

Technical Reference on Harmonization of Energy Efficiency Test Methods of Refrigerators towards the NEW IEC 62552 among APEC Region

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**Asia-Pacific
Economic Cooperation**

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1- Project Introduction



The **Overall Objective** is:

To facilitate energy saving technology innovation for refrigerators and free trade in the APEC region by helping harmonizing energy efficiency testing methods for refrigerators with the new IEC62552 Standard, and by supporting the development of an effective management and inspection environment in APEC.

Duration: Sep, 2014 to Apr, 2016.

1- Project Introduction



Specified Objectives are:

Objective 1:

to identify commonalities and differences between the new IEC 62552 standard and energy efficiency testing standards for refrigerators currently used in APEC economies;

Objective 2:

to determine pathways for the harmonization of energy efficiency testing methods of APEC economies and the new IEC 62552-3 for refrigerators;

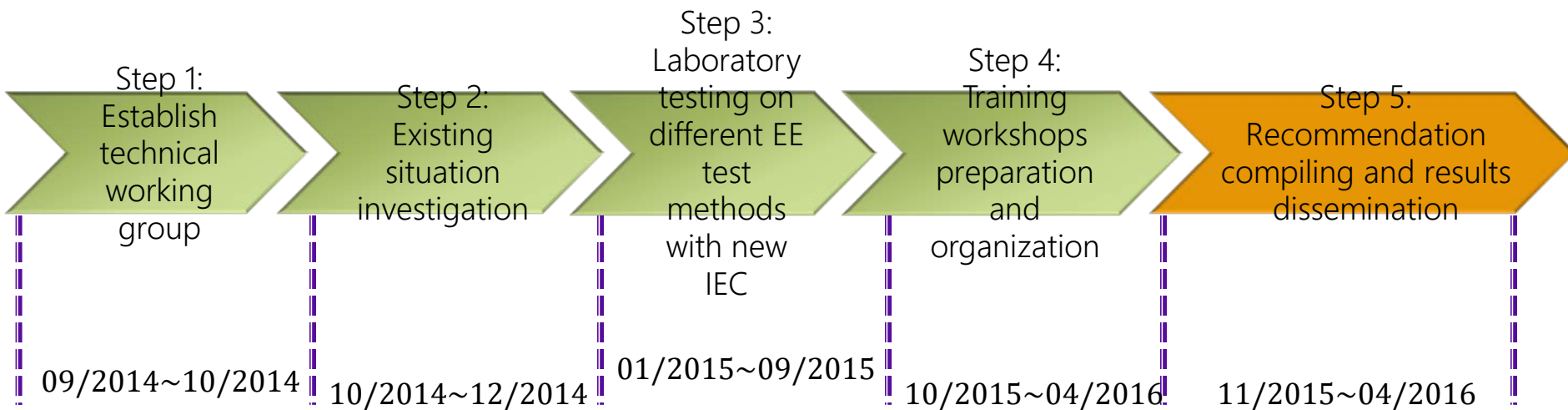
Objective 3:

to build capacities and awareness of APEC region's stakeholders and synergize their efforts related to the harmonization of testing standards for refrigerators.

