

Mechanical Seals

SLURRY SEALS



FLUID CONTAINMENT
SPECIALISTS SINCE 1967

SLURRY SERVICE

TAC Slurry Seals are advanced, efficient, and environmentally sustainable sealing solutions for the most challenging and intricate slurry applications.

Slurry service can be among the most challenging of mechanical seal applications. As modern mining and mineral extraction processes develop to become more efficient and environmentally sustainable, so must the available sealing solutions to meet these new demands. The A.R. Thomson Group Inc. line of TAC Slurry seals offers everything from more traditional solutions to state-of-the-art designs and materials. All focused on improving MTBF, plant safety and protecting the environment.

There are often many challenges in a slurry application. These include:

- Remote installation, either tailings or remote booster locations, makes monitoring mechanical seals difficult. Also, these locations may not have suitable quench water available.
- Local weather, with many such applications being outside seasonal weather, must be considered, often meaning that barrier fluid systems are impractical.
- Larger size pumps, lower speeds: Many modern slurry pump applications use much larger diameter pumps, reducing the pump components' abrasive wear. However, lower shaft speeds can reduce the effectiveness of pumping scrolls in dual slurry seals.
- Limited service windows for larger remote pumps. Servicing larger pumps is always costly, especially in difficult-to-reach locations.
- High solids concentrations. In addition to often not being suitable for a dual seal support system, high solids content media is typically unsuited for single seal use.



The A.R. Thomson Group Inc. Advantage

We developed a range of slurry seals that suit both legacy applications and modern sealing technology, specifically hardened for use in these challenging services.

Packing Solutions

Though gland packing is still used in some slurry services, there are a growing number of applications where it is no longer the preferred option; these can include:

- Workplace safety. Leaked media can pose a slip or other health hazard.
- The cost of product dilution. If a flush is used, it may need to be removed from the process stream later or reduce the purity and value of the finished product.
- Cost of lost product from normal leakage.
- Local or federal legislation changing.



Unique Technology

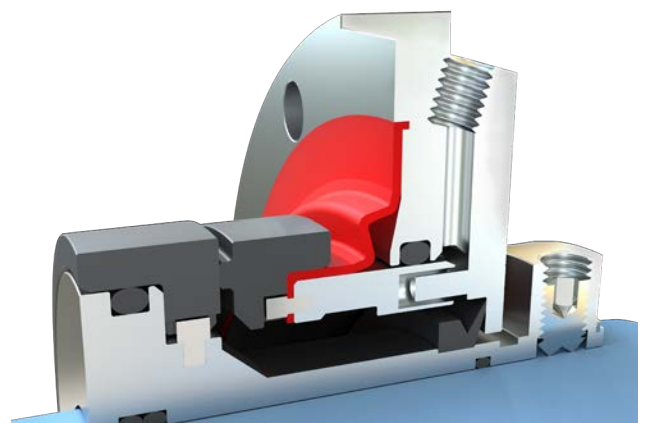
The TAC-600 seal is unique in the marketplace. It combines the benefits of a low-profile, multi-sprung, stationary seal design with a proprietary shield that prevents solids buildup from hanging up the faces. This approach results in a very versatile mechanical seal design that does not rely on long lead times or difficult-to-source components. The TAC-600 can also be tailored to suit much smaller seal chambers than traditional slurry seals. Making it suitable for service in more applications than any other design currently available.

The TAC-600 has delivered proven performance in minerals processing the world over, from precious metals, Lithium & Nickel processing to iron ore and coal processing.



Single Seals

Single seals are often seen as the ideal choice for remote locations; however, the realities of how these seals work can limit their application. A.R. Thomson can help with unique coatings for mechanical seal faces that protect against marginal fluid film, dry running and thermal shock.



SLURRY SERVICE

Water Management in Slurry Pumps

Slurry pumps are a vital specialized piece of equipment. They are widely used in mining, mineral extraction, and tailings production in metals, fertilizer, and hydrocarbon facilities. Though they are very similar to traditional centrifugal pumps, for example, they are often sized to perform better when running outside their BEP, often these pumps operate at much slower speeds than a regular process pump to reduce wear, and because of this, tend to be larger than a process pump with a similar flow. They have unique characteristics developed over years of experience in the field. Their special place in fluids handling has also led to unique challenges in providing effective dynamic sealing solutions. Typically, they also tend to rely heavily on the presence of a flush media to improve the sealing environment.

