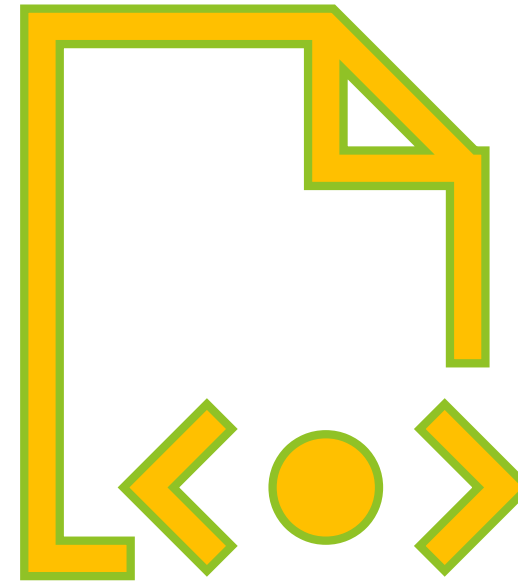


Installation Guidelines

Use for Practical Training



Before we *install isolation tool* safety precautions....

- ▶ Safe Work Permitting or Hot Work Permitting for each isolation installation shall be provided by the owner of the work. Permitting shall include the Personal Protection Equipment, Devices, Lock Out Tag Out and Atmospheric Gas Testing needed to safely perform installation and monitoring of all isolations. The SWP or HWP must address all Health, Safety, & Environment concerns.
- ▶ Other Safety Considerations:
- ▶ **Atmospheric Gas Testing** - before installation of the isolation tool and before disassembling the isolation tool from the piping system.
- ▶ **Fresh Air**
- ▶ **Confined Space**
- ▶ **Working at Heights**
- ▶ **Lock out Tag out**
- ▶ **Crush/Pinch Points**
- ▶ **LINE OF FIRE !!!!**
- ▶ **Environment** (other work around isolation)

Before we *install isolation tool* safety precautions....

- ▶ **Note:** *Important removal precautions - if the isolation tool was installed under supplied fresh air, it must be removed under fresh air. If supplied fresh air is not going to be used when removing the tool, a gas test must be requested. The gas test must be taken through the vent pipe opening and check for heavier than air gases, such as H₂S gas.*

Part #4 Installation Guidelines

Hydrostatic & Hydrodynamic Isolation

- ▶ For Training Purposes:
 - ▶ A. THE TYPE/STYLE OF SCIT TOOL AND SEAL SIZE HAS BEEN SELECTED (Pre-job Planning).
 - ▶ B. HOT WORK & SAFE WORK PERMITTING WITH GAS TEST COMPLETED.

The following shall identify the basic steps required to accomplish a Hydrostatic & Hydrodynamic Isolation.

Part #4 Installation Guidelines

Hydrostatic & Hydrodynamic Isolation

1. “De-burr” piping edges using metal file or wire brush, where applicable. Make sure the inside of piping system is clean and clear of debris.
2. Disassemble tool and have it ready to accept the VITAL Seals.
3. Install one seal on the spigot of the front plate and one seal on the spigot of the back plate.
4. Reassemble tool with seals installed. (hand tight)
5. Insert SCIT Isolation Tool into the pipe. The tool will center itself during the tightening process.
6. When installing the Isolation, position the tool as far back as possible so that the tool does not interfere with any Hot Work Operations (welding/grinding/cutting).

Part #4 Installation Guidelines

Hydrostatic & Hydrodynamic Isolation

7. Ensure that all Isolation Tool compression nut(s) will be accessible after the work has been accomplished (welded flange or fitting).
8. The fill and pressure (HDSCIT vent) fittings must be positioned at 12 and 6 o'clock (when possible) to allow medium to properly fill the tool cavity and allow air to bleed off.
9. For **single bolt tools**, tightening is accomplished by *Feel Only* (practice) using a crescent wrench (or equivalent). The nut on a single bolt tool must always be accessible.
10. To introduce medium into the cavity of the Isolation Tool, connect a hose from the pump to the lower fitting and fill until medium begins to seep out of the upper fitting - then attach all hoses.

