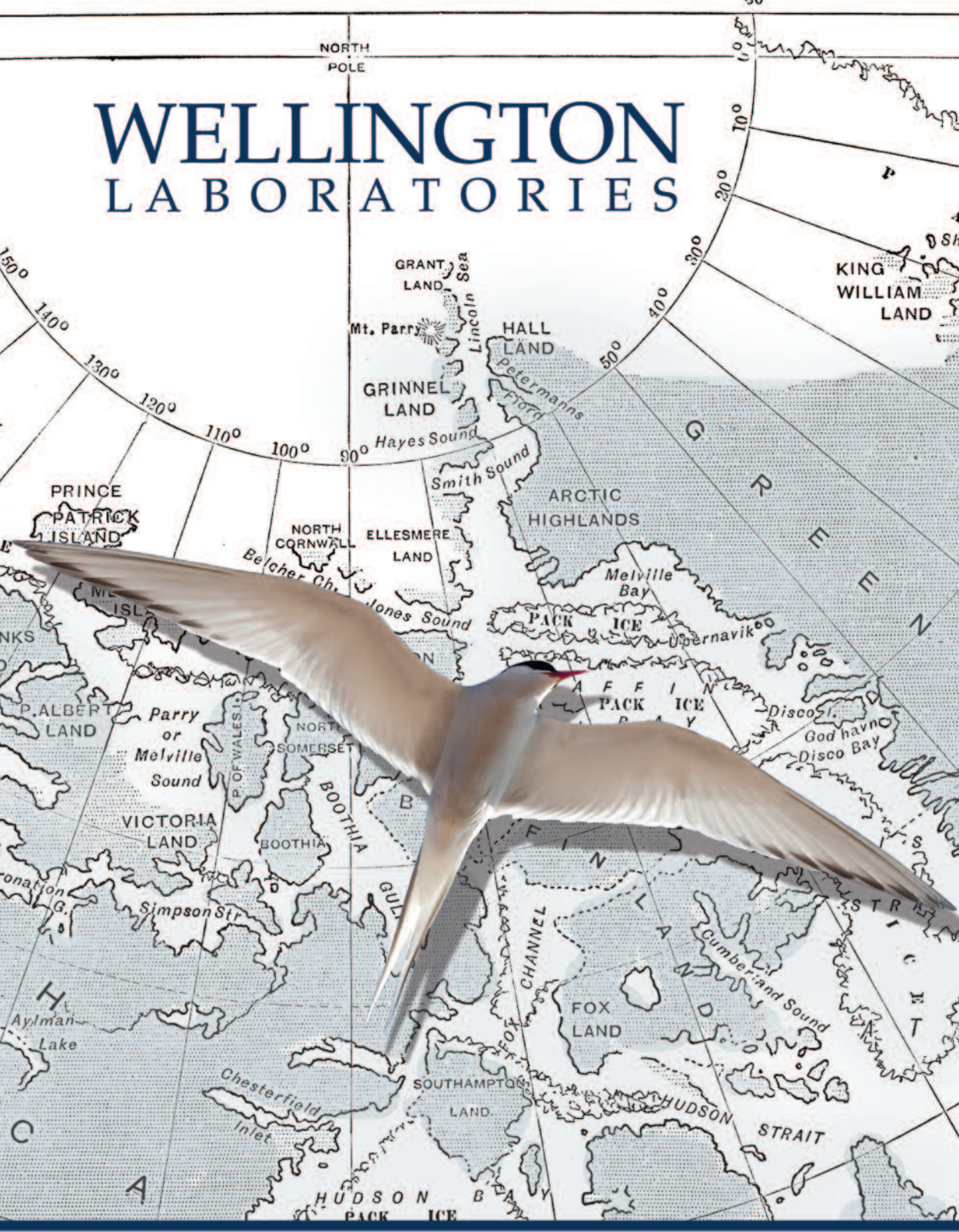
WELLINGTON LABORATORIES



QUICK REFERENCE GUIDE: PERFLUOROALKYL COMPOUNDS

GUIDELINES FOR THE USE AND HANDLING OF WELLINGTON'S FLUORINATED PRODUCTS

HAZARDS

Our products are polyfluorinated alkyl compounds offered as solutions in organic solvents such as methanol, isopropanol and nonane.
Although the maximum concentration is 50 µg/ml, that is 0.005% (w/v), these compounds must be considered toxic and should be handled accordingly.
As with all of our products, due care should be exercised to prevent human contact and ingestion. The absence of a toxicity warning for any of our products must not be interpreted as an indication that there is no possible health hazard.

