AIR CONDITIONER TEST ISSUES FOR TTMRA: SUBMISSION BY THE AIRCONDITIONING AND REFRIGERATION EQUIPMENT MANUFACTURERS ASSOCIATION (AREMA) APRIL 2003

Introduction

AREMA is the industry association representing the views of the manufacturers and importers of airconditioning and refrigeration equipment in Australia. For more than 40 years AREMA has actively represented the industry, and over that time has worked closely with governments on matters ranging from tariff protection to ozone depletion. AREMA is a strong supporter of the Minimum Energy Performance Standard (MEPS), and is committed to work with Government to ensure the program produces the maximum practicable benefit for the environment and the consumer.

Background

Energy efficiency labelling for major appliances in Australia was first proposed in the late 1970s, by the State governments in New South Wales and Victoria. In late 1985, the NSW and Victorian state governments announced that those States would make energy labelling mandatory. Energy labelling for refrigerators and freezers became mandatory in 1986. In 1987 and 1988, room air conditioners and dishwashers were included in the legislative scheme. Although several states commenced mandatory labelling in the mid 1980s, it was not until 1992 that a mandatory national labelling scheme was finally agreed, and legislation in the last state and territory was not passed until 2000.

Energy labelling is made mandatory in Australia by virtue of State and Territory legislation and subordinate regulations ("State and Territory legislation"), which incorporate relevant Australian Standards. State and Territory legislation also specifies the requirements for energy labels for appliances and sets out

offences and penalties for non-compliance with legislative requirements.

Energy Labelling and Minimum Energy Performance Standards (MEPS)

Current Regulations

Single-phase room air conditioners for household use are regulated for energy labelling in Australia. Three phase air conditioners up to 65kW cooling capacity are regulated for MEPS. Manufacturers can choose to label three phase air conditioners, but this is not mandatory.

A new approach has recently been implemented in Australia for energy labelling and MEPS. Australian Standards for products that carry an energy label now have two parts:

- Part 1 covers the test procedure and ambient conditions such as the test method, performance measures and test materials;
- Part 2 contains the detailed technical requirements for regulation of energy labelling and MEPS (where applicable)

The published MEPS levels were resolved through negotiation with Australian industry in prior years. In 1997 the proposed levels for packaged air conditioners were first released officially for public comment. In 1999, officials wrote to industry and key stakeholders to advise that they intended to recommend to ANZMEC that MEPS start from 1 March 2001 (later changed to 1 October 2001). On 9 February 2001, the part of the air conditioning standard which covers energy labelling and MEPS (AS/NZS 3823.2) was republished to include the final MEPS levels for three phase air conditioners (the same levels as were released in 1997).

Proposed Regulations

The MEPS requirements for three phase packed air conditioners are due to be revised in 2007 while MEPS for single phase units are due to be introduced in 2004 and revised in 2007, as follows:

- Mandating a two stage process for MEPS for single phase airconditioners within relevant state and territory legislation commencing in or around July 2004 that remove the lowest

efficiency models and matching world best regulatory standards (the 2001 Taiwanese standards) from around July 2007;

- Mandating more stringent MEPS for three phase airconditioners within relevant state and territory legislation commencing around July 2007 that match the proposed 2003/2004 USA standards, the most stringent proposed in the world at present;

International Approaches

Internationally, energy labelling and MEPS for air conditioning is implemented in over 13 countries. Those with MEPS are shown in Table 1, with many of these countries being major trading partners of Australia.

Table 1: Countries with MEPS for Airconditioners

Country	***Central***	***Room (Window-wall and split)***	***Packaged terminal & HP***	***Single-packaged central & HP***	***Split-system central & HP***
Australia	M 2001	Planned	M 2001	M 2001	M 2001
Canada	M 1998	M 1995	M 1998	M 1998	M 1998
China		M 1998			
Costa Rica		M 1996			
India		V 1999			
Israel		M 1985			
Japan		T 1979			
Korea		M 1993			
Mexico	M 1998	M 1995			M 1998
Philippines		M 1993			M 2002
Russia		M 1986			
Saudi Arabia		M 2001			
Singapore		M 1998			
Taiwan		M 1991			
USA	M 1992	M 1990	M 1992	M 1992	M 1992

Source: *Energy Labelling And Standards Programs Throughout The World* EES & EC (2001) M=Mandatory, V=Voluntary, with year first introduced. In many countries cases MEPS levels have been raised at least once since year of introduction.

