

## 27th CCT Meeting

# APMP Reports

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21~23 May, 2014

BIPM, Paris

France

Dr. Yong-Gyoo Kim

Chair, APMP TCT

Center for Thermometry,

KRISS, Korea



# Contents

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- I. Organization of TCT
- II. Events in 2013 (meetings, workshops, etc)
- III. Events in 2014 (meetings, workshops, etc)
- IV. CMCs
- V. Comparisons
- VI. Peer reviews

# I. TCT organization

- Chair: Dr. Y.-G. Kim (KRISS, Korea)
  - ◆ Vice-chair: to be elected in 2014
  - ◆ 1 year Chair-elect + 3 year Chair + 1 year Past-Chair

Working group	Leader	Member	Linkage to CCT
SPRT and FPs	K. Yamazawa (NMIJ)	I. Yang (KRISS) J.P. Sun (NIM) S. Tsai (CMS)	WG1 WG3
Radiation thermometry	Y. Yamada (NMIJ)	J. Ishii (NMIJ) L.Wang (NMC) S.D.Lim (KRISS)	WG5
Industrial thermometers	Y.-G. Kim (KRISS)	G. Zaid (KIM-LIPI) C.C Yeh (CMS)	WG2
Humidity	J. Lovell-Smith (MSL)	H. Abe (NMIJ) L. Wang (NMC) B.I.Choi (KRISS)	WG6
Thermophysical quantities	M. Akoshima (NMIJ)	S.Y.Kwon (KRISS) N. Yamada (NMIJ)	WG9

# Tasks of working groups

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- Planning of new APMP-KCs and -SCs to promote new CMC entries
- Review of proposed APMP-KC, -SC protocols (Comparison WG)
- Call for new CMC submission (on round call or an as-needed basis)
- Intra-RMO (APMP) review of CMC based on the CCT review protocols
- Inter-RMO reviews of CMC under CCT-WG8 and JCRB
- Contribution to revision or new proposal for the CMC review protocols
- Liaison to CCT-WGs

## II. Events in 2013

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1. APMP Workshop
  - May, Tsukuba, Japan
2. APMP Mid-year Meeting
  - June, Colombo, Sri Lanka
3. APMP TCT meeting
  - December, Taipei, Taiwan

# II-1. 2013 APMP Workshop

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## □ APMP Radiation Thermometry Comparison Preparation Workshop

- ◆ Objective: To prepare for the coming APMP radiation thermometry comparison (APMP T-K5-2013/T-S2-2013, piloted by NMIJ), by being introduced to the comparison protocol, and to be familiarized with the handling and operation of the transfer devices
- ◆ 28 May ~ 30 May, 2013
- ◆ AIST, Tsukuba, Japan
- ◆ Participant NMIs: KRISS, NIM, NIMT, NMC A\*STAR, Puslit KIM-LIPI, SIRIM 28 May ~ 30 May, 2013
- ◆ Number of participants: 14 (including 5 from NMIJ)



# II-1. 2013 APMP Workshop

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- Agenda (in brief)
  - ◆ Day 1- Opening, Introduction to each NMIs calibration facilities and services, Protocol of the comparison, Protocol of the CMC review, Evaluation of the comparison result
  - ◆ Day 2- Presentation on and demonstration of the transfer devices
  - ◆ Day 3- Lab tour, Comparison schedule, Discussion on the protocol
  
- Tentative timetable
  - ◆ June Agreement on protocol
  - ◆ August CCT authorization of protocol
  - ◆ Sept. Start of comparison
  - ◆ Dec. 2015 Draft A report 28 May ~ 30 May, 2013



## II-2. 2013 Mid-year meeting

- 24 June ~ 28 June, 2013
- Taj Samudra Hotel,  
Colombo, Sri Lanka
  - ◆ First day: EC/TC meeting
  - ◆ Second day: EC-TCC meeting
  - ◆ Third day: Symposium and Lab-tor
  - ◆ Fourth day: DEC workshop
- Annual report on the activities of TCT





## II-3. 2013 APMP TCT meeting -1

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### □ Participants

- ◆ 12 NMIs, 20 participants
  - KRISS, NMIJ, NIM, NMIA, CMS, KIM-LIPI, NIMT, SIRIM, ASTAR, ITDI, NMISA, NSC-MIPK
- ◆ 2 from Brunei (NSC-MIPK), want to be a member in next year

## II-3. 2013 APMP TCT meeting -2

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### □ CMC reviews

- ◆ 72 items from 4 NMIs were published in 2013 (increased by 72 items to 2012).
- ◆ 84 items from 8 NMIs were reviewed.
- ◆ TCT sets the guideline for CMC submission
  - Deadline: End of July each year
  - Shall use the data sheet from JCRB set.
  - Follow the CIPM-MRA-04 document strictly.

### □ Peer review

- ◆ Reviewers for SCL (Hong Kong) and KIM-LIPI (Indonesia) are approved.

