

#### NA to SS EN 1991-1-2 : 2008 (2015)

(ICS 13.220.50; 91.010.30)

# Singapore National Annex to Eurocode 1 : Actions on structures

 Part 1-2 : General actions – Actions on structures exposed to fire



Published by



NA to SS EN 1991-1-2: 2008 (2015)

(ICS 13.220.50; 91.010.30)

SINGAPORE STANDARD

### **Singapore National Annex to Eurocode 1 : Actions on structures**

- Part 1-2: General actions - Actions on structures exposed to fire

All rights reserved. Unless otherwise specified, no part of this Singapore Standard may be reproduced or utilised in any form or by any means, electronic or mechanical, including photocopying and microfilming, without permission in writing from Enterprise Singapore. Request for permission can be sent to: standards@enterprisesg.gov.sg.

This Singapore Standard was approved by the Building and Construction Standards Committee on behalf of the Standards Council of Singapore on 15 June 2008.

First published, 2008

The Building and Construction Standards Committee appointed by the Standards Council consists of the following members:

|                             | Name                       | Capacity  |
|-----------------------------|----------------------------|---|
| Chairman                    | : Mr Goh Peng Thong        | Standards Council                                   |
| 1 <sup>st</sup> Dy Chairman | : Mr Lee Chuan Seng        | Standards Council                                   |
| 2 <sup>nd</sup> Dy Chairman | : Mr Tan Tian Chong        | Standards Council                                   |
| Secretary                   | : Mr James Choo            | SPRING Singapore                                    |
| Members                     | : Mr Boo Geok Kwang        | Singapore Civil Defence Force                       |
|                             | Er. Chan Ewe Jin           | Institution of Engineers, Singapore                 |
|                             | Mr Chan Yew Kwong          | Ministry of Manpower                                |
|                             | Mr Paul Fok                | Land Transport Authority                            |
|                             | Mr Goh Ngan Hong           | Singapore Institute of Surveyors and Valuers        |
|                             | Mr Anselm Gonsalves        | National Environment Agency                         |
|                             | Mr Desmond Hill            | Singapore Contractors Association Limited           |
|                             | Mr Benedict Lee Khee Chon  | g Singapore Institute of Architects                 |
|                             | Ms Andris Leong            | Building and Construction Authority                 |
|                             | Assoc Prof Leong Eng Choor | Nanyang Technological University                    |
|                             | Dr Lim Lan-Yuan            | The Association of Property and Facility Managers   |
|                             | Mr McDonald Low            | Real Estate Developers' Association of<br>Singapore |
|                             | Mr Larry Ng Lye Hock       | Urban Redevelopment Authority                       |
|                             | Assoc Prof Gary Ong Khim ( | Chye National University of Singapore               |
|                             | Mr Davis Ong Wee Choon     | Singapore Manufacturers' Federation                 |
|                             | Er. Shum Chee Hoong        | Housing & Development Board                         |
|                             | Dr Tan Guan                | Association of Consulting Engineers,<br>Singapore   |
|                             | Mr Tang Pei Luen           | JTC Corporation                                     |
| Co-opted<br>Member          | : Dr Tam Chat Tim          | Individual Capacity                                 |

The Technical Committee on Building Structure and Sub-structure appointed by the Building and Construction Standards Committee and responsible for the preparation of this standard consists of representatives from the following organisations:

|             |   | Name                          | Capacity  |  |
|-------------|---|-------------------------------|---|--|
| Chairman    | : | Dr Tan Guan                   | Member, Building and Construction Standards Committee |  |
| Co-Chairman | : | Mr Chew Keat Chuan            | Building and Construction Authority                   |  |
| Secretary   | : | Ms Lee Hiok Hoong             | SPRING Singapore                                      |  |
| Members     | : | Er. Chan Ewe Jin              | Institution of Engineers, Singapore                   |  |
|             |   | Mr Chen Enyi                  | Cement and Concrete Association of<br>Singapore       |  |
|             |   | LTC Cheok Poh Chin            | Singapore Civil Defence Force                         |  |
|             |   | Dr Sujit Ghosh                | Ready Mix Concrete Association of<br>Singapore        |  |
|             |   | Dr Ho Nyok Yong               | Singapore Contractors Association Ltd                 |  |
|             |   | Mr Ho Wan Boon                | Singapore Structural Steel Society                    |  |
|             |   | Assoc Prof Gary Ong Khim Chye | Singapore Concrete Institute                          |  |
|             |   | Mr Song Siak Keong            | Land Transport Authority                              |  |
|             |   | Mr Sze Thiam Siong            | Setsco Services Pte Ltd                               |  |
|             |   | Ms Angeline Tan Bee Hoon      | Housing & Development Board                           |  |
|             |   | Mr Tan Jui Teck               | CPG Corporation Pte Ltd                               |  |
|             |   | Assoc Prof Tan Kiang Hwee     | National University of Singapore                      |  |
|             |   | Assoc Prof Tan Teng Hooi      | Nanyang Technological University                      |  |
|             |   | Mr Tang Pei Luen              | JTC Corporation                                       |  |
| Co-opted    |   |                               |   |  |

