Building and Construction Authority

We shape a **safe**, **high quality**, **sustainable** and **friendly** built environment.

Our Ref.: BCA BC 15.0.3 Building Plan and Management Division

10 Jan 2011

See Distribution

Dear Sir/Madam

REGULATIONS ON USE OF GLASS AT CRITICAL AREAS IN BUILDINGS TO ADDRESS SPONTANEOUS SHATTERING AND BOND FAILURE OF STRUCTURAL SEALANT USED TO SUPPORT GLAZING

Objectives

This circular is to inform the industry on the new regulations in relation to the use of glass at critical areas in buildings to address:

a) spontaneous breakage of glass elements; and

b) bond failure of structural sealant used to support glazing.

Regulation on Use of Glass at Critical Areas in Buildings

2 Tempered glass, because of its higher strength and ability to meet load design requirements, is frequently used in both the interior (e.g. parapets) and exterior (e.g. curtain walls, full-height windows and skylight) of buildings. It is often selected as the material for facade of buildings. It is also increasingly being used in other critical areas such as roofs, canopies (including sunshades) and safety barriers in buildings.

3 In view of the concern with the spontaneous shattering phenomenon in tempered glass, BCA sought feedback from the industry on the use of tempered glass in critical areas of our buildings. The industry, in general, was in favour of introducing performance-based regulatory requirements to limit the use of tempered glass installed at critical areas.

4 With effect from **1 July 2011**, if glass is used in any of the critical areas mentioned below for any project whose **building plan is first submitted on or after this date**, the following requirements shall apply:

a) Glass used as a Part or Whole of Safety Barrier

Where glass is used as a part or whole of a safety barrier, which is required to comply with Clause H on Safety from Falling in the Fifth Schedule of the Building Control Regulations (on Objectives and Performance Requirements for the Design and Construction of Buildings), it should be laminated glass. The laminated glass must comply with Singapore Standard SS341:2001 – Specification for Safety Glazing Materials for Use in Buildings.

b) Glass used as a Part or Whole of Building Facade, Roof, Canopy or Other Overhead Glazing

Where glass is used as a part or whole of a building facade, roof, canopy or other overhead glazing (such as sunshade, fins or rain shield) locating at a height of 2.4m or above, it may be float glass, heat strengthened glass, tempered glass, laminated glass or any other types of glass. Regardless of the type used, the glass must comply with Singapore Standard SS341:2001 – Specification for Safety Glazing Materials for Use in Buildings.

Specifically, **if monolithic tempered glass, heat-soaked tempered glass or any other type of glass that is prone to spontaneous breakage is used here, the design of the building shall provide for suitable protection** such as installation of screens or shields, or presence of canopies or ledges, to protect people from injuries in the event of breakage of such glass element.

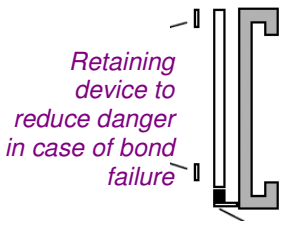
Regulation on Use of Structural Sealant Glazing in Buildings

5 When used in building facades (e.g. curtain walls), conventionally glass is often held onto aluminium frames through mechanical supports which are then attached to the building structure. The use of structural sealant to bond the glass to the aluminium frames which is known as structural sealant glazing, instead of through mechanical supports, is becoming more prevalent.

6 With effect from **1 July 2011, where structural sealant glazing is used in a glass curtain wall or other glass installation located at a height of 2.4 metres or more (whether situated within the interior or forming the exterior of a building)** for any project whose **structural plan is first submitted on or after this date**, installation will be deemed approved if it complies with all of the following requirements:

a) The structural sealant glazing shall be of either two-sided type or four-sided type **with retaining devices**. The retaining devices must be designed and constructed to prevent any fall of glass panel in the event of bond failure in the structural sealant;

b) The self-weight of the glass panels shall be mechanical supported when the structural sealant glazing system (see figure shown below) is used; **and**



Mechanical self-weight support

c) The structural sealant glazing shall be designed and constructed in accordance with the following Standards:

i. ASTM C1184: Standard Specification for Structural Silicone Sealants and ASTM C1401: Standard Guide for Structural Sealant Glazing; or

ii. BS EN 13022-2:2006: Glass in Building - Structural Sealant Glazing and BS EN 15434:2006: Glass in Building – Product Standard for Structural and/or Ultra-violet Resistant Sealant.

Clarification

7 We would appreciate it if you could convey the contents of this circular to the members of your organisation. For clarification, you may email to bca_enquiry@bca.gov.sg or call the following hotline/contact persons.

Hotline/Contact Person	**Contact Number**
Use of Glass at Critical Areas in Buildings	
BP Hotline	6325 7159
Use of Structural Sealant Glazing in Buildings	
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Yours faithfully

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