Oceanographic Calibration Facility

Hobart, Tasmania, Australia

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Calibration Facility

- The Oceanographic Calibration Facility is situated at the CSIRO O&A marine laboratories site in Hobart.
- The facility calibrates a wide range of oceanographic instrumentation with a level of accuracy consistent with the world’s best practice.
- The facility has been providing calibration services since 1988.
## Capabilities

- The facility calibrates a wide range of oceanographic instrumentation to a level of accuracy consistent with the world’s best practice.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>-2 to 0 °C</td>
<td>± 0.0015 °C</td>
</tr>
<tr>
<td></td>
<td>0 to 30 °C</td>
<td>± 0.001 °C</td>
</tr>
<tr>
<td></td>
<td>30 to 35 °C</td>
<td>± 0.0015 °C</td>
</tr>
<tr>
<td>Conductivity</td>
<td>0 to 6 S/m</td>
<td>± 0.0003 S/m</td>
</tr>
<tr>
<td>Pressure</td>
<td>0 to 11000 dbar</td>
<td>± 0.01 % of reading</td>
</tr>
</tbody>
</table>

- Dissolved Oxygen, Turbidity, Fluorescence (Chl-a).

- The Facility is accredited for Temperature and Pressure in Australia by the National Association of Testing Authorities (NATA).
  ISO/IEC:17025 Laboratory Accreditation: 2981

- Regular internal and external audit to ensure compliance.
Instrumentation and standards:

To obtain this high level of calibration, the facility has primary reference instruments and primary standards.

- **Temperature:** Water Triple Point (WTP), Gallium Melt point (GaMP) Standard Platinum Resistance Thermometers (SPRT) ASL F18 Primary Thermometry Bridge, Constant temperature seawater baths

- **Pressure:** Dead Weight Testers; Hydraulic & Pneumatic

- **Salinity:** Guildline Autosal - IAPSO Standard Seawater

- Where possible multiple reference standards from different manufacturers are held

- Regular intra and inter laboratory intercomparison of standards undertaken
Software and Automation:

To optimise adherence to best practice, and to maximise efficiency, the facility has a well developed set of programs and databases to collect, store, process, review data and to generate calibration reports.

Bath control and system monitoring

Automated Data Acquisition
Clients

The facility was initially developed to cover the calibration needs of the instrumentation associated with the Marine National Facility.

The facility’s role has consistently grown and now conducts these calibrations for a range of clients including:

- CSIRO agencies,
- State research agencies / environment protection authorities (EPA)
- Australian Antarctic Division (AAD)
- Australia’s Integrated Marine Observing System (IMOS)
- Commercial organisations

Altogether nearly 50 active clients

More than 1000 sensor calibrations per year
Oceanographic Instruments

- Instrument types /manufacturers:
  - Seabird: C, T, CTD, TSG, Glider/Argo, DO, T/P loggers
  - Wetlabs: WQM, FLNTU
  - RBR: CTD, DO, T/P loggers
  - Teledyne-RDI: CTD
  - Aqualogger: T/P loggers
  - Star-oddi: T loggers
  - Digiquartz: P
  - CSIRO custom design: T, P
Deliverables

- Calibration coefficients generated and entered into the instrument
- Uncertainty of measurement
- Calibration reports issued
- Sensor performance analysis and feedback
Sensor history

Typical high quality profiling sensor
  0.002 S/m drift over 6 years

Typical moored sensor
  0.01 S/m drift over 6 years
CSIRO O&A believes that there are advantages for running its own oceanographic calibration facility, rather than returning instruments back to the original manufacturer:

- **Cost**
  - Fee for service covers running costs, so facility is cost neutral to O&A
  - Reduced shipping costs
  - Disadvantage - Facility set-up cost is high

- **Time**
  - Reduced overall calibration time
    - Reduced transit time
  - Ability to provide ‘rush’ service

- **Expertise**
  - Focal point for metrological understanding
  - Knowledgebase of instrument performance
  - Direct link to NMI and accreditation bodies (NATA)
  - Disadvantage – Experts are hard to find!
Future development

The O&A Oceanographic Calibration Facility is client focused and we work with our client base to continually develop the facility’s capabilities. Future developments planned are:

• Expansion of the facilities to accommodate increased throughput
  • Larger calibration bath
  • Additional reference instrumentation

• New clients and new instrument types

• Additional sensor calibrations:
  • PAR, pH, Backscatter
  • ‘One stop shop’ for all oceanographic instruments

• ISO/IEC 17025 accreditation for Conductivity calibration
  • Reassessment of current uncertainty calculations
  • Analysis of salinometer performance
  • Proficiency testing of sensor calibration
  • External audit
Thank you

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