Water Consumption.

As noted above, water consumption can be excessive in a packed pump application; however, water going into a piece of rotating equipment also must come out, either onto the ground or into the product, causing dilution. Product dilution increases costs regarding reduced production efficiency and the need to remove water from the process stream. Water that leaks from the packing in regular pump operation becomes effluent and must be treated as such. In 2017 in Canada, the mining and quarrying sector discharged over 700 million cubic meters of water (does not include Oil and Gas production). Total industrial water discharge for the same year was around 3000 million cubic meters of water, though it should be noted that this number is 364 million cubic meters less than in 2009; anything that can be done to reduce this effluent further is worthy of consideration even more so if the reduction in the effluent is directly connected to a decrease in consumption.

Mechanical Seals

Mechanical seal usage has been increasing in slurry applications for many years. Better design and materials knowledge has improved reliability. Three possible ways of sealing a slurry pump with a mechanical seal exist.

- Single seal with a flush.
- Flush-less single seal.
- Dual seal with a support system.

Single seal with a flush. (Figure 1) The most common arrangement is a single seal with a flush. Any mechanical seal will eliminate visible leakage to the environment, helping with some of the issues of water management discussed above; however, water is still diluting the product. This arrangement, referred to as API plan 32, provides an element of control for the environment around the mechanical seal faces. However, this only works well, providing a reliable source of clean, flush water is available. This may not be a practical arrangement in remote sites with limited water or locales prone to freezing.

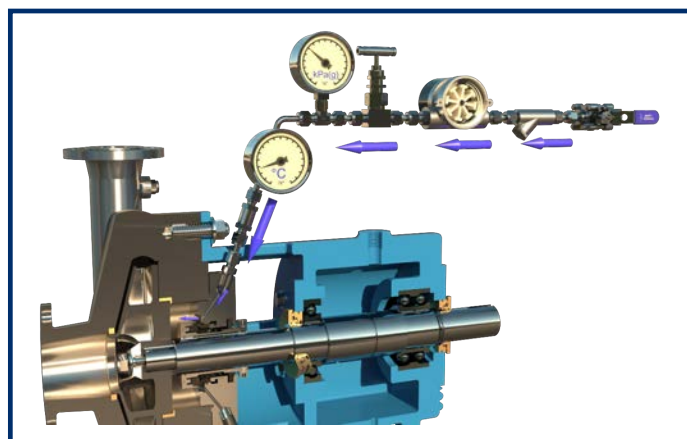


Figure 1: Common plan 32 flush arrangement.

Dual seal with a support system.

(Figure 2) An approach offered by some seal manufacturers is to fully control the sealed environment using a dual seal with a closed-loop support system or even a quench-to-drain arrangement. Double seals with closed-loop systems have proven excellent reliability in many applications and can be a good approach. Seals using this approach generally have a flow inducer to help promote barrier fluid flow through the seal; effective at higher pump shaft speeds, these devices become less efficient at lower shaft speeds. In a larger pump, the pumping ring may not help improve flow and could even inhibit any thermosyphon effect. Closed loop systems also need to be monitored for pressure and fill levels, can be susceptible to freezing, and usually require a clean water source.

