

Application Number	E.2.12 (Energy)
Application Name	PTFE-containing composite packings, gaskets, fluorine-based elastomer seal materials
Candidate Substance CAS RN to be regulated	9002-84-0
Name of Candidate Substance to be regulated	fluorine-based elastomers
Generic Name of End Product for Application	Piping, valves, pumps, vessels
Generic Name of Part for Application	Seat gaskets, fluororubber O-rings, gland packings
Description of Application (Details) Drawings, Diagrams, Photographs, Videos, etc.	"VALQUA_Group_Sustainability_Report_2022(extract)r1" "zm01_2007_Elastomer(extract)r2" "zy03_0611_Gland_Packing(extract)r2" "zy03_1601_Gasket(extract)r2"
Explanation of Irreplaceable Technology Pictorial Photographic Data, Information on Reference Websites, etc.	Materials that can be used for seal members are selected according to the temperature and fluid. In specifications where fluorine-based materials are used, temperatures of -100°C or lower, or 150°C or higher, resistance to fluid, or purity is required, and they are expensive, but are used because they cannot be substituted with other materials. (VALQUA product catalogs, etc.)
Shipping Volume Information	The amount of raw materials used for this product is 44,823 tons/year, but the amount used only in Japan for the applications is estimated to be 139.6 tons/year. The amount used in one product is <20~50% by weight, which has a huge impact on the energy sector where it is used. Applications include valves, piping, and fittings in power generation plants, LNG storage facilities. Without this part, it would be impossible to operate equipment, or to operate plants, as it is connected by piping inside the plants. For the domestic scale for the applications in which PFAS is used: Electricity sold by power companies: 729.3 billion kWh/year City gas sales by city gas companies: 25,411 million m ³ /year
Working Temperature Range	-253°C to 260°C (PTFE), -15°C to 200°C (fluororubber)
Weather Resistance	No influence of direct sunlight
Chemical Resistance	Stable against most chemicals. Slightly affected by molten alkali metals (solutions), high-temperature fluorine, and chlorine trifluoride.
Non-Adhesiveness	Wet resistance (Contact angle with water ≥ 110°)
Purity	No impurities are eluted (ppb level or less) when in contact with chemicals
PVC	Working temperature range: -20°C to 90°C
PP	Working temperature range: -20°C to 130°C

High-Density PE	Working temperature range: -80°C to 70°C
Silicon Resin	Silicone resin is inferior in solvent resistance, chemical (strong acid and strong alkali) resistance, and water resistance
Silicon Rubber	Silicon rubber is inferior to fluororubber in mechanical strength and solvent resistance when used as a seal member
EPDM	Working temperature range: -40°C to 150°C, EPDM is inferior to fluororubber in oil resistance
NBR (Nitrile Rubber)	Working temperature range: -50°C to 130°C, NBR is inferior to fluororubber in oil resistance
PEEK (Polyether Ether Ketone)	Working temperature range: -269°C to 240°C, PEEK is slightly inferior to PTFE in acid resistance, PEEK is basically injection-molded, and cannot be blended with other materials
Remarks	Heat resistance https://www.kda1969.com/study/study_pla_compare.htm Chemical resistance https://www.kda1969.com/study/study_pla_chem.htm List of physical properties of rubber https://www.kayo-corp.co.jp/common/pdf/rub_propertylist.pdf