COSASCO®

COSASCO® HRSL RETRIEVER AND SINGLE ISOLATION SERVICE VALVE WITH NON RCS HYDRAULIC ACCESS FITTING

Work Instruction

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	ALL	C	01/28/14	Annual Review – No Changes	KR	ENG	RA
	ALL	D	01/28/15	Annual Review	KR	ENG	RA
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1 IMPORTANT INSTRUCTIONS

Cosasco is committed to providing the safest and highest quality products, services, and training for the industries it serves. We are committed to ensuring that all users of our equipment work safely and efficiently. Fully anticipating the infinite variety of conditions that may be encountered in the field would be impossible, but we have designed this work instruction to emphasize safe working practices, and as much as possible, to convey the full benefit of our knowledge and collective experience in the use of the Cosasco HRSL Retriever and single isolation Service Valve (6000 psi). This work instruction is not meant to be a sole source of instruction or training guide. Because these tools are used in a broad range of environments and applications, it is important that the owner and operation personnel have been assessed, certified, and deemed competent in all safety, work management and additional risk assessment requirements in the application of this procedure.

WARNING 	Installing, operating or maintaining a Cosasco high pressure HRSL retrieval tool improperly could lead to a leak, serious injury or worse, from a surge of pressure into the Retriever, damaging the internals of the retriever. Comply with all information on the product, in this work instruction, and in Cosasco System Safety Awareness Training that apply to the product. Do not allow untrained or inexperienced personnel to work with this product. Use Cosasco parts and work procedures specified in this work instruction.

BE SURE ALL PERSONNEL READ AND FOLLOW THE INSTRUCTIONS IN THIS WORK INSTRUCTION AND ALL PRODUCT WARNINGS.

Product Owners (Purchasers)

1. Use the correct product for the environment and pressures present. If you are unsure, discuss your needs with your Cosasco representative.
2. Inform, educate, and train all personnel in the proper installation, operation, and maintenance of this product.
3. To ensure proper performance, only competent, field experienced and trained personnel should install, operate, repair and maintain this product.
4. Save this work instruction for future reference.

Product Operation Personnel (Personnel):

1. Read and understand all instructions and operating procedures for this product.
2. Follow all warnings, cautions, and notices marked on, and supplied with, this product.
3. Follow all instructions during the installation, operation, and maintenance of this product.

4. To prevent personal injury, ensure that all components are in place prior to and during operation of the product.

5. If you do not understand an instruction, or do not feel comfortable following the instructions, contact a Cosasco service technician for clarification or assistance.

6. If this work instruction is not correct for your Cosasco product, contact your regional Cosasco office and Cosasco will provide you with the requested work instruction.

7. Use only replacement parts specified by Cosasco. Unauthorized parts and procedures can affect this product's performance, safety, and invalidate the warranty. "Look-a-like" substitutions may result in improper operation and may result in serious injury or death.

8. Save this work instruction for future reference.

2 DISCLAIMER

This disclaimer relates to the use of these work instructions by non-Cosasco persons and entities.

Any person or organization utilizing this work instruction, for any purpose, does so at their own risk. Rohrback Cosasco Systems, Inc., its affiliates and employees assume no liability arising from the use of, or reliance on the information provided in any Cosasco work instructions.

Information provided in this work instruction should not be considered as all-encompassing or suitable for all situations, conditions or environments. Each individual and the organization he or she represents are responsible for implementing their own program of training and safety awareness in connection with this work instruction.

Application of information furnished by this work instruction does not guarantee that the information furnished will meet applicable USA (including OSHA), United Kingdom, or any other country's health or safety standards or requirements or, that by implementing any of the programs you or your company will comply with such rules and regulations. Always seek the advice of your legal, medical or other advisors before using this information.

3 SAFETY WARNINGS

WARNING 	It is imperative that the following safety warnings are taken into important consideration before and during use of Retrieval Equipment. Safety warnings are noted throughout this document to ensure precautions are taken for all procedures where there are risks involved. Failure to follow these warnings could result in serious injury or death.

1. Safe operation requires two experienced and competent operators.
2. Do not use this retrieval equipment unless you have been trained and competent in its safe operation.
3. If it has been longer than 90 days since your last operation, you should review the work instruction and complete an operation on a pressurized test rig.
4. Ensure all Retrieval Equipment is in good working order and has been tested in line with Section 8.1 of this work instruction.
5. Make sure you have complied with all plant safety requirements and environmental regulations.
6. Identify the type of media its pressure and temperature. Review material safety data information on the media prior to operation.
7. Ensure you have all the required safety equipment for the given media, "i.e. hard hat, safety glasses, protective clothing, safety gloves, respirator, spill safety equipment, etc...
8. Any actions which could vary system pressure such as surges caused by opening and closing of valves and chokes should be delayed until completion of retrieval operations.
9. Ensure you have enough clearance for safe operation. Note wind direction prior to starting operations involving hazardous products.
10. WARNING: Surface temperature may be hot. Contact may cause burn.
11. WARNING: Do not exceed equipment specified pressure rating. Over-pressurization can cause equipment to fail/burst posing a variety of safety hazards.
12. WARNING: Be sure to introduce pressure gradually into the tooling by opening the appropriate valve and chokes slowly. This safety measure is taken to prevent personal injury, environmental contamination and equipment damage.
13. WARNING: Do not apply a load of more than 150 pounds, perpendicular to the Retriever body axis, to prevent breakage from bending stresses.