NOTE:
THESE MATERIALS SHOULD ONLY BE USED BY PERSONNEL TRAINED IN THE HANDLING OF HAZARDOUS CHEMICALS.
ALL PROCEDURES SHOULD BE PERFORMED IN A FUME HOOD AND SUITABLE GLOVES, EYE PROTECTION AND CLOTHING SHOULD BE WORN AT ALL TIMES.

RECEIPT, INSPECTION, HANDLING AND STORAGE

Unless crystalline material is provided, all of our reference standard solutions are shipped in flame-sealed, pre-scored amber glass ampoules. Upon receipt, inspect the ampoules for breakage and leakage and then store them upright in a refrigerator until needed.

Prior to opening, allow the solution to drain into the bottom of the ampoule, lightly tapping the ampoule if necessary. Using the plastic ampoule collar provided, hold the ampoule upright and snap the top off, breaking away from the body. Transfer the solution to an amber glass container with a glass stopper for storage.

ADDITIONAL HANDLING SUGGESTIONS SPECIFIC TO THE COMPOUND WILL BE PROVIDED WITH THE CERTIFICATE OF ANALYSIS.

DISPOSAL

All waste materials generated during the use of these solutions should be treated as hazardous in accordance with national and regional regulations. A licensed disposal company should be employed.

ACCURACY

Each of our stock solutions is prepared from crystalline material that has been well characterized as to its structure and purity. The crystalline material is weighed using microbalances that are externally calibrated using NIST-traceable weights.

Solutions are prepared by completely dissolving the crystalline material in ultrapure, distilled-in-glass solvents. The volumetric flasks used for this purpose, and the pipets used for subsequent preparation of dilutions and mixtures, are all of class A tolerance and NIST-traceable.

The maximum percent relative combined uncertainty for solution preparation is calculated to be ± 5 %.

INTERLABORATORY CERTIFICATION

Wellington has contributed standards to various independent interlaboratory testing studies. Since 2005, our standards have been tested in several international round-robins. Data from these studies is available upon request.

Wellington plans to continue participating in independent interlaboratory studies to confirm the accuracy of our reference standard solutions.

EXPIRY DATE/SHELF LIFE

In order to accurately determine the shelf life of our products, testing must reveal degradation or loss in concentration of the particular analyte. Most of these fluorinated compounds are presumed to be stable based on current scientific literature. However, many of these compounds have never been offered as solutions and therefore may have degradation pathways that have not been previously observed.

Consequently, we continue to monitor the stability of these compounds by:
i) comparing freshly prepared solutions to older solutions by GC/MS and/or LC/MS.
ii) monitoring the solutions during storage by GC/MS and/or LC/MS.

Thus, our stability studies are still ongoing. In the absence of a “true expiry date”, we consider that our reference solutions retain their accuracy for a period of at least 2 years from delivery in the unopened ampoule.