Part #4 Installation Guidelines

Hydrostatic & Hydrodynamic Isolation

11. Install pressure gauge (300 psi gauge) to the pressure hose on the 12 o'clock position and install fill line from the pump can hose and block valve to the 6 o'clock position.
12. Pressurize system (20 - 50 psi) and maintain static pressure between seals.
13. During pressurization, visually inspect for leakage around Isolation Tool assembly.
14. When no leaks have been found and the pressure gauge holds steady, the Isolation Tool seal is proven.
15. Hook up vent adapter, vent hoses, and vent gauge (30 psi gauge) and vent to a safe area out of the hot work zone.

NOTE: Grounding For practical purposes the tool is essentially grounded to the pipe via water. If pure water is used, you may consider using an external ground to prevent arcing from the pipe to the tool during the welding process.

Part #4 Installation Guidelines

Hydrostatic & Hydrodynamic Isolation

16. Monitor isolations while hot work is being performed to ensure a positive pressure is maintained on the seals. A minimum of 30 - 50 psi is on the Iso Pressure Gauge and 0 psi on the Vent Gauge is required.
17. After hot work is completed and before isolation tool is removed, a gas test must be done at the vent line to ensure safety of technicians before tool, hose assemblies, and vent lines are dismantled.
18. Release the pressure and recover all test medium following notification by the Customer/Inspector that isolation requirements have been met.
19. Disconnect gauge and pump hose assemblies.
20. Loosen compression nut(s) until Isolation Tool is movable within the piping assembly.

SCIT Tool Isolation Trouble Shooting Guide

- ▶ **Purpose:**
- ▶ To provide helpful information that may help solve some problems encountered during the application of Vital services.

There are sections below that address problems that may occur in the following applications:

Hydrostatic Isolations

SCIT Tool Isolation Trouble Shooting Guide

Hydrostatic Isolation Tool

The isolation tool protects you, the customer, and property from potentially catastrophic consequences. The intent of the tool is to isolate the piping system from workers and prevent the release of deadly and /or explosive gases and fumes into the area. If a problem is encountered, necessary steps must be taken to maintain a safe work environment.

PROBLEM Loss of Hydrostatic Pressure

CAUSE Hydrostatic barrier is lost. Medium is leaking from tool, through the hose assembly, the front seal or back seal.

EFFECT The tool will still maintain an isolation via the remaining seal, but the extra safety factor provided by Vital technology has been lost.

SCIT Tool Isolation Trouble Shooting Guide

Hydrostatic Isolation Tool

SOLUTION

1. Stop any hot work

2. Investigate the source of pressure loss. If the medium is leaking from:
 - a. Hoses, fittings, or assembly, then either re-tighten fittings or re-seal the fittings with Teflon tape to achieve a positive seal.
 - b. The front of the seal? Re-establish pressure if possible or adjust front seal until a positive pressure is achieved.
 - c. Neither of the above, the back seal is bad. Re-establish pressure if possible or maintain positive pressure through continuous pumping.

SCIT Tool Isolation Trouble Shooting Guide

Hydrostatic Isolation Tool

SOLUTION

3. If unable to maintain positive pressure using above methodology:

Stop work

Clear area

Reinstall following the tool installation procedure

SCIT Tool Isolation Trouble Shooting Guide

Hydrostatic Isolation Tool

PROBLEM **Pressure Noted on Vent Gauge**

CAUSE There is an increase in pressure in the venting assembly of the isolation tool. Either the vent system has been plugged or there is pressure building up behind the tool faster than it can be vented from the venting system.

EFFECT The tool is now operating as a plug, instead of the isolation and venting tool as designed.