4 SCOPE OF DOCUMENT

This document details the procedure for the installation and retrieval of corrosion and erosion monitoring devices or chemical injection equipment using the Cosasco HRSL Retrieval Tool and Single Isolation Service Valve from 2” system hydraulic access fittings.

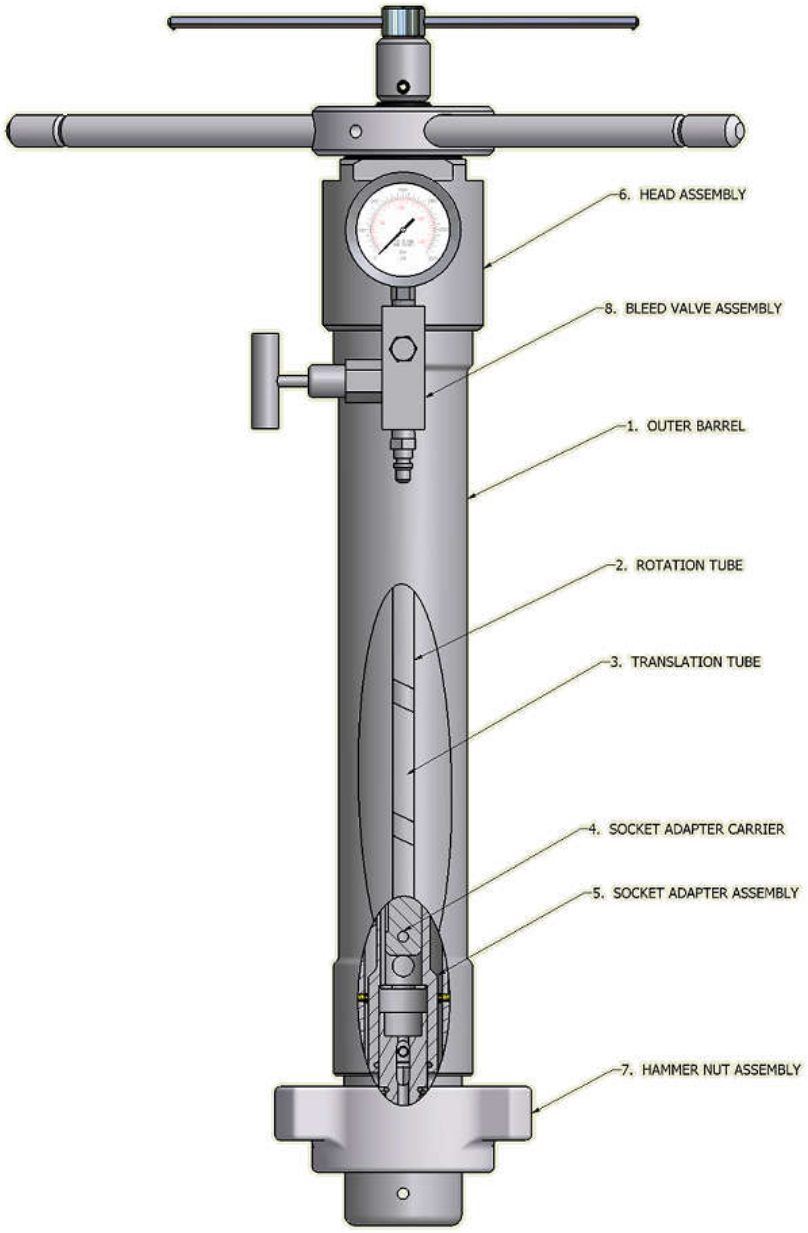
Also included is the use of special ancillary tools in conjunction with the Retriever and Service Valve. These tools are designed to allow installation and retrieval of the above mentioned devices from access fittings without shutdown when production pipework is at full operating pressure.

This document is not to be used as a training manual in the use of the fore mentioned equipment and is intended for use by Cosasco trained and qualified personnel or service personnel of clients who have been assessed, certified, and deemed competent in all safety, work management and additional risk assessment requirements in the application of this procedure. The lead technician is responsible for the strict adherence to this work instruction.

