

Plan 52 and Plan 53A Systems

Installation, Operation & Maintenance Instructions





Health and Safety

- This system has been designed for use only as a barrier fluid system for mechanical seals using a suitable non-hazardous barrier fluid.
- Isolate the process and power on installation, maintenance and decommissioning and ensure that the system pressure has been relieved before undertaking maintenance.
- The system should only be installed by competent engineering personnel
- Electrical connections must be made in compliance with applicable legislation and / or local requirements by a competent / qualified electrician.
- If there is any risk of FIRE, the system must be fitted with a suitable pressure relief device to prevent over-pressurisation.
- Pipe relief valves discharge to safe area (when fitted).
- Pressure test the complete system assembly at 1.1x maximum working pressure (duration 5 minutes) and ensure the system is completely leak free before full operation.
- Do not over-pressurise the system beyond the maximum design pressure. If there is any possibility of over-pressurisation, the system must be fitted with a suitable protection device.
- Do not exceed the operating limits of the system. Not designed for cyclic loading.
- The system may get hot in operation with risk of burn injury, and suitable engineering controls or guarding should be adopted where necessary. The risk from Legionella bacteria should be assessed with water barrier fluids at temperatures between 20°C to 45°C (68°F to 115°F).
- If the barrier fluid becomes contaminated it is recommended that the barrier fluid is replaced taking necessary precautions. If the contamination is potentially corrosive or damaging to the system remove from service and contact AESSEAL for technical advice.

User Notice

Pressure regulators are not in the scope of supply for these systems. Under API 682 4th edition, where safety considerations allow, AESSEAL plc recommends the use of a regulator which is of a self-relieving design on the inert gas supply line. For high hazard sealing applications, the use of a non-relieving regulator is advised.



Environment

Once the barrier fluid and system have reached the end of its life, it should be disposed of in accordance with local regulations and with due regard to the environment.

