

Microplastic sampler



The new Microplastic-Sampler is able to catch smallest concentration of ocean surface microplastic particles on-board of small to large vessels during cruising. The method had been tested during the last Volvo Ocean Race (2017/18). Remarkable and unique scientific data had been collected. The Micro Plastic Sampler can be operated standalone or in combination with or powerful OceanPack underway system ("FerryBox").

Principle



Sampling water is piped from a defined water inlet towards the instrument and pass a strainer (coarse filter) before flowing through the filter elements. The filter elements (cassette) consist of three filters with a defined mesh size (instantaneous size fractioning: e.g. 300 – 100 – 30 μm). The water pump is arranged downstream the filter cassette in order to avoid possible contamination. A flowmeter measures the filter volume and two pressure sensors are able to detect clogging. An external GPS antenna provides position and an accurate time stamp. All data is internally logged. Data output is possible in real time on a serial interface in NMEA-0183 format. The data can also be downloaded later via USB.



Specification	Note
Unique Features	<ul style="list-style-type: none"> • Compact, lightweight sampler with low power demand • Sampling at high vessel speed • Operation during all weather conditions • Low demand of manpower (5-10 min/day) • Instantaneous size separation (e.g. 30, 100, 300 µm)
Characteristics	<ul style="list-style-type: none"> • Unattended operation during sampling. Manual exchange of filters • Robust, versatile, compact and waterproof design • Simple to operate via intuitive 7" touch screen control • Self-recording: NetDI® data logger and microcontroller • USB data download • High reliability • Scientific data quality flagging • Data presentation on Windows® data server with OceanView™ displays. • Standalone or controlled by external flow-throw system (FerryBox). • Integration of external sensors and devices available on demand.
Applications	<ul style="list-style-type: none"> • Flow-through ("underway") micro plastic sampling on any type of vessels: from racing yachts to large freight ships. The samples can be stored free of contamination in aluminium transport boxes. • Low-power unattended automatic operation controlled by SubCtech's OceanPack™ RACE® system or the NetDI® data logger.
Operation	<ul style="list-style-type: none"> • Automatic continuous sampling with flow and pressure control • Manual changing of the filter set • Event based sampling control: sample volume, sampling time, clogging and position
Sample flow throw	Typ. 1 l/min.
Water pump	Low-power, self-priming peristaltic pump, downstream of the filter cassette.
Filter sets configuration	Set of 3 filters made of stainless steel or titanium, typ. <ul style="list-style-type: none"> • 30 µm, • 100 µm, • 300 µm Other mesh sizes on request, e.g. 5 µm up to 5 mm.
Micro controller	Embedded NetDI® controller to measure the flow rate and pressure on the filters
Data logger	Internal SD card with 8GB data storage, max 32 GB. • Simple ASCII NMEA-0183 data format • Data download to USB sticks
Data output	Real time data 1 Hz • RS-232 or RS-485 • optical isolated ASCII NMEA-0183 data format
Data input	GPS. Additional integration of external devices on request.
Instrument control	<ul style="list-style-type: none"> • LED status lights for operating, cleaning, error, standby. • Control buttons for Start / Stop sampling. • Optional remote control box.



Display	7" colour touch screen • Overview data & configuration menus Easy to use under typical on board conditions
Power	<ul style="list-style-type: none"> • AC: 90-230 V or DC: 12 or 24V. • Consumption: Approx. 20 W during operation. • Standby: 1 W.
Size	Approx. 500 x 400 x 250 mm (WxHxD)
Instrument weight	<ul style="list-style-type: none"> • Sampler approx. 14 kg • RACE Edition, full carbon: 8 kg
Filter sets weight	Weight per set, including transport box: <ul style="list-style-type: none"> • Stainless steel: 450 g • RACE Edition, titanium: 280 g
Temperature	0°C ... +45°C operating • -20°C ... +50°C storage
Shock & Vibration	Approved for on board usage such as The Ocean Race or IMOCA

Component	Image	Note
The instrument		<p>The micro plastic sampler as standalone version (lightweight carbon fiber model). The instrument is also available as a cost effective aluminium frame model</p> <p>Features:</p> <ul style="list-style-type: none"> • Self-priming pump • Smart clogging recognition • GPS receiver (time stamp, position) • Flowmeter (sampling volume) • Contamination free sampling due to selection of materials (e.g. stainless steel, Teflon)
Filter set (cassette)		<p>Sets of 3 filters with selectable mesh size. Plastic free.</p> <p>Filter set (titanium or stainless steel) are delivered in aluminium boxes and guarantee a contamination free transport of the samples. Easy exchange: filter set is handled as one piece. Long-time storage of samples is possible.</p>



Filter cassette bracket			<p>Plastic free bracket for fast and easy exchange of the filter cassettes. Open the bracket by moving the three arms up. Replace the entire cassette and push the arms back in its original position.</p> <p>Cassette can be operated also with a 2-filter setup (e.g. 500 – 100 µm)</p>
Pump			<p>Low-power, self-priming peristaltic pump. Long live time. Delivered with spare tubes (consumable).</p> <p>Control: (Optional) flow-rate and power consumption control</p> <p>Pumping head: 3 roller rotor, flip-top loading</p> <p>Max. Pressure: 4 Bar</p> <p>Flowrate: 1...3 l/min</p>
Strainer			<p>1160 Quick-lock coarse water filter. Plastic free. Fast and easy cleaning of the strainer.</p> <p>Material: Nickel-plated brass</p> <p>Filter: Stainless steel 316L</p> <p>Fittings: 1/2"</p> <p>Certification: RINA 2070/2-8183 (1 bar)</p>
GPS Antenna			<p>To be installed on the antenna mast or on-deck. IP68, UL-certified housing. Including data interface and power supply. Data and power are connected via cable.</p>
Contamination free water supply			<p>We recommend to use plastic free water hoses (e.g. stainless steel or PFA tubing).</p> <p>Option:</p> <ul style="list-style-type: none"> • 1/2" hose: PFA-T8-062-50 (Swagelok) • 1/2" connector: SS-810-1-8RT (Swagelok)
Water outlet			<p>The water outlet is uncritical for the choice of material.</p> <p>Option:</p> <ul style="list-style-type: none"> • hose: suction resistant hose with ID 13mm (OD 17mm) • Stem to Hose Connector (John Guest NC932, Steam OD 15mm, Hose ID: 1/2") • Straight Adaptor (John Guest PM011514E, Tube: 15mm OD - Bspt Thread 1/2")

