# API 682 – Plan 53A

Enjoy the Flopac performance and treat your equipment by selecting the Flopac® series SPA-53_ seal support systems.

The range of Flopac® SPA seal support systems include plan 53A seal flushing units that are typically used with arrangement 3 contacting wet seals (3CW-FB, 3CW-BB, 3CW-FF).

Plan 53A seal support systems are closed loop systems that circulate barrier liquid between a pressurised dual seal arrangement and an external reservoir to cool and lubricate the in- and outboard seals. The barrier liquid is maintained at a higher pressure than the process pressure in the seal chamber. This offers the highest level of safety eliminating process leakage entirely.

Flopac seal support systems; for reliable seal performance and optimal process efficiency.

**Advantages:**

- **Compact and light weight designs.**
- **Engineered to offer an optimal user experience.**
- **Complete (API 682) compliant packages.**
- **Quick delivery program for our competitively priced standard range.**
- **Custom designs available.**

# Technical Specification API 682 – Plan 53A

The range of Flopac® SPA seal support systems include plan 53A seal flushing units that are typically used with arrangement 3 contacting wet seals (3CW-FB, 3CW-BB, 3CW-FF)

# **Plan 53A –** Description

## Purpose

Plan 53A seal support systems provide a barrier fluid to cool and lubricate the in- and outboard seals. The barrier fluid is maintained at a pressure greater than the seal box to eliminate product leakage.

## Operation

Plan 53A seal support systems are closed loop systems that use an external reservoir to provide a pressurised barrier fluid for the inner and outer seal of a pressurized dual seal arrangement.

During normal operation, circulation between reservoir and seal is maintained by an internal pumping ring. The barrier fluid is pressurised by introducing an inert gas (usually nitrogen) from an external source. A regulator is normally used to maintain a constant pressure that is greater than the process/seal chamber pressure. This will reverse the normal leakage. Now the barrier fluid will leak into the process instead, and product leakage is eliminated entirely.

Maintenance is limited to a timely refill of barrier fluid, while ensuring a constant and sufficient supply of nitrogen. Refer to notes/recommendations below.

## Heat exchangers

In order to provide cool barrier fluid plan 53A seal support systems are often equipped with a cooler. The cooling capacity must be designed to cope with the seals heat generation and the heat soak.

Although natural air draught cooling is preferred, most plan 53A seal support systems are equipped with an internal liquid (water) cooler. The size of natural air draught cooling sections will often proof impractical. For the higher heat loads external water cooler or forced air blast cooler may be considered. Flopac can provide all. Please have a look at our cooler section to check our standard availability. Tailored solutions are available as well.

## Instrumentation

A plan 53A should be equipped with a pressure indicating transmitter, a level transmitter and a level gauge to monitor the systems pressure and level. A temperature instrument could be considered if relevant. Provided the unit is equipped with an internal cooling coil one may also consider a cooling water sight flow indicator.

## Notes/recommendations

## Notes/recommendations

Flopac provides a complete API 682 compliant package, including all the necessary appendages.

The operating principle of this seal plan accepts a certain leakage of barrier fluid into the process. Though little (typically 10cc/h and less), the compatibility of the barrier fluid with product must be verified.

The unit operates under pressurised conditions. A safe refill of barrier fluid – under pressurised conditions – requires specific equipment, usually referred to as topping-up / make up or refill units. Please refer to our section Make up units for further details.

The constant and sufficient supply of the pressurising inert gas is usually arranged for by the user. That includes the regulator. Flopac is happy to advise on further details and the appropriate regulator. Please contact our application department.

For most pressurised applications we would recommend a plan 53B instead of a plan 53A. A plan 53B is easier to operate, is better equipped to receive natural air draught cooling sections and does not rely on the sometimes limited (pressure) capacities of a plant gas network. Separating the gas from the barrier liquid also eliminates the potential worry of the pressurising gas dissolving in the barrier fluid.

