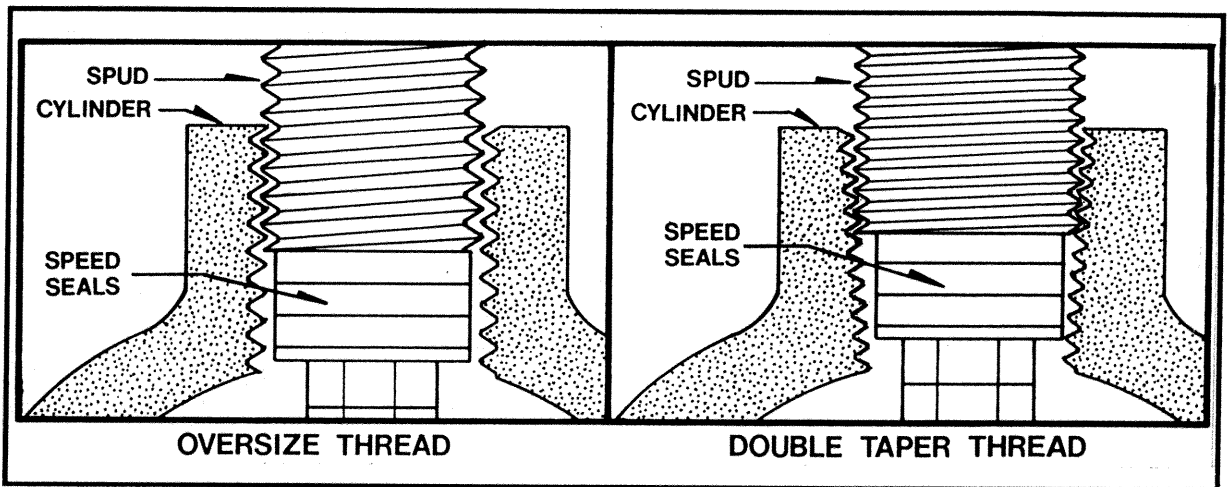
1. Read all instructions before attempting to install or operate the Hydraclose test head. GALISO, INC. CANNOT BE RESPONSIBLE FOR DAMAGE OR INJURY CAUSED BY UNSAFE USE, MAINTENANCE OR APPLICATION OF THIS EQUIPMENT. Please contact Galiso for guidance when you are in doubt as to the proper safety precautions to be taken when installing or operating this equipment.
2. When connecting a cylinder to the test head, make certain that the cylinder neck threads are properly engaged with the test spud (see Figure 2 below). Before testing each cylinder, inspect the cylinder neck threads. Cylinders with excessively worn neck threads should be re-tapped or condemned. The test spud should engage with at least five (5) neck threads in order for the cylinder to be safely tested. If the cylinder is not properly attached to the test head, the cylinder may be blown off of the test head during pressurization. If you have any doubts about the connection between the cylinder neck and the test head, do not test the cylinder.

**FIGURE 2) HYDRACLOSE SEAL, CYLINDER NECK**

(continued)

PART 2) SAFETY, (Continued)

3. Make certain that you are using a test spud that is appropriate for the neck threads of the cylinder that is being tested (see Figure 3 below). Certain types of cylinders (such as cylinders with oversize neck threads or double tapered neck threads) will appear firmly attached when screwed on to an incorrect test spud, without properly engaging the threads of the test spud. If you have any questions concerning the appropriate test spud to be used with a particular type of cylinder, contact Galiso.

**FIGURE 3) CYLINDER NECK THREAD DETAIL**

4. Your test jacket must include a proper explosion port that is equipped with a Galiso crystal glass burst disk.
- A. The explosion port must be at least 4 inches in diameter and must include a suitable flange for installation of a Galiso crystal glass burst disk.
 - B. If you are unsure of the suitability of the explosion port or burst disk, contact Galiso for further information. Detailed blueprints and specifications are available upon request.
 - C. The purpose of the explosion port and burst disk is to protect the operator in the event of catastrophic failure of the cylinder while it is under pressure. The burst disk is designed to shatter in the event of an explosive release of pressure into the test jacket. When the burst disk shatters, excess pressure is released through the explosion port, preventing the Hydraclose head from being forced out of the test jacket.

