# Teflon variations and uses in plastic laboratory tubing – Primer

**TEFLON© comes in many forms and varieties. Each form has different properties and costs.** Below is a brief explanation of the different types of TEFLON© which is a registered trademark of E.I. DuPont.

**PFA** *PerFlourAlkoxy*, has very low friction, excellent purity and excellent chemical resistance. Making it ideally suited for products serving the chromatography and other industries, it is translucent and possible to see what is inside the bottle or container it is made from. It has a temperature range from -270°C to 260°C. It also has greater strength, stiffness and creep resistance compared to other Teflon products listed below. In addition, it has great flexibility and therefore a long useful life when used properly. PFA is preferred over FEP when heat is repeatedly used but is more affected by water and weathering than FEP.
*PFA is sold by DuPont as Teflon PFA.*

**PTFE** *polytetrafluoroethylene*, has an extremely low coefficient of friction so where surface wear might be a problem this material is often chosen. PTFE can be used between -70°C to temperature of 260°C without compromising its resistance to solvents and other chemicals. PTFE cannot be processed by normal extrusion and injection molding methods because it will “creep” and cold flow and has a very high melt temperature. Therefore, PTFE is machined in the fabrication of labware making each individual item expensive. PTFE is a solid and has high molecular weight and is hydrophobic and cannot be wetted. PTFE was discovered by Roy Plunkett of Kinetic Chemicals, a DuPont and General Motors subsidiary.
*PTFE is sold by DuPont as Teflon*

**FEP** *fluorinated ethylene propylene*, is similar PTFE and PFA in chemical resistance but has better impact strength and can be injected molded into labware at lower temperatures than PFA and therefore generally has a lower cost associated with it.  FEP is somewhat translucent in color and fairly rigid and has a temperatures range from -270°C to 200°C. FEP can be sterilized more than once but has a lower melting point than PFA or PTFE. FEP can be extremely resistant to caustic agents, detergents  and is very flexible.
*FEP is sold by DuPont as Teflon FEP.*

**ETFE** *ethylene-tetrafluroethylene* is not a true “TEFLON” product and is more of a fluorine based plastic. It is a translucent white material with very good chemical resistance. Its mechanical properties approach that of TEFLON but can be molded into labware making each item more affordable. It melts at a lower temperature than Teflon but has a better impact resistance than FEP, PFA and PTFE.


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