Summary of LC/MS/MS Tune Parameters and Transitions

Perfluoroalkylcarboxylic Acids

Compound	Molecular Formula	Molecular Weight	Cone (V)	Collision (eV)	Precusor Ion (m/z)	Product Ion (m/z)
PFBA	$C_4HF_7O_2$	214.0396	10	8	213	169
PFBA [M+4]	$^{13}C_4HF_7O_2$	218.0090	10	8	217	172
PFPeA	$C_5HF_9O_2$	264.0474	10	9	263	219
PFPeA [M+3]	$^{13}C_3{}^{12}C_2HF_9O_2$	267.0244	10	9	266	222
PFPeA [M+5]	$^{13}C_5HF_9O_2$	269.0091	10	9	268	223
PFHxA	$C_6HF_{11}O_2$	314.0552	10	9	313	269
PFHxA [M+2]	$^{13}C_2{}^{12}C_4HF_{11}O_2$	316.0399	10	9	315	270
PFHxA [M+5]	$^{13}C_5{}^{12}C_1HF_{11}O_2$	319.0169	10	9	318	273
PFHpA	$C_7HF_{13}O_2$	364.0630	15	11	363	319
PFHpA [M+4]	$^{13}C_4{}^{12}C_3HF_{13}O_2$	368.0324	15	11	367	322
PFOA	$C_8HF_{15}O_2$	414.0708	15	11	413	369
PFOA [M+2]	$^{13}C_2{}^{12}C_6HF_{15}O_2$	416.0555	15	11	415	370
PFOA [M+4]	$^{13}C_4{}^{12}C_4HF_{15}O_2$	418.0402	15	11	417	372
PFOA [M+8]	$^{13}C_8HF_{15}O_2$	422.0096	15	11	421	376
PFNA	$C_9HF_{17}O_2$	464.0786	15	11	463	419
PFNA [M+5]	$^{13}C_5{}^{12}C_4HF_{17}O_2$	469.0404	15	11	468	423
PFNA [M+9]	$^{13}C_9HF_{17}O_2$	473.0098	15	11	472	427
PFDA	$C_{10}HF_{19}O_2$	514.0864	15	13	513	469
PFDA [M+2]	$^{13}C_2{}^{12}C_8HF_{19}O_2$	516.0711	15	13	515	470
PFDA [M+6]	$^{13}C_6{}^{12}C_4HF_{19}O_2$	520.0405	15	13	519	474
PFUdA	$C_{11}HF_{21}O_2$	564.0942	15	13	563	519
PFUdA [M+2]	$^{13}C_2{}^{12}C_9HF_{21}O_2$	566.0789	15	13	565	520
PFUdA [M+7]	$^{13}C_7{}^{12}C_4HF_{21}O_2$	571.0407	15	13	570	525
PFDoA	$C_{12}HF_{23}O_2$	614.1020	20	13	613	569
PFDoA [M+2]	$^{13}C_2{}^{12}C_{10}HF_{23}O_2$	616.0867	20	13	615	570
PFTrDA	$C_{13}HF_{25}O_2$	664.1098	22	15	663	619
PFTeDA	$C_{14}HF_{27}O_2$	714.1176	15	14	713	669
PFHxDA	$C_{16}HF_{31}O_2$	814.1332	25	15	813	769
PFODA	$C_{18}HF_{35}O_2$	914.1488	25	15	913	869

Perfluoroalkylsulfonates

Compound	Molecular Formula	Molecular Weight	Cone (V)	Collision (eV)	Precusor Ion (m/z)	Product Ion (m/z)
KPFBS	$C_4F_9SO_3K$	338.1901	40	25	299	99
NaPFHxS	$C_6F_{13}SO_3Na$	422.0972	50	30	399	99
NaPFHxS [M+3]	$^{13}C_3{}^{12}C_3F_{13}SO_3Na$	425.0743	50	30	402	99
NaPFHxS [M+4]	$C_6F_{13}S^{18}O_2{}^{16}ONa$	426.0968	50	30	403	103
NaPFHpS	$C_7F_{15}SO_3Na$	472.1050	60	35	449	99
KPFOS	$C_8F_{17}SO_3K$	538.2214	60	40	499	99
NaPFOS	$C_8F_{17}SO_3Na$	522.1129	62	40	499	99
NaPFOS [M+4]	$^{13}C_4{}^{12}C_4F_{17}SO_3Na$	526.0823	62	40	503	99
NaPFOS [M+8]	$^{13}C_8F_{17}SO_3Na$	530.0517	62	40	507	99
NaPFDS	$C_{10}F_{21}SO_3Na$	622.1285	70	50	599	99
NaPFDoS	$C_{12}F_{25}SO_3Na$	722.1441	80	50	699	99

Summary of LC/MS/MS Tune Parameters and Transitions

Perfluorooctanesulfonamides

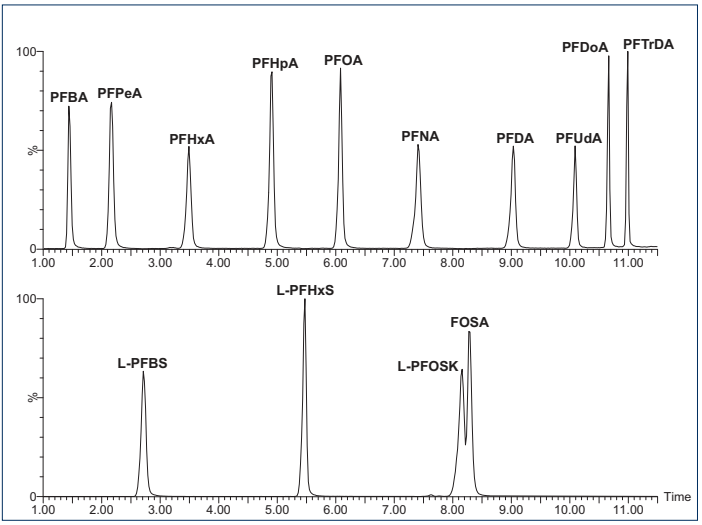
Compound	Molecular Formula	Molecular Weight	Cone (V)	Collision (eV)	Precusor Ion (m/z)	Product Ion (m/z)
FOSA	$C_8H_2F_{17}NO_2S$	499.1462	40	30	498	78
FOSA [M+8]	$^{13}C_8H_2F_{17}NO_2S$	507.0851	40	30	506	78
N-MeFOSA	$C_9H_4F_{17}NO_2S$	513.1731	45	25	512	169
N-MeFOSA [M+3]	$C_9{}^2H_3HF_{17}NO_2S$	516.1913	45	25	515	169
N-EtFOSA	$C_{10}H_6F_{17}NO_2S$	527.2000	40	25	526	169
N-EtFOSA [M+5]	$C_{10}{}^2H_5HF_{17}NO_2S$	532.2303	40	25	531	169

