

The Danish Technological Institute – In short



An self-owned and not-for-profit institution founded in 1906.

Staff: approx. 1100 Revenue: 146 EUR MILLION (2014) Customers: >10,000

Metrology:

Staff: approx. 50 Facilities: Temperature, Flow, Air-velocity Geometry, Length, Humidity, Moisture, Pressure, Force, Mass, Electrical, Frequency, ... + 17 Mobil laboratories for on-site



DI: Contact Thermometry, Water- and Energy Flow, Air-velocity, Geometry All services accredited by DANAK according to ISO 17025 (Calibration) and ISO 17043 (PT's) CMC's in BIPM database: 44 (and 6 more upcoming)

Organisation			Board of Representatives Board of trustees			TEKNOLOGISK INSTITUT	
Danish Technological Institute							
Building and construction	DMRI	Energy and climate	Materials	Life Science	Business and society	Production	AgroTech
Vice President Mette Glavind	Vice President Lars Hinrichsen	Vice President David Tveit	Vice President Mikkel Agerbæk	Vice President Bo Frølund	Vice President Jane Wickmann	Vice President Anne-Lise H. Lejre	Vice President Thomas B. Olsen
Concrete Sustainable Buildings Indoor Environment and Building Examinations Masonry Textiles Wood Technology	DMRI Business Development Hygiene and Preservation Meat Technology Measuring Systems and Data Integration Slaughterhouse Technologies	Energy and Climate Management Automobile Technology Biomass and Biorefinery Energy Efficiency and ventilation Installation and Calibration Refrigeration and Calibration Pipe Center Transport and Electric Systems	Packaging and logistics Functional Coating Metal and Surface Technology Plastic Technology Product Development Tribology	Life Science Management DTI Enhanced OilRecovery DTI Oil & Gas Food Technology Chemistry and Biotechnology Laboratory for Chemistry and Microbiology	Business Development Management Policy and Business Analysis Ideas and Innovation Training Subsid Danfysik A/S Teknologisk Institut AB Sverige Dancert A/S	Metrology and Quality Assurance Nano and Microtechnology Health and Human Interaction Technologies DTI Polska DTI Spain Teknologisk Innovation A/S	Food Innovation Environmental Technology Plant Technology Fieldtrials, technology and analysis Software Development

Metrology is a key activity for DTI



- DTI make sure that our customers have access to knowledge and technology that give them the optimum background for meeting their customers.
- Metrology is a key-enabling tool for industry and a part of the DTI Strategy
- Participation in the EURAMET cooperation help us keeping our services on an international high level and certificates internationaly accepted

EMRP and **EMPIR** Participation



DANISH TECHNOLOGICAL

- Participation in EMPIR helps us developing new metrology services for our customers
- What we bring in to the projects:
 - a very large industrial network and a good insight into industrial needs
 - good contact to standardisation
 - acces to advanced equipment that often is not possessed by NMI's (CT-scanners, 3Dprinting, advanced chemical analysis etc.)
- Participation in EMRP/EMPIR: 2009 Powerplants (flow) 2010 MADES (temperature) 2010 METEOMET (air-velocity) 2011 MeDD (micro-flow) 2012 Metefnet (moisture) 2012 Microparts (geometry)

2013 METEOMET2 (air-temperature, air-velocity)2014 EMPRESS (temperature)2014 HIT (moisture)2015 SIB Medd (micro-flow)

EMRP – MeDD (microflow)

Because Denmark has

- A large number of pharmaceutical manufacturers using micro-flow measurement in research and production
- Manufacturers of medical devices for critical drug delivery (insulin pumps, syringes etc.)
- Hospitals having a high number of infusion pumps. Health personnel interviewed indicated that malfunctioning of the pumps caused problems for example in neonatal intensive care

What can we do now:

- We have extended our accredited calibration services in water flow to extend the existing range down to 1 µl/h. And now cover from 1 µl/h to 500 m³/h by means of primary realization.
- We calibrate pumps for customers down to 1 µl/h
- Characterize pumps, e.g. with respect to flow pulsation
- Offer consultancy and training



EMRP – Metefnet (moisture in materials)

Because

- The energy consumption in Denmark related to drying processes amounts more than 17 % of the total energy consumption
- Moisture affects a lot of products produced or processed in Denmark, for example: medicals, food, feed, biomass
- Errors and inconsistent measurement and control of the material moisture is to blame for waste of products, reduced shelf life of food, large energy consumption and increased emmisions in connection with combustion of bio-mass.

What can we do now (soon):

- We have established a unique primary standard measuring ALL the water and ONLY the water from a sample and traceable to dewpoint temperature and flow.
- We can validate customers' equipment and methods
- Offer consultancy and training to Danish industry



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DI Cooperation nationally: Danish Center of Excellence for flow measurement





- Together the two Institutes facilities are among the largest in Europe
- Total staff (flow): approx. 50
- Water flow: 1 µl/h to 500 m³/h (4 °C to 85 °C) - on-site calibration up to DN 1000 and 17,000 m3/h
- **Gas flow:** 1 ml/min. to 10000 m3/h
- Air-velocity: 0,05 m/s to 30 m/s
- Other liquids: oil, gasoline, liquefied petroleum gas and related products







• The Cooperation is based on a formal agreement.

Activities:

- Cooperation in research shared milestones in performance contracts
- Organize a yearly national flow conference for industry and utilities
- Organize regular meetings in a group for informal exchange of experience (industry and utilities).
- Organize regularly national intercomparisons in flow and anemometry.
- Cooperation concerning MID approval of heat-meters.