For further information please contact **AESSEAL®**

Installing & Commissioning

Typical AES-28 Vessel with Options

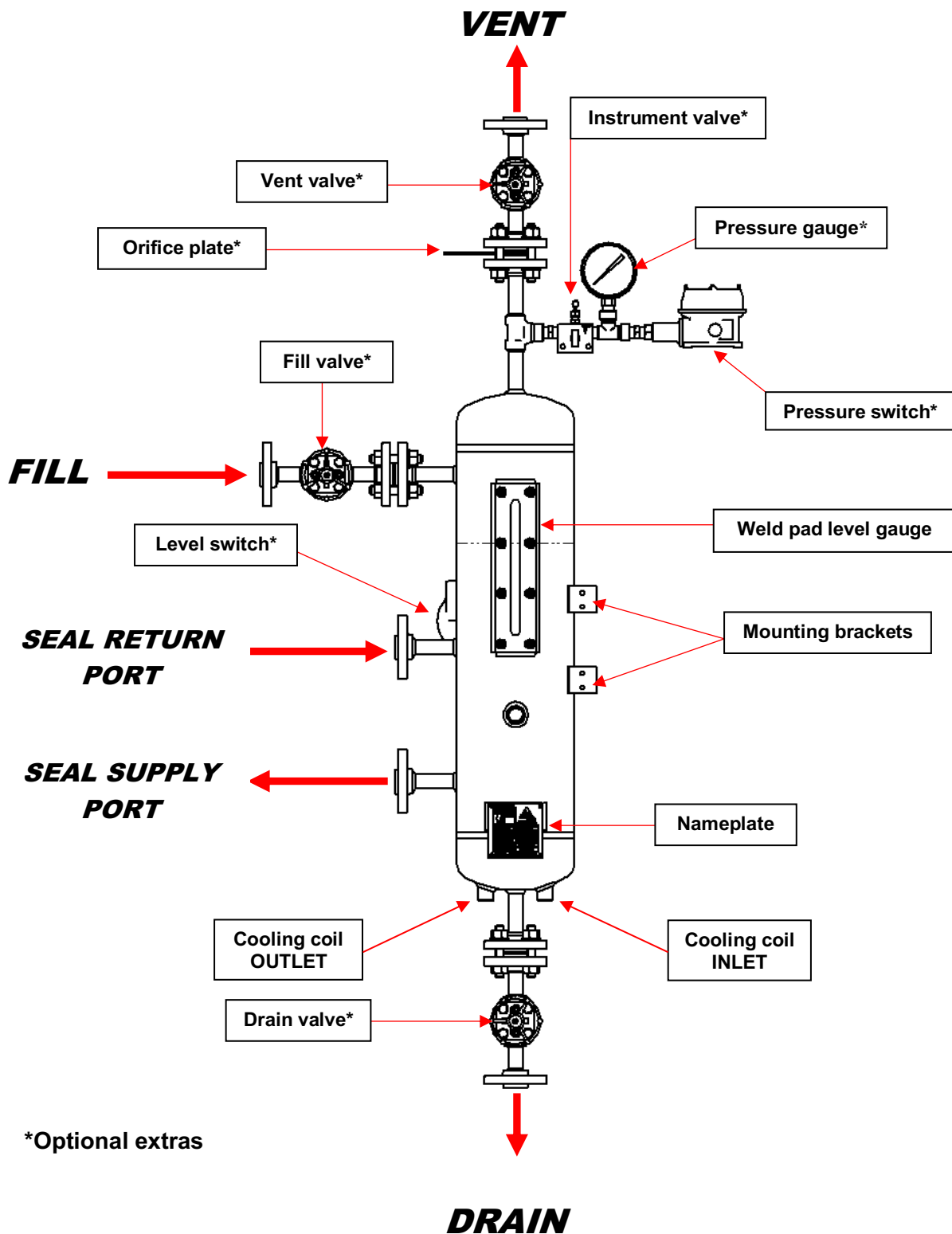
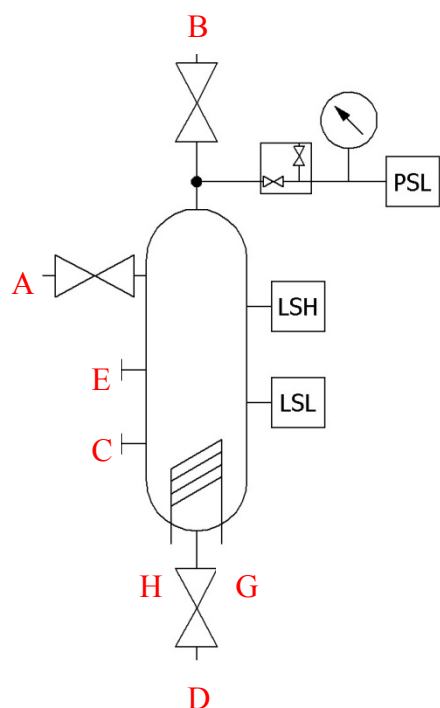
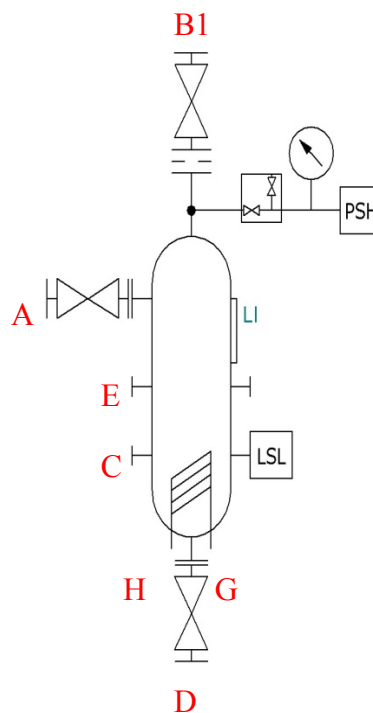


Fig.1 Typical layout (PLAN 52 shown)

Please also refer to the drawing contained in the document pack whilst reading these instructions!

Fig. 2a & 2b Typical P&ID Configurations

Fig.2a Plan 53A with
Screwed connectionsFig.2b Plan 52 with
Flanged connections

Installing & Commissioning

Connections

Make all connections & ensure that the seal supply and return pipelines do not sag and have no sharp bends:

A Fill barrier fluid port/Pressure connection

B N2 Inlet connection (PLAN 53A)

B1 Vent to safe area point (PLAN 52)

C **TO** Seal supply point

D Drain connection

E **FROM** seal return point

G Cooling coil **INLET** connection

H Cooling coil **OUTLET** connection

- Install the vessel in a suitable location, which is free from vibration and no more than 2 meters / 80" above vertically, and 1 meter / 40" from the side horizontally of the mechanical seal. Nb. See below for cooling coil commissioning details.
- Using the 4 off 11mm diameter holes in the mounting brackets, mount the vessel in a position so it is easy to monitor and maintain.
- Check that any isolation or instrumentation valves are open and close the drain valve **D**.
- **PLAN 53A** system: Connect an external N2 gas supply to the inlet **B** connection and check for leaks.
- **PLAN 52** system: Make sure the vent valve **B1** is open.
- Begin filling the vessel with the selected barrier fluid through the FILL port until the level is 25mm / 1" below the top of the weld pad level gauge.

