Thermocouple sensors for heat treatment applications calibrated to meet the requirements of AMS2750 NADCAP, BAC562I and CQI-9 standards suitable for use in Temperature Uniformity Surveys (TUS), System Accuracy Tests (SAT) and as Control, Monitoring and Load Sensors.

TC Inc for Temperature Sensing, Measurement and Control
**Type 12HT Calibrated Heat Treatment Thermocouples**

Calibrated Mineral Insulated Thermocouples

Our range of AMS2750 NADCAP, BAC5621 or CQI-9 Compliant mineral insulated thermocouples are designed to meet the high quality and accuracies demanded for heat treatment applications within the Aerospace industry. Through careful material selection and a comprehensive calibration program in our ISO17025 UKAS accredited laboratory, we can offer a wide range of sheath diameters and materials from stock with quick manufacture times. Their semi rigid construction allows them to be bent and formed to suit particular applications without impairing performance.

- **Calibrated in line with AMS 2750 NADCAP, BAC5621 or CQI-9 requirements**
- **Suitable for use in Temperature Uniformity Surveys (TUS), System Accuracy Tests (SAT), Control Recording and Monitoring and Load sensors**
- **Batch calibration certificate supplied as standard**
- **Sensors are individually tagged and numbered for full traceability**
- **Available in thermocouple types N, K, T and J**
- **Wide range of sheath diameters and materials**

**AMS2750 NADCAP, BAC5621 or CQI-9 certified**

<table>
<thead>
<tr>
<th>Type</th>
<th>Temperature Range (continuous)</th>
<th>Temperature Range (short term)</th>
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</thead>
<tbody>
<tr>
<td>N</td>
<td>32°F to +210°F</td>
<td>490°F to +2370°F</td>
</tr>
<tr>
<td>K</td>
<td>32°F to +210°F</td>
<td>290°F to +2460°F</td>
</tr>
<tr>
<td>T</td>
<td>300°F to +570°F</td>
<td>430°F to +760°F</td>
</tr>
<tr>
<td>J</td>
<td>-68°F to +1299°F</td>
<td>290°F to +1380°F</td>
</tr>
</tbody>
</table>

**Sheath Specifications**

- **600**
  - Inconel 600®
  - Nickel/Chromium/Iron alloy
  - To BS 3074 : 1974, Werkstoff No : 2.4816
  - Used in severely corrosive atmospheres to elevated temperatures.
  - Has good resistance to oxidation.
  - Do not use in sulphur bearing atmospheres above 1020°F.

- **114**
  - Nicrotherm D™
  - Nickel/Chromium/Silicon/Molybdenum
  - To BS 3074 : 1974, Werkstoff No : 2.4816
  - For high temperature Type ‘K’ and almost all Type ‘N’. Very good high temperature strength. Excellent in oxidising, carburising, reducing and vacuum atmospheres. Do not use in sulphur containing atmospheres.

- **310**
  - Grade 310 Stainless Steel
  - 25/20 Nickel/Chromium
  - To BS 970 Part 4 : 1970
  - Good high temperature corrosion resistance and suitable for use in sulphur bearing atmospheres. Has high oxidation resistance which is maintained if subsequent manipulation is strictly limited.

- **321**
  - Grade 321 Stainless Steel
  - 18/8/1 Nickel/Chromium/Titanium Stabilized
  - To BS 970 Part 4 : 1970
  - Very good corrosion resistance throughout the operating temperature range. Suited to a wide range of industrial applications. Enjoy high ductility.

**Types of Sensing Junction**

- **2I**
  - Insulated
  - The hot (measuring) junction is insulated from the sheath and this gives a floating output with a typical insulation resistance in excess of 100 megohms. Enter 2I for simplex or 2ID for duplex.

- **2ID**
  - Insulated

**Calibration Accuracies**

- **AMS1 AMS2750**
  - ±0.2°F or 0.4% of reading (whichever is greater).
  - End to end deviation of material batch no greater than 2°F.
  - Temperature Uniformity Survey (TUS) System Accuracy Test (SAT) Control, Monitoring & Recording (Class 1 & 2).

- **AMS2 AMS2750**
  - ±0.2°F or 0.35% of reading (whichever is greater). End to end deviation of material batch no greater than 2°C.
  - Temperature Uniformity Survey (TUS) System Accuracy Test (SAT) Control, Monitoring & Recording (Class 1 & 2).

- **BAC2 BAC5621**
  - ±0.2°F or 0.4% of reading (whichever is greater). End to end deviation of material batch no greater than 1.0°F.
  - Secondary/Field Test Sensor.

- **CQI1 CQI-9**
  - ±0.2°F or 0.4% of reading (whichever is greater). End to end deviation of material batch no greater than 2.2°F.
  - Temperature Uniformity Survey (TUS) System Accuracy Test (SAT) Control, Monitoring & Recording (Class 1 & 2).

**Tagging**

- **PL**
  - Plastic ID Label
  - Rated 150°F. For use with all end seals.

