Efficiency Standards for Beverage (Visi) Coolers in Pakistan

Final Consultative Meeting

15th February 2021
Avari Hotel, Lahore
Hosted by NEECA & CLASP

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Background

As part of the effort to develop a broad range of efficiency standards in Pakistan, CLASP and HIMA^Verte are supporting NEECA and PSQCA with the development of MEPS and Labels for commercial beverage (visi) coolers. The overriding goal of the CLASP, NEECA and PSQCA collaboration being to reduce energy consumption across the economy and contribute towards reduced greenhouse gas (GHG) emissions.

This is the third and final stakeholder consultation on beverage coolers, focusing on the final proposed technical specification for MEPS and labelling of beverage coolers in Pakistan. Two previous consultations have been held:

- The first consultation focused on informing the big three purchasers of beverage coolers in Pakistan (Coke, Nestle and Pepsi) of the plans and proposed process for the development of mandatory regulations for the sector, and gaining their buy-in. That workshop was undertaken on 9th November 2021 at the Lahore offices of the WWF.

- The second consultation (17th Nov 2021) sought to present and confirm the understanding of current performance of Pakistani manufactured beverage coolers in comparison with products produced and used by international counterparts, and discuss potential routes and costs of bridging the performance differential. Potential MEPS and labelling thresholds were also discussed along with projections of the associated energy and cost savings.

Minutes and presentation of both workshops are available in commercial refrigeration section on the following link: https://www.clasp.ngo/pakistan-projects/

Extensive additional bilateral consultation meetings have also been held between HIMA^Verte staff and various stakeholders to develop and refine proposals.

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Objective

For all stakeholders in the Pakistan beverage cooler market to gain:

- A clear and consistent understanding of the proposed beverage cooler MEPS and Labelling requirements (and associated test methodology) to be implemented in Pakistan, and the likely timeframes for that implementation;
- Confirmation that suppliers are all capable to meeting *at least* the minimum performance standards proposed;
- Broad agreement that the proposed test method, MEPS levels and Labelling thresholds were appropriate to Pakistani manufacturing, purchasing and user conditions, and that they should be formally submitted to PSQCA and NEECA for adoption.

Proceedings:

Dr Mohazzam (NEECA MD) kicked off the meeting by providing the strategic background for standards and labelling within the overall government and NEECA policy frameworks, thus giving context to how the proposed beverage regulations sit within the overarching government agenda.

From that point onward presentations followed the agenda. Please refer to the following Annexes for relevant additional information:

- Annex 1 for the Agenda
- Annex 2 for listing of participants
- Annex 3 for the Final Draft Technical Regulations for Beverage Coolers
- Annex 4 for the Proposed EEI and Energy Consumption Values by Product Volume
- Annex 5 for the Basic technical improvement options and costs.

A further attachment provides copies of all the slides presented.

Key Outcomes

Key outcomes from the consultative exchanges were as follows:

- Broad agreement MEPS and Labelling of beverage coolers is highly likely to result in significant improvements in the efficiency of products in the Pakistani market, in particular leading to more innovation and the introduction of premium efficiency products as suppliers seek to obtain higher star ratings.
- All manufacturers present confirmed that they are able to produce products that can meet the proposed minimum energy performance standard when measured using the ISO 22044 test method.
- The proposed timeframes for implementation were acceptable and practical, i.e. the introduction of mandatory MEPS and Labelling on the 1st January 2023, as was the subsequent proposed strengthening of MEPS in 2025.
- While the proposed timeframes for introduction the mandatory maximum GWP and ODP refrigerant levels are well within the supplier and purchaser plans, these should be reviewed prior to the 2025 implementation date as national infrastructure (particularly related to safe product service) has yet to be developed. This was noted and agreed by NEECA.

Based on the above positions, the combined stakeholder group agreed the proposed technical requirements for MEPS and Labelling of Beverage Coolers could formally be submitted to NEECA and PSQCA for adoption on 26th February 2022.