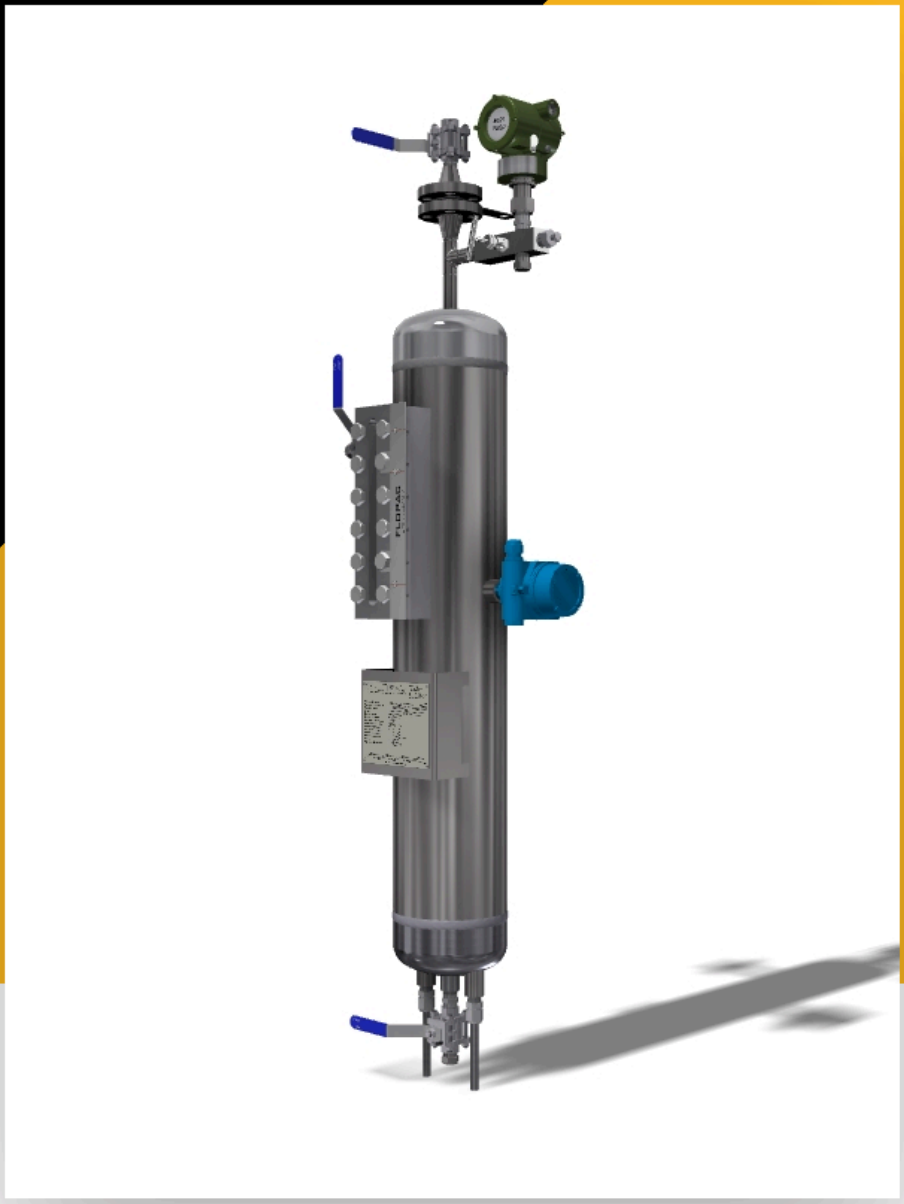
**Please contact Flopac for a more detailed advise on all topics related to Flopac® seal support system plan 53A. We will gladly assist.**

## Plan 53A – main features

- Pressurised by external gas source.
- No product leakage.
- Lubricates and cools the seals.
- Clean barrier fluid film on inboard seal faces improves seal live.
- Lubricates and cools the seals.
- Circulation device needed.

## Benefits of the Flopac Plan 53A

- Wetted parts all SS316.
- Flexible designs all properly engineered.
- Reliable performance.
- (API 682/ISO 21049) compliant.
- Compact and lightweight configuration.
- Directly from the manufacturer.



## Options

- Alternative material selections for specific services.
- Flexible designs to fit a specific location or available space.
- High pressure designs (ANSI 600# / 1500#) for static designs up to 200 barg.

- Additional temperature- or flow instruments to enhance monitoring facilities.
- Addition of a barrier liquid circulation unit; to ensure circulation and to enhance cooling capacity.
- Addition of an all stainless steel 5 ltr refill unit with 75cc/str handpump. (Other refill options available. Note: filling funnels should not be used!)