2- Project Updates



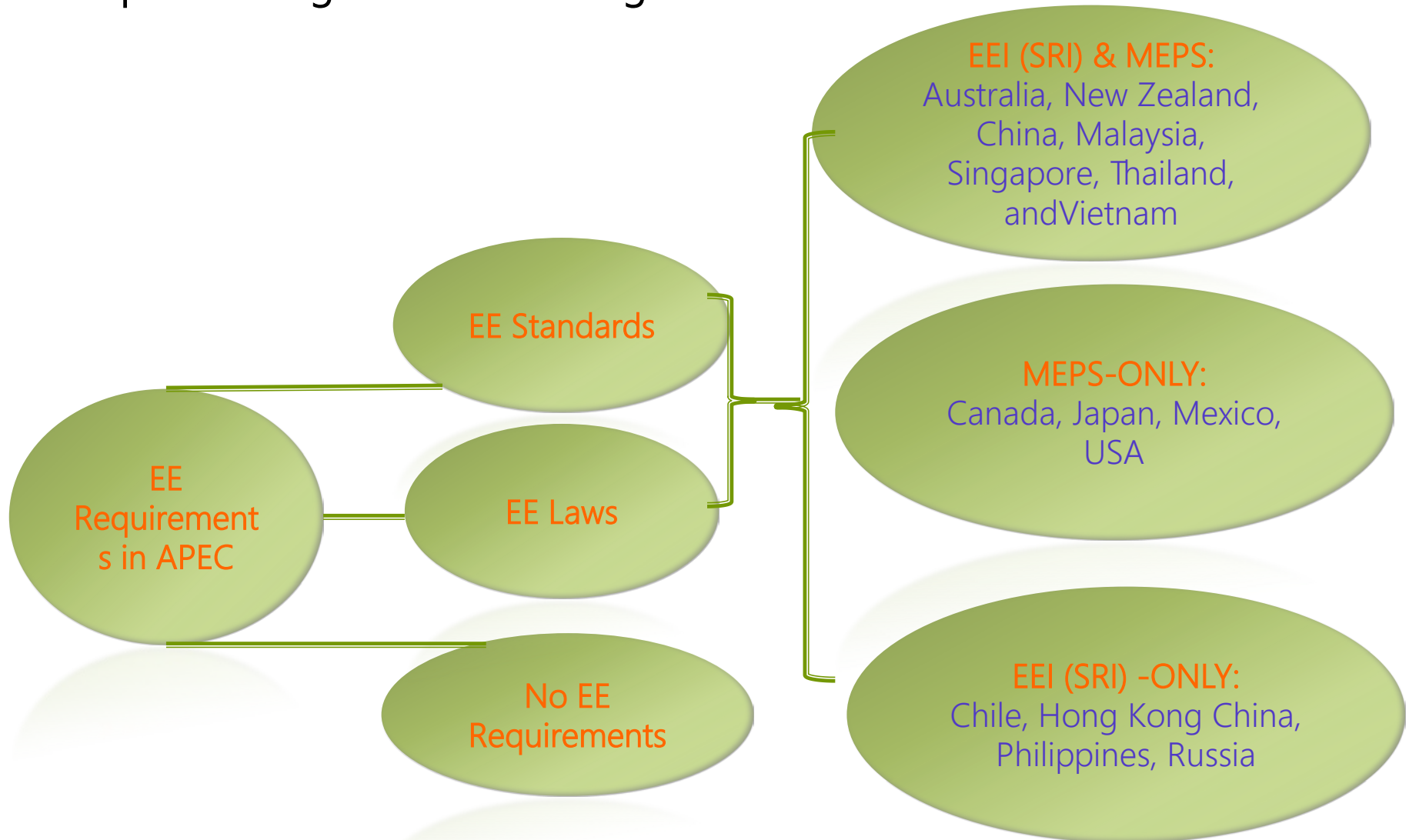
Activity Updates





2- Project Updates

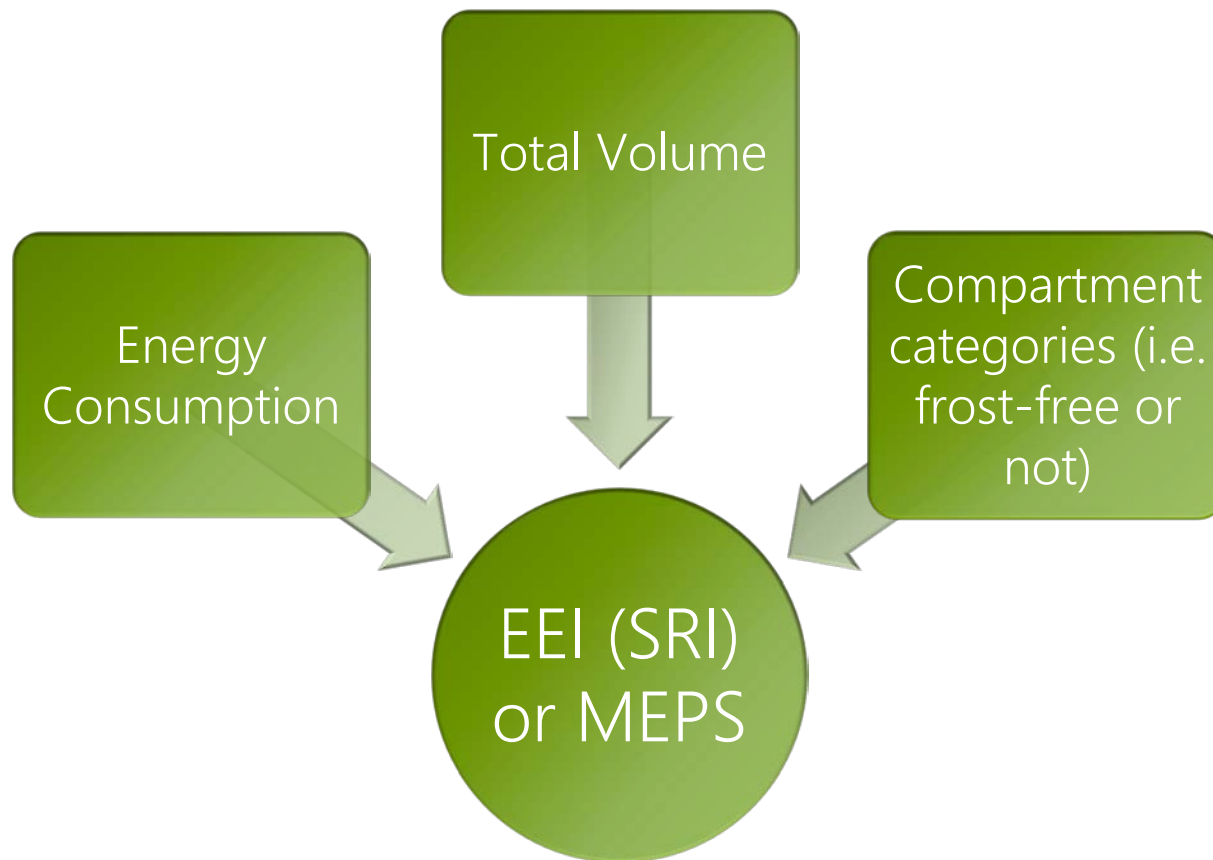
Step 2: Existing situation investigation



