

Steam turbine unit 1kW



DESCRIPTION

- The steam turbine unit include steam boiler, utility group, and alternator turbine unity of electricity production.
- The unit is delivered complete with technical and educational manual.
- It is designed and manufactured to industrial standards.
- Complete safe material, control and measurement.
- This unit can be used at different levels and for different courses.

SUGGESTED LESSONS

Functioning of an electricity production unit

- Steam boiler
- Steam turbine
- Alternator
- Efficiency

Measuring devices on different circuits

- Temperature
- Level
- Pressure
- Flow

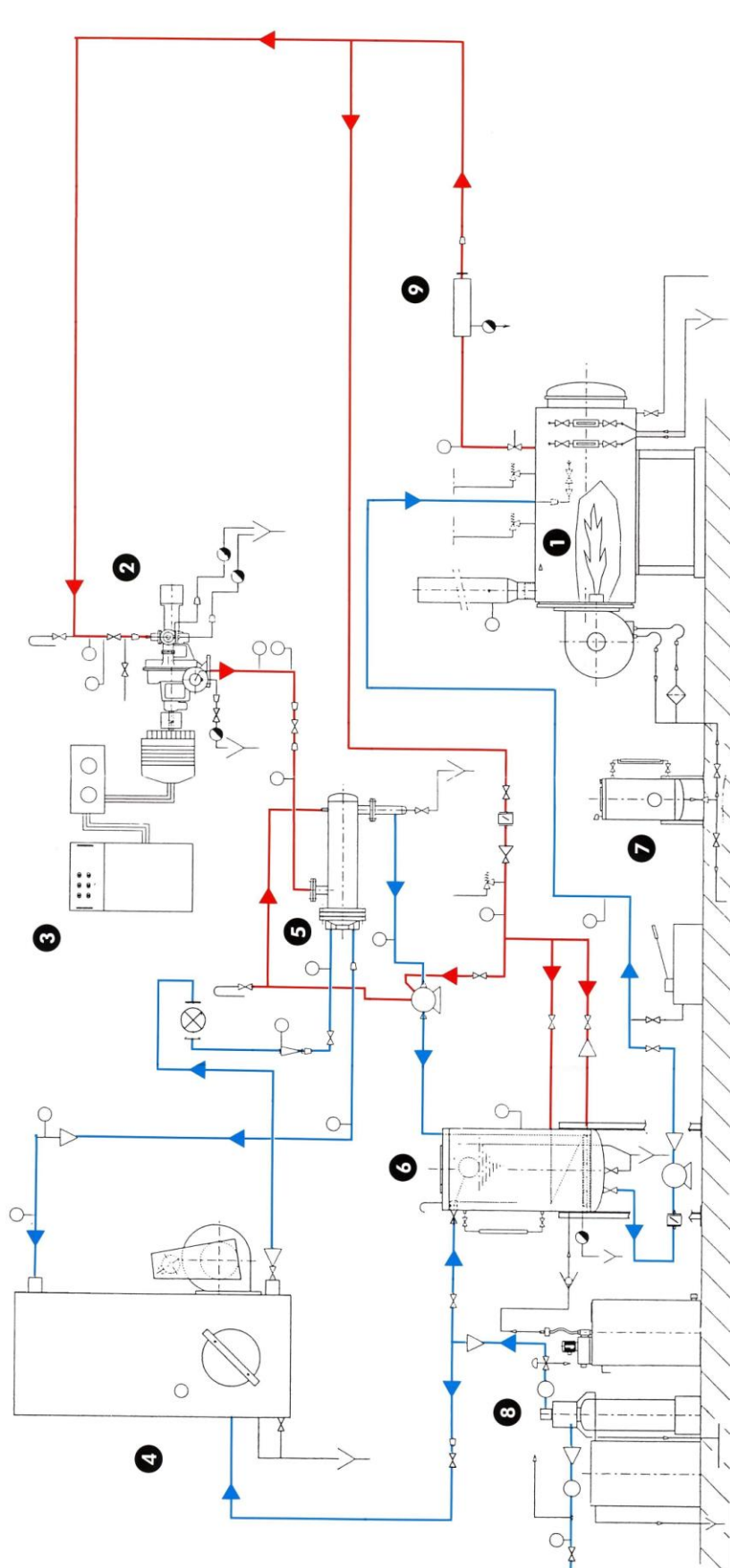
Efficiency calculation

- Steam boiler
- Superheater
- Steam turbine
- Steam condenser
- Cooling tower

Study and analyse on water treatment system

TVT 1kW

SYNOPTIC DIAGRAM



TECHNICAL DESCRIPTION

1. Steam boiler 81 000kcal/h

Permanent presence boiler with safety (level control, security pressure control, valve...)

