

RAC 5-Gas Sampler



The RAC 5-Gas Sampler is a compact, portable wet-chemical system that collects up to five different pollutant gases from ambient air in one sampling cycle. The 5-Gas Sampler tests for sulfur dioxide (SO₂), nitrogen dioxide (NO₂), hydrogen sulfide (H₂S), ammonia (NH₃), aliphatic aldehydes (R-CHO) and other pollutant for which there is a suitable chemical reagent (absorbing solution). This versatile instrument can be used to accurately sample a single gas or up to five different gases simultaneously. Simplified design, ease of assembly and modular components permit easy changes in sampling train configurations to meet variable sampling requirements.

The 5-Gas system can be used virtually anywhere that line power is available and is used for area surveillance, plant perimeter surveys and interior air quality monitoring or evaluation.

FEATURES

- Critical orifices provide 200 ml/min flow rate (nominal) through system.
- All orifices protected by in-line filters & moisture traps to prevent clogging & flow reduction.
- Sampling cabinet equipped with thermostatically-controlled heater to prevent reagent freezing.
- All-weather shelter is lightweight, portable and easy-to-operate.
- Polypropylene bubblers with threaded interchangeable caps (2-hole cap for sampling & solid cap for transport).
- Optional timing mechanisms available

5-GAS SAMPLER COMPONENTS

The RAC 5-Gas Sampler is furnished complete in a portable all-weather shelter and is ready-to-operate (reagents not included). This self-contained design includes a heavy-gauge steel cabinet with a hinged lockable lid, two separate compartments and a weather-resistant baked enamel finish that is suitable for use under most climatic conditions. The preassembled complete sampling train and a thermostatically-controlled heater assembly are installed in an insulated compartment; the system's vacuum pump, vacuum gauge and electrical junction box are installed in the second compartment, which has louvers on three sides for heat dissipation. A 3-wire power cord is supplied as standard.

SAMPLING TRAIN:

The RAC gas sampling train assembly includes a polypropylene inlet tube with a conical rain shield, a membrane-type inlet filter for removal of particulates and an aluminum rack containing a 5-branch glass inlet manifold, 5 polypropylene 100ml bubblers with interchangeable caps, 5 constricted glass bubbler tubes, 1 fritted glass bubbler tube, 5 polypropylene moisture-entrainment traps, 5 critical/limiting orifices, a 5-branch exhaust manifold and all necessary connecting tubing. The complete sampling module is easily removed for filling, cleaning or changes in configuration.

Threaded caps for the polypropylene bubblers are a 2-hole inlet and outlet design that is used during sampling operations and a solid leak-tight cap used to transport bubblers filled with reagents, both before and after sampling cycles.



TEMPERATURE CONTROL:

The sampling cabinet thermostatically-controlled heating element maintains a uniform internal temperature of $32\pm 2^{\circ}\text{C}$ ($90\pm 3^{\circ}\text{F}$) to assure continuous sampling/operating efficiency.

FLOW-REGULATING ORIFICES:

The critical/limiting orifices are precision-bore glass tubing encased in Tygon plastic tubing. The orifices provide a 200 ml/min flow rate (approximate) to all bubblers and are easily cleaned in small ultrasonic baths.

DETACHABLE LEGS:

The all-weather shelter has sturdy angle-iron legs that can be attached flush with the cabinet for carrying/transporting. The legs are securely attached in either the extended or retracted position by rust-resistant bolts threaded into captive nuts.

TIMING MECHANISMS:

To meet a variety of sampling requirements, a 24-hour timer or a 7-day skip timer can be supplied with the RAC 5-Gas Sampler as optional accessories. The 24-hour timer has permanently attached trippers that provide up to 96 on-off cycles in 15-minute increments over a 24-hour period. The 7-day skip timer permits settings one week in advance and has 14 trippers that provide minimum sampling cycles of 3 hours and maximum cycles of 7 days. Both timers are attached to the shelter hinged lid and positioned in the pump compartment.

OPERATION

In operation, the vacuum pump draws ambient air in through the conical rain shield and inlet tube (the rain shield is inverted to prevent precipitation from entering the sampling device). Particulate matter entrained in the air sample is trapped in a membrane-type filter before air enters the inlet manifold. The inlet manifold then divides the air stream into five equal volumes that flow through Teflon tubing to the bubblers. Each bubbler has a 2-hole cap with a standard glass bubbler tube, either constricted or fritted, on the inlet port. The sample air passes through these tubes into 50ml of reagent (absorbing solution) contained in each bubbler.

After bubbling through the reagent, the air exhausts through Tygon tubing connected to the outlet port in the 2-hole cap. Each sample stream then passes through another polypropylene bubbler containing a foam demister followed by a membrane filter. This dual-trap arrangement protects the critical orifices from moisture or other entrainments and helps to maintain continuous full-flow operation for optimum sampling efficiency. The scrubbed air streams then flow through the critical orifices to the exhaust manifold and are discharged through the pump.

In this instrument, contaminate gas samples contact only polypropylene, Teflon or glass before entering the absorbing reagents. This design concept provides for optimum sample collection. All materials in contact with the sample stream are widely recognized for their non-contaminating characteristics when used in a broad range of air pollution instrumentation.

After a sampling cycle is completed, the sampling train assembly is removed from the shelter. The reagent tubes are removed from the rack and the 2-hole caps are replaced with solid, leak-tight, threaded caps. These then are taken to a laboratory for analysis of contents according to appropriate procedures.

Specifications:

Vacuum Pump	1/6 hp, 1.8 cfm free flow.
Electrical	110V/60Hz, 3.7 amp; 220V/50Hz, 1.9 amp
Dimensions, H x W x D	27 x 18 x 14-inches (70 x 46 x 36cm) with legs extended
Weight	33 pounds (15kg) without timer
Timer Weights	24-hour: 3 pounds (1.4kg); 7-day: 6 pounds (2.7kg)

Ordering Information

209031	5-Gas Sampler, All-Weather Shelter with Glass Orifices, 110V/60Hz
209031-1	5-Gas Sampler, All-Weather Shelter with Glass Orifices, 220V/50Hz
992424	24-Hour Timer, 110V/60Hz
209047	24-Hour Timer, 220V/50Hz
992425	7-Day Mechanical Skip Timer, 110V/60Hz
992408	7-Day Mechanical Skip Timer, 220V/50Hz