Tests and Measurements

Australian and New Zealand Standards

The testing standard for non-ducted air conditioners is AS/NZS3823 and was prepared by the Joint Standards Australian/Standards New Zealand Committee EL/15, Quality and Performance of Household Electrical Appliances. It supersedes AS 1861.1-1988, Airconditioning units-Methods of assessing and rating performance, Part 1: Refrigerated room air-conditioners. It is technically equivalent to, and reproduced from International Standards Organisation 5151:1994, Non-ducted air conditioners and heat pumps-Testing and rating for performance. . It should be noted that ISO has undertaken a revision of both the non ducted (ISO5151) and ducted air conditioner standard (ISO13253) over the past few years and many of the proposed changes by ISO TC86 SC6 working group 1 have already been included in the Australian/New Zealand Standard.

Part 2 of the Standard includes data on how to calculate star ratings and the comparative energy consumption (CEC - the energy number that appears on the label) for each appliance, details on the number of units to be tested, minimum performance requirements, application forms, check testing procedures, the design and shape of the energy label and how the label is to be affixed to the appliance. Part 2 also contains any requirements for MEPS for the particular appliance type.

In updating the test methods for each appliance, issues, which had to be considered by the Standards Committees, and were sometimes balanced against each other included:

- The requirement for any Australian or Joint Standard to adopt the relevant IEC or ISO Standard wherever feasible.
- The need for repeatability and reproducibility in testing.
- The requirement that appliances tested according to both the proposed and existing methods would generally need to achieve at least similar energy usage figures where possible, so as to avoid confusion over relative energy consumption/ efficiency.

- The need to cater for every design on the Australian or New Zealand market.
- The aim that the test methods should be relevant to actual usage by consumers.

International Standards

The majority of countries use a local testing standard that is based on the ISO standard and condition T1, as shown in Table 2

Table 2: International Test Standards for AC

Economy	Test procedure name	Test point name	Similarity to ISO 5151 point T1
Australia	AS/NZS 3823.1.1-98	T1	T1 except wet-bulb tolerances
Canada	CAN/CSA-C368.1-M90	None	Close to T1 excluding water cooled units
	CAN/CSA-C273.3-M91	A	T1 excluding water cooled units
	CAN/CSA-C744-93	None	Close to T1 excluding water cooled units
China	GB 7725-96	T1	T1
Hong Kong	ISO 5151-94(E)	T1	T1
Japan	JIS C9612-94	None	T1 (except water temperature tolerances)
	JIS B8616-93		
Korea	KS C 9306-97	NA	T1
	KS B 6369-95	NA	T1
Mexico	NOM-073-SCFI-94	None	Close to T1 except for water condenser units
Philippines	PNS 240-89	D	Close to T1 except outdoor wet-bulb and differences for water condenser units
Chinese Taipei	CNS 3615–95	Cooling condition	Very close to T1
	CNS 2725-95	Cooling condition	Close to T1 except for water condenser units
Thailand	TIS 1155-2536 (1993)		T1 except for exclusion of arithmetic mean tolerances
USA	10 CFR 430 Subpart B, Appendix F, ANSI/AHAM RAC-1-82 & ASHRAE 16-83-RA88	None	Close to T1 except for water condenser units
	10 CFR 430 Subpart B, Appendix M &ARI 210/240-94	A	T1 excluding water cooled units
	ARI 310/380-93	None	Close to T1 excluding water cooled units
International	ISO 5151-94(E)	T1	T1

Source: *Test Standards in APEC Member Economies*, final report, Nov 1999, EES et al

The USA uses a different testing standard for measuring the performance of airconditioners, however the test to determine energy performance (Energy Efficiency Ratio or EER) is based on the same conditions present in the ISO standard. The major difference with the USA is when Seasonal Energy Efficiency Ratio (SEER) is specified as the measure of energy performance. This test requires various measurements of the airconditioners performance at different temperatures and is used to determine a degradation co-efficient which is used to measure the efficiency loss as a result of cycling.

Standards Development

Each year the Australian Greenhouse Office, in the role of chair of the National Appliance and Equipment Energy Efficiency Committee (NAEEEC), commits resources to the development and revision of Standards to support the Energy Labelling and MEPS program. Examples of the support are:

- Funding of testing designed to develop industry competency with a new or developing Standard.
- Funding of testing programs designed to inform the process of the setting of MEPS levels.
- Commissioning of round robin testing programs designed to ensure that enforcement programs are based on robust and reproducible test methods.
- Provision of technical expertise to Standards Committees.
- Assistance to Standards Australia to maintain representation on key international Standards Committees.
- Assistance in the development and maintenance of the supply of materials used in testing.

During 2002 NAEEEC committed more than $350,000 to standards development and round robins, and a further $105,000 for checktesting.

Australian Market

Sources of Product

The vast majority of single-phase airconditioners now sole in Australia are imported. The last remaining local manufacturer of these products, Email (now Electrolux) ceased local production in 1999.