(continued)

PART 2) SAFETY, (Continued)

5. In the event that you must replace the Test Jacket Burst Disk, make certain that you use a replacement burst disk from Galiso (Part number 01-32-2509). Never operate the Hydraclose test head with an improper burst disk in place. The burst disk is designed to fail at a specific pressure to prevent the test head from being blown out of the test jacket in the event that an improperly mounted cylinder comes off of the test spud while under test pressure.
6. Do not handle the pressure connection hoses while the cylinder is under pressure. If a pinhole leak occurs while the hose is under pressure, a stream of pressure will be released from the leak. In some cases, the pressure of the stream can be forceful enough to puncture the skin.
7. Regularly inspect the operation of the hose connections. When the hose connections become worn or loose fitting, they must be replaced. Contact Galiso for part numbers and replacement instructions.
8. Take care to keep the cylinder testing area as clean, dry and free of debris. This will decrease the chance of operator injury due to slips or falls.
9. Wear eye protection and gloves when operating the Hydraclose test head.

PART 3) HYDRACLOSE TEST HEAD OPERATION

1. The top end of the test spud must be securely attached to the Hydraclose Test Head.
 - A. With GHH-6H and GHH-6B Hydraclose Test Heads, Teflon tape should be used to seal the connection between the threaded test spud and the spud plate on the bottom of the Test Head.
 - B. With GHH-6G Hydraclose Test Heads, the "Quick Change" test spud snaps in place on the Hydraclose Test Head. Before attaching the GHH-6G Hydraclose Test Head to the cylinder, grasp the "Quick Change" Test Spud and check to make sure that it is securely attached to the Test Head.
 - C. Do not over-tighten the test spud. The top end of the test spud seals 100 PSI maximum.
2. Install the proper size "Speed Seals" on the end of the test spud. Next, the Retainer Washer fits over the "Speed Seals" to hold them in place, followed by the Jam Nut and then the Brass Protective Nut, as shown in Figure 4 and in Form No. GSO8204-9. The "Speed Seals" and Retainer Washer must be of the proper size to match the Test Spud and cylinder neck that they are being used with, otherwise the spud seal may leak and the head sealing mechanism may be damaged.

