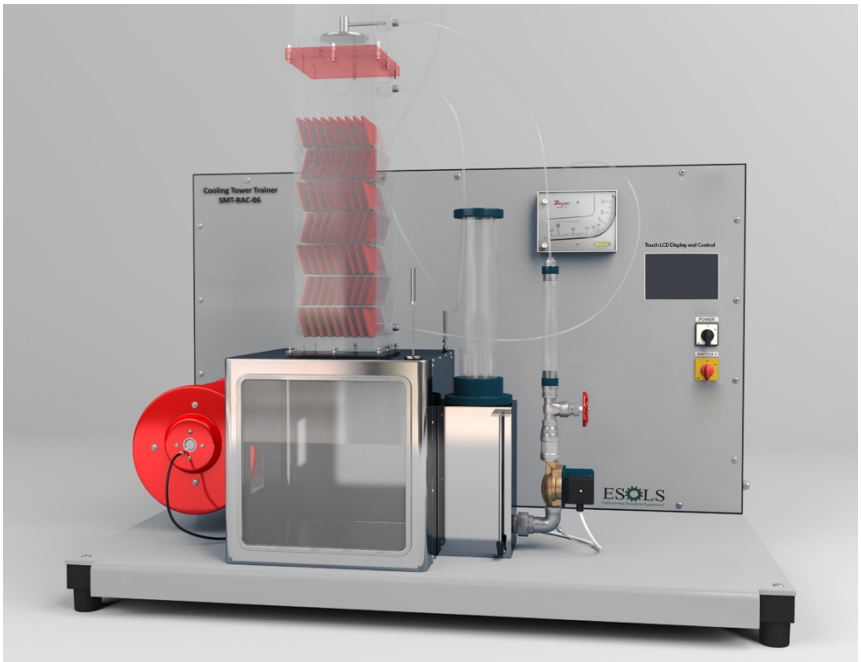
Water cooling Demonstration Unit (SMT-RAC-06)

ESOLS Water cooling Tower Demonstration Unit is stand-alone unit used to study the closed-circuit cooling and heat dissipation. In water cooling towers the water to be cooled is sprayed over a wet deck surface. Water and air come into direct contact in the counter-flow. The water is cooled by convection. Some of the water evaporates and the evaporation heat removed further cools down the water. In this Unit Water is heated in a tank and transported by a pump to an atomiser. The atomiser sprays the water to be cooled over the wet deck surface. The water trickles from the top to the bottom along the wet deck surface whilst air flows from the bottom to the top. The heat is transferred directly from the water to the air by convection and evaporation. The evaporated water volume is recorded. The air flow is generated by a fan and adjusted using a throttle valve. The cooling column is transparent allowing clear observation of the wet deck surface and the trickling water.

The unit has Touch LCD display for visualization of process and the measurements. The Unit is also connected to Software for computer connectivity and data analysis. The Touch screen and computer software is included in the package.



TECHNICAL SPECIFICATIONS

Specifications:

- Touch LCD with GUI Interface for better monitoring and accurate measurement of Plant variables.
- Measures evaporated water loss for a complete understanding of the cooling process
- Three optional interchangeable columns containing different packing densities and arrangements
- One optional interchangeable column with no packing to demonstrate free-fall cooling
- All columns have clear sides for a full view of the heat transfer process
- Variable water and air flow controls to maximise heat transfer experiments
- ESOLS DAQ Software for monitoring and control.

Technical Data:

- Cooling column
  - specific surface of the wet deck surface: 100m2/m3
  - cross-section: 160x160mm
- Volumetric air flow measurement via orifice: Ø 80mm
- Heater, adjustable in three stages:
  - 500W
  - 1000W
  - 1500W
- Thermostat: switches off at 50°C
- Fan
  - power consumption: 250W
- Pump
  - max. head: 40m
  - max. flow rate: 100L/h
  - Tank for additional water: 4.2L
- Measuring ranges
  - differential pressure: 0 to 1000Pa (air)
  - flow rate: 12 to 360L/h (water)
  - temperature: 2x 0 to 50°C, 3x 0 to 100°C
  - rel. humidity: 10 to 100%
- 230V, 50Hz, 1 phase
  230V, 60Hz, 1 phase; 230V, 60Hz, 3 phases
- Touch LCD with GUI Interface for better monitoring and accurate measurement of Plant variables.
- ESOLS DAQ Software for monitoring and control.
  - Graphical visualization.
  - Security mechanism for login.
  - USB Connected
  - Compatible with Windows 7,8.1,10.
- Digital Instrumentation
- Capability to modify according to end user.
- Can be used in Research Purposes.

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Experiments:

- Thermodynamic principles of the wet cooling tower
- Recording the vapour pressure curve of water.
- Presentation of the relationship between pressure and temperature in a closed system.
- Air flow rate on the performance of a cooling tower
- Water flow rate on the performance of a cooling tower
- Water temperature on the performance of a cooling tower
- Cooling load on the performance of a cooling tower
- Packing density on the performance of a cooling tower
- Packing height on the performance of a cooling tower
- Operation at constant power (constant cooling load)
- Operation at constant water temperature
- Energy and mass balance across the air and water streams

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