Perfluorooctanesulfonamidoethanols

Compound	Molecular Formula	Molecular Weight	Cone (V)	Collision (eV)	Precusor Ion (m/z)	Product Ion (m/z)
N-MeFOSE	$C_{11}H_8F_{17}NO_3S$	557.2263	40	35	556	122
N-MeFOSE [M+7]	$C_{11}{}^2H_7HF_{17}NO_3S$	564.2694	40	35	563	126
N-EtFOSE	$C_{12}H_{10}F_{17}NO_3S$	571.2532	40	33	570	136
N-EtFOSE [M+9]	$C_{12}{}^2H_9HF_{17}NO_3S$	580.3086	40	33	579	142

Perfluorooctanesulfonamidoacetic acids

Compound	Molecular Formula	Molecular Weight	Cone (V)	Collision (eV)	Precusor Ion (m/z)	Product Ion (m/z)
FOSAA	$C_{10}H_4F_{17}NO_4S$	557.1829	35	25	556	498
N-MeFOSAA	$C_{11}H_6F_{17}NO_4S$	571.2098	35	20	570	419
N-MeFOSAA [M+3]	$C_{11}{}^2H_3H_3F_{17}NO_4S$	574.2280	32	20	573	419
N-EtFOSAA	$C_{12}H_8F_{17}NO_4S$	585.2367	35	20	584	419
N-EtFOSAA [M+5]	$C_{12}{}^2H_5H_3F_{17}NO_4S$	590.2670	32	20	589	419



The LC/MS/MS parameters presented were determined using a Micromass Quattro *micro* API MS and are meant as starting points only. *Further optimization is recommended.*

Summary of LC/MS/MS Tune Parameters and Transitions

Fluorinated Telomer Alcohols

Compound	Molecular Formula	Molecular Weight	Cone (V)	Collision (eV)	Precusor Ion (m/z)	Product Ion (m/z)
4:2 FTOH	$C_6H_5F_9O$	264.0907	15	12	263	203
4:2 FTOH [M+4]	$C_6{}^2H_4HF_9O$	268.1150	15	12	266	204
6:2 FTOH	$C_8H_5F_{13}O$	364.1063	13	9	363	303
6:2 FTOH [M+4]	$^{13}C_2{}^{12}C_6{}^2H_2H_3F_{13}O$	368.1032	13	9	367	306
7:2 sFTOH	$C_9H_5F_{15}O$	414.1141	20	14	393	219
8:2 FTOH	$C_{10}H_5F_{17}O$	464.1220	14	12	463	403
8:2 FTOH [M+4]	$^{13}C_2{}^{12}C_8{}^2H_2H_3F_{17}O$	468.1188	14	12	467	406
10:2 FTOH	$C_{12}H_5F_{21}O$	564.1376	13	11	563	503
10:2 FTOH [M+4]	$^{13}C_2{}^{12}C_{10}{}^2H_2H_3F_{21}O$	568.1344	13	11	567	506

