EQUIPMENT AND INSTRUMENTATION TECHICAL SPECIFICATIONS AND QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

I. VENT GAS FLOW METER

a. Velocity Range: 0.1–250 ft/sec

b. Repeatability: ± 1% of reading over the velocity range

c. Design Accuracy: ± 5% initially to 40%, 60%, and 90% of monitor full scale as certified by the manufacturer

d. Operational Accuracy: ± 20% of reading over the velocity range of 0.1–1 ft/s and ± 5% of reading over the velocity range of 1–250 ft/s

e. Installation: Applicable AGA, ANSI, API, or equivalent standard

f. Flow Rate Determination: Must be corrected to one atmosphere pressure and 68 °F

g. QA/QC: Annual calibration shall be conducted.

h. Pressure and Temperature Sensors: *See* Part IV below.

II. VENT GAS AVERAGE MOLECULAR WEIGHT ANALYZER (may be part of the Vent Gas Flow Meter)

a. Molecular Weight Range and Accuracy:

i. Range: 0 to 60 gr/grmol

ii. Accuracy: ± 1.2 gr/grmol if a Vent Gas Flow Meter or BTU analyzer that monitors the flare is capable of continuously analyzing Molecular Weight;
± 3.0 gr/grmol if and only if: (i) the Vent Gas Flow Meter that monitors the flare is not capable of continuously analyzing Molecular Weight; (ii) there is no BTU Analyzer that monitors the flare or the BTU Analyzer is not capable of continuously analyzing Molecular Weight; and (iii) a Gas Chromatograph is used for the purpose of continuously analyzing Molecular Weight

III. STEAM FLOW METER

a. Repeatability: ± 1% of reading over the range of the instrument

b. Accuracy: ± 1% full scale on a volumetric basis
± 2.5% full scale on a mass basis

c. Installation: Applicable AGA, ANSI, API, or equivalent standard

d. Flow Rate Determination: Must be corrected to one atmosphere pressure and 68 °F

e. QA/QC: Annual calibration shall be conducted.

f. Pressure and Temperature Sensors: *See* Part IV below.

IV. VENT GAS AND STEAM FLOW METERS: PRESSURE AND TEMPERATURE SENSORS

a. Temperature monitor must be calibrated annually to ± 5%.

b. Pressure monitor must be calibrated annually to within ± 5%.

V. GAS CHROMATOGRAPH ("GC")

A. General

a. Accuracy: The gas chromatography system shall be maintained to be accurate within 5% of full scale.

b. 8-Hour Repeatability: ± 1.0% of full scale on a volumetric basis over the full range

c. The minimum sampling frequency shall be one sample every 15 minutes.

d. The GC shall be capable of speciating all gas constituents listed in Appendix 1.9.

e. The sampling system sample line shall be heat traced and maintained at no lower than 135 degrees Fahrenheit with no cold spots. The sampling cabinet shall be maintained at no lower than 125 degrees Fahrenheit. All system components shall be heated, including the probe external to the flare piping, calibration valve, sample lines, sampling loop (or sample introduction system), and GC oven.

f. Where technically feasible, the sampling location should be at least two equivalent duct diameters downstream from the nearest control device, point of pollutant generation, or other point at which a change in the pollutant concentration or emission rate occurs. The location should not be close to air in-leakages. Where technically feasible, the location should also be at least 0.5 diameters upstream from the exhaust or control device.

B. Gas Chromatograph Calibration Standards

1. **Net Heating Value and Analyte Measurements**. For the Net Heating Value and Analyte measurements, the GC shall be operated and maintained in accordance with Performance Specification 9 ("PS9") of Appendix B of 40 C.F.R. Part 60 except:

   a. Daily Validation Procedure. Instead of the daily mid-level validation procedure in Section 10.2 of PS9, a daily low-level validation procedure shall be conducted on the calculated Net Heating Value of a certified calibration gas mixture that is developed using the concentration of each analyte specified in Column 1 of Table 1 below. The average instrument response shall not vary by more than 10 percent from the Net Heating Value of the certified calibration gas mixture.

