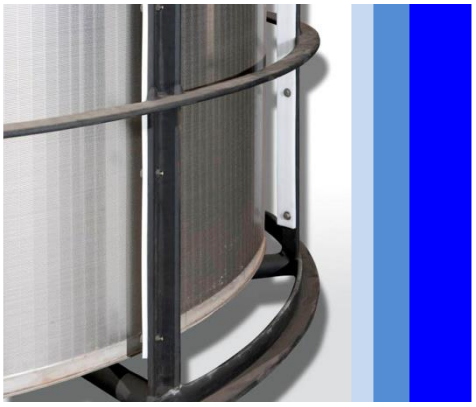
KEMIX (Pty) Ltd.

INTERSTAGE SCREEN



Carbon-in-pulp plant with two mineral processing separating pumping interstage screens per tank and tanks positioned with the same horizontal elevation

Two mineral processing separating pumping interstage screens (MPS 2030 (P)) per tank

There are predominantly two counter current methods employed in the industry to adsorb leached gold from a pulp stream onto activated carbon. These methods are Carbon-in-Leach (CIL) and Carbon-in-Pulp (CIP).

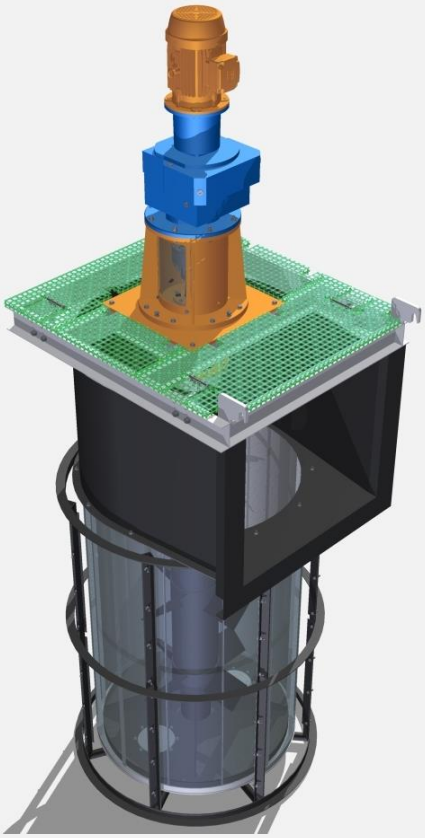
CIL and CIP operations have a number of adsorption tanks placed in series. Pulp flows continuously from the first tank to the last, while carbon is pumped counter current from the last to the first tank.

The main difference between CIL and CIP lies in the extent to which gold is leached prior to carbon adsorption. In the CIL operation, carbon is added to the leaching tanks, therefore the leaching reaction and adsorption occur simultaneously. In the CIP process most of the leachable gold has been leached prior to the first adsorption stage.

For both CIL and CIP operations, the adsorption tanks can be arranged in the conventional cascading configuration or the tanks could be positioned on the same horizontal elevation.

Mineral Processing Separating (MPS) and Mineral Processing Separating Pumping (MPS(P)) interstage Screen technology was designed to operate in both CIL and CIP operations.

MPS and MPS(P) interstage screens are semi-submerged top exit type screens. The wedge wire screen is submerged under the pulp operating level. Pulp flows through the wedge wire screen apertures while carbon is retained. The pulp flows upwards through the inside of the screen and exits via a launder interface above the wedge wire screen and volute interface.



MPS interstage screen

The **MPS interstage screens** are typically utilised in circuits having the tanks installed with a predetermined height differential i.e. cascade arrangement. This height differential overcomes the pressure drop around the wedge wire screen which in turn introduces pulp flow through the plant.

The MPS interstage screen operates with a higher pulp level in the tank relative to the pulp at the screen's exit launder.

The **MPS(P) interstage screens** are installed in circuits having the tanks and operating pulp levels at the same horizontal elevation.

