



PART OF G&O MARITIME GROUP 

Technical white paper  
Upgrade of HS-ISO with Resilient Seal

## Resilient Seal for HS-ISO

The HS-ISO Pressure valves are now available with a Resilient Seal placed in the seat of the pressure unit. Existing HS-ISO valves can be



*HS-ISO in Stainless steel execution*

upgraded with the new Resilient Seal by replacing the seat, the magnet and the tag-plate on the existing valves. The upgrade complies with the newest rules and regulations.

The Resilient Seal addresses the demand for reduction of leakage from cargo tanks and reduces wear rates on valves in the seat and disc area.

The Resilient Seal upgrade is available both as parts and as a complete certified plug-and-play kit that can be fitted after gas freeing of the tank.

New complete HS-ISO valves can also be ordered with the Resilient Seal feature.



*Viton Resilient Seal in HS-ISO seat*

### The Resilient Seal

One of the main new features, that help ship owners reduce gas leakage from cargo tanks, lower cost and minimize wear and tear on the seat and disc, is the Resilient Seal.

The incorporation of the Resilient Seal in the seat of the HS-ISO pressure unit is based on the experience gained from the PV-VOC.

The Resilient Seal reduces wear and tear on the seat and disc, reduced leakage and makes maintenance of the valve easier. Keeping the valve nozzle clean is however still the most important precautions that need to take place to get the best performance out of the Resilient Seal and have the lowest wear and tear on the seat and disc.

Vessels caring oil products have the biggest gain by implementing the Resilient Seal in the HS-ISO. The presence of dirt and cargo residual in the nozzle area from oil produces, accelerates wear rates compare to e.g. chemical tankers where cargoes are cleaner and the distance from the cargo tank to the valve are longer.

The Resilient Seal is made from an NBR or Viton composite material depending on the application. The Viton composite (green color) is more chemical resistant and therefore used for smaller ISO valves, wheatears the NBR is used where the seal will be exposed to hydrocarbons, oils and petrol i.e. on large vessels with large ISO valves.



The Resilient Seal is designed in such a way that dirt and particles caught between the seal or disc reduce pitting on the disc. The biggest factor here is again how clean the nozzle area is kept. At the same time will the resilient

seat secures a lower leak rate compares to metal-to-metal because of the flexible characteristic of the material.

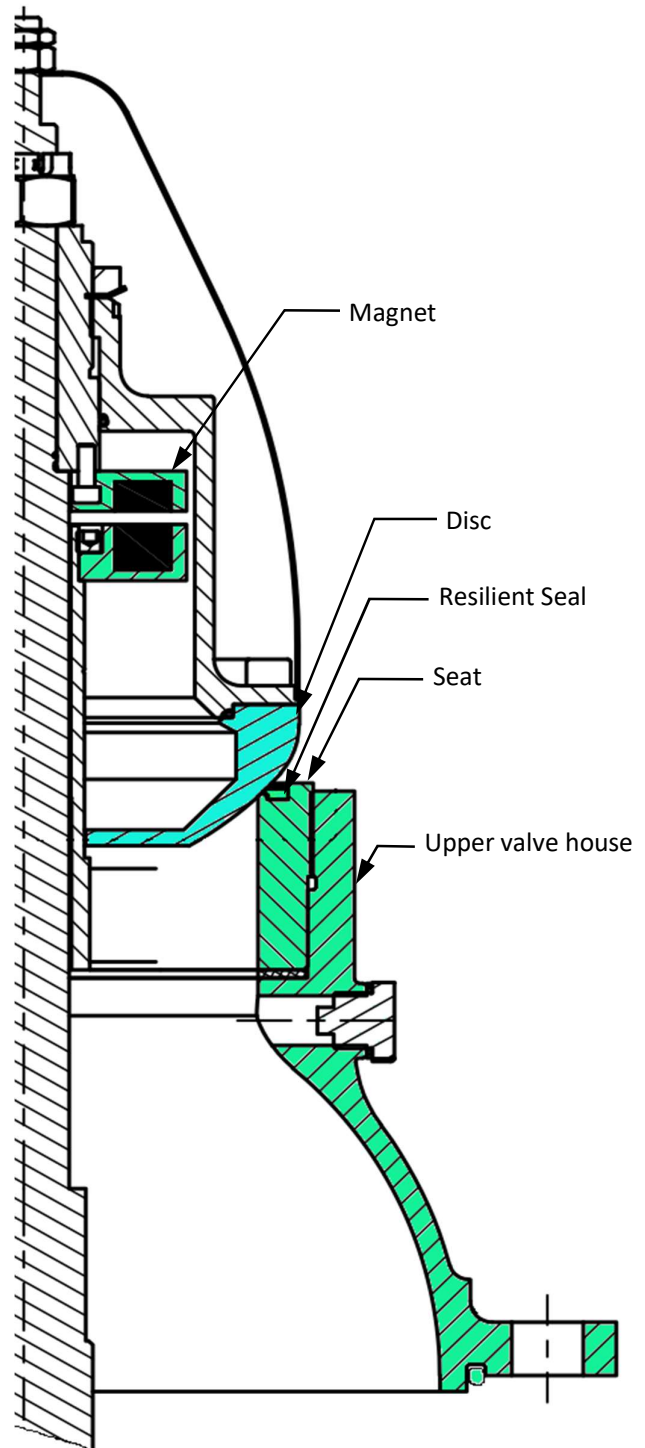
### Leak rates

Low leak rates are important because of new regulations implemented in ISO15364:2016. Here it is defined how much a valve can leak at any time. For the smallest PV valves, this is 2,3 l/min which is checked and verified when leaving the factory.

