

4.5 How is the SO₂ mass emission rate calculated?

For an Acid Rain Program or CAIR SO₂ unit using the Appendix D methodology, the hourly SO₂ mass emission rate is calculated using an equation that has one of the following basic structures:

$$\text{SO}_2 \text{ mass emission} = \text{Fuel flow rate} \times \text{Fuel sulfur content} \times \text{Units conversion factor rate (lb/hr)}$$

or

$$\text{SO}_2 \text{ mass emission rate (lb/hr)} = \text{SO}_2 \text{ emission rate (lb/mmBtu)} \times \text{Heat input rate (mmBtu/hr)}$$

An example of an equation with the first basic structure is Equation D-2 in section 3 of Appendix D, and an equation with the second basic structure is Equation D-5. In the first general equation above, the fuel flow rate is the hourly average reading from the fuel flowmeter, and the fuel sulfur content is based on the results of periodic fuel sampling and analysis (see Section 4.7, below). In the second general equation, the heat input rate is derived from the hourly average fuel flowmeter reading and the fuel GCV (see Section 4.6, below), and the SO₂ emission rate is either:

- A generic default value for the type of fuel combusted (e.g., 0.0006 lb/mmBtu for PNG); or
- A site-specific default value, determined by substituting the GCV and total sulfur content of the fuel into Equation D-1h in Appendix D.

Note that for oil, when the fuel flow rate is measured on a volumetric basis (e.g., gal/hr), it must be converted to a mass basis using the oil density. Therefore, for Acid Rain or CAIR SO₂ sources using volumetric oil flowmeters, periodic sampling of the density of the oil is also required.