# CERTIFICATE OF TEMPERATURE MAPPING

ISSUED BY: **Arena Instrumentation Ltd**

Start Time and Date of Mapping: 29th January 2019

End Time and Date of Mapping: 12th February 2019

Date of Issue: 15th February 2019

**ARENA INSTRUMENTATION LTD**
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Approved Signatory

M. Horsley

Customer: PM Strategic Sourcing Ltd
Unit 1b South Park Court,
Hobson Street, Macclesfield,
Cheshire, SK11 8BS

Manufacturer: PM Strategic Sourcing
Description: Cool Bag
Model: N/A
Serial: N/A

Location: Unit 5 Loughborough

Operator: Mark Horsley

Our Ref: 15731

| CONDITION OF UNIT UNDER TEST | YES/NO |
|---|---|
| The unit under test was adjusted | N |
| The unit under test was repaired | N |

## STABILITY

The readings given are the results at the time of mapping and do not carry any implication regarding the long terms stability of the unit under test.

## ACCREDITATIONS

Arena Instrumentation is accredited by UKAS to BS EN 17025:2005 to undertake the calibration presented in this certificate.

## ENVIRONMENT

The instrument was mapped on site with the ambient conditions between 22$^0$C, 25$^0$C and 32$^0$C.

## PROCEDURE

AINS1.008

## UNCERTAINTIES

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor *k* = 2, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

**NOTES**

1. The Unit Under Test was switched on for a minimum of 60 minutes prior to mapping.
2. The temperatures quoted are with respect to the international temperature scale, ITS-90.
3. This mapping applies only to Unit Under Test.
4. TESTING FOR TEMPERATURE STABILITY OF 2-8 DEGREES ($4^0$C Used)
    - Pre freeze the boards for 12 hours
    - Place 2 frozen boards in the base of the transport case and 2 frozen boards in the lid of the case in the mesh insert
    - Cover the ones in the base with a layer of bubble wrap
    - After a period of half an hour (to allow the case to cool) fill the case with goods (for the purpose of this test ensure the case is full of bubble wrap)
    - Close the case
    - Commence test
5. TESTING FOR TEMPERATURE STABILITY OF 15-25 DEGREES ($20^0$C Used)
    - Pre freeze the freeze boards for 12 hours
    - Place 2 frozen boards in the base of the transport case and 2 frozen boards in the lid of the case in the mesh insert
    - After a period of half an hour (to allow the case to cool) remove all freeze boards
    - Fill the case with goods (for the purpose of this test ensure the case is full with bubble wrap)
    - Close the case
    - Commence test

# Mapping Report

This document has been reviewed and approved POST execution by the undersigned

| Approved By (Print) | Job Title: | Signature: | Date: |
|---|---|---|---|
| Mark Horsley | Arena Technician | Mark Horsley | 15th February 2019 |
| | Equipment Owner | | |
| | Department Manager | | |
| | QA/Ops Manager | | |

Summary

| Issues | | Signature: | Date: |
|---|---|---|---|
| Hot Spots | User Defined | Mark Horsley | 15th February 2019 |
| Cold Spots | User Defined | Mark Horsley | 15th February 2019 |
| Other Issues | User Defined | Mark Horsley | 15th February 2019 |

## 1.0 Scope

| Temperature Limits | Humidity Limits | Logging Period | Logging Interval |
|---|---|---|---|
| None Standard (User defined LIMITS) | N/A | 24 Hours | 5 minutes |
| Core/Load Probe Used | Y | | |

## 2.0 Method of Calibration

The unit under test was mapped in accordance with work instruction AINS1.008 Mapping of Equipment and Rooms.

The expanded uncertainty of individual measurements is ± 0.21 ºC

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

## 3.0 Layout

The diagram shown below indicates position of the data loggers.