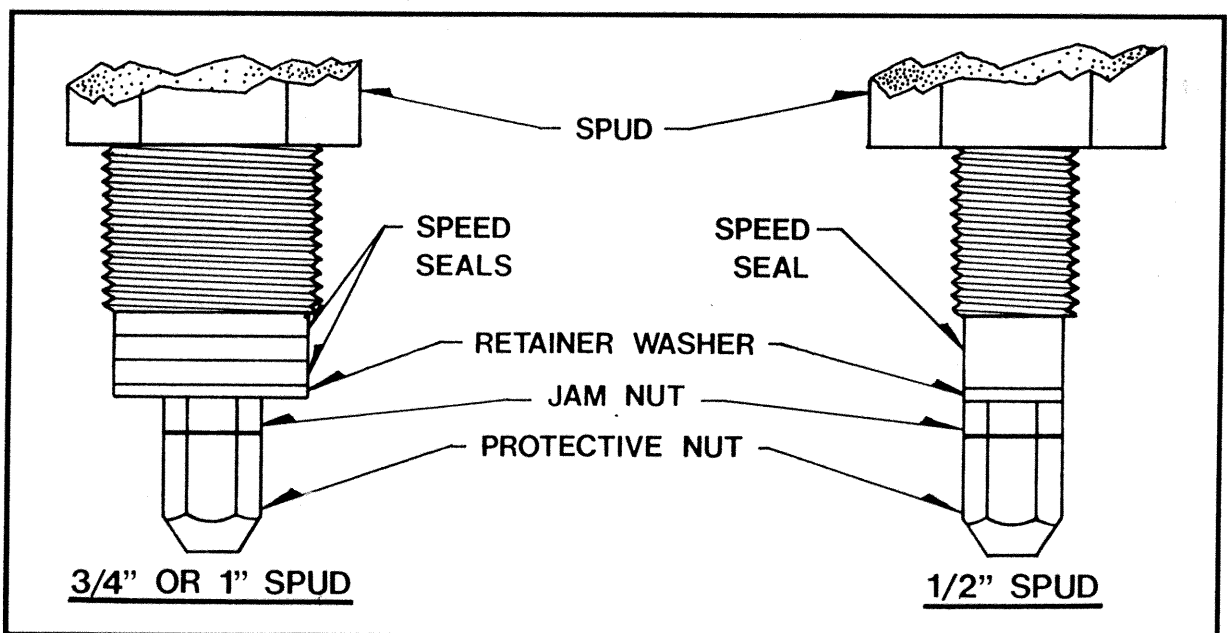


FIGURE 4) SPEED SEAL DETAIL

3. The 1/2 inch spud requires only one 1/2 inch "Speed Seal". The 1/2 inch "Speed Seal" is manufactured as one unit since 1/2 inch cylinder neck threads are generally shorter than 3/4 inch and one inch neck threads.

(continued)

PART 3) HYDRACLOSE TEST HEAD OPERATION, (Continued)

4. The 3/4" and 1" spuds require three "Speed Seals" to properly seal. If the cylinder neck threads are short, the spud can be sealed with two or even one "Speed Seal", providing that spacer washers of the appropriate diameter are used adjacent to the Retainer Washer to maintain the proper stack-up.
5. Change the "Speed Seals" when they become excessively thin or ragged to avoid leakage and damage to the sealing mechanism.
6. Inspect the threads on the bottom of the test spud regularly, if the threads become excessively worn, replace the test spud.
7. Lock the Jam Nut and the Brass Protective Nut together so that they will not unscrew. Do not use the test head without the Brass Protective Nut in place, the stem threads will be damaged, resulting in unnecessary repairs.
8. Protect the Spud Stem from being bent or twisted. A bent or twisted Spud Stem will interfere with sealing action.
9. Protect the Head Boot from cuts and gouges that could damage the sealing surface. If the head boot is properly cared for, it should last for years. If the test head is damaged, it can either be sent to the factory for repairs or you can repair it yourself with Galiso replacement parts. Loan heads are available from Galiso to allow you to continue testing while your Test Head is being repaired.
10. The Quick Connect Fittings should be inspected for wear periodically and replaced as needed. The hose couplers should fit snugly on the Quick Connect Fittings.
11. The "O"-Ring seal in the Quick Connect Fittings should be changed when wear prevents proper sealing.
12. The metal surfaces of the Hydraclose Test Head should be kept clean and free of corrosion. Metal surfaces should be painted with a high quality, cold galvanizing, metal primer. The inside upper 12 inches of the test jackets should be painted with cold galvanizing metal primer to protect the sealing area.
13. **NEVER** pressurize the Test Head without providing an adequate constraint for the "Speed Seals" and the test boot. The "Speed Seals" can be constrained by screwing them into a cylinder neck or appropriate test blank (available from Galiso). The test boot can be constrained with either the test jacket or with a snug fitting metal band at least 2" wide and 1/16" thick which is slipped over the head boot to prevent rupturing. At 50 PSI sealing pressure, there is over 3000 pounds force exerted by the sealing boot on the test head. Hydraclose head testing and maintenance systems are available from Galiso.

(continued)

PART 3) HYDRACLOSE TEST HEAD OPERATION, (Continued)

14. The test jacket terminal block is equipped with a safety relief valve for seal pressure set at 100 PSI to prevent over-pressurization of the sealing apparatus.
15. **CAUTION** : The Hydraclose Test Head must be securely engaged with at least five (5) threads in the cylinder neck in order to safely seal (see Part 2, Figure 2). All cylinders should be inspected before testing to insure that the neck threads are not excessively worn or damaged. Cylinders with inadequate neck threads should be re-tapped or condemned.
16. Make certain that you are using a test spud that is appropriate for the neck threads of the cylinder that is being tested (see Part 2, Figure 3). Certain types of cylinders (such as UCC cylinders with oversize neck threads or Airco cylinders with double tapered neck threads) will appear firmly attached when screwed on to an incorrect test spud, without properly engaging the threads of the test spud. If you have any questions concerning the appropriate test spud to be used with a particular type of cylinder, contact Galiso.
17. In the event that you must replace the Test Jacket Burst Disk, make certain that you use a replacement burst disk from Galiso. Never operate the Hydraclose test head with an improper burst disk in place. The burst disk is designed to fail at a specific pressure to prevent the test head from being blown out of the test jacket in the event that an improperly mounted cylinder comes off of the test spud while under pressure.
18. Following is a brief description of the operation procedure for the Hydraclose Test Head.
 - A. The Hydraclose Test Head is screwed into the cylinder neck, engaging with at least five (5) neck threads (see number 15 above).
 - B. A hoist is attached to the Hydraclose Test Head and the test head with attached cylinder are loaded into the Hydraclose Test Jacket. After the test head is in place in the test jacket, the Test Pressure Hose and the Seal Pressure Hose are attached.