# Mechanical seal system SPA-530

A complete and fully functional Plan 53A system for arrangement 3 (3CW-FB, 3CW-BB, 3CW-FF) dual seals in accordance with API 682 or ISO 21049 latest edition – for shaft diameters ≤ 60mm.

These low budget, yet complete and fully functional units are best suited for standard applications. Also for applications with shaft diameters > 60mm, but that requires an exception to the API 682.

## Standard configuration

Design ASME VIII, div. 1/not stamped and/or the European legislation (CE) such as PED 2014/68/EU and the ATEX 2014/34/EU – Zone 2 II/A T1-T3. Wetted parts AISI 316(L) – Suitable for general oil/water service – Non-hazardous. Design 40 barg @ -15/+90°C ANSI 300#-NPS 6" – sch.40s. Vmin 12 L @ NLL. Seal supply and return connections ¾" NPT All further connections ½" NPT Coolwater connections OD ½" Engineering units: SI units, Bar/°C. NDE: Visual-/hydrostatic and leaktesting. Surface preparation : Flopac std. **Available at request:**

- Extended NDE packages to include inspections such as X-ray, LPE and P(A)MI.
- Refer to the section 'options' below.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# **SPA-530** Configuration

## Main components

### One piping assembly

An all welded  – stainless steel 316L construction with threaded NPT connections, as appropriate.

### Appendages

The nitrogen charge-, fill and drain connections are provided with a block valve. The fill connection is additionally fitted with a non-return valve, the nitrogen charge connection with a 3.2mm bore SS 316 restriction orifice. Further appendages as appropriate.

### One pressure indicating transmitter

A 4-20mA Smart/Hart® transmitter of high industrial quality with a 0.2% accuracy, including local display. Wetted parts SS316 with an IP 66 PU coated aluminium housing. Mounted on a SS316 instrument valve.

### One level transmitter

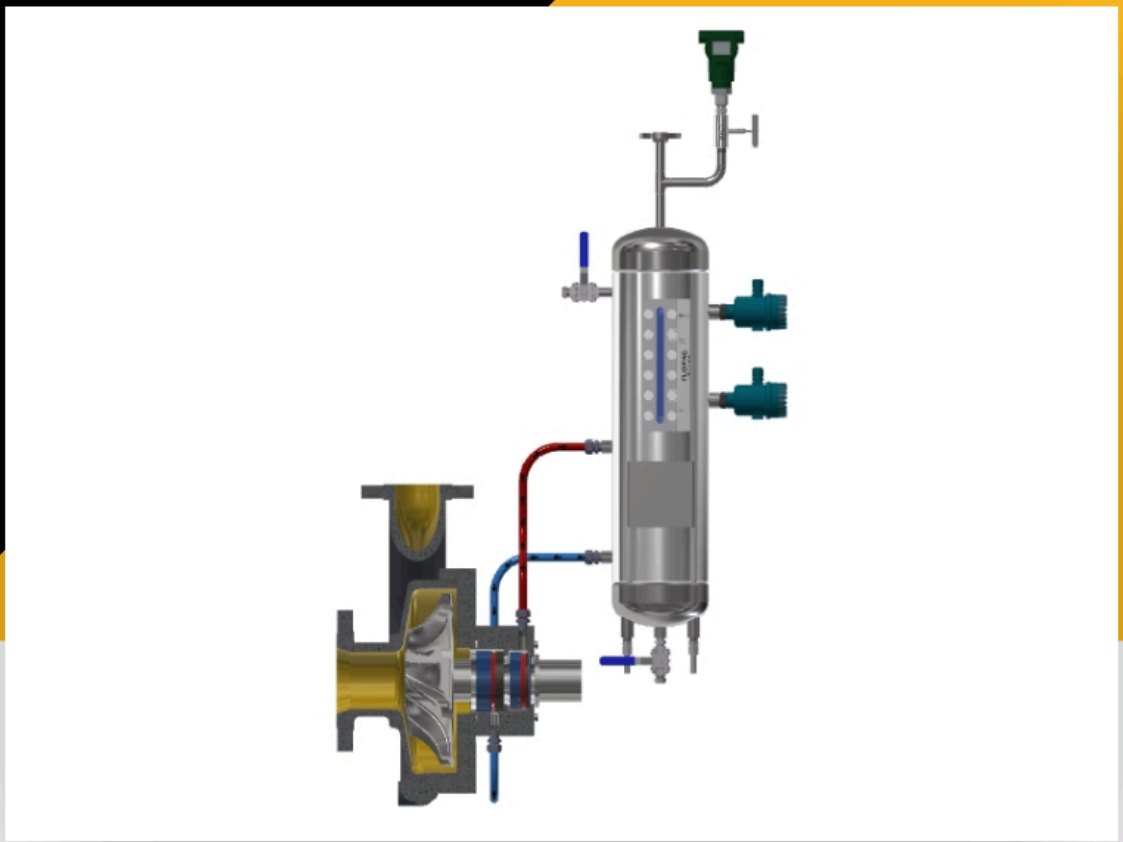
A 4-20mA Smart/Hart® Guided Wave Radar (GWR) transmitter of high industrial quality with a 0.5% accuracy, excluding local display. Wetted parts SS316 with an IP 66 PU coated aluminium housing.

