



Kinetics Controls & Innovation Ltd

Case History

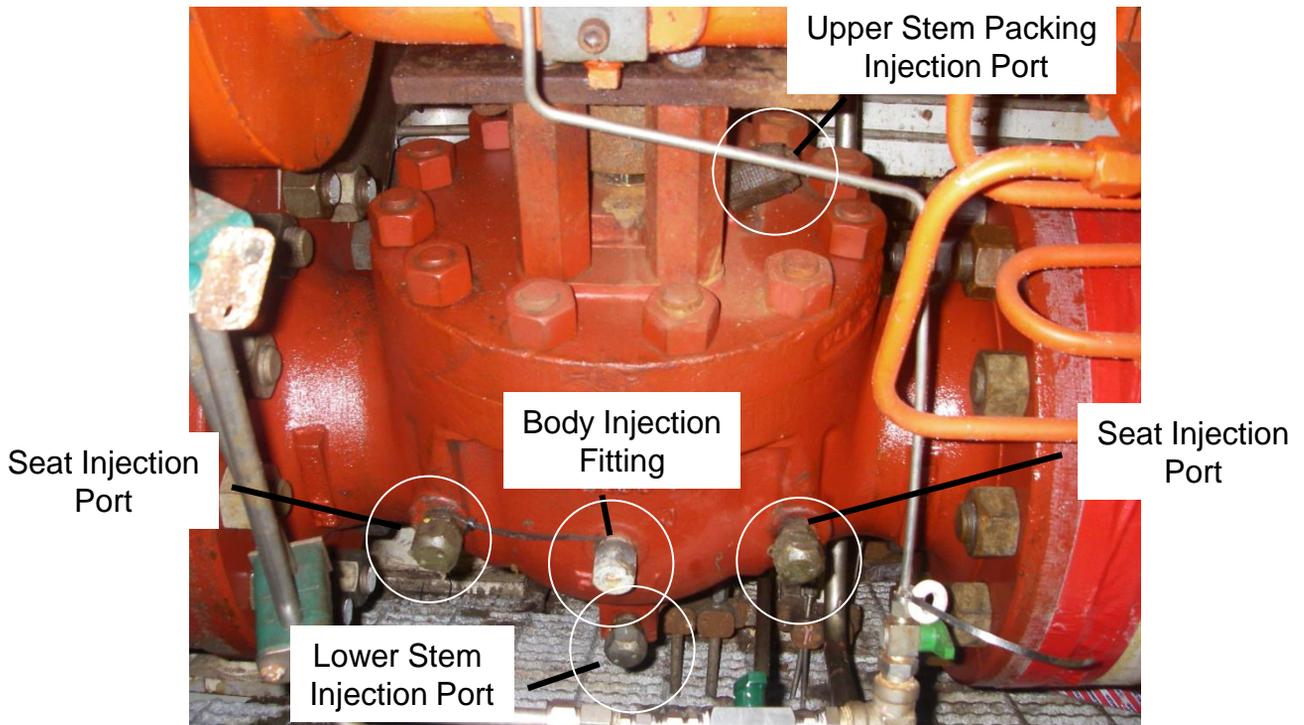
North Sea Platform
Ball Valve Stem Isolation CV 11 8" #600
Mac-Pac / Mac-Seal 02

The following is based on limited information at the time of this evaluation

History:

Indications are that the lower support stem is passing production fluids / gas. The design of this ball valve has an injection port at or between the lower stem seal structure (to be confirmed) which may allow access to inject a high viscosity fluid to support a barrier from the environment.

The object is to provide products and procedures to suit an on-the-job evaluation deployment and contingency measures.



