

**ALASKA DEPARTMENT OF ENVIRONMENTAL  
CONSERVATION**

**Standard Permit Condition XII – SO<sub>2</sub> Material Balance  
Calculation**

**Permit Condition for Air Quality Permits**

**Adopted by Reference in 18 AAC 50.346**

**April 1, 2002**

**Revised July 22, 2020**

## Standard Permit Condition XII – SO<sub>2</sub> Material Balance Calculation

**Emissions Unit or Stationary Source Categories This Condition Applies to:** Any fuel burning equipment using liquid fuel.

The Department will use Standard Permit Condition (SPC) XII in any operating permit unless the Department determines that emissions unit- or stationary source-specific conditions more adequately meet the requirements of 18 AAC 50.

### Permit Wording:

#### *SO<sub>2</sub> Material Balance Calculation*

If a fuel shipment contains more than 0.75 percent sulfur by weight, calculate the three-hour exhaust concentration of SO<sub>2</sub> using the following equations:

$$A = 31,200 \times (\text{wt}\%S_{\text{fuel}}) = 31,200 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$B = 0.148 \times (\text{wt}\%S_{\text{fuel}}) = 0.148 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$C = 0.396 \times (\text{wt}\%C_{\text{fuel}}) = 0.396 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \quad D = 0.933 \times (\text{wt}\%H_{\text{fuel}}) = 0.933 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$E = B + C + D = \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{2cm}}$$

$$F = 20.9 - (\text{vol}\%_{\text{dry}}O_{2, \text{exhaust}}) = 20.9 - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$G = (\text{vol}\%_{\text{dry}}O_{2, \text{exhaust}}) \div F = \underline{\hspace{1cm}} \div \underline{\hspace{1cm}} = \underline{\hspace{2cm}}$$

$$H = 1 + G = 1 + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$I = E \times H = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$\text{SO}_2 \text{ concentration} = A \div I = \underline{\hspace{1cm}} \div \underline{\hspace{1cm}} = \underline{\hspace{2cm}} \text{ ppm}$$

The  $\text{wt}\%S_{\text{fuel}}$ ,  $\text{wt}\%C_{\text{fuel}}$ , and  $\text{wt}\%H_{\text{fuel}}$  are the weight percents of sulfur, carbon, and hydrogen, respectively, in the fuel. These percentages should total 100%.

The fuel weight percent of sulfur is obtained pursuant to Condition <insert cross reference to SPC XI - SO<sub>2</sub> Emissions From Liquid Fuel-Burning Equipment, Condition 2.1b or 2.2>. The fuel weight percents of carbon and hydrogen are obtained from the fuel refiner.

The volume percent of oxygen in the exhaust ( $\text{vol}\%_{\text{dry}}O_{2, \text{exhaust}}$ ) is obtained from oxygen meters, manufacturer's data, or from the most recent analysis under 40 C.F.R. 60, Appendix A-2, Method 3, adopted by reference in 18 AAC 50.040(a), at the same emissions unit load used in the calculation.

Enter all of the data in percentages without dividing the percentages by 100. For example, if  $\text{wt}\%S_{\text{fuel}} = 1.0\%$ , then enter 1.0 into the equations, not 0.01, and if  $\text{vol}\%_{\text{dry}}O_{2, \text{exhaust}} = 3.00\%$ , then enter 3.00, not 0.03.

[18 AAC 50.346(c)]