Carbonyl Compounds by US EPA TO-11A

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Leeder Consulting specialise in non-routine laboratory analysis. Independence and commitment to your project's **"data quality objectives"** enables us to suggest innovative and cost effective solutions. If it is high-tech, challenging, difficult or out of the ordinary - call us now.

US EPA TO-11A is the International Standard for the "Determination of Aldehydes and Ketones in Ambient Air using Active Sampling onto Absorbent Cartridges."

The method is validated for a wide range of Carbonyls, down to trace levels < 0.1 ppbv in air.

Sampling is by DNPH Cartridge, recognised as having many advantages over other sampling methods.

Formaldehyde is a major compound in the formation of photochemical ozone . Short term exposure to formaldehyde and other specific aldehydes (acetaldehyde, acrolein, 2-butenal) is known to cause irritation of the eyes, skin, and mucous membranes of the upper respiratory tract . In polluted atmospheres, indoors as well as outdoors, formaldehyde may contribute to common annoyances such as eye irritation and unpleasant odours.

Summary of Method - A known volume of ambient air is drawn through a prepacked cartridge coated with acidified DNPH at a sampling rate of 100-2000 mL/min for an appropriate period of time. The sampling volume is dependent on the expected concentration in the test atmosphere but typically ranges between 10 and 1000 litres.

After sampling, the sample cartridges and field blanks are individually capped. Sample identifying tags and labels are then attached to the capped tubes. They are then placed in a polypropylene shipping container, cooled (to ~ 4 deg C), and returned to the laboratory for analysis.

Pictured right is a DNPH Sample Cartridge. >

Carbonyl Compounds	by DNPH Cartridge
Formaldehyde	Propanal
Acetaldehyde	Hexanal
Acetone	Tolualdehyde
Acrolein	Methacrolein
Benzaldehyde	Pentanal
Butanal	2-Butanone
2-Butenal	

Based on collecting a 500 litre sample of air through the cartridge and analysis to our standard detection limit of 0.5 µg/cartridge, the detection limit in air will be **1.0 µg/m^3**.

With certified media, analysis to 0.1 µg/cartridge and collecting a 1000 litre sample, the detection limit can be as low as **0.1 µg/m^3**.

The compounds listed above are reported in the Standard Leeder Consulting Carbonyl Screen. Many other compounds can also be analysed by this method. These include Isovaleraldehyde, p-Tolualdehyde, o-Tolualdehyde, Isobutyraldehyde, 2,5-Dimethylbenzaldehyde, m-Tolualdehyde, 2-Pentanone, Furfural and Glutaraldehyde.

We also offer the option of analysis by **HPLC-MS**, which can detect a number of additional compounds. This option enables analysis of over 40 compounds plus **Mass Spectrometry confirmation** in one test.

Leeder Consulting offer a range of specialised high-tech, non-routine and on-site services. Access to leading edge technology and expertise in Australia and overseas guarantees results when and where you require. To discuss your requirements or for more information **call us now.**

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Summary of the USEPA TO-11a Method for the Determination of Aldehydes and Ketones in Ambient Air using Active Sampling Onto Absorbent Cartridges.

A known volume of ambient air is drawn through a prepacked cartridge coated with acidified DNPH at a accurately measured sampling flow rate of between 1 litre and 2 litres per minute for an appropriate period of time. The direction of the sampling flow should be in the specified direction.

The sampling time and volume is dependent on the expected concentration in the test atmosphere but typically ranges between 10 litres and 1000 litres. The volume should be determined to avoid sample breakthrough and the total carbonyls on the tube should not exceed 75 ug.

After sampling, the sample cartridges and field blanks should be individually capped. Sample identifying tags and labels are then attached to the capped cartridges which should be placed immediately in the foil envelopes provided and placed in a polypropylene shipping container, cooled (to ~ 4 deg C), protected from light, and returned to the laboratory for analysis.

Care should be exercised in the handling of cartridges to minimise unintentional exposure. It should be noted that OZONE is a known negative interference. If you suspect the presence of ozone, use an ozone denuder or scrubber as detailed in the method.

With each batch of up to 10 samples, at least one trip blank and an unused cartridge for a laboratory blank should be included in the batch sent to the laboratory.

Samples should be analysed within 30 days of sampling assuming they have been properly stored.

This Summary is purely for general information and we advise you refer to the USEPA TO-11 method for specific guidance.