CV 8" #600 Ball Valve

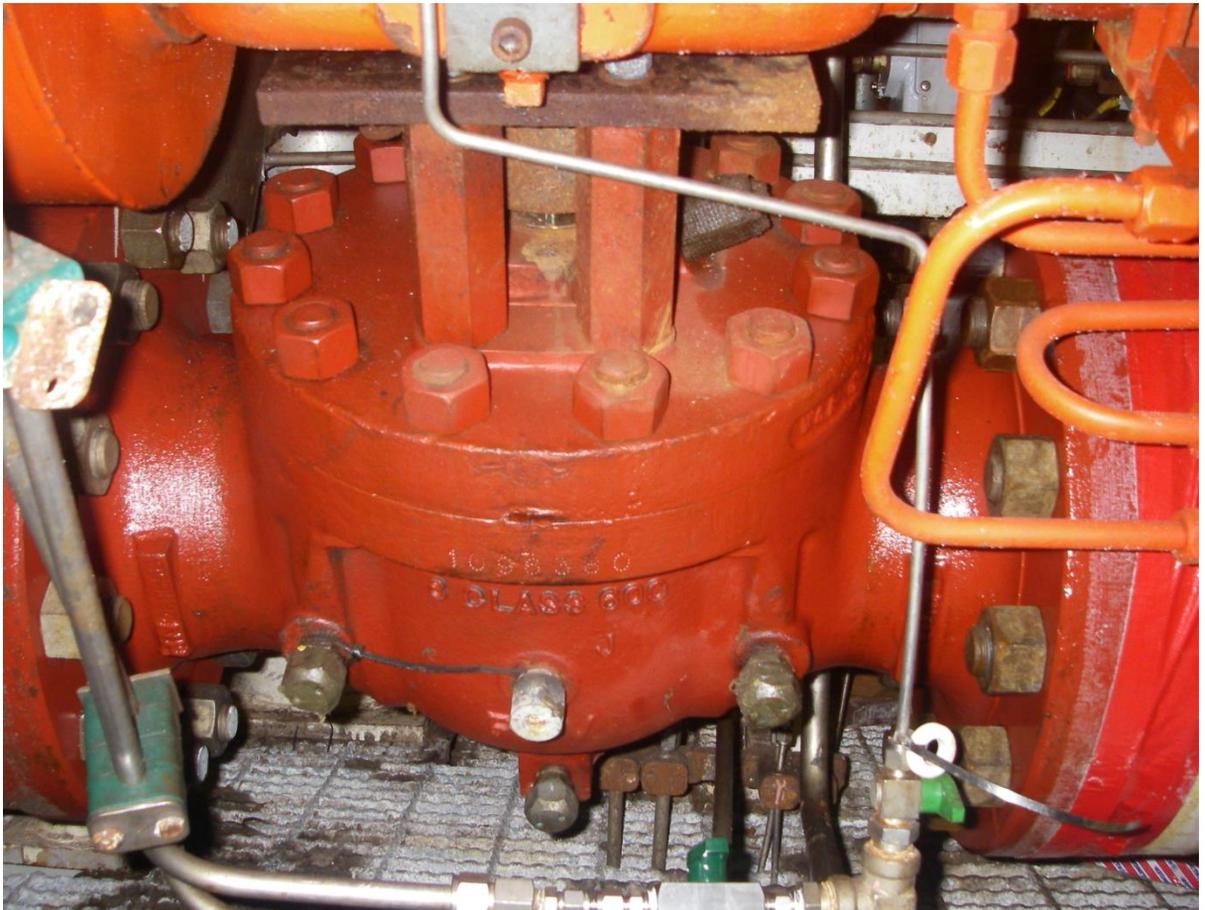


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The valve is in the horizontal position as seen in this photograph and has an operating pressure of 700 to 800psi at a temperature of 25°C.

Information required:

- Valve internal drawing.
- Lower stem attachment to the ball i.e. Will the lower stem rotate when opening the valve?
- Can the ball be functioned during sealant deployment?
- Can the line pressure be bled down before sealant deployment?
- What is the current leak rate?



CV 8" #600 Ball Valve



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KCI Products

Mac- Pac:

The Mac-Pac is a high viscosity sealant designed as a high / low temperature sealant with lubrication support properties. The temperature range is -50 to 250°C. The product is used as a sealant with gate, ball and plug valves, also within high / low temperature stem packing areas. **Note:** subject to the application.

The Mac-Pac is used as a fluid type seal structure and maybe required to be re-injected if and when the valve is functioned which is subject to the size of the leak path and pressure support requirements.

The Mac-Pac is provided in stick form and can be placed in a standard grease injection gun.

Mac-Seal 02

The Mac-Seal 02 is designed as a static seal i.e. once deployed the sealant will convert from a fluid to a flexible solid and bond with the existing cavity / void profile. This product is self-energising with pressure from above or below but will lose its sealing structure if disturbed i.e. by operating the valve (lower stem). This product is not recommended if the valve is to be functioned. The valve can remain in the open position as part of the production line until access can be obtained to complete the repair.

Note: Once the Mac-Seal 02 has been injected you will not be able to obtain further access as the injection port will be blocked. The Mac-Seal 02 can be removed mechanically and will peel free without surface damage to the existing metal parts and damaged rubber seals

The Mac-Seal 02 is provided as a two-part structure i.e. compound and hardener. Both products are mixed and poured into the deployment tool (standard grease injection gun).