PART 4) MAINTENANCE

HYDRACLOSE TEST HEAD

1. Change the "Speed Seals" when they become excessively worn or ragged to avoid leakage and damage to the sealing mechanism.
2. Regularly Inspect the threads on the bottom of the test spud, if the threads become excessively worn or damaged, replace the test spud.
3. The Quick Connect Fittings should be inspected for wear periodically and replaced as needed. The hose couplers should fit snugly on the Quick Connect Fittings.
4. The "O"-Ring seal in the Quick Connect Fittings should be changed when wear prevents proper sealing.
5. The metal surfaces of the Hydraclose Test Head should be kept clean and free of rust and corrosion. Metal surfaces should be painted with a high quality, cold galvanizing metal primer.

HYDRACLOSE TEST JACKET

1. The inside upper 12 inches of the test jacket should be painted with cold galvanizing metal primer to protect the sealing area.
2. The Test Jacket should be cleaned periodically to remove any accumulation of dirt or debris as needed or at least once every three months.
3. Test jacket water that has become stagnant or brackish should be drained from the test jacket and replaced with fresh water.
4. In the event that you must replace the Test Jacket Burst Disk, make certain that you use a replacement burst disk from Galiso. Never operate the Hydraclose test head with an improper burst disk in place. The burst disk is designed to fail at a specific pressure to prevent the test head from being blown out of the test jacket in the event that an improperly mounted cylinder comes off of the test spud while under pressure.

The Galiso Inc. Multi-port Test Head Addendum

Introduction:

Thank you for choosing the Galiso Multi-Port Test Head. The Galiso Multi-Port Test Head allows you to load from one to four cylinders at one time into the test jacket for faster testing. Your new test head also features the convenient time saving Hydraclose test jacket seal as do all Galiso test heads.

Safety:

See part two page five in this Manual.

Galiso Multi-port Head Operation:

