

Candidate Pumps for Personal Particulate Air Pollution Sampling in Heavily Polluted Environments

- Target sampling times: typically 24-hr and 48-hr; exceptionally 72-hr
- Typical PM_{2.5} concentrations in target environments: 30-1000 ug/m³

Sampling Pump	TUFF Standard (3/4 ^a) Casella	TUFF Plus (3/4) Casella	TUFF Pro (3/4) Casella	Apex Pro Casella	XR5000 SKC
Feature					
Battery	Standard: 1.7Ah High Capacity: 2.7 Ah	Standard: 1.7Ah High Capacity: 2.7 Ah	Standard: 1.7Ah High Capacity: 2.7 Ah	Standard: 1.7Ah High Capacity: 2.7 Ah	Standard: 2.2 Ah High Capacity: 4.4 Ah
Battery gauge	Approximate battery remaining (4-part bar)	Approximate % battery remaining	Approximate time battery remaining	Approximate battery remaining (4-part bar)	Approximate battery remaining (4-part bar)
Charge time	~3 hours	~3 hours	<5 hours	~3 hours	~8 hours
Weight	~475 g	~475 g	~475 g	~500 g	~600g (high capacity battery)
Software	Insight Pump Management	Insight Pump Management	Insight Pump Management	Insight Pump Management	Not listed
Programmable Start Time	NO	NO	YES	NO	YES
Programmable End Time	NO	YES (max RUN time unclear)	YES (max RUN time can be set >25 hr)	YES for < 25 hr NO for > 25 hr	YES, program total RUN time
ON/OFF	NO	NO	YES: RUN time + EXP time to achieve desired TWA (e.g. 50%); software needed	YES for < 25 hr NO for > 25 hr	YES, 10min/10min standard; must make special request for other configurations
Combined ON/OFF and Start/End Programmability	NO	NO	NO	NO	YES
Drawback	No programmable functionality	Insufficient programmable functionality	Lack of combined programmable functionality	Inadequate programmable functionality	Sampling VOLUME not shown

^a version 3 has maximum flow rate of 3 LPM; version 4 has maximum flow rate of 4.5 LPM