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Building Plan & Management Group

27 Jun 2016

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Dear Sir/Madam

REGULATION ON DAYLIGHT REFLECTANCE OF MATERIALS USED ON EXTERIOR OF BUILDINGS

Objective

This circular is to inform the industry on the following changes to the requirements on control of daylight reflectance of materials used on the exterior of buildings under the Building Control (BC) Regulations. There will be a change from compliance in a prescriptive manner to a performance based manner. The changes are:

- (a) Repeal of the control of daylight reflectance of materials used on the exterior of buildings as one of the prohibited construction materials under the Sixth Schedule of the BC Regulations;
- (b) Amendment to the Fifth Schedule of the BC Regulations to include daylight reflectance of materials used on the exterior of buildings as one of the performance requirements; and
- (c) Amendment to the BCA's Approved Document to include Section P "Daylight Reflectance".

Background

2 Daylight reflectance, which is the sum of specular reflectance and diffuse reflectance, is the measurement of the percentage of visible light that is reflected off a material. The daylight reflectance of materials for building works is regulated in view of the potential disamenity caused by sunlight reflected off a building. The use of building materials with daylight reflectance exceeding 20% on all external surfaces is currently prohibited under the Sixth Schedule ("Prohibited Construction Materials") of the BC Regulations.

3 On 3 February 2015, BCA convened a Performance-Based Standing Committee, with representatives from industry associations (including REDAS, SIA, IES, ACES and SCAL), public agencies, industry standard workgroup and academics, to consult on BCA's proposal for changes to the requirements on control of daylight reflectance. The proposal was also published on BCA's website for a two-month period for public consultation. The public consultation was closed on 8 April 2015.

4 Taking into consideration of the feedback received, BCA worked with the Performance-Based Standing Committee to finalise the performance-based requirements for the control of daylight reflectance of materials used on the exterior of buildings.

Amendments to the Building Control Regulations

5 To effect this change, the BC Regulations has been amended to introduce the objectives and performance requirements on daylight reflectance under the Fifth Schedule (see **Annex A**). Correspondingly, the current prescriptive prohibition in the Sixth Schedule ("Prohibited Construction Materials") of the BC Regulations has been repealed.

6 As in all performance-based requirements, BCA will specify the acceptable solution (see **Annex B**) in the Approved Document. If a Qualified Person (QP) adopts the acceptable solution, the proposed design will be deemed to have complied with the objectives and performance requirements set out in the Fifth Schedule of the BC Regulations.

7 However, if the QP so decides to use materials which are unable to meet the performance standard of the acceptable solution, the QP will have to provide an alternative solution including performing reflectivity simulation and analysis to demonstrate that the outcome of the alternative design is on par with or better than that of the acceptable solution.

Effective date

8 The new edition of the BCA's Approved Document is available at BCA website www.bca.gov.sg. As this amendment allows the industry greater flexibility in proposing designs and types of materials, the relevant amendment to the BC Regulations and the Approved Document will take immediate effect.

Contact Person for Clarifications

9 We would appreciate it if you could convey the contents of this circular to the members of your organisation. Should you need further clarifications, please contact Mr Tan Yu Jun at Tel 6804-4374 or by email to: tan_yu_jun@bca.gov.sg.

Yours faithfully,



TAY CHIOU PENG
DEPUTY GROUP DIRECTOR
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for COMMISSIONER OF BUILDING CONTROL

AMENDMENTS TO THE FIFTH SCHEDULE OF THE BUILDING CONTROL REGULATIONS

(New section P in Fifth Schedule)

FIFTH SCHEDULE

P Daylight reflectance

P.1 Objective

P.1.1 The objective of paragraph P.2.1 is to protect occupants of buildings in the vicinity of a building from loss of amenity caused by the reflection of sunlight off the external surface of that building, arising from the use of materials with high daylight reflectance.

P.2 Performance requirement

P.2.1 The external surface (including a roof) of a building must be designed and constructed in a manner such that any reflection of sunlight off the external surface of the building does not result in loss of amenity to occupants of other buildings in the vicinity of that building.

AMENDMENTS TO THE BCA'S APPROVED DOCUMENT

(New section P in Approved Document)

P Daylight reflectance

P.1 Objective

P.1.1 The objective of paragraph P.2.1 is to protect occupants of buildings in the vicinity of a building from loss of amenity caused by the reflection of sunlight off the external surface of that building, arising from the use of materials with high daylight reflectance.

P.2 Performance requirement

P.2.1 The external surface (including a roof) of a building must be designed and constructed in a manner such that any reflection of sunlight off the external surface of the building does not result in loss of amenity to occupants of other buildings in the vicinity of that building.

P.3 Acceptable solution

P.3.1 The requirement in paragraph P.2.1 is deemed to be satisfied if the specifications set out in paragraphs P.3.2 to P.3.3 are complied with.

P.3.2 The material used for the building work is deemed acceptable if –

- (a) The glass for the building work has a daylight reflectance not exceeding 20%
- (b) For the use of any material, other than glass, for the building work on –
 - (i) the façade of the building has a specular reflectance not exceeding 10%
 - (ii) the roof, inclined at an angle of not exceeding 20 degrees from the horizontal plane, of the building has a specular reflectance not exceeding 10%
 - (iii) the roof, inclined at an angle of more than 20 degrees from the horizontal plane, of the building has a daylight reflectance not exceeding 20% and a specular reflectance not exceeding 10%

- (c) Emulsion paint on plastered or concrete surfaces which has a specular reflectance not exceeding 10%

Note: 1 For the purpose of (b)(ii) and b(iii), in any building where the façade and the roof continue seamlessly, the area above the last finished floor will be considered the roof.

2 Daylight reflectance is the sum of specular reflectance and diffuse reflectance.

P.3.3 The testing of reflectance values for any material shall be conducted in accordance with ASTM E903: Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres, or equivalent, with an integrating sphere of minimum 150mm diameter.

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