

# CERTIFICADO DE CALIBRACIÓN / CALIBRATION CERTIFICATE

INNOVATECIS CIA LTDA

General José María Guerrero N69-170 y Alfonso del Hierro

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Certificado No. (Certificate #): 62207

Fecha de Recepción (Reception Date): 2025-10-13

Fecha de Calibración (Calibration Date): 2025-10-17

Próxima Fecha de Calibración (Calibration Due):

Fecha de Emisión (Emission Date): 2025-10-17

**Cliente (Client):** SEROIL INSTRUMENTS CIA. LTDA.  
FRANCISCO DE ORELLANA / KM 6 VIA A LAGO SN, PUERTO FRANCISCO DE ORELLANA (COCA), ORELLANA (SEDE PRIN

## Información del Instrumento (Instrument Information)

|                             |                 |                            |                |                                |                  |
|-----------------------------|-----------------|----------------------------|----------------|--------------------------------|------------------|
| <b>Equipo (Instrument):</b> | Microbaño       | <b>Int. de Medición:</b>   | (-20 a 200) °C | <b>Ubicación:</b>              | *****            |
| <b>Marca (Brand):</b>       | WIKA            | <b>(Measurement Range)</b> |                | <b>(Location):</b>             |                  |
| <b>Modelo (Model):</b>      | CTD9100-COOL    | <b>División de escala:</b> | 0.1 °C         | <b>Lugar de Calibración:</b>   | Lab. INNOVATEC   |
|                             | 1708152 /       | <b>(Resolution)</b>        |                | <b>(Place of Calibration):</b> | INNOVATEC's Lab. |
| <b>Serie/Código:</b>        | LAB-TEM-PAT-021 |                            |                |                                |                  |

## Datos de Calibración (Calibration Info)

**Procedimiento (Procedure):** INN-PC-29

## Condiciones Ambientales (Environmental Conditions)

**Temp. Inicial (Initial Temp.):** 21.5 °C

**Hum. Inicial (Initial Hum.):** 54.6 %HR

**Temp. Final (Final Temp.):** 22.3 °C

**Hum. Final (Final Hum.):** 55.1 %HR

## Trazabilidad (Traceability Info)

| Patrón (Standard)   | Marca (Brand) | Cert. #       | Última Calibración (Last Cal.) | Periodo (Period) |
|---------------------|---------------|---------------|--------------------------------|------------------|
| PRT                 | ISOTECH       | AC-31859      | 2025-06-30                     | 2                |
| Advanced Multimeter | Transmille    | 51065         | 2024-03-26                     | 2                |
| Termocupla          | -             | 51731 / 51732 | 2024-11-26                     | 1                |
| -                   | -             | -             | -                              | -                |
| -                   | -             | -             | -                              | -                |
| -                   | -             | -             | -                              | -                |

## Resultados (Results)

Ver Resultados en Hoja Adjunta

See results in attached Sheet

El presente Certificado de Calibración posee la trazabilidad en esta magnitud hacia el Patrón Nacional, a través de la realización de la unidad de medida en el NPL, NIST, u otro Laboratorio Nacional reconocido al Sistema Internacional de Medidas. La calibración fue realizada bajo un Sistema de Gestión de Laboratorio conforme a la Norma ISO/IEC 17025:2017. Los resultados y su incertidumbre reportada con un nivel de confianza de k=2, 95% son relacionados a este instrumento y en el tiempo que se realizó las medidas. Este Laboratorio no se responsabiliza de los perjuicios que pueda ocasionar el uso inadecuado del instrumento calibrado. La reproducción parcial es prohibida, la reproducción total deberá hacerse con la autorización escrita aprobada por INNOVATEC Industrial Solutions. *This Certificate of Calibration provides traceability of measurement to the National Standard, through units of measurement realized at the NPL, NIST or other recognized National Standard Laboratories to the International System of Units. The calibration was performed under a Laboratory Management System in accordance with the ISO/IEC 17025:2017 Standard. The results and the reported uncertainty at a confidence level of k=2, 95% are related only to this instrument and at the time of measurement. This Laboratory is not responsible for any damages that may result from improper use of the calibrated instrument. Partial reproduction is forbidden, the total reproduction must have an approved written authorization by INNOVATEC Industrial Solutions.*

Comentarios:

Los resultados son un promedio de los datos tomados durante la calibración.

