



10-L BAG METHOD FOR MEASURING VOC EMISSIONS FROM VEHICLE INTERIOR MATERIALS

Application

Use this procedure as a material-level screening method for the emissions of selected volatile organic compounds (VOCs) and total volatile organic compounds (TVOCs).

Apparatus and Materials Required

Gas Chromatograph Mass Spectrometer (GC-MS)

Agilent GC 6890-MS 5975B (or equivalent)

High Performance Liquid Chromatography (HPLC)

Agilent 1100 Shimadzu LC-20A, Thermo U-3000 (or equivalent)

Thermal Desorption

Thermal Desorption System – Autosampler (TDSA)
Gerstel TDSA2 with a cold injection system (or equivalent)

Thermal Desorption Unit (TDU)
Gerstel Twister TDU (or equivalent) with a cold injection system
Markes TD-100 (or equivalent)

Mechanical convection oven

Capable of maintaining a temperature of 100 ± 0.5 °C, typical chamber size is 0.4 m³

10-Liter Sampling bag

10-L polyvinyl fluoride (PVF) Tedlar® bag with a sampling valve composed of inert materials (Quick Lock-type fittings composed of inert materials are recommended). Typical bag size is approximately 33 cm x 50 cm or 30 cm x 56 cm. The bag should be capable of being sealed with plastic C-clamp. Any alternative bag material must demonstrate equivalency. Purchasing thermally pre-cleaned, sealed sampling bag is recommended. Evaluate all bag lots to the background limits prior to use. If the lot does not meet the background criteria, see page 5 for the 10-L Bag Thermal Conditioning Procedure.

Date	Action	Revisions	Rev. 02
2018 07 02	Revised	See Summary of Revisions	T. Guo, AP
2017 12 13	Revised	See Summary of Revisions	Stark, NA
2017 01 23	Released		Stark, NA



Suitable suppliers for sampling bags:

Dalian Delin Gas Packaging Co., Ltd.
240 Sanyuan St, Xigang District, Dalian, Liaoning, China
Tel: 86-0411-83703385 or 86-0411-83671536
Fax: 86-0411-83706065
www.delindl.com

Sampling Bag Technologies, LLC
27491 Schoolcraft, Livonia, MI 48150
734-525-8600
www.samplingbagtech.com

Restek Corporation, U.S.
Catalog #: 22053
110 Benner Circle, Bellefonte, PA 16823
1-800-356-1688, ext. 3
csreps@restek.com
www.restek.com/

William Vecere
Sales@plastichmbags.com
248-866-3913
Troy, MI USA

Jensen Inert Products
Catalog #: GSTP0101219LJCP
3773 NW 126th Avenue #1
Coral Springs, FL 33065
954-344-2006
www.jenseninert.com/

Thermal Desorption (TD) Tube

Gerstel TDSA Tubes - Tenax® TA or Carbotrap 300 (or equivalent)

Gerstel TDU Tubes - Gerstel Carbopack B / Carbopack X (or equivalent)

Markes TD Tubes - Tenax® TA (or equivalent)

2,4-dinitrophenylhydrazine (DNPH) Cartridge

Waters Corporation: Sep-Pak silica cartridge, catalogue number WAT037500

Bonna-Agela Technologies: Cleanert IC-DNPH

Sampling pump

Gillian IAQ-Pro (or equivalent)

Gas flow meter

Agilent Technologies ADM 2000, Bios International Corp. DCL-M (or equivalent)

Mass flow controller

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Matheson 8272-0414, MKS 1179A12CS1AV, Brooks Instrument 5850E (or equivalent)
The mass flow controller must be capable of delivering a flowrate of 1 to 3 LPM to fill the bags

Vacuum pump

KNF Neuberger Inc. NPU544-NO35.8.92, Jin Teng GM-1.0A (or equivalent)

TD tube conditioning chamber

Markes TC-20 for Markes tubes, Gerstel TC2 tube conditioner for Gerstel tubes (or equivalent)

Sampling Assembly Transfer line

PTFE (or equivalent inert material)

Connection Fittings

Ultra-Torr Vacuum Fittings with O-rings (or equivalent)

C-clamps

For sealing the sampling bag(s) or other sealing methods as long as the bag passes a leak check

Ultra High Purity (UHP) Nitrogen (N₂)

99.999% purity, hydrocarbon concentration <0.5 ppm

Ultra High Purity (UHP) Helium (He)

99.999% purity, hydrocarbon concentration <0.5 ppm

Acetonitrile

HPLC-quality, carbonyl-free, Honeywell Burdick & Jackson BJ-018 (or equivalent).

DI Water

Resistivity greater than or equal to 10 megohm

Conditioning of Materials and Specimen Preparation

Note: Whenever handling the specimens, samples, and sampling bags, nitrile gloves shall be worn.

1. Cut 10 x 20 cm test specimens and begin conditioning for 72 ± 2 hours at $23 \pm 2^\circ\text{C}$, $50 \pm 5\%$ relative humidity and ambient atmospheric pressure.
2. After conditioning period, test specimens must be placed in a new polyethylene (PE) coated aluminium bag or wrapped tightly in silicon free aluminium foil then placed in a new PE bag for shipping to a test laboratory. Note: Any samples bagged, and not immediately tested, shall return to the conditioning room/chamber until testing begins.

Notes:

- Suppliers shall submit a minimum of two (2) specimens per test. One (1) specimen per test will be used as backup.