

Environmental Protection Agency

§ 1065.675

§ 1065.675 CLD quench verification calculations.

Perform CLD quench-check calculations as follows:

(a) Calculate the amount of water in the span gas, $x_{H2Ospan}$, assuming complete saturation at the span-gas temperature.

(b) Estimate the expected amount of water and CO₂ in the exhaust you sample, x_{H2Oexp} and x_{CO2exp} , respectively, by considering the maximum expected amounts of water in combustion air, fuel combustion products, and dilution air concentrations (if applicable).

(c) Calculate water quench as follows:

$$quench = \left(\frac{x_{NOwet} / (1 - x_{H2Omeas})}{x_{NOdry}} - 1 \right) \cdot \frac{x_{H2Oexp}}{x_{H2Omeas}} + \frac{x_{NO,CO2} - x_{NO,N2}}{x_{NO,N2}} \cdot \frac{x_{CO2exp}}{x_{CO2meas}} \quad \text{Eq. 1065.672-1}$$

Where:

quench = amount of CLD quench.

x_{NOdry} = measured concentration of NO upstream of a bubbler, according to §1065.370.

x_{NOwet} = measured concentration of NO downstream of a bubbler, according to §1065.370.

x_{H2Oexp} = expected maximum amount of water entering the CLD sample port during emission testing.

$x_{H2Omeas}$ = measured amount of water entering the CLD sample port during the quench verification specified in §1065.370.

$x_{NO,CO2}$ = measured concentration of NO when NO span gas is blended with CO₂ span gas, according to §1065.370.

$x_{NO,N2}$ = measured concentration of NO when NO span gas is blended with N₂ span gas, according to §1065.370.

x_{CO2exp} = expected maximum amount of CO₂ entering the CLD sample port during emission testing.

$x_{CO2meas}$ = measured amount of CO₂ entering the CLD sample port during the quench verification specified in §1065.370.

Example:

x_{NOdry} = 1800.0 μmol/mol

x_{NOwet} = 1760.5 μmol/mol

x_{H2Oexp} = 0.030 mol/mol

$x_{H2Omeas}$ = 0.017 mol/mol

$x_{NO,CO2}$ = 1480.2 μmol/mol

$x_{NO,N2}$ = 1500.8 μmol/mol

x_{CO2exp} = 2.00%

$x_{CO2meas}$ = 3.00%

$$quench = \left(\frac{1760.5 / (1 - 0.017)}{1800.0} - 1 \right) \cdot \frac{0.030}{0.017} + \frac{1480.2 - 1500.8}{1500.8} \cdot \frac{2.00}{3.00}$$

$quench = -0.00888 - 0.00915 = -1.80\%$

EFFECTIVE DATE NOTE: At 73 FR 33738, June 30, 2008, §1065.675 was revised, effective July 7, 2008. For the convenience of the user, the revised text is set forth as follows:

§ 1065.675 CLD quench verification calculations.

Perform CLD quench-check calculations as follows:

(a) Calculate the amount of water in the span gas, $x_{H2Ospan}$, assuming complete saturation at the span-gas temperature.

(b) Estimate the expected amount of water and CO₂ in the exhaust you sample, x_{H2Oexp} and x_{CO2exp} , respectively, by considering the maximum expected amounts of water in combustion air, fuel combustion products, and dilution air concentrations (if applicable).

(c) Set x_{H2Oexp} equal to $x_{H2Omeas}$ if you are using a sample dryer that passes the sample dryer verification check in §1065.342.

(d) Calculate water quench as follows: