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AESSEAL® plc

CONDENSATE

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DEC '04

CONDENSATE INSTALLATION

When selecting and installing suitable Barrier Fluid System for your Double Seal application consideration should be given to the following selection parameters. These parameters must also be considered in conjunction with your specific site standards and requirements.

1. **Materials of Construction**

Consideration must always be given when selecting and installing a barrier system to the suitability of its materials of construction with reference to the environment and process within which it will be operating.
A full list of system materials of construction is available on request.

2. **Barrier Fluid**

   a. When selecting and installing a Barrier Fluid the site must determine its compatibility with the process to which it is to be applied. Consideration must also be given to personnel and environmental exposure when selecting and installing the barrier medium and appropriate precautions taken and protective equipment and clothing worn.
   b. The flammability and auto ignition characteristics of the barrier fluid must be considered in conjunction with the system surface temperature and its location to other equipment.
   c. Vaporisation must also be considered. Barrier fluids such as solvents should not be used due to their low vaporisation temperatures.

3. **Temperature**

   a. Site specific surface temperature limits must always be considered. Where the surface temperature of the system is likely to exceed these site limits a guard should be placed around the system.

4. **Pressure**

   a. All pressure vessels are tested to 1.5 times the recommended working pressure. When considering a specific site pressure requirement the pressure rating of the system components must also be considered. Such items as the tubing where the temperature and pressure relationship should be understood. Details are available on request.

5. **Electrical Requirements**

   a. Electrical requirements will be site specific set against the applicable local or National Standards. A Systems Application Form should be completed by the customer when ordering a system and this will indicate the electrical classification required.