Electric cabinet with alarms

Maximum temperature 192°C

Steam production 135Kg/h

Maximum pressure 12 bars

Burner fuel (possibility natural gas)

2. Steam turbine

Steam turbine 1kW

Turn speed : 3600rpm

Pressure supplying : 12 bars

Mechanic regulation of overspeed

Shut valve

3. Alternator

Mechanic connecting to the turbine

Production : 1000W-50hz à 3600rpm

Production control thanks to potentiometer

Dissipation of energy on electric

4. Cooling turn

Open tower with forced

Power : 130KW

Open air circuit with flow 1.2m³/s

Direct current water circuit with flow 12 m³/h

5. Steam condenser

Tubular exchanger (water in tubes)

Exchange surface 1.4m²

Condensates are pumped back to the water tank

6. Water tank

Volume : 250L

Material : stainless steel

Control : level, temperature

Heating by steam with injector

Feeding pump for the boiler

7. Fuel tank

Volume : 250L

Material : stainless steel

Control : level, temperature

Retention tank under the fuel tank

8. Water treatment

Automatic softener with regeneration of resin

Salt tank 100L

Water treatment by addition of specific product thanks to dosing pump

9. Electrical superheater

Power : 8kW

Steam flow 135 Kg/h

Steam temperature (inlet) : 192°C

Steam temperature (outlet) : 240°C

Digital regulation of temperature (PID)

INSTRUMENTATION

- Steam flow in kg/h with vortex flowmeter for steam
 - o Scale : 0-200 kg/h of steam

- Cooling water flow on the condenser with flowmeter
 - o Scale : 0-10 m³/h
 - o Precision : ± 3 % full scale

- Temperatures : 9 thermometers with needle
 - Precision 1%
 - o condenser water inlet
 - o condenser water outlet
 - o steam boiler outlet
 - o steam superheater outlet
 - o steam turbine inlet
 - o steam turbine outlet
 - o condensate
 - o water tank
 - o Fuel temperature in the tank
 - o

- Pressure : 7 manometers with needle
 - Precision : 1 %
 - o Steam boiler outlet
 - o Steam turbine inlet
 - o Steam turbine outlet
 - o Steam utility circuit
 - o Water feeding
 - o Steam condenser inlet
 - o Steam condenser outlet

- Speed of the turbine with digital indicator
 - Scale : 0-4000 rpm
 - Precision : 0,1%

- Electric power with digital indicator
 - Scale : 0-1000 Watts
 - Precision : 0,5 %

TVT 1kW

DETAILED PICTURES



Steam boiler



Utility group



Cooling tower



Turbine with condenser



Superheater



Turbine and alternator

TVT 1kW

UTILITIES :

Supplying :

- Electricity : 400V 3phases + N + T – 3kW
- Water : network supplying

Drains :

- Boiler's smoke diam 139mm
- Liquid waste
- Pipe for discharge valves

INSTALLATION VOLUME :

Boiler :

- Length : 2 000mm
- Width : 1 200mm
- Height : 2 000mm

Turbine :

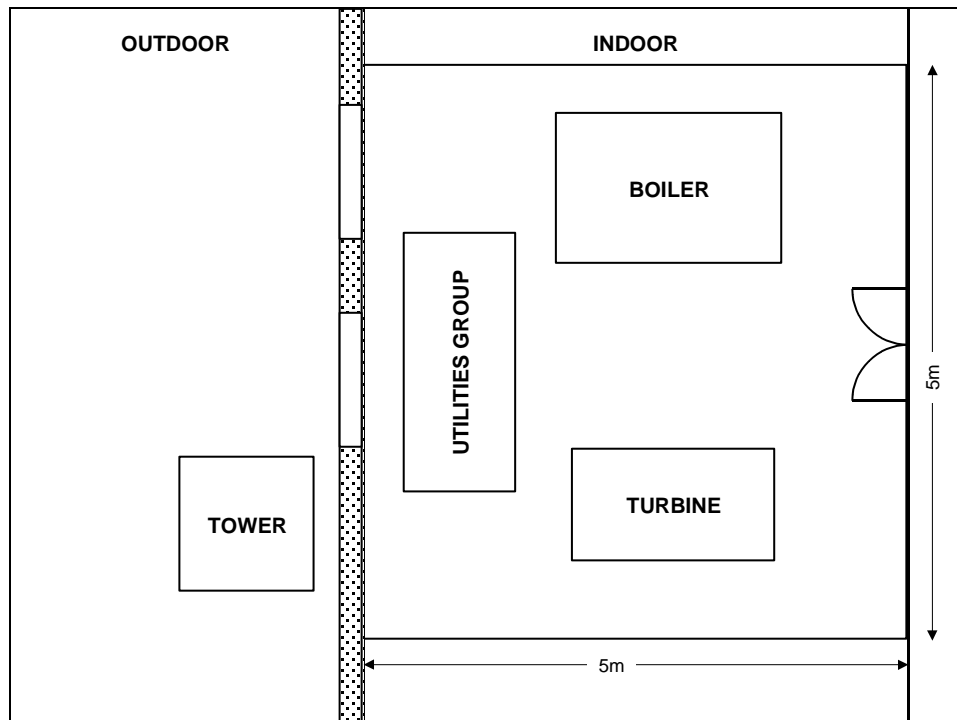
- Length : 1 800mm
- Width : 1 000mm
- Height : 2 000mm

Utility group :

- Length : 2 300mm
- Width : 1 000mm
- Height : 2 000mm

Cooling turn :

- Length : 1 200mm
- Width : 1 200mm
- Height : 2 200mm



Example of implantation