### One level indicator

A Flopac weld pad level gauge with reflex glass complete with level markings. Wetted parts SS316.

### One internal cooling coil

A Flopac high efficiency spiral wound cooling coil fitted inside the reservoir. Nominal capacity 850 Watt.  Wetted parts SS316. Connections OD ½" – tube.



## Options

- Additional temperature- or flow instruments to enhance monitoring facilities.
- Addition of a buffer liquid circulation unit; to ensure circulation and to enhance cooling capacity.
- Addition of an all stainless steel 5 ltr refill unit with 75cc/str handpump. (Other refill options available. Note: filling funnels should not be used!)

# Mechanical seal system SPA-536

A complete and fully functional Plan 53A system for arrangement 3 (3CW-FB, 3CW-BB, 3CW-FF) dual seals in accordance with API 682 or ISO 21049 latest edition – for shaft diameters ≤ 60mm.

For applications with a shaft diameter > 60mm, kindly refer to our SPA-538 units.

Our SPA-536 units serve the need for a more robust and all welded, yet flexible design that easily adopts to the more specific design requirements and/or high end client specs.

## Standard configuration

Design ASME VIII, div. 1/not stamped and/or the European legislation (CE) such as PED 2014/68/EU and the ATEX 2014/34/EU – Zone 2 II/A T1-T3. Wetted parts AISI 316(L) – Suitable for general oil/water service – Non-hazardous. Design 40 barg @ -15/+90°C ANSI 300# – NPS 6" – sch.40s. Vmin 15 L @ NLL. Seal supply and return connections ¾" NPT All further connections ½" NPT Coolwater connections OD ½" Engineering units: SI units, Bar/°C. NDE: Visual-/hydrostatic and leaktesting. Surface preparation : Flopac std. **Available at request:**

- Designs tailored to meet your specific requirements.
- High pressure designs (ANSI 600# / 1500#) for static designs up to 200 barg.
- High temperature designs.
- Extended NDE packages to include inspections such as X-ray, LPE and P(A)MI.
- Refer to the section 'options' below.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# **SPA-536** Configuration

## Main components

### One piping assembly

An all welded  – stainless steel 316L construction with threaded NPT, socket- or butt-welded flanged connections, as appropriate.

### Appendages

The nitrogen charge-, fill and drain connections are provided with a block valve. The fill connection is additionally fitted with a non-return valve, the nitrogen charge connection with a 3.2mm bore SS 316 restriction orifice. Further appendages as appropriate.

### One pressure indicating transmitter

A 4-20mA Smart/Hart® transmitter of high industrial quality with a 0.2% accuracy, including local display. Wetted parts SS316 with an IP 66 PU coated aluminium housing. Mounted on a SS316 instrument valve with block-, venting and test facilities.

