

TD - 020

# Steam Power Plant Simulator

## Overview

The steam power plant trainer tends to demonstrate the process of generating steam in industrial section in a smaller scale. The trainer also demonstrates the conversion of thermal energy to mechanical energy.



## Specifications

- The steam plant mainly consists of heat source, turbine and cooling system
- The steam boiler produces wet steam then it passes to the superheated to produce superheated steam.
- Rapid steam generation is possible due to the short heat up time of the boiler.
- The speed and torque are the parameters affecting the output of the turbine.
- Downstream of the turbine, the steam is condensed and returned to the boiler.
- Complete water treatment system is added to the feed water circuit, which consists of ion exchanger and chemical dosing.
- Temperature, pressure, speed and flow rate are measured in different places inside the boiler and displayed on the screen.
- A schematic process diagram is included in the trainer in addition to the control panel.

## Experiments

- Recognize the steam plant components and how it works.
- Steam-water circuit.
- Determine the boiler efficiency, mechanical and thermal efficiency of the turbine, condenser efficiency and specific fuel consumption of the plant.

## Components



1	superheater
2	Boiler
3	Condenser
4	Condensate pump
5	Turbine
6	Displays and controls
7	Feed water tank

## Technical data

### • Steam generator

- » Steam output: 200Kg/h at 11 bar
- » Max fuel consumption: 12L/h
- » Heat-up time: 8 min
- » Max pressure: 13 bar

### Superheater

- » Power: 7KW

### Single stage axial turbine with Curtis wheel and hydraulic speed regulator

- » Power max: 1.5KW at 3000 min-1

### Water-cooled condenser

- » Cooling capacity: 98KW
- » Transfer surface: 2.5m<sup>2</sup>

### Measuring Ranges

- » Temperature: 9x 0 - 4000c, 2x 0 - 1000c
- » Flow rate: 0 - 167L/min (cooling water)
- » Pressure: 3x 0 - 16bar, 1x ±1bar
- » Torque: 0 - 20Nm
- » Speed: 0 - 4000min-1

### Electrical supply

- » 220V, 50Hz, 3 phases

## Accessories

- User manual in Arabic or English

## Options

- Cooling tower trainer
- Determination of the vapour content trainer