SCIT Tool Isolation Trouble Shooting Guide

Hydrostatic Isolation Tool

SOLUTION

If any pressure is noted on the vent gauge, immediately:

- Stop work
- Clear area
- Report problem to operations
- Keep area clear until problem is solved
- Only re-enter area when operations has reported that it is safe to do so (may require gas test, a new permit, and additional PPE)
- When returning, check isolation tool to ensure it is still intact and gauges are reading proper pressures

SCIT Tool Isolation Trouble Shooting Guide

Hydrostatic Isolation Tool

PROBLEM Pressure or Vacuum on Isolation Tool (removing tool)

CAUSE Thermal expansion and cooling can occur on piping when the pipe heats up or cools down. For example, when the pipe heats up during the day, the heat builds up pressure in the pipe which is then vented out of the isolation vent hose. During the evening, when the pipe cools, it can create a vacuum in the pipe and draw air into the vent hose to create an equilibrium.

SCIT Tool Isolation Trouble Shooting Guide

Hydrostatic Isolation Tool

EFFECT If the pipe is venting, potentially dangerous gases may be released in to the area. Caution is needed, and extra PPE may be required. If the piping is under vacuum, the surrounding air is drawn into the pipe.

SCIT Tool Isolation Trouble Shooting Guide

Hydrostatic Isolation Tool

SOLUTION When removing an isolation, first remove the vent gauge and check to determine if the pipe is either:

- under pressure, and venting out of the pipe
- under vacuum, drawing into the vent pipe
- under equilibrium, neither venting or drawing

SCIT Tool Isolation Trouble Shooting Guide

Hydrostatic Isolation Tool

SOLUTION

If the pipe is under pressure, vent to a safe area, until equilibrium is reached, before loosening tool.

If the pipe is under vacuum, remove venting assembly and allow equilibrium to be reached before loosening the tool.

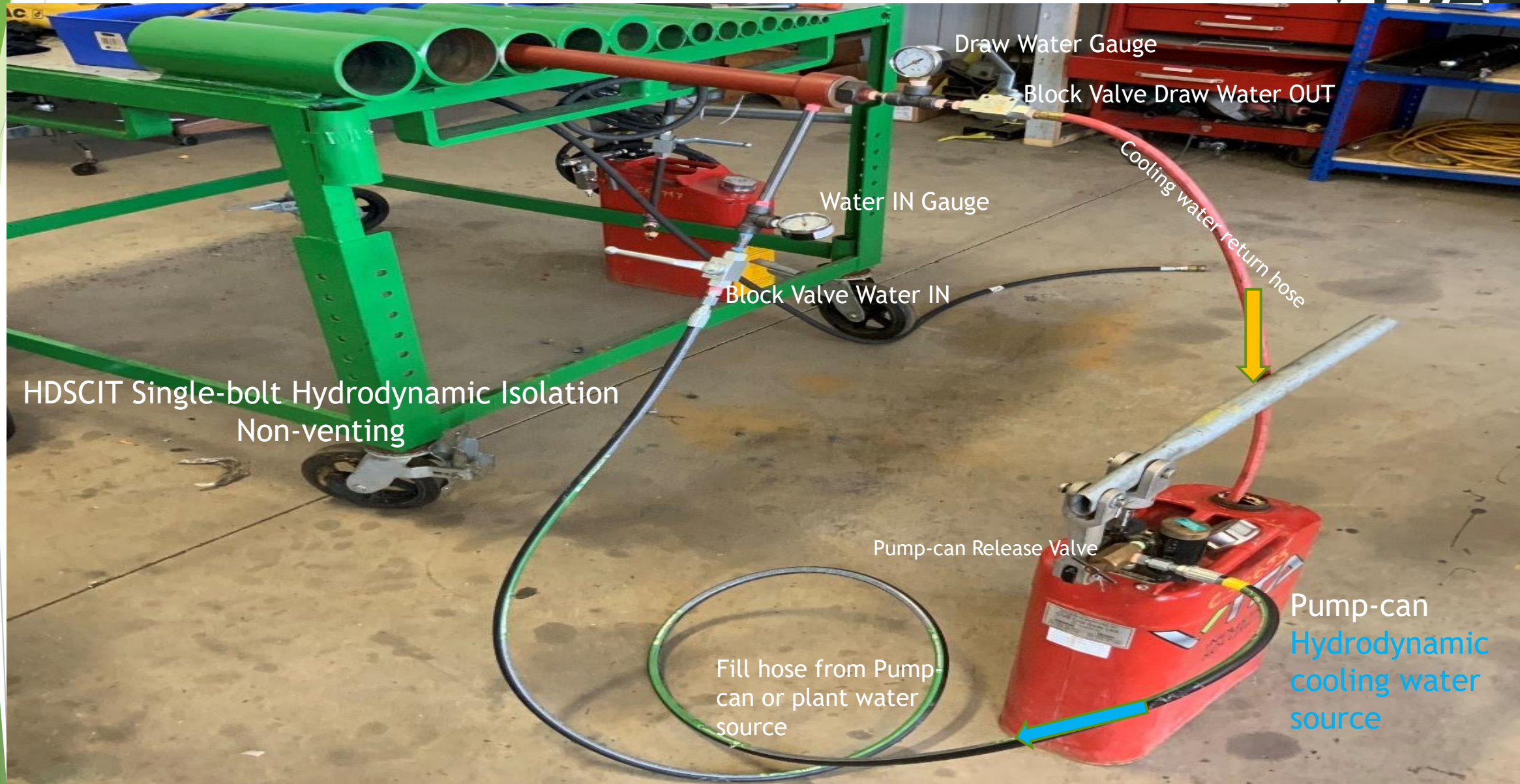
If the pipe is under equilibrium, follow normal procedures.

