



POWER PLANT FUNDAMENTALS BASIC POWER PLANT THEORY

Power Plant Basics	Plant Theory	Plant Auxiliaries	Plant Systems	Basic Electricity
Plant Controls	Basic Water Chemistry and Treatment	Fuels and Combustion	Boilers	Turbines
Environmental Protection	Instrumentation and Control	Power Generation	Electrical Systems and Equipment	Plant Protection

801 - Power Plant Basics

- Knowledge of the function of the Power Plant.
- Knowledge of Boilers.
- Knowledge of Turbine Fundamentals.
- Knowledge of overall Plant Operation

802 - Plant Theory

- Knowledge of Energy Conversion.
- Knowledge of Properties and Fluid Flow.
- Knowledge of Pressure.
- Knowledge of Temperature and Heat.
- Demonstrate basic knowledge of thermodynamics and Unit energy conversion processes.
- Knowledge of Water/Steam Properties.
- Knowledge of Applications.
- Knowledge of Steam Tables.
- Knowledge of Plant Performance.

803 - Plant Auxiliaries

- Knowledge of Fluid Flow, Piping and Piping Auxiliaries.
- Knowledge of Pumps and Drives.
- Knowledge of Compressors and Fans.
- Knowledge of Heat Exchangers and Operation of Plant Auxiliaries.

804 - Plant Systems

- Ability to Read System Diagrams.
- Knowledge of Steam Systems.
- Knowledge of Condenser, Circulating Water and Fire Protection Systems.
- Knowledge of Condensate and Feedwater Systems.
- Demonstrate basic knowledge of the condensate, feedwater, boiler water, steam cycle and turbine/generator operation

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805 - Basic Electricity

- Knowledge of the Fundamentals of Electricity 1. e.g.: ohm's law, how voltage can be produced.
- Knowledge of the Fundamentals of Electricity 2. eg. Voltage distribution in series, parallel and series-parallel circuits.
- Knowledge of Batteries, Generators and Motors.
- Knowledge of Transformers and Control Mechanisms.

806 - Plant Controls

- Knowledge of the Control Process
- Knowledge of Pressure and Flow Measurement.
- Knowledge of Level and Temperature Measurement.
- Demonstrate the ability to understand Instrumentation on P&IDs.

807 - Basic Water Chemistry and Treatment

- Knowledge of Chemistry Concepts.
- Knowledge of Water Chemistry Fundamentals.
- Knowledge of Water Treatment Fundamentals.
- Knowledge of Water Treatment Applications.
- Knowledge of Boiler Water Treatment.
- Knowledge of LP Service Water Treatment.
- Knowledge of Ion Exchange.
- Knowledge of Cooling Water Treatment.

808- Fuels and Combustion

- Knowledge of Fuels and Combustion Characteristics.
- Knowledge of Coal Handling Equipment.
- Knowledge of Oil and Gas Handling Equipment.
- Knowledge of Ash Handling Equipment.

809 - Boilers

- Knowledge of Boiler Fundamentals.
- Knowledge of Boiler Startup and Shutdown Procedures.
- Knowledge of Normal Operation and Boiler Efficiency.
- Knowledge of Abnormal Conditions and Emergency Procedures pertaining to the Boiler.

810 - Turbines

- Knowledge of Turbine Construction and Principles of Operation.
- Knowledge of Turbine Valves and Support Systems.
- Knowledge of Turbine Control, Instrumentation and Protection Systems.
- Knowledge of Turbine Operation.
- Demonstrate basic knowledge of the steam cycle and turbine operation.

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811 - Environmental Protection

- Knowledge of the Environment.
- Knowledge of Water Pollution.
- Knowledge of Air: Particulates.
- Knowledge of Air: Gas.

812 - Instrumentation and Control

- Knowledge of Pressure and Flow Measurement.
- Knowledge of Level and Temperature Measurement.
- Demonstrate the ability to understand Instrumentation on P&IDs.
- Knowledge of the Control Process
- Knowledge of Sensing, Measuring and Controlling Elements.
- Knowledge of Controllers and Final Control Elements.
- Knowledge of Types of Control.
- Knowledge of Drum Level and Combustion Control.

813 - Power Generation

- Knowledge of Generator Principles.
- Knowledge of AC Power.
- Knowledge of Generator Auxiliary Systems.
- Knowledge of Generator Operation.
- Demonstrate basic knowledge of generator operation.

814 - Electrical Systems and Equipment

- Knowledge of Three-Phase Power.
- Ability to Read Electrical Diagrams.
- Knowledge of Unit Transformers, Switchyards and Substations.
- Knowledge of Station Service System.

815 - Plant Protection

- Knowledge of Fundamentals of Plant Protection Knowledge of Electrical Protection
- Knowledge of Boiler and Turbine Protection.
- Knowledge of Logic diagrams- Integrated Plant Protection.

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