

EcoGuard AB
Hammarbacken 4A
191 49 SOLLENTUNA

Calibration of temperature logger

Identification

Object	25 temperature loggers Ecoguard model TS-020000, identification se table of results.
Object state	Upon arrival the objects had no visual damages.
Calibration location	The National Laboratory for Temperature, SP, Borås, Sweden
Calibration date	March 25, 2014

Measurement methods and procedures

Comparison in liquid baths with one of the resistance thermometers of SP according to SP-Method 2876.

The loggers were protected from contact with the fluid of the bath during the calibration. The temperature loggers registered the temperature in the bath for at least 4 hours at each temperature. The measurement results are presented in the form of mean values in the table. A central Unit CE-015110 and web interface Sensor Reading Report Generator was used for reading the loggers.

The temperature loggers were not adjusted before the calibration.

According to data from the customer are the calibrated temperature loggers manufactured in year 2014, week 10. Also according to customer the loggers are collected randomly from production without any kind of selection

Measurement conditions

Temperature scale ITS-90

Results

Results and expanded uncertainty of the calibration are presented in the form of a table on page 2.

SP Technical Research Institute of Sweden

<i>Postal address</i>	<i>Office location</i>	<i>Phone / Fax / E-mail</i>
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Table of results

EcoGuard model TS-020000

Serial no.	Correction at 16 °C °C	Correction at 21 °C °C	Correction at 26 °C °C	Expanded Uncertainty °C
131670	0.1	0.1	0.1	±0.15
131675	0.1	0.1	0.0	±0.15
131676	0.1	0.0	0.0	±0.15
131881	0.1	0.0	0.1	±0.15
131882	0.1	0.1	0.1	±0.15
131883	0.1	0.0	0.0	±0.15
131884	0.1	0.0	0.1	±0.15
131885	0.1	0.0	0.0	±0.15
131886	0.0	0.0	0.0	±0.15
131887	0.1	0.0	0.1	±0.15
131888	0.0	0.0	0.0	±0.15
131889	0.1	0.1	0.0	±0.15
131902	0.1	0.1	0.1	±0.15
131904	0.0	0.0	0.0	±0.15
131906	0.1	0.0	0.0	±0.15
131907	0.0	0.0	0.0	±0.15
131909	0.1	0.0	0.0	±0.15
131971	0.1	0.1	0.1	±0.15
131975	0.1	0.1	0.1	±0.15
131976	0.1	0.0	0.0	±0.15
131977	0.1	0.1	0.0	±0.15
131978	0.1	0.1	0.0	±0.15
131979	0.1	0.1	0.0	±0.15
131980	0.1	0.1	0.1	±0.15
131988	0.0	0.1	0.0	±0.15

True temperature = instrument reading + correction

Uncertainty

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with EA Publication EA-4/02 (formerly EAL-R2). The long term stability of the calibrated object is not included in the reported expanded uncertainty of measurement.



Traceability

The measurement results are by regular calibrations of the laboratory's standards traceable to the Swedish National Laboratories for electrical quantities and temperature at SP in Borås. The National Laboratory for Temperature realizes ITS-90 from -189.3442 °C to 2600 °C. To ensure international equivalence and acceptance of the established traceability, interlaboratory comparisons are made between national laboratories.

Equipment

Resistance thermometer, Pt100 ohm, serial no. 68254
DTM, Hart 1502A, serial no. A13412
Water bath, Heto KB 24, serial no. 7612

SP Technical Research Institute of Sweden Measurement Technology - Volume, Flow and Temperature

Performed by

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KALIBRERINGSBEVIS

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CALIBRATION CERTIFICATE issued by a Swedish National Laboratory

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Measurement methods and procedures

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The temperature loggers were not adjusted before the calibration.

According to data from the customer are the calibrated temperature loggers manufactured between 2008 and 2010. Also according to customer all the loggers have been mounted and used in different apartments.

Measurement conditions

Temperature scale ITS-90

Results

Results and expanded uncertainty of the calibration are presented in the form of a table on page 2.

SP Technical Research Institute of Sweden

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Table of results

EcoGuard model TS-020000

Serial no.	Correction at 21 °C °C	Expanded Uncertainty °C
6461	0.1	±0.15
7634	0.0	±0.15
7930	0.0	±0.15
8002	0.0	±0.15
8017	0.0	±0.15
8064	0.0	±0.15
8347	0.0	±0.15
8464	0.1	±0.15
8530	0.1	±0.15
8547	0.0	±0.15
13599	0.0	±0.15
13640	0.1	±0.15
13662	0.0	±0.15
13759	0.1	±0.15
14642	0.0	±0.15
15898	0.0	±0.15
16035	0.0	±0.15
17844	0.0	±0.15
18006	-0.1	±0.15
18626	0.0	±0.15
34792	0.1	±0.15
110576	0.1	±0.15

True temperature = instrument reading + correction

Uncertainty

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with EA Publication EA-4/02 (formerly EAL-R2). The long term stability of the calibrated object is not included in the reported expanded uncertainty of measurement.



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DTM, Hart 1502A, serial no. A13412
Water bath, Heto KB 24, serial no. 7612

SP Technical Research Institute of Sweden Measurement Technology - Volume, Flow and Temperature

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