- Close the fill valve **A**, disconnect the external barrier fluid supply and check for any leakage. Connect the N2 gas supply to inlet **B** (PLAN 53A) using appropriate piping. See Regulator instructions for setting pressure.
- Increase the N2 gas supply pressure until the required barrier fluid pressure is attained and check for any leaks. Tighten any joints necessary if a leak is detected.
- Ensure that the external gas supply to the vessel remains on after commissioning is complete.
- Check and review all the instruction manuals before starting the pump.
- Start the process pump then turn off after a few seconds. Check the fluid level in the vessel and refill if necessary, following the above procedure. Completely vent all the lines and seal chamber then top-up the barrier fluid if required.
- Re-start the pump, adjust the pressure until the required operating pressure is registering on the pressure gauge. Regulate any instrumentation necessary for the system to work at the correct operating parameters.
- Note: 1.4 bar / 20 psi is the minimum differential pressure when operating a double mechanical seal. Some sites may prefer to operate in the range of 1.4 to 4.1 bar / 20-60 psi dependant on seal type and operating plan.

Cooling Coil

- If required for optimum cooling conditions and performance, connect an external water supply to the cooling coil port **G**, and water return to drain outlet **H**. Once both connections have been made, turn the water supply on. The flow rate should typically be >2 Litres/min.
- Ensure that the water supply to the vessel remains on constantly during operation after commissioning is complete.

Operation

- When the system is first run, check the direction of flow, i.e. which pipe gets hot, as one pipe will be hotter than the other. The pipe that gets hot **MUST** go to the return port on the vessel **E**, or flow may cease. If the flow is incorrect reverse the connections at the seal or vessel.
- The barrier system will need to be closely monitored for variations in pressure, temperature, and barrier fluid level the first 2 to 3 hours until equilibrium temperature is achieved. Check for signs of leakage from seal, system, and pipe work. Attention should be given to the system instrumentation and weld pad level gauge for vessel fluid level.
- The barrier fluid temperature should be measured close to the vessel, and be <80° C, although this is dependent on the process liquids temperature being used and operating conditions.

Vessel Specifications

Design pressure	45 bar G (652.67 psi G)
Test Pressure	67.5 bar G (979.0 psi G)
Max. design Temperature	100°C (212°F)
Min. design Temperature	-20°C (-4°F)

- *For AES28 Systems, when used with a water based barrier/buffer the Chloride content should not exceed 250ppm*

Vessel	Volume (Total)	Volume (@NLL)
AES12	15 Litre (3.96 US gal)	12 Litre (3.17 US gal)
AES28	28 Litre (7.4 US gal)	20 Litre (5 US gal)

NOTE - System specifications vary depending on components fitted; refer to system nameplate or AESSEAL for system specific details

Maintenance

The system should be maintained in accordance with site standards, or local regulations.

Daily

- Check and record the system pressure reading, any change may be a sign of a developing problem, such as a blockage/advanced seal leakage.
- Check for signs of leakage from seal, system, and pipe work.
- Check barrier fluid level/temperature and top-up/adjust as necessary.
- Make sure water supply to cooling coil is on, the temperature, and record the flow rate.
- Check any alarms on the pressure and level switches or transmitters if fitted.

Monthly

- Any filters (If fitted) should be inspected every month and changed if contaminated/blocked.
- Any discolouration of the barrier fluid or contamination of the filter may be an indication of leakage of the inboard mechanical seal and should be investigated immediately.

After 5 years

- We also recommend that after 5 years a complete internal and external inspection is conducted of the vessel, and all the systems component parts.

After 10 Years

- The system / vessel should be subjected to a complete and thorough examination, including the undertaking of a full system hydrostatic proof pressure integrity test by a suitably qualified and competent person*. AESSEAL recommends this should form part of the written scheme of examination as per the PSSR 2000 regulations.

** AESSEAL offers a full examination, integrity testing and refurbishment service (or, where necessary, a replacement system / vessel), to ensure continued optimum and safe system performance.*

Optional Extras

Finned Tubing

- Install any supplied lengths of finned tubing by connecting one length to the seal supply connection **C**, and the other to the seal return connection on the vessel **E**.
- The end user will supply and connect the hard pipe from the seal to the finned tubing.

Pressure & Level Transmitters

- Adjust the pressure and level transmitter until desired working settings are reached, consult manufacturers operating manuals for any technical information.

If you have purchased other optional extras, please refer to the installation instructions supplied by the manufacturer.