## II-3. 2013 APMP TCT meeting -3

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### □ APMP Comparisons

- ◆ Decision on next CCT-K5.2014 APMP participants
  - KRISS, NMIJ, NIM selected
- ◆ New APMP comparisons approved
  - KC for Ag point
    - Pilot: NMIJ, Co-pilot: KRISS
    - To be APMP.T-K4.2
  - KC for SPRT Ar ~ Zn
    - Pilot: NIM, Co-pilot: KRISS, NMIJ
    - APMP.T-K9
  - SC for Thermocouple up to 1500 °C
    - Pilot: NMIA
    - To be APMP.T-S14
  - SC for Ear thermometer
    - Pilot: NIM
    - To be APMP.T-S15

## II-3. 2013 APMP TCT meeting -4

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- TCT resolution on the delay of comparisons
  - ◆ Delay of KC/SC without an **inevitable reason**
    - In case of delay longer than indicated in the protocol
    - Restriction as in the protocol applied
    - And restrict to the participation in other comparisons until problem is solved.
    - This resolution is applied to new comparisons hereafter.

## II-3. 2013 APMP TCT meeting -5

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### □ TCT guideline on workshop

- ◆ TCT has a satellite workshop just before the APMP meeting **every year**.
- ◆ 2014 Workshop
  - ‘**Meteorological measurements** of temperature and humidity in country’
  - Subject related to the TCT strategy and PTB-APMP-APLMF work-plan

### □ TCT guideline on Lab reports

- ◆ At every **even** year, TCT member NMIs should present their laboratory report at the meeting.

# III. Events in 2014

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## 1. APMP Mid-year Meeting

- 1 ~ 5 June, Jakarta, Indonesia

## 2. APMP Workshop

- 19 ~ 20 September, Daejeon, Korea
- Subjects on meteorological temperature and humidity measurements in APMP region

## 3. APMP TCT meeting

- 21 ~ 26 September, Daejeon, Korea
- Next TCT chair person will be nominated.

# IV. CMCs

Country	Institute	Published 2013	Actions in 2014			Total
			APMP Reviewed	WG8 Submitted	WG8 Approved	
Australia	NMIA	26				26
China	MIM	23	8	7		23
Hong Kong	SCL	38	3	3		38
India	NPLI	4				4
Indonesia	KIM-LIPI	8	4	3		8
Japan	NMIJ	39	10	5		39
Korea	KRISS	69	7	7		69
Malaysia	SIRIM	6				6
New Zealand	MSL	14				14
Singapore	NMC-A*STAR	80	5	1		80
South Africa**	NMISA	37				37
Taiwan	CMS	20	7	7		20
Thailand	NIMT	19	40	24		19
Vietnam	VMI	4				4
Total		387	84	57		387

# V. Comparisons-APMP KCs

- 11 KCs are running, (including 7 BCs) and one is in preparation/
- 1 KC (APMP.T-K4) was finished in 2013

KC Code	Short description	Person-in-charge	No. of Participants	Status						Remarks
				Protocol	Measurement	Draft A	Draft B	WG7 review	KCDB published	
K3.4	SPRT Hg ~ Zn, BC	Dr.W.C. Joung wukchul.joung@kriss.re.kr	2	Done	Done	In prep				
K3.5	SPRT Zn, BC	Dr. K.S.Gam ksgam@kriss.re.kr	2	Done	Done	In prep				
K3.6	SPRT Ar, BC	Dr. J. Sun sunjp@nim.ac.cn	2	Done	Going					
K3.7	SPRT Ar, BC	Dr. J. Sun sunjp@nim.ac.cn	2	Under review						
K4	SPRT Al	Dr. K.S.Gam ksgam@kriss.re.kr	8	Done	Done	Done	Done	Done	Done	May, 2013 finished
K4.1	SPRT Ag, BC	Dr. J. Sun sunjp@nim.ac.cn	2	Done	Going					
K4.2(?)	SPRT Ag	Dr.K.Yamazawa kazuaki-yamazawa@aist.go.jp	NC	In prep						
K6.1	Dew point, BC	Mr. Thasorn Sinhaneti thasorn@nimt.or.th	2	Under review						
K6.2013	Repeat of K6	Dr. Wang Li wang_li@nmc.a-star.edu.sg	10	Under review						
K7	TPW	Ms. Shu-Fei Tsai shu-fei_tsai@itri.org.tw	11	Done	Done	Done	Done	Under review		
K7.1	TPW, BC	Dr. J. Tamba j-tamba@aist.go.jp	2	Done	Going					
K8	High humidity	Jeremy.Lovell-Smith@callaghaninnovation.govt.nz	10	Done	Going					
K9(?)	SPRT Ar ~ Zn	Dr. J. Sun sunjp@nim.ac.cn	NC	In prep						



# Some key issues

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## □ APMP.T-K4.2 (planned)

- ◆ SPRT in Ag point
- ◆ Previous K4 (SPRT at Al and Ag point) was failed to get data at the Ag point.
- ◆ To compensate, new KC is planned.
- ◆ NMIJ and KRISS will act as pilot.