   b. Quarterly Validation Procedure. The multi-point calibration error check procedure in Section 10.1 of PS9 shall be conducted quarterly for the analytes listed in Subparagraph V.B.1.c below. No calibrations will be required after routine maintenance or repair where such activities do not have the potential to alter the sampling or analysis of the gas. The GC must meet the calibration performance criteria in Sections 13.1 and 13.2 of PS9 for the listed analytes, such that: (i) the average instrument response must not differ by more than 10 percent of each analyte calibration gas value; and (ii) the precision and linearity check of each analyte listed below shall not deviate by more than 5 percent from the average concentration measured.

   c. The analytes to be used are:

      i. Hydrogen
      ii. Nitrogen
      iii. Methane
      iv. Ethane
      v. Propane
      vi. Propylene
      vii. Ethylene

d. The calibration gas mixtures may be set by the procedures identified in Section 7.1 of PS9 or may be within 10 percent of the concentration values listed in Table 1. The gases must be certified to ± 2 percent.

Table 1: Calibration Gas Mixtures for Net Heating Value Calibrations/Validations[(1)]

Component	Daily Low-Level Gas (Col. 1)	Quarterly Low-Level Gas (Col. 2)	Quarterly Mid-Level Gas (Col. 3)	Quarterly High-Level Gas (Col. 4)
Hydrogen	**8**	**8**	**30**	**12**
Nitrogen	**65**	**65**	**8**	**5**
Methane	**22**	**22**	**48**	**30**
Ethane	**2**	**2**	**3**	**30**
Propane	**1**	**1**	**2**	**15**
Propylene	**1**	**1**	**8**	**5**
Ethylene	**1**	**1**	**1**	**3**
NHV (Btu/scf) Unadjusted for H2	**310**	**310**	**793**	**1273**

(1) The individual analytes are in volume percent.

2. **H_2S Measurement**. For the H_2S measurement, the GC shall be operated and maintained in accordance with Performance Specification 7 of Appendix B of 40 C.F.R. Part 60. Quality assurance procedures set forth in Appendix F of 40 C.F.R. Part 60 shall be followed. The span shall be set at 300 ppmv H_2S or as required by NSPS Subpart Ja, if different.

VI. Calculation of Instrument Downtime

1. For purposes of calculating the 110 hours per calendar quarter of instrument downtime allowed pursuant to Paragraphs 28 and 60.a for SDP's Regular-Use Flares and for purposes of calculating the 5% of instrument downtime allowed pursuant to Paragraphs 28 and 60.b for SDP's Temporary-Use Flares, the time used for GC calibration and validation activities required by Subparagraph V.B.1 of this Appendix may be excluded.

2. Any hour that meets the requirements of 40 C.F.R. § 60.13(h)(2) shall not be counted toward instrument downtime. Specifically:

   (i) For a full operating hour (any clock hour where the flare is In Operation (*i.e.*, Capable of Receiving Sweep, Supplemental, and/or Waste Gas) for 60 minutes), if there are at least four valid data points to calculate the

hourly average (that is, one data point in each of the 15-minute quadrants of the hour), then there is no period of instrument downtime;

(ii) For a partial operating hour (any clock hour where the flare is In Operation (*i.e.*, Capable of Receiving Sweep, Supplemental, and/or Waste Gas) for less than 60 minutes), if there is at least one valid data point in each 15-minute quadrant of the hour in which the flare is In Operation (*i.e.*, Capable of Receiving Sweep, Supplemental, and/or Waste Gas) to calculate the hourly average, then there is no period of instrument downtime; and

(iii) For any operating hour in which required maintenance or quality-assurance activities on the instruments or monitoring systems associated with the flare are performed:

(A) If the flare is In Operation (*i.e.*, Capable of Receiving Sweep, Supplemental, and/or Waste Gas) in two or more quadrants of the hour and if there are at least two valid data points separated by at least 15 minutes to calculate the hourly average, then there is no period of instrument downtime; or

(B) If the flare is In Operation (*i.e.*, Capable of Receiving Sweep, Supplemental, and/or Waste Gas) in only one quadrant of the hour and if there is at least one valid data point to calculate the hourly average, then there is no period of instrument downtime.