



COSASCO® 1125psi Side Stream Kit

Work Instruction



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Revision History Record

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	-	7/9/13	Initial Release	ENG	ENG	RB
	A	1/6/14	Added Pressure Testing of Side Stream Unit		ENG	RB
ALL	B	1/30/14	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 1125psi Side Stream Kit. 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 Side Stream Kit improperly could lead to serious injuries. 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.
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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.

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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 Side Stream 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 injuries.

1. Do not use the Side Stream equipment unless you have been properly trained in its safe operation.
2. Safe operation requires a minimum of one trained operator.
3. Make sure you have complied with all plant safety requirements and environmental regulations.
4. Identify the type of media, its pressure and temperature. Review material safety data information of the media prior to operation.
5. 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...).
6. 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 the installation.
7. Ensure you have enough clearance for safe installation.

4 SCOPE OF DOCUMENT

This document details the procedure for the assembly, installation and safe operation of the Cosasco Side Stream unit.

Caution must be used at all times when working with pressurized equipment and before actual field work is attempted, personnel must be trained in the safe use of the Side Stream unit.

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

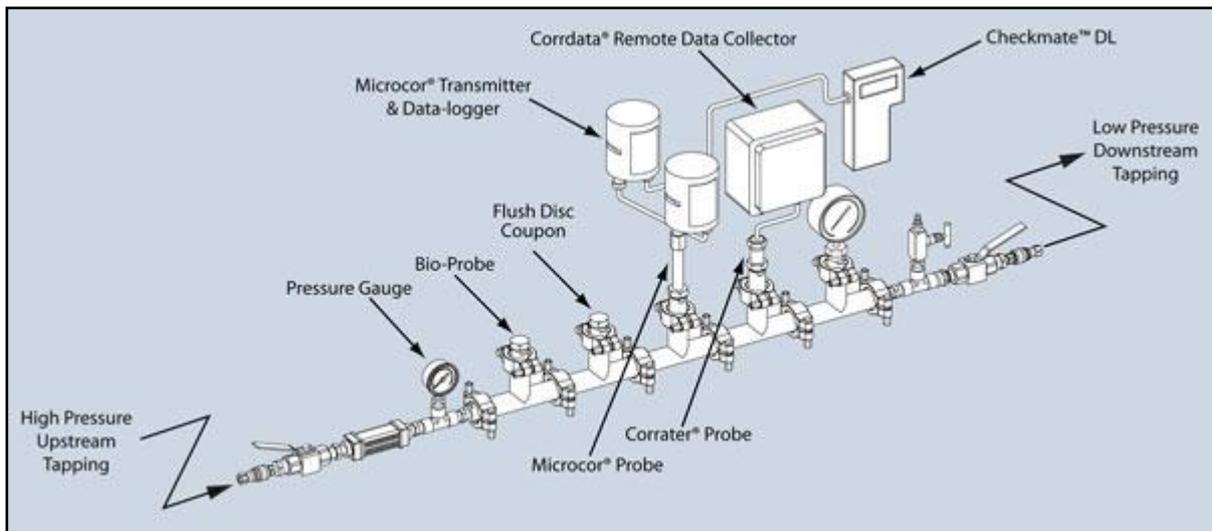
procedure. The lead technician is responsible for the strict adherence to this work instruction.

5 HOW THE SIDE STREAM UNIT WORKS

5.1 Side Stream Unit

The Cosasco Side Stream unit installs quickly to provide metal loss, corrosion rate, erosion rate, pressure, temperature, flow, and bacterial activity in various pipelines. Configured to meet specific requirements, the assembly includes multiple, easily connected 1" tees. Each tee is configured with the choice of the following corrosion management and process monitoring technologies allowing a customized monitoring system that can include:

- Microcor® corrosion and erosion rate measuring
- Corrater® LPR measuring
- Bio-probes
- Corrosion Coupons
- Process pressure and temperature



