

Circular Letter No.: 2024.210

Issue Date: 21 June 2024

Application: BEAM Plus NB Version 2.0

Effective Date: 21 June 2024

MW 7a Ozone Depleting Substances - Refrigerants

- 1. The Technical Circular Letter hereby announces an update to the credit content for **MW 7a Ozone Depleting Substances - Refrigerants** under BEAM Plus NB v2.0.
- 2. The aim of the update is to clarify the following:
 - Update of Extent of Application;
 - Refinement on assessment criteria of Locally Qualified Professional (LQP); and
 - Update of submittal requirements.
- 3. The requirements given in Section 1.3 and Section 4.2 of the BEAM Plus NB v2.0 Manual (2023 Edition) are hereby updated with the enclosures in Annex A and Annex B of this Technical Circular Letter:
 - Page Annex A-1 shall replace the MW 7 contents in Section 1.3 Summary of Credits specified in Page 23 of the Manual; and
 - Pages Annex B-1 to B-6 shall replace all contents in Section 4.2 on MW 7 specified in Pages 220 to 224 of the Manual.
- 4. <u>Approved PA projects</u>: For projects that have already completed PA and have certain assessment approach approved, the Applicant may opt to adopt the same assessment criteria for FA or voluntarily comply with this Technical Circular Letter. For the avoidance of doubt, the Applicant shall provide PA evidence (e.g., extract of the PA report, documents submitted for assessment in PA, etc.) in subsequent assessments to support the intention of using the same assessment methodology as in PA.

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Ir Victor Cheung Chairperson of Standards Sub-committee Annex A:

Updated MW 7 Credit Content for Section 1.3 under BEAM Plus NB v2.0

	Section	Credit Requirement	Extent of Application	Credit
		For exemplary performance, 1 additional BONUS credit where 50% or more of all materials used for sub-item (a) or (b) or (c) are materials with recycled content.		
MW 7	Ozone Depleting Substances	 (a) Refrigerants credit for the use of refrigerants with a value less than or equal to the threshold of the combined contribution to ozone depletion and global warming potentials using the specified equation. (b) Ozone depleting materials credit for the use of products in the building fabric and services that avoid using ozone depleting substances in their manufacture, composition or use 	All buildings with newly installed air conditioning and refrigeration equipment for part (a) All buildings for part (b)	2
MW 8	Regional Materials	 1 credit for the use of regional materials meeting prescribed requirement, which contributes at least 10% of all building materials used in the project. 1 additional BONUS credit for the use of regional materials meeting prescribed requirement, which contributes at least 20% of all building materials used in the project. For exemplary performance, 1 additional BONUS credit for the use of regional materials used in the project. 	All buildings	1+2 additional BONUS
		materials meeting prescribed requirement, which contributes 50% or above of all building materials used in the project.		
MW 9	Use of Green Products	 (a) Certified Green Products credit for having at least 5% certified green products in one (1) of the listed categories (outside surface works, building façade and structures, interior non-structural components, and building services components). credits for having at least 5% certified green products in two (2) of the listed categories (outside surface works, building façade and structures, interior non-structural components, and building services components). 	All buildings	2+3 additional BONUS + 1 BONUS

Annex B:

Updated Credit Content for Section 4.2 under BEAM Plus NB v2.0

4	Materials and Waste	4.2	Selection of Materials		
		MW 7	Ozone Depleting Substances		
	Extent of Application	All build part (a)	ings with newly installed air conditioning and refrigeration equipment for		
		All build	lings for part (b)		
	Objective	Reduce atmospl	Reduce the release of harmful ozone-depleting substances into the atmosphere.		
	Credits Attainable	2			
	Credit Requirement	(a) Ref	frigerants		
		1 c thre war	1 credit for the use of refrigerants with a value less than or equal to the threshold of the combined contribution to ozone depletion and global warming potentials using the specified equation.		
		(b) Oz	one Depleting Materials		
		1 credit for the use of products in the building fabric and services that avoid using ozone depleting substances in their manufacture, composition or use.			
	Assessment	(a) Ref	frigerants		
		 The air-conditioning and refrigeration equipment shall fulfill the following equation which determines a maximum threshold for the combined contributions to ozone depletion and global warming potentials: 			
			$LCGWP + LCODP \times 10^5 \le 13$		
			LCGWP = [GWPr x (Lr x Life + Mr) x Rc] / Life		
		LCODP = [ODPr x (Lr x Life + Mr) x Rc] / Life			
		LCGWP = Lifecycle Global Warming Potential (kg CO ₂ /kW -Yr)			
		LCODP = Lifecycle Ozone Depletion Potential (kg CFC 11/kW-Yr)			
		GWPr = Global Warming Potential of Refrigerant			
		ODPr = Ozone Depletion Potential of Refrigerant (0 to 0.2 kg CFC11/kg r)			
		Lr = Refrigerant Leakage Rate (0.5% to 2.0%; default of 2% unless otherwise demonstrated)			
		Mr = End-of-life Refrigerant Loss (2% to 10%; default of 10% unless otherwise demonstrated)			
		Rc = Refrigerant Charge			
		Life = Equipment Life (default based on equipment type as listed in table below, unless otherwise demonstrated)			