However, participants did note that additional information on potential product improvements and associated costs would be welcomed and would accelerate improvements to product performance (notes from a previous consultation workshop included in Annex 5 with links to the “Best European Products” available from the

TopTen Website[1]). Government attention to support testing laboratory development and the facilitating of the national infrastructure to support the adoption of refrigerants was also sought.

[1] https://www.topten.eu/private/products/beverage_coolers?filters%5Bcapacity_volume_net_litres%5D=212.19%3B772&sort_attribute=energy_efficiency_index_percental&sort_direction=4&enable_series_product=0

Annex 1

Agenda: Efficiency Standards for Beverage (Visi) Coolers in Pakistan

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TIME	AGENDA ITEM
10.30 – 10.40 am	Welcome note & Round of Introductions
10.40 – 11.05 am	**A Recap** Visi market/Estimate of consumption/ Climate Class, K Class / Test results *Muhammad Salman Zaffar / Ali Habib – National Team Leader CLASP*
11:05 – 11.45 am	**Draft final technical regulations** Test method / EEI calculation / Adjusted volume calculation Proposed performance requirements Compliance Regulations *Muhammad Salman Zaffar – Team Leader, CLASP*
11.45 – 12.00 am	Q and A session – *CLASP / NEECA*
12.00 – 12.45 pm	**ISO 22044** Testing details / Cans loading / Equivalent volume measuring *Abdul Rehman / Jeremy Tait – Consultant, CLASP*
12.45 – 1.00 pm	Q and A session – *CLASP / NEECA*
1.00 pm	LUNCH and informal chat

Annex 2: List of Participants

Sr No.	Name	Organization
1	Imad Hasani	Arcelik / Dawlance
2	Akhtar Bhutta	Varioline Intercool
3	Mazhar	Ice-Age
4	Ali Haider	Ice-Age
5	Rizwan Yaqoob	Waves
6	Jawad Ahmed	Waves
7	Badr Munir	Coca Cola
8	Sohaib Siddique	Khan Brothers
9	Jahanzaib Islam	Khan Brothers
10	Waqas Ali Chisti	PEL
11	Attique Ahmad	PEL
12	Azka Tauseef	WWF
13	Wajid	WWF
14	Dr. Sardar Mohazzam	NEECA
15	Asad Mehmood	NEECA
16	Irag Rashid	NEECA
17	Allah Deta	PEMA
18	M Ishaq Nawaz	PEL
19	Saima Shafi	NEECA
20	Iftikhar Hussain Shah	NEECA
21	Mohammad Haris	NEECA
22	Faizan Ali	NEECA
23	Saeed Akbar	MAGM Holdings
24	Hira Ashraf	PEECA
25	Jeremy Tait (on zoom)	CLASP
26	Stuart Jeffcot	CLASP
27	Ali Habib	CLASP/HIMA^Verte
28	Muhammad Salman Zaffar	CLASP/HIMA^Verte
29	Amna Shahab	CLASP/HIMA^Verte
30	Abdul Rehman	CLASP/HIMA^Verte
31	Areeb Hussain	CLASP/HIMA^Verte

Annex 3: Final Draft Technical Regulations for Beverage Coolers

Notification of Minimum Energy Performance Standards and Labeling Regulation for Vertical Commercial Beverage Coolers (Final Draft: Technical Content)

Article 1. Scope

1.1 Scope

This regulation applies to integral vertical commercial beverage coolers between 0.5m and 2.2m in height.

1.2 Exemptions

This regulation does NOT apply to the following refrigerating equipment:

a) equipment that is powered by energy sources other than electricity;
b) refrigerating equipment specifically tested and approved for the storage of medicines or scientific samples;
c) refrigerated cabinets that operate by means of a separately housed condensing unit (remote cabinets);
d) off-grid refrigeration equipment.

Article 2. Terms & Definitions

All terms and definitions are given in ISO 22044 with the exception of those defined in Article 2.

2.1 Definitions

Commercial Beverage Cooler: A refrigerated cabinet to sell and/or display pre-packaged beverage products that are non-perishable, which is designed to chill products loaded at ambient temperature to the defined storage temperature class within a specified time, and for which the customer is allowed direct access to the products.
Off-grid refrigeration equipment: Refrigerated equipment that is power from any source other the national or regional mains electricity supply grid.
Height: The vertical distance from the floor to the top of the commercial beverage cooler.

