



Omniseal Solutions
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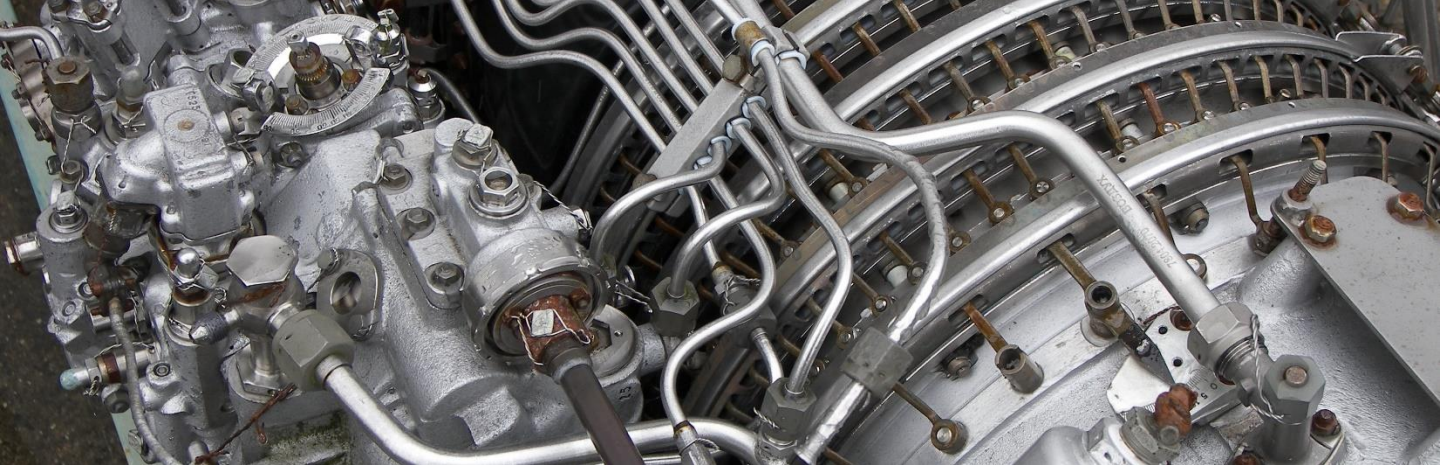
BEYOND
the boundaries of possible



AVIATION CASE STUDY

JET ENGINE LUBRICATION SYSTEMS





OMNISEAL® SPRING-ENERGIZED SEALS

Jet Engine Lubrication Systems

Mark Scoular August 2021

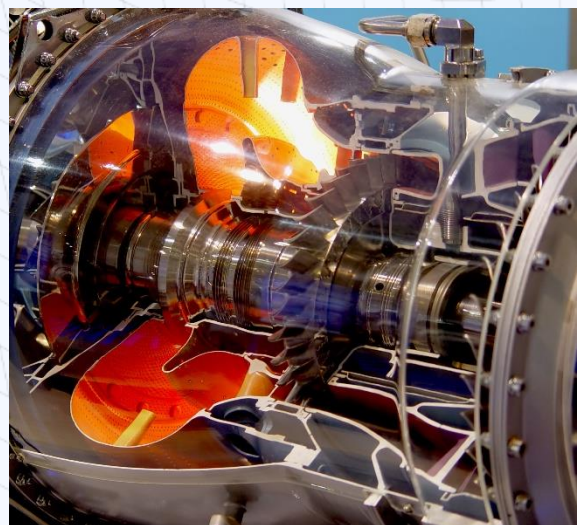
AVIATION HIGH TEMPERATURE HARSH MEDIA HIGH ACCOMMODATION

Environment

As manufacturers continue to improve the efficiency of jet engines, this results in the increase of temperatures throughout these systems. One example is High Temperature Stability (HTS) lubrication oils that are conveyed through a complex circuit and subjected to large temperature variations as well as strong vibration. These oils have been developed to sustain the harshest conditions in order to cool down engine parts and lubricate bearings.

Challenge

HTS oils are in turn more aggressive for polymer media, especially at high temperature. A sealing solution should not only accommodate the deformations and vibrations of the hardware but also remain stable in aggressive media at high temperature (up to 350°C / 680°F), in particular when soak back effect occurs.



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Solution

Omniseal® spring-energized seals with a metal spring interior and polymer jacket maintain a high temperature stability while being inert to the most aggressive oils. The sealing solution shows better durability at temperature higher than 230°C (446°F) compared to high grade elastomer O-Rings.

Simulation services and in-house testing, combined with finite element analysis relating to the specifics of a customer problem, allow the technical team to create a precision solution. In this lubrication system case, it provides a dilatation proof, tight, durable solution adapted to the former groove design that avoids re-engineering and reduces weight compared to a metal seal option.



A precision solution that is dilatation proof,
tight & durable

Benefits

- Superior lifetime compared to elastomers for reduced maintenance and improved durability
- Comparative replacement of former O-Ring design without hardware re-design
- High accommodation on soak back effects and supporting simulation evidence

Specification

Solution	• Omniseal® 103 Spring-Energized Seals
Area	• Jet Engine Lubrication Systems
Material	• High-Performance Polymer Materials A08, A10 or A90
Precision part	• Custom spring-energized face or radial seal
	• Media: High Temperature Stability Oil
Technical details	• Temperature: -55°C to 350°C (-67°F to 665°F)
	• Pressure difference: Up to 60 PSI (4 BAR)



Omniseal Solutions
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Design Expertise & Tailor-made Solutions for Your Critical Applications

Omniseal Solutions™ is a global engineering leader with over 65 years of historical legacy, relentlessly dedicated to the design and manufacture of precision sealing and material solutions that protect critical applications in the most demanding environments and passionately driven to push *Beyond the Boundaries of Possible*.



About the Author

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