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New ASTM Method for Monitoring Ethylene Oxide in the Workplace

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The ORBO-78 adsorbent tube is cited in the new ASTM Method D5578 for monitoring ethylene oxide in air. The tube contains Carboxen-564 carbon molecular sieve coated with hydrogen bromide, an adsorbent that meets all criteria of the method.

A new ASTM method has been developed for monitoring ethylene oxide in air. ASTM D5578, Standard Test Method for Determination of Ethylene Oxide in Workplace Atmospheres (HBr Derivatization Method), cites the ORBO™-78 adsorbent tube as the sampling device (1,2).

Figure A. Ethylene Oxide by ASTM D5578

The sampling device in this method must contain a carbon molecular sieve adsorbent coated with hydrogen bromide (HBr) contained in 400/200mg beds. The HBr reacts with the ethylene oxide to form 2-bromoethanol, which is then extracted and analyzed by gas chromatography with an electron capture detector. Comparisons revealed good correlation of airborne ethylene oxide between Method D5578 and the established Qazi-Ketcham charcoal tube method (3). Research was conducted to validate the carbon molecular sieve chosen for this application by evaluating desorption efficiency and breakthrough volume. Carboxen™-564 adsorbent was selected because of its favorable performance characteristics. Data indicated that no significant breakthrough of 2-bromoethanol occurs at sample volumes of 55.2 liters in either dry or humid conditions. Desorption efficiency over airborne concentrations of 0.06-1.02ppm (based on 32L air volume) was 100%.

Figure A shows the chromatogram for a spiked tube representing the concentration at the action level (one-half the threshold limit value) of 0.5ppm, based on a 10-liter sample volume. A comparison with the background levels for a blank tube indicates that the adsorbent in ORBO-78 tubes is a high purity material that does not interfere with 2-bromoethanol analysis.

Ordering Information:

ORBO-78 Adsorbent Tubes
Pk. of 25 20355
GP 10% DEGS-PS on 80/100 SUPELCOPORT 20g 11999
SUPELCOWAX™ 10 Fused Silica Capillary Columns 30m x 0.53mm ID, 1.0µm film 25301-U 25325
2-Bromoethanol 2000µg/mL in toluene 1mL 48874

References

References not available from Supelco.

*US Pat. No. 4,839,331.
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Fused silica columns manufactured under HP US Pat. No. 4,293,415.