Member . : Dr Tam Chat Tim Individual Capacity

The following Technical Experts contributed in their individual capacity to the preparation of this standard:

Dr Tan Teng Hooi (WG Convenor)

Er. Tay Ah Ching (WG Secretary)

Dr Richard Liew Jat Yuen (Taskforce Leader)

Mr Adrian Billinghurst

Er. Chan Yek Seng

Er. Ho Pui Ming

Er. Fred Lee Ka Wing

Dr Leong Eng Choon

Er. Lim Peng Hong

Mr André Lovatt

Er. Low Kam Fook

Mr Mah King Kheong

Mr Ong Yew Hing

Dr Tan Kang Hai

Er. Tan See Chee

Er. Tay Yak Hong

LTC Philip Tham Sek Khow

Er. Thung Sek Kwang

#### NA to SS EN 1991-1-2: 2008 (2015)

The organisations in which the experts are involved are:

Arup Fire Singapore
Beca Carter Hollings Ferner (SEA) Pte Ltd
Building and Construction Authority
CPG Consultants Pte Ltd
Defence Science & Technology Agency
Jurong Consultants Pte Ltd
Land Transport Authority
Maunsell Consultants (Singapore) Pte Ltd
Nanyang Technological University
National Environment Agency
National University of Singapore
Singapore Civil Defence Force
TYH Consulting Engineers
Worley Parsons Pte Ltd

#### **Contents**

|               |  | Page |
|---------------|--|------|
| Nation        | 6  |      |
| CLAU          | SES  |      |
| NA.1          | Scope  | 7    |
| NA.2          | Nationally determined parameters                               | 7    |
| NA.3          | Decisions on the status of the informative annexes             | 8    |
| NA.4          | Reference to non-contradictory complementary                   | 10   |
| TABL          | ES   |      |
| A.2           | Fire load densities q <sub>f,k</sub> for different occupancies | 9    |
| Bibliography_ |  | 11   |

#### **National Foreword**

This Singapore Standard was prepared by the Technical Committee on Building Structure and Substructure under the purview of the Building and Construction Standards Committee.

This standard is an adoption of UK National Annex to Eurocode 1: Actions on structures – Part 1-2: General actions – Actions on structures exposed to fire and is implemented with the permission of British Standards Publishing Ltd.

In preparing this standard, reference was also made to PD 6688-1-2 : 2007 – Background paper to the UK National Annex to BS EN 1991-1-2.

Acknowledgement is made to BSI for the use of information from the above publications.

This Singapore NA contains information on those parameters which are left open in EN 1991-1-2 for national choice, known as nationally determined parameters. The Singapore NA is to be read in conjunction with the SS EN 1991-1-2: 2008 – Eurocode 1: Actions on structures – Part 1-2: General actions – Actions on structures exposed to fire.

At the time of publication, this standard is expected to be used as a reference in the Building and Construction Authority's 'Approved Document – Acceptable Solutions'.

Attention is drawn to the possibility that some of the elements of this Singapore Standard may be the subject of patent rights. Enterprise Singapore shall not be held responsible for identifying any or all of such patent rights.

#### NOTE

- 1. Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions.
- 2. An SS or TR is voluntary in nature except when it is made mandatory by a regulatory authority. It can also be cited in contracts making its application a business necessity. Users are advised to assess and determine whether the SS or TR is suitable for their intended use or purpose. If required, they should refer to the relevant professionals or experts for advice on the use of the document. Enterprise Singapore shall not be liable for any damages whether directly or indirectly suffered by anyone or any organisation as a result of the use of any SS or TR.
- 3. Compliance with a SS or TR does not exempt users from any legal obligations.

## Singapore National Annex to SS EN 1991-1-2 : 2008 – Eurocode 1: Actions on structures – Part 1-2 : General actions – Actions on structures exposed to fire

#### NA.1 Scope

This Annex gives:

- a) the Singapore decisions for the Nationally Determined Parameters described in the following subclauses of SS EN 1991-1-2: 2008:
  - -2.4(4)
  - -3.1(10)
  - -3.3.1.2(1)
  - -3.3.1.3(1)
  - -3.3.2(2)
  - -4.2.2(2)
  - -4.3.1(2)
- b) the Singapore decisions on the status of SS EN 1991-1-2: 2008 informative annexes.