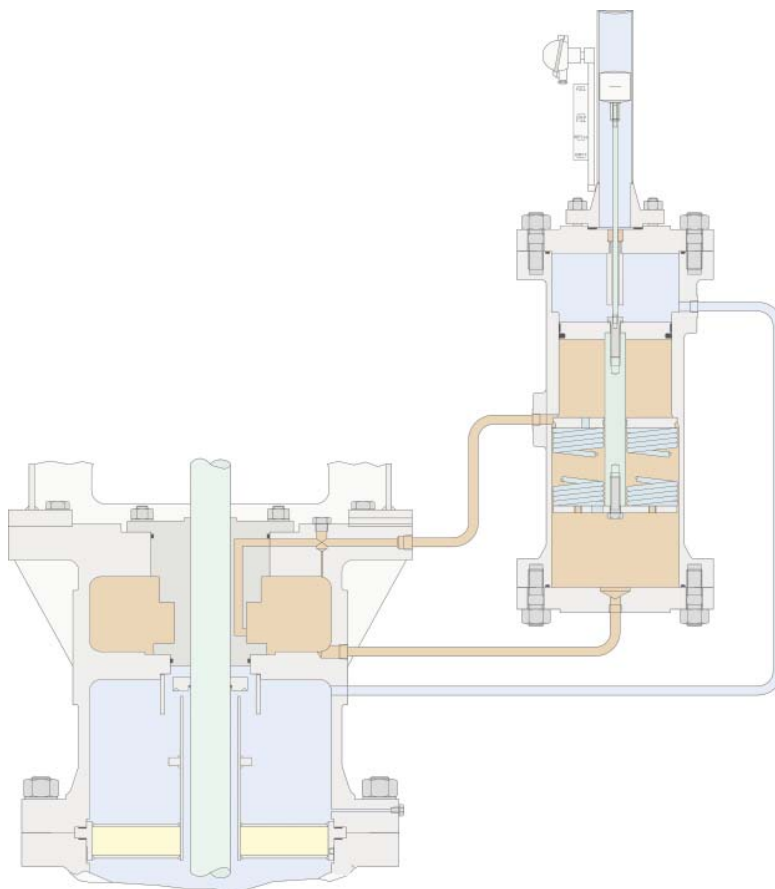


# Sulzer Pumps J-Unit Cryogenic Sealing System



# J-Unit Cryogenic Pump Sealing System

The J-unit is not a pump, but a pressurized shaft sealing system developed by Sulzer Pumps for vertical pump applications. The J-unit is designed to be an 'add-on' module of components that can be fitted to standard product lines in order to provide an environment that allows the use of standard mechanical seals in low temperature services.



Cryogenic pumping requires special sealing solutions for reliable operation

## Main Construction Features

### Insulation Chamber

The insulation chamber provides separation between the low temperature liquid in the pump and the much higher temperatures found around the mechanical seal. The modular nature of the design minimizes the number of installed components.

### Insulation Baffle

The insulation serves two purposes:

- The insulation reduces the heat transfer from the low temperature pumpage to the insulation chamber
- Acts as a reservoir for any barrier fluid which leaks from the inboard mechanical seal face thus preventing contamination of the pumped product.

Sealing between the two components of the baffle and the inside of the insulation chamber is accomplished using spiral wound gaskets for pressure sealing.

### Seal Chamber

The seal chamber is usually a cast component that is integrated with the insulation chamber. It's purpose is to provide a housing and barrier fluid reservoir for the dual back-to-back cartridge seal. It also provides a collection area above the insulation baffle in which any seal leakage is collected.

### Shaft Seals

The J-unit utilizes a dual pressurized seal cartridge. The cartridge has two mechanical seals from the manufacturers standard range, mounted in a back-to-back configuration. Forced circulation of the barrier fluid through the cartridge is provided by a pumping ring. The seal axial position and drive are set externally. Drive between the shaft and the seal sleeve is provided by set screws.

### Pressure Unit

The pressure on the upper side of the piston is maintained at suction pressure by utilizing a piped connection from the insulation chamber.

Changes in suction pressure are immediately transmitted to the pressure unit.

This pressurization connection, combined with an internally mounted piston and spring arrangement, maintains the seal barrier fluid at a pressure constantly 2 to 4 bar greater than suction pressure.

### Principal of Operation

The insulation chamber (A) provides a thermal barrier between the mechanical shaft seal and the pumpage. Piping (B) from the top of the insulation chamber transmits suction pressure to the upper portion

of the J-unit (C), forcing the piston down.

This action pressurizes the sealing fluid in the lower portion of the pressure chamber (D).