5 HOW THE COSASCO SYSTEM WORKS

5.1 *The Retrieval Tool*

The standard HRSL retrieval tool features a stainless steel outer barrel, Viton O-rings and graphite impregnated Teflon seals. They are two models available, with pressure ratings of 2500 psi (172 barg) and 6000 psi (414 barg) with a maximum operating temperature of +400°F (+204°C) and meets the NACE MR0175 standard. The retriever has eight main parts as displayed below: Outer Barrel, Rotation Tube, Translation Tube, Socket Adapter Carrier, Socket Adapter Assembly, Head Assembly, Hammer Nut Assembly, Bleed Valve Assembly and Pilot adaptor.



The most commonly used retrieval tools come in 18”, 25” & 37” stroke lengths. The stroke length determines the length of device the retrieval tool can accommodate for installation or retrieval.

Some useful retrieval tool specifications are included in the table below.

HRSL-Retriever Stroke Length	Clearance required for removal of retrieval tool (measured from top of access fitting)	Weight (6000 psi rated)	Maximum Device Length (S) Solid Plug or (H) Hollow Plug using 6000 psi Single service valve
18”	44.75” (113.7cm)	55lb (24.9kg)	6.00” (S) 4.50” (H)
25”	51.75” (131.4cm)	63lb (29.0kg)	13.00” (S) 11.50” (H)
37”	63.75” (161.9cm)	76lb (36.7kg)	25.00” (S) 23.50” (H)

5.2 *The Service Valve (Single Isolation)*

The Service Valve contains line pressure while the plug is absent from the access fitting body during on-line service. The valve is rated to 6000 psi, with a maximum operating temperature of +450°F (232°C)* and also meets NACE MR0175 and MR0103 standards. It complies with API Fire-Safe Standards of refining fire test for soft seated ball valves, draft 5 and production fire test for API specifications 6A and 6D, draft 2. It incorporates one bypass valve allowing controlled pressure equalization of the retrieval tool during on-line retrievals and one bleed valve.

*With high temperature seal options

5.3 *Servicing & Pressure Testing of Retrieval Equipment*

IMPORTANT!	Retriever and Service Valve must be pressure tested prior to use to ensure safe operation of tools!

All Retrieval Tools and Service Valves must be pressure tested prior to use. The Field Technician using the equipment must possess current pressure test certificates for the retrieval equipment prior to commencing on-line retrievals operations.

If the pipelines being worked on contain heavy debris, including, but not limited to; iron sulphide, sand, solids and iron oxide, the tool may become contaminated and difficult to use. The Field Technician will determine on a case by case basis if the tool needs to be stripped down or if it can be flushed out with either water or suitable cleaning agent without stripping the tools down.

At the end of each major service visit, the tools will be stripped down, cleaned, seals replaced as necessary, re-assembled and pressure tested. See Section 8 for pressure testing procedure.

6 PRE JOB PREPARATION

The following three sections discuss the major steps required, prior to starting any on-line retrieval using the HRSL Retrieval Tool and Service Valve. The lists in the following sections are prompts and are not intended to replace client Risk Assessments or Job Safety Analysis, which will also have to be completed prior to work start.

6.1 *Site Survey*

It is necessary to perform a Job Step Analyses at each work location prior to work start, to ensure the following variable information is known:

- Scaffolding or any additional access requirements to ensure safe access and egress to work site
- Clearance for using the Retrieval Tool and Service Valve. *See table in section 5.2 for guidance on extension clearances required.* A 1.5 M radial clearance around the retrieval tool will also be required for its operation
- Pipe line pressures & temperatures, so that operating pressure of tools is not exceeded
- Any potential hazards around the worksites, such as slip, trip or fall hazards
- Emergency access & egress routes
- The pipe line media, which the equipment and operators will be exposed to
- Means of raising alarm in emergency situations

6.2 *Documentation & Communication*

Prior to work start the following documentation must be generated and reviewed:

- Permit to Work, as specified by the client
- Client specific Risk Assessment or Job Step Analyses, with Cosasco personnel input
- Critical Step Checklist
- SAFR Location Sheet
- Pressure test certificates for Retrieval tool, Service valve, and Back Pressure Pump with Hose.
- Personnel competency certificates

A toolbox talk will be performed by the lead Engineer (Cosasco or Client), including but not limited to the following:

- The main steps involved in the job
- Equipment to be used
- Review of work permit and risk assessment
- PPE required
- Means of communication with Control Room personnel
- Actions to be taken in the event of an emergency
- Control room is aware of work party location
- All personnel involved with the work are aware of all control measures and are competent to be involved in the work
- Work party are aware of any other work taking place in close proximity to worksite
- Any additional hazards identified during this talk should be reviewed and control measures implemented

