



International Energy  
Policy & Programme  
Evaluation Conference

Bangkok 2017

# Harmonization of Standards for the Testing Method of Air-conditioners in ASEAN

Dr Chin, Wai Meng

2<sup>nd</sup> November 2017



International Copper  
Association Southeast Asia  
Copper Alliance



# Presentation outline

- WHAT....
- WHY....
- WHEN & WHERE....
- HOW....
- WHO.....
- Experiences from ASEAN
- Conclusion

# WHAT.....

- Program initiated in 2010 by ICA and UNEP under the steering of the ASEAN EE&C SSN:
  - Study conducted on estimate of EE related to increase in MEPS for AC and refrigerators in ASEAN
  - Critical needs identified: harmonization of standards for testing methods and MEPS
  - Strategic framework for harmonization of EE standards for household appliances developed and approved by EE&C SSN
  - ACs selected as priority
- “APEC-ASEAN Harmonization of Energy Efficiency Standards for Air Conditioners: Phase 1” is the first step in harmonization of EE standards for ACs
- APEC economies to draw lessons on harmonization in ASEAN

# Project Framework

- Creation and meetings of the Policy Working Group (PWG) to provide policy guidance; and the Technical Working Group (TWG) assembling key experts to lead the technical work on standards development
- A report on recommendations for an ASEAN harmonized standard for testing methods through work of the TWG and extensive stakeholders consultation and approval by the ASEAN EE&C SSN and the APEC EGEEC and SCSC
- A report on recommendations on the way forward for an APEC-wide harmonization of standards for testing methods for air conditioners in consultation with APEC EGEEC and SCSC

# Putting into perspective



The function of the Policy Working Group (PWG) is:

- To liaise with the Technical Working Group (TWG) to ensure necessary linkages between the testing methods and the desired level of energy performance
- To work at policy level for the development of roadmaps for MEPS and HEPS in ASEAN.

The function of the Technical Working Group (TWG) is:

- To make recommendations to the Policy Working Group (PWG) regarding a harmonized standard of testing methods for air-conditioners.
- In terms of deliverables, the TWG is tasked to:
  1. Agree on a common definition of room air conditioners
  2. Develop a harmonized standard of testing methods based on the existing sets of standards at ASEAN level.

# WHY.....

- Market transformation  
Towards higher Energy Efficiency
- Establish Minimum Energy Performance Standard (MEPS)
- Guideline for future harmonization work

# WHEN & WHERE.....

## Project timeline

Activity	2013										
	...	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1. Formation of TWG	■										
2. 1 <sup>st</sup> meeting		■									
3. Draft common definition of ACs			■	■	■						
4. Comparative analysis of standards for testing methods			■	■	■						
5. 2 <sup>nd</sup> meeting						■	■				
6. Finalize common definition of ACs						■	■	■			
7. Draft harmonized standards for testing methods					■	■	■	■	■		
8. 3 <sup>rd</sup> meeting									■		
9. Finalize harmonized standards for testing methods										■	■

Bangkok, 20<sup>th</sup>  
February 2013

Teleconference,  
6<sup>th</sup> June 2013

Jakarta, 2<sup>nd</sup> July  
2013

Teleconference,  
18<sup>th</sup> October 2013

Bangkok, 14<sup>th</sup>  
November 2013

\* Total project time frame = **9 months**

# HOW.....

- A comparison analysis of commonalities and differences was done between the benchmark ISO5151:2010 standard and the national test standards used in respective ASEAN countries.
- Of the 10 ASEAN countries, only 6 countries have responded to the study, i.e. Malaysia, Singapore, Thailand, Indonesia, Viet Nam and Philippines.

INTERNATIONAL  
STANDARD

ISO  
5151

Second edition  
2010-08-15

---

**Non-ducted air conditioners and heat  
pumps — Testing and rating for  
performance**

*Climatiseurs et pompes à chaleur non raccordés — Essais et  
détermination des caractéristiques de performance*

# Methodology

- Comparison is done between each related clause in ISO 5151:2010 with the corresponding clauses in the national test standards used in each ASEAN country.
- Energy efficiency standards, e.g. MEPS, are not considered.
- Comparison is focused on cooling capacity testing, not covering performance testing, and heating tests.
- For this purpose, a questionnaire was sent out to the TWG members. Feedback from the members are then compiled and analyzed.

# National test standards

- The following is a list of the national test standards used in the respondent countries:
  - a) Malaysia MS ISO 5151:2004
  - b) Singapore ISO 5151:1994
  - c) Thailand TIS 1155-2536, TIS 385-2524
  - d) Indonesia SNI 19-6713
  - e) Viet Nam TCVN 6576:1999
  - f) Philippines PNS 240:1998
- Malaysia, Singapore, Vietnam and Philippines have been referencing the older version of ISO5151:1994.
- Brunei, Laos, Cambodia and Myanmar have not established any national test standards at the time of the project.

# Findings

- The results of the analysis show that about 80% of the relevant clauses in the standard are common among the respondent countries' national test standards.
- However, there are several differences among the standards which require closer scrutiny, i.e.:
  - a) Test condition T1 vs. T4
  - b) Test voltages specified in ISO5151:2010 standard (i.e. Table 2) vs. national power supply voltages
  - c) Duration of test data recording and interval of data recording
  - d) Allowable variation of entering indoor air temperature readings during steady-state cooling capacity tests
  - e) Location of test unit in the outdoor test room, and the percentage of piping length in the two room chambers
  - f) Acceptance of both calorimeter and indoor air-enthalpy test methods

# Rationalization of gaps

- Through a series of discussions, the TWG has agreed, in the interest of harmonization, to change some of their existing test procedures and policies to close the gaps.