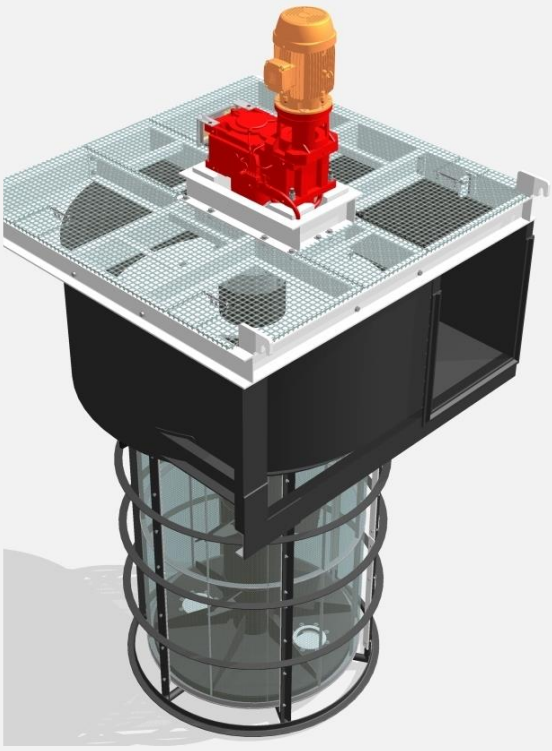
The pressure drop around the wedge wire screen is overcome with an up-pumping impeller which is incorporated into the MPS(P) interstage screen.

The pumping action of the impeller induces sufficient head and pulp velocity to transports the pulp to the next adsorption tank in the circuit.

The MPS(P) interstage screen operates with the pulp in the tank at a lower level relative to the pulp level at the screen's exit launder.

The advantage of using MPS(P) type interstage screens on circuits having the same horizontal elevation is that civil construction requirements are notably reduced when compared to a conventional cascade circuit.

For both the MPS and MPS(P) interstage screens the drive and screen form an integrated unit that can easily be removed for cleaning and routine maintenance procedures.



MPS(P) interstage screen

INTERSTAGE SCREEN DESCRIPTION

MPS Interstage Screen

The MPS screen incorporates a cylindrical wedge wire basket (screen) attached to the underside of the volute.

The volute also houses the driving unit and includes a discharge launder.

Rotating around the periphery of the screen is a cage with pulse blades attached and designed to keep the screen surface clear of carbon and pulp.

The rotating cage sets up a pulse and sweeping action around the periphery of the screen. This reduces the possibility of carbon and near size material pegging in the screen's apertures which in turn ensures that pulp flowrate through the screen is maintained.

The drive shaft of the cage is surrounded by a stationary pipe, which extends up beyond the slurry operating level. This pipe is referred to as the hydraulic seal, which ensures that pulp and carbon cannot by-pass the screen, thus providing an effective seal, having no moving parts.