Comments

Calibrado por:

Jonathan Fonseca

Aprobado por:

Approved by:

Fin de Certificado (End of Certificate)

| Certificado No.:      |                      | 62207        |                  | Equipo (Instrument): Microbaño |                            |                             |                                |
|-----------------------|----------------------|--------------|------------------|--------------------------------|----------------------------|-----------------------------|--------------------------------|
| Fecha de Calibración: |                      | 2025-10-17   |                  | Marca (Brand): WIKA            |                            |                             |                                |
| Nominal<br>(Nominal)  | Patrón<br>(Standard) | UBP<br>(UUT) | Error<br>(Error) | Precisión<br>(Accuracy)        | Estabilidad<br>(Stability) | Uniformidad<br>(Uniformity) | Incertidumbre<br>(Uncertainty) |
| -20 °C                | -19.532 °C           | -20.0 °C     | -0.468 °C        | ± 0.3 °C                       | 0.458 °C                   | 0 °C                        | ± 0.3 °C                       |
| 0 °C                  | 0.685 °C             | 0.0 °C       | -0.685 °C        | ± 0.3 °C                       | 0.045 °C                   | 0 °C                        | ± 0.09 °C                      |
| 100 °C                | 100.149 °C           | 100.0 °C     | -0.149 °C        | ± 0.3 °C                       | 0.231 °C                   | 0 °C                        | ± 0.28 °C                      |
| 200 °C                | 201.593 °C           | 200.0 °C     | -1.592 °C        | ± 0.3 °C                       | 0.152 °C                   | 0 °C                        | ± 0.2 °C                       |

Diagram de Posición de Sensores (Sensor Position Diagram)