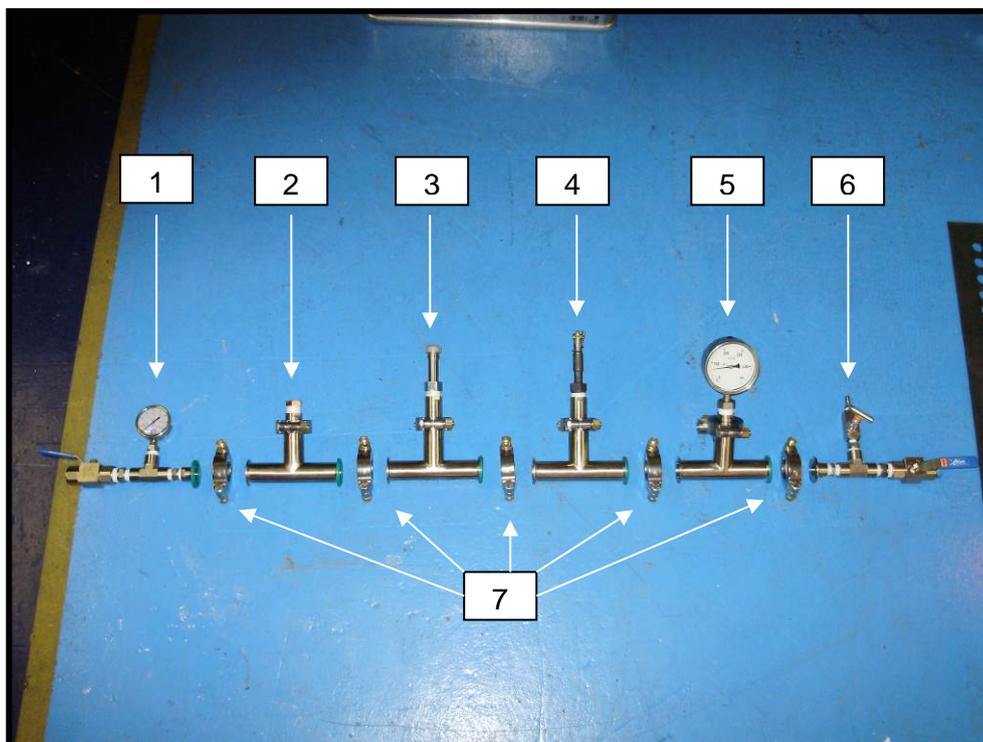
Cosasco Side Stream Assembly

5.2 Side stream Assembly

The standard Cosasco Side stream unit consists of four "T" cell assemblies, two 3/4" ball valve assemblies, two sets of snap-on hoses with connections, two sets of HP hoses and arrestors and nine clamp assemblies. The probes and temperature gauge are installed in each of the cells via an NPT threaded hub which clamps into the top of each T piece.

The Cosasco Side Stream unit is capable of operating in pressurized systems up to 1125psi (77 barg) and temperatures up to 200°C (392°F).

The standard 4-cell Side Stream is assembled as shown below:



- 1 – Pressure Gauge & 3/4" Ball Valve assembly
- 2 – Bio Probe or Corrosion coupon T-Cell
- 3 – LPR Corroter Probe T-Cell
- 4 – ER Microcor Probe T-Cell
- 5 – Temperature Gauge T-Cell
- 6 – Bleed Valve & 3/4" Ball Valve assembly
- 7 – Clamp assembly

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6 PRE JOB PREPARATION

The following three sections discuss the major steps required prior to starting any work involving the Side Stream kit. 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 Analysis at each work location prior to work commencing, to ensure the following variable information is known:

- Scaffolding or any additional access requirements to ensure safe access and egress to work site
- Pipe line pressures & temperatures, so that operating pressure of Side Stream 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
- Identify tie in points for Side Stream hoses and the fittings required

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 Analysis, with Cosasco personnel input
- Critical Step Checklist
- SAFR Location Sheet
- Personnel competency certificates
- Valid Pressure Test Certificate of the Side stream unit being used

A toolbox talk will be performed by the Cosasco Technician, 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

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6.3 Worksite Checks

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

Worksite

- Ensure any scaffolding to be worked on is certified
- 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
- Barrier off work area so Side stream unit is not disturbed

All equipment including hand tools and corrosion monitoring equipment is to be inspected pre-job to ensure it is fit for purpose and in good working order.

7 INSTALLATION OF SIDE STREAM UNIT

1. When on location the Side Stream is assembled with the correct number of cells depending on the number of monitoring devices to be used. A viton seal should be inserted between each of the sealing faces of the T pieces before the clamp is installed.
2. The clamps must be installed correctly to avoid buckling of the nut and bolt arrangements and to ensure correct sealing between the assemblies. To install correctly ensure that the bolts are tightened equally and parallel to each other, ensuring the gap between each clamp is the same on either side of the T piece. See *Fig 1 below*.
3. Once the corrosion monitoring devices have been installed in the cells and the side stream is fully assembled, the inlet and outlet hoses should be connected to the system sample tie-in points and the side stream. Ensure all valves on system sample tie-in points are in the closed position before attaching hoses also ensuring hose arrestors are in place. This then completes the flow path, taking a "stream" of fluid from the process line out through the side stream and into a lower pressure system.

IMPORTANT!

The Side Stream assembly should be securely positioned before continuing operation.

4. Before beginning Side Stream operations, confirm the inlet and outlet line pressures, media, flow rate and temperature with operations.

IMPORTANT!

Side stream outlet sample point must be lower pressure than the inlet sample point to allow acceptable flow of media through the Side Stream unit

5. Before flowing any process fluid into the Side Stream the valves status should be as follows:

- Side stream Inlet $\frac{3}{4}$ " Ball Valve – **Open**
- Side stream Outlet $\frac{3}{4}$ " Ball Valve – **Closed**
- System Inlet Sample Point – **Closed**
- System Outlet Sample Point – **Closed**
- Side stream Bleed Valve(s) – **Closed**

6. Slowly open the system inlet sample point to allow the line pressure/media into the Side Stream unit through the open $\frac{3}{4}$ " Inlet Ball Valve. Observe the pressure gauge and temperature gauge located on the Side Stream to verify that the inlet sample point is operating correctly and the process fluid has flowed into the Side Stream.

