Status of Verification of Temperature/Humidity Chambers within IECEE CB Scheme

Cannes 2018

IECEx ExTAG Training

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Background

- Committee of Testing Laboratories (CTL) ~ IECEx ExTAG
- CTL WG 01, "Metrology and Accuracy/Uncertainty”

Title / Description

CTL WG 01

CTL WG 01 "Metrology and Accuracy/Uncertainty"

Convenor

Mr Hall Jeffrey
UL RTP

Technical Advisors

Last Name, First Name	Company

Members

Last Name, First Name	Company
Mr Andersen Morten	NEMKO AS
Mr Barbini Daniel	CSA Group Testing & Certification Inc. (Toronto)
Mr Florczyk Robert	UL (US)
Mr Hingott Michael	TÜV SÜD Product Service GmbH
Mr Lescure Marc	LCIE
Mr Ologbosere John	TÜV Rheinland Japan Ltd.
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Mr Schorn Heribert	UL (Demko)
Mr Schrepfer Karlheinz	VDE Prüf- und Zertifizierungsinstitut GmbH
Mr Schutt Jeffry	Intertek Testing Services Shanghai
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Research

- Several years' work
- Standards analysis
  - > 2500 IEC standards
  - ~1000 unique standards
- All IECEE categories except:
  - EMC
  - INST – Installation accessories & connection devices
  - TOOL
  - TOY

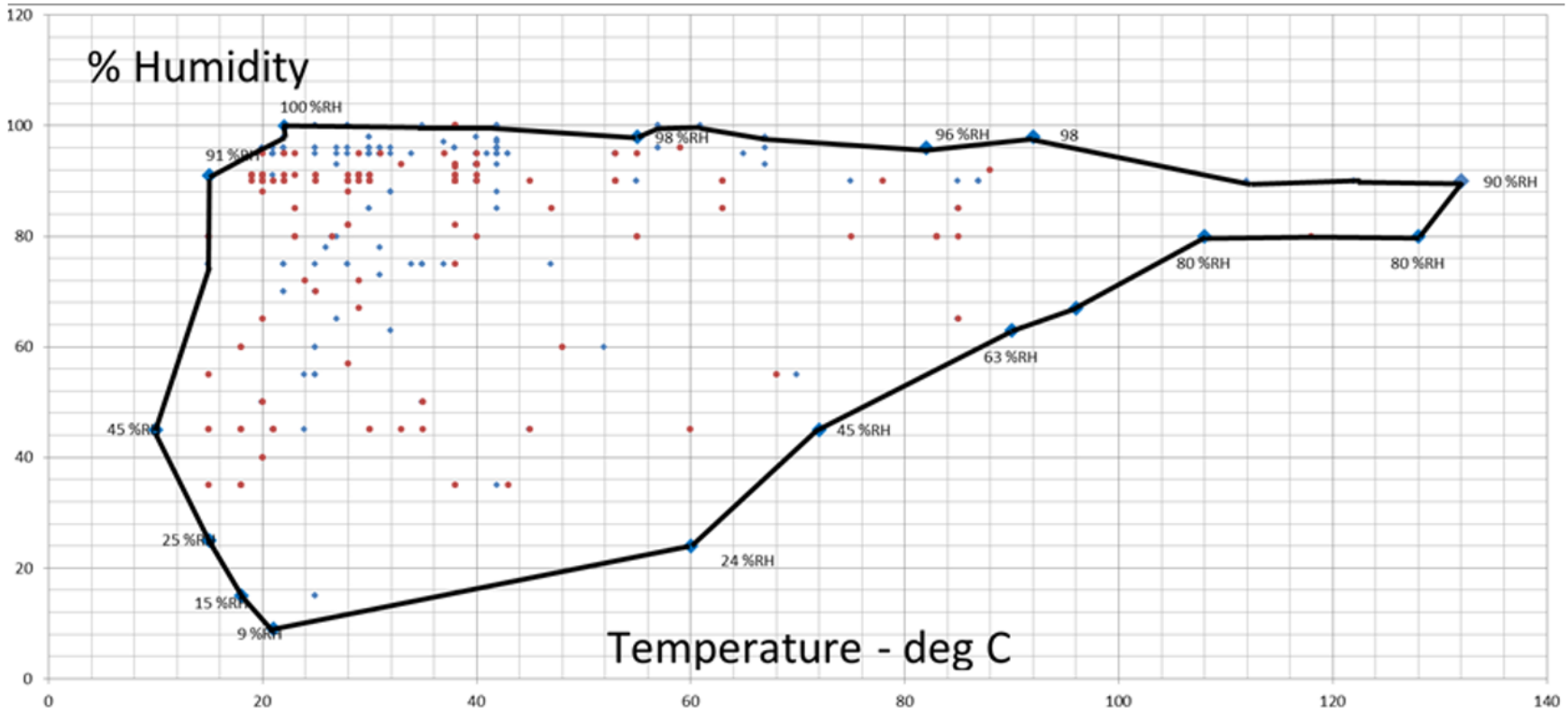
Results - Standards

- 135 standards - Defined RH / T values
- 250 different set point values
- 181 standards reference directly or indirectly:
  - IEC 60068-3-5 (Temperature) or
  - IEC 60068-3-6 (Temperature & Humidity)