2- Project Updates



Step 2: Existing situation investigation



2- Project Updates

Step 2: Existing situation investigation



Upright Refrigerator



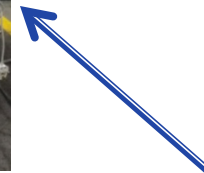
Chest Freezer



Upright Refrigerator-freezer



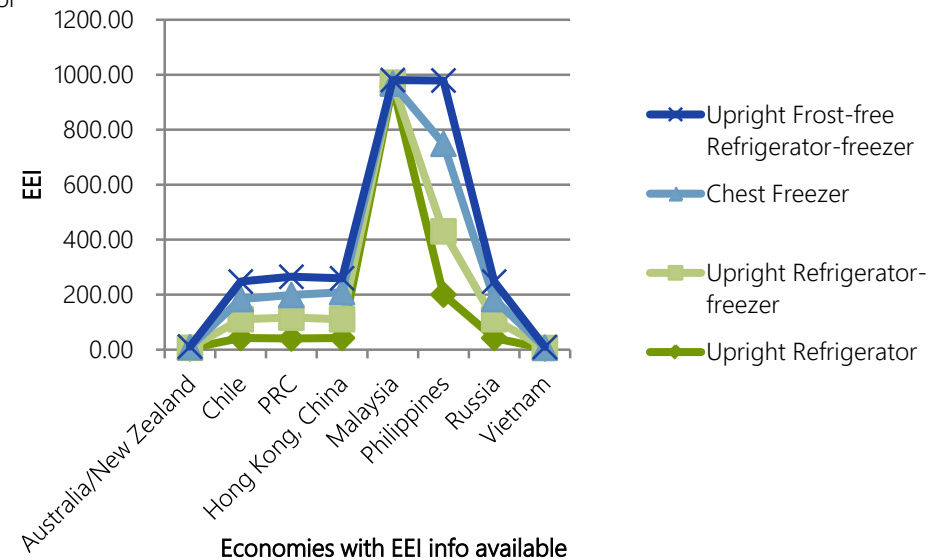
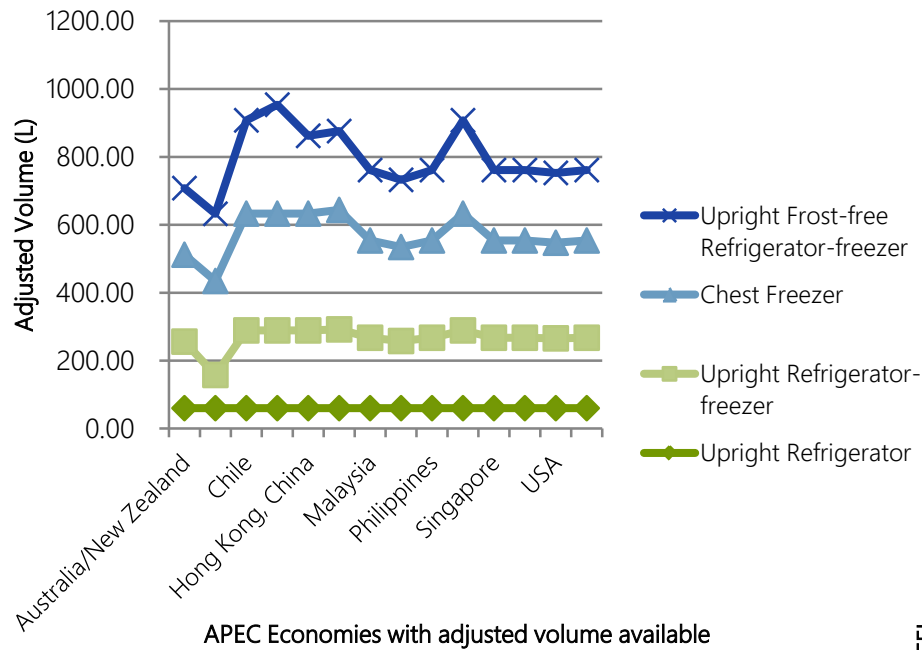
Upright Frost-free Refrigerator-freezer



