

Product Line Description: The DiP-FAST (Differential Pressure Filtered Accumulating Sample Tube) was developed for simultaneous filtering and sample capture 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, just physics! Patent pending.

Property	DiP-FAST-S	DiP-FAST-M
Depth Range	3-20 m	10-60 m
Inlet Valve	Check valve.	Adjustable pressure relief valve.
Outlet Valve	Check valve (relieves pressure buildup on ascent).	
Mechanism	Passive, pressure differential sampling.	
Filter Attachment	Inlet luer lock; Filter-agnostic, see flow rates table below for examples	
Uses	eDNA sampling, other filtered or unfiltered water sampling at depth.	
Volume Fill and Soak Times	$V_w = V_0 - V_0 P_0 / (P_{ext} - P_{valve})$.	See tables below!
Neg Control	Pull vacuum on outlet or pressurize inlet.	



Fill Table and Flow Rates

Filter Housing	Filter	Min Depth	mL/min
	47 mm, Glass Fiber	5 m	1800
Smith-root	47 mm, MCE 1 um	5 m	1000
Cobetter Filter Holder	47 mm, MCE 1 um	5 m	525
	Sterivex GP 0.22 um syringe filter	10 m	308
	33 mm diameter PES, 0.45 um	10 m	380
	Wildertlabs CA 1.2 um syringe filter	15 m	150

Lookup Table: Total fill volume (mL) versus set valve pressure and deploy depth.												
		DiP-FAST-S		DiP-FAST-M (Adjustable)								
Valve PSI		0.5	5	10	15	20	30	40	50	60	70	80
Deploy Depth (m)	3	599	0	0	0	0	0	0	0	0	0	0
	5	907	384	0	0	0	0	0	0	0	0	0
	10	1403	1131	676	0	0	0	0	0	0	0	0
	15	1698	1531	1278	907	308	0	0	0	0	0	0
	20	1893	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

Creative commons, non-commercial design for a DIY DiP-FAST-S: order a kit or source your own parts.