6.3 *On-site equipment and Worksite Checks*

Upon completion of the steps in section 6.1 & 6.2 final checks should be made at the worksite prior to work start, including equipment checks and worksite checks as follows:

Worksite

- Ensure any scaffolding to be worked on is certified and is of safe design
- Check previously identified escape routes are still clear
- Test means of communication with control room
- Double check PPE is in good condition and fit for purpose
- Identify any other work parties in proximity work location

Retrieval Equipment

- Inspect the Service Valve O-ring, which seats on the access fitting for any damage
- Inspect the Retriever O-ring which mates with the retrieval tool at the hammer union
- Extend and collapse the Retriever inner barrel to ensure it is free to move and does not display any sign of binding
- Open and close the Service Valve to ensure that the ball valve is free to move and does not display any sign of binding
- Ensure that the Socket adapter assembly on the Retriever is adjusted to suit the valve in use (ie holes 2&4 for single valve) and device being installed or removed to / from the access fitting.

7 RETRIEVAL OF DEVICES FROM 2" SYSTEM HYDRAULIC ACCESS FITTINGS

WARNING!	It is imperative for the operator to first determine pressure, temperature, and the type of media before the retrieval operation is started. Any action which could vary pressure, such as surges caused by the opening or closing of valves or chokes, must be delayed until after the retrieving operation has been completed. Failure to determine line pressure or change in line pressure will not let the operator determine if the Retriever has been completely pressurized which could lead to a leak, serious injury or worse.

7.1 *Removal of Caps from Access Fittings*

1. Ensure that there is enough space to use the retriever, back pressure pump and service valve.

2. Confirm the pipeline pressure, and whether variations in pressure can be expected during the period when the hydraulic retriever is to be operated.

3. Check the condition of the hydraulic access fitting. If a pressure bearing cap is fitted, check the gauge for pressure indication. If pressure is indicated, attempt to bleed off to assess the rate of leak past the carrier plug primary seal or the probe seal. If it is possible to bleed off the pressure within 10 seconds, then close the valve and check for speed of buildup. If pressure builds up within 10 minutes, then the fitting cannot be serviced, and a shutdown will be required to service the location. If no pressure is present, then remove, **one at a time**, one Seal Nut and then the Locking Pin. Check the pin for damage, ensuring that the point of the pin is intact and replace where necessary. Each locking pin O-ring should be replaced with new at every service. Grease each pin and re-install.

WARNING!	This is the only point of the procedure that the locking pins should be fully removed and only one locking pin at a time. Serious injuries may occur due to leakage under high pressure, if locking pins are removed at any other step in this procedure.

4. If a thread protector cap is installed, loosen with a C-spanner (if necessary) and remove.

IMPORTANT!	WEAR SAFETY GLASSES! USE NON-SPARKING HAMMER!

5. If a pressure bearing cap is fitted, check gauge for pressure indication, if none is indicated open bleed valve on cap to confirm no pressure is present and proceed to step 7. If pressure is present proceed to step 6 below.

6. If pressure is indicated on the pressure gauge of the cap, attempt to bleed off to assess the rate of leak past the carrier plug primary seal or the probe seal. If it is possible to bleed off the pressure within 10 seconds then close the valve and check for speed of build up. If pressure builds up within 10 minutes the cap cannot be removed and a shutdown will be required to service the location. If pressure does not build up then proceed to step 7 below.

7. Once cap has been confirmed free the pressure, loosen the cap using a C-Spanner and remove. If a Swagelok probe adapter is installed through the cap, the adapter will have to be removed prior to removal or turning of the cap. Once completely unthreaded pull the probe extension adapter away from the cap, this disconnects the adapter from the probe pins. Keeping a slight pulling pressure on the adapter unscrew the pressure retaining cover from the access fitting. It may be necessary for 2 operators to carry out this operation.

7.2 *Access Fitting Preparation & Installation of Service Valve*

1. Check the condition of the access fitting external sealing face, which must be free of corrosion, debris and pitting. Clean the threads and sealing face if necessary, using a wire brush, following which apply non-metallic grease to both surfaces.

2. Check the Service Valve as follows:
   - Service Valve is open
   - Bleed valve is closed
   - By-pass valve is closed
   - O-ring is present and seated correctly in access fitting mating face of the valve
   - A spacer ring is required, check O-ring is present and seated correctly.

3. Install service valve on to the access fitting with spacer ring installed ensuring that the valve handle is positioned so that the valve can be freely opened and closed, and then tighten the hammer union with a non sparking hammer; ensuring the valve is in the open position and firmly seated on the access fitting.

IMPORTANT!	WEAR SAFETY GLASSES! USE NON-SPARKING HAMMER!

