

Our Ref : APPBCA-2018-09

Building Plan & Management Group

Date : 31 Oct 2018

### See Distribution List

Dear Sir/Madam

## **ADOPTION OF NEW SINGAPORE STANDARD SS 555:2018 – CODE OF PRACTICE FOR PROTECTION AGAINST LIGHTNING**

### **Objective**

This circular is to inform the industry on the adoption of new Singapore Standard SS 555:2018 – Code of Practice for Protection against Lightning, the key changes in the Standard and the submission requirements for LPS at the application of TOP/CSC.

2 The new Singapore Standard, SS555:2018 Protection Against Lightning, was launched by Enterprise Singapore on the 29 Aug 2018. With effect from **1 May 2019**, developments whose building plans are submitted on or after this date must comply with the relevant requirements in SS 555:2018 to meet the objectives in the Clause L of the Fifth Schedule of the Building Control Regulations.

### **New Clauses introduced under Annex ZA of SS555:2018**

3 The new clauses introduced in the new Singapore Standard under Annex ZA (National Deviations) of SS555:2018 are as shown in Table 1 below. The LPS As-built plans endorsed by the Professional Engineer (Electrical) (PE(Electrical)) and submitted during TOP applications shall also include any applicable details pertaining to the new clauses in Table 1, as shown in Appendix A.

Table 1: New clauses in SS 555:2018 Annex ZA

Clauses	Description
8.3	Protection in open spaces
8.4	Additional measures for habitable rooftop spaces (e.g. roof gardens, penthouse terraces)
8.5	LPS warning signs
8.6	Protection of corners and edges of flat roofs and parapet walls of tall buildings

4 The PE(Electrical) should also note that there are four classes (I, II, III and IV) of Lightning Protection System (LPS) mentioned in Part 3 of the SS555:2018. For the purpose of complying with the Building Control Regulations, a minimum level of Class III LPS (equivalent to a rolling sphere radius of 45m under the rolling sphere method of determining air termination positions) must be provided. For buildings with higher risks (e.g. storage of explosive or flammable contents), a higher level lightning protection must be provided accordingly.

### **Submission of Documents for TOP/CSC Applications**

#### Updated Certificate of Supervision and Standardised Test Form

5 We have noted in the applications for TOP/CSC that there are many different formats of Resistance & Continuity Test Forms. Hence we have standardised these forms as attached in Appendix B and PE(Electrical) shall use these standardised forms for TOP/CSC applications on or after **1 May 2019**.

#### Maintaining Proper Records of LPS during Construction Stage

6 The PE (Electrical) responsible for the supervision of the LPS installation works should keep the following records properly throughout the project.

- a. Photos of all concealed equipotential bonding between metal fixtures, steel rebar of concrete and LPS. Some examples of metal fixtures include railings, staircases, windows, antennae, façade and M&E services (e.g. ducts, pipes, cable containments).
- b. Earth Resistance & Continuity Test Form

- c. LPS Components Test Report [Test in accordance with IEC 62561 series]
- d. Risk Assessment Report

**For Clarifications**

7 We would appreciate it if you could convey the contents of this circular to the members of your organisation. For clarifications, please submit your enquiry through BCA's Online Feedback Form at <https://www.bca.gov.sg/feedbackform/> or call us at 1800 342 5222.

Yours faithfully

A handwritten signature in black ink, appearing to read 'Punithan Shanmugam', with a small flourish at the end.

PUNITHAN SHANMUGAM  
DIRECTOR  
BUILDING PLAN AND POLICIES DEPARTMENT  
BUILDING PLAN AND MANAGEMENT GROUP  
for COMMISSIONER OF BUILDING CONTROL

## Appendix A

### 1. DETAILS TO BE INCLUDED IN LPS AS-BUILT PLANS

LPS as-built plans accompanying any application for TOP/CSC shall be prepared and endorsed by a Professional Engineer (Electrical). All LPS plans shall, where applicable, include the following:

- (1) **Site Plan;**
- (2) **Roof Plans showing;**
  - (i) air-termination system
  - (ii) location of air finials
  - (iii) location of down conductors
  - (iv) location of equipotential bonding to metallic fixtures
  - (v) class of lightning protection
- (3) **Elevation Plans showing;**
  - (i) zones of lightning protection provided by rolling sphere and/or protection angle method
  - (ii) for tall building, air-termination system against flashes to the sides of building down to a height of 45m
- (4) **1<sup>st</sup> Level / Basement Plans showing:**
  - (i) location of earthing inspection chambers
  - (ii) type of earth electrodes (copper rods, copper plates, metal piles)
- (5) **Typical Detail Plans showing:**
  - (i) connections between down conductor, test link and earthing inspection chamber
  - (ii) equipotential bonding details showing all concealed connections to steel frame, reinforcement steel and other conductive parts of the building used as a natural component of the LPS.
- (6) **Compliance To New Clauses In SS 555:2018 ANNEX ZA**
  - (i) Clause 8.3 : Protection in open spaces
  - (ii) Clause 8.4 : Additional measures for habitable rooftop spaces (e.g. roof gardens, penthouse terraces)
  - (iii) Clause 8.5 : LPS warning signs
  - (iv) Clause 8.6 : Protection of corners and edges of flat roofs and parapet walls of tall buildings

## Appendix B

### CERTIFICATE OF SUPERVISION OF LIGHTNING PROTECTION SYSTEM

This form may take you 5-8 minutes to complete.

