

OECD polymer of low concern (PLC) criteria and additional customer related criteria

OECD = Organisation for Economic Co-operation and Development

Polymers currently in use	Polymer composition	MW, Mn, MWD	Wt-% oligomer	Electrical charge
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Fluoropolymer	✓	✓	✓	✓
PTFE	✓	✓	✓	✓
TFM-PTFE	✓	✓	✓	✓
PFA	✓	✓	✓	✓
FEP	✓	✓	✓	✓

Alternative Materials (just as examples)

PE	✗		✗	
PS			✗	
PA 66			✗	
PMMA			✗	
PPS			✗	
PI			✗	

Symbols



Meaning

- Accept
- Not fulfilled
- Accept with limitations
- Nearly not fulfilled

Legend

Polymer composition	: & elemental composition; including CAS no.
MW, Mn, MWD	they are used criteria for PLC assessment. MWD --> polydispersity
Wt-% oligomer	oligomers < 1000 Da
Electrical charge	ionic, nonionic; cationic polymers associated with anionic
Reactive functional groups (RFG)	Atom or associated group of atoms in a chemical structure

Functional group equivalent weight (FGEW)	FGEW is defined as the ratio of Mn to the number of
Low MW leachables	or organic, that migrate (i.e. leach) out of the polyme
Water/lipid solubility, octanol water partition	Water solubility = extent to which a compound will di
Particle size	on are associated with adverse health effects. Polyme
Polymer stability	naller particles is critical. Molecules with Mn<1000 D
Thermal stability	mperature during disposal. Thermal stability testing r
Abiotic stability	iotic degradation may involve sunlight, water or oxyge
Biotic stability	organisms under oxygenated (aerobic) or anoxic (anaer
suited for liners of pipelines, pumps, valves	The material needs a certain flexibility to be able to n
Solvent Stability	We use isobutanol, chloro benzene, di chloro benzen
Acid and caustic stability	We use HCL, sulfuric acid, phosphoric acid and acetic
Temperature stability up to 160°C	Our processes run at temperatures up to 160 °C and i

Reactive functional groups (RFG)	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒
Functional group equivalent weight (FGEW)	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒
Low MW leachables	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒
Water/lipid solubility, octanol water partition	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒
Particle size	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒
Polymer stability	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒
Thermal stability	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒
Abiotic stability	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒	☒ ☒ ☒ ☒ ☒

dispersity index

quatic toxicity

icture that is intended or can be reasonable expected to undeergo facile chemical reaction

functional groups in the polymer

r

insoluble in water; negligible water solubility $< 1 \times 10^{-6} \text{ mg/L} = 1 \text{ ppt}$

particle size should be $> 5 \text{ }\mu\text{m}$

are capable of crossing cell membranes

may involve TGA

en.

erobic) conditions

make an inliner out of it.

in acetone and some other solvents.

acid as well as caustic soda.

pressures up to 10 bars.

Biotic stability		
suited for inliners of pipelines, pumps, valves		
Solvent Stability		
Acid and caustic stability		
Temperature stability up to 160°C		

Application in chemical industrie	Sealing made of		
	Fluoropolymers	Graphite	Aramid fibres
aquaous media pipelines	✓	✓	✓
remounting of steal pipes with PTFE inliner	✓	✗	✗
connection from and to PTFE lined valves	✓	✗	✗
elastomers in double acting mechanical seals	✓	✗	✗
sealings of solvent pipelines	✓	✓	✗
sealings of acid (e.g. HCL) pipelines	✓	✓	✓
sealings of caustics (e.g. NaOH) pipelines	✓	✓	✓
pipelines of media with high temperature	✓	✓	✓
Sealing of glasslined flanges	✓	✗	✗
Sealing of glass flanges	✓	✗	✗
waste gas pipelines	✓	✓	✓
waste water pipelines	✓	✓	✓
sealings in valves according to TA Luft	✓	✗	✗

Symbols



Meaning

Accept

Not fulfilled

Accept with limitations

Nearly not fulfilled

Rubber

