



CCT Member and Observer Activity Report

Period: May 2024 to May 2026

Institute: National Measurement Institute Australia (NMIA)

State economy: Australia

Number of persons involved in thermometry of the institute: 9

Short summary of research and development:

- Fixed-point thermometry and SPRT infrastructure

NMIA continued maintenance and renewal of its ITS-90 fixed-point cell ensemble, which now includes more than 40 fixed-point cells. New argon, mercury, indium, tin and zinc fixed-point cells were acquired or replaced to maintain long-term measurement capability.

A commercial single-charge argon triple point realization system was modified into a multi-charge apparatus, improving operational efficiency and supporting future realization of the ITS-90 scale. The laboratory has also continued replacing legacy resistance bridges with MicroK bridges as part of an ongoing modernization program.

Technical work from NMIA was presented at TEMPMEKO 2025

- Industrial temperature calibration

To improve service continuity and operational resilience, duplicate calibration baths have been established across key temperature ranges. Routine quality monitoring of ice-point realizations is maintained through comparison with the water triple point.

Additional risk management measures have been implemented for high-temperature oil bath systems, including redesign of cooling-water infrastructure and safety reviews.

- Humidity and trace moisture metrology

NMIA continues routine calibration services for relative humidity, dew/frost point and trace moisture measurements.

Growing demand from transformer, energy and gas-industry customers has led to expansion of humidity calibration capability, including development of a second RH/T calibration system. Work is underway to improve the primary humidity generator and establish real-time monitoring of chamber air uniformity.

Development activities are focused on extending trace moisture measurements to lower frost-point temperatures using a two-flow-mixing system, implementation of a new chilled-mirror reference hygrometer, and development of a new primary trace moisture generator with reduced uncertainty.

NMIA has also initiated collaboration with Australia's hydrogen gas purity program to establish trace moisture measurement capability in hydrogen using cavity ring-down spectroscopy (CRDS), supporting Australia's emerging hydrogen industry.

- High-temperature thermometry

Miniature copper fixed-point cells continue to be used for thermocouple calibration as an alternative to gold fixed-point realizations. Research is ongoing into the influence of thermocouple inhomogeneity on measurement performance.

Development work is progressing toward the implementation of cobalt-carbon fixed-point cells for calibration up to approximately 1400 °C and support of future radiation thermometry capability.

Short summary of recent comparison activity:

- Participated in APMP. T - K9
- Participated in APMP. T – S8
- Participated in APMP. T – K6 (Draft A)
- Participated in APMP. T – S13 (Draft A)
- Participated in APMP. T – S14 (Draft A)
- Participated in APMP. T – S17 (Draft B)
- Participated in APMP zinc-cell pilot comparison.
- Participated in APMP-T-S16 (final report published)