- **ML**
  - Laser Etched Metal Tag
  - For use with all end seals above 450°F.

- **EL**
  - Laser Etched on Sensor
  - Laser etch of serial number. This can be instead of or in addition to either of the options above.

* Tel: 708-449-0700 · info@tc-inc.com · www.tc-inc.com
**Calibrated Heat Treatment Thermocouples Type 12HT**

**Types of End Seal Configuration**

- **3P1**
  - Internal Seal with Bare Conductors for all sheath diameters
  - 3P1 Maximum end seal temperature 275°F
  - 3P1B Maximum end seal temperature 570°F

- **3P2L**
  - Crimp on Stainless Steel Pot Seal for sheath diameters up to 0.118"
  - 3P2L Pot Seal rated to 275°F
  - 3P2LA Pot Seal rated to 455°F
  - 3P2LB Pot Seal rated to 570°F

- **3P2 TRL**
  - Stainless Steel Pot Seal with Anti Chafe Spring for sheath diameters up to 0.118"
  - 3P2TRL Pot Seal rated to 275°F
  - 3P2TRLA Pot Seal rated to 455°F
  - 3P2TRLB Pot Seal rated to 570°F

- **3P4CL**
  - Stainless Steel Pot Seal with Anti Chafe Spring for sheath diameters between 0.118" & 0.315"
  - 3P4CL Pot Seal rated to 275°F
  - 3P4CLA Pot Seal rated to 455°F
  - 3P4CLB Pot Seal rated to 570°F

- **3P4 CTRL**
  - Stainless Steel Pot Seal with Anti Chafe Spring for sheath diameters between 0.118" & 0.315"
  - 3P4CTRL Pot Seal rated to 275°F
  - 3P4CTRLA Pot Seal rated to 455°F
  - 3P4CTRLB Pot Seal rated to 570°F

**Extension Wires**

- **A30**
  - HR PVC Flat Twin (220°F)
  - One pair of stranded 24AWG conductors. Cores HR PVC insulated. Pair laid flat. HR PVC sheathed overall.

- **A27**
  - HR PVC Twisted Pair with Screen (220°F)
  - One pair of stranded 24AWG conductors. Core HR PVC insulated. Pair twisted, screened with Mylar® aluminium tape and drain wire. HR PVC sheathed overall.

- **B20**
  - PFA Flat Twin (480°F)
  - One pair of solid 24AWG conductors. Cores PFA insulated. Pair laid flat. PFA sheathed overall.

- **B50**
  - PFA Flat Twin (480°F)
  - One pair of stranded 24AWG conductors. Cores PFA insulated. Pair laid flat. PFA sheathed overall.

- **B80**
  - PFA Twisted Pair with Screen (480°F)
  - One pair of stranded 24AWG conductors. Cores PFA insulated. Pair twisted, screened with Mylar® aluminium tape and drain wire. PFA sheathed overall.

**Order Code - Example**

- Style No.: 12HT
- Thermocouple Type (see section 1): N
- Sheath Length (in inches): 70
- Sheath Diameter (see section 3): 600
- Sensing Junction (see section 4): 0.118"
- End Seal Configuration (see section 7): 2L
- Extension Wire (see section 8): 3P4CLA
- Calibration Accuracy (see section 6): 40° B50NX

**Alternative Calibration Details (Optional)*

- UKAS (U) / In House (I)
- Calibration Range (see section 1)
- Interval / Custom Temperatures (in °F)
- For custom ranges or individual probe calibration. See section 6 and page 4 for further details of our standard calibration report.

**Tagging Options**

- Plastic ID Label or Metal Tag Label (see section 5)
- Etched on Sensor (see section 5)

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Calibration Details

All 12HT sensors are supplied with a 2-page batch calibration report (shown left) over the temperature range 32-2192°F. Calibration is performed in our ISO17025 approved laboratory and is fully traceable to NPL/NIST standards. The report is designed with the needs of the selected standard in mind and includes a list of calibrated equipment used, results for start/end/average of batch (figure 1), correction factors, start/end differential and graphical representation of the output curves (figure 2). All applewire standards are referenced in a conformity statement (figure 3).

Calibration reports are generated for each batch of sensors manufactured with a unique certificate number and the following order-specific information:

- Customer Name and Address
- Order Reference
- Coil Reference
- Coil Length
- Serial Number
- Description of Product
- Sensor Part Code

TC Ltd operate an extensive pre-testing calibration program. All of our mineral insulated wires used to manufacture the 12HT range are calibrated in our laboratory, all reels meeting the requirements of the AMS2750, BAC5621 & CQI-8 standards are stocked ready for quick manufacture with a 7/10 day typical lead time for completed sensors with calibration report.

If your application requires individual sensor calibration or uses custom temperatures not shown on the report, these requirements can be added to the 12HT part code as shown in the order code example below. We will then perform the custom calibration before despatch and amend the report accordingly. It is also possible to specify full UKAS calibration if required. Please contact one of our experienced sales engineers for more details.