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PU Monitor (Pasteurization Monitor) Type PMKL

Application:

The pasteurization monitor, also called a PU Monitor, is designed for recording temperature curves and measuring the pasteurization effect during the pasteurization of beer and soft drinks in tunnel or immersion pasteurizers. The device can also be used as a recorder of any other temperatures, for example during mashing, primary fermentation, secondary fermentation, ambient temperatures in storage areas, etc.

A bit of theory:

Increasing the biological shelf life of beer and beverages bottled in glass or cans can be ensured by pasteurization in tunnel or immersion pasteurizers. The kinetic dependencies of the thermal destruction of microorganisms during beer pasteurization were developed by Benjamin and Del Vecchio, who, based on theoretical and experimental findings, defined the so-called pasteurization unit (PU) for the quantitative expression of the pasteurization effect and determined a functional relationship for calculating pasteurization units during the pasteurization process. This functional relationship is used for measuring the pasteurization effect in beer and soft drink pasteurization by PU monitors.

Technical Description:

The device consists of two temperature probes and a measuring data logger. One temperature probe measures the temperature of the beverage inside the bottle or can, and the second temperature probe monitors the temperature of the shower water in the tunnel pasteurizer that heats the bottles. The measuring data logger is placed inside a waterproof housing. The length of the temperature probe is chosen so that the measuring point lies approximately 10–30 mm above the bottom of the bottle or can, which is the area that heats up the slowest.

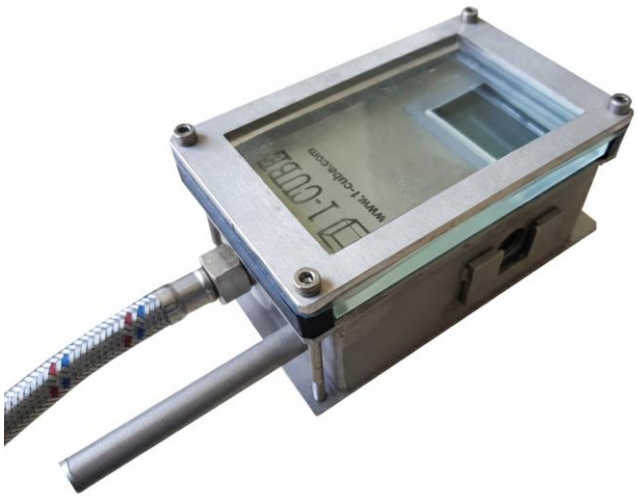
A bottle containing the beverage is placed in the PU Monitor holder, and the temperature sensor is inserted into the bottle. Temperature measurement is started by placing a magnet near the pasteurization monitor. The pasteurization monitor is equipped with internal memory in which the measured temperatures are periodically stored. The PU Monitor is then allowed to pass through the pasteurization tunnel.

After the pasteurization monitor exits the pasteurization tunnel, the measurement is terminated by again placing the magnet near the pasteurization monitor. After the measurement is finished, the recorded temperatures are transferred from the internal memory of the pasteurization monitor to a PC using a USB connection cable, where the measured values are processed and evaluated using the supplied analysis software.

The pasteurization monitor is powered by a 3.6 V AA-type lithium battery with a service life of 3 years, which can be easily replaced with a new one once discharged.

The evaluation software provides the following features:

- Operates under the operating systems Windows 11, Windows 10, Windows 8, Windows 7
- Transfer of measured temperatures from the pasteurization monitor to a PC
- Graphical display of temperature curves and pasteurization curves
- Graphical display of the curve of assigned lethal rates of biological microorganism inactivation
- Calculation of total pasteurization units
- Calculation of instantaneous values of total lethal effect
- Calculation of instantaneous values of total relative reduction in microorganism count
- Calculation of the reference proportion of sensory damage to beer caused by pasteurization
- Tabular listing of measured values
- Printing of temperature curves, pasteurization curves, and tabular values on a printer
- Archiving of measured data on a PC
- Reloading of archived data from the PC and displaying it on the computer screen, or printing it out as needed



A special version of the pasteurization monitor is available for temperatures up to 85 °C. If you require this version, it must be specified in the order.

Technical Data:

Parameter	Range
Pasteurization units range	0 až 1000 PU
Temperature range	Standard: up to 70 °C, special version up to 85 °C (must be specified in the order)
PU calculation	1 PU/min at 60 °C
z (for foreign yeast culture)	6,94 ^{0}C
Temperature measurement accuracy	0,1 ^{0}C
Total pasteurization unit accuracy	0,5 PU
Temperature measurement period	Default value is 10 s, can be adjusted
Weight, dimensions	5,5 kg 50x15x32 cm (height)

Scope of Delivery:

- PU Monitor type PMKL with one temperature sensor for the bottle and one for shower water temperature
- Bottle holder
- Start/Stop magnet
- PC software + USB communication cable to PC

Accessories (not included in delivery – available upon customer request):

- Adapter for cans
- Additional temperature sensors for bottles or cans

Main Advantages:

- No need to recharge the battery in the PU Monitor.
- High accuracy and calibration capability — ideal for laboratories with an established ISO 9001/9002 quality system.
- Long-term experience: We have been manufacturing pasteurization monitors for more than 25 years, during which we have produced over 300 units. Our PU Monitors are used, for example, in breweries such as Heineken, Asahi, and Budweiser Budvar.

