

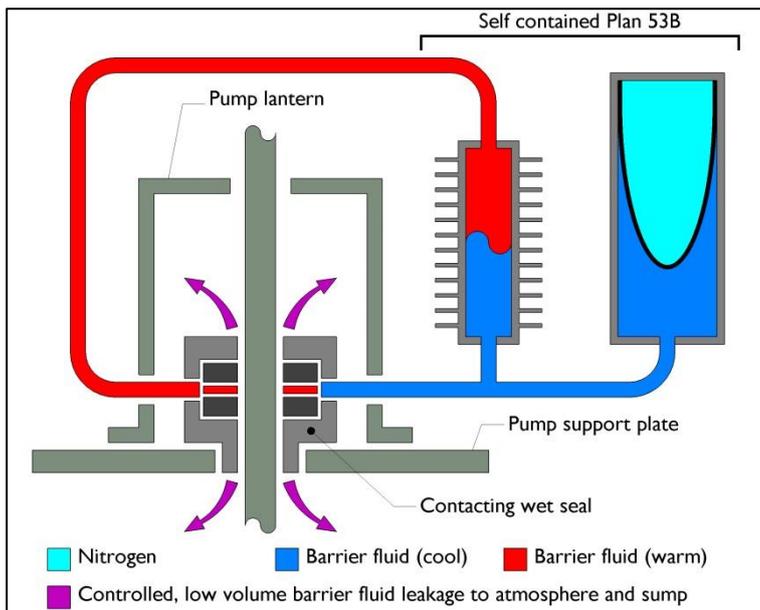
Comparison of API 682 Plan 53B and Plan 74 Seal Support Systems

technical bulletin

API 682 Plan 74 Seal Support Systems can often be used as a lower costs alternative to API Plan 682 53B Seal Support Systems. Plan 74 Seal Support Systems use an inert gas (usually nitrogen) at the seal face rather than the process fluid used at the seal face of the Plan 53B Seal Support System.

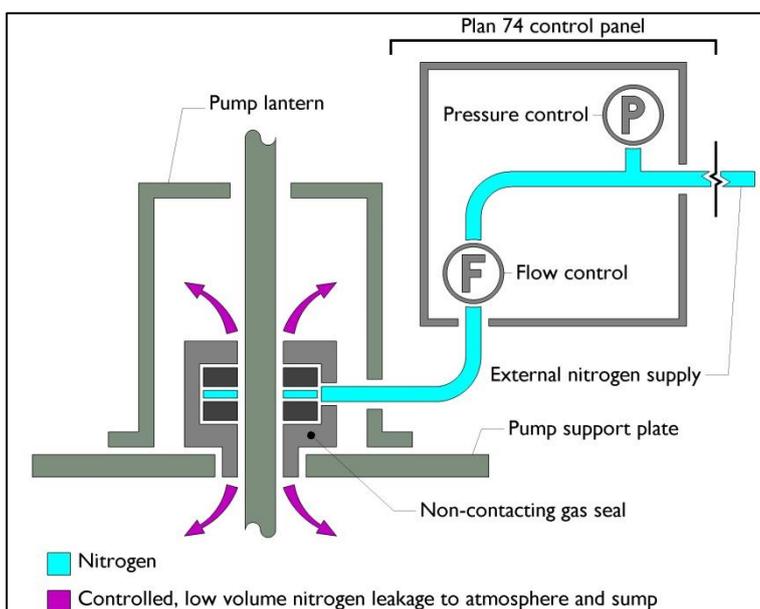
The Plan 74 Seal Support System generally costs less than a Plan 53B Seal Support System and is equally reliable and largely maintenance free, requiring less production downtime. As long as there is a ready supply of nitrogen at the right pressure, the lower overall life cost Plan 74 Seal Support System should be given consideration.

Plan 53B Seal Support System



In a Plan 53B Seal Support System a clean fluid film is maintained between the seal faces using a barrier fluid that is pressurised by an inert gas. The gas and barrier fluid are kept separate through a bladder in the accumulator. Any heat in the barrier fluid can be removed by an air-cooled or water-cooled heat exchanger.

Plan 74 Seal Support System



In a Plan 74 Seal Support System the seal faces are directly pressurised by an externally supplied inert barrier gas (usually nitrogen) rather than a barrier fluid. This arrangement is suitable for containing hazardous fluids where contamination of the process fluid with nitrogen can be tolerated. Plan 74 systems are best suited to applications when an external nitrogen feed is readily available on-site.

Comparison of API 682 Plan 53B and API 682 Plan 74 Seal Support Systems

The following table has been developed to help guide the decision as to when a Plan 74 Seal Support System could be used instead of a Plan 53B Seal Support System.

	Plan 53B Seal Support System	Plan 74 Seal Support System
Suitability to pumps and fluids	Suitable for horizontal and vertical pumps and can be used for polymerizing process fluids (used in the manufacture of polymers).	Suitable for horizontal and vertical pumps though particularly well suited to vertical pumps due to simpler design considerations. Often used for high vapour pressure fluids and light hydrocarbons.
Seal face	Uses the barrier fluid at the seal face.	Uses nitrogen gas at the seal face to provide a 5 micron thick gas seal film that ensures frictionless operation resulting in no friction heat and wear free operation which increases the overall pump efficiency.
Pressure	Up to ~100 bar .	The nitrogen source in a typical plant has a pressure of about 7 bar and so if the pressure of the pumped fluid is in excess of 5 bar a pressure amplifier (piston pump) may be required to boost the system pressure to maintain it at 2 to 3 bar above the duty pressure, up to a maximum design pressure of ~40 bar .
Contamination of process fluid	Minimal contamination of the process fluid occurs from the barrier fluid used in the seal.	Minimal process fluid contamination must be tolerable from the high pressure nitrogen used in the seal.
External feeds	No external feeds are required.	External nitrogen feed is required although a bank of nitrogen bottles can also be used. A pressure control valve to regulate nitrogen feed supply pressure and visual flow and pressure indication and a low pressure alarm should be incorporated.
Maintenance of system	Regular fixed maintenance schedule , typically fortnightly, is required to ensure that seals are checked, cleaned and replaced as needed. The system accumulator and bladder also needs to be checked regularly for leakage of the barrier fluid.	Very little maintenance is required for the system or seal faces as no fluid come into contact with the seal and so there is minimal wear. The on-site nitrogen feed would be subject to normal plant maintenance.
Efficiency	The barrier fluid causes drag at the seal faces reducing efficiency .	There are no frictional losses at the seal faces and so no efficiency loss resulting in lower running costs compared to Plan 53B systems.
Cost		Typically 50% of the capital cost of Plan 53B (assuming connection to on-site nitrogen feed is readily available).