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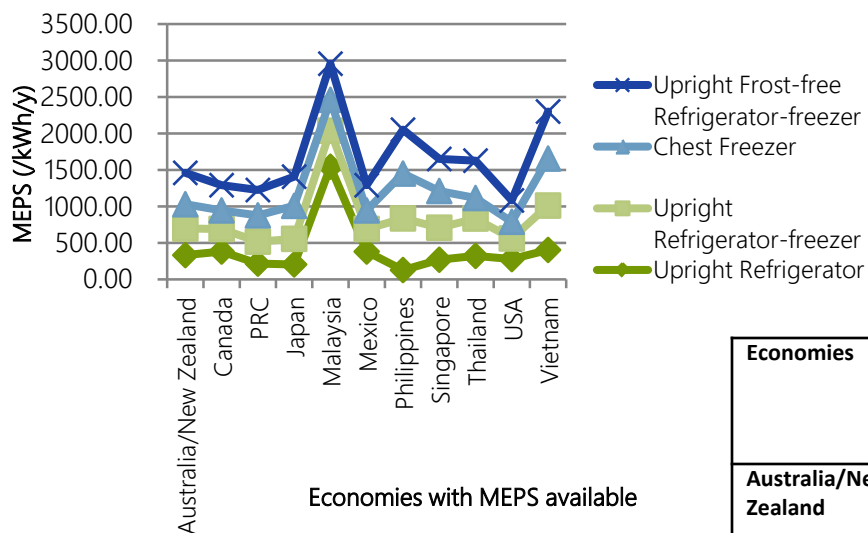
Step 2: Existing situation investigation



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Step 2: Existing situation investigation