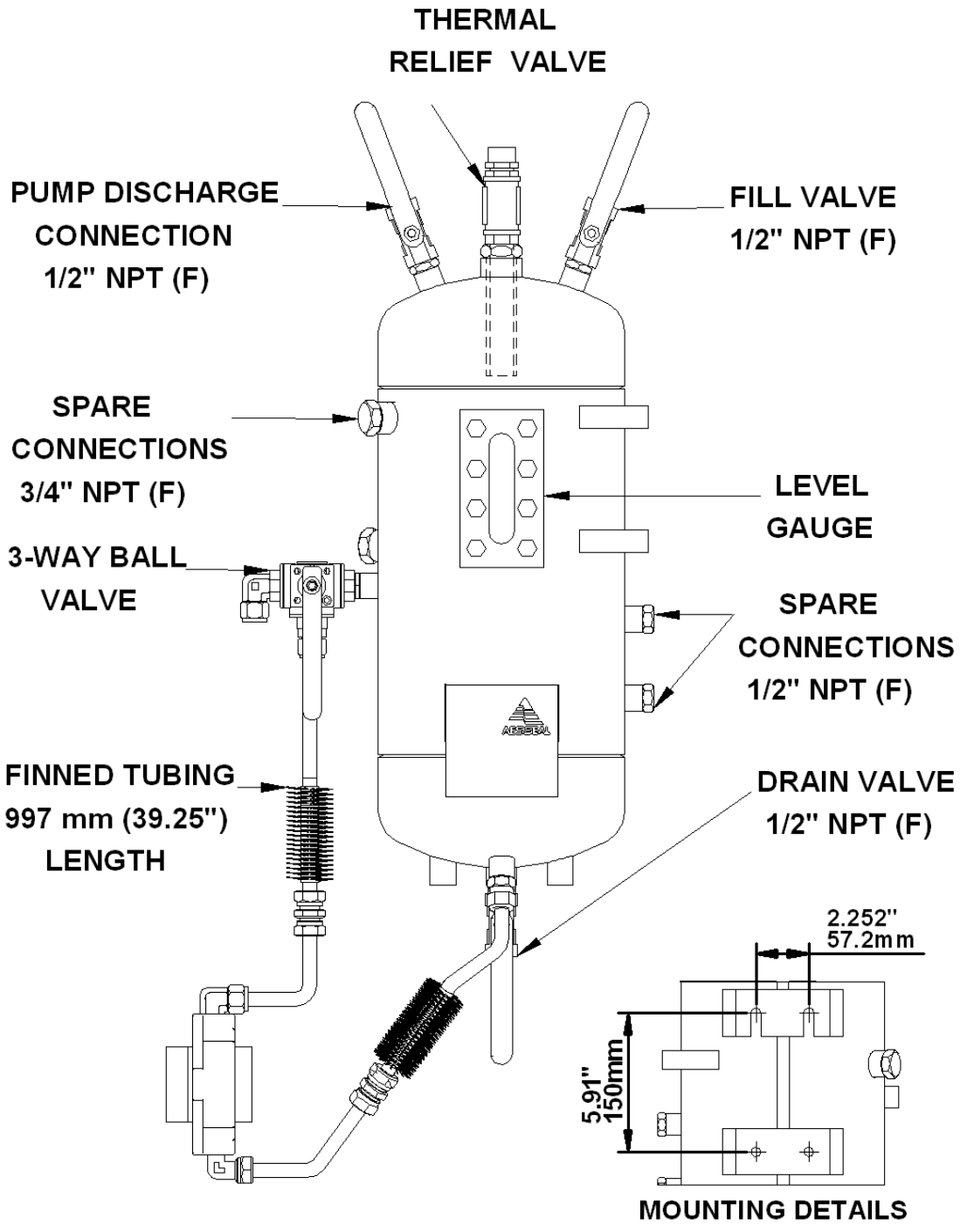
DECLARATION OF INCORPORATION

This Mechanical Seal Support System must not be put into service until the relevant machinery into which it is incorporated has been declared to be in conformity with the provisions of the Machinery Directive.

James F McKeever
Managing Director,
AESSEAL (MCK) Ltd.

ENVIRONMENTAL TECHNOLOGY

INSTALLING & COMMISSIONING A CONDENSATE SYSTEM



PRESSURE EQUIPMENT DIRECTIVE COMPLIANT

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TYPICAL DUTIES

- General Purpose Condensate System

GENERAL SPECIFICATION

Description:	High Performance Condensate System, which should be connected directly to a suitable Condensate Pump Discharge Port to form a low maintenance, high reliability barrier fluid support system. In normal operation the pump pressurises the vessel, but negligible water is drawn. The "thermosyphon" effect (natural convection) ensures that the seal is kept cool. In the meantime the integrity of the barrier is maintained to extend seal life and prevent any loss of product.
Standard Equipment:	Vessel Fill Valve Pump Discharge Connection Valve Thermal Relief Valve Level Gauge 3-Way Ball Valve Drain Valve Finned Tubing
Options:	Stainless Steel Hose Kit
CS3 coding:	M7 VAS/CONDES-15
Literature:	n/a
Price List Ref:	Current issue in the "Systems" folder in the 'In-Use Directory'
Availability:	2-4 weeks from placement of order

TECHNICAL FEATURES

❖ ***Vessel:***

Construction:	In accordance with ASME VIII Div 1 rules. All Welders to have current WPQR's coded to ASME XI. All pressure welds to have current supporting PQR's.
Material:	316 Stainless Steel body
Finish:	Glass Bead Blast finish
Capacity:	15 litre (4 US Gallons) nominal capacity
Pressure Ratings:	Maximum working pressure 30 bar(g) @ 200°C (435 PSI @ 392°F) Vessel tested to 45 bar(g) (650 PSI)

Connections:		
	Top Port	1" NPT
	Pump Discharge Connection Port	½" NPT
	Fill Valve Port	½" NPT
	Vessel Drain Port	½" NPT
	Seal feed line Port	½" NPT
	Seal riser line port	½" NPT
	2 x Instrument Connection Ports	½" NPT
	2 x Level Switch Connection Ports	¾" NPT

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❖ ***Fill Valve / Pump Discharge Connection Valve / Drain Valve:***

Description: Allow the filling of the vessel with liquid, attachment of the vessel to the discharge port of the pump and drainage of fluid.

