

Case Study

JULABO F33-MA

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Cooling Rate Determination of a JULABO F33-MA Refrigerated Circulator

Objective

Performance test of a JULABO F33-MA refrigerated circulator.
In addition a horizontal uniformity measurement was conducted in the bath.

Test Details

A cooling process from +50 °C to -10 °C was performed to determine the cooling performance.
To conduct the uniformity measurement two identical temperature sensors were placed at the same depth in the center of the bath in order to record the temperature difference between the two sensors. In addition a uniformity comparison was conducted between one sensor in the middle and one in each corner of the bath.
The measurement results were recorded on a notebook using the EasyTemp software.

Test Conditions

Equipment	F33-MA
Mains Voltage	230 Volt / 50 Hz
Ambient temperature	20-22 °C (room temperature)
Bath fluid	Silicon-Oil „Thermal HY“
Specific Settings	Temperature control via JULABO EasyTemp Software



RESULT

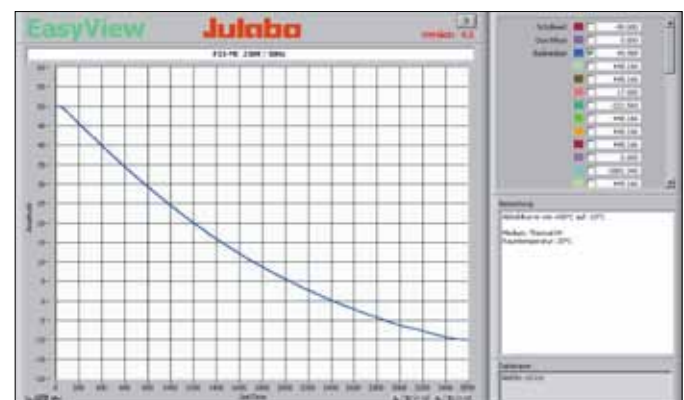
The test result shows that the cooling process was completed within 58 minutes.
The uniformity in comparison to the sensor in the middle of the bath is +0.09K (maximum).

Test Results

TEST	TEMPERATURE RANGE	TIME
Test 1	Cool-down +50 °C ... -10 °C	58 Min.

Test 1

Cool-down from +50°C to -10°C in 58 minutes.



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Test 2

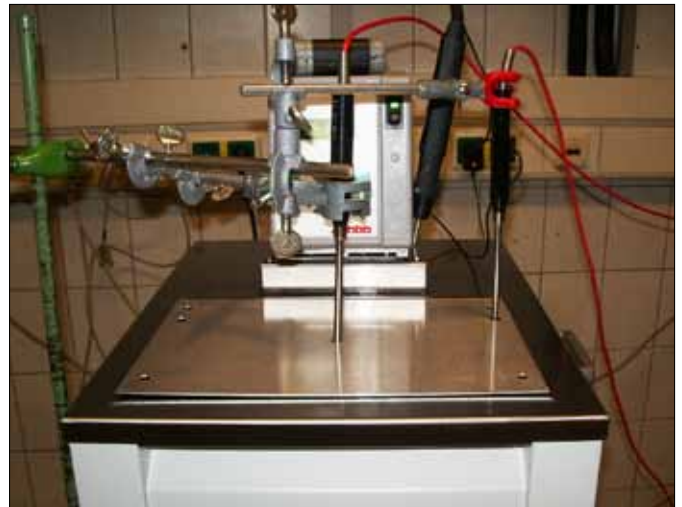
Horizontal uniformity measurement.

Measurement setup and calibration of the two sensors.



The measurements were taken in all 4 corners of the bath. The deviations of the temperatures in the corners were stated in relation to the sensor in the middle of the bath. Both sensors had the same immersion depth during the measurement.

Sensor position	Deviation
Back left	-0,02k
Front left	+0,08k
Back right	+0,08k
Back front	+0,09k



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