



MODEL TASC-HT-HTO (-C14) TRITIUM AND C-14 AIR SAMPLERS

CARBON 14 and TRITIUM in AIR SAMPLE COLLECTING SYSTEM PASSIVE SAMPLE COLLECTOR FOR AIRBORNE RADIOACTIVE MATERIAL

TRITIUM IN AIR SAMPLE COLLECTING SYSTEM FOR MEASUREMENT TO 10^{-9} Ci/m³ OR LOWER

The TASC is a self-contained unit which serves to collect air samples from stacks, hoods, room air, the outside environment or other areas.

METHOD OF OPERATION AND USE

Airborne Tritium in the sample is continuously collected in vials filled with liquid collection medium. The amount trapped increases linearly with elapsed time. At regular intervals, the sampling is stopped, the contents removed and assayed using LSC (Liquid Scintillation Counting) methods to determine the amount of radioactivity.

Knowing the collection flow rate, and the results of the scintillation assay, the average sample activity can be calculated for the period of time over which the sample was collected.

TRITIUM COLLECTION

Separate HT and HTO collectors are provided for discriminating tritium measurement. The HTO (T₂O) is directly trapped in a set of three vials, while the HT fraction of airborne tritium is trapped in a second set of three vials by converting the HT (T₂) into the oxide by means of a tube furnace.

Cascaded triple vials are provided to ensure virtually 100% collection efficiency.

DESCRIPTION

The sampler consists of a pump and mass flow meter to draw a constant sample (air) stream into a set of vials which collects the radioactive material.

Three vials are used to ensure that whatever may be missed by the first vial is virtually certain to be trapped by a second and third.

One set of vials is used to collect tritium oxide, the air stream exiting from this set is passed through an oxidizing tube furnace and the resultant oxides are then trapped in the second set of vials.

The front panel of the instrument has digital displays for flow rate, elapsed time and tube furnace temperature as well as a visual indicator to signal low sample flow.

ALTERNATE CONFIGURATIONS AND COLLECTING OTHER ISOTOPES

TASC samplers are available in two versions; standard flow rate (100 ml/min) and high flow rate (1000 ml/min). Other isotopes that can be collected include Carbon 14, where the radioisotope, in the form of ¹⁴CO₂, is collected by using specific chemical reagents.



Model TASC-HT-HTO,
Standard Flow Rate Version– (6)x 20 mL vials

FOR REGULATORY COMPLIANCE

The TASC uses well proven techniques of passively collecting very low level radioactive samples by continued trapping in vials containing liquid or granular agents.

Government regulations impose very strict requirements on minimum detectable activity levels. Passive samplers, although they do not provide real time data, provide a low cost highly effective method of measuring to extremely low levels, thereby ensuring compliance.



Optional NEMA
Cabinet for
C-14 Version

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MODEL TASC-HT-HTO (-C14) TRITIUM AND C-14 AIR SAMPLERS

TECHNICAL SPECIFICATIONS

TRITIUM in AIR SAMPLE COLLECTING SYSTEM

Model TASC-HTO-HT, standard flow version

Sensitivity for ^3H :	10^{-9} $\mu\text{Ci/ml}$ (10^{-9} Ci/m^3) for 7 day period at 100 ml/min
Air Flow Rate:	100 \pm 3 ml/minute factory calibrated set point
Flow Meter:	Mass flow meter, 250 ml/minute full scale
Air Flow Indicator:	ml/min, Digital Display, 3½-digits, 0.1 to 199.9
Air Mover:	Continuous duty, diaphragm pump
Elapsed Time Indicator:	Multifunction timer module, with maximum time setting of 0.1 to 999.9 hours
Thermal Oxidizer:	Tube furnace, regulated range: 455° - 475°C (851° - 887°F)
Temperature Indicator:	°C, Digital Display, 3½-digits, 1 to 1999
Unit Cooling:	Continuous duty fan; 1 m ³ /min (30 CFM) free flow
Sample Collectors:	Two manifolds, one for HT and the other for HTO, made from a silver-brazed construction of stainless steel and brass, nickel electroplated.

- CHOICE OF:**
- a) Three polyethylene vials on each manifold, 20 ml volume each, total 6 vials
 - b) Two polyethylene vials on each manifold, 60 ml volume each, total 4 vials

Sample Medium:	Distilled water or Propylene Glycol
Power Connection:	10 feet, three wire, grounded cable.
Power Requirements:	115VAC or 230VAC, 50-60 Hz, 200 Watts
Overall Dimensions:	356mm (14") d X 483mm (19") w X 310mm (12.2") h
Weight:	13.6 kgs (30 pounds)
Sample Connections:	Inlet/Exhaust: Hose barb for 5mm (3/16") I.D. vinyl tubing