Differences	ISO5151:2010 clause	Recommendations of TWG
Gap #1 Test condition T1 vs. T4 which is used in Philippines	5.1.2.1	T1 test condition to be used for determination of cooling capacity rating.
Gap #2 Test voltage of 220V used in Thailand vs. 230V as indicated in Table 2 of ISO 5151:2010	Table 2	The test voltages for capacity testing stipulated in Table 2 of ISO 5151: 2010 to be followed.  Thai Industrial Standard Institute (TISI) has agreed to amend TIS1155 standard to change the test voltage to 230V, though time is required for implementation (2-3 years).

# Rationalization of gaps

Differences	ISO5151:2010 clause	Recommendations of TWG
Gap #3 Differences in duration of test data recording and interval of data recording	5.1.4.3, 7.3.3, 7.3.5	<p>The duration of test data recording and interval of data recording stipulated in ISO 5151: 2010 to be followed.</p> <p>Test data recording duration = 30 minutes (minimum), interval of data recording for air temperatures <math>\leq 1</math> min.; and others <math>\leq 5</math> min. Final reading averaged over the data recording duration.</p>
Gap #4 Variation of entering indoor air temperature readings during steady-state cooling capacity tests	7.3.1, 7.3.2	<p>The test tolerances of air entering temperatures stipulated in Table 11 in ISO 5151:2010 to be followed.</p>

# Rationalization of gaps

Differences	ISO5151:2010 clause	Recommendations of TWG
<p>Gap #5</p> <p>Location of test unit in outdoor room:</p> <ul style="list-style-type: none"> <li>- Distance of test unit from room wall surface</li> <li>- Percentage of pipe length in outdoor room</li> </ul>	Annex A	<p>The requirements of positioning the indoor and outdoor test units in the test chambers stipulated in Annex A of ISO 5151:2010 to be followed.</p> <p>Total pipe length = 7.5m with the percentage of total pipe length in the outdoor room set at 50%, which complies with the requirements in Annex A.</p>
<p>Gap #6</p> <p>Acceptance of both calorimeter and indoor air-enthalpy test methods</p>	7.1.1, 7.1.2, 7.1.3	<p>With the exception of Thailand, ASEAN members accept the test results from both calorimeter and indoor air-enthalpy test methods. However, Thai Industrial Standard Institute (TISI) has agreed to amend TIS1155 standard to accept results from both methods, though time is required for implementation (2-3 years). In view of this, the TWG recommends that both methods to be accepted.</p>

# Recommendations

- With the closure of these gaps, and high level of compliance among the national test standards, the TWG/PWG is in agreement for ASEAN to adopt directly the international ISO 5151:2010 standard as the harmonized standard of testing method for air conditioners.
- Other recommendations:
  - The TWG/PWG is recommending that the evaluation method for seasonal and part-loading performances with the ISO 16358 standard to be considered in the following next stages of the harmonization exercise.
  - It is also recommended that ASEAN national test laboratories should build balanced-type calorimeter rooms for the purpose of conducting cooling capacity rating tests on air-conditioners. However, barriers of insufficient funding and lack of technical expertise to build new facilities must be addressed in the next phases of this harmonization project.

# WHO.....

- TWG members who have worked together to complete this project:

Malaysia            En. Zamri Mustaffa, En. Fairuz Zainordin  
(SIRIM QAS)

Singapore        Ms. Michelle Ng (TUV SUD)

Thailand           Mr. Suebphong Suwannakut (EEI)

Indonesia        Pak Irwan Inayaturohman (B4T)

Vietnam           Ms. Doan Thi Thanh Van (VSQI)

Philippines      Ms. Mirna Campanano (LATL)

Cambodia        Mr. Hang Seiha (MIME)

- And not forgetting the guidance provided by ICA (Mr. Steven Sim & Mr. Bek) and METI, Japan (Ms. Naoko and Mr. Kaibara).

# Experiences from ASEAN

## 1. Scope of work

The harmonization exercise should start by restricting the scope of study within a manageable size. This will allow the working group to focus on harmonizing one set of testing standards among the economies for a start.

## 2. Level of receptivity

The harmonization exercise should focus on key economies which have medium and high levels of energy efficiency receptivity to drive the programme, who would then be role models for the less developed economies.

# Experiences from ASEAN

## 3. Agreement with a well-established standard

The successful harmonization of testing method in ASEAN is partly due to the referencing of existing national test standards to the ISO 5151:1994. Nevertheless, compromises are still needed to make changes to existing practises in the interest of harmonization.

## 4. Test facilities

There is a shortage of testing facilities in the ASEAN region. It is necessary to understand the capacity building plans of member economies and examine the difficulties and barriers to increase the testing capacity. Support should be given to less developed economies, in terms of technical expertise or providing advice in securing funding from relevant authorities.

Other possible mechanism is the establishment of Mutual Recognition Agreement (MRA) for accepting test reports from other member economies.

# Conclusion

- Phase 1 of the “APEC-ASEAN Harmonization of Energy Efficiency Standards for Air Conditioners” project has been completed with the recommendation of definition for RACs and adoption of ISO 5151:2010 as the harmonized test standard.
- The experiences gleaned from this ASEAN-wide exercise will serve as guidelines for similar harmonization efforts.



**Thank you for your attention**