

OPERATING PRINCIPLE OF A PELTON TURBINE



Experimental capabilities

- Identification of the components of a hydraulic system of Pelton turbine
- Measures of all the physical parameters of the turbine: water pressure, water flow rate, rotational speed, torque generated
- Drawing of characteristic curves of the turbine: efficiency curve according to the rotational speed, torque in relation of the speed of rotation ...
- Comparison of the performance based on the supply pressure
- Comparison of the performance based on the opening of the supply nozzle
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Operating principle

The TVP010 bench allows the study of a hydraulic Pelton turbine

The user will adjust the supply of the various turbine parameters (pressure, flow rate and nozzle opening). It will then use the band brake in order to create a load on the turbine shaft. The goal is to vary the speed and to be able to meet the diverse settings according to it.

The system is designed to allow the user to visualize the impact of the water on the blades of the turbine and to see the shape of the jet depending on the load on the shaft. Torque measurement using a digital dynamometer and masses of known weight.

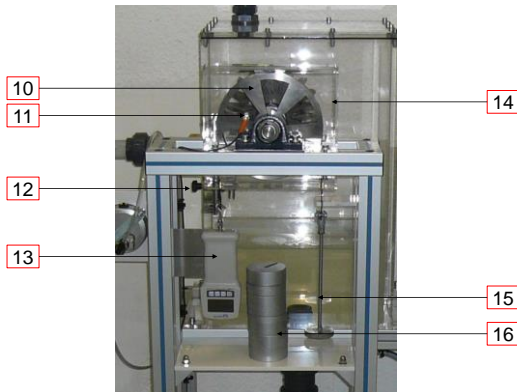
Students will have to make a calculation of mechanical conversion to obtain the torque.

The robust design of this device makes it suitable for use in schools.

Anodized aluminum structure on wheels gives it a very robust as well as a flexible integration into your premises.

The manufacturing of this equipment meets European Machine Directive

Illustrations



Technical details

1. Pelton turbine in stainless steel 200mm diameter with 20 blades
2. Water injection nozzle diameter 11 mm. Contains a needle that ensures the spray pattern and can adjust its diameter
3. Electrical box including the protections (circuit breakers ..), a supply disconnector, the power button of the pump, the water flow rate indicator and the indicator rotational speed of the pump
4. Transparent water tank. Useful water volume: 20L
5. Drain valve of the tank
6. Pressure manometer. Scale: 0-4 bars. Measuring the inlet pressure of the nozzle
7. Control valve of water flow rate. Multi-turn membrane valve
8. Turbine flowmeter. Scale: 4 to 160L / min. NPN signal transmitted towards the indicator on the box
9. Pump water circulation. Stainless steel pump. Max pressure: 4.5bars. Max flow rate: 100L/min
10. Flywheel in steel with brake band
11. Rotational speed sensor inductive type. NPN signal transmitted towards the indicator on the box
12. Knurl of quick stop of the turbine (deviation of the jet)
13. Electronic dynamometer
14. Protective cover of the flywheel (transparent)
15. Support of the masses
16. Set of masses of known weight for braking the turbine (5x 1kg, 2x 500grs, 5x 100grs, 2x 50grs)

Services required

- Electrical supply: 230 VAC - 50 Hz - 10 A
- Power supply Type : 1 Phase + Neutral + Earth
- Water supply : filling tank
- Water capacity : 20 L
- Dimensions: (LxWxH mm): 1450 x 500 x 1400
- weight (Kg): 120

Documentation

- User's manual
- Pedagogical manual
- Technical documentation of the components
- Lab exercises
- Configuration files (PLC, controller)
- Software :
- Certificate of conformity CE

Note : if the equipment installation is operated by our staff, all supplies and exhaust connections required must stand at less than 2m from the machine