

BCA Green Mark Certification Standard for New Buildings

Addendum No. 1

Effective from 1 September 2014

Applicable to GM Version 4.0

This Addendum shall be read in conjunction with the BCA Green Mark Certification Standard for New Buildings and shall form part of the Certification Standard.

Amendments to the BCA Green Mark Certification Standard

(1) Purpose of amendments

The purpose of the amendments is to allow alternative scoring methodology for meeting the criteria under 'RB 1-2 Naturally Ventilated Design and Air-Conditioning System'.

(2) List of amendments

(a) Item 3 under the 'Pre-requisite Requirements for Residential Building Criteria' on Page 4 of the Standard shall be replaced as provided below. Changes are highlighted in blue.

Prerequisite Requirements for Residential Building Criteria	
<p>(3) Prescribed energy performance standard of air-conditioning system for all dwelling units to be as follows:</p> <p>Green Mark Gold^{Plus} } Green Mark Platinum } Provision of air-conditioning systems for all dwelling units with minimum COP_{100%} of 3.34 & Weighted COP of 3.76 or more</p>	<p>Related Criteria</p> <p>RB 1-2 Naturally Ventilated Design and Air-Conditioning System</p>

(b) Item 1-2(a) Option 2(ii) under the 'RB 1-2 Naturally Ventilated Design and Air-Conditioning System' in Table 5.3.7(a) on Page 10 of the Standard shall be replaced as provided below. Changes are highlighted in blue.

Table 5.3.7(a) : Residential Building Criteria

Part 1 – Energy Efficiency	Green Mark Points						
<p><u>RB 1-2 Naturally Ventilated Design and Air-Conditioning System</u></p> <p><u>Option 2 – Ventilation Design (without the use of simulation modeling) and Efficient Use of Air-Conditioning System</u></p> <p><u>(a) Dwelling Unit Indoor Comfort</u></p> <p>Enhance dwelling unit indoor comfort through the provision of good natural ventilation design and energy efficient air-conditioners</p> <p>(ii) Provision of air-conditioning system</p> <p>Use of energy efficient air-conditioners that meet the prescribed energy performance standards.</p> <p>Note (1) : Option 2(ii) is not applicable for developments where air-conditioners are not provided. Points will be scored and prorated accordingly under Option 2(i)</p> <p><u>Prerequisite Requirement :</u></p> <p>Green Mark Gold^{Plus} } Green Mark Platinum } Provision of air-conditioning systems for all dwelling units with minimum COP_{100%} of 3.34 & Weighted COP of 3.76 or more</p>	<p>Extent of Coverage : At least 80% of the air-conditioners used in all dwelling units</p> <p>Air-conditioners labelled with :</p> <p>Three Ticks – 4 points Four Ticks – 8 points</p> <p>OR</p> <table border="1"> <thead> <tr> <th>Coefficient of Performance (COP) range</th> <th>Point Allocation</th> </tr> </thead> <tbody> <tr> <td>COP_{100%} ≥ 3.06 & 3.76 > Weighted COP ≥ 3.34</td> <td>4</td> </tr> <tr> <td>COP_{100%} ≥ 3.34 & Weighted COP ≥ 3.76</td> <td>8</td> </tr> </tbody> </table>	Coefficient of Performance (COP) range	Point Allocation	COP _{100%} ≥ 3.06 & 3.76 > Weighted COP ≥ 3.34	4	COP _{100%} ≥ 3.34 & Weighted COP ≥ 3.76	8
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(c) Item 1-2(a) Option 2(ii) under the 'RB 1-2 Naturally Ventilated Design and Air-Conditioning System' on Page 44 of the Standard shall be replaced as provided below. Changes are highlighted in blue.

RB 1-2 NATURALLY VENTILATED DESIGN AND AIR-CONDITIONING SYSTEM

Requirements	<p><u>1-2 (a) Dwelling Unit Indoor Comfort</u></p> <p><u>Option 2(ii) Provision of energy efficient air-conditioning system</u></p> <p>Extent of coverage : At least 80% of air-conditioners used in all dwelling units.</p> <p>Up to 8 points can be scored for the use of the air-conditioners that are certified under the Singapore Energy Labelling Scheme based on the following rating.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Energy Efficiency Rating</th> <th style="text-align: center;">Point Allocation</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">✓✓✓</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">✓✓✓✓</td> <td style="text-align: center;">8</td> </tr> </tbody> </table> <p>OR</p> <p>Up to 8 points can be scored for the provision of air-conditioning system with Coefficient of Performance (COP) that meet the prescribed energy performance standards stated in the following Table 1-2.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">Table 1-2 – Prescribed Energy Performance Standards for Air-Conditioning System</th> </tr> <tr> <th style="text-align: center;">Coefficient of Performance (COP) range</th> <th style="text-align: center;">Point Allocation</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">COP_{100%} ≥ 3.06 & 3.76 > Weighted COP ≥ 3.34</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">COP_{100%} ≥ 3.34 & Weighted COP ≥ 3.76</td> <td style="text-align: center;">8</td> </tr> </tbody> </table> <p>Notes :</p> <p>(1) Coefficient of Performance or COP refers to the ratio of the total cooling capacity expressed in Watts to the total effective input power expressed in Watts, and as specified in the test report.</p> <p>(2) Weighted COP refers to the sum of 0.4 × COP at full-load cooling capacity and 0.6 × COP at part-load cooling capacity i.e. Weighted COP = 0.4 × COP_{100%} + 0.6 × COP_{50%}</p> <p>Option 2(ii) is not applicable for developments where air-conditioners are not provided. Points can be scored and prorated accordingly under Option 2(i).</p>	Energy Efficiency Rating	Point Allocation	✓✓✓	4	✓✓✓✓	8	Table 1-2 – Prescribed Energy Performance Standards for Air-Conditioning System		Coefficient of Performance (COP) range	Point Allocation	COP _{100%} ≥ 3.06 & 3.76 > Weighted COP ≥ 3.34	4	COP _{100%} ≥ 3.34 & Weighted COP ≥ 3.76	8
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(d) Prerequisite requirements for Item (B) on Page 44 of the Standard shall be replaced as provided below. Changes are highlighted in blue.

Prerequisites	(B) To be eligible for Green Mark Gold ^{Plus} and Green Mark Platinum, the air-conditioning system provided for all dwelling units must meet the minimum COP _{100%} of 3.34 and weighted COP of 3.76 or more.
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(e) Documentary evidence requirements for Item 1-2(a) Option 2 (ii) under the 'RB 1-2 Naturally Ventilated Design and Air-Conditioning System' on Page 45 of the Standard shall be replaced as provided below. Changes are highlighted in blue.

Documentary Evidences	<p><u>For 1-2(a) Option 2(ii) – Provision of Air-Conditioning Systems</u></p> <ul style="list-style-type: none"> • Extracts of the tender specification showing the types of air-conditioners provided for all dwelling units of the development; • Technical product information and schedule of air-conditioners showing the numbers, types and approved tick-rating as registered; and • Testing report endorsed by the testing laboratory showing the results of tests carried out in accordance with applicable test standards as prescribed in the Energy Conservation (Energy Labelling and Minimum Performance Standards for Registrable Goods) Regulation.
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