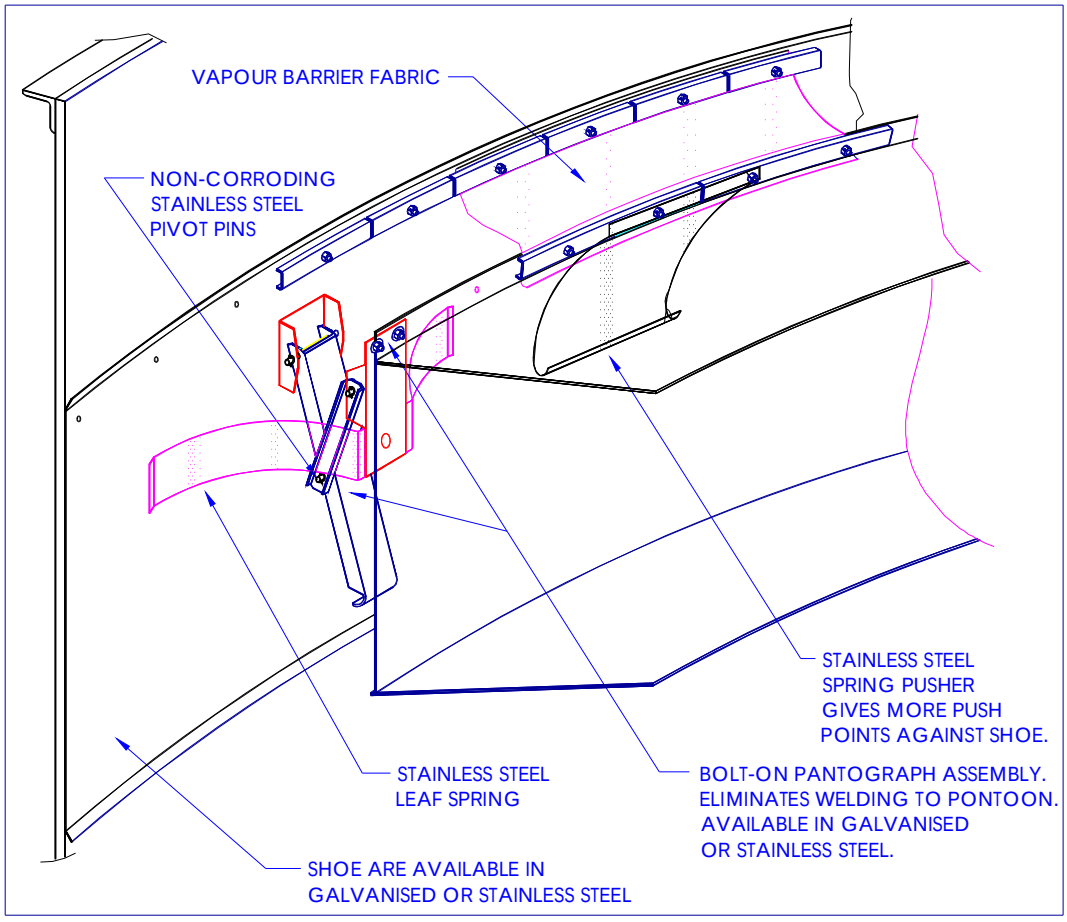
Pantograph
Shoe Seal for Floating Roof Tanks

The BTE Pantograph Shoe Seal is designed for easy installation and service at a competitive price. Shoe seals are used world wide and are renowned for their long life. The introduction of MTBE and increased use of aromatics within petrochemical tank farms have seen a resurgence of modern shoe seal use, particularly in the USA.



Why use a shoe seal?

Shoe seals only have metal parts in contact with the tank stored product. The vapour barrier fabric can be Urethane, PVC/Nitrile, or PTFE. Metal parts can be stainless or galvanised steel. The above choice of metals and vapour barrier fabrics means that a shoe seal combination can be made for all liquids normally stored within petrochemical tank farms.

Historically, shoe seals offer the longest service life of all seal types. These days, with rising costs, petrochemical companies are seeking ways to reduce the maintenance cost of tanks. The BTE Pantograph Shoe Seal is the answer. Typically, we expect the life of an all-stainless steel BTE Pantograph Shoe Seal to be in excess of 25 years.