2.3 Families of models

Two or more models are in the same family of models if the requirements of this section are satisfied in relation to the models and the family.

Parent model requirements

There must be a single model (the *parent model*) for each family that is manufactured by one manufacturer and that has essentially identical electrical, physical, and functional characteristics that affect energy consumption. The parent model, when compared to the other models in the family, must:

i. have the highest, or the equal highest, specific energy consumption;
ii. meet the requirements of the coldest, or the equal coldest M-package temperature class when tested in accordance with the relevant test standard;
iii. have the largest, or the equal largest vertical opening;
iv. have the greatest, or the equal greatest horizontal distance between the front and the rear of the cabinet; and
v. be included on a test report that was prepared prior to the application for registration for any model that is a member of the family.

Family model requirements

Each model in the family must:

a) be in the same product class as the parent model; and
b) meet the requirements of:
   i. the same M-package temperature class as the parent model; or
   ii. a warmer M-package temperature class than the parent model.

Article 3. Measurement Methods and Performance Requirements

Refrigerating equipment falling within the scope of Article 1 shall meet the performance requirements of Article 3.

3.1 Test method and rated conditions

Testing for energy consumption shall be undertaken in accordance with the requirements of ISO 22044, and at the rated conditions defined in **Table 1**.

Table 1. Rated conditions for package temperature and test room climate class

M-can temperature class	Test room climate class	Measurement standard
K1 (average temperature equal to or less than 3.5ºC)	CC2 (32.2ºC 65% RH)	ISO 22044

3.2 Calculation of energy efficiency index

The energy efficiency index (EEI) of a beverage cooler that is covered by this regulation is calculated in accordance with the following formula:

$$EEI = \frac{TEC}{RTEC} \times 100$$

Where:

TEC is the measured Total Energy Consumption over (24 hours), expressed in kWh, derived in accordance with ISO 22044 at rating conditions of Climate Class CC2 and M-can temperature K1.

RTEC is the Reference Total Energy Consumption (over 24 hours) of a beverage cooler of the same volume, expressed in kWh, and is calculated using the formula below[2]:

$$RTEC = 2.1 + (0.0067725 \times Vg))$$

where

Vg is the measured **gross** volume derived in accordance with ISO 22044.

The TEC and RTEC calculations shall be rounded to the nearest 0.01 kWh. Values exactly mid-way shall be rounded to the higher result.

3.3 Minimum energy performance (MEPS) requirements

Up to the 31 December 2024, the minimum energy performance requirement for all refrigeration equipment within the scope of this document is set out in **Table 2**.

[2] Note this formula derives a value for RTEC assuming temperature conditions CC2 and K1, as per ISO 22044.

From 1 January 2025, the minimum energy performance requirement for all refrigeration equipment within the scope of this document is set out in **Table 3**.

Table 2: Minimum Energy Performance Requirements to 31 December 2024

Maximum EEI
100

Table 3. Minimum Energy Performance Requirements from 1 January 2025

Maximum EEI
80

3.4 Pakistan Energy label thresholds

All products shall display the Pakistan Energy Label at the point of sale, on all promotional material (including websites where the product is featured), and when being delivered to the end-user.

3.4.1 Pakistan Energy Labelling Thresholds

The thresholds of performance to be used for the energy label for products sold up to 31 December 2024 are set out in **Table 4**.

The thresholds to be used for the energy label for products sold from 1 January 2025 are set out in **Table 5**.

Table 4: Thresholds to be used for the energy label for products sold up to 31 December

Star Level	Maximum EEI
1 Star	100
2 Star	80
3 Star	65
4 Star	35
5 Star	10

Table 5. Thresholds to be used for the energy label for products sold from 1 January 2025

Star Level	Maximum EEI
1 Star	Not Used
2 Star	80
3 Star	65
4 Star	35
5 Star	10

3.5 Refrigerant and foam blowing agent

From 1 January 2025, refrigerants and foam-blowing agents used in refrigerating appliances shall comply with requirements based on their ozone depletion potential (ODP) and 100-year global warming potential (GWP – 100 year) according to the limitations listed in **Table 6**[3].