Part #4 Installation Guidelines

HYDRODYNAMIC COOLING PROCESS

Once the seal has been proven hydrostatically, we can start the HYDRODYNAMIC COOLING PROCESS STEP BY STEP.

NOTE: For multi bolt hydrodynamic isolations the front of the SCIT tool must be packed with insulation to protect from radiant heat for the PWHT process. If this is done properly the tool will remain safe and intact. If it is not done properly the tool will be exposed to the extreme heat and may melt the seals as a result.



HDSCIT Single-bolt Hydrodynamic Isolation
Non-venting

Draw Water Gauge

Block Valve Draw Water OUT

Water IN Gauge

Block Valve Water IN

Cooling water return hose

Pump-can Release Valve

Fill hose from Pump
can or plant water
source

Pump-can
Hydrodynamic
cooling water
source

Part #4 Installation Guidelines

HYDRODYNAMIC COOLING PROCESS

1. Open the Block Valve WATER IN (intake) from water source slowly and open Block Valve WATER OUT (discharge) sufficiently to establish a flow through the Isolation Tool while maintaining a pressure within the Tool cavity (monitored at the inlet). REMEMBER if water source is plant water with higher PSI to regulate at the Block Valve WATER IN.

Part #4 Installation Guidelines

HYDRODYNAMIC COOLING PROCESS

2. The flow through the HDSCIT Tool will need to be enough to prevent overheating of the seal. Discharge flow from the Tool should be no more than warm to the touch and should be monitored for the duration of the PWHT process.