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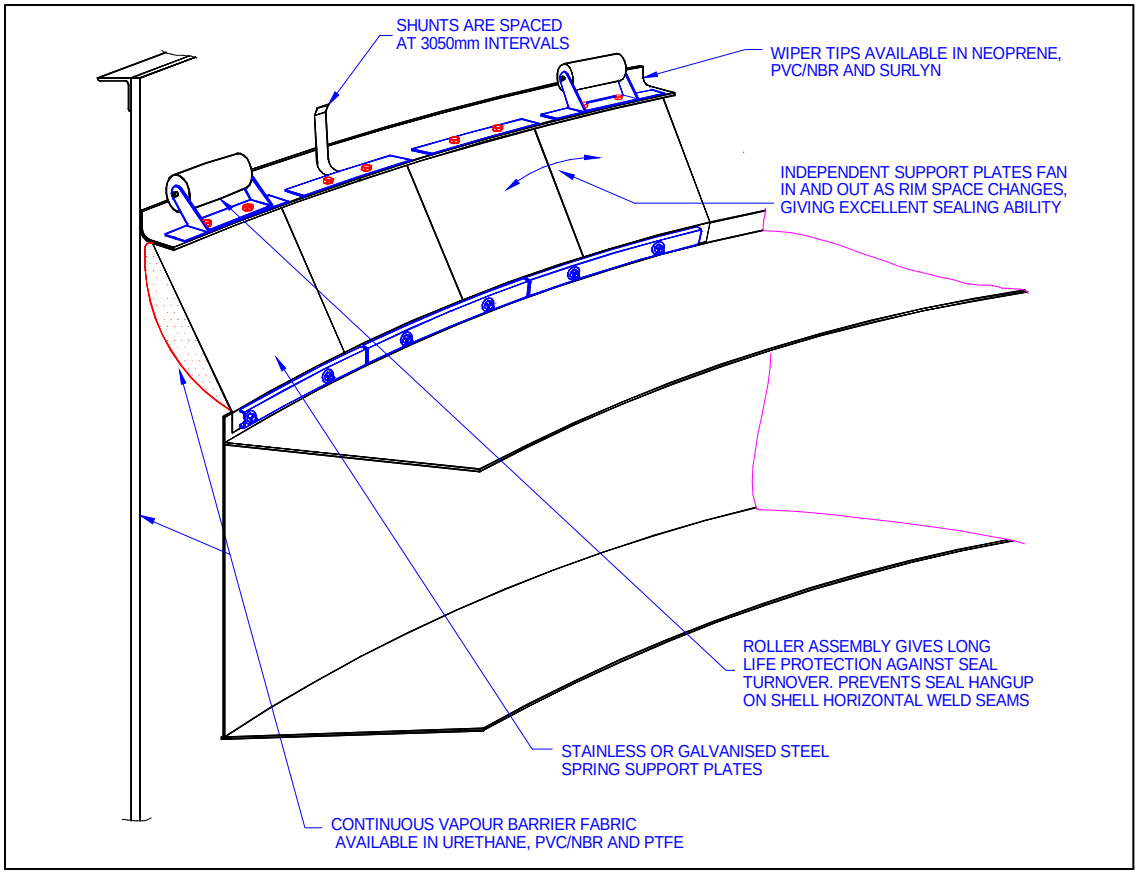
Secondary
RollerSeal for
Floating Roof Tanks

The BTE Secondary Wiper Seal is designed to provide secondary sealing for all floating roof applications. Metal parts can be galvanised or stainless steel, with a variety of materials available for wiper tips and vapour barrier fabric. Our standard configuration includes Neoprene wiper tips and Urethane vapour barrier fabric.

The BTE Secondary RollerSeal plates are not bolted together. Support plates can fan out independently of each other easily accommodating rim space changes.
Because the seal is very flexible, less tension is required by the support plates to keep the wiper tip in contact with the shell. This means lower tip wear.

Other brand rigid-tip design secondary seals are very stiff, do not conform easily to out-of-round shells, and require more tension secondary support plates to keep the tip in contact with the shell, accelerating tip wear



A significant feature of the seal is the special synthetic roller assembly. These positively eliminate seal roll over. Ideal for old out-of-round tanks. The corrosion free roller is shell-contoured to minimise painted shell marking. The roller assembly allows a shorter support plate height for a given maximum rim space. This allows greater working tank volume. The roller normally only contacts the shell when the rim space is larger than nominal.

