Boiler Efficiency, Gaseous Fuels (ASME PTC 4)

11/10/2026

Project: boiler-efficiency-gas

Input Parameters

Methane (CH4)	95.000 %
Ethane (C2H6)	2.5000 %
Propane (C3H8)	0.20000 %
Butane (C4H10)	0 %
Pentane (C5H12)	0 %
Ethylene (C2H4)	0 %
Propylene (C3H6)	0 %
Benzene (C6H6)	0 %
Hydrogen (H2)	0 %
Carbon monoxide (CO)	0 %
Hydrogen sulphide (H2S)	0 %
Water vapour (H2O)	0 %
Carbon dioxide (CO2)	0.60000 %
Nitrogen (N2)	1.7000 %
Oxygen (O2)	0 %
Sulphur dioxide (SO2)	0 %
Excess air	10.000 %
Air humidity (kg water per kg dry air)	0.013000 kg/kg
Combustion air temperature entering the boiler	30.000 °C
Flue gas temperature leaving the boiler (after air heater)	120.00 °C
CO in dry flue gas	20.000 ppm
Surface radiation and convection loss	1.0000 %
Unaccounted loss / manufacturer's margin	0.50000 %

Calculated Results

Gross calorific value per Nm^3	39,686 kJ/Nm^3
Gross calorific value used	52,882 kJ/kg
Net calorific value	47,696 kJ/kg
Dry gas loss	3.0666 %
Water from hydrogen in fuel	10.526 %
Moisture in fuel	0 %

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Moisture in air	0.079287 %
Unburned CO	0.014168 %
Surface radiation and convection	1.00000 %
Unaccounted	0.50000 %
Total losses	15.186 %
Credit: entering dry air above 25 °C	0.17160 %
Credit: moisture in entering air	0.004140 %
Total credits	0.17574 %
Fuel efficiency, gross (HHV) basis	84.989 %
Efficiency, net (LHV) basis	94.230 %