7.3 *Installation of Retrieval Tool and Removal of Carrier Plug*

1. Inspect the mating retrieval tool to valve O ring seal on the retrieval tool and ensure there are no nicks, abrasions or damage etc. If damaged this seal should be replaced immediately.

2. With 2 Cosasco trained operators, connect retriever to service valve by lifting the retrieval tool in to position to mate it with the valve, then tighten the retriever hammer union clockwise and secure using a non-sparking hammer. Note - Prior to lifting the retriever, if the access fitting is in a top of line position, it may be necessary to use an HRSL retriever handle to lift it safely.

IMPORTANT!	WEAR SAFETY GLASSES! USE NON-SPARKING HAMMER!

3. Ensure that the retriever bleed valve is closed, the service valve bleed and bypass also need to be closed.

WARNING! 	Double check that both the Retriever bleed valve and Service Valve bleed valve and bypass valve are closed! Leakage will result when plug assembly is disengaged. Leakage of volatile or high temperature media could result in serious injuries!

4. Rotate the translation handle clockwise to move the socket adapter over the top of the plug. Once at the top of the plug, rotate the rotation handle clockwise to thread the socket adapter pilot into the plug assembly. Slight clockwise pressure should be maintained on the translation handle to move the carrier forward as the thread engages the plug assembly. If the rotation handle becomes difficult to turn, rotate the translation handle slightly clockwise. Thread into the plug assembly at least 3 full turns.

5. Connect the back pressure pump hose to the retriever bleed assembly and back pressure pump. Note - Pump, hose and all connections must be pressure rated to same pressure rating of retrieval tool.

IMPORTANT!	Pump, hose and all connections must be pressure rated to same pressure rating of retrieval tool.

6. Fill pump reservoir with desired fluid, potable water will normally be used although hydraulic oil can be used if required.

7. Open retrieval tool bleed valve.

8. Begin actuating the pump.

9. Pump until pressure indicated on pump or retrieval tool pressure gauge is at least 10% above line operating pressure. Note: Ensure pressure rating of retrieval tool is never exceeded.

IMPORTANT!	Ensure lowest pressure rating of retrieval tools are never exceeded. (Hydraulic Tool and Service Valve)

10. Once the desired pressure has been achieved, close the bleed valve on the retrieval tool or service valve.

11. Release the pressure back to pump reservoir from the hose via the pump valve.

12. Disconnect the hose from the retrieval tool.

13. The tool is now pressurized and ready to begin removal of the carrier plug.

14. Loosen (counterclockwise) the access fitting locking pins **1.5 - 2 complete turns until they are flush with the access fitting**. If any of the locking pins are difficult to loosen it

is likely that there is not enough pressure pushing against the carrier plug. In this case increase the pressure using the manual/air operated hydraulic pump.

15. Whilst maintaining positive clockwise pressure on the retrieval tool rotation handle, slowly open the bleed to atmosphere valve on the HRSL tool. This will allow the hydraulic carrier plug to unseat and the equalisation of pressure between the tool and line

WARNING! 	Make sure there are no locking pin threads visible. Serious injuries may occur due to leakage under high pressure if locking pins are disengaged.

16. Retain positive clockwise pressure on the retrieval tool rotation handle whilst turning the translation handle anti-clockwise to draw the carrier plug assembly back up into the retrieval tool barrel.

17. Once the monitoring device is fully withdrawn inside the retrieval tool, close the service valve ball.

18. Using a suitable container slowly bleed off the pressure from within the retrieval tool. Once pressure is at 0 bar close the bleed valve and monitor for 1 minute for pressure build up. If pressure build up occurs, double check the bypass valve is closed & that the ball valve is closed properly.

19. Once pressure release has been achieved, two Cosasco trained operators will detach the retrieval tool from the service valve using a non-sparking hammer to loosen the retriever hammer coupling and then lift it off the Service Valve.

20. Place the retrieval tool in a suitable place. Ensure that spill matting and bucket is available to catch / clean up any residual fluids.

21. Install a service valve blank cap c/w bleed and pressure gauge on the valve.

22. Turn the translation handle clockwise until the monitoring device and carrier plug are visible.

23. Remove carrier plug and monitoring device from the connecting rod of the retrieval tool and carry out servicing as required.

7.4 *Preparation of the Carrier Plug & Device*

Pre-installation note

1. Inspect the carrier plug for any damage. If there is significant damage it will be necessary to use a new carrier plug. Fit a new primary packing, and replace the 2 x guide rings on the plug at every service. The guide ring ends should not meet when installed on the plug. Note – The carrier plug has a reverse thread where the hollow plug nut or other device connects to the carrier plug.
2. For a solid plug, screw the coupon holder or chemical injection nut down on to the primary packing seal and tighten using a suitable spanner, then tighten the set screw using a hex key.