CARBON 14 and TRITIUM in AIR SAMPLE COLLECTING SYSTEM

Model TASC-HTO-HT-C14, standard flow version

Tritium Collection	As above, plus a separate panel for Carbon 14 Collection
Sensitivity for ^{14}C :	10^{-10} $\mu\text{Ci/ml}$ (10^{-10} Ci/m^3) for 7 day sample at 100 ml/min
Desiccant:	Up to 4 drying columns containing indicating Drierite™
Sample Collector:	15ml polycarbonate tube
Sample Medium:	Sodium Hydroxide, granular form, 20 – 30 mesh Available from chemical suppliers as Ascarite™
Overall Dimensions:	135mm (5.3") d X 483mm (19") w X 415mm (16.3") h
Weight:	9.1 kgs (20 pounds)
Connectors:	Hose barbs for 5mm (3/16") I.D. vinyl tubing

TECHNICAL SPECIFICATIONS

TRITIUM in AIR SAMPLE COLLECTING SYSTEM

TASC-HTO-HT, High Flow Version

Sensitivity for ³H:	10 ⁻⁹ μCi/ml (10 ⁻⁹ Ci/m ³) for 24 hour period at 1.000 Liters/min
Air Flow Rate Range:	Adjustable, 0.300 min. to 1.000 max. (±0.01) Liters/minute
Flow Meter:	Mass flow meter, 1.000 Liters/minute full scale
Air Flow Indicator:	Liters/min, Digital Display, 3½-digits, 0.001 to 1.999
Air Mover:	Continuous duty, diaphragm pump
Elapsed Time Indicator:	Multifunction timer module, with maximum time setting of 0.1 to 999.9 hours, and programmable reset
Thermal Oxidizer:	Tube furnace, regulated range: 455° - 475°C (851° - 887°F)
Temperature Indicator:	°C, Digital Display, 3½-digits, 1 to 1999
Unit Cooling:	Continuous duty fan; 1 m ³ /min (30 CFM) free flow
Sample Collectors:	Two manifolds made from stainless steel Two glass bottles, 250 ml volume each mount onto each manifold for HT and HTO, total of four bottles
Sample Medium:	Distilled water or Propylene Glycol
Power Connection:	10 feet, three wire, grounded cable.
Power Requirements:	115VAC or 230VAC, 50-60 Hz, 300 Watts
Overall Dimensions:	356mm (14") d X 483mm (19") w X 310mm (12.2") h Note: 125-150mm (5 to 6") additional height is required under the enclosure to permit mounting/dismounting of the bottles
Weight:	15 kgs (33 pounds)
Sample Connections:	Inlet/Exhaust: Hose barb for 5mm (3/16") I.D. vinyl tubing



Model TASC-HT-HTO,
High Flow Rate Version



MODEL TASC-HT-HTO (-C14) TRITIUM AND C-14 AIR SAMPLERS

TECHNICAL SPECIFICATIONS

CARBON 14 in AIR SAMPLE COLLECTING SYSTEM ASC-C14B, high flow version

Sensitivity for ^{14}C :	10^{-10} $\mu\text{Ci/ml}$ (10^{-10} Ci/m^3) for 24 hour period at 1.000 Liters/min
Air Flow Rate Range:	0.300 min. to 1.000 max. (± 0.01) Liters/minute factory calibrated
Flow Meter:	Mass flow meter, 1.000 Liters/minute full scale
Air Flow Indicator:	Liters/min, Digital Display, 3½-digits, 0.001 to 1.999
Air Mover:	Continuous duty, diaphragm pump
Elapsed Time Indicator:	Multifunction timer module, with maximum time setting of 0.1 to 999.9 hours, and programmable reset
Thermal Oxidizer:	Tube furnace, regulated range: 455° - 475°C (851° - 887°F)
Temperature Indicator:	°C, Digital Display, 3½-digits, 1 to 1999
Unit Cooling:	Continuous duty fan; 1 m^3/min (30 CFM) free flow
Sample Collectors:	Two manifolds constructed of stainless steel tubing and compression fittings. Two glass bottles, 250 ml volume each mount onto each manifold for $^{14}\text{CO}_2$ and ^{14}C , total of four bottles
Sample Medium:	CO_2 absorbing chemical Perkin Elmer Carbo-Sorb™ E * The liquid media for absorbing CO_2 is very hazardous. Consult the Safety Data Sheet before using
Power Connection:	10 feet, three wire, grounded cable.
Power Requirements:	115VAC or 230VAC, 50-60 Hz, 200 Watts
Overall Dimensions:	356mm (14") d X 483mm (19") w X 310mm (12.2") h Note: 125-150mm (5 to 6") additional height is required under the enclosure to permit mounting/dismounting of the bottles
Weight:	15 kgs (33 pounds)
Sample Connections:	Inlet/Exhaust: Hose barb for 5mm (3/16") I.D. vinyl tubing Outlet: Stainless Steel * hose barb for 5mm (3/16") ID silicone rubber tubing *

* NOTE:

Materials that contact the CO_2 absorbing chemical must be compatible with it.

METAL: Must be Type 304 or 316 stainless steel, no brass or copper alloys are permitted. No plating shall be applied.

PLASTIC: Teflon is best for chemical resistance to a wide range of chemicals. Polypropylene is good also.

ELASTOMER: Silicone rubber compounds are used for O-Ring and hose material.

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