### One level transmitter

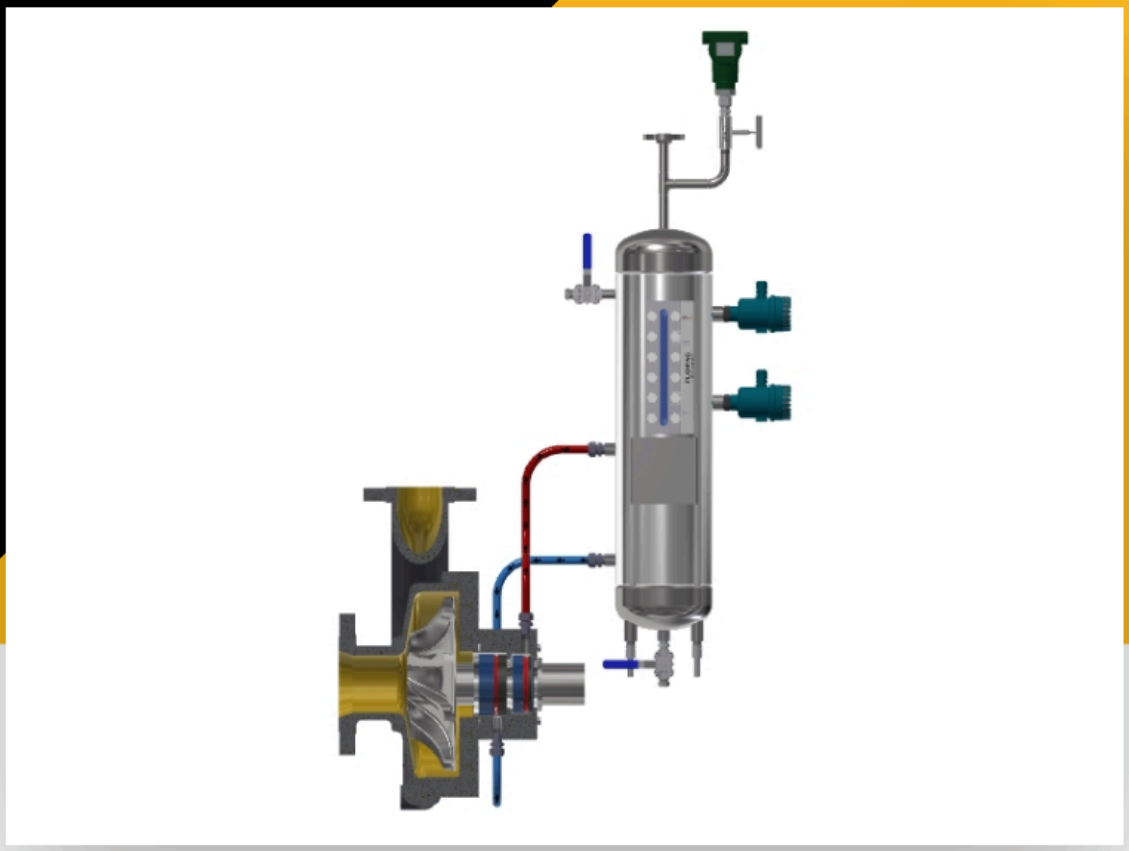
A 4-20mA Smart/Hart® Guided Wave Radar (GWR) transmitter of high industrial quality with a 0.5% accuracy, excluding local display. Wetted parts SS316 with an IP 66 PU coated aluminium housing.

### One level indicator

A Flopac weld pad level gauge with reflex glass complete with level markings. Wetted parts SS316.

### One internal cooling coil

A Flopac high efficiency spiral wound cooling coil fitted inside the reservoir. Nominal capacity 1000 Watt. Wetted parts SS316. Connections OD ½" – tube.



## Options

- Alternative material selections for specific services.
- Flexible designs to fit a specific location or available space.
- High pressure designs (ANSI 600# / 1500#) for static designs up to 200 barg.
- Additional temperature- or flow instruments to enhance monitoring facilities.
- Addition of a buffer liquid circulation unit; to ensure circulation and to enhance cooling capacity.
- Addition of an all stainless steel 5 ltr refill unit with 75cc/str handpump. (Other refill options available. Note: filling funnels should not be used!)

# Mechanical seal system SPA-538

A complete and fully packaged Plan 53A system for arrangement 3 (3CW-FB, 3CW-BB, 3CW-FF) dual seals in accordance with API 682 or ISO 21049 latest edition – for shaft diameters > 60mm.

For applications with a shaft diameter ≤ 60mm, kindly refer to our SPA-536 units.

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- Refer to the section 'options' below.


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# **SPA-538** Configuration

## Main components

### One piping assembly

An all welded  – stainless steel 316L construction with threaded NPT, socket- or butt-welded flanged connections, as appropriate.