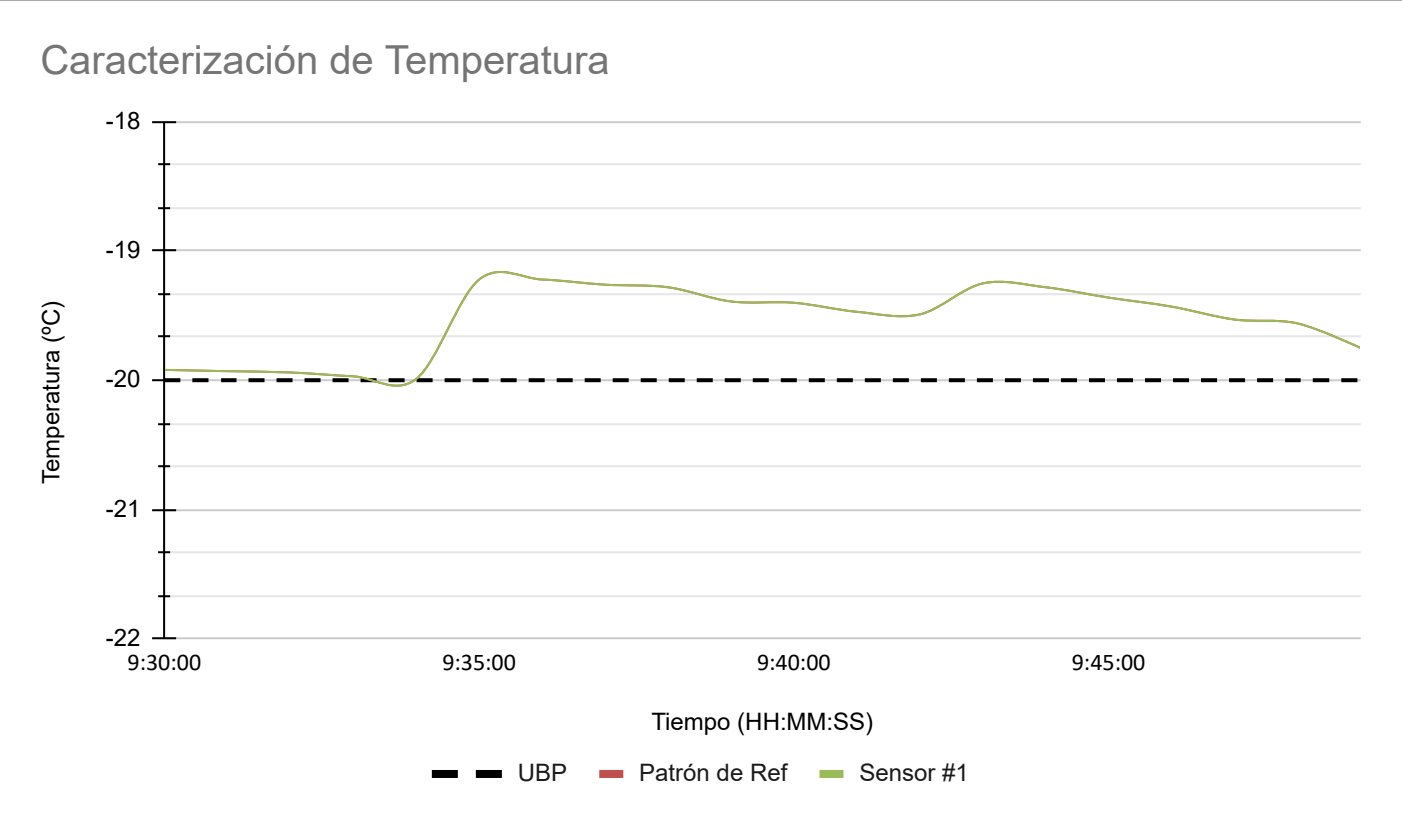


- Leyenda:**
- 1: Patrón de Referencia
  - 1: Sensor #1

Las imagenes utilizadas solo son un ejemplo de lo puntos de medida empleados y posición de los sensores.

| Hora (Time) | UBP (UUT) | Patrón de Ref (Ref. Standard) | Sensor #1 (Sensor #1) | Sensor #2 (Sensor #2) | Sensor #3 (Sensor #3) | Sensor #4 (Sensor #4) | Sensor #5 (Sensor #5) | Sensor #6 (Sensor #6) | Sensor #7 (Sensor #7) | Sensor #8 (Sensor #8) | Error (Error) |
|-------------|-----------|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| 9:30:00     | -20 °C    | -19.92 °C                     | -19.920 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.08 °C      |
| 9:31:00     | -20 °C    | -19.92 °C                     | -19.930 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.07 °C      |
| 9:32:00     | -20 °C    | -19.92 °C                     | -19.940 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.06 °C      |
| 9:33:00     | -20 °C    | -19.92 °C                     | -19.970 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.03 °C      |
| 9:34:00     | -20 °C    | -19.92 °C                     | -19.990 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.01 °C      |
| 9:35:00     | -20 °C    | -19.92 °C                     | -19.220 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.78 °C      |
| 9:36:00     | -20 °C    | -19.92 °C                     | -19.220 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.78 °C      |
| 9:37:00     | -20 °C    | -19.92 °C                     | -19.260 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.74 °C      |
| 9:38:00     | -20 °C    | -19.28 °C                     | -19.280 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.72 °C      |
| 9:39:00     | -20 °C    | -19.28 °C                     | -19.390 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.61 °C      |
| 9:40:00     | -20 °C    | -19.28 °C                     | -19.40 °C             | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.6 °C       |
| 9:41:00     | -20 °C    | -19.28 °C                     | -19.470 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.53 °C      |
| 9:42:00     | -20 °C    | -19.28 °C                     | -19.490 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.51 °C      |
| 9:43:00     | -20 °C    | -19.28 °C                     | -19.250 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.75 °C      |
| 9:44:00     | -20 °C    | -19.28 °C                     | -19.280 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.72 °C      |
| 9:45:00     | -20 °C    | -19.28 °C                     | -19.360 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.64 °C      |
| 9:46:00     | -20 °C    | -19.28 °C                     | -19.430 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.57 °C      |
| 9:47:00     | -20 °C    | -19.28 °C                     | -19.530 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.47 °C      |
| 9:48:00     | -20 °C    | -19.28 °C                     | -19.560 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.44 °C      |
| 9:49:00     | -20 °C    | -19.28 °C                     | -19.750 °C            | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -0.25 °C      |

