DryF Webinar
April 7th 2021
Speaker: Søren Schmidt
OUR STORY

Key points

- **ROTREX** is an automotive company founded in year 2000
- Company core technology is ultra high-speed planetary drives, with units mechanically exceeding shaft speed of 340,000 rpm
- Develops, produces and markets superchargers and air pumps for a wide range of industries based on patented traction technology for OEM, OES, and aftermarket companies worldwide
ROTREX PRODUCTS

AUTOMOTIVE SUPERCHARGERS

FUEL CELL COMPRESSORS

CUSTOM SUPERCHARGERS

1996 → TODAY

2010 → TODAY
DryF – Why Rotrex?

- Prior the DryF project, there were existing compressors mainly screw and piston type

- DryF Open loop is re-compression of high temperature steam – not possible with existing compressors

- Additionally, MVR requires high volumetric capacity, because of the lower density of steam

- A pioneer in the DryF project, Sintef, identified Centrifugal turbo compressors to be the solution as they offer high volumetric capacity and are “oil-free” heat pump solutions
DryF requirements

- Specifications defined in the first Work package based on demo plant requirements
- Steam producing heat pumps, and supply steam from 1 to 2-6 bar. (Commonly expanded from 10 to 2/5 bar).
- Target thermal capacity: 300kW – 1MW
  - Specific mass flow: 800kg/h
  - Inlet temperature: 110 °C @ Ambient temperature
- To achieve the relatively high pressure ratio, a two stage compression is required
- Each compression stage demanded a specific compressor design

Outlet of stage 2:
- Super heated water vapor
- 230 °C
- 4.8 bar (abs)
- Mass flow 800 kg/hr

Inlet of stage 2:
- Super heated water vapor
- 145 °C
- 2.5 bar (abs)
- De-superheating (pure water)

Inlet of stage 1:
- Water vapor
- 110 °C
- Atmospheric pressure
- Mass flow 720 kg/hr
The journey from Automotive to industrial demands

- Normal automotive applications deal with temperatures up to 50°C and ambient pressure.
- DryF demands nearly 300% higher temperatures along with steam and over-pressure at inlet.
- Several designs made and tested under these extreme conditions.
- New design includes:
  - Simulated impeller design, CNC 5-Axis billet machined in Titanium.
  - Highly specialized hydrodynamic sealing solutions.
  - Special compression chamber separation design.
  - Integrated lubrication circuits.
- Stable operation speeds up to 80,000 rpm.
- Two-stage MVR compression tested successfully in TRL6 (Lab).
The foundation for industrial compressors achieved

- DryF have introduced Rotrex to a completely “new world”
- Challenges going from automotive to industrial processes are identified
- “Supercharging” the industry towards a carbon free future
GET IN TOUCH

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