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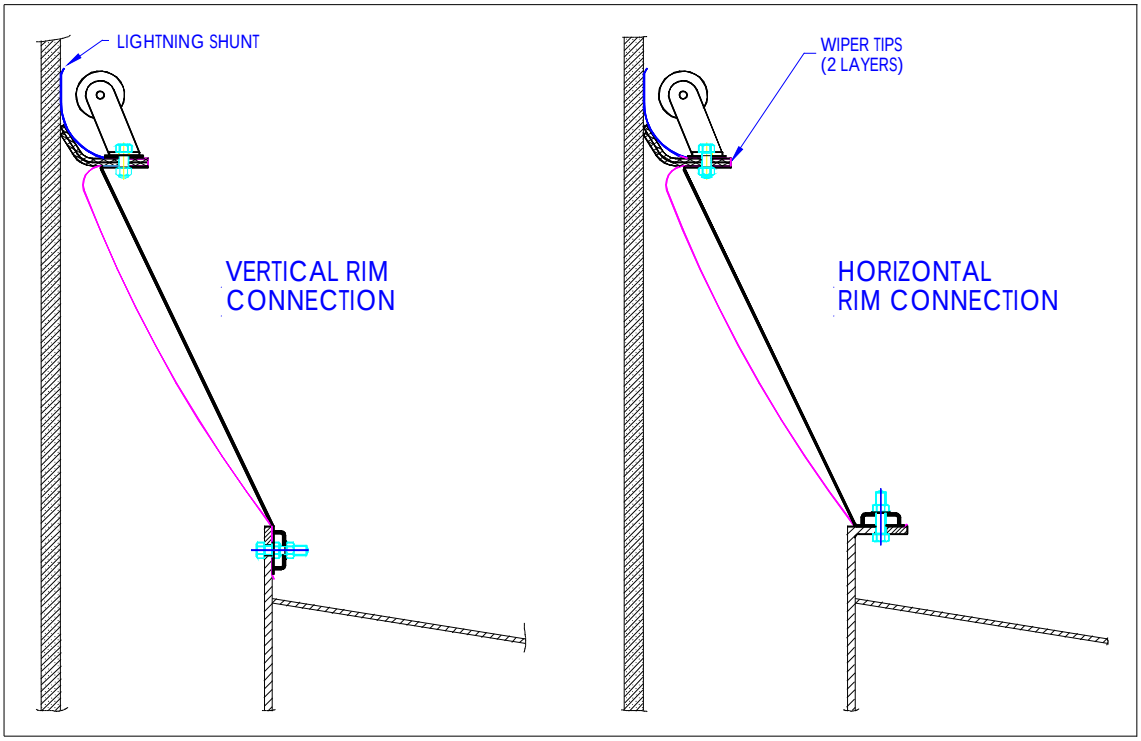
BTE Secondary RollerSeal



BTE Tank Products include:

- Aluminium Internal Floating Roofs
- Floating roof Tank Seals
- Floating Roof Tank Drain Systems
- Floating Roof Tank Fire Foam Systems
- Floating Suction lines & Skimmers
- Floating Suction Swing Joints 3” to 36”

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The BTE Pantograph shoe seal is a modern development of the original SR1 pantograph shoe seal which has been used reliably around the world for more than 30 years. The SR1 however has some faults which have been overcome with the BTE Pantograph design.

SR1 Design Weaknesses

A. Spreader bars only provide 6 contact points per shoe. This makes the seal less able to conform to tank out of roundness

B. Counterweights often corrode and fall off, making the seal ineffective.

C. Steel pivot pins corrode and freeze up the pantograph mechanism. The shoe then stays jammed at the minimum rim space position and "gaps" at greater rim spaces.

D. The "omega" shaped expansion joints on the shoe look good in theory. In practice, they are too stiff to allow appreciable expansion and contraction. The shoe is not good at sealing out-of-round tanks.

E. Installation requires welding of 9 lugs per shoe to the pontoon rim. This is time consuming. The rim must be checked inside the pontoon to ensure the welding did not burn through, allowing explosive vapours into the pontoon.

F. Adjacent shoes must be bolted together (preferably the whole tank circumference) and the assembled complete ring of shoes lowered into the rim space. This is relatively difficult.

G. Since the design is very old, the manufacturing cost is relatively high. Cost of full stainless steel hanger assemblies, if required, are prohibitive.

BTE Pantograph Design Solutions

A. BTE design provides 9 contact points per shoe. Seal is well able to conform to tank shell irregularities.

B. Stainless steel Leaf Springs and Spring Pusher Plates push against the shoes with low cyclic stress giving infinite life.

C. 12mm diameter stainless steel pivot pins are used throughout. Stainless steel "R" retaining pins are used, allowing quick and easy installation and removal of shoes.

D. The BTE design has adjacent shoes overlap by 50mm. This provides the expansion joint. A spring pusher plate acts at the shoe lap to ensure the shoes remain in contact at all times at the shoe lap.

E. No welding is required. The shoe pantograph hanger assemblies are bolted to the rim. Individual shoes can easily be removed and replaced WITH THE TANK REMAINING IN SERVICE. BTE can advise on proper safety procedures for this.

F. Adjacent shoes are not bolted together. This means individual shoes can easily be installed or removed by hand using only a 3-man team.

G. BTE's modern design is made using the latest manufacturing techniques and results in the world's most cost effective shoe seal design.

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