

2.5 Sulfuric Acid Plants

2.5.1 Applicability and Designation of Affected Facility

The provisions of this source category are applicable to each sulfuric acid production unit, which is subject to Section 1.1 of the general provisions of this text.

2.5.2 Test Methods and Procedures

(a) In conducting the performance tests required in Section 1.2, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of this part or other methods and procedures as specified in this section, except as provided in Section 1.2, paragraph 2. Acceptable alternative methods and procedures are given in paragraph (c) of this section.

(b) The owner or operator shall determine compliance with the SO₂ acid mist, and visible emission standards as follows:

(1) The emission rate (E) of acid mist or SO₂ shall be computed for each run using the following equation:

$$E = (C Q_{sd}) / (PK)$$

Where:

E = emission rate of acid mist or SO₂ kg/metric ton (lb/ton) of 100 percent H₂SO₄ produced.

C = concentration of acid mist or SO₂, g/dscm (lb/dscf).

Q_{sd} = volumetric flow rate of the effluent gas, dscm/hr (dscf/hr).

P = production rate of 100 percent H₂SO₄, metric ton/hr (ton/hr).

K = conversion factor, 1000 g/kg (1.0 lb/lb).

(2) Method 8 shall be used to determine the acid mist and SO₂ concentrations (C's) and the volumetric flow rate (Q_{sd}) of the effluent gas. The moisture content may be considered to be zero. The sampling time and sample volume for each run shall be at least 60 minutes and 1.15 dscm (40.6 dscf).

(3) Suitable methods shall be used to determine the production rate (P) of 100 percent H₂SO₄ for each run. Material balance over the production system shall be used to confirm the production rate.

(4) Method 9 and the procedures in Section 1.3 shall be used to determine opacity.

(c) The owner or operator may use the following as alternatives to the reference methods and procedures specified in this section:

(1) If a source processes elemental sulfur or an ore that contains elemental sulfur and uses air to supply oxygen, the following procedure may be used

instead of determining the volumetric flow rate and production rate:

- (i) The integrated technique of Method 3 is used to determine the O₂ concentration and, if required, CO₂ concentration.
- (ii) The SO₂ or acid mist emission rate is calculated as described in 2.5.3(d) substituting the acid mist concentration for C_s as appropriate.

2.5.3 Emission Monitoring

- (a) A continuous monitoring system for the measurement of sulfur dioxide shall be installed, calibrated, maintained, and operated by the owner or operator. The pollutant gas used to prepare calibration gas mixtures under paragraph 2.1 Performance Specification 2 (Appendix B) and for calibration checks under Section 1.5, paragraph 3 of this text, shall be sulfur dioxide (SO₂). Method 8 shall be used for conducting monitoring system performance evaluations under Section 1.5, paragraph 2, except that only the sulfur dioxide portion of the Method 8 results shall be used. The span value shall be set at 1000 ppm of sulfur dioxide.
- (b) The owner or operator shall establish a conversion factor for the purpose of converting monitoring data into units of the applicable standard (kg/metric ton, lb/ton). The conversion factor shall be determined, as a minimum, three times daily by measuring the concentration of sulfur dioxide entering the converter using suitable methods (e.g., the Reich test, National Air Pollution Control Administration Publication No. 999-AP-13 and calculating the appropriate conversion factor for each eight-hour period as follows:

$$CF = k \left[\frac{1.000 - 0.015r}{r - s} \right]$$

Where:

CF = conversion factor (kg/metric ton per ppm, lb/ton per ppm).

k = constant derived from material balance. For determining CF in metric units, k=0.0653. For determining CF in English units, k=0.1306.

r = percentage of sulfur dioxide by volume entering the gas converter. Appropriate corrections must be made for air injection plants subject to the Director's approval.

s = percentage of sulfur dioxide by volume in the emissions to the atmosphere determined by the continuous monitoring system required under paragraph (a) of this section.

- (c) The owner or operator shall record all conversion factors and values under paragraph (b) of this section from which they were computed (i.e., CF, r, s).
- (d) Alternatively, a source that processes elemental sulfur or an ore that contains elemental sulfur and uses air to supply oxygen may use the following continuous emission monitoring approach and calculation procedures in determining SO₂

emission rates in terms of the standard. This procedure is not required, but is an alternative that would alleviate problems encountered in the measurement of gas velocities or production rate. Continuous emission monitoring systems for measuring SO₂, O₂, and CO₂ (if required) shall be installed, calibrated, maintained, and operated by the owner or operator and subjected to the certification procedures in Performance Specifications 2 and 3. The calibration procedure and span value for the SO₂ monitor shall be as specified in paragraph (b) of this section. The span value for CO₂ (if required) shall be 10 percent and for O₂ shall be 20.9 percent (air). A conversion factor based on process rate data is not necessary. Calculate the SO₂ emission rate as follows:

$$E_s = (C_s S) / [0.265 - (0.126\% O_2) - (A\% CO_2)]$$

Where:

E_s = emission rate of SO₂, kg/metric ton (lb/ton) of 100 percent of H₂SO₄ produced.

C_s = concentration of SO₂ kg/dscm (lb/dscf).

S = acid production rate factor, 368 dscm/metric ton (11,800 dscf/ton) of 100 percent H₂SO₄ produced.

%O₂ = oxygen concentration, percent dry basis.

A = Auxiliary fuel factor.

= 0.00 for no fuel.

= 0.0226 for methane.

= 0.0217 for natural gas.

= 0.0196 for propane.

= 0.0172 for #2 oil.

= 0.0161 for #6 oil.

= 0.0148 for coal.

= 0.0126 for coke.

%CO₂ = carbon dioxide concentration, percent dry basis.

Note: It is necessary in some cases to convert measured concentration units to other units for these calculations:

Use the following table for such conversions:

FROM --	TO --	MULTIPLY BY --
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g/scm	kg/scm	10^{-3}
mg/scm	kg/scm	10^{-6}
ppm (SO ₂)	kg/scm	$2,660 \times 10^{-6}$
ppm (SO ₂)	lb/scf	$2,660 \times 10^{-7}$

- (e) For the purpose of reports under Section 1.5, paragraph 3, periods of excess emissions shall be all three-hour periods (or the arithmetic average of three consecutive one-hour periods) during which the integrated average sulfur dioxide emissions exceed the applicable standards.