

Chemical resistance

Overview for FlowStart Evo parts

21-8-2013

1 Chemical resistance

When using the FlowStart Evo for chemical reactions, chemical compounds come into contact with several wetted parts. All of these wetted parts are replaceable. Even though FutureChemistry has selected the best high-performance materials for these parts, some chemicals may deteriorate the integrity over time. Even though the actual performance of materials highly depends on concentration, temperature and exposure time, we have built up a chart of chemical resistance to give an indication of how the wetted parts will perform in combination with several example chemicals. First, for each wetted part a list of materials used is given. Next, several classes of chemical compounds are listed with performance. The performance is segmented in the following way:

Good performance, can be used without problems are expected	+
Material could deteriorate over time. Please clean as soon as possible after use, and expect to replace parts after extended use	0
Not recommended: use for own risk	-
No data known	N/A

Overview of materials per part

		PEEK	ETFE	FEP, PFA or PTFE	PE- HD	Kalrez	Borosilicate glass
FlowStart Evo standard parts	Standard syringes (1 and 5 mL)						
	Standard inlet and outlet modules						
	Microreactors						
Add-on modules	High temperature module						
	Back pressure regulator						

Overview of Chemical resistance per material

		PEEK	ETFE	FEP, PFA or PTFE	PE- HD	Kalrez	Borosilicate glass
Aliphatic compounds	Heptane	+	+	+	0	+	+
	Paraffin oil	+	N/A	+	+	+	+
Aromatic compounds	Benzene	+	+	+	0	+	+
	Nitrobenzenes	0	+	+	0	+	+
	Phenol (aq)	0	+	+	+	+	+
	Styrene	+	+	N/A	0	N/A	+
Ketones, alcohols etc.	Acetone	+	+	+	+	+	+
	Isopropanol	+	N/A	N/A	+	+	+
	Benzaldehyde	+	+	+	+	+	+
	DMF	+	0	+	+	+	+
	DMSO	0	0	+	N/A	+	+
	Formaldehyde (aq)	+	+	+	+	+	+
	Methylethylketone	0	N/A	N/A	+	+	+

		PEEK	ETFE	FEP, PFA or PTFE	PE- HD	Kalrez	Borosilicate glass
Amines	Aniline	+	+	+	+	+	+
	Ammonia (anhydrous liquid)	+	+	+	+	+	+
	Hydrazine hydrate (aq)	+	+	+	N/A	+	+
	Pyridine	+	0	+	+	+	+
Halogenated compounds	Chloroform	+	0	+	0	+	+
	Dichloromethane	+	+	+	0	+	+
	Iodoform	N/A	N/A	N/A	N/A	0	N/A
	Aqua regia (3:1 HCl HNO ₃)	-	+	+	-	+	0
Acids	Acetic acid (aq)	+	+	+	+	+	+
	Boric acid (aq)	+	+	+	+	+	+
	Chromic acid (aq)	+	+	+	+	+	+
	Hydrochloric acid (aq)	+	+	+	+	+	+
	Hydrofluoric acid (aq)	-	+	+	+	+	-
	Nitric acid (40% aq)	-	0	0	+	+	+
	Sulphuric acid (conc)	-	+	0	+	+	+
	Bases	Sodium hydroxide (aq)	+	0	+	+	+
Halogens	Bromine (pure)	-	0	+	-	+	+
	Fluorine gas	-	0	0	-	0	+
Oxidants	Ozone	+	+	+	0	+	+
	Hydrogen peroxide	N/A	+	+	+	+	+