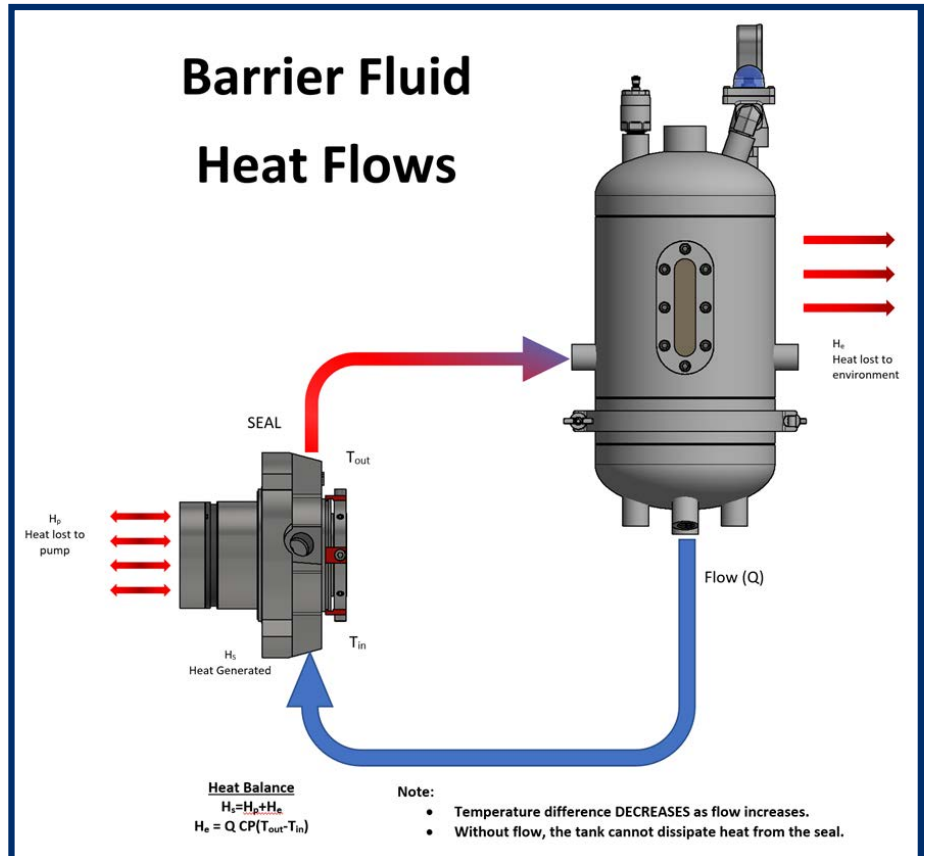


Figure 2: Concept layout for a double seal support system.

Flush-less seals (Figure 3) have excellent application potential as they don't require a support system, packing adjustment, or suffer from the parasitic loss of an expeller. However, they have traditionally had limited use, especially if solids concentration exceeds 60%. These seals often use a flexible rotor design, which, despite being non-clogging, can face issues like spring flexing due to angular misalignment and inability to self-align. Flexible stator designs can also become problematic as slurry packs around the stationary face. A.R. Thomson unique approach combines the best principles of current seal designs with a flexible stationary design and a large shielding device to prevent solids buildup, overcoming common issues faced by similar seals.

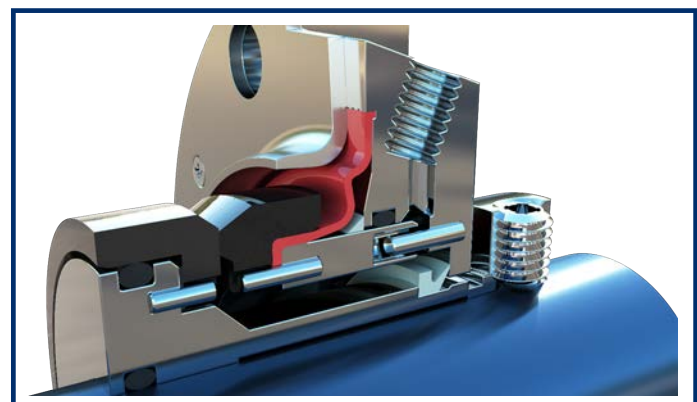


Figure 3: The TAC600 flush less slurry seal.

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LOCATIONS

55+

YEARS OF
EXPERIENCE



SERVICE



The A.R. Thomson Group Inc. was established in 1967 as a regional manufacturer & distributor of gaskets and other fluid containment products. With the rapid growth of oil and gas production, petrochemical, oil refining and pulp and paper industries, our manufacturing facilities expanded to meet increased demand for these products. Since 1967, we have developed our expertise and know-how to become the leader in solving fluid containment problems. No matter what your containment needs are, we can help.