CASE STUDY

Research & Development

End-User Description
Concordia University's student rocket team. Using gaskets for cryogenic insulation of the engine's fuel injector manifold.

The Challenge
We had no issues, except for one of the hotfires where the gasket on the LOX side burst after firing. On the first run, a slotted gasket was used, which unfortunately led to it bursting: A LOX leak occurred because of it from that gasket, but the engine was able to continue firing. We suspect the cause of it to be the initial pressure spike. However, the full one did not show that issue, and sustained shape after firing, even through the pressure spike.

On the other hand, the fuel one, which is also slotted, survived both firings. There was also a leak on our second firing (started about 5s after ignition) though the solid LOX gasket was completely fine after. Thus, we have less suspicion that the gasket was an issue. The source of this leak is still being investigated.

The Solution
Durlon® 9002

Durlon provided low-temperature and high-pressure rated gaskets that fit the application, made of Durlon 9002. This specific gasket provided thermal stability, resistance to cryogenic temperatures, and the ability to withstand elevated pressures without compromising its sealing capabilities.

The Customer's Findings
"The sealing and insulation properties of the gaskets were up to the team's specifications and provided the required performance."

"The cryogenic temperatures were not propagating everywhere, thus no hardware was damaged, and the engine was able to fire successfully."

The Benefits
The Durlon® 9002 gasket played a crucial role in safeguarding the lower end of the injector from the potentially damaging effects of cryogenic temperatures. In the past, cryogenic temperatures would propagate out of the gasket and cause hardware damage. This gasket; acting as a thermal barrier, successfully mitigated the impact of cryogenic temperatures on the lower end of the injector. Overall, it enhanced the system's resilience, preventing potential damage and contributing to improved overall performance and safety.

The rocket engine was hotfired two seperate times each for 10 seconds. This hotfire beat the previous world record for most powerful student rocket engine, outputting 40kN of thrust.

Look out for the accompanying case study video on our website.

Durlon® Product Used
Durlon® 9002

End-User Industry
Research and Development (Student Rocket Team)

Media
Rocket fuel

Durlon® 9002

DURLON® SEALING SOLUTIONS