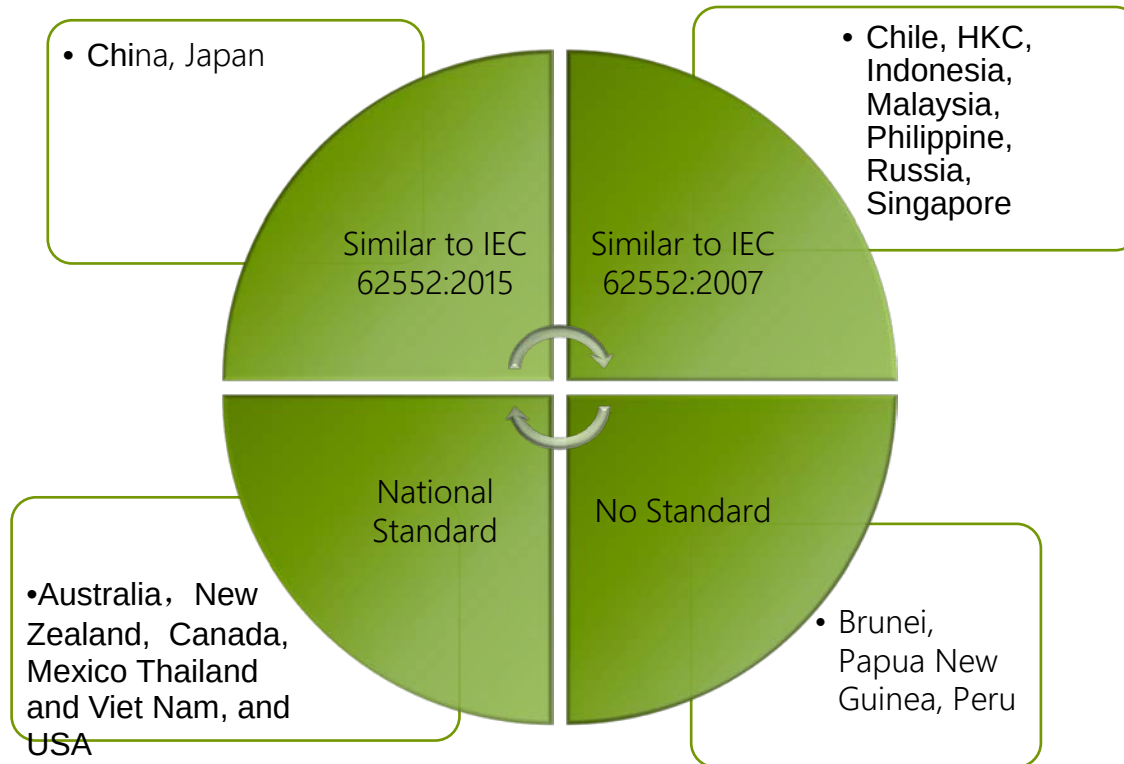
EE labeling grade comparison for the 4 samples in APEC

Economies	Best Grade	Worst Grade	Upright Refrigerator	Upright Refrigerator-freezer	Chest Freezer	Upright Frost-free Refrigerator-freezer
Australia/New Zealand	10	1	4	2	2	2
Chile	A	G	A	B	B	B
PRC	1	5	1	5	5	4
Hong Kong, China	1	5	2	4	5	3
Malaysia	1	5	5	4	3	4
Philippines	1	5	3	3	5	5
Russia	A	G	A	B	B	B
Singapore	5	1	3	1	2	1
Thailand	5	1	5	5	3	5
Viet Nam	5	1	5	5	5	5

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Step 2: Existing situation investigation



Key Elements in Testing Methods:

1. Test conditions
2. Measuring instruments
3. Installation of refrigerators
4. Determination method of the energy

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Step 3: Laboratory Testing

1

- Testing Protocol
- Sample Purchasing

2

- Testing (Supplementary testing)
- Testing Original Records and Results

3

- Testing Cross-check with CSC
- Testing Official Report with Results Analysis

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Step 3: Laboratory Testing



Samples Information

	Upright Refrigerator	Upright Refrigerator-freezer	Chest Freezer	Upright Frost-free Refrigerator-freezer
Model	BC-92	BCD-200	BD-295	BCD-322W
Climate class	ST	ST	ST	ST
Temperature Control Device	Mechanical	Mechanical	Mechanical	Electronical
Volume (fresh food/frozen food)	92L	137L/63L	295L	234L/88L
Related Energy Consumption	0.40 kWh/24h	0.50 kWh/24h	0.90 kWh/24h	0.76 kWh/24h
Manufacture	Hisense	Siemens	LG	Siemens



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Step 3: Laboratory Testing

- 4 standards being applied in laboratory testing:
- IEC 62552:2015 Household refrigerating appliances;
 - IEC 62552:2007 Household refrigerating;
 - USA test method standard
 - AU test method standard-AS/NZS 4474.2:2009+A1:2011+A2:2014

Items \ Standard	IEC 6255 2:201 5	IEC 62552: 2007	USA test method standard	AU test method standard
Tested daily energy consumption	√	√	√	√
Tested annual energy consumption	√	√	√	√
Tested volume	√	√	√	√
Calculated EEI			√	√
Calculated energy grade			√	√
Calculated MEPS			√	√