Equipment	Default Equipment Life
Window air-conditioner, heat pump	10 years
Unitary, split, packaged air-conditioner, package heat pump	15 years
Reciprocating and scroll compressor, reciprocating chiller	20 years
Absorption chiller	23 years
Water-cooled packaged air-conditioner	24 years
Centrifugal chiller	25 years

2. For systems with different types of equipment, a weighted average of all the air-conditioning and refrigeration equipment shall be calculated using the following equation:

 $[\Sigma(LCGWP + LCODP \times 10^5) \times Q_{unit}]/Q_{total} \le 13$

Q_{unit} = Gross ARI rated cooling capacity of an individual air- conditioning or refrigeration unit (kW)

Q_{total} = Total gross ARI rate cooling capacity of all air- conditioning or refrigeration (kW)

- 3. Small air-conditioning units, defined as those containing less than 0.23 kg of refrigerant, and other equipment, such as standard refrigerators, small water coolers and any other cooling equipment that contains less than 0.23 kg of refrigerant, can be excluded from this assessment.
- 4. Provide calculation endorsed by Locally Qualified Professional who has at least 3 years of relevant experience in mechanical/ BS design giving details of the air-conditioning and refrigeration equipment installed; and demonstrating that the global warming potential and ozone depletion potential of the refrigerants used in equipment meets the specified requirement. Reference shall be made to refrigerant suppliers and/or equipment manufacturer's data, etc.

The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

- Member of The Hong Kong Institution of Engineers (MHKIE);
- Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
- Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
- Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

The accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

(b) Ozone Depleting Materials

1. Provide a full description and specifications of all major thermal insulation and fire-retardant materials specified in roof constructions, walls, chilled water pipes, refrigerant pipes, ductwork, advising the presence or otherwise of ozone depleting agents.

The ozone depleting materials worksheet shall be reviewed and endorsed by the main contractor. The qualified personnel from the main contractor are:

- 1.1. The contractor's quantity surveyor who possesses the following qualification:
 - A Corporate Member of The Hong Kong Institute of Surveyors (HKIS) in QS Discipline; or
 - A Chartered Member of Royal Institution of Chartered Surveyors (RICS) in QS Discipline; or
 - A Corporate/ Certified/ Full Member of other International Institute of Surveyors in QS Discipline; or
- 1.2. The contractor's project manager who supervises the Project QS, monitors the use of materials, and possesses the following qualification or experience:
 - A Corporate Member of Hong Kong Institute of Construction Managers (HKICM); or
 - A Chartered Member of Chartered Institute of Building (CIOB); or
 - A Corporate/ Certified/ Full Member of other International Institute of Construction Managers in QS Discipline; or
 - At least 10 years of construction-related experience.

CV of the personnel and organisation chart highlighting the personnel shall be submitted to demonstrate the personnel has fulfilled the abovementioned requirements.

2. Where there is any doubt as to the ozone depletion potential of a material or product, details shall be ascertained from the manufacturer. Credit will be awarded where demonstration of reasonable effort has been made to avoid the use of products that have significant ozone depletion potential.

