Plug-in Seals™

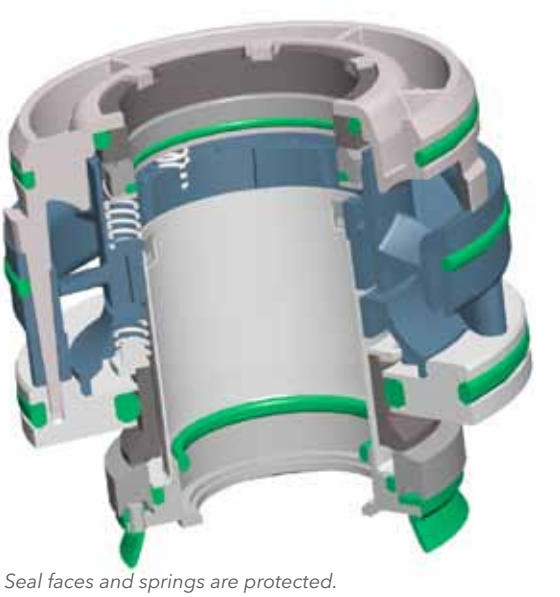
The reliability of a submersible Flygt pump or mixer is limited by its sealing system. Unlike dry-installed equipment, any fluid that leaks through the seals will accumulate in the drive unit causing increased wear rates and damage over time. As such, exceptional demands are made on every Flygt Plug-in Seal to provide unparalleled reliability and service life.

Double mechanical seal in a single unit assembly

Seal faces remain protected from contamination
Pre-assembly in a clean environment ensures that seal faces remain protected during installation, and result in the elimination of any contamination risk. Mounting of individual or relapped seals increases the risk of contaminated seal surfaces, which leads to leakage and/or excessive wear.

Springs are protected from corrosive pump media and clogging
To ensure trouble-free operation, the springs are located on the barrier-fluid side of the seals, and completely shielded from the pump media.

Inner and outer seals are replaced at the same time, ensuring overall sealing reliability
The inner seal and outer seal cannot be replaced or refurbished separately. Since it is impossible to estimate the lifetime of an inner seal, the inner seal is automatically replaced with the outer seal as a single assembly. Once the set is disassembled, it cannot be re-assembled in the exact same position and can therefore lead to an increased leakage rate.



Seal faces and springs are protected.

Thorough testing ensures airtightness
All Flygt Plug-in Seals™ are thoroughly pre-tested and approved before they are delivered as spare parts. As the final step in the production, the inner and outer seals in the units are independently tested for airtightness in a pressurized test cavity. A differential pressure is applied while the seals are rotated.

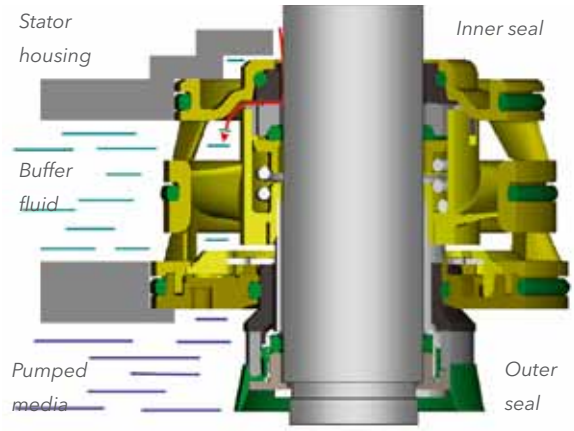
No special service tools required
The Plug-in Seal is quick and easy to mount in the pump. All double-seal components are supplied and assembled in a tandem arrangement, incorporated into a single unit assembly.

The Flygt Plug-in Seals are easy to mount in the pump.

Patented Active Seal™ system

Selected Plug-in Seal variants include the Active Seal system, which is especially beneficial for continuous-duty operation. The system eliminates the risk of leakage into the stator housing, minimizing the risk of bearing and stator failures. This enhances sealing reliability, reduces downtime and achieves lower operating costs. It also makes it possible to extend service inspection intervals (up to 12,000 hours) for many applications, especially for continuous-duty Flygt pumps and mixers.