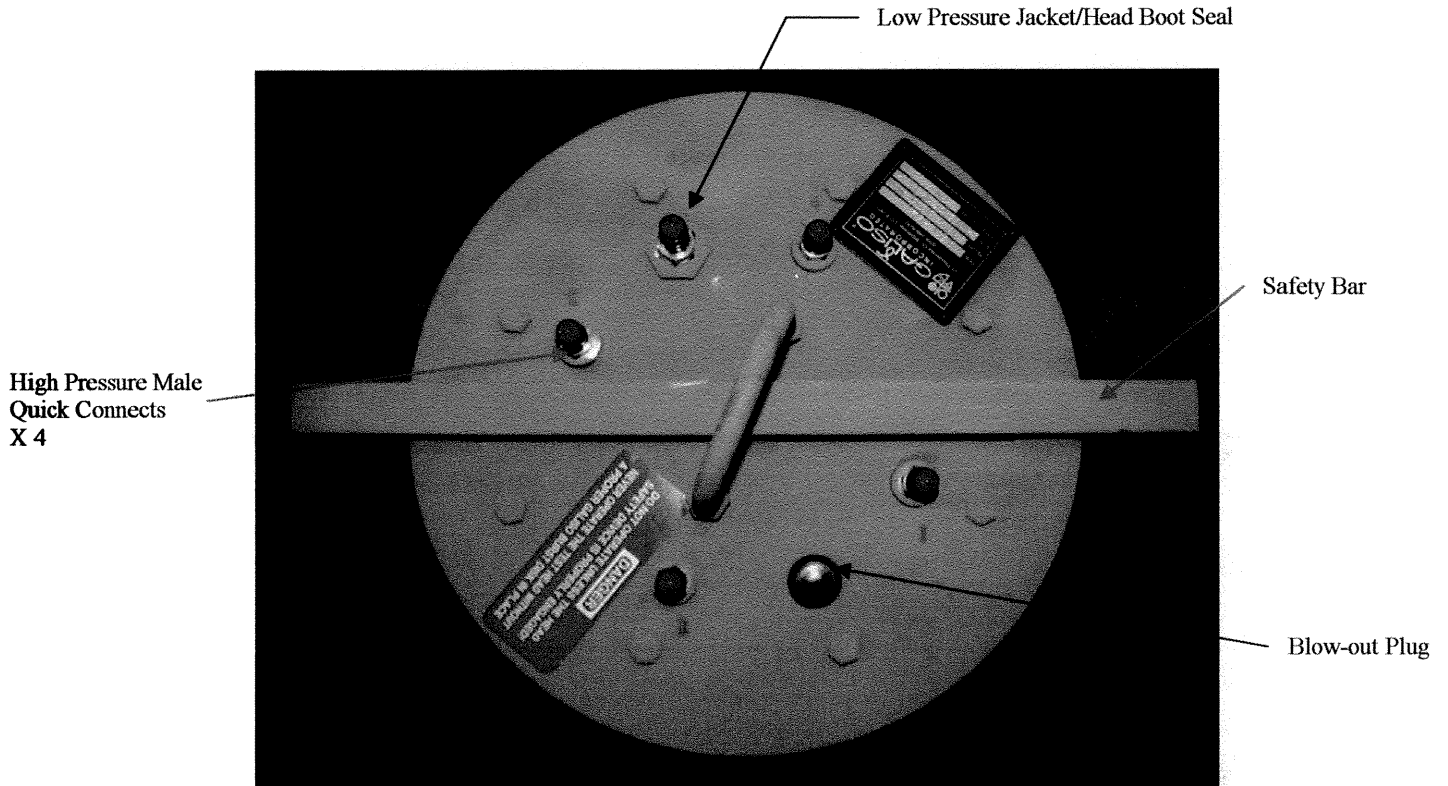
The Galiso Multi-Port Test Head is designed with the Galiso Hydraclose test jacket seal as are all Galiso test heads, see illustration bellow and Figure 1, and Page 1 of the manual for operation.

Cylinder attachment and testing:

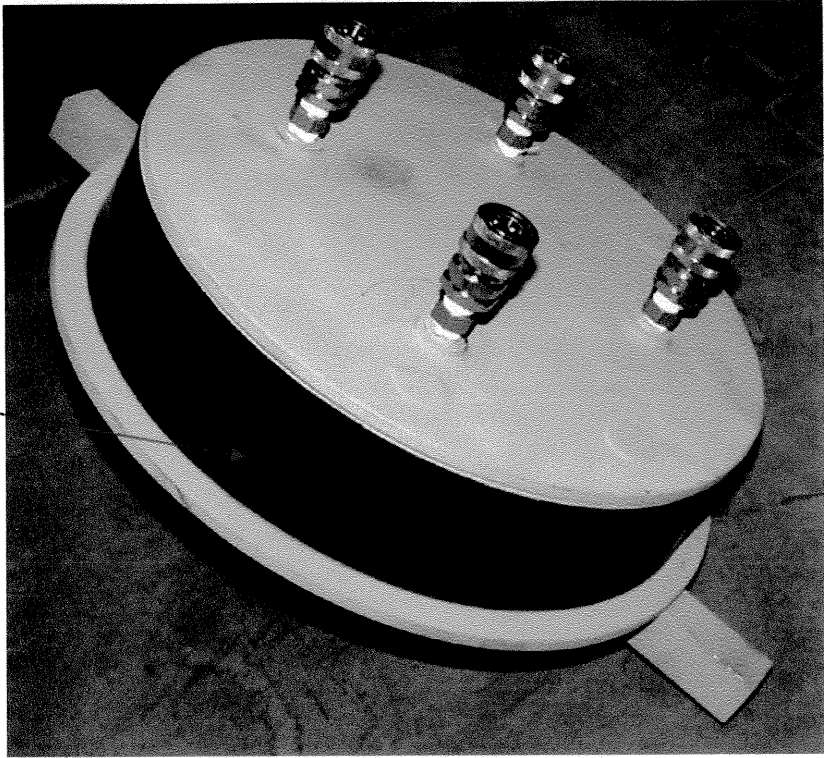
See Illustration below: Fill each cylinder to be tested with water and insert your cylinder adapter/test spud with male quick connect and tighten to that cylinder specification. With your test head hanging from a chain hoist insert the cylinder with male quick connect into one of the female quick connects on the bottom of the test head. Note the location of each cylinder and record that position stamped next to the high-pressure male quick connects on the top of the test head for reference in the event one cylinder fails the test. If testing less than four cylinders insert quick connect plugs in the female quick connects not used. Now insert the Test Head in the jacket and attach the low pressure jacket/head seal hose to seal the jacket for testing. Now starting with the high pressure quick connect marked number one attached the high pressure test hose and perform the cylinder test, repeat on each cylinder to be tested.

