

DETERMINATION OF COMPLIANCE EVALUATION

Boiler	
Manufacturer	Nebraska Boiler
Model	NS-E-65-ECON
Maximum Heat Input	99.8 MMBtu/hr (84,300 lbs. Steam/hr)
Primary Fuel Types	Natural Gas
Standby Fuel Type	None
Burner	
Manufacturer	Todd Combustion
Model	DRMB Ultra Low NOx burner
NOx Control Type	Low NOx Burner and Flue Gas Recirculation System

EMISSION CONTROL TECHNOLOGY EVALUATION:

The proposed boiler will be fitted with a Todd Combustion ultra low NOx burner with induced flue gas recirculation system. The boiler will be fired exclusively on natural gas. The manufacturer is proposing a maximum NOx emission concentration of 9 ppmvd @ 3% O₂. For CO emissions, the manufacturer is proposing a maximum emission concentration of 50 ppmvd @ 3% O₂.

(A). Assumptions:

1. Natural gas heating value of 1,000 Btu/ft³ (Proposed by the applicant).
2. Natural gas F Factor of 8,710 dscf/MMBtu.

(B). Emission Factors:

The emission factor (EF_{NG}) for the combustion of natural gas for NOx, CO, and VOC emissions from the main burners will be based on the emission rates as proposed by the applicant. The EF for PM₁₀ when burning natural gas is based on the emission factors from AP-42 (5th Edition - 3/98), Table 1.4-2. The EF for SOx, when burning natural gas is based on mass balance with a maximum sulfur content of 1.0 gr-S/100 ft³

Emission Factors for Boiler	
Pollutant	EF_{NG}
NOx	9 ppmv @ 3% O ₂ (0.0108 lbs./MMBtu)
CO	50 ppmv @ 3% O ₂ (0.0369 lbs./MMBtu)
VOC	3 ppmv @ 3% O ₂ (0.00123 lbs./MMBtu)
PM ₁₀	0.0076 lbs./MMBtu
SOx	0.00285 lbs./MMBtu

(C). Potential To Emit (PE):

Natural Gas Combustion:

Main Burner Rating: 99.8 MMBtu/hr
Daily Operating Hours: 24 hr/day
F Factor for Natural Gas: 8,710 scf/MMBtu
Molecular Weight for NO_x: 46 lbs/lbs-mole
Molecular Weight for CO: 28 lbs/lbs-mole
Molecular Weight for VOC: 16 lbs/lbs-mole

PE = Burner Rating (MMBtu/hr) × 24 hrs/day × EF lbs./MMBtu

PE = Emission Concentration (ppmv) × Molecular Weight × 2.59×10^{-9} × F
Factor × Burner Rating (MMBtu/hr) × $[20.9/(20.9 - O_2\%)]$ × 24 hrs/day

PE Calculations for Boiler		
Pollutant	EF _{Main Burner}	PE _{Main Burner} (lbs./day)
PM ₁₀	0.0076 lbs./MMBtu	18.2
SO _x	0.00285 lbs./MMBtu	6.8
NO _x	9 ppmv @ 3% O ₂ (0.0108 lbs./MMBtu)	26.2
CO	50 ppmv @ 3% O ₂ (0.0369 lbs./MMBtu)	88.3
VOC	3 ppmv @ 3% O ₂ (0.00123 lbs./MMBtu)	3.0