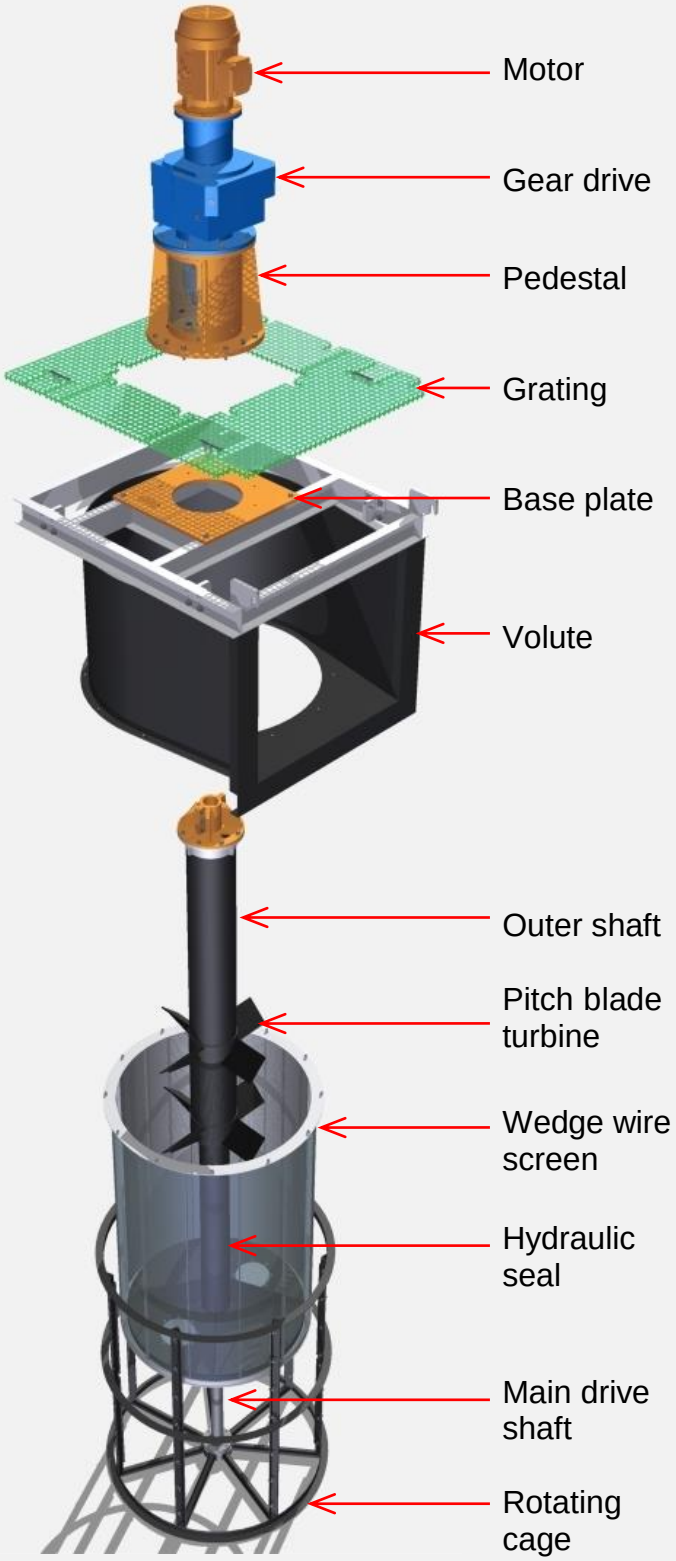
The hydraulic seal is attached to the bottom of the screen by means of a hydraulic seal base.

Around the stationary hydraulic seal is a hollow (outer) shaft, which is attached to the drive shaft above the top of the hydraulic seal. This hollow shaft rotates along with the main drive shaft and has a pitch blade turbine (PBT) attached which provides the agitation inside the screen basket.

The PBT blades in turn cause an upwards movement of the pulp inside the screen thus maintaining the pulp in a suspended state. This also aids in keeping the internal wedge wire area clean.

A single gearbox and electric motor drive the entire mechanism.

The MPS screen is attached to the internal launder of the adsorption tank by means of a hook-on arrangement. This allows the complete mechanism to be removed from the tank without having to loosen bolts or drain the tank.



