

Sample Oxidizer Model 307

Standard Features

The 307 Sample Oxidizer is an automatic preparation and oxidization system for both single and dual radiolabeled samples containing ^3H and/or ^{14}C for use in liquid scintillation counting. The 307 Sample Oxidizer ensures reliable combustion of biological, environmental and industrial samples. This system includes the following standard features and benefits:

- Single “push button” operation initiates automatic cycle, positioning of vials and ignition basket, non-catalytic combustion, dispensing of scintillation cocktails and carbon dioxide trapping agent, and system cleaning.
- Physical separation of ^3H and ^{14}C radionuclides from dual labeled sample material for ease of sample analysis.
- Minimizes optical and chemical quenching. Reduces chemiluminescence in most sample preparations, increases statistical accuracy of liquid scintillation counting results. Eliminates self-absorption.
- Observation of combustion allows for visual inspection during sample burn.
- Complete combustion of liquid, wet or dry sample eliminates the need for chemical solubilization.
- Ensures maximum radionuclide recovery for ^{14}C with sample size equivalent up to 40 millimoles of carbon dioxide and up to 85 millimoles of water for samples containing ^3H (up to 1.5 grams).
- Radionuclide recovery for both ^3H and ^{14}C of >97% maximizes radionuclide separation for single label analysis using liquid scintillation counting techniques and an efficiency quench correlation curve for each radionuclide.
- Radionuclide memory of less than 0.08% for most ^3H and ^{14}C labeled sample materials.
- Non-catalytic combustion eliminates catalyst usage, cost and replacement.
- Accommodates 20 mL glass or low cost polyethylene vials.
- Capacity to process up to 60 samples per hour for each radionuclide.
- Unique design bellows-type reagent metering pumps. Pumps adjustable from 0 to 18 milliliters, automatically dispense accurate volumes of both ^3H and ^{14}C scintillation cocktails and carbon dioxide trapping agent.
- Long life, removable platinum ignition basket.
- Non-pressurized reagent storage tank capacity of five liters for each reagent allows up to 500 sample combustions between refills.
- Ambient temperature trapping of water and carbon dioxide provides safe and clean operation.



Sample Oxidizer Model 307

- Accessory kit with spare parts; included are additional O-rings, glass combustion flask, wrench, seals, and assorted small parts.

Options

- Performance verification kit includes both standardized ^3H and ^{14}C labeled material used to determine system performance.
- Chemicals and supply kit which includes a starter supply of the necessary reagents and material.

Sample Combustion

The 307 Sample Oxidizer provides a simple, automatic method of preparation for samples that are otherwise difficult to prepare for liquid scintillation counting. The instrument combusts the sample material in an oxygen-enriched atmosphere with a continuous flow of oxygen to constituent water vapor and carbon dioxide using a patented process to achieve physical separation of ^3H and ^{14}C radionuclides into two separate counting vials.

1. Sample material is placed into a Combusto-Cone™ and may be either dry, wet or liquid. The Combusto-Cone with sample is placed into the platinum ignition basket.
2. For single labeled ^{14}C samples or dual labeled $^3\text{H}/^{14}\text{C}$ samples, the system will accommodate a sample size equivalent up to 40 millimoles of CO_2 (approximately 1.2 g of filter paper) and will meet all performance specifications.



- For ^3H samples, the system will accommodate a sample size equivalent of up to 85 millimoles of H_2O (approximately 1.5 mL of water). Larger ^3H samples may be handled by burning multiple samples and trapping the water vapor in the same counting vial.
- System includes a combustion timer for setting combustion time from 0 to 5 minutes. Up to 60 samples per hour of each nuclide can be prepared.
- Combustion flask enclosure is heated to approximately 125°C to avoid condensation of $^3\text{H}_2\text{O}$ vapor.
- A double safety window is provided for visual inspection of sample combustion.
- The combustion flask compartment door is interlocked so that the automatic cycle cannot be initiated if the door is open.
- The combustion flask and ignition basket are easily removed for cleaning.