Table 6. Requirements for refrigerant and foam-blowing agent characteristics from 1 January 2025

GWP 100-year	ODP
150	<1

3.6 Safety requirements

Commercial refrigerating appliances shall comply with IEC 60335-2-89: 2019 or subsequent revisions.

3.7 Product registration requirements

An individual model, or family of models, covered by the regulation can only be offered for sale in Pakistan if it holds a current registration approved by NEECA.

3.8 Product information requirements

In addition to the Pakistan Energy label, a further information label shall be affixed on the product in a location that is readily visible for the buyer. The label shall indicate:

a) Type of equipment (i.e., beverage cooler);
b) Model number;
c) Family model name;
d) Country where the product was manufactured;
e) Year of manufacture;
f) Name and address of the manufacturer;
g) Gross volume (litres);
h) Annual energy consumption in kWh per year (equal to TEC * 365)
i) Refrigerant and foam-blowing agent designation, including their ODP and GWP 100-year[3].

[3] In case of doubt, ODP and GWP 100-year values used will be those reproduced in the "SCIENTIFIC ASSESSMENT OF OZONE DEPLETION: 2018 Appendix A, available at https://ozone.unep.org/sites/default/files/2019-05/SAP-2018-Assessment-report.pdf.

Instruction manuals for installers and end-users, and free access websites of manufacturers, importers and authorised representatives shall include the following information:

a) Instructions for the correct installation and end-user maintenance, and cleaning of the appliance including the condenser coil;
b) A statement that reads 'If the condenser coil is not cleaned [the recommended frequency for cleaning the condenser coil, expressed in times per year], the efficiency of the equipment will decrease significantly.';
c) Instructions for how to access maintenance or repair services and spare parts;
d) the minimum duration of the guarantee of the refrigerating appliance offered by the manufacturer, importer, or authorised representative.

Article 4. Entry into Force

This regulation shall enter into force no earlier than *[pending formal adoption]* after adoption.

Minimum Content of Test Report for Refrigerated Beverage Cooler

1. Testing laboratory
1.1 Name of the testing laboratory
1.2 Laboratory address where testing was conducted
1.3 Contact details (name of contact, phone number and e-mail address)
1.4 Date of specific tests
1.5 Relevant accreditation(s) (where applicable)
2. Client (Not applicable in the case of in-house testing laboratory)
2.1 Company registration number
2.2 Manufacture/importer/supplier's name
2.3 Address of manufacturer/importer/supplier
2.4 Contact name and title
2.5 Contact details (Phone number and e-mail address)
3. Test methods and conditions
3.1 Test standards and editions used
3.2 Any deviations from the stated test method
3.3 Climate Class (CCx) and M-can temperatures (Kx) used
4. Energy consumption of beverage cooler
4.1 Brand
4.2 Model
4.3 Serial number
4.4 Rated voltage and frequency in volts and hertz
4.5 Refrigerant designation
4.6 Number of doors
4.7 External dimensions (height, width and depth
4.8 If Energy Management Device (EMD) installed
4.9 Test results for energy consumption test
4.9.1 Test room temperature (°C)
4.9.2 Highest test can temperature (°C)
4.9.3 Lowest test can temperature (°C)
4.9.4 Average test can temperature (°C)
4.9.5 If no EMD fitted, measured daily energy consumption (kWh)
4.9.6 If EMD fitted measured energy consumption:
4.9.6.1 Measured 12 hour energy consumption with EMD off (kWh)
4.9.6.2 Measured 12 hour energy consumption with EMD on (kWh)
4.9.6.3 Measured daily energy consumption (kWh)
4.9.7 Measured gross volume (litres)
4.9.8 Number and type of cans in unit during the test
4.9.9 Whether any lights were switched on for the stipulated portion of the test
5. Photographs of:
5.1 Rating plate of the cabinet
5.2 Cabinet as set up for test (door open, front view; door closed front view)

