

# When clients become partners in innovating sealing solutions for the green transition

By collaborating closely with the client and leveraging the respective expertise and supplier networks, Dana-Seals successfully delivered a tailored sealing solution that addressed the specific challenges posed by hydrogen for e-fuel in cryogenic environments. The outcome exemplifies the power of partnership in driving innovation and achieving sustainable solutions for the green transition.

## Background

Developing sealing solutions for hydrogen for e-fuel in cryogenic environments presents a unique challenge. This includes the need for new compounds and alloys to enable effective sealing against hydrogen H<sub>2</sub>, the smallest molecule in the world. Standard sealing solutions available today often fall short in addressing these requirements. A client from the European hydrogen industry faced a similar predicament. None of the existing seals met their specific performance and material needs. With time running out, they urgently sought a customized seal that could meet their requirements promptly.

## Solution

To meet the tight deadline, Dana-Seals and the client's R&D department collaborated to form a fast-working team. This team not only combined their expertise but also tapped into each other's suppliers and extended networks. The race against time became a quest to source rare compound and alloy parts, as well as acquire unique raw materials within a limited timeframe.

## Research & Development

Dana-Seals used a new high-performance thermoplastic compound, DanaFlon 196, specifically for this project. The spring energizer utilized a unique alloy combination capable of withstanding extreme temperatures as low as -196 degrees Celsius. The client requested an acceptable leak rate of up to 200 parts per million (ppm). However, the customized seal from Dana-Seals demonstrated exceptional performance, with leakage measuring less than 50 ppm. This remarkable achievement surpassed the client's requirements by fourfold.

## Seal for cryogenic hydrogen

|                     |  |
|---------------------|--|
| › Temperature       | -196 degree C  |
| › Media             | 5% hydrogen + 95% N <sub>2</sub>                       |
| › Movement          | Static   |
| › Diameter          | Ø40 mm   |
| › Groove dimensions | 3,1 x 4,8 mm   |
| › Sealing effect    | Leak less than 50 ppm                                  |
| › Accepted leak     | 200 ppm  |
| › Spring material   | Special alloy  |
| › Sealing material  | DanaFlon 196 (High performance thermoplastic material) |



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