

SINGAPORE STANDARD

Steel for the prestressing of concrete

– Part 3 : Quenched and tempered wire



Published by

Enterprise
Singapore

SS 475 : Part 3 : 2000
ISO 6934-3 : 1991
(ICS 77.140.15; 91.080.40)

SINGAPORE STANDARD

Steel for the prestressing of concrete

– Part 3 : Quenched and tempered wire

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.

© ISO 1991– All rights reserved
© Enterprise Singapore 2000

ISBN 9971-67-787-3

This Singapore Standard was approved by the Building Materials Product Standards Committee on behalf of the Standards Council of Singapore on 31 March 2000.

First published, 2000

The Building Materials Product Standards Committee appointed by the Standards Council consists of the following members:

	Name	Organisation
Chairman	: Mr Goh Chong Chia	<i>Standards Council</i>
Secretary	: Mr Han Kin Sew	<i>Singapore Productivity and Standards Board</i>
Members	: Mr Boo Geok Kwang	<i>Singapore Civil Defence Force</i>
	Assoc Prof Chiew Sing Ping	<i>Nanyang Technological University</i>
	Mr Goh Soo Meng	<i>Institution of Engineers Singapore</i>
	Mr John Kong Wai Meng	<i>Singapore Confederation of Industries</i>
	Mr Lee Seng Kee	<i>Singapore Mass Rapid Transit</i>
	Mr Lim Hsiang Iu	<i>Urban Redevelopment Authority</i>
	Mr Larry Ng Lye Hock	<i>Housing & Development Board</i>
	Mr Ong Geok Soo	<i>Jurong Town Corporation</i>
	Ms Pauline Sim	<i>Singapore Institute of Architects</i>
	Mr P Sripathy	<i>Land Transport Authority</i>
	Ms Tan Chiew Wan	<i>Singapore Productivity and Standards Board</i>
	Assoc Prof Tan Kiang Hwee	<i>National University of Singapore</i>
	Mr Tan Tian Chong	<i>Building and Construction Authority</i>
	Mr Teo Tit Ngee	<i>Singapore Contractors Association Limited</i>
Co-opted Member	: Dr Tam Chat Tim	<i>Individual Capacity</i>

The Technical Committee on Steel appointed by the Building Materials Product Standards Committee and responsible for the preparation of this standard consists of representatives from the following organisations:

	Name	Organisation
Chairman	: Assoc Prof Chiew Sing Ping	<i>Building Materials Product Standards Committee</i>
Deputy Chairman	: Mr Chan Yek Seng	<i>Jurong Town Corporation</i>
Secretary	: Ms Lee Hiok Hoong	<i>Singapore Productivity and Standards Board</i>
Members	: Assoc Prof James M W Brownjohn	<i>Nanyang Technological University</i>
	Mr Bernard K P Chung	<i>Singapore Structural Steel Society</i>
	Mr Ho Wan Boon	<i>PWD Corporation Pte Ltd</i>
	Mr Khalid Mahmood	<i>Association of Consulting Engineers, Singapore</i>
	Mr Lee Yoon Moi	<i>Singapore Contractors Association Limited</i>
	Assoc Prof Richard J Y Liew	<i>National University of Singapore</i>
	Mr Henry H T Lim	<i>Institution of Engineers Singapore</i>
	Mr Pang Piow Chi	<i>Singapore Confederation of Industries</i>
	Mr Tan Hong Tuan	<i>Housing & Development Board</i>

The Working Group appointed by the Technical Committee to assist in the preparation of this standard comprises the following members:

	Name	Organisation
Convenor	: Mr Chan Yek Seng	<i>Jurong Town Corporation</i>
Members	: Mr Louis Paul Fok Kow	<i>Land Transport Authority</i>
	Mr Lee Yoon Moi	<i>Singapore Contractors Association Limited</i>
	Mr Pang Piow Chi	<i>Singapore Confederation of Industries</i>
	Mr Tan Kheng Hwee	<i>BBR Construction Systems Pte Ltd</i>
	Mr Tan See Wan	<i>Singapore Productivity and Standards Board</i>

(blank page)

Contents

	Page
National Foreword _____	6

SPECIFICATION

1	Scope _____	7
2	Normative references _____	7
3	Definitions _____	7
4	Conditions of manufacture _____	7
5	Surface configuration _____	7
6	Properties _____	7
7	Designation _____	9
8	Delivery conditions _____	9

ANNEXES

A	Examples of surface configurations (informative) _____	10
ZA	Guidelines on modulus of elasticity (informative) _____	13
ZB	Specification to limit ionising radiation (informative) _____	14

TABLES

1	Dimensions, masses and tensile properties of quenched and tempered wire _____	8
2	Required characteristic elongation _____	8
3	Maximum relaxation values _____	9
A.1	Rib dimensions _____	11
ZB.1	Radioactivity – Maximum activity concentration _____	13

FIGURES

A.1	Quenched and tempered ribbed wire _____	10
A.2	Quenched and tempered grooved wire _____	12
A.3	Quenched and tempered indented wire _____	12

National Foreword

This Singapore Standard was prepared by the Technical Committee on Steel under the direction of the Building Materials Product Standards Committee.

This standard is identical to ISO 6934-3 : 1991 which is published by the International Organisation for Standardisation. In addition to Annex A in the ISO standard, the Technical Committee has included Annexes ZA and ZB which are for users' information only.

Annex ZA (Informative) 'Guidelines on modulus elasticity' has been included for the designers' easy reference whereas Annex ZB (Informative) is a specification to limit ionising radiation from steel for the reinforcement of concrete. The specification is introduced to address concerns of possible radioactive contamination during the manufacturing process and the risk to health through exposure to radioactivity from the finished steel product.

Attention is drawn to the following:

1. Where the words 'International Standard' appear, they should be read as 'Singapore Standard'.
2. The comma has been used throughout as a decimal marker, whereas in Singapore Standards, it is a practice to use a full-point on the baseline as the decimal marker.
3. This ISO standards referred to shall be replaced by Singapore Standards as follows:

International Standard	Corresponding Singapore Standards
ISO 6934-1 : 1991	SS 475 : Part 1 : 2000 Steel for the prestressing of concrete – Part 1 : General requirements
ISO 10065 : 1990	SS 427 : 1998 Steel bars for reinforcement of concrete – Bend and rebend tests

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.*

Specification for steel for the prestressing of concrete – Part 3 : Quenched and tempered wire

1 Scope

This part of ISO 6934 specifies requirements for round wire made of quenched and tempered high tensile steel, with a surface which is either plain, ribbed, grooved or indented. The product is delivered in coils, according to the general requirements specified in ISO 6934-1.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 6934. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 6934 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 6934-1:1991, *Steel for the prestressing of concrete – Part 1: General requirements.*

ISO 7801:1984, *Metallic materials – Wire – Reverse bend test.*

ISO 10065:1990, *Steel bars for reinforcement of concrete – Bend and rebend tests.*