Temperature Calibration

Instron® ensures you are operating at the proper temperature.

Why Calibrate Temperature?

It is a basic fact of physics that materials are affected by temperature. As a consequence, many testing and materials processing activities are either conducted at non-ambient temperatures or subject materials to thermal conditioning.

It is therefore essential for testing and processing companies working at non-ambient temperatures to have confidence in the soundness of the thermal conditioning equipment. Users may ask typical questions, including:

- How accurate is the temperature?
- How much does the temperature vary over time?
- How uniform is the temperature within the temperature cabinet?

Regular temperature calibration of your thermal conditioning equipment, be it temperature cabinets, heat treatment chambers or pre-test conditioning units, provides assurance that your test data is valid and your processes are properly controlled.

To address these challenges, Instron has developed a number of temperature verification procedures that meet the most common requirements of laboratories and related manufacturing processes.

Types of Equipment Verified

- Environmental cabinets
- Specimen conditioning units
- Heat treating and finishing equipment

Verifications can provide profiles within cabinets to characterise the uniformity of temperature and control.

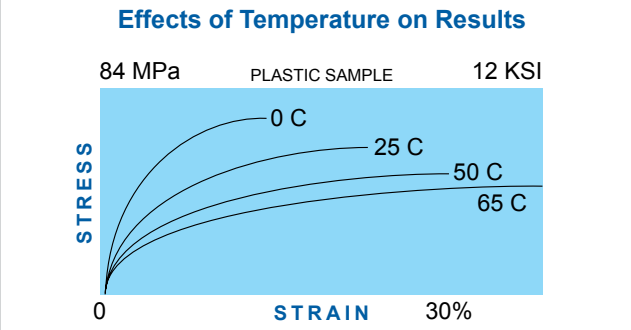

Figure 1: Material properties can be affected by small changes in temperature. Errors in temperature mean errors in results.

EXTRA INSTRON SERVICES

Temperature Certificate -
Single-Point Enviromental Chamber Calibration

Instron® certificates are designed to help you meet your quality program requirements. They all include a unique certificate number and date of issue.

CERTIFICATE OF CALIBRATION

ISSUED BY: **INSTRON CALIBRATION LABORATORY**

DATE OF ISSUE: **See Signatory Date Below** CERTIFICATE NO: **E0001**

INSTRON CALIBRATION LABORATORY
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E Mail: extra-uk@instron.com

APPROVED SIGNATORY

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FOR: ABC Corporation Ltd

LOCATION: Environmental Eng. Test Lab.
ABC Road
Partswich
Hants.
PO99 99XX

Contact: Fred Smith

DESCRIPTION: Instron SFL EC1559 Temperature cabinet

DEVICE IDENTIFICATION: EC1559 - xxxxxxx

TEMPERATURE RANGE: -70 ~ +280 Deg C

DATE OF VERIFICATION: 27-Nov-2006

'As found'/ 'as left' information is provided. Instron service engineers can make adjustments and repairs if necessary.

The above temperature cabinet has been calibrated against the calibration devices listed on page 2 of this certificate. The verification involved sensing the cabinet with 3 thermocouples located as specified on page 2. The temperature cabinet was verified at 3 set temperatures.

The temperature cabinet was set to the lowest of the required temperatures and allowed to stabilise for 20 minutes. After this stabilisation period the temperature cabinet's performance was verified by recording the thermocouple values over the next 20 minutes with 10 series of readings.

The temperature cabinet was set to the next required temperature and allowed to stabilise. After this stabilisation period the temperature cabinet's performance was verified by recording the thermocouple readings. This process was repeated until all 3 temperature levels were verified.

Calculations to determine errors, means, highs, lows and range parameters were then carried out. The recorded and calculated data is presented on page 3.

The calibration was carried out in the AS FOUND condition

The reported expanded uncertainty is based on a standard uncertainty multipled by a coverage factor k = 2, providing a level of confidence of approximately 95%.

This certificate is issued by the Instron Calibration Laboratory. It provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Temperature Certificate -
Multi-Point Temperature Uniformity Survey

CERTIFICATE OF CALIBRATION

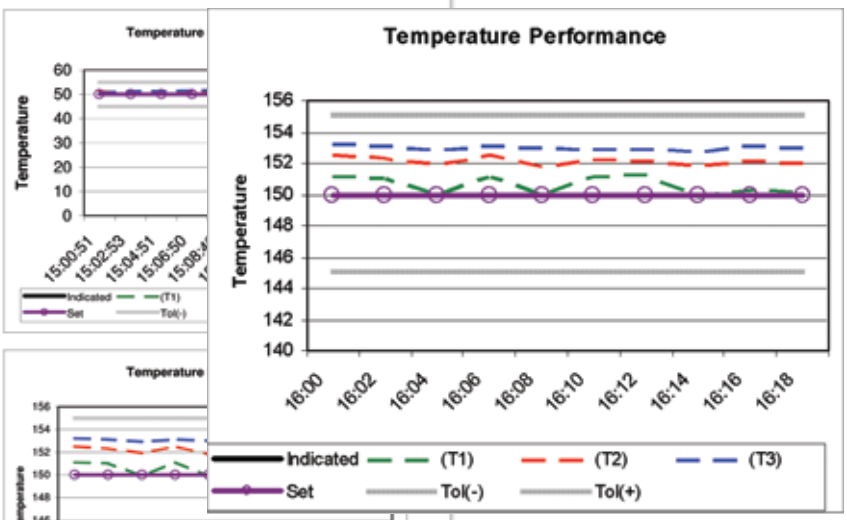
INSTRON CALIBRATION LABORATORY

CERTIFICATE NUMBER
E0001

MEASUREMENTS:

SET TEMPERATURE: 50.0 °C Stabilisation time: 20 mins.

