Alternatives listed in PFAS Annex E and reasons for non-replacement

	Application	PFAS	Non-PFAS alternatives	Reasons why PFAS cannot be replaced by non-PFAS
a)	Sealing	fluoroelastomers	Ethylene propylene diene monomer (EPDM) silicone rubbers	In sealing material applications (e.g. packing), heat resistance, solvent resistance and low gas permeability are important, and EPDM and silicone rubber provide low or medium durability but not enough property, so they cannot replace all applications and fluorinated materials must be used.
b)	Wire insulation	PTFE, PFA, ETFE, FEP, FEPM, PFPE	Silicone materials Polyetheretherketone(PEEK) mica EPDM Polyvinyl chloride ceramic based polymer	In cable insulation materials, mechanical, thermal, volume resistance and electrical properties are important, and the alternatives listed as alternatives have low resistance to any of these properties and cannot replace them in applications where they need to be met simultaneously, and fluorinated materials need to be used. For example, silicone has low resistance to mechanical properties (susceptible to tearing/abrasion), PEEK has low electrical properties, mica is hard and not suitable as a cable, etc.
c)	Immersion cooling (Heat transfer fluid)	Hydrofluoroethers Fluorinated amines	Mineral oils synthetic oils natural oils Hydrocarbon fluids	Compared to fluorinated materials (liquids), the viscosities of all alternative oils are considerably higher and it is difficult to circulate them and maintain a constant temperature. In addition, the flash point is considerably lower, and significant equipment modifications are required to ensure safety.
d)	liquid crystal displays (LCD)	-CF3 group	Cyano (-CN) group	For liquid crystal molecules, low viscosity, high resistance, low dielectric anisotropy and low birefringence are important, and replacing a liquid crystal molecule with a CF3 group with a cyano group will result in a deterioration in all of these properties and cause adverse effects such as slow response speed and unsmooth display, and high voltage drive and high energy consumption.