## □ APMP.T-K6.2013

- ◆ Repeat of APMP.T-K6, humidity standards  $-50\text{ }^{\circ}\text{C D.P.} \sim 20\text{ }^{\circ}\text{C D.P.}$  since it was done long time ago (1997).

## □ APMP.T-K9 (planned)

- ◆ Same to CCT-K9
- ◆ NIM will guide this comparison soon.

# V. Comparisons-APMP SCs

- 13 SCs are running, and two are in preparation.
- 1 SC (APMP.T-S5) was finished in 2013

KC Code	Short description	Person-in-charge	No. of Participants	Status						Remarks
				Protocol	Measurement	Draft A	Draft B	WG7 review	KCDB published	
S5	Au/Pt	Dr.Ferdouse Jahan Ferdouse.Jahan@measurement.gov.au	7	Done	Done	Done	Done	Done	Done	Published in 2013
S6	IPRT	HAFIDZAH B.OTHMAN hafidzah@sirim.my	16	Done	Done	Under review				
S7	Co-C	Dr.Y.G.Kim dragon@kriss.re.kr	5	Done	Done	In prep.				
S8	LIG	Monalisa G. Ragay phy6_i_lyk@yahoo.com	7	Done	Going					
S9	Thermal diffusivity	Dr.M.Akoshima m-akoshima@aist.go.jp	4	Under Review						
S10	Thermal conductivity	Dr.S.Y.Kweon kweonsy@kriss.re.kr	5	Under review						
S11	Radiation thermometer (156 °C ~ 2000 °C)	Mr. Yoshiro Yamada y.yamada@aist.go.jp	12	Done	Going					
S12	Radiation thermometer (960 °C ~ 2800 °C)	Mr. Yoshiro Yamada y.yamada@aist.go.jp	9	Done	Going					
S13	Humidity (-90 ~ -60 C D.P.)	Jeremy.Lovell-Smith <a href="mailto:Jeremy.Lovell-Smith@callaghaninnovation.govt.nz">Jeremy.Lovell-Smith@callaghaninnovation.govt.nz</a>	7	Under review						
S14(?)	Thermocouple (1000 °C ~ 1560°C)	Dr. Van Der Ham, Eric Eric.VanDerHam@measurement.gov.au	NC	In prep.						
S15(?)	Ear thermometer	Mrs. Bai Chengyu baichy@nim.ac.cn.	NC	In prep.						

# Some key issues

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- APMP.T-S7
  - ◆ Co-C eutectic point using Pt/Pd thermocouples as travelling standards
  - ◆ Long delay more than 2 years due to problems in some participant. (Not ready for measurement initially and fire hazard later, etc.)
  - ◆ Very recently measurements are completed.
  - ◆ This comparison is a origin of APMP TCT resolution on the delay of comparisons.
- APMP.T-S8
  - ◆ Comparison of Liquid-in-Glass thermometers filled with mercury
  - ◆ Big problems in custom clearance and courier transportation
  - ◆ APMP is now considering the replace of artifacts by alcohol-filled thermometers.
- APMP.T-S10
  - ◆ Comparison of thermal conductivity of thermal insulating materials
  - ◆ Besides of APMP, other RMO NMIs are willing to participate in this comparison.
  - ◆ Now protocol is revising.
- APMP.T-S11 and S12
  - ◆ Comparison on radiation thermometers as travelling standards.
  - ◆ These are closely related with the coming CCT comparison on radiation temperature.

# V. Comparisons-CCT KCs

KC Code	Short description	Person-in-charge	Status						Remarks
			Protocol	Measurement	Draft A	Draft B	WG7 review	KCDB published	
K3.2	SPRT Ar ~ Zn	Dr. J. Sun sunjp@nim.ac.cn	Done	Done	Done	Under review			NIM, NMC
K8	High dew point	INTA	Done	Done	Under review				NMIJ, MSL, NMC
K9	SPRT Ar ~ Zn	NIST	Done	Going					KRISS, NMIJ, NIM, NMIA
K4.1	SPRT Ag	Ms. Kim Nguyen kim.nguyen@nmi.gov.au	Done	Going					NMIA, NMIJ
K10(?)	Radiation temperature	NPL	Under review						KRISS, NMIJ, NIM

The participants of K10 (radiation temperature) were determined at the last APMP TCT meeting.

# VI. Peer review

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<b>NMI</b>	<b>Date</b>	<b>Scope</b>	<b>Peer reviewers</b>
NMIJ (Japan)	Jan. 2013	Radiation temperature	Dr. Seung Nam Park (KRISS)
SCL (Hong Kong)	Jan. 2014	Temperature Humidity	Dr. Rod White (MSL) Dr. Wang Li (ASTAR)
NIMT (Thailand)	July 2014	Contact temperature Radiation temperature Humidity	Dr. Kazuaki Yamazawa (NMIJ) Dr. Naohiko Sasajima (NMIJ) Dr. Hisasi Abe (NMIJ)
KIM-LIPI (Indonesia)	Oct. 2014	Humidity	Dr. Hisasi Abe (NMIJ)

*Thank you.*