IMPORTANT!

At this point the side stream is under pressure so all hoses and fitting are to be inspected for any leaks before continuing with the operation. If the unit is leaking, isolate the Side Stream by closing the system inlet sample point and bleed off the pressure using the bleed valve and $\frac{3}{4}$ " ball valve assembly on the Side Stream unit. Once the leak has been rectified commence the operation again from point 6 of this work instruction.

7. Once the inlet sample point is open and no leaks have been detected, locate and open the $\frac{3}{4}$ " outlet ball valve located on the side stream. At this point the system outlet sample point can be opened to allow continuous flow through the Side Stream assembly.

8. The Side Stream should now have a steady flow of process fluid flowing through it. Monitor the unit for leaks again to ensure all of the hoses, fittings and seals are containing the process fluid.

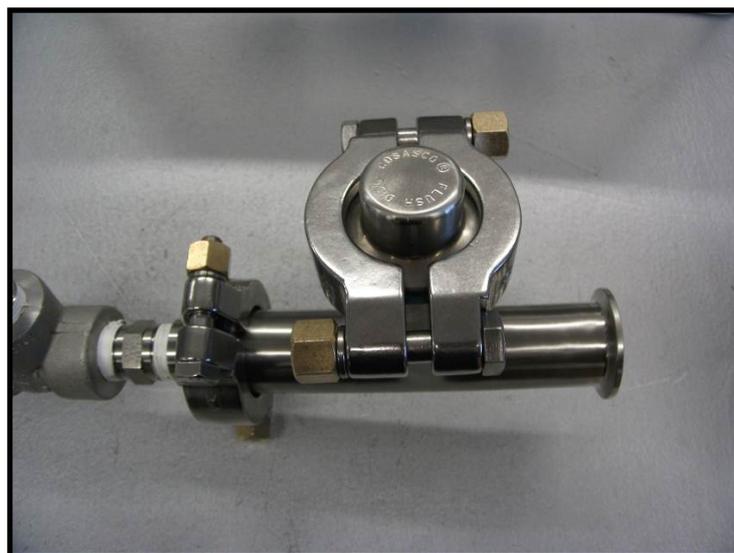


Fig 1. – Correctly installed clamp

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8 SIDE STREAM MAINTENANCE & PRESSURE TESTING

The maintenance interval required for the Side Stream unit will be determined by the media acting upon the assembly. Sand, grit or metal chips may cause internal damage to fittings and seals causing leaks that will require fitting/seal replacement. The unit should be routinely disassembled and flushed after operations to ensure continued functionality.

After use, all parts of the unit should be inspected closely for signs of wear and damage. Probes and logging equipment are to be tested to ensure they are operating correctly before being used again.

On each assembly/disassembly of the Side Stream unit a full pressure test must be carried out to ensure safe functioning of the Side Stream. The working pressure of this unit is 1125psi and therefore a test must be completed to 1.5 x this pressure (1690psi) for 15 minutes before the unit can be exposed to live system pressures.

The Side Stream is supplied with two sets of seal of different temperature ratings. A seal set that is colored blue (EPDM -45/+150°C) and a seal set that is colored green (Viton - 30/+200°C). The Side Stream assembly must be tested separately with both seal sets installed.

9 PRESSURE TESTING OF SIDE STREAM UNIT

1. A back pressure pump should be filled with hydraulic oil or potable water and a connecting hose (of a suitable pressure rating) used to connect the back pressure pump outlet to the 3/4" Ball Valve assembly at one end of the Side Stream unit. This valve should be in the open position.
2. The 3/4" Ball Valve assembly at the other end of the Side Stream unit should be in the open position.
3. With the back pressure pump on "Pressure Hold" and at its low-pressure setting (the button on the right hand side of the back pressure pump body pulled out) hand pump the oil into the side stream unit.
4. Continue pumping until all air is displaced from the 3/4" Ball Valve assembly at the opposite end of the Side Stream unit from the hose connection.
5. Continue pumping and during a pump action, close the 3/4" Ball Valve assembly at the opposite end of the Side Stream unit from the hose connection.
6. Re-commence pumping and pressurize the assembly to the pressures stated in step 7. 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 back pressure pump. If any pressure loss is due to leakage, this will be visible and immediately apparent.
7. 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.
8. After completing all six tests in step 7, release pressure in the back pressure pump by turning the pressure hold screw on the left hand side of the back pressure pump towards "Pressure Release".
9. After successful testing has been completed then the Side Stream unit will be required to be disassembled and re-built with the other temperature rated seal kit installed. On re-assembly of the Side Stream kit then steps 1-8 should be repeated.
10. Upon completion of the two procedures above then a Maintenance sheet and a Pressure Test Certificate should be generated and filed appropriately. A pressure Test Certificate should be kept with the Side Stream assembly.