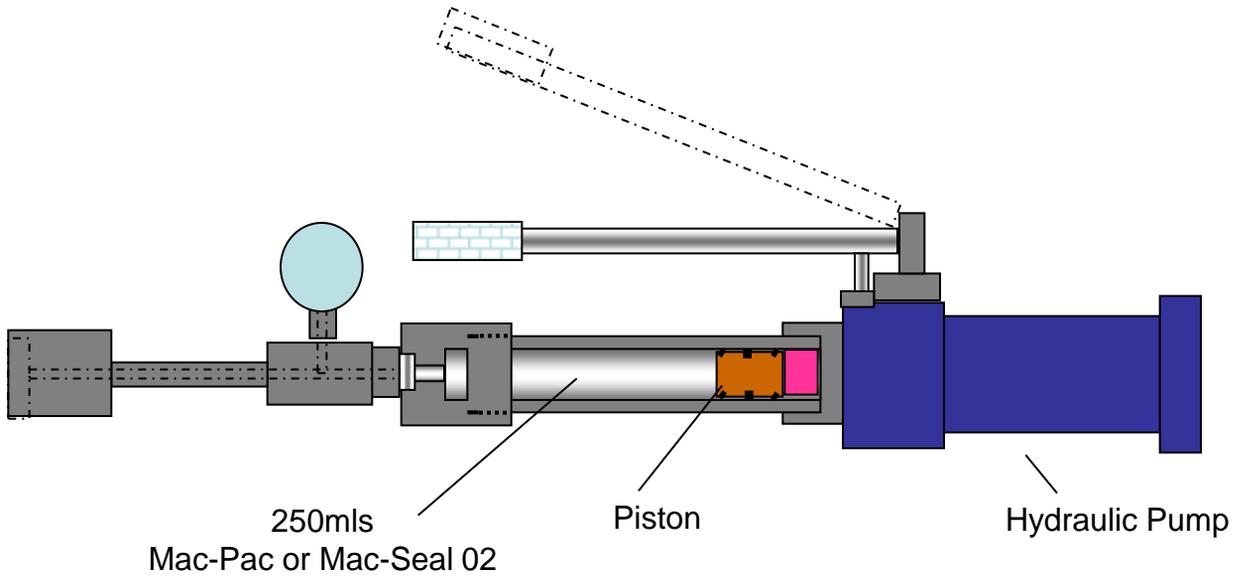
The hardener volume will be designed to meet the setting time, normally 2-1/2 hours, subject to the application. This can be shortened or extended to suit.



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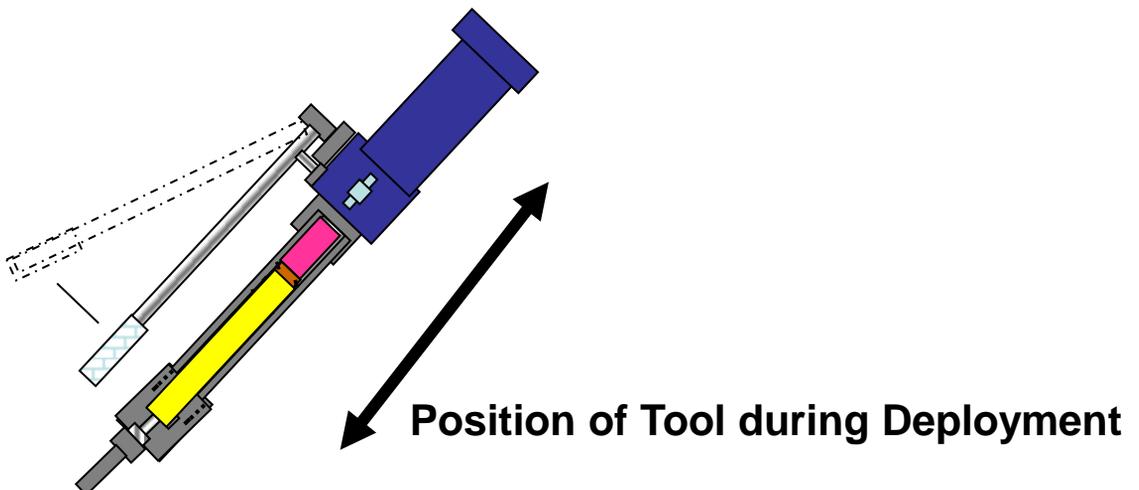
Tooling:

Hydraulic hand pump, tee piece, pressure gauge, feed line and button design injection fitting.



10,000psi W.P.

Note: Estimated fluid volume at the lower stem is 100mls





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Evaluation review:

Function valve if possible to determine lower valve attachment to ball, This will confirm which product to use.

Bleed down line, this will support the application (dose not look possible).

Procedure Overview:

Mac-Pac:

Inject Mac-Pac through lower stem injection fitting. Due to the viscosity the pressure should stand up on the gauge, but bleed down slowly.

Open and close the valve to displace the sealant

Note: only if the lower stem is attached to the ball.

The pressure on the tool gauge should drop during each function indicating sealant displacement throughout the stem seal cavity. This will eventually hold pressure at a higher pressure than line pressure. Visually inspect the external area for leakage. If holding, bleed off the tool and disconnect. Visual inspection to confirm isolation.

If leak is still present inject additional sealant.

Mac-Seal 02: (Subject to the stem being static)

With the stem not rotating this will allow the Mac-Seal 02 to be deployed, but due to the issue with line pressure there will be a situation where the line pressure will push the sealant fluid down through the leak path before the product can convert to a flexible solid . To support this it is recommended that a small amount of Mac-Pac is injected into the stem cavity as a support structure 50 mls followed by 250mls of Mac-Seal 02.

Some of this sealant may go into the valve cavity but this will have no effect when the valve is functioned.

Both Mac-Pac and Mac-Seal are compatible.

Maintain pressure until the sealant is set or the sealant has been displaced.