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Step 3: Laboratory Testing



Australia



Doe



IEC 62552:2007



IEC 62552:2015

Test loading view of chest freezer

2- Project Updates

Step 3: Laboratory Testing



Australia



Doe



IEC 62552:2015



IEC 62552:2007



Test loading view of refrigerator

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Step 3: Laboratory Testing



Australia



Doe



IEC 62552:2007



IEC 62552:2015



Test loading view of refrigerator-freezer



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Step 3: Laboratory Testing



Australia



Doe



IEC 62552:2007



IEC 62552:2015



Test loading view of frost free refrigerator-freezer

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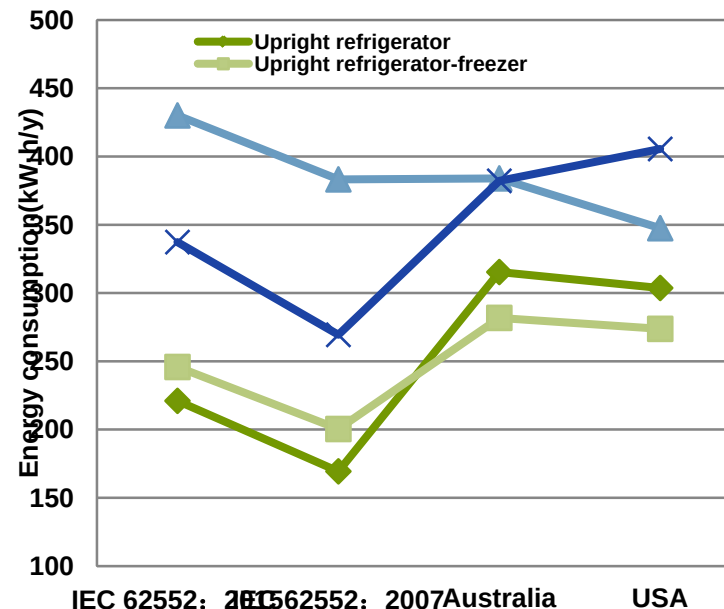
Step 3: Laboratory Testing



Annual Energy
Consumption test results
(IEC 62552-2015 with load
processing)

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Deviation of annual energy
consumption for different
test methods with IEC
62552-2015



Test standards	IEC 62552:2007	Australia	USA
Appliance			
Upright refrigerator	-23.4%	42.6%	37.4%
Upright refrigerator-freezer	-18.5%	14.6%	11.4%
Chest freezer	-10.9%	-10.7%	-19.2%
Upright frost-free refrigerator-freezer	-20.1%	13.3%	20.2%

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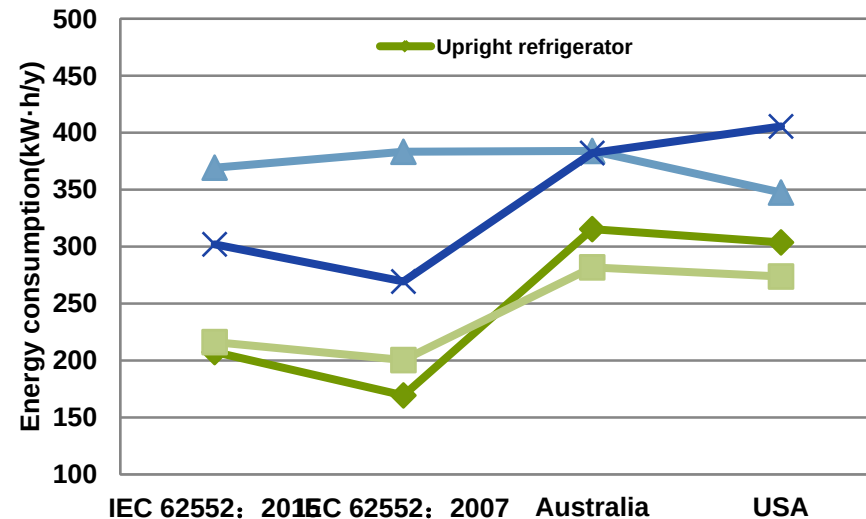


Step 3: Laboratory Testing

Annual Energy Consumption
test results (IEC 62552-2015
without load processing)

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Deviation of annual energy
consumption for different test
methods with IEC 62552-2015
without load processing



Appliance \ Test standards	IEC 62552:2007	Australia	USA
Upright refrigerator	-18.3%	52.1%	46.4%
Upright refrigerator-freezer	-7.3%	30.3%	26.5%
Chest freezer	3.8%	4.0%	-6.0%
Upright frost-free refrigerator-freezer	-10.8%	26.5%	34.3%