Fluorinated Telomer Acids

Compound	Molecular Formula	Molecular Weight	Cone (V)	Collision (eV)	Precusor Ion (m/z)	Product Ion (m/z)
6:2 FTA	$C_8H_3F_{13}O_2$	378.0899	15	15	377	293
6:2 FTA [M+2]	$^{13}C_2{}^{12}C_6H_3F_{13}O_2$	380.0746	15	15	379	294
8:2 FTA	$C_{10}H_3F_{17}O_2$	478.1055	14	15	477	393
8:2 FTA [M+2]	$^{13}C_2{}^{12}C_8H_3F_{17}O_2$	480.0902	14	15	479	394
10:2 FTA	$C_{12}H_3F_{21}O_2$	578.1211	15	15	577	493
10:2 FTA [M+2]	$^{13}C_2{}^{12}C_{10}H_3F_{21}O_2$	580.1058	15	15	579	494
3:3 FTA	$C_6H_5F_7O_2$	242.0933	15	8	241	177
5:3 FTA	$C_8H_5F_{11}O_2$	342.1089	15	10	341	237
7:3 FTA	$C_{10}H_5F_{15}O_2$	442.1245	15	10	441	337

Fluorinated Telomer Unsaturated Acids

Compound	Molecular Formula	Molecular Weight	Cone (V)	Collision (eV)	Precusor Ion (m/z)	Product Ion (m/z)
6:2 FTUA	$C_8H_2F_{12}O_2$	358.0835	14	21	357	293
6:2 FTUA [M+2]	$^{13}C_2{}^{12}C_6H_2F_{12}O_2$	360.0682	14	21	359	294
8:2 FTUA	$C_{10}H_2F_{16}O_2$	458.0991	14	21	457	393
8:2 FTUA [M+2]	$^{13}C_2{}^{12}C_8H_2F_{16}O_2$	460.0838	14	21	459	394
10:2 FTUA	$C_{12}H_2F_{20}O_2$	558.1147	14	21	557	493
10:2 FTUA [M+2]	$^{13}C_2{}^{12}C_{10}H_2F_{20}O_2$	560.0995	14	21	559	494

Fluorinated Telomer Sulfonates

Compound	Molecular Formula	Molecular Weight	Cone (V)	Collision (eV)	Precusor Ion (m/z)	Product Ion (m/z)
4:2 FTS	$C_6H_4F_9SO_3Na$	350.1354	25	20	327	307
6:2 FTS	$C_8H_4F_{13}SO_3Na$	450.1510	25	20	427	407
8:2 FTS	$C_{10}H_4F_{17}SO_3Na$	550.1666	25	25	527	507

Summary of LC/MS/MS Tune Parameters and Transitions

Perfluoroalkylphosphonic acids

Compound	Molecular Formula	Molecular Weight	Cone (V)	Collision (eV)	Precusor Ion (m/z)	Product Ion (m/z)
PFHxPA	$C_6H_2F_{13}PO_3$	400.0331	40	35	399	79
PFOPA	$C_8H_2F_{17}PO_3$	500.0487	40	35	499	79
PFDPA	$C_{10}H_2F_{21}PO_3$	600.0643	45	35	599	79
Cl-PFHxPA	$C_6H_2ClF_{12}PO_3$	416.4877	40	35	415	79

Sodium Perfluoroalkyl Phosphinates

Compound	Molecular Formula	Molecular Weight	Cone (V)	Collision (eV)	Precusor Ion (m/z)	Product Ion (m/z)
6:6PFPi	$C_{12}F_{26}PO_2Na$	724.0528	80	45	701	401
6:8PFPi	$C_{14}F_{30}PO_2Na$	824.0685	80	45	801	501
8:8PFPi	$C_{16}F_{34}PO_2Na$	924.0841	80	45	901	501

Mono-Substituted Polyfluorinated Phosphate Esters

Compound	Molecular Formula	Molecular Weight	Cone (V)	Collision (eV)	Precusor Ion (m/z)	Product Ion (m/z)
6:2PAP	$C_8H_4F_{13}PO_4Na_2$	488.0500	25	20	443	97
6:2PAP [M+2]	$^{13}C_2{}^{12}C_6H_4F_{13}PO_4Na_2$	490.0347	25	20	445	97
8:2PAP	$C_{10}H_4F_{17}PO_4Na_2$	588.0656	25	20	543	97
8:2PAP [M+2]	$^{13}C_2{}^{12}C_8H_4F_{17}PO_4Na_2$	590.0503	25	20	545	97

Di-Substituted Polyfluorinated Phosphate Esters

Compound	Molecular Formula	Molecular Weight	Cone (V)	Collision (eV)	Precusor Ion (m/z)	Product Ion (m/z)
6:2diPAP	$C_{16}H_8F_{26}PO_4Na$	812.1592	30	20	789	443
6:2diPAP [M+4]	$^{13}C_4{}^{12}C_{12}H_8F_{26}PO_4Na$	816.1286	30	20	793	445
8:2diPAP	$C_{20}H_8F_{34}PO_4Na$	1012.1904	35	25	989	543
8:2diPAP [M+4]	$^{13}C_4{}^{12}C_{16}H_8F_{34}PO_4Na$	1016.1598	35	25	993	545

