CSA Group

CSA SPE-7001-12

Sustainability Standard for household refrigeration appliances

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Note: *For information about the* ***Standards Update Service,*** *go to* ***shop.csa.ca*** *or e-mail* ***techsupport@csagroup.org.***

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The following revisions have been formally approved and are marked by the symbol delta (Δ) in the margin on the attached replacement pages:

Revised	Clause 8.1.4.2 and Annex C
New	None
Deleted	None

- Update your copy by inserting these revised pages.
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taking steps to make sure that the product in question does not contain the substances in the above Directives above the amounts allowed.

(d) A product shall receive 1 point if the manufacturer identifies, based on its assessment procedure and tracking of US, Canadian, and international regulations, which substances should be targeted for phase-out or reduced use.

(e) A product shall receive 1 point if the manufacturer uses a technique to show that the material being considered for substitution does not show greater hazard in direct contact with food, ice, or water for consumption, or environmental pollution impact. One approach that may be used is the EPA's *Alternative Assessment Criteria for Hazard Evaluation*.

A manufacturer should be able to show that by internal policies, contact with suppliers, testing, or other documentation that their suppliers have shown reductions or that the OEM finished goods manufacturer has taken steps to construct a timetable or phase-out plan for the targeted substances.

(f) A product shall receive 1 point if the manufacturer has identified a candidate material for substitution, has removed the materials, and has replaced these with materials that do not show greater hazard in dermal, food, or environmental pollution impact. To be eligible for the points in this section, the manufacturer should be able to demonstrate the actual phase out of or reduction of chemicals that they have identified.

The points for this set of criteria are cumulative to a maximum of 7 points.

8.1.4 Criteria: Refrigerant and foam blowing agent selection

8.1.4.1 Criteria Prerequisite

A product's refrigerant and foam blowing agent shall have a total effective Global Warming Potential (GWP) of less than 1835.

Δ 8.1.4.2 Assessment

A product's refrigerant and foam blowing agent shall be awarded points for low total effective GWP based on the normalized mass weighted average GWP of the material in the final product, rounded to the nearest integer using the following formula (see Annex C for additional information):

$$\text{Total points} = 12.18 - 0.0024 * \sum_{n=1}^{N} (M_n * GWP_n)$$

where

N = total number of refrigerants and blowing agents in the refrigerator design

n = individual refrigerant / blowing agent in the refrigerator design

M_n = total mass of the refrigerant or blowing agent component in the design, lbm

GWP_n = Intergovernmental Panel on Climate Change (IPCC) *Fourth Assessment Report* (AR4) 2007, Working Group 1 value of the GWP of the refrigerant or blowing agent component in the design based on the 100 year values, IPCC AR4: http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html

Notes:

(1) *Annex C contains background information, tables, and graphs for further explanation. However, the formula shown in Clause 8.1.4.2 should be used to assign the nearest integer for points.*

(2) *GWP_e is the total effective GWP for the refrigerant materials (blowing agent and compressor gas) is the normalized summation of the mass weighted average of the refrigerant and the blowing agent:*

$$GWP_e = \frac{\sum_{n=1}^{N} (M_n * GWP_n)}{2.5\text{lbm}}$$

The points in this category are assigned based on the product rating and range from a minimum of 0 to a maximum of 12. Points are not cumulative and a product shall receive points for the one performance rating category that it meets. A product can achieve a maximum of 12 points in this attribute category.

8.1.5 Criteria: Product recycled content

8.1.5.1 Criteria prerequisite

The manufacturer shall inventory the percentage of pre-consumer and post-consumer recycled materials in the product, measured as a percentage of total weight of the product. Regional or global average recycled content data may be used where more specific information from a supplier is not available.

8.1.5.2 Assessment

The purpose of this set of criteria is to seek the most optimal level of recycled material content in appliances without degrading the performance, safety, or aesthetics of the appliance. It is important to design for the use of both pre-consumer and post-consumer recycled material content.

The product shall be evaluated based on the following :

(a) A product shall receive 1 point if the manufacturer implements a program and sets targets for increasing the percentage of pre-consumer recycled materials in the product and shows progress toward meeting the targets.

(b) A product shall receive 1 point if the manufacturer implements a program and sets targets for increasing the percentage of post-consumer recycled materials in the product and shows progress toward meeting the targets.

For the first edition of this Standard, it is important to establish a baseline. If the company does not have a fixed baseline at present for comparison, units with similar features produced within the preceding five years shall be used for comparison. If the company does not have a similar unit from previous production for comparison (i.e., the company is producing and introducing into the market a totally new model family), the manufacturer should review the product design against that used for other similar featured products in the preceding five-year period. The new model or current model design should be compared against a baseline unit produced within the preceding five years for pre- and post-consumer recycled product material to determine progress.

The points in this category are cumulative to a maximum of 2 points.

8.1.6 Criteria: Packaging recycled content

8.1.6.1 Criteria prerequisite

The manufacturer shall inventory the percentage of pre-consumer and post-consumer recycled materials in the packaging, measured as a percentage of total weight of the product packaging.

8.1.6.2 Assessment

The purpose of this set of criteria is to seek the most optimal level of recycled content for product packaging without degrading the performance of the packaging and affecting the safety or performance of the appliance.

The product shall be evaluated based on the following metrics:

(a) A product shall receive 1 point if the manufacturer implements a program and sets targets for increasing the percentage of pre-consumer recycled materials in the product packaging and shows progress toward meeting the targets.

(b) A product shall receive 1 point if the manufacturer implements a program and sets targets for increasing the percentage of post-consumer recycled materials in the product packaging and shows progress toward meeting the targets.

For the first edition of this Standard, it is important to establish a baseline. If the company does not have a fixed baseline at present for comparison, units with similar features produced within the preceding five years shall be used for comparison. If the company does not have a similar unit from previous production for comparison (i.e., the company is producing and introducing into the market a totally new model family), the manufacturer should review the packaging against that used for other similar size products in the preceding five-year period. The new model or current model packaging should be compared against the baseline unit produced within the last five years for pre- and post-consumer recycled packaging material to determine progress.

The points in this category are cumulative to a maximum of 2 points.

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Total effective *GWP*	Total points
0 to 111	12
112 to 275	11
276 to 440	10
441 to 604	9
605 to 768	8
769 to 932	7
933 to 1096	6
1097 to 1261	5
1262 to 1425	4
1426 to 1589	3
1590 to 1753	2
1754 to 1917	1
Greater than 1917	0

Individual values for GWP_n are taken from the IPCC *4th Assessment Report*, Table 2.14, for reference below. The list is not comprehensive:

R134a GWP of 1430
R245fa GWP of 1030
R404a GWP of 3921
R410a GWP of 2087
Cyclopentane GWP of 10
R441a (propane, n & iso-butane, ethane)GWP of 8
R600a (isobutane) GWP of 4
Other Saturated Light Hydrocarbons GWP of 4
Examples: propane, butane, pentane, hexane, cyclohexane

Only some of these compounds have 100-yr GWP value in the peer reviewed literature (e.g., 3.3 for propane and 4.0 for butane). However, the GWPs of all these hydrocarbons are expected to be low, based on similarity to other compounds with GWPs that have been published in the peer-reviewed literature (see IPCC *4th Assessment Report*, Table 2.15).

As an example, a refrigerator with 2.3 pounds of Cyclopentane having a GWP of 10 and 0.25 pounds of Isobutane with a *GWP* of 4, would have an effective *GWP* of 9.6 and would receive 12 points from the equation for *Total Points*.