Construction: Stainless Steel

Connection: ½" NPT (F)

❖ ***Thermal Relief Valve:***

Description: Allows discharge of the hottest water in the vessel to drain, should the liquid temperature and vessel pressure exceed the desired amount. This should be set at 2 bar(g) above the pump discharge pressure.

Construction: Stainless Steel

Connection: ½" NPT (F) Drain Connection

❖ ***Level Gauge:***

Description: Weld Pad Style, allows the viewing of liquid level within the vessel.

Construction: Mild Steel (Painted), Stainless Steel Option Available

❖ ***3 Way Ball Valve:***

Description: Allows air to escape from the seal during filling, then is manually closed to prevent fluid loss. Allows sampling of the barrier fluid within the vessel and allows 'flushing' of the seal faces if required.

Construction: Stainless Steel

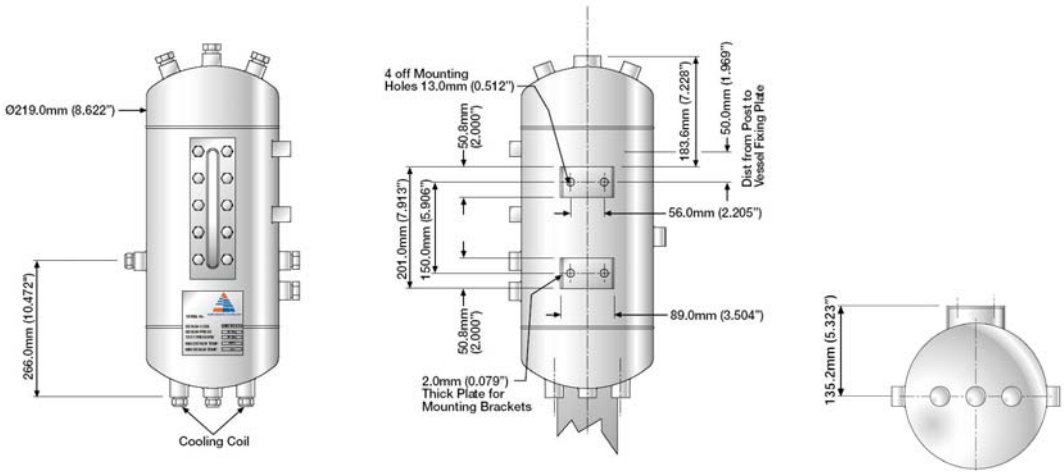
Connections: ½" NPT (F)

❖ ***Finned Tubing:***

Description: Improves heat transfer of the hot water to the colder environment by way of increasing the surface area of the supply and return tubing. Each length (997mm / 39.25") has a surface area of 0.5m^2.

