

SINGAPORE STANDARD Singapore National Annex to Eurocode 3 : Design of steel structures

Part 1-10 : Material toughness and through thickness properties

Confirmed 2016

Published by



(ICS 91.080.10)

SINGAPORE STANDARD

Singapore National Annex to Eurocode 3 : Design of steel structures

- Part 1-10 : Material toughness and through thickness properties

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.

ISBN 978-981-4278-83-6

This Singapore Standard was approved by the Building and Construction Standards Committee on behalf of the Standards Council of Singapore on 9 December 2010.

First published, 2011

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

		Name	Capacity
Chairman	:	Mr Goh Peng Thong	Member, Standards Council
1 st Dy Chairman	:	Mr Lee Chuan Seng	Member, Standards Council
2 nd Dy Chairman	:	Mr Tan Tian Chong	Member, Standards Council
Secretary	:	Ms Tan Chiew Wan	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 Chong	Singapore Institute of Architects
		Ms Andris Leong	Building and Construction Authority
		Assoc Prof Leong Eng Choon	Nanyang Technological University
		Dr Lim Lan-Yuan	The Association of Property and Facility Managers
		Mr McDonald Low	Real Estate Developers' Association of 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, Singapore
Co-opted		Er. Tang Pei Luen	JTC Corporation
Members	:	Prof Choo Yoo Sang	National University of Singapore
		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	Er. Chew Keat Chuan	Building and Construction Authority

	Name	Capacity
Secretary :	Ms Lee Hiok Hoong	SPRING Singapore
Members :	Er. Chan Ewe Jin	Institution of Engineers, Singapore
	Dr Ho Nyok Yong	Singapore Contractors Association Ltd
	Mr Ho Wan Boon	Singapore Structural Steel Society
	Mdm Neo Bian Hong	Land Transport Authority
	Assoc Prof Gary Ong Khim Chye	Singapore Concrete Institute
	Mr Sze Thiam Siong	Setsco Services Pte Ltd
	Er. Angeline Tan Bee Hoon	Housing & Development Board
	Er. Tan Jui Teck	CPG Corporation Pte Ltd
	Prof Tan Kiang Hwee	National University of Singapore
	Er. Tang Pei Luen	JTC Corporation
	Assoc Prof Susanto Teng	Nanyang Technological University
Co-opted Members :	Prof Richard Liew Jat Yuen Dr Tam Chat Tim Dr Tan Teng Hooi	National University of Singapore Individual Capacity Individual Capacity

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

Prof Richard Liew Jat Yuen (Convenor) Mr Bernard Chung (Taskforce Leader) Er. Chen Guangming (Secretary) Er. Patrick Choy Mr Tommy Chua Er. Ho Wan Boon Dr Ng Yiaw Heong Mr Sze Thiam Siong Er. Tay Yak Hong (Co-Convenor) Mr Tee Swee Huat Dr Teo Teck Heong

The organisations in which the experts are involved are:

Building and Construction Authority Continental Steel Pte Ltd Kong Hwee Iron Works & Construction Pte Ltd MTTJ Engineering Sdn Bhd National University of Singapore Setsco Services Pte Ltd Tata Steel International TTJ Design and Engineering Pte Ltd TYH Consulting Engineers Yongnam Engineering & Construction Pte Ltd

(blank page)

Contents

		Page
Nation	al Foreword	6
NA.1	Scope	7
NA.2	Nationally determined parameters	7
NA.3	References to non-contradictory complementary information	10
Tables	S	
NA.1	Values of ΔT_{RD} for specific welded locations	8
NA.2	Values of ΔT_{Rg} according to gross stress concentration factor	8
NA.3	Values of ΔT_{RT} according to difference between Charpy test and minimum service temperatures	9
NA.4	Values of $\Delta T_{R\sigma}$ for maximum tensile stresses less than 0.75 $f_y(t)$	9
NA.5	Values of ΔT_{Rs} according to steel grade	9
Bibliog	graphy	11

National Foreword

This National Annex 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 (NA to BS EN 1993-1-10:2005) to Eurocode 3: Design of steel structures – Part 1-10 : Material toughness and through-thickness properties and is implemented with the permission of the British Standards Publishing Ltd.

In preparing this standard, reference was also made to PD 6695-1-9 : 2008 'Recommendations for the design of structures to BS EN 1993-1-10'.

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 1993-1-10 for national choice, known as nationally determined parameters. The Singapore NA is to be read in conjunction with the SS EN 1993-1-10 : 2010 – Eurocode 3: Design of steel structures – Part 1-10 : Material toughness and through-thickness properties.

Where appropriate, users may refer to the guidance and recommendation in the BC 1:2008 'Design Guide on use of alternative steel material to BS 5950' published by the Building and Construction Authority (BCA). Reference should be made to the most current version as this publication is expected to be replaced by subsequent revisions based on the SS EN 1993 series of standards.

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 1993-1-10 : 2010 – Eurocode 3: Design of steel structures – Part 1-10 : Material toughness and through-thickness properties

NA.1 Scope

This National Annex gives:

- a) the Singapore decisions for the Nationally Determined Parameters described in the following subclauses of SS EN 1993-1-10:2010:
 - 2.2(5)
 - 3.1(1)
- b) references to non-contradictory complementary information.