Reagents

- The three non-pressurized reagent storage tanks are accessible for setting dispensing volumes, measuring the liquid level in the tanks, and filling.
- Each reagent tank has a capacity of five liters, which is sufficient for up to 500 sample combustions.
- Each tank has a measuring dipstick marked in one liter increments.
- Reagent tanks are completely accessible by removing the snap-in front panels.
- Each tank has a bellows-type metering pump which is adjustable from 0-18 mL by simple dial settings. If samples containing only ^3H labeled material are to be combusted, the two ^{14}C reagent pumps can be deactivated by setting the toggle valve to "off". For samples containing only ^{14}C labeled material, the ^3H reagent pump can be similarly deactivated.
- The four tanks are arranged left to right as follows (when viewed facing the front of the instrument) and are labeled on the front:
 - Distilled water only.
 - Monophase[®] S (liquid scintillator for ^3H).
 - Carbo-Sorb E (carbon dioxide absorber).
 - Permafluor[®] E+ (liquid scintillator for ^{14}C).

Additional Features

- A pressurized five liter, distilled water reservoir is provided for the automatic cleaning, steam injection, and pre-coating of the ^3H exchange column.
- The distilled water reservoir has a vent valve for depressurizing the tank when the system is turned off, or when checking the distilled water level with the dipstick.
- The system has built-in pressure regulators and filters for nitrogen, oxygen, and water.
- A specially constructed reaction column eliminates loss of carbon dioxide absorber.
- A "reset button" to reset the combustion timer prior to "restart" of the program while the sample is still burning.
- "Override" button to cut off excessive combustion time after combustion has been completed.
- A "backpressure" indication gauge to monitor pressure in the trapping device during combustion.
- A "Test/Run" toggle valve. In the "Test" mode the entire system will be checked for leak tightness. Normal operation is in the "Run" mode.

Performance Specifications

^3H Recovery: >97% ^3H Memory: <0.08%
 ^{14}C Recovery: >97% ^{14}C Memory: <0.08%

The performance is based on the use of: Monophase-S as the ^3H liquid scintillator, Carbo-Sorb E as the CO_2 absorber, Permafluor E+ as the ^{14}C liquid scintillator, and filter paper (or similar) as sample material. Use of other reagents may yield lower recoveries and higher memories.

Physical Data

Weight: 220 lbs (100 kg) net weight
 300 lbs (135 kg) shipping weight

Air Velocity: 265 cfm

Dimensions: 32 in (81 cm) high x 37 in (94 cm) wide
 x 18 in (45 cm) deep

Power Requirements: 100-122 V @ 10A, 200-244 V @ 5A; 50/60 Hz

Gas Connections:

Oxygen: 45-60 psig. (3.1-4.1 kg/cm²)

Nitrogen*: 45-60 psig. (3.1-4.1 kg/cm²)

*NOTE: Compressed house air can be used as a substitute for nitrogen.



Worldwide Headquarters: PerkinElmer Life and Analytical Sciences, 710 Bridgeport Avenue, Shelton, CT 06484 USA (800) 762-4000

Europe: PerkinElmer Life and Analytical Sciences, Imperiastraat 8, B-1930 Zaventem Belgium

Technical Support: in Europe: techsupport.europe@perkinelmer.com in US and Rest of World: techsupport@perkinelmer.com

Belgium: Tel: 0800 94 540 • **France:** Tel: 0800 90 77 62 • **Netherlands:** Tel: 0800 02 23 042 • **Germany:** Tel: 0800 1 81 00 32 • **United Kingdom:** Tel: 0800 89 60 46

Switzerland: Tel: 0800 55 50 27 • **Italy:** Tel: 800 79 03 10 • **Sweden:** Tel: 020 79 07 35 • **Norway:** Tel: 800 11 947 • **Denmark:** Tel: 80 88 3477 • **Spain:** Tel: 900 973 255

All trademarks or registered trademarks are the property of PerkinElmer, Inc. and/or its subsidiaries.