Construction: Cupro Nickel Tube with Copper Finns

INSTALLATION & COMMISSIONING

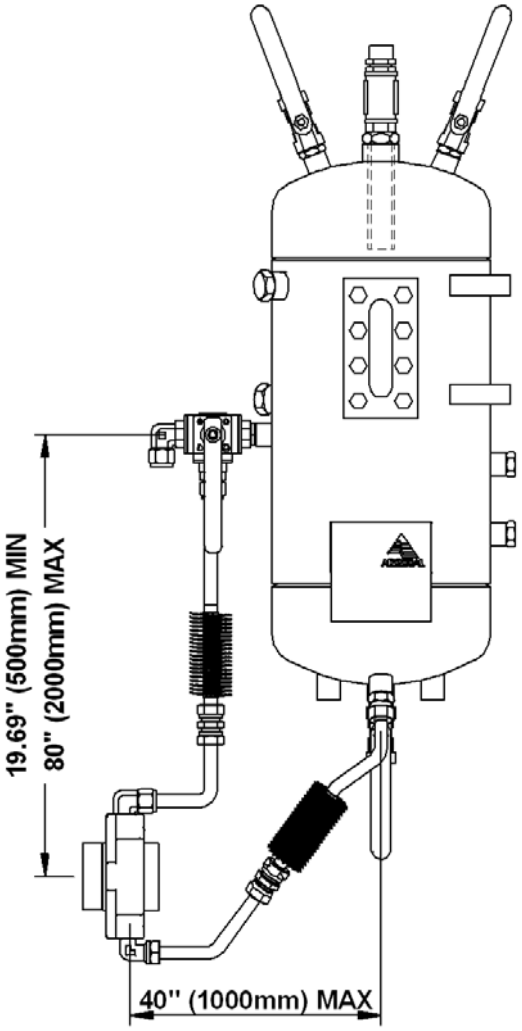


When correctly installed, a thermosyphon barrier fluid system is simple, effective and highly reliable. These guidelines will help ensure trouble free installation and operation.

Pipework: Always use piping which has an **inner diameter** of at least 3/8" (10mm).

Fittings: Do not use fittings with overly restricted bores. If finned tubing is being used, please note that this may be cut, bent and prepared just as ordinary tubing is. In the case where a 28 litre vessel and finned tubing is being used, a taller stand is available on request.

Vessel Mounting: Please ensure that the system is mounted to a bracket/stand which is not subject to vibration. The System should be suitably mounted in a position where the pipe lengths and runs fall in line with those recommended in the drawing below. This will ensure that optimum thermosyphon action will take place.



On vertical pumps, there is a danger that when the system is filled a pocket of air may be trapped in the seal. When this happens, the outboard seal faces will run dry and may be irreversibly damaged. To prevent this, it is advisable to "vent" the outboard faces.

This can easily be done on most seals by gently lifting the outboard rotary from the stationary. You will hear the air escape and then you will see barrier fluid appear. At this point ease the faces back.

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Return pipe run: The riser (hot) pipe MUST NOT SAG. This cannot be overemphasised; the slightest sag can prevent flow. The pipe run must always go upwards.

Priming the seal: **Before connecting the vessel to the Pump Discharge Port, it is imperative that the vessel is filled with cold, clean water.** The cold, clean water supply should be connected to the Fill Valve (1/2" NPT (F)) at the top of the vessel. At this stage, the Pump Discharge Connection should not be connected, and hence the valve may be opened to act as an air vent. During the fill stage, rotate the 3-way ball valve clockwise, and keep the valve in this position until water begins to emerge from the left hand port on the valve. At this point, rotate the 3-way ball valve anti-clockwise (counter-clockwise), and continue filling the vessel.

When the fluid meniscus is around 10mm from the top of the sight-glass, turn the cold, clean water supply off and close the Fill Valve.

The Pump Discharge can now be connected to the Pump Discharge Connection Valve at the top of the vessel. Once this is achieved, open the Pump Discharge Connection Valve, and turn the pump on.

Direction of Flow: In an ideal system the ports on the seal should be vertical and the hot fluid will emerge from the uppermost seal connection, which is then piped to the return (side) connection on the reservoir. In practice the ports may end up being horizontal, but his should not pose a problem if the seal is correctly installed.

When the system is first run, check the direction of flow – i.e. which pipe gets hot. The hot pipe must go to the return (side) connection on the reservoir, or flow may cease after a short while. If the flow is the wrong way round, reverse the connections at seal or vessel. This is, of course, only valid where the ports are horizontal. If the ports are vertical, we would recommend that the seal is re-installed. It should be noted that even a slight concentric misalignment would cause the barrier fluid to flow in the opposite direction.

Commissioning Checks: Check for and eliminate any leaks.

Run the pump (or mixer etc.) and check which pipe gets hot. Reverse pipe connections if necessary on horizontal porting – reset the seal on vertical porting.

Run the system normally for several hours to reach equilibrium temperatures, periodically checking seal inlet and outlet temperatures. The riser temperature must not exceed 80°C (176°F), and also the feed/riser temperature difference should not exceed 25°C (45°F). If the riser temperature exceeds 80°C (176°F), it may become necessary fit a guard around the system to prevent personnel injury.

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