Selection, Preparation, Validation, Care and Storage of Natural Gas and Natural Gas Liquids Reference Standard Blends

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1. SCOPE

1.1. This method covers the recommended procedures for selecting the proper Natural Gas and Natural Gas Liquids (NGL) Reference Standards, preparing the standards for use, verifying the accuracy of composition as reported by the manufacturer, and the proper care and storage of those standards to insure their integrity and longevity as long as they are in use.

2. SUMMARY OF PROCEDURE

2.1. It is highly recommended that the proper reference standard blend be obtained for a particular application. The accuracy of its reported composition must be authenticated when received and periodically during its use.

2.2. Special care must be taken to ensure the integrity of any reference standard from the time it is received until it is taken out of service.

2.2.1. It is a good laboratory practice to order a replacement standard and confirm its validity well in advance of the depletion or deterioration of the reference standard blend that is presently in service.

2.3. A constant pressure cylinder used to obtain a NGL Reference Standard must be properly prepared and inspected to avoid contaminating, altering or losing its contents.

2.4. All necessary Department of Transportation (DOT) requirements must be followed when transporting a Natural Gas or NGL Reference Standard blend.

3. SELECTION OF REFERENCE STANDARD BLENDS

3.1. The selection of a proper reference standard blend depends upon the composition of the samples that are to be analyzed. A reference standard composition should resemble the samples that are to be analyzed.

3.1.1. A reference standard blend prepared gravimetrically, containing high purity components to a stated accuracy as shown in **Table 1** and provided with the stated uncertainty per component as calculated by the manufacturer, is recommended for instrument calibrations. The concentration of a component in the reference standard blend should not be less than one-half or more than double the concentration of the corresponding component in the unknown (unless linearity tests demonstrate otherwise). Corresponding components in the reference standard blend and in the unknown should not differ by more than twenty (20) mol percent (of the total mixture) when the peak area calculation method is used. When applying these rules, the values for the hexanes and heavier components may be totaled and considered as a single component.

Recommended Purity for Reference Standard Blend Components

% Concentration in Reference Standard Blend	Required Purity of Raw Component Stock
0.00 - 0.099%	95% Relative
0.10 - 9.999%	98% Relative
10.0 - 100%	99% Relative

Table 1

3.1.2. On a thermal conductivity detector (TCD), it is known that a hexanes plus containing only normal alkanes will yield a different response than a blend that also contains isomers. The ideal hexanes plus composition will have a similar molecular weight and density to that of the unknown samples and produce a similar response. This reduces the error on determination of the hexanes plus concentration. Extended analyses of the potential sample streams can be utilized to determine the composition and concentration ranges of the hexanes plus for a reference standard.

3.1.3. A properly blended Reference Standard should be prepared gravimetrically by the manufacturer and its composition verified by chromatographic analysis before shipment to the user.

3.2. It may be necessary for the user to check the linearity of an instrument before a range of instrument accuracy can be determined. (Refer to section 6.3)

3.2.1. The linearity of the instrument will determine the range of samples that can be analyzed with a single reference standard. It may be necessary to obtain more than one reference standard blend.

NOTE: *Hydrogen and/or Helium are more difficult to blend. Contact the manufacturer for the accuracy determination of these components.*

4. INITIAL PREPARATION AND HANDLING OF REFERENCE STANDARD BLENDS

4.1. Before a reference standard can be used for calibrating instruments, it must be properly prepared and the contents must be verified. Improper preparation can lead to inaccurate calibrations and verifications.

4.2. If a Natural Gas Reference Standard has (or is suspected to have) dropped below its hydrocarbon dew point it must be maintained above its hydrocarbon dew point for at least 4 hours before attempting to analyze it. Due to the uncertainty in measuring or calculating the hydrocarbon dew point, it is recommended that the standard be maintained at least 30°F (17°C) above the expected hydrocarbon dew point. (Refer to API MPMS Chapter 14.1)

4.3. The pre-charge end of a NGL Reference Standard cylinder should be pressured not less than 200 psi (1379 kPa) above the vapor pressure of the sample at the temperature of the chromatograph injection valve (A pressure of 1000-1200 psig should be sufficient for most liquids).

CAUTION: *Do not over-pressure the cylinder.*

4.3.1. The contents of a NGL Reference Standard blend should be thoroughly mixed immediately before attempting to analyze it. (Refer to manufacturer's information for mixer type and proper mixing instructions.)