Graficos (Graphs):

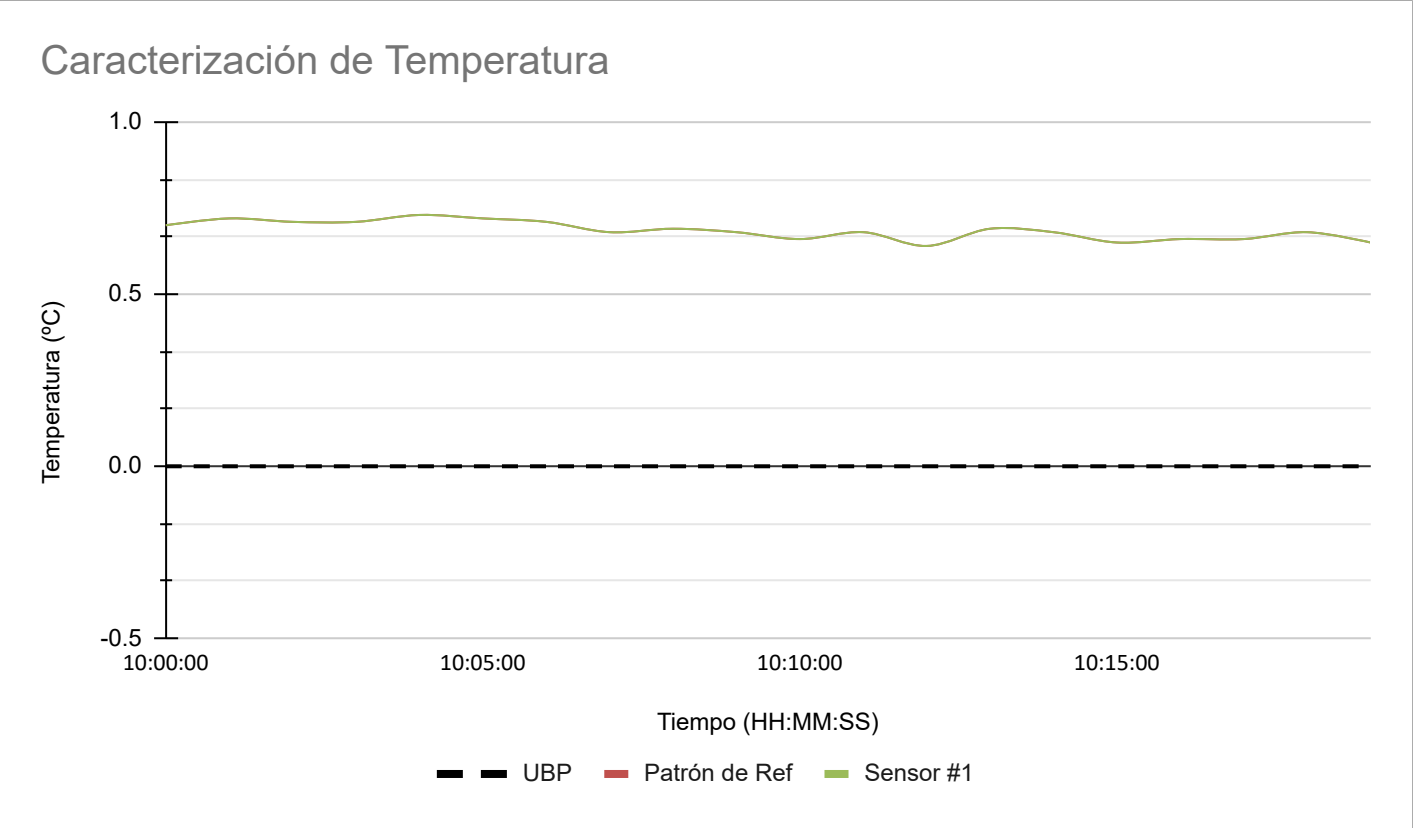


Certificado No.: 62207  
Fecha de Calibración 2025-10-17

Equipo (Instrument): Microbaño  
Marca (Brand): WIKA

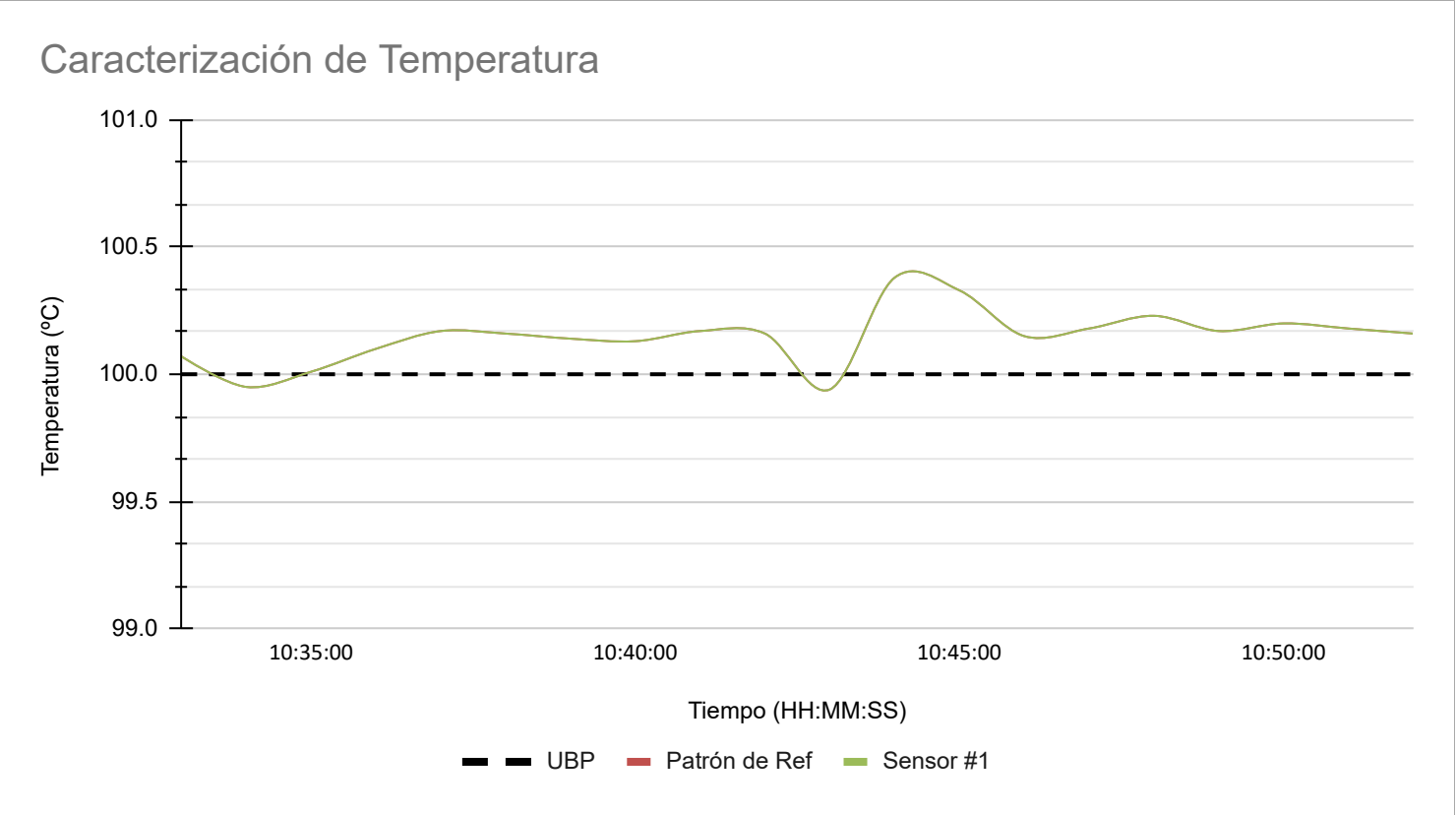
| Hora<br>(Time) | UBP<br>(UUT) | Patrón de Ref.<br>Ref. Standard | Sensor #1<br>(Sensor #1) | Sensor #2<br>(Sensor #2) | Sensor #3<br>(Sensor #3) | Sensor #4<br>(Sensor #4) | Sensor #5<br>(Sensor #5) | Sensor #6<br>(Sensor #6) | Sensor #7<br>(Sensor #7) | Sensor #8<br>(Sensor #8) | Error<br>(Error) |
|----------------|--------------|---------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------|
| 10:00:00       | 0 °C         | 0.7 °C                          | 0.70 °C                  | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.7 °C          |
| 10:01:00       | 0 °C         | 0.72 °C                         | 0.720 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.72 °C         |
| 10:02:00       | 0 °C         | 0.71 °C                         | 0.710 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.71 °C         |
| 10:03:00       | 0 °C         | 0.71 °C                         | 0.710 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.71 °C         |
| 10:04:00       | 0 °C         | 0.73 °C                         | 0.730 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.73 °C         |
| 10:05:00       | 0 °C         | 0.72 °C                         | 0.720 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.72 °C         |
| 10:06:00       | 0 °C         | 0.71 °C                         | 0.710 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.71 °C         |
| 10:07:00       | 0 °C         | 0.68 °C                         | 0.680 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.68 °C         |
| 10:08:00       | 0 °C         | 0.69 °C                         | 0.690 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.69 °C         |
| 10:09:00       | 0 °C         | 0.68 °C                         | 0.680 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.68 °C         |
| 10:10:00       | 0 °C         | 0.66 °C                         | 0.660 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.66 °C         |
| 10:11:00       | 0 °C         | 0.68 °C                         | 0.680 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.68 °C         |
| 10:12:00       | 0 °C         | 0.64 °C                         | 0.640 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.64 °C         |
| 10:13:00       | 0 °C         | 0.69 °C                         | 0.690 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.69 °C         |
| 10:14:00       | 0 °C         | 0.68 °C                         | 0.680 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.68 °C         |
| 10:15:00       | 0 °C         | 0.65 °C                         | 0.650 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.65 °C         |
| 10:16:00       | 0 °C         | 0.66 °C                         | 0.660 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.66 °C         |
| 10:17:00       | 0 °C         | 0.66 °C                         | 0.660 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.66 °C         |
| 10:18:00       | 0 °C         | 0.68 °C                         | 0.680 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.68 °C         |
| 10:19:00       | 0 °C         | 0.65 °C                         | 0.650 °C                 | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.65 °C         |