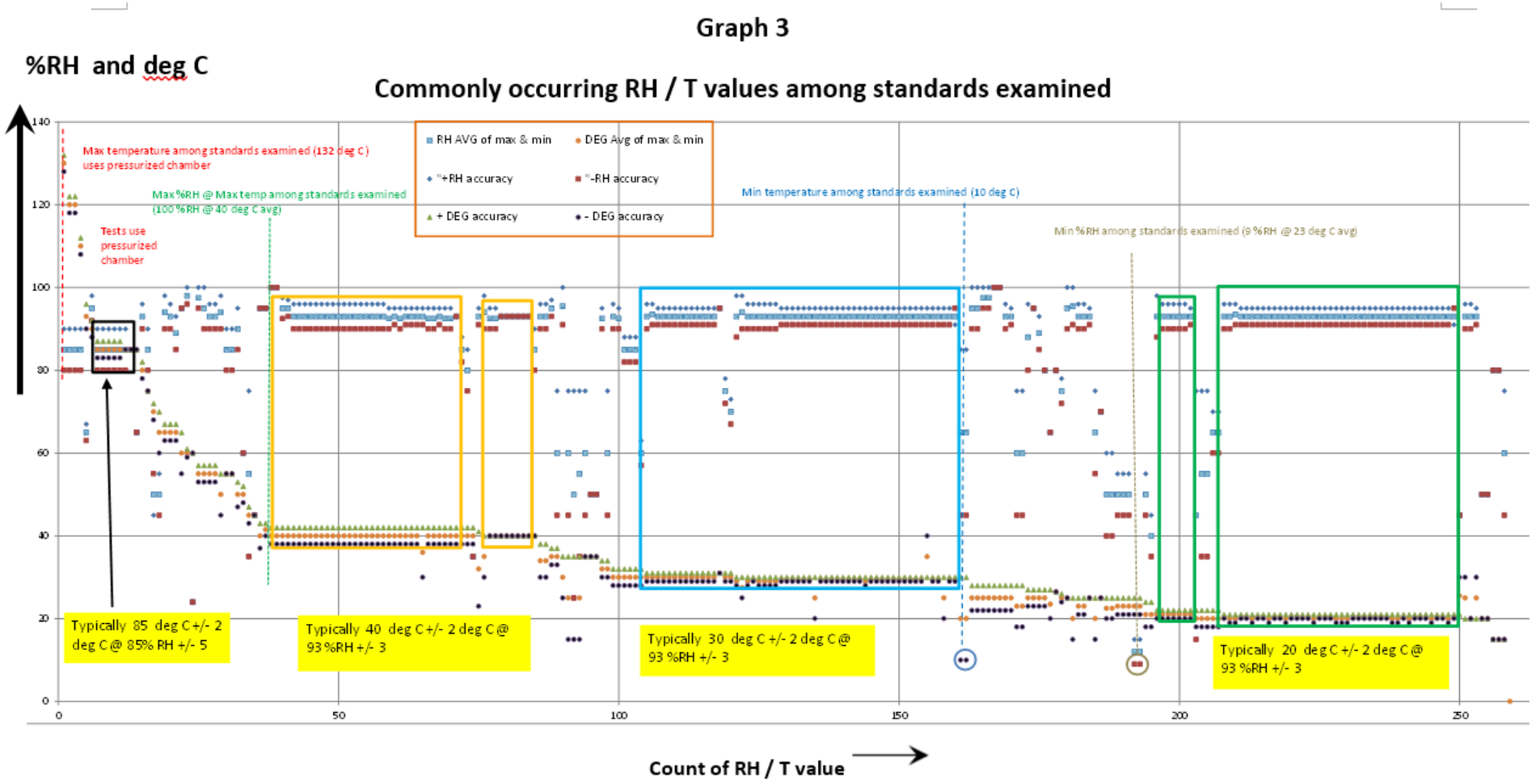
Results – Climate Graph

Graph 1

"Ideal" climate graph of RH / T values in IEC standards examined



Results – Common RH/T Values



Chamber Design & Performance

- Performance typically point or dimensioned area
- Mounting of RH/T sensors
- Control circuit design for humidity & temperature not necessarily coordinated
- 1°C can create change of ~4% RH
- Heat sources for air heating and humidity generation create fluctuations in RH/T control circuits as chamber attempts to maintain the desired set point

Empty Chamber Working Space Characterization

- Understand basic RH / T gradients across working space
- Good first approximation of chamber performance
- Test sample affect air flow
  - Creating potential “dead” spots
  - Airflow may be more turbulent
  - Either may be beneficial or detrimental to test

Base Line Profile

- Chamber specs do not always provide full details
- Knowledge of conditions allow proper sample placement
- IEC 60068-3-6:
  - 9 temperature < 2000 liters
  - 15 temperature sensors > 2000 liters
  - At least one humidity sensor within the chamber.
  - Variation in RH across the chamber (gradient) due to temperature differences at the temperature sensor locations provides means to calculate the RH

OD Draft Development

- Early stages
  - Approval by CTL WG01 still needed
  - Approval by CTL still needed – maybe 2019?
- Purpose – Verification temperature/humidity chambers
- Scope – Only when test standard does not provide criteria verification
- Proposed full verification intervals – no longer than 36 months
- Defines calibration requirements for equipment used for verification
- Measurement uncertainty requirements