<b>THE BUILDING CONTROL ACT (CAP 29)</b> <b>CERTIFICATE OF DESIGN &amp; SUPERVISION OF LIGHTNING PROTECTION SYSTEM</b>	
Commissioner of Building Control Building & Construction Authority 52 Jurong Gateway Road #11-01 Singapore 608550 Website: <a href="http://www.bca.gov.sg/">http://www.bca.gov.sg/</a>	<b>INSTRUCTIONS:</b> (1) One copy is to be submitted (2) Please tick in the appropriate box. (3) This form is to be filled in BLACK INK only.
This Certificate relates to the lightning protection system installed in the building(s) approved under:- Project Ref. No.: [ ] Address: [ ] Building Name (if any): [ ] TS/MK & Lot/Plot: [ ] Remarks: [ ]	
<b>Part 1 : Lightning Protection System Design Certification</b>	
I certify that the design of the above-mentioned lightning protection system complies with the requirements of the Building Control Regulations 2003, SS:555 and the relevant Singapore Standard Code of Practice.	
(a) The design of the lightning protection system is in accordance with -	
<input type="checkbox"/>	the Code of Practice For Protection Against Lightning - SS 555:2010; or
<input type="checkbox"/>	the Code of Practice For Protection Against Lightning - SS 555:2018. (building plan submitted on or after <b>1 May 2019</b> )
(b) <input type="checkbox"/> The design and installation of the lightning protection system are based on alternative solution Remarks on alternative solution provided: [ ]	
Address of Professional Engineer	Name, PE Registration Number & Signature of Professional Engineer
Tel No.	Date:

**Part 2: Lightning Protection System Supervision Certification**

I have supervised the above-mentioned lightning protection installation and hereby certify the installation works complies with the requirements of the Building Control Regulations 2003, SS:555 and the relevant Singapore Standard Code of Practice. I further certify that the installation works has been inspected and tested by me in accordance to relevant Singapore Standard Code of Practice.

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Address of Professional Engineer

Name, PE Registration Number & Signature of Professional Engineer

Tel No.

Date:

This form may take you 5-8 minutes to complete.

**THE BUILDING CONTROL ACT (CAP 29)**  
**CERTIFICATE OF SUPERVISION OF LIGHTNING PROTECTION SYSTEM**  
**(Earth Resistance & Electrical Continuity Test Form)**

Commissioner of Building Control  
 Building & Construction Authority  
 52 Jurong Gateway Road #11-01  
 Singapore 608550  
 Website: <http://www.bca.gov.sg/>

**INSTRUCTIONS:**

- (1) One copy is to be submitted
- (2) This form is to be filled in BLACK INK only.

Project Ref. No.: [ ]

**Lightning Protection System Earthing & Electrical Continuity Test**

Address: [ ]

Test Date: [ ]

**Test Instrument Details**

Brand & Model 1: [ ]

Serial No.: [ ]

Calibrated: [ ]

Brand & Model 2: [ ]

Serial No.: [ ]

Calibrated: [ ]

**Table 1 : Earth Resistance System Test**

Type of Test	Resistance of Earth Termination System [Ohm]												Remarks	
	1	2	3	4	5	6	7	8	9	10	11	12		
Earth Electrode Point														
Point Resistance [R < N x 10Ω]														
Electrical Continuity Test Between N & N+1														
Earth Electrode Point	13	14	15	16	17	18	19	20	21	22	(N-1) <sup>th</sup>	N <sup>th</sup>		
Point Resistance [R < N x 10Ω]														
Electrical Continuity Test Between N & N+1														

Overall resistance of the Earth Termination System

[R<sub>overall</sub> ≤ 10Ω]: [ ]

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**Table 2 : Natural Down Conductor Electrical Resistance Test**

Type Of Test	Continuity Test for Down Conductor System [Ohm]												Remarks
	1	2	3	4	5	6	7	8	9	10	11	12	
Electrical Continuity Test													
Overall value in Ohm [R<0.2Ω]													
Electrical Continuity Test	13	14	15	16	17	18	19	20	21	22	(N-1) <sup>th</sup>	N <sup>th</sup>	
Overall value in Ohm [R<0.2Ω]													

\* Table 2 applicable for down conductor using natural component such as rebar of concrete column.

Notes :

1. Test Report shall be provided for each structure/building.
2. LPS as-built plans should include air-termination system, down conductor system, earth termination system, details of equipotential bonding, zones of lightning protection provided by rolling sphere and/or protection angle, photos of concealed equipotential bonding points between metal fixtures, steel rebars of concrete with LPS, etc.
3. Any other details as required by BCA but not mentioned above.

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Signature/Name/PE Registration Number of Professional Engineer



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