The masses utilized to calculate the molecular weights stated in this reference guide are as follows:

^{12}C = 12.011
^{13}C = 13.003355
H = 1.00794
^{2}H = 2.014
N = 14.0067
O = 15.9994
F = 18.998403
S = 32.064
P = 30.97376
Na = 22.9898
K = 39.0983

Reference = http://web/utk.edu/~bartmess/massabun.txt

The LC/MS/MS parameters presented were determined using a Micromass Quattro *micro* API MS and are meant as starting points only. *Further optimization is recommended.*

General Structure of Various Fluorinated Compounds

PFCA	R_f-CO_2H	$R_f = CF_3(CF_2)_n$	n = 0 to 20	
PFAS	R_f-SO_3^-	$R_f = CF_3(CF_2)_n$	n = 0 to 20	
PFASi	R_f-SO_2^-	$R_f = CF_3(CF_2)_n$	n = 0 to 20	
FOSA	R_f-SO_2NH_2	$R_f = CF_3(CF_2)_n$	n = 7	
N-alkylFOSA	R_f-SO_2NRR'	$R_f = CF_3(CF_2)_n$	n = 7	R = Me or Et R'= H
N-alkylFOSAA	R_f-SO_2NRR'	$R_f = CF_3(CF_2)_n$	n = 7	R = CH_2CO_2H R'= H or Me or Et
N-alkylFOSE	R_f-SO_2NRR'	$R_f = CF_3(CF_2)_n$	n = 7	R = CH_2CH_2OH R'= Me or Et
FTOH	R_f-CH_2CH_2OH R_f-$CH(OH)CH_3$	$R_f = CF_3(CF_2)_n$	n = 0 to 15	
FTA	R_f-CH_2CO_2H	$R_f = CF_3(CF_2)_n$	n = 0 to 15	
FTUA	R_f-$CF{=}CHCO_2H$	$R_f = CF_3(CF_2)_n$	n = 0 to 15	
PFAPA	R_f-PO_3H_2	$R_f = CF_3(CF_2)_n$	n = 0 to 15	
PFPi	$(R_f)_2P(O)OH$	$R_f = CF_3(CF_2)_n$	n = 0 to 10	
PAP	$R_fCH_2CH_2OP(O)(OH)_2$	$R_f = CF_3(CF_2)_n$	n = 0 to 10	
diPAP	$(R_fCH_2CH_2O)_2P(O)OH$	$R_f = CF_3(CF_2)_n$	n = 0 to 10	

Commonly Used Units of Measure

wt/wt basis				wt/vol basis			
ppm	mg/kg	µg/g	ng/mg	**ppm**	mg/l	µg/ml	ng/µl
ppb	µg/kg	ng/g	pg/mg	**ppb**	µg/l	ng/ml	pg/µl
ppt	ng/kg	pg/g	fg/mg	**ppt**	ng/l	pg/ml	fg/µl
ppq	pg/kg	fg/g	ag/mg	**ppq**	pg/l	fg/ml	ag/µl

Common Acronyms

PFCA	**P**er**f**luoroalkyl**c**arboxylic **a**cid
PFOA	**P**er**f**luoro**o**ctanecarboxylic **a**cid
PFAS	**P**er**f**luoro**a**lkyl**s**ulfonate
PFOS	**P**er**f**luoro**o**ctane**s**ulfonate
PFASi	**P**er**f**luoro**a**lkyl**s**ulf**i**nate
FOSA	Per**f**luoro**o**ctane**s**ulfon**a**mide
FOSAA	Per**f**luoro**o**ctane**s**ulfon**a**mido**a**cetic acid
FOSE	Per**f**luoro**o**ctane**s**ulfonamido**e**thanol
FTOH	**F**luorinated **t**elomer alcohol (-**OH** functional group)
FTA	**F**luorinated **t**elomer **a**cid
FTUA	**F**luorinated **t**elomer **u**nsaturated **a**cid
FTS	**F**luorinated **t**elomer **s**ulfonate
PFAPA	**P**er**f**luoro**a**lkyl**p**hosphonic **a**cid
PFPi	**P**er**f**luoroalkyl**p**hosph**i**nate
PAP	Mono-substituted **p**olyfluoro**a**lkyl**p**hosphate ester
diPAP	**Di**-substituted **p**olyfluoro**a**lkyl**p**hosphate ester
PFAI	**P**er**f**luoro**a**lkyl **i**odide
SFA	**S**emi**f**luorinated **a**lkane
FTI	**F**luorinated **t**elomer **i**odide
FTO	**F**luorinated **t**elomer **o**lefin
FTAC	**F**luorinated **t**elomer **ac**rylate