Annex 4: Proposed EEI and Energy Consumption Values by Product Volume

Tables of Volume and Maximum EEI and Energy Consumption Values by Star Rating

Star Value Maximum EEI

Volume (Litres)	1-Star	2 Stars	3-Stars	4-Stars	5-Stars
0	100	80	65	35	10
20	100	80	65	35	10
40	100	80	65	35	10
60	100	80	65	35	10
80	100	80	65	35	10
100	100	80	65	35	10
120	100	80	65	35	10
140	100	80	65	35	10
160	100	80	65	35	10
180	100	80	65	35	10
200	100	80	65	35	10
220	100	80	65	35	10
240	100	80	65	35	10
260	100	80	65	35	10
280	100	80	65	35	10
300	100	80	65	35	10
320	100	80	65	35	10
340	100	80	65	35	10
360	100	80	65	35	10
380	100	80	65	35	10
400	**100**	**80**	**65**	**35**	**10**
420	100	80	65	35	10
440	100	80	65	35	10
460	100	80	65	35	10
480	100	80	65	35	10
500	100	80	65	35	10
520	100	80	65	35	10
540	100	80	65	35	10
560	100	80	65	35	10
580	100	80	65	35	10
600	100	80	65	35	10
620	100	80	65	35	10
640	100	80	65	35	10
660	100	80	65	35	10
680	100	80	65	35	10
700	100	80	65	35	10

Star Value Maximum Daily Energy Consumptions (kWh)

Volume (Litres)	1-Star	2 Stars	3-Stars	4-Stars	5-Stars
0	2.10	1.68	1.37	0.74	0.21
20	2.24	1.79	1.45	0.78	0.22
40	2.37	1.90	1.54	0.83	0.24
60	2.51	2.01	1.63	0.88	0.25
80	2.64	2.11	1.72	0.92	0.26
100	2.78	2.22	1.81	0.97	0.28
120	2.91	2.33	1.89	1.02	0.29
140	3.05	2.44	1.98	1.07	0.30
160	3.18	2.55	2.07	1.11	0.32
180	3.32	2.66	2.16	1.16	0.33
200	3.45	2.76	2.25	1.21	0.35
220	3.59	2.87	2.33	1.26	0.36
240	3.73	2.98	2.42	1.30	0.37
260	3.86	3.09	2.51	1.35	0.39
280	4.00	3.20	2.60	1.40	0.40
300	4.13	3.31	2.69	1.45	0.41
320	4.27	3.41	2.77	1.49	0.43
340	4.40	3.52	2.86	1.54	0.44
360	4.54	3.63	2.95	1.59	0.45
380	4.67	3.74	3.04	1.64	0.47
400	**4.81**	**3.85**	**3.13**	**1.68**	**0.48**
420	4.94	3.96	3.21	1.73	0.49
440	5.08	4.06	3.30	1.78	0.51
460	5.22	4.17	3.39	1.83	0.52
480	5.35	4.28	3.48	1.87	0.54
500	5.49	4.39	3.57	1.92	0.55
520	5.62	4.50	3.65	1.97	0.56
540	5.76	4.61	3.74	2.02	0.58
560	5.89	4.71	3.83	2.06	0.59
580	6.03	4.82	3.92	2.11	0.60
600	6.16	4.93	4.01	2.16	0.62
620	6.30	5.04	4.09	2.20	0.63
640	6.43	5.15	4.18	2.25	0.64
660	6.57	5.26	4.27	2.30	0.66
680	6.71	5.36	4.36	2.35	0.67
700	6.84	5.47	4.45	2.39	0.68

