

Differential Pressure Filtered Accumulating Sample Tube

The DiP-FAST was developed for rapid filtering of subsurface water in situ. Operating on the principle of differential pressure creating a relative vacuum, it uses check valves and pressure relief valves to allow water in and compressed air out at specified differential pressures. To operate, lower to desired depth then retrieve to collect the filter on the inlet as well as the water sample. No electronics involved, just physics!

Property	DiP-FAST-S	DiP-FAST-M	DiP-FAST-D
Release Date	January 2026	January 2026	TBD 2026
Depth Range	3-15 m	5-60 m	50-200 m
Inlet Valve	Check valve (opens on submersion)	Adjustable pressure relief valve	Fixed pressure relief valve (50, 75, 110, 150 m)
Outlet Valve	Check valve (relieves pressure buildup on ascent)		
Mechanical	Entirely passive sampling.		
Filter attachment	Luer lock.		
Filter compatibility	Filter-agnostic, see flow rates table below for examples.		
Uses	eDNA sampling, microplastics sampling, water sampling (with no filter)		
Volume fill and soak times	$V_w = V_0 - V_0 P_0 / (P_{ext} - P_{valve})$. See tables below!		
Negative Control	Pull vacuum on outlet or use second pressurized tube attached to inlet.		

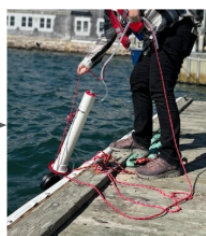


Filter-based flow rates and fill tables

Filter Type	mL/min
Cobetter filter holder with 47 mm diameter, MCE hydrophilic 0.45 um pore	525
Sterivex 0.22 um pore	308
Smith-Root 1.5 um pore GF Non-self-preserving Filter*	600
33 mm diameter, 0.45 um pore PES hydrophilic	380

		Valve Setting (PSI)									
		5	10	15	20	30	40	50	60	70	80
Depth (m)	5	384	0	0	0	0	0	0	0	0	0
	10	1131	676	0	0	0	0	0	0	0	0
	15	1531	1278	907	308	0	0	0	0	0	0
	20	1780	1620	1403	1094	0	0	0	0	0	0
	30	2075	1993	1893	1766	1377	555	0	0	0	0
	40	2242	2193	2136	2067	1882	1582	1015	0	0	0
	50	2351	2318	2281	2238	2129	1975	1737	1322	420	0
	60	2427	2403	2377	2348	2277	2183	2052	1858	1541	930

DiP-FAST DIY



Open source design for a simplified version of the DiP-FAST-S: build your own with parts from the hardware store!

