

The Unique Role of Fluoropolymers in Sealing Devices

Who are the ESA?

The European Sealing Association (ESA) is an association of European (+ UK) based companies which manufacture Sealing Devices.

- Established in 1992, Registered in Germany & UK
- Non profit Organisation
- 50 Members, 2 Research Organisations, Amtec (Germany) and Cetim (France)
- Sealing Device Groups; Mechanical Seals, Packings, Gaskets, Elastomeric & Polymeric Seals and Expansion Joints.

Typical Sealing Applications

Domestic.

Home, schools, hospitals, office, domestic other:

Applications.

Washing machine, dishwasher, taps, central heating pumps, underfloor heating manifolds, cut off valves and ball valves, gas controls/cutoffs, solar pumps, pure oxygen supplies (hospital)

Performance requirements of Sealing Devices: Low temp range, low pressure, low dynamic loads, none hostile chemicals (water, gas, waste water)
Fluoropolymers widely used in pump and valve applications above. Chemical resilience, mouldability, low friction, machineability, dynamic and static loads.



Typical Sealing Applications

Industry:

Drinking water and water treatment plants, chemical, Oil & Gas, Automotive, Nuclear, Aerospace, Food, Hydrogen, Semiconductor, Oxygen service, Space, Pharmaceutical



Example: Cryogenic Applications.

Air separation plants, hydrogen development, chemical and LNG plants

Typical Equipment, control valves, pumps, compressors, flanges, expansion joints.

Wide temp capability (-162 deg C), High pressure, chemical resistance, safety critical. Widespread use of Fluoropolymer Sealing devices.

Typical Applications

Example: Onshore Gas treatment:

500 to 1,000 sealing applications.

High pressure, wide temperature, critical application.

Fluoropolymers widely used in mechanical seals, flange gaskets, packing sets. Critical applications where chemical resistance and the ability to withstand thermal cycling conditions are necessary.



Example: Refinery

>20, 000 Application specific seals.

High/low temp, high pressure, wide Ph range, high mechanical loads, safety critical.

Fluoropolymers used in flange gaskets, expansion joints, packing sets, mechanical seals. Mainly because of chemical resistance properties combined with durability under fluctuating thermal and mechanical loads.

Approval Programmes and Design Standards

- ❖ **Everyone of the 50 Members has a Technical Department and/or Research functions engaged in assessing the suitability of Sealing materials to meet the conditions and approval requirements. The Sealing Materials chosen are very application specific, heavily researched and understood.**
- ❖ **International and National Standards.**
Fluoropolymers in sealing devices approved for food, water, oxygen etc Numerous technical standards, ISO, EN, BSI for leak rates and tightness calculations.
- ❖ **Customer Specific Standards:**
Military, Aerospace, Petrochemical, Nuclear, Original Equipment such as pumps, valves, compressors.
Application Specific but 5 to 25 years wouldn't be unusual.

Fluoropolymers in Sealing Devices?

Fluoropolymers are Very Application Specific.

Wide variety of Sealing Materials available for use in Domestic through to Industrial and OEM applications.

Why **Fluoropolymers in Sealing Devices**:

- ❖ No Alternative, the only material suitable:
 - Chemical resistance, thermal capability (high/low), mechanical integrity, low coefficient of friction. Critical use environments.
- ❖ Mouldability, machineability.
- ❖ Downside, High Cost.
- ❖ Cannot be Reused. Contamination, purity requirements, wear, risk of failure too costly (monetary and human cost)

ESA's analysis of the current PFAS Restriction Proposal

✓ Restricting PFAS is necessary to protect human health and the environment

NO Recognition of the crucial role of Fluoropolymers in the PFAS Restriction Proposal.

NO reference to Sealing Devices = Sealing Devices utilising Fluoropolymers would be banned as of 2026.

NO Reference to Maintenance and Repair requirements. Sealing Devices are part of maintenance and repair schedules in numerous industry sectors.

Interlink between Sectors not clear: eg - some sealing devices contain electronics. Electronics don't have any derogation = some sealing devices containing FP could not be placed on the market, even where there is a derogation.

✗ **An ESA Sealing Device SEA will be submitted.**

Conclusion: The ESA is;

- ✘ **Seeking a Proportionate Response.**
- ✘ **Asking that Fluoropolymers in Sealing Devices are recognised. Without them all of society will stop.** They are selected because of their ability to withstand hostile, aggressive and/or are reliable in critical environments.
Essential Use, seeking an exemption.
- ✘ **Seeking Recognition that there is no Alternative in Sealing Devices. An Alternative would need to be;**
 - ✘ Tested and approved for all known chemicals, leak rates understood, seating stresses would need to be calculated and temperature/pressure limits understood.
 - ✘ Meet/exceed existing EU/ISO Standards, extensive timeline.
 - ✘ Require application testing. Nuclear, Aerospace, Military, Petrochemical > 5 years to 25 years
 - ✘ Resilient. Unfortunately, persistence is a necessary attribute. The cost of failure is too high.

Thankyou.