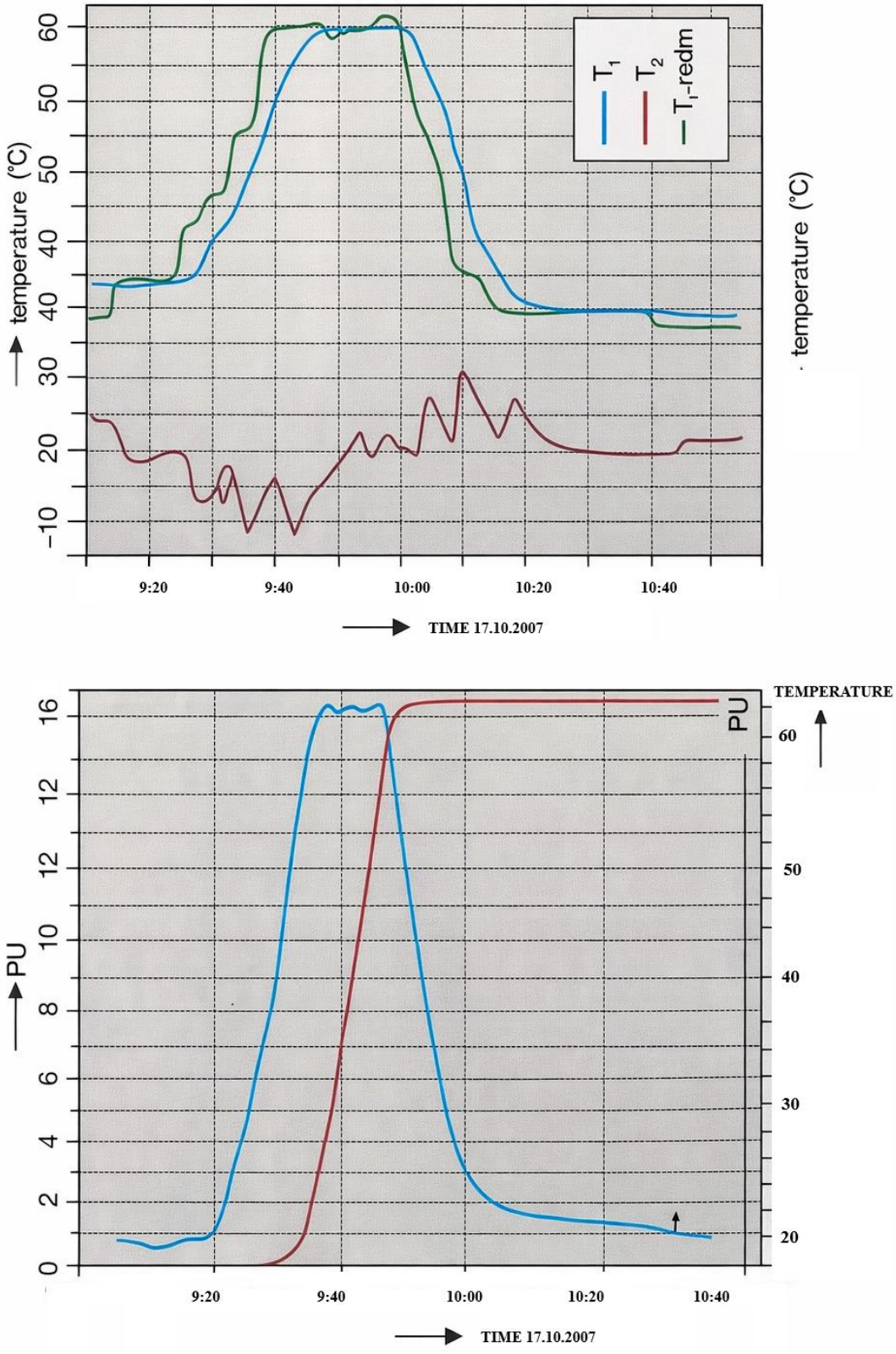
Frequently Asked Questions (FAQ):

Can the PU Monitor be used for both bottles and cans?
Yes, it can. For cans, an additional adapter is required, which is placed onto the sensor.

Does the PU Monitor need to have its battery recharged?
No. The PU Monitor uses a 3.6 V battery with a minimum service life of 3 years, and once discharged it can be easily replaced.

What information must be provided to the manufacturer when ordering?
Since the bottom of the temperature sensor should be positioned 10–30 mm above the bottom of the bottle (the coldest point), bottle drawings must be provided. Based on these drawings, the lengths of the temperature sensors will be manufactured. It is also necessary to specify whether the PU Monitor will be used for a maximum temperature of 70 °C (beer only) or 85 °C (for beer and soft drinks).

Is it possible to calibrate the PU Monitor?
Yes, the pasteurization monitor can be calibrated, including issuance of a calibration certificate. This is ideal for laboratories with an established ISO 9001/9002 quality system.



Example of temperature curves and the PU unit integration curve.
Upper graph — Temperature profile in the tunnel pasteurizer (T2) and in the bottle (T1)
Lower graph — Temperature in the bottle (T1) and cumulative pasteurization dose function (PU)