For vessels owners, this means that they, in theory, can be asked to verify that the valve does not leak more than defined in API 2000/ISO 28300 and ISO15364:2016. The Resilient Seal will here be a tremendous help, provided that the nozzle is kept clean, to stay below the require limits compares to a metal-to-metal solution.

### Changes to the HS-ISO

Implementing a Resilient Seal will not cause any changes to the flow capacity of the HS-ISO. The flow rates and flow characteristics for the HS-ISO valves with the Resilient Seal are the same as without Resilient Seal. Since implementing a Resilient Seal is as a design change it is required that the HS-ISO is recertified according the latest rules and regulations.



*Section of HS-ISO top, colored parts are part of the recommended spare part kit*

Pres-Vac has therefore recertified the HS-ISO to comply with ISO16364:2016 and ISO 16852:2016 among others. To comply we have had to upgrade the magnet to a new type. This PV-

Barium magnet is therefore a mandatory part of the Resilient Seal Upgrade kit.



C-Kit for HS-ISO

### Upgrade overview

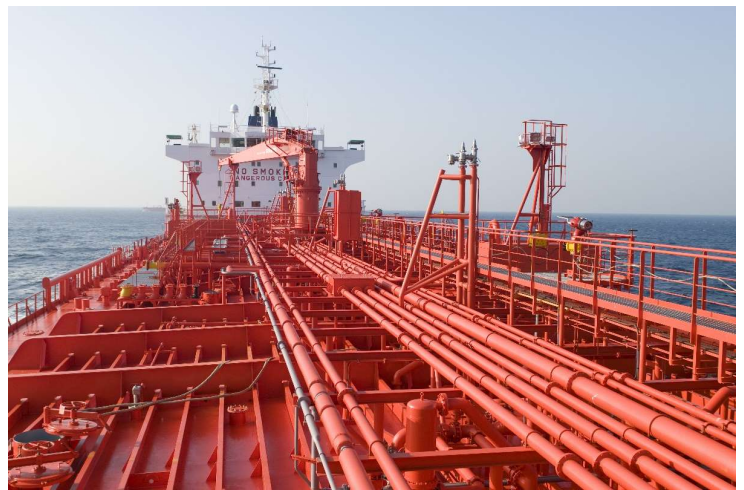
The HS-ISO Resilient Seal upgrade comes in 3 kits: a minimum, a recommended and a plug and play solution. The minimum necessary parts are:

- Valve seat
- Resilient seal
- PV-Barium magnet
- Tag-plate

The minimum and recommended kit requires that the valve is disassembled, cleaned, reassembled with the new parts and name tag and goes through a class witnessed test. This procedure can be done during dry docking where the valves are disassembled but it is not recommended outside docking.

Alternatively, is it possible to purchase complete tested pressure kits (C-Kits) that already have been tested and class approved. This type of kit can also be used to swap the pressure unit after the tank has been gas freed.

Replacing existing Resilient Seals spare part is



also a relatively simple procedure. The top cone is removed, the valve is locked in open position the existing resilient ring is removed, and the new ring is mounted. The procedure takes 5-10 min per valve.

Resilient seal upgrade procedure		
C-kit		On-site calibration
Procedure	Parts	Procedure
<ul style="list-style-type: none"> <li>• Loosen bolts</li> <li>• Replace Pressure unit (C-kit)</li> <li>• Replace Tag-plate</li> <li>• Update documentation (certification, test sheet, drawings, flow curves)</li> </ul>	<ul style="list-style-type: none"> <li>• C-Kit</li> <li>• Tag-plate</li> </ul>	<ul style="list-style-type: none"> <li>• Upper valve house</li> <li>• Resilient seal</li> <li>• Magnet</li> <li>• Tag-plate</li> <li>• O-rings (recommended)</li> <li>• Disc (recommended)</li> <li>• Disassemble pressure unit (see operational manual 3.6)</li> <li>• Replace magnet</li> <li>• Replace upper valve house</li> <li>• Replace Tag-plate</li> <li>• Replace O-rings Q, R, S, TT and disc (recommended)</li> <li>• Reassemble valve</li> <li>• Test and calibration (see manual 3.4)</li> <li>• Create test sheet</li> <li>• Witness test from classification</li> </ul>