3. For a probe such as ER, screw the hollow plug nut on to the carrier plug until it contacts the primary packing, ensuring that the old probe seal is not present in the plug nut, and then tighten using a suitable spanner. Ensuring that a probe seal is present on the shaft of the new probe, screw the probe in to the hollow plug nut anticlockwise (reverse thread) until the probe seal makes contact with the carrier plug and tighten firmly using a suitable spanner, then tighten the set screws using a hex key.
4. If the device, such as a chemical injection nozzle or strip coupons, will require alignment with the process flow in the pipe, the carrier plug should at this point be marked to confirm orientation of the carrier plug.

7.5 *Reinstallation of the Carrier Plug and Device*

1. Inspect the mating retrieval tool to valve O ring seal on the retrieval tool and ensure there are no nicks, abrasions or damage etc. If damaged this seal should be replaced immediately.
2. Screw the carrier plug on to the connecting rod of the retrieval tool and align the mark on the carrier plug with the rotation handle of the retrieval tool.
3. While maintaining positive clockwise pressure on the rotation handle, turn the translation tool handle anti-clockwise to withdraw the plug monitoring device in to the retrieval tool.
4. Check the pressure gauge for pressure indication on the service valve blank cap, if no pressure is indicated open bleed valve on the cap to confirm no pressure is present. If no pressure is present then remove the valve blanking cap and proceed to step 4.

   If pressure is indicated on the pressure gauge attempt to bleed off the pressure via the bleed valve on the cap or vent to atmosphere on the service valve. If it is possible to bleed off pressure within 10 seconds, close the bleed valve and check for speed of build up. If pressure builds up within 1 to 2 minutes the cap should not be removed. If it is not possible to bleed off pressure from behind the blanking cap, the closed service valve and blanking cap should remain installed on the access fitting until the next shutdown opportunity when they can be removed safely.
5. With 2 Cosasco trained operators lift the retrieval tool and connect it to the service valve by screwing the retrieval tool hammer coupling on to the valve and tightening with a non-sparking hammer. Ensure that the rotation handle of the retrieval tool is in line with the pipe line flow direction.

IMPORTANT!	WEAR SAFETY GLASSES! USE NON-SPARKING HAMMER!

6. Check and make sure the retrieval tool bleed valve is closed.
7. Back pressure Retriever. Refer to Section 7.3, steps 4-11.
8. Open the ball valve.
9. Turn the retrieval tool translation handle clockwise, keeping the rotation handle in a fixed position, to push the monitoring device and carrier plug through the service valve until seated within the access fitting.

10. Maintain pressure on the translation handle to ensure the carrier plug remains firmly seated and tighten all 4 access fitting locking pins. Each pin will screw in approx 3 – 4 turns before coming into contact with the carrier plug. Once contact is achieved the pins must be tightened evenly but not excessively. Note: Working the locking pins opposites at all times will ensure the plug is seated correctly.
11. Using a suitable container slowly bleed off the pressure inside the retrieval tool. If it is not possible to bleed off the pressure it is likely that the plug is not seated correctly. Ensure that the locking pins are tightened evenly and attempt bleed off again.
12. Close the retrieval tool bleed valve and monitor for pressure build up for 1 minute. If no pressure build up occurs proceed to step 12. If pressure build up is apparent it will be necessary to retrieve the plug and check the condition of the primary packing on the carrier plug.
13. Once the pressure has been bled off successfully detach the carrier plug assembly from the retrieval tool socket adapter pilot by turning the rotation handle anti-clockwise.
14. Withdraw the socket adapter pilot into the retrieval tool to check it has been disconnected from the plug assembly.
15. With two Cosasco trained operators, unscrew the retrieval tool from the service valve and lay down in a suitable place ensuring spill matting is available to catch any residual fluids which may come from the retrieval tool. The retrieval tool is ready for next use at this stage.
16. Loosen the service valve using a non-sparking hammer and remove from the access fitting taking care to remove the spacer ring if applicable.
17. Ensure the correct orientation of the carrier plug.

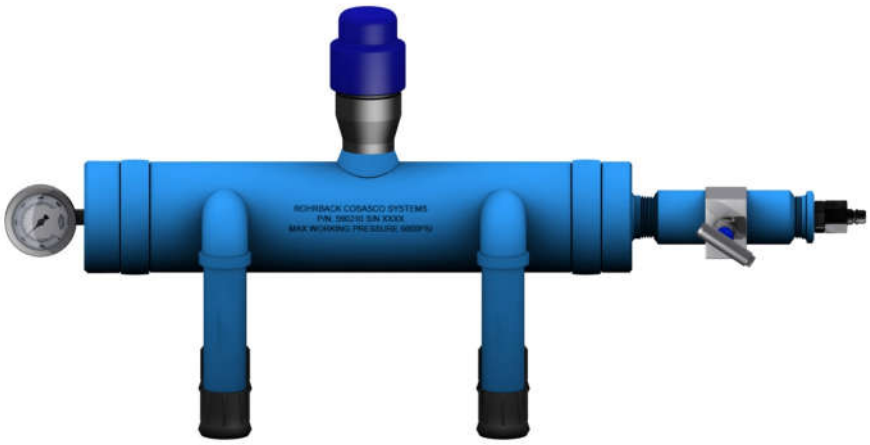
7.6 *Cap Installation and Fitting of Probe Adapter*