### Appendages

The nitrogen charge-, fill and drain connections are provided with a block valve. The fill connection is additionally fitted with a non-return valve, the nitrogen charge connection with a 3.2mm bore SS 316 restriction orifice. Further appendages as appropriate.

### One pressure indicating transmitter

A 4-20mA Smart/Hart® transmitter of high industrial quality with a 0.2% accuracy, including local display. Wetted parts SS316 with an IP 66 PU coated aluminium housing. Mounted on a SS316 instrument valve with block-, venting and test facilities.

### One level transmitter

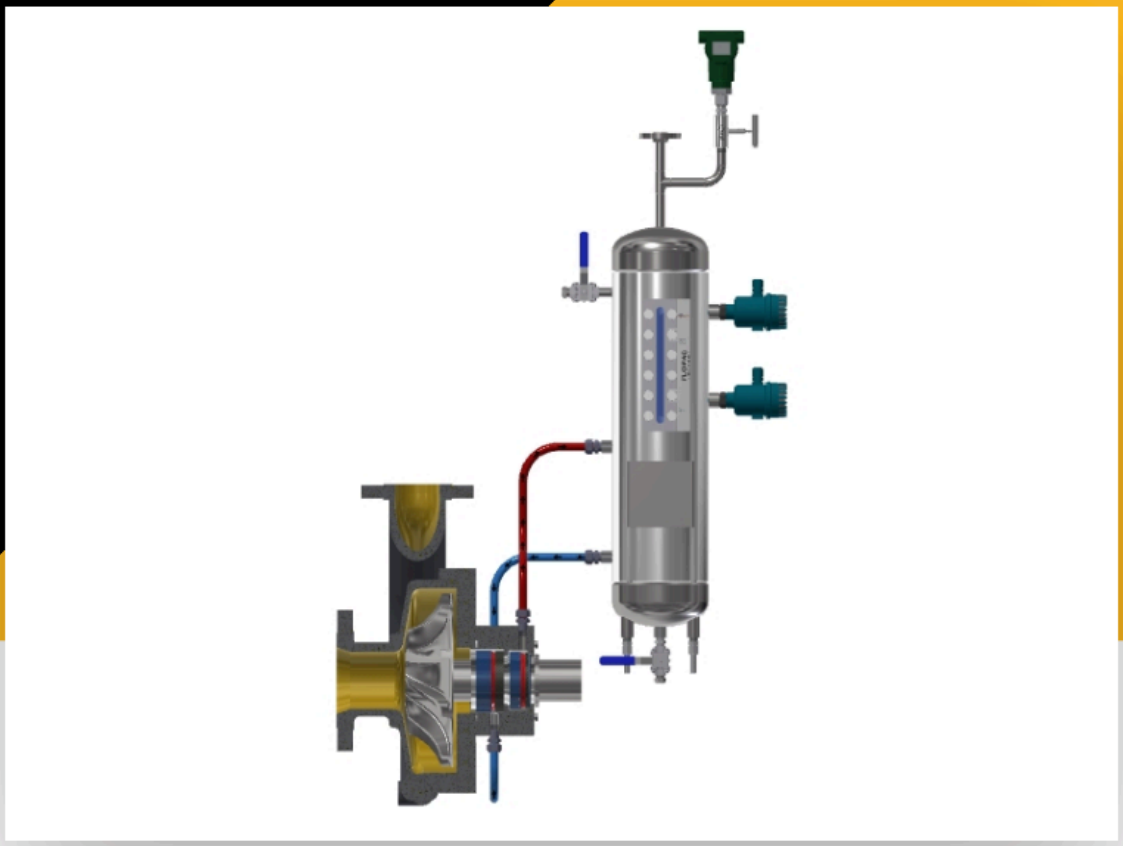
A 4-20mA Smart/Hart® Guided Wave Radar (GWR) transmitter of high industrial quality with a 0.5% accuracy, excluding local display. Wetted parts SS316 with an IP 66 PU coated aluminium housing.

### One level indicator

A Flopac weld pad level gauge with reflex glass complete with level markings. Wetted parts SS316.

### One internal cooling coil

A Flopac high efficiency spiral wound cooling coil fitted inside the reservoir. Nominal capacity 1500 Watt. Wetted parts SS316. Connections OD ½" – tube.



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