

# BOILING POINT HEAT TRANSFER COMPUTERIZED UNIT

## Mod. BPHTC/EV

### INTRODUCTION

This unit is designed to display the various types of boiling at variation of the intensity of the heat flow. More precisely, it allows to reproduce the nucleate and the film boiling and to plot the so-called "pool boiling" which is the basis of the design of the systems with the steam boiler. The experiment is performed with environmental-friendly, special low boiling point liquid.

A transparent vessel allows to observe the evaporation process at the heated cylinder. The cylinder operates as a fire tube heated from inside. An integrated water-cooled condenser allows for a continuous boiling process. The special liquid used evaporates at low temperatures.

A PC data acquisition and analysis system allows to acquire automatically the measurements, to display the curves on the screen and to save the experimental data for further analysis.

### TRAINING PROGRAM

- Different forms of evaporation (nucleate, film boiling)
- Determination of the heat transfer coefficient and specific thermal flux
- Effect of temperature and pressure on the evaporation process
- Plotting of the characteristic curves of the main operating parameters
- Determination of the cooling capacity provided by the water inside the container
- Determination of the mass of fluid inside the transparent container

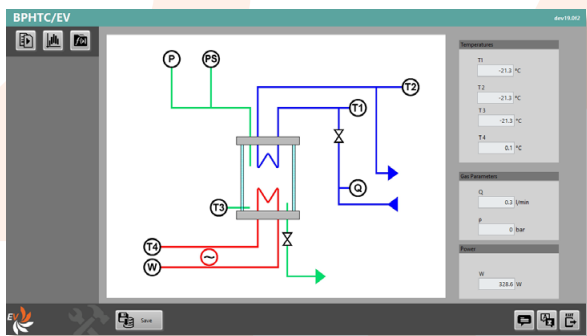


### TECHNICAL SPECIFICATIONS

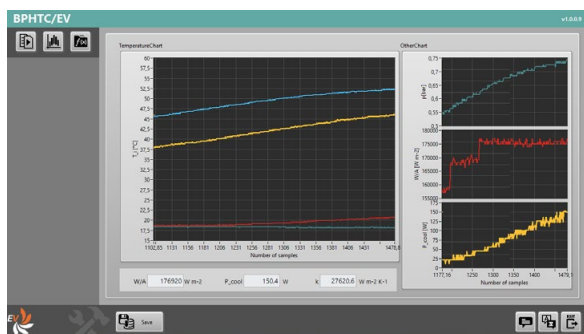
- Bench top unit
- Heating element 300 W at 230 Vac
- Adjustable heating power via knob (potentiometer)
- Cooler: coil type, made of copper
- Transparent process tank, approx. 3 liters capacity
- Copper piping
- Environmental-friendly evaporation liquid
- Safety valve, adjustable from 1 bar to 4 bar
- Adjustable pressure switch for additional protection of heating circuit
- 6 digital displays to monitor:
  - Gas pressure
  - Water flow rate
  - Heat temperature
  - Gas temperature
  - Water inlet temperature
  - Water outlet temperature
- Microprocessor-based Digital multimeter for Electrical Parameters (Voltage, Current, Active Power)
- Main switch and fuses
- Heater switch and heater lamp
- Run button
- Emergency push button
- USB interface to the PC

## DATA ACQUISITION

- The trainer is equipped with a data acquisition form with USB interface for pc connection
- The software (based on NI LabVIEW) allows the user to:
  - Monitor the operating parameters



- Visualize the real-time trends of the main parameters of interest



- Visualize acquired data graphically:
  - . Pressure as a function of the evaporating liquid temperature
  - . Heat transfer coefficient and heater specific thermal flux in function of the temperature difference between the surface of the heater and the evaporating fluid
- Save data in tabular format for future analysis

**Power supply:** 230 Vac 50 Hz single-phase  
(Other voltage and frequency on request)

**Dimensions:** 92 x 52 x 90 cm

**Net weight:** 36 kg

### REQUIRED

**PERSONAL COMPUTER**  
- NOT INCLUDED -



### UTILITIES (PROVIDED BY THE CUSTOMER)

- Water supply: from mains (150 l/h max)

### SUPPLIED WITH

**EXPERIMENTAL HANDBOOK**

