

Boiler Operator License Exam

QUICK REFERENCE CHEAT SHEET | ASME / State Boiler Code

BOILER TYPES & CLASSIFICATION

Type	Design	Typical Use
Fire-tube boiler	Hot gases flow through tubes inside water shell	Low pressure; heating; small facilities
Water-tube boiler	Water in tubes; hot gases surround tubes	High pressure; large facilities; power plants
Cast iron sectional	Sections bolted together; water and fire tubes	Residential and light commercial heating
Electric boiler	Electric resistance or electrodes heat water	Clean; no flue; low to medium pressure
High pressure	Over 15 psi steam or 160 psi hot water	Requires licensed operator at all times
Low pressure	15 psi or less steam; 160 psi or less hot water	May not require licensed operator (state-specific)

BOILER CONTROLS & SAFETY DEVICES

Device	Function
Safety Valve	Opens automatically if pressure exceeds set point -- MOST critical safety device
Low Water Cutoff (LWCO)	Shuts burner if water level drops too low -- prevents boiler damage
Pressure Gauge	Indicates steam pressure -- test regularly
Water Column	Sight glass to observe water level in boiler drum
Burner Lockout Control	Shuts fuel supply if flame failure occurs
High-Limit Pressure Control	Secondary pressure cutout -- backup to operating control
Blowdown Valve	Removes sediment and maintains water quality

BOILER WATER CHEMISTRY

Parameter	Target Range	Purpose
pH	8.5-9.5	Prevent corrosion; slightly alkaline
Hardness	0 ppm (softened)	Prevent scale formation on heating surfaces
TDS (Total Dissolved Solids)	Per boiler manufacturer spec	Blowdown to maintain; high TDS causes carryover
Dissolved Oxygen	Near 0 ppm	Oxygen causes pitting corrosion; use deaerator or chemical
Conductivity	Varies by pressure	Indicator of TDS level; use to determine blowdown frequency

EXAM-DAY TIPS

- + Safety valve is the most important boiler safety device -- never tamper with or block.
- + Low water condition: NEVER add cold water to a hot dry boiler -- thermal shock risk.
- + Boiler efficiency: stack temperature below 350 F is optimal; excess air increases heat loss.
- + Log book: operators must maintain daily log of pressures, temperatures, and water tests.
- + License classes vary by state: typically HP (high pressure) and LP (low pressure) separate.
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