Submittals

(a) Refrigerants

Supporting Documents Please provide softcopies with filename prefix as indicated on the leftmost column below.			CA	FA/ RFA
MW_07a_00	BEAM Plus NB submission template for MW 7a	~	~	~
MW_07a_01	Specifications highlighting the use of refrigerants	~	-	-
MW_07a_02	Endorsed Air-conditioning and Refrigeration Equipment Worksheet [Appendix A]	~	~	~

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MW_07a_03	CV of the professional as per the requirements in the assessment	~	~	~
MW_07a_04	Equipment schedule of HVAC&R equipment showing the refrigerants employed that are free from CFC and HCFC	-	~	~
MW_07a_05	Technical data (e.g. catalogue or manufacturer's information) of HVAC&R equipment highlighting the values adopted in the calculation	-	✓	~
MW_07a_06	1	/	/	/
MW_07a_07	Drawings (e.g. schematic diagram, layout drawings) showing no newly installed air conditioning and refrigeration equipment (substantiation for non- applicability only)	✓	✓	✓

(b) Ozone Depleting Materials

Supporting Documents Please provide softcopies with filename prefix as indicated on the leftmost column below.			CA	FA/ RFA
MW_07b_00	BEAM Plus NB submission template for MW 7b with	\checkmark	~	~
	Ozone Depleting Materials Worksheet [Form S-A] endorsed by the main contractor; CV of the personnel; and Organisation chart highlighting the personnel	-	V	✓
MW_07b_01	Specifications highlighting the use of insulation materials	~	-	-
MW_07b_02	Catalogues of insulation materials or statement from manufacturer demonstrating that the products are free from CFC and HCFC	-	✓	✓

Remarks

(a) Additional Information

The Montreal Protocol has scheduled the phasing out of controlled substances, including chemicals containing chlorine and bromine used as refrigerants, solvents, foam blowing agents, aerosol propellants, fire suppressants, and for other purposes.

Ozone Layer Protection Ordinance (Cap. 403) gives effect to Hong Kong's international obligations to control the manufacture, import and export of ozone depleting substances.

Ozone Layer Protection (Controlled Refrigerants) Regulation requires the conservation of controlled refrigerants used in large scale installations and motor vehicles.

Ozone Layer Protection (Product Containing Scheduled Substances) (Import Banning) (Amendment) Regulation passed in 2009 extends the banning of the import of controlled products (including refrigeration and air-conditioning equipment, aerosol products such as metered dosed inhalers, insulation panel and pre-polymer) containing chlorofluorocarbons (CFCs) and halons to those containing other scheduled substances including hydrochloroflurocarbons (HCFCs) by phases.

All products containing HCFCs, except dichlorotrifluoroethane (HCFC-123) have been banned since 1 January 2015. It is targeted to ban all products containing HCFCs starting from 1 January 2020.

The Amendment Regulation also bans the import of CFC-containing metered dosed inhalers and fire extinguishers containing HCFCs and bromochloromethane (BCM) from 1 January 2010.

Refrigerant	ODP [1]	GWP ^[1]			
Hydrofluorocarbons					
HFC-23	~0	12240			
HFC-32	~0	650			
HFC-134a	~0	1320			
HFC-152a	~0	140			
HFC-402A	~0	1680			
HFC-404A	~0	3900			
HFC-407C	~0	1700			
HFC-410A	~0	1890			
HFC-413A	~0	1774			
HFC-507A	~0	3900			
Hydrochlorofluorocarbons					
HCFC-123	0.02	76			
^[1] – Sources:					
i. IPCC Second Assessment Report;					
ii. "World Resources Institute (2005), World Business Council for					

Given that CFCs and HCFCs have been banned, except HCFC-123, HFCs offer near-zero ODP but some have comparatively high GWPs.

Sustainable Development";

iii. U.S. Environmental Protection Agency.

The U.S. Environmental Protection Agency provides information on suitable substitutes for ozone depleting substances, including refrigerants for various types of air-conditioning and refrigeration equipment, fire suppression, blowing agents, solvents, etc.

CIBSE GN01 outlines the hazards of using these refrigerants and provides design guidance for refrigeration systems, thermal insulation and fire protection systems.

ASHRAE Guideline 3-1996. Reducing Emission of Halogenated Refrigerants in Refrigeration and AS recommends practices and procedures that will reduce inadvertent release of halogenated refrigerants. The practices and procedures in this guideline cover emission reduction of halogenated hydrocarbon and halogenated ether refrigerants:

- (i) from stationary refrigeration, air-conditioning, and heat pump equipment and systems; and
- (ii) during manufacture, installation, testing, operation, maintenance, and disposal of equipment and systems.

(b) Related Credit

None