Bag

Plan View

794 Load

724 Air

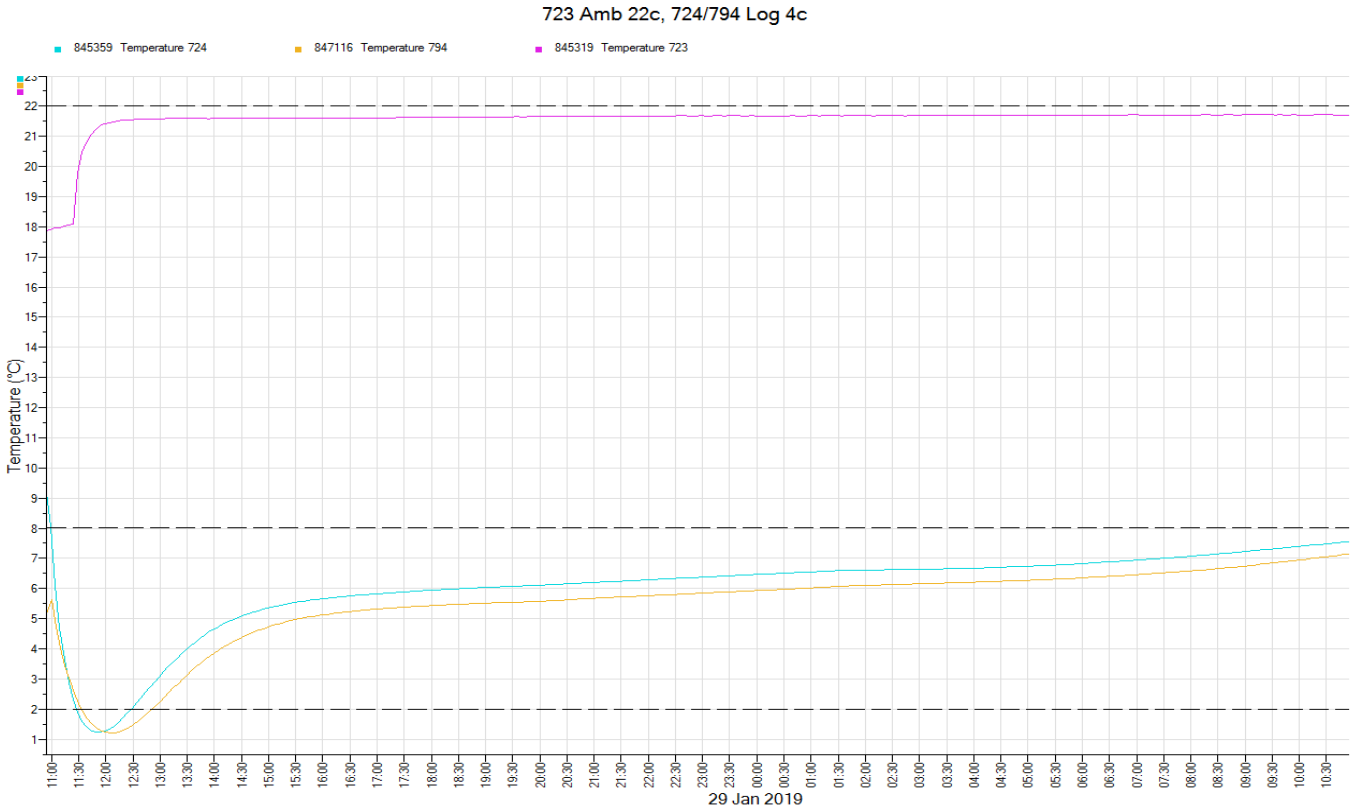
Ambient

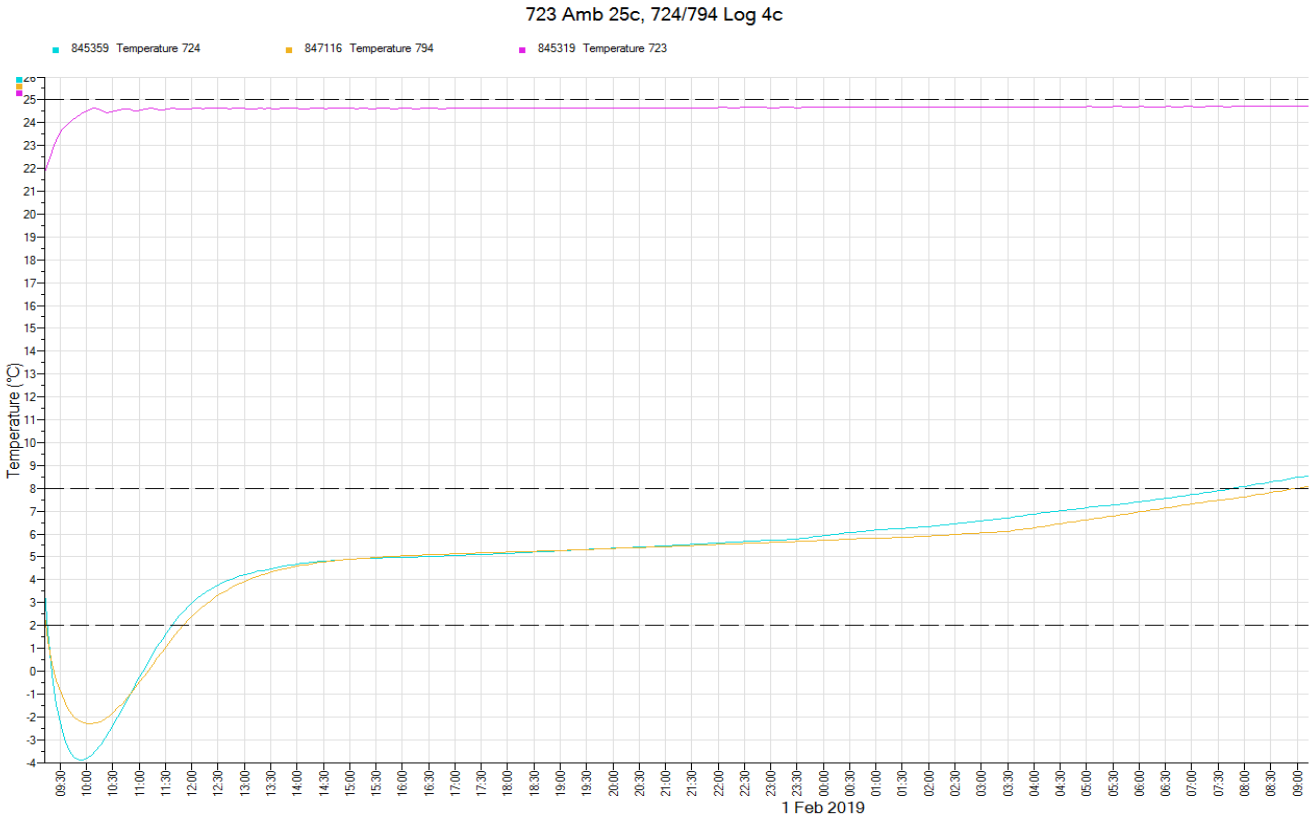
723 Air

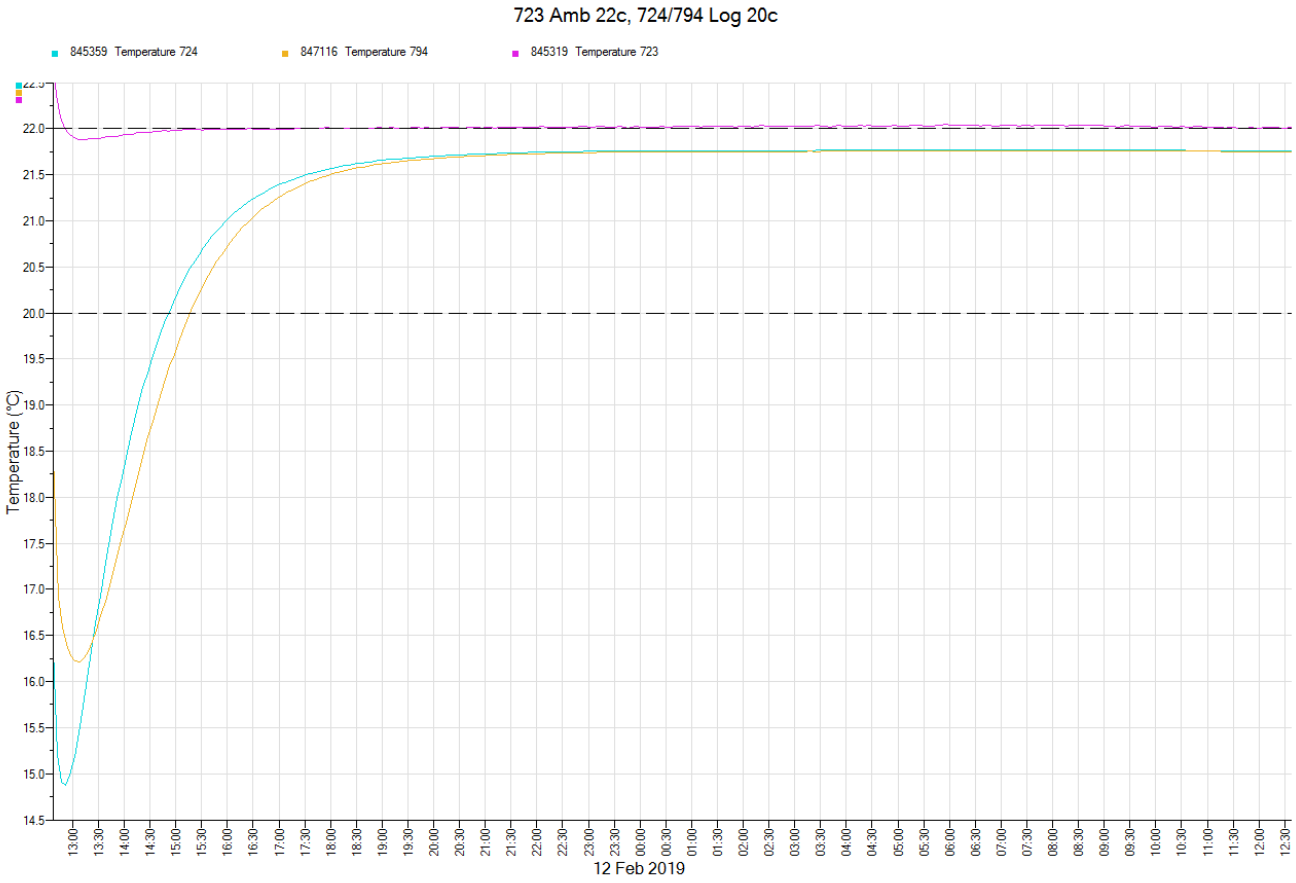
## 4.0 Loading

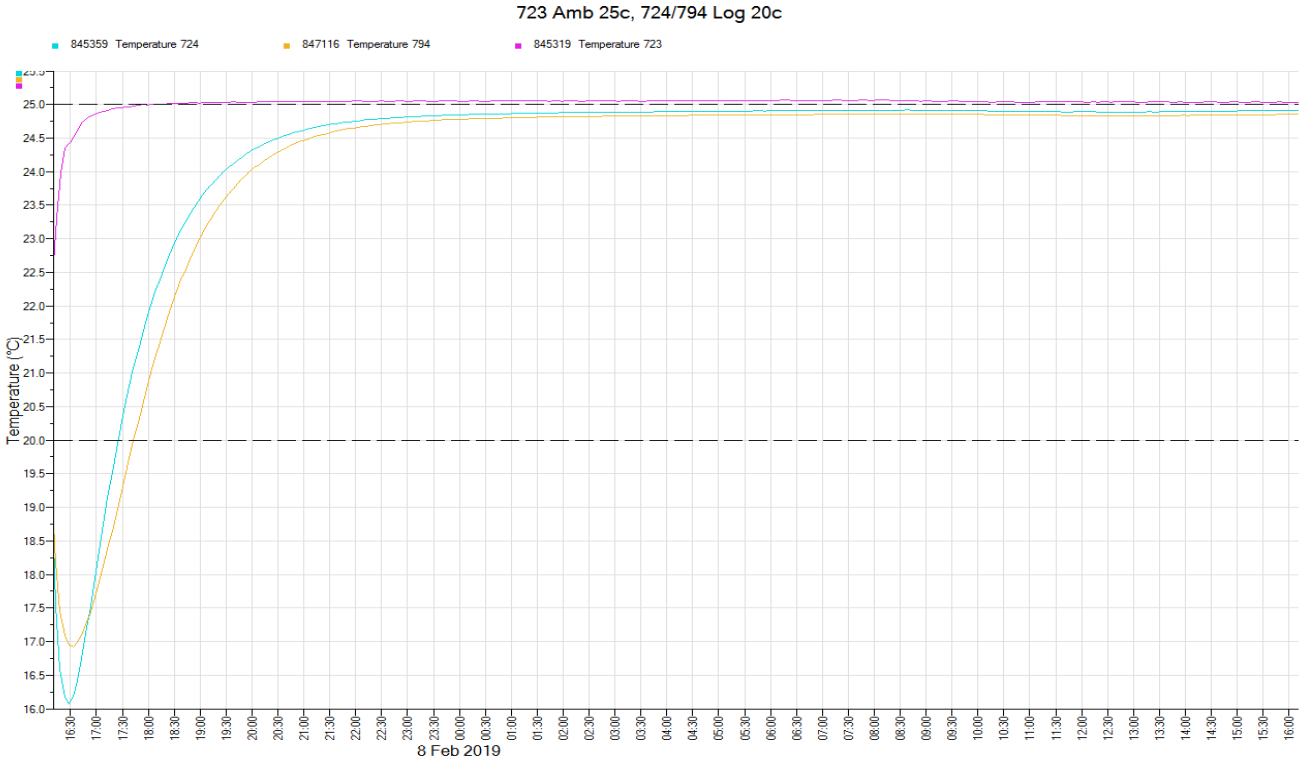
# 5.0 Results

## Temperature against Time Plot



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## 6.0 Test Equipment

| Ref | Equipment Type | Manufacturer / ID Number | Model | Serial Number | Calibration Certificate Number | Calibration Date |
|---|---|---|---|---|---|---|
| AI-L44 | Data Logger | Gemini / Tiny Tag | TK-4014/TK-4023 | 712-724 & 794 | AI-L44/2018 | 31st July 2018 |

## 7.0 Summary

Temperature excursions outside the temperature limits are to be determined by the user.