***Cycle cooling water as needed, this can be accomplished through the pump can or
plant water with continuous flow***

Part #4 Installation Guidelines

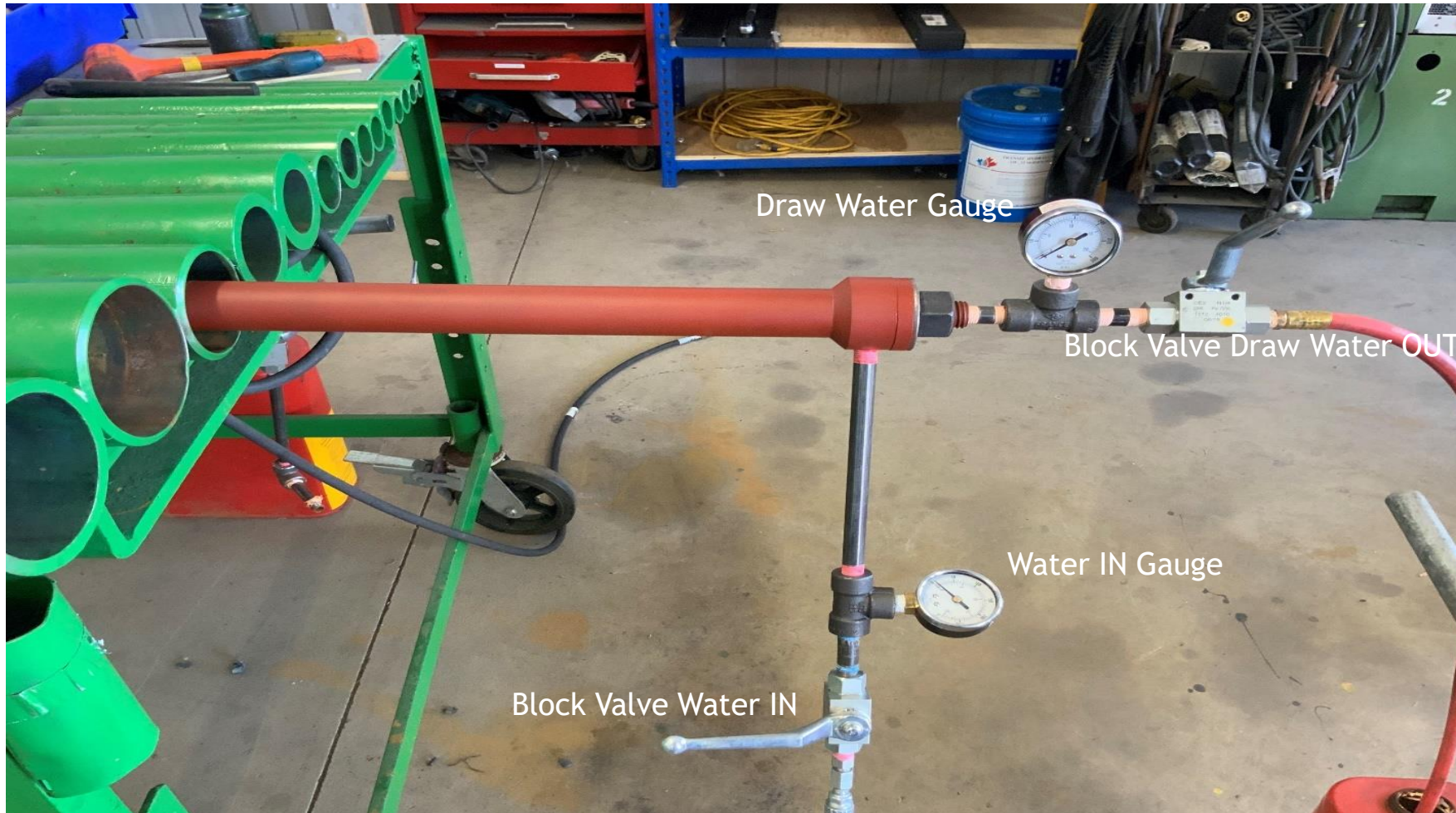
HYDRODYNAMIC COOLING PROCESS

3. Both inlet and outlet pressures must be monitored. A decrease in the outlet pressure and flow without a corresponding decrease in the inlet pressure can indicate a problem with the seals.

Part #4 Installation Guidelines

HYDRODYNAMIC COOLING PROCESS

4. To ensure a Hydrostatic Isolation is maintain you can shut of both the Block Valve on intake and discharge lines and check gauges for WATER IN and draw WATER OUT.