1. Clean the access fitting and apply non metallic grease to the external threads and sealing face of the access fitting to ensure adequate protection from corrosion and minimise the likelihood of the protective cover seizing in place at a later date.
2. If a pressure retaining cap is being installed on the access fitting, check the following prior to installation.
   - O-ring is present inside the cap
   - Pressure gauge is installed firmly, is in good condition and has thread sealant applied at the ¼" NPT connection
   - Bleed valve is installed firmly, is in good condition and has thread sealant applied at the ¼" NPT connection
3. Screw on the access fitting cap by hand until it stops.
4. Using a pipe wrench or 105mm open ended spanner, tighten the cap – do not over tighten. The cap takes the load of the carrier plug under normal operating conditions - not the locking pins. Therefore when the cap is tightened the locking pins will feel as if they are loose again – this is normal. Screw the locking pins in but only enough to take up any slack.
5. If a 3 hole pressure retaining cover is being installed in conjunction with a Swagelok probe adapter proceed as follows.

- Apply thread sealant to the threaded section closest to the probe pin receiver holes.
- Position the male / male threaded part of the adapter as close to the probe pin receiver holes as possible and the female Swage nut at the top of the adapter nearest the instrument connection pins.
- While holding the shaft in position, thread the male / male threaded section in to the ½" NPT hole on the cap. It may be necessary to remove the bleed valve on the cap for adequate access during this step. Tighten the threaded nut in to position using a suitable spanner. Note - it is important that the probe pins are not in contact with the probe adapter during tightening of the nut, otherwise damage to the probe pins can occur.
- Gently lower or push the shaft of the adapter towards the probe until the adapter makes contact with the probe pins
- Turn the adapter in either direction until the locator pin on the probe and locator groove on the probe adapter are aligned, which should be obvious to feel. Once aligned the probe adapter can be pushed fully on to the probe pins. If the adapter cannot be easily pushed on to the probe pins, double check the alignment of the pins and adapter.
- Once the probe pins are engaged with the adapter, thread the female Swage nut on to the threaded male section of the nut located in the cap. Tighten slowly to compress the metal olive, using a suitable open ended wrench – do not over tighten. Note - when tightening the female nut, observe the male threaded section to ensure it is not turning, if the male threaded section turns it means that the probe pins are being twisted and damaged, if necessary hold the threaded male section in place using another open ended wrench.

8 SPECIAL TOOLS & PROCEDURES

8.1 *Pressure Testing*



Cosasco Pressure Test Rig

IMPORTANT!	Retriever and Service Valve must be pressure tested prior to use to ensure safe operation of tools!

All Retrieval Tools and Service Valves must be pressure tested prior to use. The Field Technician using the equipment must possess current pressure test certificates for the retrieval equipment prior to commencing on-line retrievals operations.

NOTE: A pressure test can only be considered valid if the test meets the following minimum criteria:

- Prior to Mobilization:
    - On completion of a service campaign the Retrieval Tool and Service Valve must be disassembled, inspected, and fully serviced in accordance with the latest revision of the relevant COSASCO ‘Maintenance Work Instruction’. Upon servicing completion, providing a successful pressure test is completed the equipment may be mobilized for further service work within 7 days of the successful test.
    - If the equipment is stored for a time period greater than 7 days from servicing, but no longer than 6 months it may be mobilized for further service work without being re-serviced, provided that a new successful pressure test has been completed within the 7 days prior to mobilization.

- If the equipment is to be stored for a period of greater than 6 months from being serviced then all equipment should be re-serviced and pressure tested every 6 months in accordance with the latest revision of the relevant COSASCO 'Maintenance Work Instruction'. A successful pressure test will be required within the 7 days prior to mobilization for service work.

- Equipment mobilized for Field Service:

  - Once the retrieval equipment has been used in the field each online retrieval operation can be considered a successful pressure test for a further consecutive online retrieval operation with a validity of 12 hours. This duration between retrieval operations may be increased to 72 hours provided the tool is drained of any process fluids and the equipment internals have a suitable lubricant / protectant such as WD40 or Hydraulic Oil applied within the 12 hours following the last successful retrieval operation.

