SINGAPORE CIVIL DEFENCE FORCE

Your Ref **:** **Our Ref:** CD/FSSD/12/02/03/01

Date **:** 31 December 2015

Registrar, Board of Architects
Registrar, Professional Engineers Board
President, Singapore Institute of Architects
President, Institution of Engineers, Singapore
President, Association of Consulting Engineers, Singapore

Dear Sir/Mdm

FIRE SAFETY REQUIREMENTS FOR SOLAR PHOTO-VOLTAIC (PV) INSTALLATIONS ON ROOF

As part of global drive for greater use of green energy, Singapore has taken active steps in adopting solar photovoltaic system as alternative means of electricity generation. In anticipation of the proliferation of projects and increasing scale incorporating solar PV systems in buildings, SCDF has formulated a set of Fire Safety Requirements (FSR) to facilitate its installation on the roof (see attached **Annex A** - FSR 13: 2015). These requirements were formulated together with relevant stakeholders and after extensive consultations with the industry. This FSR shall take effect from 1 July 2016.

2. Please convey the contents of this circular to members of your Institution/Association/Board. The circular is also available in CORENET-e-Info: http://www.corenet.gov.sg/einfo

3. For any inquiry or clarification, please contact the following officers:
   (a) Mr Pang Tong Teck (Tel. No. 68481403)
   (b) LTC Vincent Ho (Tel. No. 68481418)
   (c) MAJ Tan Chung Yee (Tel. No. 68481457)

HQ SINGAPORE CIVIL DEFENCE FORCE, 91 UBI AVENUE 4, SINGAPORE 408827
TEL: 68481457 FAX: 68481490 EMAIL:TAN_Chung_Yee@scdf.gov.sg

Yours faithfully,

(transmitted via e-mail)

MAJ Tan Chung Yee
Fire Safety and Shelter Department
for Commissioner
Singapore Civil Defence Force

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HQ SINGAPORE CIVIL DEFENCE FORCE, 91 UBI AVENUE 4, SINGAPORE 408827
TEL: 68481457 FAX: 68481490 EMAIL:TAN_Chung_Yee@scdf.gov.sg

Annex A

SINGAPORE CIVIL DEFENCE FORCE

FIRE SAFETY REQUIREMENTS FOR SOLAR PHOTO-VOLTAIC INSTALLATIONS ON ROOF

FSR 13 : 2015

Effective Date: 1 July 2016

Issued by :

Fire Safety & Shelter Department
Singapore Civil Defence Force

(Total 4 pages)

FSR 13 : 2015

FIRE SAFETY REQUIREMENTS FOR SOLAR PHOTO-VOLTAIC (PV) INSTALLATIONS ON ROOF

1 SCOPE

This set of Fire Safety Requirements (FSR 13: 2015) shall be applicable to roof mounted PV installations.

2 GENERAL

2.1 This FSR shall be read in conjunction with the prevailing Code of Practice for Fire Precautions in Buildings, namely the Fire Code.

2.2 This FSR shall take precedence over similar requirements (if any) stipulated in the prevailing Fire Code.

3 FIRE SAFETY REQUIREMENTS

3.1 Means of Access

3.1.1 For PV installations on the roof, at least one exit staircase shall be provided. Where the area of non-habitable roof is large and one-way travel distance to the exit cannot be met, an additional cat ladder or ship ladder adequately separated in accordance with Cl.1.2.60 of Fire Code and leading to the circulation area of the floor below shall be provided.

3.1.2 For existing buildings which are carrying out the installation of PVs on the roof level where the provision of single exit staircase is not feasible, a portable sturdy ladder to the roof access is required. Single storey buildings with roof height not more than 12m or inaccessible pitch roof up to 24m from grade level are not required to provide the sturdy ladder if there is adequate fire engine access way fronting this installation.

3.1.3 The computation of travel distance for roof areas which are open to the sky for any Purpose Group (except Purpose Group 1) can be based on the sprinkler-protected requirement.

3.1.4 All access hatches, if provided, shall be readily accessible from the roof. Access hatch opening shall have a minimum clear width of 1000mm in diameter.

3.2 Fire Resistance of PV Modules

3.2.1 The standard IEC 61730-2: Photovoltaic Module Safety Qualification, Part 2: Requirements for Testing stipulates the fire test for PV modules. The characteristics assessed in the fire test establish the fundamental fire resistance of PV modules mounted over an existing roof.

3.2.2 A minimum fire resistance rating Class C shall be provided for any roof-mounted PV module.

3.2.3 System components associated with the PV modules such wirings, switchboard assemblies shall comply with the installation requirements as stipulated in SS CP5: Code of Practice for Electrical Installations.

3.2.4 The Solar PV components shall be listed under Class 2 of the Product Listing Scheme (PLS) and subject to annual surveillance test.

3.3 Design and Installation Criteria

3.3.1 The sub-array for the PV installations shall be limited to maximum size of 40m by 40m.

3.3.2 A clearance of 3m around the access/hatch opening and in front of exit door (of exit staircase) shall be provided.

3.3.3 For roof without perimeter parapet / railing, a clear width of not less than 2.5m shall be maintained along the perimeter aisles / gangways. For roof with perimeter parapet / railing of height not less than 900mm, a clear width of not less than 1.5m shall be provided along the perimeter aisle / gangway.

3.3.4 There shall be a minimum of 1.5m separation between arrays.

3.3.5 There shall be no storage or services below the PV installation.

3.3.6 PV modules, wirings, switchboard assemblies and other equipment shall not cover any ventilation system on the roof (e.g. smoke control/ extraction systems or air well).

3.4 Emergency Disconnection

3.4.1 Manual emergency shut-off system for the disconnection of the PV modules shall be provided on AC side (typically where inverters are placed) and switch room.

3.4.2 Operating instructions on the emergency shut off system shall be clearly displayed near to the emergency shut-off system. It shall be placed at a height between 1.5m to 2m from the floor.

3.4.3 A simplified site plan with the position of PV modules and systems circuit diagrams shall be displayed close to access openings or exit staircase to the roof. The site plan shall be placed at a height between 1.5m to 2m from the floor.

4 SUBMISISION OF FIRE SAFETY PLAN

4.1 Solar PV system installation that comes with any new building project shall be reflected in the building plans together with all other fire safety works for submission to SCDF for approval.

4.2 For existing buildings where solar PV system is to be installed, the plans may be lodged under the Minor Additions and Alteration (MAA) Lodgement Scheme.

4.3 The plan shall clearly contain the following:

(a) Location of manual emergency shut-off system;
(b) Location of site plan indicating position of PV modules and systems circuit diagrams; and
(c) Location of fire extinguishers