SCIT Tool Isolation Trouble Shooting Guide

- ▶ **Purpose:**
- ▶ To provide helpful information that may help solve some problems encountered during the application of Vital services.

There are sections below that address problems that may occur in the following applications:

Hydrodynamic Isolations

SCIT Tool Isolation Trouble Shooting Guide

Hydrodynamic Isolations

The hydrodynamic isolation is a special application tool that not only acts as a hydrostatic isolation tool, but also prevents the transfer of heat through a continuous flow of water through the tool. This is especially useful when the customer is performing heat treating or stress relieving on piping and piping assemblies.

PROBLEM

Pressure Noted on Vent Gauge

CAUSE

There is an increase in pressure in the venting assembly of the isolation tool. Either the vent system has been plugged or there is pressure building up behind the tool faster than it can be vented from the venting system.

EFFECT

The tool is now operating as a plug, instead of the isolation and venting tool as designed.

SCIT Tool Isolation Trouble Shooting Guide

Hydrodynamic Isolations

SOLUTION If any pressure is noted on the vent gauge:

- Do not turn off the water
- Clear area
- Report problem to operations, they will determine if work shall continue or stop
- Keep area clear until problem is solved
- Only re-enter area when operations has reported that it is safe to do so (may require gas test, a new permit, and additional PPE)
- When returning, check isolation tool to ensure it is still intact and gauges are reading proper pressures.

SCIT Tool Isolation Trouble Shooting Guide

Hydrodynamic Isolations

PROBLEM Loss of Hydrodynamic Flow

CAUSE Hydrostatic/Hydrodynamic barrier is lost. Medium is leaking from tool, through the hose assembly, the front Seal or back Seal.

EFFECT The tool will still maintain an isolation via the remaining Seal, but the extra safety factor provided by Vital technology has been lost. Additional hazards may be introduced into the work area. These can include steam and water. The steam is a potentially dangerous heat hazard that can cause severe burns. The water can create slip hazards, or in the presence of electricity (heat treating elements), can create a shock hazard.

SCIT Tool Isolation Trouble Shooting Guide

Hydrodynamic Isolations

EFFECT - cont'd

In all cases, you must continue to pump water through the tool until the pipe system has cooled. If the flow of water to the tool is stopped, the tool Seal system can melt / burn, the tool can be damaged, and the heat will not be safely isolated, creating a potentially dangerous environment.

SCIT Tool Isolation Trouble Shooting Guide

Hydrodynamic Isolations

SOLUTION

- Do not turn off the water
- Investigate the source of pressure loss.
- If the medium is leaking from hoses, fittings, or assembly and it is safe to do so, either re-tighten fittings or re-seal the fittings with Teflon tape to achieve a positive seal.
- If the medium is leaking from the back seal, continue with the heat treating or stress relieving. Notify operations that water is leaking into the line in the event the line is moisture sensitive. Continue to pump water through the tool.

SCIT Tool Isolation Trouble Shooting Guide

Hydrodynamic Isolations

SOLUTION - cont'd

- If the medium is leaking from the front seal, significant steam will be generated, and the heat-treating process will be in jeopardy.

Immediately:

- Do not turn off the water (this is the instinctive reaction)
- Clear area
- Contact operations, the customer and the stress relieving personnel. They will determine the next steps to be taken and whether the work will continue or not. In all cases, the water must be left on until the tool has cooled sufficiently.

SCIT Tool Isolation Trouble Shooting Guide

Hydrodynamic Isolations

SOLUTION - cont'd

In the rare cases that the hydrostatic barrier is lost, Vital recommends the following remedial action (the customer will determine the best course of action):

- If the heat treating is at the start of the cycle, in the rare instance this happens, it is recommended the heating be stopped, and the tool reinstalled.
- If the heat-treating cycle is at the recommended soak temperature, the recommended procedure is to cool as slow as possible, then x-ray for cracks.
- If the heat treatment cycle is in the cooling stage, the recommended procedure is to cool as slow as possible, then x-ray for cracks.