Conversion Factors and Units of Measure

Prefix	Symbol	Factor	Fraction	
centi	c	10^{-2}	= 1/100	part per hundred
milli	m	10^{-3}	= 1/1,000	part per thousand
micro	µ	10^{-6}	= 1/1,000,000	part per million (ppm)
nano	n	10^{-9}	= 1/1,000,000,000	part per billion (ppb)
pico	p	10^{-12}	= 1/1,000,000,000,000	part per trillion (ppt)
femto	f	10^{-15}	= 1/1,000,000,000,000,000	part per quadrillion (ppq)
atto	a	10^{-18}	= 1/1,000,000,000,000,000,000	part per quintillion
zepto	z	10^{-21}	= 1/1,000,000,000,000,000,000,000	part per sextillion
yocto	y	10^{-24}	= 1/1,000,000,000,000,000,000,000,000	part per septillion

Typical HPLC/UPLC Flow Rates

Column ID (mm)	Particle Size 5µm	Particle Size 3µm	Particle Size 2µm	Particle Size sub 2µm*
1.0	0.05 ml/min	0.07 ml/min	0.1 ml/min	0.15 ml/min
2.1	0.2	0.3	0.5	0.4 - 0.6
3.2	0.5	0.7	1.0	0.8
4.6	1.0	1.5	2.0	1.0

*Flow rate may be limited by column back pressure.

Common Buffers

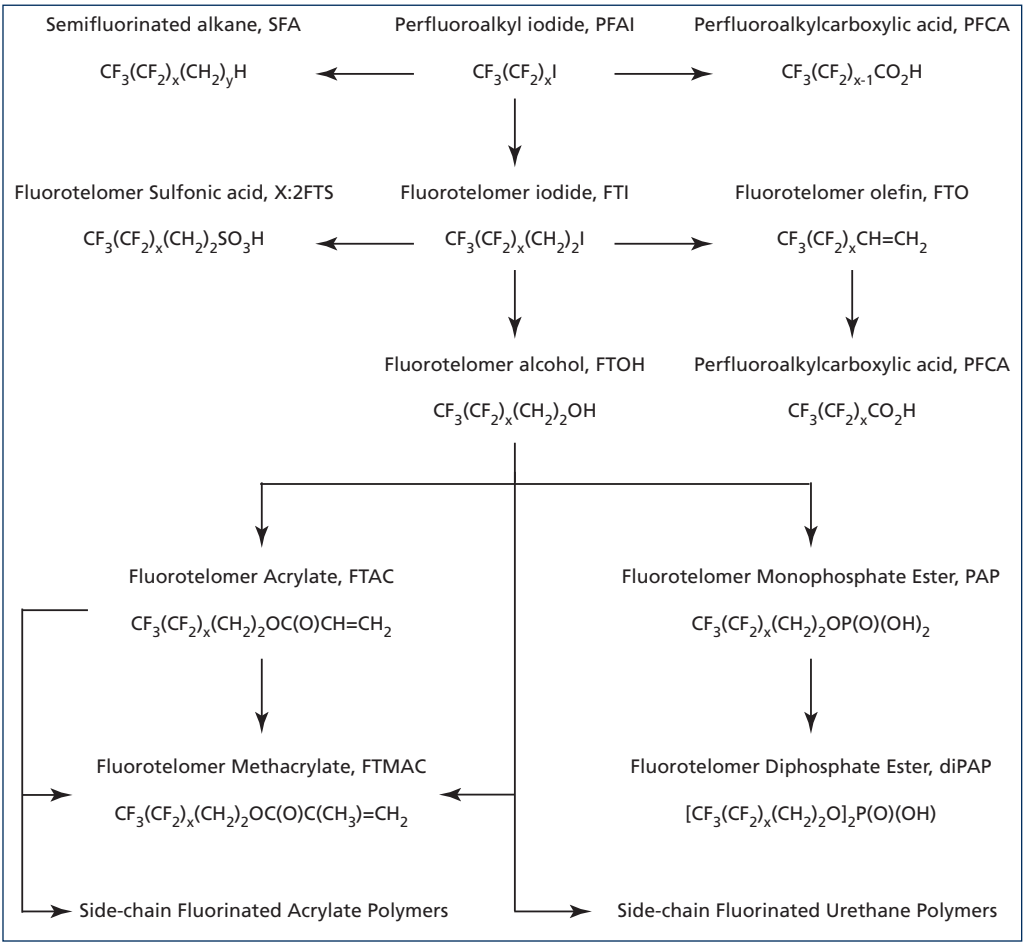
Buffer Type	pKa	Buffer pH Range	Examples
Acetate	4.8	3.8 - 5.8	Ammonium Acetate Acetic Acid Sodium Acetate
Ammonia	9.2	8.2 - 10.2	Ammonium Hydroxide Ammonium Phosphate (mono- and di-basic) Ammonium Carbonate
Borate	9.2	8.2 - 10.0	Sodium Borate Boric Acid
Carbonate	10.2	9.2 - 11.2	Ammonium Carbonate Ammonium Bicarbonate
Citrate	3.1 4.7 5.4	2.1 - 4.1 3.7 - 5.7 4.4 - 6.4	Trisodium Citrate Diammonium Citrate Triammonium Citrate Citric Acid
Formate	3.8	2.8 - 4.8	Ammonium Formate Formic Acid
Phosphate	2.1 7.2 12.3	1.1 - 3.1 6.2 - 8.2 11.3 - 13.3	Potassium Phosphate Monobasic Potassium Phosphate Dibasic Potassium Phosphate Tribasic Phosphoric acid