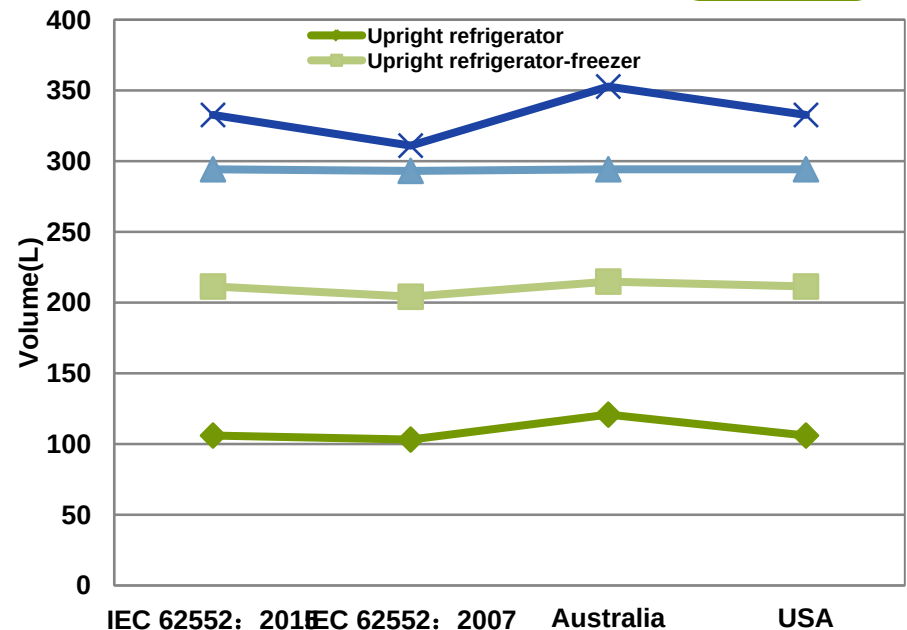
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Step 3: Laboratory Testing

Volume test results

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Deviation of Volume for
different test methods with IEC
62552-2015



Appliance \ Test standards	IEC 62552:2007	Australia	USA
Upright refrigerator	-2.6%	13.9%	0%
Upright refrigerator-freezer	-3.4%	1.7%	0%
Chest freezer	-0.4%	0%	0%
Upright frost-free refrigerator-freezer	-6.5%	6.0%	0%

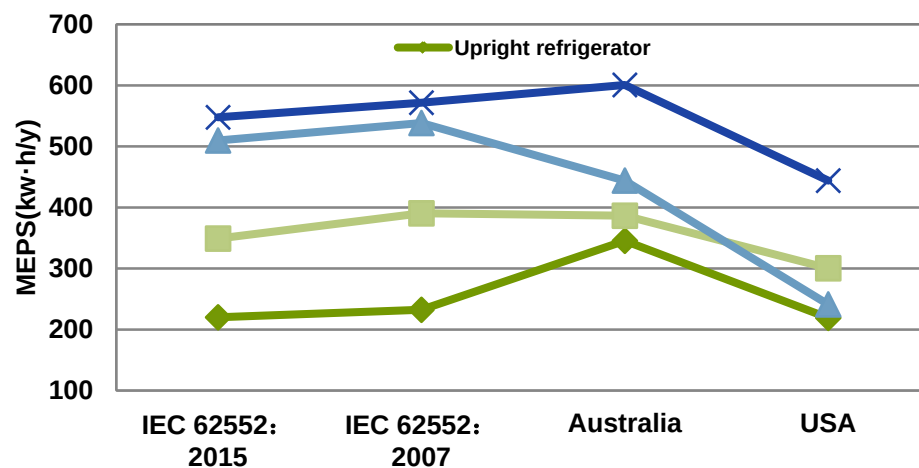
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Step 3: Laboratory Testing

EEI & MEPS
Calculation and
Comparison Results

Test standards / Appliances	IEC 62552:2015 5 with China energy standard GB 12021.2-2015	IEC 62552:2007 with China energy standard GB 12012.2-2008	Australia	USA
Upright refrigerator	5	2	1	N/A
Upright refrigerator-freezer	3	2	3	N/A
Chest freezer	3	3	2.5	N/A
Upright frost-free refrigerator-freezer	3	1	3	N/A



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Step 3: Laboratory Testing

Key Influencing Factors for Energy Consumption Testing Results When Harmonizing to the NEW IEC 62552:

- Ambient Temperature
- Target Temperature
- Storage temperature sensor and storage plan
- Storage temperature sensor (cylinder instead of M package) and empty load
- Determination of frozen-food compartment temperature
- Products adaptability for twice test at 16°C and 32 °C

Thank You!

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