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NUCLEAR CASE STUDY

HYDRAULIC SNUBBER ACTUATORS

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ETFE LARGE BORE, SPRING-ENERGIZED SEALS

Hydraulic Snubber Actuators

Nathan Handschke May 2025

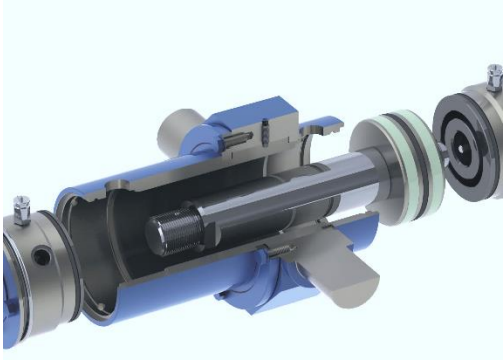
NUCLEAR RADIATION RESISTANCE HIGH TEMPERATURE HIGH PRESSURE

Environment

A snubber is a mechanical device designed to protect pipes and other critical components from excessive shock or sway caused by seismic disturbances or other transient forces. In a nuclear power plant, the environment is defined by its accident conditions, which mean that a hydraulic snubber actuator can be subject to high temperature and pressure as well as potentially encounter radiation during these accident conditions.

Challenge

In accident conditions (e.g., an earthquake), the snubbers activate and transition from a flexible state into momentarily, rigid locked conditions. In this state, the snubber absorbs dynamic energy and transfers it to the supporting structure, preventing excessive movement and damage to critical components. The accident conditions during this incident include temperatures of up to 100°C (212°F), pressures of 350 bar (5000 psi), as well as radiation exposure. The radiation exposure is the biggest driver in using the right material selection for this application that can handle these extreme conditions.



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Solution

Operating in a nuclear power plant, snubber seals must face harsh operating conditions and need to ensure high performance with extended lifetime.

Omniseal Solutions provides precision spring-energized seals that are custom designed for these severe conditions and to protect the nuclear plant's critical components. Our ETFE Fluoroloy® material solution offers excellent chemical resistance to the fireproof hydraulic fluids and radiation resistance during accident conditions. Along with the polymer jacket, the stainless steel spring gives the sealing solution a stiffness, allowing for critical support in misalignment.

Keep aligned in radiation resistance for your nuclear snubbers with our ETFE Spring-Energized Seals.

Technology Advantages

- Excellent chemical compatibility
- Good radiation resistance (up to 10^8 rad)
- Stiff and robust, able to support misalignment
- PFAS-Free* options are available (**PFAS-Free here means we do not intentionally add PFAS material in the product, but does not exclude the possibility of traces, as these materials are common in the environment)*

Specification

Solution	• Large Bore, Spring-Energized Seal
Area	• Power Plant
Material	• ETFE based jacket materials (Fluoroloy® A61, 23, 707, & A11) • Spring in 17/7PH stainless steel
Technical details	• Media: Fireproof hydraulic fluids (Synquench) • Max Temperature: 100°C (212°F) • Speed: 0.3 m/s (1ft/s) • Max Pressure: 350 bar (5000 psi) • Lifetime: 25 times per year for 10 years

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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 wear control solutions that protect critical applications in the most demanding environments and passionately driven to push *Beyond the Boundaries of Possible*.

Contact Our Expert

Nathan Handschke

Market Development Manager – Nuclear & Science Research

Minnesota, USA

+1-612-212-6715

nathan.handschke@saint-gobain.com

Omniseal Solutions
help@omniseal-solutions.com
www.omniseal-solutions.com