

The temperature group at Justervesenet

CCT 29th meeting, session 5

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Justervesenet (JV)



- The NMI of Norway
- Approx. 30 people working with national standards
 - Mass and related quantities
 - Flow
 - Electromagnetic quantities
 - Radiometry
 - Thermometry
 - Length and dimensional quantities
 - Time and frequency
- Disseminates SI to national clients
- Research and development
- Traceability support for the legal metrology department
- Notified body in some areas

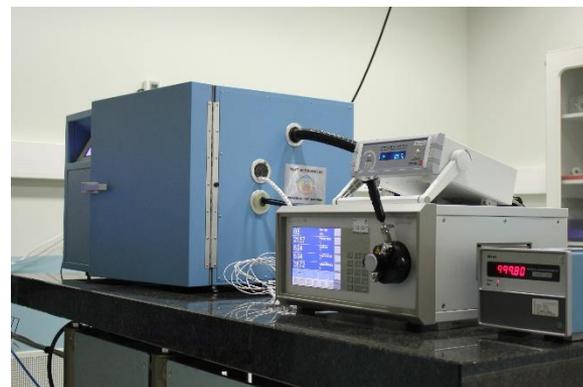
The temperature group

- 5 employees
- 1 physics PhD, 1 chemistry PhD, 1 physics master, 2 engineers



The temperature group

- ITS-90 fixed points from Ar to Ag + Cu
- A secondary lab (-196 °C to 1200 °C)
- Radiation thermometry below 1000 °C
 - VTBBs used as references
- Humidity
 - Relative humidity [10 95] %RH, [-40 +70] °C
 - Dewpoint [-80 +65] °C
 - Air temperature [-40 +85] °C
- The humidity lab has recently been upgraded:
 - New climate chamber
 - New reference dewpoint mirrors
 - Air temperature equipment
 - Currently constructing a new primary dewpoint generator





SI dissemination 2020

Field	Number
Fixed point	15
Secondary	83
Humidity	49
Radiation thermometry	21



Traceability activities - comparisons

Recent key comparisons	Topic	Role
EURAMET.T-K9	Fixed points Ar to Zn. SPRT as circulating device.	Participant
EURAMET.T-K9.1	Fixed points Hg, TPW, Ga, Sn, Zn	Pilot, link, coordinator
Supplementary comparisons		
EURAMET.T-S3	Pt-Pd thermocouples at fixed points	Participant
European comparisons		
ATM ILC (P1459)	Air temperature between -80 °C and +60 °C	Coordinator and link
P1352	Relative humidity, [10 95] %RH, [-40 20] °C	Participant
P1189	Relative humidity, [10 95] %RH, [-10 70] °C	Participant

Development activities

Acronym/code	Project topic	JV activity
EMPRESS 1	Enhancing process efficiency in high value manufacturing	Analyse the use of sapphire tubes as light guides for pyrometers
EMPRESS 2		Utilize blackbody radiation as auxiliary data for sapphire FBG fibres
MetForTC	Traceable Measurement Capabilities for Monitoring Thermocouple Performance	Evaluate the use of optical fibres in conjunction with multispectral pyrometry as a surveillance method
HUMEA	To develop measurement and research capabilities for dew point/%RH	A guest researcher at INRiM for 3 months, work on humidity subchambers
Meteomet	Metrology for meteorology and climate	To evaluate historical records of temperature data from weather stations
EMN Climate and Ocean Observation	European Metrology Network for various climate/meteorology related quantities	Traceability for field measurements of temperature and humidity
P1459	Air temperature metrology	Coordinating a European ILC, development of improved calibration facility for air temperature sensors
P1149	Surface temperature	Hot plate calibration setup used in an ILC





Motivation for CCT membership

- To contribute in developing industrially relevant thermometry at a global level
- To contribute in developing environmentally relevant standards, techniques and recommendations within the fields covered by CCT
 - Air temperature
 - Humidity
 - Moisture
- To contribute in developing the framework of international equivalence
 - Maintain the current equivalence through KCs
 - Explore ideas for enhancing the current system of international equivalence
 - Explore ideas for equivalence within the new SI