Conversion Factors for Units of Pressure Measurement

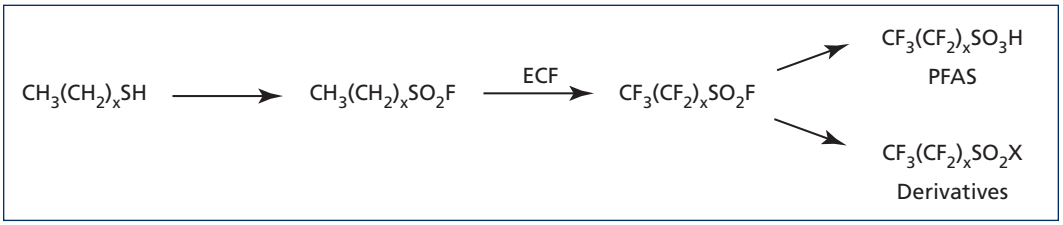
	PSI	*bar*	*torr*	*kPa*	*atm*	*inches Hg*	*kg/cm²*
PSI=	1	0.06895	51.713	6.8948	0.068	2.0359	0.0703
bar=	14.5038	1	751.88	100	0.9869	29.5300	1.0197
torr=	0.0193	0.00133	1	0.1330	0.00132	0.0394	0.00136
kPa=	0.1450	0.0100	7.52	1	0.00987	0.2962	0.0102
atm=	14.696	1.0133	760	101.32	1	29.921	1.0332
inches Hg=	0.49612	0.03376	25.400	3.376	0.0334	1	0.0345
kg/cm²=	14.223	0.9806	735.5	98.06	0.967	28.958	1

The Telomerization and ECF Processes

Although perfluorinated products were historically produced using electrochemical fluorination, today the majority of industrially manufactured perfluorinated compounds are obtained through the telomerization process. This process generates a perfluoroalkyl iodide intermediate which can be utilized to produce a variety of fully and partially fluorinated compounds. The flow-chart below illustrates the synthesis of common perfluorinated products from a perfluoroalkyl iodide (*Integr Environ Assess Manag,* **2011**, *7*, 513-541).



Perfluoroalkanesulfonates (PFAS) and perfluoroalkanesulfonyl fluorides are still being produced using electrochemical fluorination (ECF). This method commonly results in a mixture of linear and branched perfluorinated isomers and homologues.



The popularity of our Reference and Handling Guide for Halogenated Aromatic Compounds has prompted us to introduce this *Quick Reference Guide for Perfluoroalkyl Compounds*. A full *Reference and Handling Guide for Perfluoroalkyl Compounds* containing information on stability, analytical challenges, and recommended storage is available on our web-site.

If you have any comments or suggestions for future reference guides, or if you would like to receive additional copies, please contact Wellington Laboratories at the address below.

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