Maintenance:

You will need to change out the seals on your female quick connects as they wear over time; they are available for sale from Galiso when needed. See (Part Four, Maintenance, and Page 8) for maintenance required on the head boot /Jacket seal.



Addendum Fig 1: Top View



Jacket/Head Boot Seal

High Pressure Female Quick
Connects X 4

Addendum Fig: 2 Bottom View

1. **DURATION:** Galiso provides a one-year warranty from date of purchase, to the original purchaser, for standard products, unless otherwise specified. For all spare parts purchases, Galiso provides a 90-day warranty unless otherwise specified. Soft goods such as our speed seals, and O-rings, which are subject to wear in the normal course of operation, are not covered under this warranty.
2. **COVERAGE:** Galiso manufactured equipment is warranted against defective materials or workmanship. THIS WARRANTY IS VOID IF:
 - A) THE EQUIPMENT HAS BEEN DAMAGED BY ACCIDENT OR UNREASONABLE USE, IMPROPER SERVICE/MAINTENANCE, IMPROPER INSTALLATION, ABNORMAL OPERATING CONDITIONS, NEGLIGENCE, REPAIR BY ANY PERSON NOT AUTHORIZED BY GALISO, INC. OR OTHER CAUSES NOT RELATED TO MATERIAL DEFECTS OR WORKMANSHIP.
 - B) THE SERIAL NUMBER HAS BEEN ALTERED OR DEFACED.

3. **PERFORMANCE:** Galiso reserves the right to make warranty determination only after inspecting the item at the Galiso manufacturing facility. If the warranty determination indicates that the defective item is covered under warranty, the item will be repaired or replaced with same parts/items or parts/items of equivalent quality, at the option of Galiso. In the event of replacements, the replacement unit will continue under the original equipment warranty or carry a 90-day warranty, whichever is longer. No charge will be made for warranty repairs, and/or replacements. All freight charges are the responsibility of the customer requesting warranty service.

If the warranty determination indicates that the item is not covered by warranty, a repair/replacement cost estimate will be submitted to the purchaser for approval prior to initiating any repair work.

4. **CLAIMS:** In the case of equipment malfunction, notify Galiso (1-800-854-3789) and provide the Model Name, Model Number, Serial Number and a description of the problem. Return Authorization Number, shipping and/or service information will be provided on receipt of the required information.
5. **SERVICE EQUIPMENT:** Galiso attempts to make available, whenever possible, a limited amount of service equipment at a minimal use charge, plus freight expense, for those customers wishing to avoid downtime during repair of their equipment. Such items are available on a first come, first served basis and are billable at the specific service charge applying with a one-month minimum.
6. **MODEL CHANGES:** Galiso reserves the right to make changes in materials and specifications, without notice. Galiso may offer, for a stipulated fee, the opportunity to upgrade your equipment to the latest configuration.
7. **DISCLAIMERS:** Galiso provides technical data and assistance to aid customers in the selection and use of our products. There are no implied warranties of merchantability nor suitability for a particular purpose associated with the transmittal of technical data and/or customer assistance.

Galiso does not assume liability for any consequential, incidental, or special damages. Liability under this warranty is limited to repairing, or replacing Galiso equipment items returned to the factory or an authorized facility.