Table 3 shows the country of origin for single-phase airconditioners being sold in Australia. Over 1 300 models are registered for energy labelling in 2003, with 93% of the models being made in Asia, as can be seen in Table 4. Rebadging is also very common in the airconditioner market, and the same model may be manufactured in several countries. Only a handful of units are manufactured or assembled in Australia, primarily for the ducted market.

Table 3: Country of Origin by Models on Energy Label Register, 2003

Country of Origin	Ducted	Other	Split	Window Wall	Total
Australia	16	1			17
China	4	9	277	100	390
Indonesia			2		2
Israel	5		29		34
Italy	2	3	11	1	17
Japan			85	11	96
Korea	2	6	158	79	245
Malaysia	3	2	96	24	125
New Zealand			10		10
Saudi Arabia			4	11	15
Singapore			24	9	33
Taiwan			31	16	47
Thailand	55	3	258	36	352
Total	87	24	985	287	1383

Table 4: Percentage of Models by Country of Origin, 2003

Country of Origin	Ducted	Other	Split	Window Wall	Total
Australia	18%	4%	0%	0%	1%
China	5%	38%	28%	35%	28%
Indonesia	0%	0%	0%	0%	0%
Israel	6%	0%	3%	0%	2%
Italy	2%	13%	1%	0%	1%
Japan	0%	0%	9%	4%	7%
Korea	2%	25%	16%	28%	18%
Malaysia	3%	8%	10%	8%	9%
New Zealand	0%	0%	1%	0%	1%
Saudi Arabia	0%	0%	0%	4%	1%
Singapore	0%	0%	2%	3%	2%
Taiwan	0%	0%	3%	6%	3%
Thailand	63%	13%	26%	13%	25%

In many of these counties, labelling and/or MEPS is required by the government and testing is conducted to the ISO standard for room air conditioners, which is adopted by the Australian Standard. This ensures that tests conducted by manufacturers for their local standard are applicable in Australia, and hence minimises costs of compliance to the suppliers/importers.

Costs of Testing

The costs of testing a single-phase unit for compliance to Energy Labelling are between $2 000 and $3 000 per test. Three units are required to be tested for each registration, therefore the total cost of testing per model is approximately $7 500.

A test for a three-phase unit would cost about $7 000 per unit, however simulation of the test conditions can be undertaken for the purposes of meeting the MEPS requirement and hence costs can be lower.

The Issue

The MEPS Program has been able to engender strong industry support through the adoption of rigorous but pragmatic procedures, with close consultation with industry. An element of industry's support stems from Australian Government recognition of the global nature of the airconditioning industry, and the need

to harmonise international standards. The use of the agreed IEC test method is an essential element for the promotion of international trade, free of artificial trade barriers.

There have been persistent rumours of the New Zealand Government moving to adopt a different test method. An AREMA delegation attended the most recent NAEEEC meeting, where New Zealand officials confirmed that significant changes were under consideration, but could not provide any details of the proposal apparently under consideration.

There is no valid reason for New Zealand to adopt a different approach. It is difficult to imagine that New Zealand encompasses climatic variations more significant than those which existing in Australia, or for that matter in Japan. Japan includes local conditions that vary from hot and humid to cold and dry- in each case perhaps more severe than conditions prevailing in New Zealand.

This situation is extremely serious, and has significant implications for trans-Tasman trade. According to industry and Government sources, the New Zealand Government is considering moving away from the agreed IEC test method, and adopting a hybrid system using seasonal energy ratings. New Zealand's action in enacting the TTMRA exemption on both lamp ballasts and water heaters, undertaken at extremely short notice earlier this year further underpins AREMA's concern.

Since the NAEEEC meeting in March, repeated attempts to clarify the situation have met with no success.

Summary

The majority of airconditioners supplied in Australia are imported from Asia. Over the last 5 years, considerable effort has been undertaken by the airconditioning industry and Australian governments to develop and improve the testing standards used to support the Energy Labelling and MEPS programs. It is estimated that the costs to industry and government of this development are approximately $1M. The industry are in general agreement on the direction and levels of MEPS for airconditioners

over the next 5 years and support the current testing standard and MEPS rating process.

The testing and rating procedures used in Australia for Energy Labelling and MEPS are consistent with international requirements and allow the transfer of products from the Asia region to Australia without considerable costs to comply with the current energy efficiency regulations.

In order to re-define a test process, considerable resources would be required and would cost a similar amount to the development of the original airconditioners testing standard. In addition, if a new test is required, over 1 300 models would need to be re-tested at a conservative cost of approximately $10M. This would also place Australia outside of the internationally agreed testing methodology for measuring the energy performance of airconditioners, hence possibly impede trade and reduce the competition within the supply of airconditioners in the Australian market.

New Zealand proposals to move away from the agreed test method is contrary to the spirit of the TTMRA, and has the potential to significantly disrupt and distort trans Tasman trade.