Graficos (Graphs):



| Hora<br>(Time) | UBP<br>(UUT) | Patrón de Ref.<br>Ref. Standard | Sensor #1<br>(Sensor #1) | Sensor #2<br>(Sensor #2) | Sensor #3<br>(Sensor #3) | Sensor #4<br>(Sensor #4) | Sensor #5<br>(Sensor #5) | Sensor #6<br>(Sensor #6) | Sensor #7<br>(Sensor #7) | Sensor #8<br>(Sensor #8) | Error<br>(Error) |
|----------------|--------------|---------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------|
| 10:33:00       | 100 °C       | 100.07 °C                       | 100.070 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.07 °C         |
| 10:34:00       | 100 °C       | 99.95 °C                        | 99.950 °C                | -                        | -                        | -                        | -                        | -                        | -                        | -                        | 0.05 °C          |
| 10:35:00       | 100 °C       | 100.01 °C                       | 100.010 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.01 °C         |
| 10:36:00       | 100 °C       | 100.1 °C                        | 100.10 °C                | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.1 °C          |
| 10:37:00       | 100 °C       | 100.17 °C                       | 100.170 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.17 °C         |
| 10:38:00       | 100 °C       | 100.16 °C                       | 100.160 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.16 °C         |
| 10:39:00       | 100 °C       | 100.14 °C                       | 100.140 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.14 °C         |
| 10:40:00       | 100 °C       | 100.13 °C                       | 100.130 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.13 °C         |
| 10:41:00       | 100 °C       | 100.17 °C                       | 100.170 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.17 °C         |
| 10:42:00       | 100 °C       | 100.16 °C                       | 100.160 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.16 °C         |
| 10:43:00       | 100 °C       | 99.94 °C                        | 99.940 °C                | -                        | -                        | -                        | -                        | -                        | -                        | -                        | 0.06 °C          |
| 10:44:00       | 100 °C       | 100.38 °C                       | 100.380 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.38 °C         |
| 10:45:00       | 100 °C       | 100.33 °C                       | 100.330 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.33 °C         |
| 10:46:00       | 100 °C       | 100.15 °C                       | 100.150 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.15 °C         |
| 10:47:00       | 100 °C       | 100.18 °C                       | 100.180 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.18 °C         |
| 10:48:00       | 100 °C       | 100.23 °C                       | 100.230 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.23 °C         |
| 10:49:00       | 100 °C       | 100.17 °C                       | 100.170 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.17 °C         |
| 10:50:00       | 100 °C       | 100.2 °C                        | 100.20 °C                | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.2 °C          |
| 10:51:00       | 100 °C       | 100.18 °C                       | 100.180 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.18 °C         |
| 10:52:00       | 100 °C       | 100.16 °C                       | 100.160 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -0.16 °C         |

