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Committee D16 on Aromatic Hydrocarbons and Related Chemicals
Subcommittee D16.16 on Industrial & Specialty Product Standards

Research Report: D16-1074

Interlaboratory Study to Establish Precision Statements for ASTM D8311, Impurities in Monoethylene Glycol by Gas Chromatography with Normalization

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1. Introduction:

1.1 This test method covers the gas chromatographic determination of the purity and impurities in MEG with normalization. The impurities to be determined includes 1,3-Dioxane-2-methanol, diethylene glycol (DEG) and triethylene glycol (TEG) with the LOD of 0.0002 mass %.

2. Test Method:

2.1 A MEG sample is injected into the gas chromatography. The components in sample are separated with a capillary column and detected with a flame ionization detector (FID). All the peak areas on the chromatogram are collected and calibrated with calibration factors measured with calibration solution. The calibrated peak areas are used to calculate the purity of MEG and the amount of the impurities with normalization

3. Participating Laboratories:

3.1. The following laboratory participated in this study:

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4. Description of Samples:

4.1 Two MEG samples are tested in this study. The samples are prepared by adding the typical impurities including DEG, TEG and 1,3-dioxane-2-methanol into a blank MEG.

5. Inter-laboratory Study Instructions:

5.1. The concentration of the components in the test samples are listed in Table 1.

Table 1. The concentration of the components

	Sample I	Sample II
EG	99.9363	99.9450
1,3-Dioxane-2-methanol	0.0052	0.0033
DEG	0.0126	0.0044
TEG	0.0102	0.0011
Water	0.0307	0.0414

5.2. Operating conditions of gas chromatography are listed in Table 2.

Table 2. The operation conditions of gas chromatography

Inlet	Split
Temperature, °C	300
Column	
Material	fused silica
Stationary Phase	6 % Cyanopropyl-phenyl -94 % dimethyl polysiloxane
Length, m	30
Internal diameter, mm	0.32
Film thickness, μm	1.8
Column temperature program	
Initial temperature, °C	80
Initial time, min	0.1
Programming rate, °C/min	25
Final, °C	240
Time 2, min	10
Carrier gas	Helium
Flow velocity, mL/min	1.5 Helium
Split ratio	30:1
Sample size, μL	1.0
Detector	FID
Temperature, °C	300