

# Calibration Standards for Toxic Organics Methodology

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Under Title III of the Federal Clean Air Act, the US Environmental Protection Agency (EPA) must monitor emissions of hazardous air pollutants (HAPs) from both area and point sources. Provisions in Title III mandate that the EPA categorize sources, regulate emissions of 189 HAPs, determine applicability of maximum achievable control technology (MACT), evaluate residual risk after MACT, and address sudden accidental releases. To demonstrate compliance of these regulations, industry sources are required to quantitate their emissions. The EPA has published numerous sampling and analytical methods from industrial sources for quantifying HAPs. One method, Toxic Organics Method 14 (TO-14), is applicable to specific volatile organic compounds (VOCs) that have been tested and determined to be stable when stored in pressurized canisters.

Supelco and Scott Specialty Gases, Inc. have developed six high quality and accurate gas calibration standards in high pressure, transportable cylinders for Method TO-14. These standards contain 100 ppb of each analyte in nitrogen, and offer guaranteed reliability and performance associated with the large high pressure cylinders — without the maintenance and safety problems — that labs require to perform Clean Air Act and TO-14 analyses.

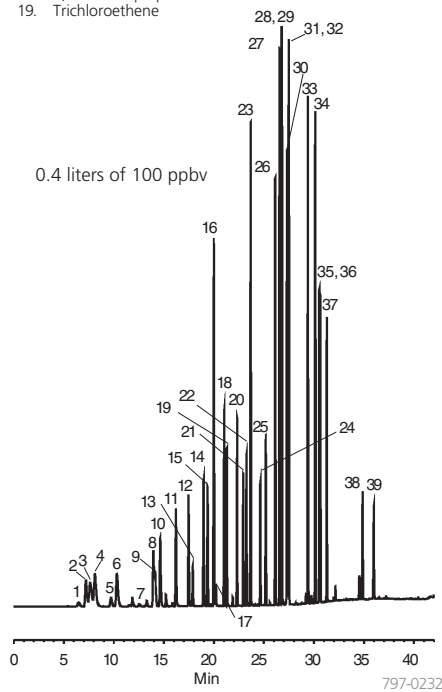
The 100 ppb concentrations satisfy the requirements of Method TO-14, reducing inaccuracies inherent in serial dilutions. Scott's Micrograv<sup>®</sup> process, which is a direct gravimetric blending technique, and Aculife<sup>®</sup> cylinder treatment, a chemical vapor deposition process that eliminates gas-to-cylinder surface interactions, provide the stability guarantee of 100ppb for each analyte. In addition, ongoing monthly testing procedures ensure the stability of these products.

The TO-14 Calibration Mix 1 (Cat. No. 41900-U) is a composite mix of all 39 TO-14 compounds (Figure A). The chromatogram was obtained by collecting 0.4 liters of gas onto a Carbotrap<sup>™</sup> 217 thermal desorption tube (11.5 cm x 4 mm I.D. glass), followed by thermal desorption onto a Carbotrap 201 focusing tube (18.4 cm x 1 mm I.D.) and separated using an SPB<sup>™</sup>-1 capillary GC column (60 m x 0.32 mm I.D., 4.0 µm film).

**Figure A. Calibration Standard**

thermal desorber: ACEM 900/901-FF (22587)  
 focusing tube: Carbotrap 201,  
 18.4 cm x 1 mm I.D. glass  
 (20865)  
 trap desorption: 350 °C (5 min.) at 2.5 mL/min.  
 trap idle: 40 °C  
 transfer line: 225 °C  
 valve compartment: 200 °C  
 sampling tube: Carbotrap 217,  
 11.5 cm x 4 mm I.D. glass  
 (20895-U)  
 column: SPB-1, 60 m x 0.32 mm I.D.,  
 4.0 µm film (custom)  
 oven: 35 °C (8 min.) to 230 °C at  
 8 °C/min., hold 10 min.  
 det.: FID, 250 °C  
 carrier gas: helium, 2.5 mL/min.

- |                            |                               |
|----------------------------|-------------------------------|
| 1. Halocarbon 12           | 20. cis-1,3-Dichloropropene   |
| 2. Chloromethane           | 21. trans-1,3-Dichloropropene |
| 3. Halocarbon 114          | 22. 1,1,2-Trichloroethane     |
| 4. Vinyl chloride          | 23. Toluene                   |
| 5. Bromomethane            | 24. 1,2-Dibromoethane         |
| 6. Ethyl chloride          | 25. Tetrachloroethene         |
| 7. Halocarbon 11           | 26. Chlorobenzene             |
| 8. 1,1-Dichloroethene      | 27. Ethylbenzene              |
| 9. Methylene chloride      | 28. m-Xylene                  |
| 10. Halocarbon 113         | 29. p-Xylene                  |
| 11. 1,1-Dichloroethane     | 30. Styrene                   |
| 12. cis-1,2-Dichloroethane | 31. o-Xylene                  |
| 13. Chloroform             | 32. 1,1,2,2-Tetrachloroethane |
| 14. 1,2-Dichloroethane     | 33. 1,3,5-Trimethylbenzene    |
| 15. 1,1,1-Trichloroethane  | 34. 1,2,4-Trimethylbenzene    |
| 16. Benzene                | 35. 1,3-Dichlorobenzene       |
| 17. Carbon tetrachloride   |                               |
| 18. 1,2-Dichloropropane    |                               |
| 19. Trichloroethene        |                               |



A SCOTTY<sup>®</sup> HP cylinder measures only 12 ¼" high and 3 ¼" in diameter (31 cm x 8 cm), but contains 104 liters of gas at 1800 psi – enough gas to deliver adequate calibration for 80 or more tests. In addition, the cylinder is equipped with CGA 110/180 fittings to plumb directly into your gas sampling system or through an appropriate Scotty regulator.

Where available, the components in Scott TO-14 gas calibration blends are traceable to NIST reference mixtures (NIST SRM 1804). All are certified for superior stability and accuracy.

## Ordering Information:

Description	Cat. No.
<b>TO-14 Calibration Mix 1</b> 100 ppb each component in nitrogen. 39 components (listed in Figure A). 104 liters	<b>41900-U</b>
<b>TO-14 Aromatics Subset Mix</b> 100 ppb each component in nitrogen. 14 components. 104 liters	<b>41901</b>
<b>TO-14 Chlorinated Hydrocarbons Subset Mix</b> 100 ppb each component in nitrogen. 19 components. 104 liters	<b>41902</b>
<b>TO-14 CFC/HCFC Subset Mix</b> 100 ppb each component in nitrogen. 4 components. 104 liters	<b>41903</b>
<b>TO-14 Reactive Subset Mix</b> 100 ppb each component in nitrogen. 3 components. 104 liters	<b>41911</b>
<b>TO-14 GC/MS Tuning Solution</b> 2 ppm bromofluorobenzene in nitrogen. 104 liters	<b>41913</b>

## Trademarks

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 Aculife, Micrograv, SCOTTY — Scott Specialty Gases, Inc.



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