

NR-13 - Boilers Operation Safety Training - 40h

Duration	40 Hours
Target group	Boiler Operators.
Prerequisites	<ul style="list-style-type: none">- RG and CPF;- Passport (expatriate);- Proof of Grade School.
Objective	Qualify industrial workers to act as boiler operators.
Contents	<ul style="list-style-type: none">• Notions of applied physics;• Pressure;• Atmospheric pressure;• Gauge pressure and absolute pressure;• Internal pressure in boilers;• Pressure Units;• Heat transfer;• General notions: what is heat, what is temperature.• Modes of heat transfer;• Specific heat and sensible heat;• Heat transfer at constant temperature;• Thermodynamics;• Concepts Saturated steam and superheated steam;• Fluid Mechanics;• Fundamental Concepts;• Pressure in Flow;• Gas Flow;• Notions of applied chemistry;• Density;• Solubility;• Diffusion of gases and vapors;• Characterization of Acid and Base (Alkali) - Definition of pH;• Basic principles about Corrosion;• General considerations about boilers;• Types of boilers and their uses;• Flamotubular boilers;• Aquatubular boilers;• Electric boilers;• Solid fuel boilers;• Liquid fuel boilers;• Gas boilers;• Boiler accessories;• Boiler control instruments and devices;• Feeding device;• Level display;• Level control system;• Pressure indicators;• Safety devices;• Auxiliary devices;• Valves and piping;• Smoke draft;• Instrumented Safety System;

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- Boiler operation;
 - Boiler start and shutdown;
 - Regulation and control: of temperature; of pressure; of power supply; of the water level; of pollutants; and combustion.
 - Operation failure, causes and control measures.
 - Daily inspection guide;
 - Operation of a system of several boilers;
 - Procedures in emergency situations;
 - Boiler water treatment;
 - Water impurities and their consequences;
 - Feed water treatment;
 - Boiler water control;
 - Prevention against explosions and other risks;
 - General risks of accidents and health risks;
 - Explosion risk;
 - Study cases;
 - Legislation and standardization;
 - Regulatory Norm nº 13 (NR-13);
 - Boiler B Category;
 - Topics of inspection and maintenance of equipment and records.

Total Contact Time: Theory: 40h

Technical Reference: NR-13.

Exam

Multiple choice exam with minimum passing grade of 60%.

Validity: N/A