Boiler Efficiency, Solid and Liquid Fuels (ASME PTC 4)

11/10/2026

Project: boiler-efficiency

Input Parameters

Carbon	45.000 %
Hydrogen	3.5000 %
Oxygen	5.0000 %
Nitrogen	1.0000 %
Sulphur	0.50000 %
Ash	35.000 %
Moisture	10.000 %
Gross calorific value, as fired (0 = estimate)	0 kJ/kg
Excess air	20.000 %
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)	140.00 °C
CO in dry flue gas	150.00 ppm
Unburned carbon in residue, per kg fuel	0.50000 %
Temperature at which ash leaves	25.000 °C
Surface radiation and convection loss	1.0000 %
Unaccounted loss / manufacturer's margin	0.50000 %

Calculated Results

Gross calorific value used	18,613 kJ/kg
Net calorific value	17,605 kJ/kg
Dry gas loss	4.7322 %
Water from hydrogen in fuel	4.4684 %
Moisture in fuel	1.4287 %
Moisture in air	0.11232 %
Unburned CO	0.13310 %
Unburned carbon in residue	0.90600 %
Sensible heat in residue	0 %
Surface radiation and convection	1.0000 %
Unaccounted	0.50000 %
Total losses	13.281 %

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Credit: entering dry air above 25 °C	0.20037 %
Credit: moisture in entering air	0.004835 %
Total credits	0.20521 %
Fuel efficiency, gross (HHV) basis	86.925 %
Efficiency, net (LHV) basis	91.901 %