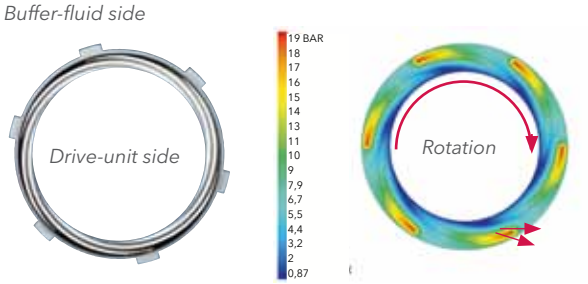
The outer seal is designed to deal with the harshest of environments and prevent the leakage of all types of pumped media into the buffer chamber. The inner seal, with the Active Seal function, acts as a micro-pump, continuously working to prevent liquid from entering the motor cavity. The rotation of the laser-cut grooves on the rotating seal face creates a pumping action. This results from the viscous shear of the fluid in the grooves, which creates a hydrodynamic pumping effect that directs any liquid on the stator side back to the buffer-fluid side of the seal. The patent covers the Active Seal functionality in a double mechanical seal system.



Active Seal applied in a Flygt Plug-In Seal. Any buffer fluid that may leak into the stator housing is immediately pumped back to the buffer fluid chamber.

Inner seal with laser-cut grooves
The Active Seal function can only be applied to the inner seal of a double-face seal system. The shallow spiral laser-cut grooves turn from the inner diameter to the outer diameter in a direction counterclockwise to the rotation. During operation, any fluid in the grooves will be forced along the groove to the outer tip by the viscous shear/drag of the fluid, not centrifugal action. Any leakage that enters between the seal faces will continuously be forced back by the barrier fluid.

Easy to upgrade
Flygt Plug-in Seals with the Active Seal system are completely interchangeable with previous generations of Plug-in Seals.



The pumping action is achieved by laser-cut grooves in the rotating seal face.

The grooves continuously pump liquid from the inner diameter to the outer diameter of the seal ring.

Powerful integrated cooling pump

Efficient cooling flow for pumps with internal cooling system

The integrated axial-flow propeller between the inner and outer seals provides a positive flow and circulation of the barrier fluid, securing efficient cooling and lubrication that minimizes the risk of machine failure.

The cooling pump propeller.

Uniform seal design

Same installation and service procedures for all Flygt products with Plug-in Seals

The uniform design ensures easy and correct mounting of the seal. The Plug-in Seal series comprises six sizes, from .787 inches to 3.15 inches shaft diameter, and is available for a wide range of Flygt pumps and mixers, including 2610-2670, 3153-3315, 4610-4680, 5100 and 5150.

The Plug-in Seal series comprises six sizes.

Durable and resistant materials

Seal rings with a unique tungsten carbide composition (WCCR)

WCCR is a tungsten carbide grade with low friction properties, high bending strength and toughness. It is used for the inner seal rings as well as the outer seal rings. This grade, exclusively developed for Flygt products, is an extremely durable and wear-resistant material that offers high thermal conductivity and low thermal expansion.

Seal rings in silicon carbide (RSiC)

The outer seal rings in Plug-in Seals are also available in silicon carbide, with great chemical resistance to low pH values and chlorides. Silicon carbide is an excellent seal ring material in most applications and a good complement to WCCR.

Equipped with O-rings in Viton only

Viton O-rings withstand temperatures up to 482°F and are resistant to most acids and alkalis. Traditional sealing O-rings in nitrile fail at 266°F.

The tungsten carbide composition (WCCR) material (left) and the RSiC (silicon carbide) material.

O-rings in nitrile (left) and viton after testing at 392°F.

Solid seal ring design

Solid seal rings minimize the risk of warped seal faces that cause leakage

Flygt Plug-in Seals™ have robust seal rings. The seal rings are solid with faces formed of the same material as the rest of the ring. The seals will not warp due to the temperature changes and there is no risk of bi-metallic effect, which can cause the seal face to lose shape or separate from the ring. The seal face is also protected from other deformations due to expansion or shrinkage. This one-material design maintains a high-quality seal over time, because the faces cannot slip, become detached from the seal ring or warp to a non-sealing shape.

Solid seal ring.

Mechanical torque lock ensures a reliable positive drive of the rotating seal ring

All seal rings are mechanically torque-locked and do not rely on rubber friction. The torque lock will work in both directions of shaft rotation.

The torque lock.

Low leakage and power losses thanks to minimized seal ring diameters

Both leakage and power loss are directly related to the seal diameter.

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