MPS interstage screen

MPS(P) Interstage Screen

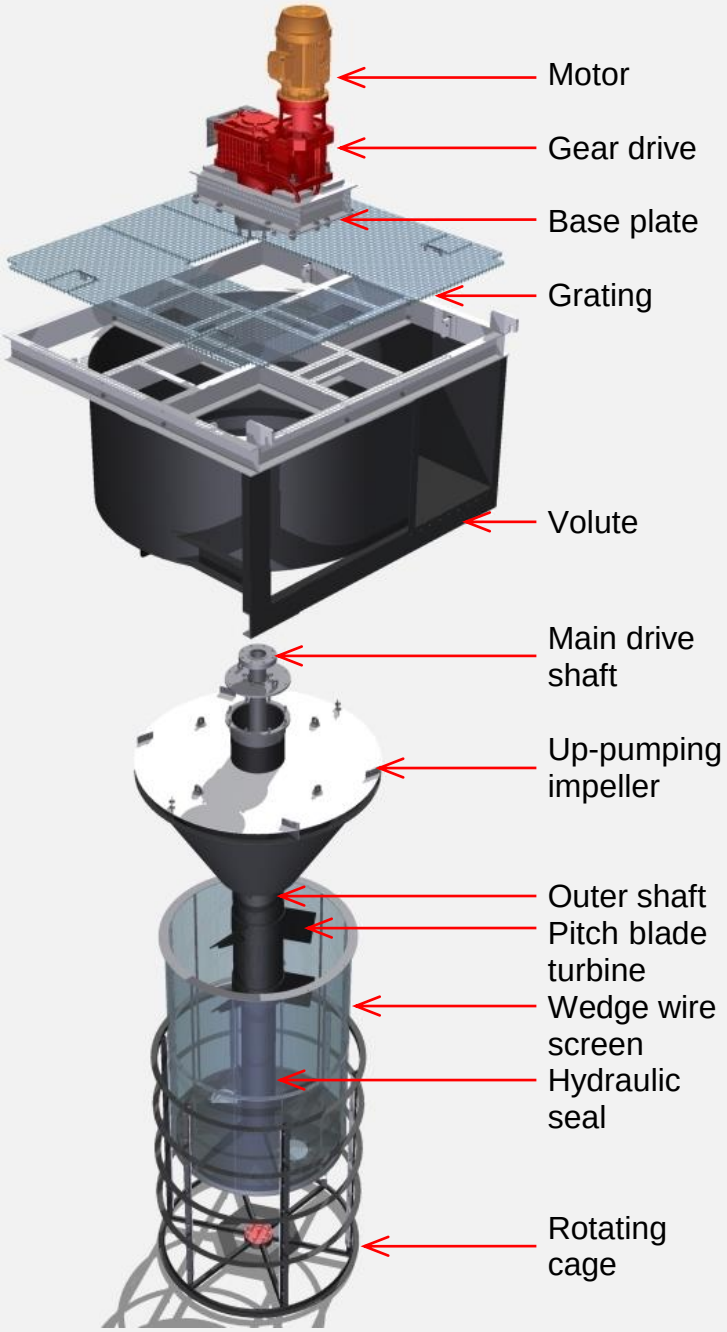
The MPS(P) screen has an up-pumping impeller as part of its internal mechanism. The volute is also different to that of the MPS type screen.

The hollow (outer) shaft of the MPS(P) screen houses the up-pumping impeller.

The pumping impeller is a mixflo type, specially designed to handle high flowrates at low tip speeds.

The up-pumping impeller elevates the pulp from inside the screen and deposits it higher than the level of the pulp in the adsorption contactor in which the screen is operating. Thus, the MPS(P) screen is able to generate pulp height sufficient to overcome the pressure drop around the screen, thus overcoming the need to have a series of staggered adsorption contactors.

The benefit of the MPS(P) screen is that the working platform on top of the adsorption circuit is level resulting in improved ergonomics.



MPS(P) interstage screen

LAYOUT DRAWINGS

Kemix offers the generation of launder layout general arrangement (GA) drawings as a service.

The launder layout GA indicates the positioning of the interstage screen relative to the agitator and launder interface. It also provides details of Interstage screen port and launder interface.

LAUNDER GATE VALVE

The Kemix launder gate valves are designed for open launder circuits, primarily gold adsorption circuits such as CIL, CIP and Pumpcell plants.

These gate valves are custom designed and manufactured to suit the launder dimensions pertaining to the specific application. They can be supplied as either manual or automated units.

