

Tailor-made Dana seal in natural gas injection valve

Customizing products for complex conditions

Converting from traditional fuel to gas puts new challenges on engines' sealing solutions. Being more evaporate, volatile, and therefore highly prone to leak, gas calls for new innovative sealing-solutions. Traditional solutions like O-rings can be a challenge, when the most volatile gas of them all, Hydrogen (H₂), becomes the next generation's emission friendly fuel. Engines running on natural gas (LNG) is a good place to start innovating tighter sealing-solutions. Here, PTFE has proved to be a promising material for the future.

Background

The gas injection valve seal is needed in a huge diesel engine. A vibrating engine with complicated constraints: The pressure is up to 300 bar. Gas pulsating and the temperature can go as high at 200° Celsius. For this, Dana-Seals was asked to develop a tailor-made PTFE seal-solution..

Solution

The product development team at Dana-Seals worked in close cooperation with the client to get the PTFE-compound right. After a long period of testing a wide range of different combinations, the tipping point proved to be a perfect adjustment of the helical metal spring energized seal's spring-pitch. In the final solution, every part of the seal is based on traditional materials; it is the tireless testing of different combinations that ultimately made a leak-proof seal living up to the client's demands.

Enforcing both the seal and the environment

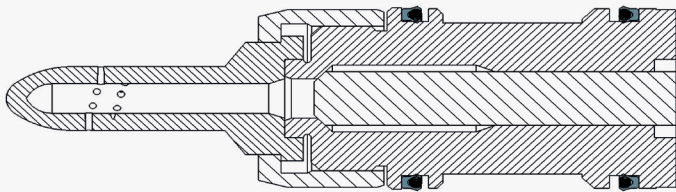
Dana-Seals specializes in helping clients when choosing a standard product is not the right solution. Both when it comes to getting the PTFE-compound and the spring-energizing-elements right. The PTFE compound is an advanced type which has extreme high tightness. The spring, designed and produced inhouse at Dana-Seals, provides max spring/sealing force.

Seals like the gas injection valve seal can only be invented if both client and seal-supplier invest in allocating the right expertise and hours – or years - needed to get it right. In this case, the redesign of the metal spring included twisting the distance in the pitch and enforcing the metal. An innovation that ultimately will be applicable in several complex sealing conditions in the green transition future.

Facts about Seal in gas injection valve in massive engine

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|--------------|--------------------------------|
| Pressure | 300 bar pulsating |
| Temperature | Up to 200°C |
| Media | Natural gas |
| Movement | Static/shaking with the engine |
| Installation | Bore \varnothing 55 mm |
| | Groove \varnothing 47 mm |
| | Groove with 6,2 mm |

Fig.1:



Surface finish on the sealing groove and on the bore max Ra 0,2 μ m.

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