Technical options to improve performance

clasp

HIMA Verte

Technical measure	Efficiency improvement %	Incremental cost US$	Incremental cost %	Comment
Use of Energy Management Device	20%	US$ 15	3%	Automatic switch off lights, fans compressor in quiet periods or allow product temperature to float upwards
Switch to hydrocarbon refrigerant with optimised charge size (R290 or R600a)	8%	US$ 30	6%	Assumes additional safety features needed
Efficient ECM or DC evaporator fan motor	10%	US$ 8	1.5%	Electronic or DC motors can halve fan power; extra savings from less heat load inside compartment
Improved fixed speed compressor	3%	US$ 5	1%	Example in shop: SECOP FR11G, has COP 1.51 and bottom 20% of SECOP range for this application. A good household fridge has COP 1.8 (20% better). Variable speed as further option to achieve best in class.
Electronic thermostat	3%	US$ 10	2%	Closer temperature control; less overshoot; less cycling
Improved design of evaporator and condenser	5%	US$ 25	5%	Larger heat exchange area; better fins for heat exchange. Higher scope for savings from evaporator design, with higher associated cost
Increased insulation of body	5%	US$ 30	6%	Add 1.25cm to thickness
Efficient ECM or DC condenser fan motor	0.7%	US$ 5	1%	Electronic or DC motors can halve fan power
Improved LED lighting	0.5%	US$ 5	1%	Extra savings by reducing heat load inside the cooled compartment
Better double glazing for door	TBD	TBD	TBD	K-glass; argon filled. Triple glazing is an option for best in class.

Sources: Various EU, US, U4E. Assumes cost of cabinet is US$ 500

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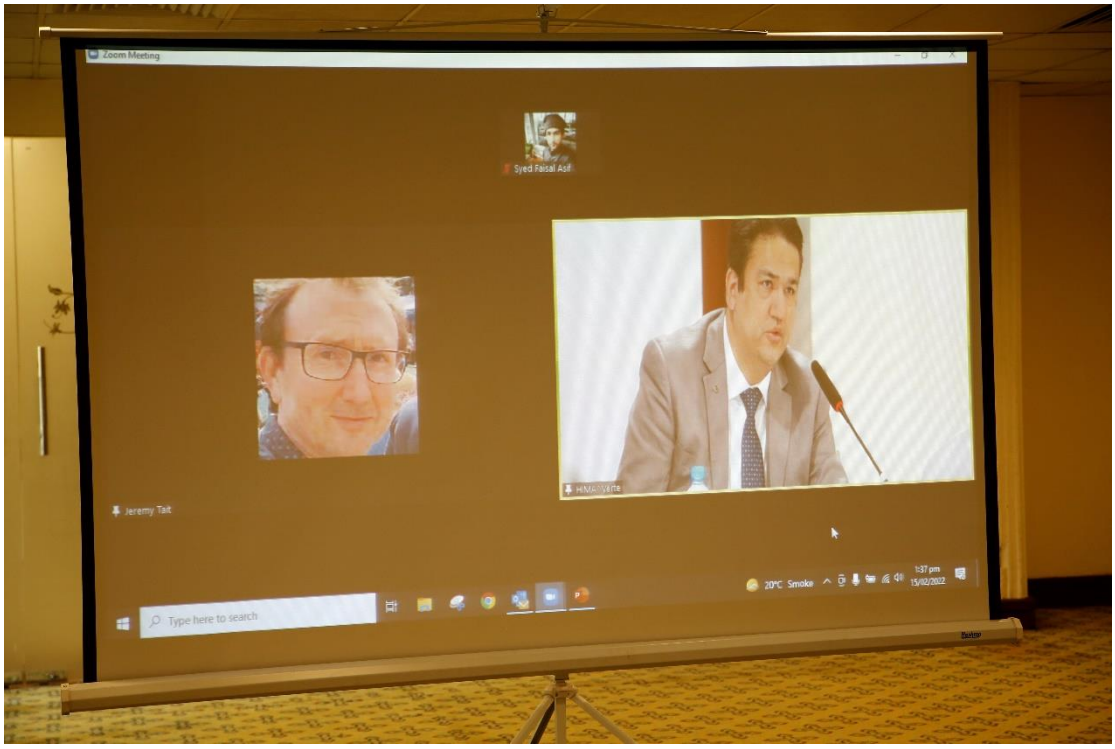
Annex 6: Photographs


Zoom Meeting
Syed Faisal Asif
Jeremy Tait
Type here to search
20°C Smoke
1:37 pm
15/02/2022