The resultant pressure transmitted to the seal chamber (E) is equal to the suction pressure PLUS the load of the spring (F) acting on the piston.

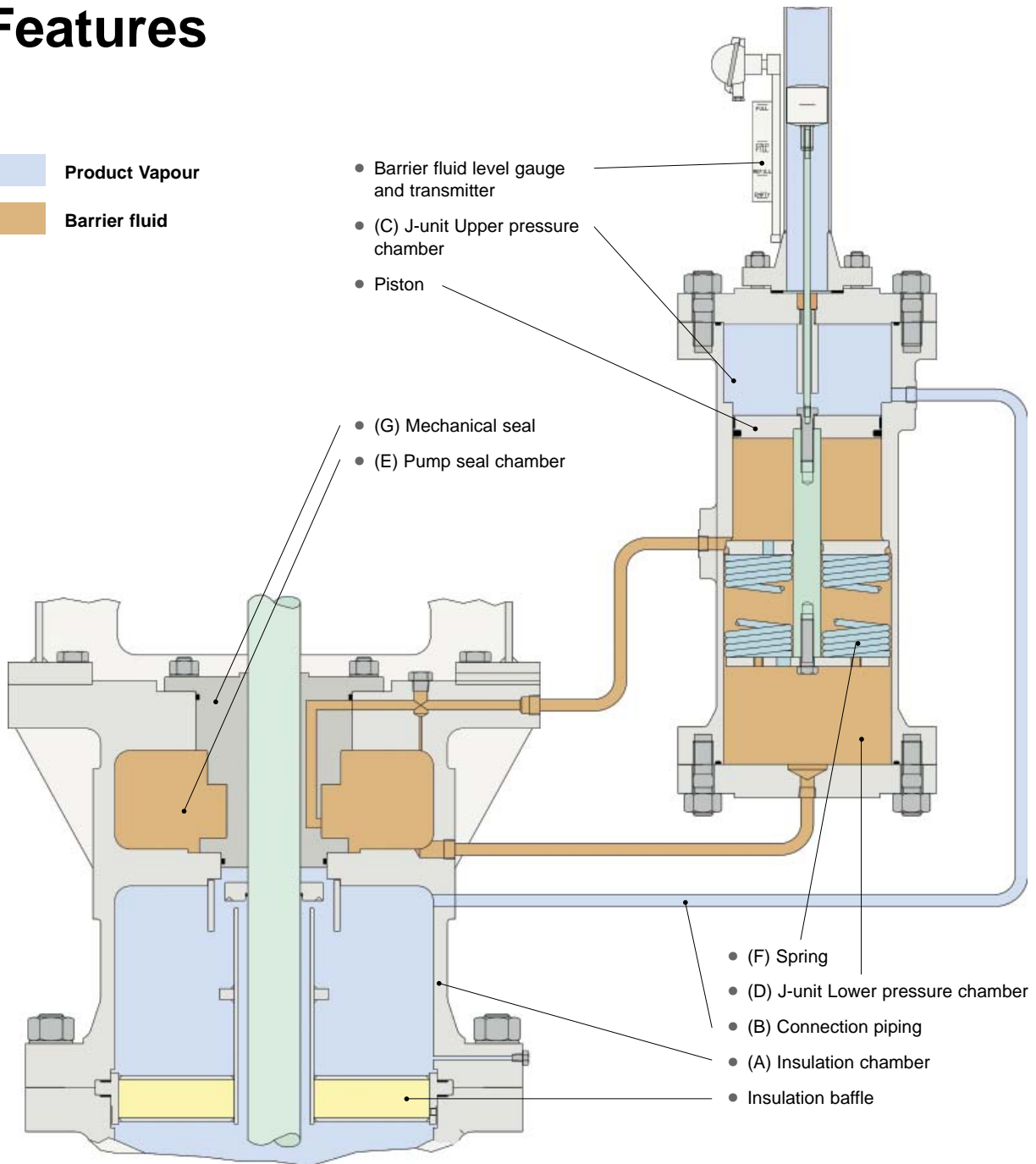
This pressure differential between the insulation chamber and the seal chamber prevents the pumpage from contaminating the seal faces or escaping to atmosphere and provides the ideal operating environment for the mechanical seal faces with regard to temperature, pressure and lubrication.

To facilitate cooling, the sealing fluid is continuously circulated between the seal chamber and the pressure unit via a pumping ring fitted to the mechanical seal (G).

This principle can also be utilized for non-cryogenic applications whenever there is a requirement to eliminate the leakage of flammable or toxic pumpage from mechanical seals.

# Features

- Product Vapour
- Barrier fluid



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