

SPEEDING UP THE PROCESS

How Technetics Developed New Hydrodynamic Seals in Just Thirteen Weeks



Technetics was contacted by a well-known global aerospace manufacturer seeking hydrodynamic (HD) seals that could meet the performance requirements of an auxiliary power unit (APU) application. After struggling through numerous iterations with Technetics' competitors, a suitable HD seal solution still hadn't been found and Technetics began developing a solution. Within 13 weeks of the initial consultation, Technetics engineers were able to leverage their extensive dynamic seal experience, proprietary HD design code, advanced spiral groove design, and unique manufacturing processes to deliver prototype hardware that was ready for testing.

Hydrodynamic seals are critical components in vital aircraft systems, and many competing HD seals fail to perform as advertised, especially at high altitudes. So Technetics developed a hydrodynamic code that enabled accurate prediction of performance at altitude. To validate the prototype seals, the APU customer installed five different seals—two compressor and three gearbox seals—on a test rig that simulates engine operation at altitude. All five of these seals performed flawlessly on the first try, an exceptional result in the aerospace industry, further confirming the validity of the unique code and groove geometry that Technetics relies on. In fact, liftoff speeds during testing showed that the seals performed 2.87x better than those of competitors.

Moreover, after a 5,000-hour endurance test, Technetics' Hydrodynamic seals showed absolutely no sign of wear. The lower liftoff speeds of Technetics' HD seals result in a service life that is six times longer than competitive products. Air leakage tests, meanwhile, showed Technetics HD seals have less than half the air leakage of competitor offerings. For aircraft operators, this means that Technetics HD seals are not only safe and reliable but also provide the advantages of extended maintenance cycles and increased operational efficiency.

Technetics went from initial concept to prototype in just 13 weeks and was, therefore, able to satisfy the very specific and critical needs of a customer within an extremely accelerated timeframe. To date, Technetics has supplied the customer with over 4,500 seals, many of which are hydrodynamic.

Today, Technetics is considered a leading provider of high-quality HD seals in a variety of industries. These seals operate in a wide range of temperatures between cryogenic and 1,000° F (538.8° C) for bellows-energized seals and -65°F to 400°F (-53.9°C to 204.4°C) for spring-energized models. They can withstand pressures of up to 150 psid, and can be used with gases and vapors/mist. They are made using various high-quality carbon grades, bronze and ceramics, and are available in sizes ranging from one to six inches in diameter.