Graficos (Graphs):



| Hora<br>(Time) | UBP<br>(UUT) | Patrón de Ref<br>Ref. Standard | Sensor #1<br>(Sensor #1) | Sensor #2<br>(Sensor #2) | Sensor #3<br>(Sensor #3) | Sensor #4<br>(Sensor #4) | Sensor #5<br>(Sensor #5) | Sensor #6<br>(Sensor #6) | Sensor #7<br>(Sensor #7) | Sensor #8<br>(Sensor #8) | Error<br>(Error) |
|----------------|--------------|--------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------|
| 11:00:00       | 200 °C       | 201.5 °C                       | 201.50 °C                | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.5 °C          |
| 11:01:00       | 200 °C       | 201.49 °C                      | 201.490 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.49 °C         |
| 11:02:00       | 200 °C       | 201.5 °C                       | 201.50 °C                | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.5 °C          |
| 11:03:00       | 200 °C       | 201.44 °C                      | 201.440 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.44 °C         |
| 11:04:00       | 200 °C       | 201.48 °C                      | 201.480 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.48 °C         |
| 11:05:00       | 200 °C       | 201.6 °C                       | 201.60 °C                | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.6 °C          |
| 11:06:00       | 200 °C       | 201.53 °C                      | 201.530 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.53 °C         |
| 11:07:00       | 200 °C       | 201.59 °C                      | 201.590 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.59 °C         |
| 11:08:00       | 200 °C       | 201.61 °C                      | 201.610 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.61 °C         |
| 11:09:00       | 200 °C       | 201.63 °C                      | 201.630 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.63 °C         |
| 11:10:00       | 200 °C       | 201.62 °C                      | 201.620 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.62 °C         |
| 11:11:00       | 200 °C       | 201.62 °C                      | 201.620 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.62 °C         |
| 11:12:00       | 200 °C       | 201.64 °C                      | 201.640 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.64 °C         |
| 11:13:00       | 200 °C       | 201.62 °C                      | 201.620 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.62 °C         |
| 11:14:00       | 200 °C       | 201.61 °C                      | 201.610 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.61 °C         |
| 11:15:00       | 200 °C       | 201.65 °C                      | 201.650 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.65 °C         |
| 11:16:00       | 200 °C       | 201.68 °C                      | 201.680 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.68 °C         |
| 11:17:00       | 200 °C       | 201.63 °C                      | 201.630 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.63 °C         |
| 11:18:00       | 200 °C       | 201.73 °C                      | 201.730 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.73 °C         |
| 11:19:00       | 200 °C       | 201.68 °C                      | 201.680 °C               | -                        | -                        | -                        | -                        | -                        | -                        | -                        | -1.68 °C         |

Graficos (Graphs):