  - If it has been longer than 12 hours since the equipment was last used (or 72 hours if drained, flushed and lubricated) then the equipment must be disassembled, inspected, and fully serviced in accordance with the latest revision of the relevant COSASCO 'Maintenance Work Instruction'. Upon servicing completion, providing a successful pressure test is completed the equipment may be used for further service work within 7 days of the successful test.

  - If the retrieval equipment is used on any fitting containing debris/grit/sand which is deemed to affect the smooth operation of the equipment then the equipment at minimum must be drained, flushed and lubricated prior to further use. Special attention should be given to bleed valve and pressure gauge assemblies. A successful pressure test must then be carried out prior to the equipment being used for further retrieval operations.

    At the end of the shift, within a 12 hour period the equipment should then be disassembled, inspected, and fully serviced in accordance with the latest revision of the relevant COSASCO 'Maintenance Work Instruction'. Upon servicing completion, providing a successful pressure test is completed the equipment may be used for further service work within 7 days of the successful test.

IMPORTANT!	If at any point either Retrieval Technician deems it necessary, for any reason, then the equipment must be stripped, cleaned, and serviced in accordance with the relevant COSASCO 'Maintenance Work Instruction'. A successful pressure test will then be required prior to further use!

8.2 *Pressure Testing Procedure*

1. Fit the Service Valve to the access fitting on the pressure test rig by placing the hammer nut end of the valve onto the access fitting.

2. Turn the hammer nut clockwise down the external acme thread until the Service Valve is securely seated to the access fitting body.

3. Tighten the hammer nut using a brass or equivalent non sparking hammer.

4. Check that the bypass valves on the Service Valve are closed and the atmospheric bleed valve(s) are closed. Main balls should be fully open.

5. The back pressure pump should be filled with hydraulic oil and a connecting hose (of a suitable pressure rating) used to connect the pump outlet to the quick coupler inlet fitted to the test rig.

6. With the pump on "Pressure Hold" and at its low-pressure setting hand pump the oil into the pressure test rig.

7. Stop pumping once the oil level has passed the bottom ball valve and close it.

8. Re-commence pumping and pressurize the assembly to the pressures stated in step 9. Leave pressurized for 15 minutes during each stage and observe that there is no pressure drop on the pressure test rig gauge.

   Note - *There may be some drop in pressure during the 15 minute test period due to the compression of air still in the system and also due to oil being drawn back into the hand pump. If any pressure loss is due to leakage, this will be visible and immediately apparent.*

9. Pressure test the equipment to the following pressures:

   - 5% of pressure rating of equipment.
   - 10% of pressure rating of equipment.
   - 20% of pressure rating of equipment.
   - 50% of pressure rating of equipment.
   - 100% of pressure rating of equipment.
   - 150% of pressure rating of equipment.

10. After completing all six tests in step 9, release pressure in the hydraulic pump. **Note:** this process must be repeated for the top ball valve of the Double Isolation Valve.

11. After completion of the pressure test on both balls, ensure both ball valves are opened and place the Retriever Tool onto the Service Valve. Turn the hammer nut union in a clockwise direction.

12. Tighten the hammer nut using a brass or equivalent non sparking hammer.

13. Ensure the bleed to atmosphere valve(s) on the Service Valve is closed and the Retriever bleed to atmosphere valve is opened.

14. With the hydraulic pump on "Pressure Hold" and at its low-pressure setting hand pump the oil through the Service Valve and into the Retrieval Tool, ensuring the isolating valve is fully opened.

15. Continue pumping until all air is displaced from the Retriever atmospheric bleed valve.

16. Continue pumping and during a pump action, close the Retriever atmospheric bleed valve.

17. Continue pumping and pressurize the assembly to the pressures stated in step 9. Leave pressurized for 15 minutes during each stage and observe that there is no pressure drop on the pressure test rig gauge. **Note:** There may be some drop in pressure during the 15 minute test period due to the compression of air still in the system and also due to water being drawn back into the hand pump. If any pressure loss is due to leakage, this will be visible and immediately apparent.

18. During each stage the Retriever requires to be stroked to check the integrity of the seals over the full travel of the outer barrel.
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19. After completing all six tests in step 9, release pressure in the hydraulic pump Check both the pressure gauges on the test rig and retrieval tool are at zero and drain off any residual fluid trapped in the retrieval tool and Service Valve.

20. Remove both the retrieval tool and Service Valve from the test rig.

21. Complete a pressure test certificate for both the Retriever and the Service Valve and file these in the dedicated maintenance folder for each tool.

22. A scanned copy of the original should also be filed accordingly.

Note - *There may be some drop in pressure during the 15 minute test period due to the compression of air still in the system and also due to water being drawn back into the hand pump. If any pressure loss is due to leakage, this will be visible and immediately apparent.*

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