HOOK MOUNTING BRACKET AND HOLD DOWN CLAMP DESCRIPTION

In Kemix's experience unsecured interstage screens will become dislodged from their mounting points, which may result in:

- A gap between the interstage screen's outlet and interfacing launder which results in carbon passing to the subsequent tank.
- Screen damage as a result of the dislodgment. This could result in the screen sinking into the tank.

Hook mounting brackets and hold down clamps are the recommended Kemix interstage screen mounting mechanisms for CIL and CIP applications. These hook mounting brackets and hold down clamps keep the interstage screens in position which allows it to operate as designed.

These components are fabricated from stainless steel to avoid corrosion and ensure durability.

Hook mounting brackets and hold down clamps are supplied as a unit and perform the following functions:

- Avoids interstage screen floating or dislodgment through the use of the securing arms.
- Ensures the interstage screen is secured to the tank top structure.
- Ensures appropriate sealing between the interstage screen's outlet and interfacing launder.

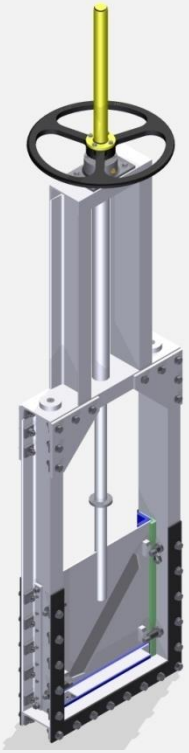
Additionally hook mounting brackets and hold down clamps perform the following individual functions:

Hook mounting brackets:

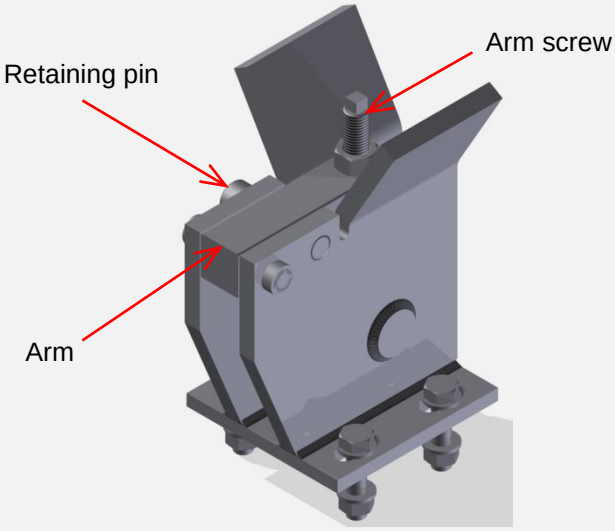
- Hooks and aligns the front end (outlet side) of the Interstage screen.

Hold down clamps:

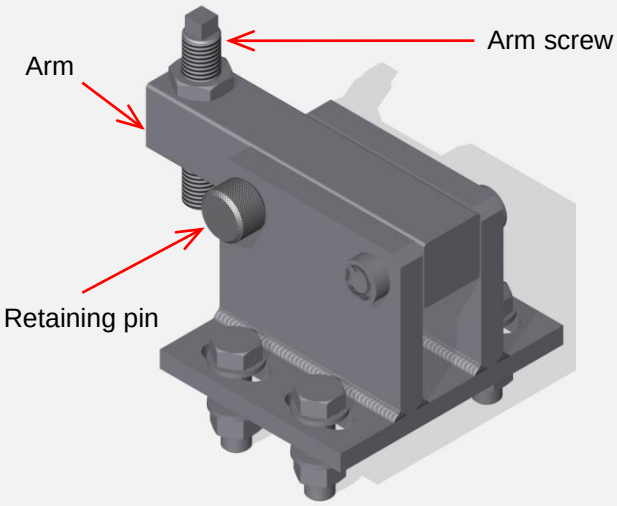
- Locks down the rear end of the Interstage screen.



Launder gate valve



Hook mounting bracket



Hold down clamp

Mineral processing separating pumping interstage screen (MPS 2030 (P))

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