Time Hr:Mn:Sec	Indicated Temp.	Measured Temp (T1)	Error	Measured Temp (T2)	Error	Measured Temp (T3)	Error
15:00:51	50	50.1	-0.1	51.2	-1.2	50.6	-0.6
15:02:53	50	51.2	-1.2	50.6	-0.6	51.3	-1.3
15:04:51	50	50.3	-0.3	51.3	-1.3	51.3	-1.3
15:06:50	50	50.4	-0.4	51.2	-1.2	51.5	-1.5
15:08:49	50	50.3	-0.3	51.6	-1.6	51.7	-1.7
15:10:49	50	50.2	-0.2	51.1	-1.1	51.6	-1.6
15:12:49	50	50.3	-0.3	51.4	-1.4	51.7	-1.7
15:14:50	50	50.1	-0.1	51.2	-1.2	51.6	-1.6
15:16:50	50	50.3	-0.3	51.3	-1.3	51.7	-1.7
15:18:49	50	50.1	-0.1	51.4	-1.4	51.5	-1.5
Mean	50	50.33	-0.33	51.23	-1.23	51.45	-1.45
Max	50	51.2	-0.1	51.6	-0.6	51.7	-0.6
Min	50	50.1	-1.2	50.6	-1.6	50.6	-1.7
Uncertainty of Measurement (°C)		±1.1		±1.03		±1.11	

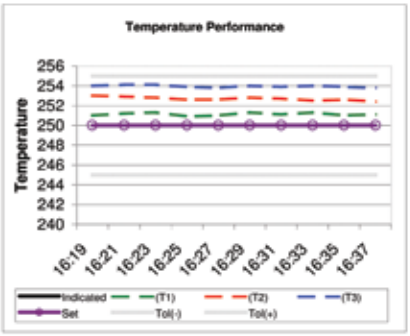


SET TEMPERATURE: 150.0 °C Stabilisation time: 30 mins.

Time Hr:Mn:Sec	Indicated Temp.	Measured Temp (T1)	Error	Measured Temp (T2)	Error	Measured Temp (T3)	Error
16:00:31	150	151.1	-1.1	152.5	-2.5	153.2	-3.2
16:02:28	150	151	-1	152.3	-2.3	153.1	-3.1
16:04:30	150	149.9	0.1	151.9	-1.9	152.9	-2.9
16:06:28	150	151.1	-1.1	152.5	-2.5	153.1	-3.1
16:08:30	150	149.9	0.1	151.8	-1.8	153	-3
16:10:28	150	151.1	-1.1	152.2	-2.2	152.9	-2.9
16:12:33	150	151.2	-1.2	152.1	-2.1	152.9	-2.9
16:14:32	150	149.8	0.2	151.9	-1.9	152.8	-2.8
16:16:31	150	150.3	-0.3	152.1	-2.1	153.1	-3.1
16:18:29	150	150.2	-0.2	152	-2	153	-3
Mean	150	150.56	-0.56	152.13	-2.13	153	-3
Max	150	151.2	0.2	152.5	-1.8	153.2	-2.8
Min	150	149.8	-1.2	151.8	-2.5	152.8	-3.2
Uncertainty of Measurement (°C)		±1.47		±1.01		±0.92	

SET TEMPERATURE: 250.0 °C Stabilisation time: 40 mins.

Time Hr:Mn:Sec	Indicated Temp.	Measured Temp (T1)	Error	Measured Temp (T2)	Error	Measured Temp (T3)	Error
16:19:16	250	251	-1	253	-3	254	-4
16:21:16	250	251.2	-1.2	252.9	-2.9	254.1	-4.1
16:23:16	250	251.3	-1.3	252.8	-2.8	254.1	-4.1
16:25:16	250	250.9	-0.9	252.6	-2.6	253.9	-3.9
16:27:18	250	251	-1	252.6	-2.6	253.8	-3.8
16:29:17	250	251.3	-1.3	252.8	-2.8	254	-4
16:31:19	250	251.1	-1.1	252.7	-2.7	253.9	-3.9
16:33:15	250	251.3	-1.3	252.5	-2.5	254	-4
16:35:17	250	251	-1	252.6	-2.6	253.9	-3.9
16:37:15	250	251.1	-1.1	252.4	-2.4	253.8	-3.8
Mean	250	251.12	-1.12	252.69	-2.69	253.95	-3.95
Max	250	251.3	-0.9	253	-2.4	254.1	-3.8
Min	250	250.9	-1.3	252.4	-3	253.8	-4.1
Uncertainty of Measurement (°C)		±1.82		±1.83		±1.81	



The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.

Instron® temperature calibration certificates include a graphical presentation of the data in addition to the more conventional tabular presentation of results. In addition, where requested by the customer, the calibration certificate can record acceptability criteria.

Benefits of using an External Provider of such Calibrations

The following are benefits from using a third party calibrator for your temperature verification activities;

- Avoids the need to provide and maintain expensive calibration equipment and procedures
- Avoids the need to train and maintain staff in thermal calibration techniques
- Provides you with a formal calibration certificate with ISO17025 compliant uncertainty of measurement data
- Provides your organisation, auditors and customers with independent objective evidence of your equipment's performance and commitment to professional measurement practices

Selection of environmental cabinets that can be verified by Instron®

For information on Instron® products and services call your local worldwide sales, service and technical support offices:

(NOTE: THIS SHOULD BE IN BLACK) Please Add Your Local Sales and Service Contact Information Here

Address
Tel: Fax: www.instron.com

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