



Operating Instructions

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Sample Tubes for Diacetyl, Acetoin, and 2,3-Pentanedione Cat. No. 226-183

A personal sample pump is used to draw air through two single-section glass sorbent tubes connected in series. Diacetyl, acetoin, and 2,3-pentanedione are trapped on specially cleaned and dried silica gel inside the tubes.

Before sampling: Break glass ends away from eyes and food/beverage products. Join two tubes with a short length of Tygon® tubing. "Part A" is printed on the tube to be used in front and "Part B" is printed on the tube to be used in back.

During sampling: Use Protective Tube Cover Type D (Cat. No. 224-29D) to protect the worker and food/beverage products from glass and the light-sensitive sample from exposure to light. If a tube cover is not available, wrap sample tubes in aluminum foil.

- **TWA Sample**

OSHA Methods 1012 and 1013: Recommended sampling time and rate are 180 minutes at 50 ml/min

OSHA Method 1016: Recommended sampling time and rate are 200 minutes at 50 ml/min or 180 minutes at 50 ml/min if also sampling for diacetyl and acetoin in the same sample

- **Short-term Sample**

OSHA Method 1012, 1013, and 1016: Recommended sampling time and rate are 15 minutes at 200 ml/min

After sampling:

- **Methods 1012 and 1013:** Separate the two tubes and cap with supplied end caps. Wrap tubes in aluminum foil to protect light-sensitive sample from light. Transport to a laboratory for analysis.
- **Method 1016:** Separate the two tubes and cap with supplied end caps. Wrap tubes in aluminum foil to protect light-sensitive sample from light. Keep samples cold and ship cold to a laboratory as soon as possible using expedited shipping.

Special Handling: Sample is light sensitive. Use protective tube cover or cover with aluminum foil during sampling. Cover with aluminum foil after sampling.

Sample Storage:

- **OSHA Methods 1012 and 1013:** Storage at 39.2 F (4 C) is recommended. Samples are stable at ambient temperature (75.2 F or 24 C) for two weeks before analysis.
- **OSHA Method 1016:** Keep samples at 39.2 F (4 C) and ship cold to a laboratory as soon as possible after sampling, preferably by overnight or express shipping. Samples should be analyzed within 17 days of sampling.

Analysis:

- **OSHA Method 1012** (for levels of approximately 50 ppb) post-sampling chemical derivatization and gas chromatography with electron capture detection (GC/ECD). **Reliable quantitation limit:** Approximately 2 ppb for TWA samples and 5 ppb for short-term samples.
- **OSHA Method 1013** (for levels of approximately 500 ppb) solvent extraction and gas chromatography with flame ionization detection (GC/FID). **Reliable quantitation limit:** Approximately 15 ppb for TWA samples and 35 ppb for short-term samples.
- **OSHA Method 1016** sample extraction with 95:5 ethyl alcohol:water and gas chromatography using a flame ionization detector (GC-FID). Diacetyl, acetoin, and 2,3-pentanedione can be sampled simultaneously on one sample and separated during analysis. See method for details.

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