Driveline

Case Study

Enhanced mobility in 4x4 sport utility vehicles

Optimised seal running surface and hardness combined with outstanding corrosion resistance

About CTIS

Central Tyre Inflation (CTI) seals are precision rotary seal systems which are used exclusively in the axles and wheel drive systems on equipment in the transport industry.

These specialist seals are used in pairs to transfer compressed air from a fixed stub shaft to a rotating hub for the purposes of tyre inflation and deflation.

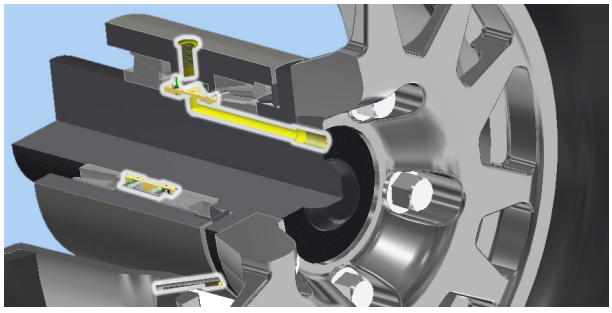
CTI seals perform a critical function to ensure the reliability of modern internal CTI systems.

FTL's CTI seals push the performance barriers of efficiency and reliability to new limits, with all seals rigorously tested in-house to confirm their performance and long-term endurance.

The Client

A major North American corporation with over a century of experience in the design and development of driveline solutions for both off highway and commercial vehicle applications.

The client is a iconic automotive company whose vehicles already have a class leading mobility pedigree over difficult and challenging ground conditions.



Wheel hub showing CTI seals and sleeve

Faultless performance, reliability and functionality

The Challenge

The objective was to develop a wheel hub sealing solution to facilitate CTI (central tyre inflation) enablement, to enhance vehicle mobility.

The application is a volume production passenger vehicle with additional considerations and challenges to overcome and address. These included:

- Required temperature range of -40°C to +190°C.
- Surface speed >4M/sec, on highway potential for long periods at high speed.
- External contamination, operation submerged and contact with mud, sand and gravel etc.
- Air pressure up to 150psi, normal operating range 80psi to 120psi
- Limited installation envelope
- High levels of utilisation, pressure cycles during tire inflation and deflation
- Functional reliability and service life, in line with industry and customer expectations

The Solution

The proposed solution, which drew upon our wealth of in-service seal and sleeve CTI solutions was a compact design with a number of novel features.

The CTI sealing elements included moulded ports on the rear of each seal to allow back-to-back installation without a lantern ring, whilst a simple retaining ring holds the seals within the housing. Thereby, reducing installation complexity and installation envelope, as well as achieving cost savings.

The FTL Koronite® sleeve, which provided the running surface for the sealing solution was developed to be a press fit onto the existing front and rear spindles.

CTI solution delivers competitive advantage for client's class-leading vehicle offering

The Benefit

Extensive in-house testing was conducted by the client to provide initial functional validation of the CTI seal and sleeve solution. The solution was then installed onto a prototype trial vehicle, and an aggressive test programme was initiated.

All vehicle testing was successfully completed, and the vehicle was exhibited at a number of industry events to demonstrate the realisable mobility advantages delivered by CTI.

Extended testing and proving was also undertaken in the rough terrain of the backcountry in the Moab, Utah area.

Under all aggressive test scenarios, the CTI seal and sleeve solution performed faultlessly and delivered the automotive industry and customer expectation for reliability and functionality.

The client now has a proven CTI enabling solution to further enhance their class leading mobility pedigree that keeps them ahead of the pack, driving innovation and driving forward.

In-depth Solutions

For more in-depth solutions

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