

**SINGAPORE STANDARD**

# **Specification for personal fall-arrest systems**

– Part 4 : Vertical rails and vertical lifelines  
incorporating a sliding-type fall arrester

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– Part 4 : Vertical rails and vertical lifelines incorporating a sliding-type fall arrester

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## SS 528 : Part 4 : 2006 (2014)

This Singapore Standard was approved by the General Engineering and Safety Standards Committee on behalf of the Standards Council of Singapore on 16 October 2006.

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The General Engineering and Safety Standards Committee appointed by the Standards Council consists of the following members:

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<b>Chairman</b>	: Mr Chan Yew Kwong	<i>Member, Standards Council</i>
<b>Deputy Chairman</b>	: Assoc Prof Hum Sin Hoon	<i>Member, Standards Council</i>
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	Mr Seet Choh San	<i>Singapore Institution of Safety Officers</i>
	Mr Wong Swee Thye	<i>Singapore Manufacturers' Federation (Metal, Machinery and Engineering)</i>
	Mr Eugene Yong Kon Yoon	<i>Singapore Contractors Association Limited</i>

The Technical Committee on Personal Safety and Ergonomics appointed by the General Engineering and Safety Standards Committee and responsible for the preparation of this standard consists of representatives from the following organisations:

	<b>Name</b>	<b>Capacity</b>
<b>Chairman</b>	: Assoc Prof Foo Swee Cheng	<i>Member, General Engineering and Safety Standards Committee</i>
<b>Secretary</b>	: Ms Barbara Bok	<i>SPRING Singapore</i>
<b>Members</b>	: Mr Choo Choong Huat	<i>Singapore Institution of Safety Officers</i>
	Mr Go Heng Huat	<i>Occupational Safety and Health Division, Ministry of Manpower</i>
	Mr Ajai Kumar	<i>Association for Singapore Marine Industries</i>
	Mr Patrick Ker	<i>Back Society Singapore</i>
	Mr Lee Seng Eng	<i>Land Transport Authority</i>
	Assoc Prof Lim Kee Yong	<i>Ergonomics Society of Singapore</i>

<b>Members</b>	: Ms Ng Kim Lan	<i>Occupational and Environmental Health Society</i>
	Mr Ong Pak Shoon	<i>Singapore Manufacturers' Federation</i>
	Mr Seah Chong An	<i>TÜV SÜD PSB Corporation Pte Ltd</i>
	Mr Sze Thiam Siong	<i>SETSCO Services Pte Ltd</i>
	Mr Tan Jway Kwee	<i>Institution of Engineers Singapore</i>
	Mr Raymond Wong	<i>Singapore Contractors Association Limited</i>
	Mr Yoong Chi Meng	<i>Occupational Safety and Health Division, Ministry of Manpower</i>

The Working Group appointed by the Technical Committee to assist in the preparation of this standard comprises the following experts who contributed in their *individual capacity*:

	<b>Name</b>
<b>Convenor</b>	: Mr Winston Yew
<b>Members</b>	: Mr Chin Sze Kiong
	Mr Anthony Lee
	Mr Francis Ng
	Mr Seah Chong An
	Mr Jaymes Tan
	Mr Tan Kai Hong
	Mr Ronnie Tan
	Mr Raymond Wong

The organisations in which the experts of the Working Group are involved are:

*Association for Singapore Marine Industries*  
*Institution of Engineers Singapore*  
*Jubilant International Pte Ltd*  
*Ministry of Manpower*  
*PDS International Pte Ltd*  
*QMT Industrial and Safety Pte Ltd*  
*QSS Safety Products (S) Pte Ltd*  
*Singapore Contractors Association Limited*  
*TÜV SÜD PSB Corporation Pte Ltd*

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## National Foreword

This Singapore Standard was prepared by the Technical Committee on Personal Safety and Ergonomics under the purview of the General Engineering and Safety Standards Committee.

This standard, which comes in six parts, supersedes the requirements for safety harnesses described in SS 402 : Part 1 : 1997 – ‘Industrial safety belts and harnesses – Part 1 : General requirements’ and SS 402 : Part 2 : 1997 – ‘Industrial safety belts and harnesses – Part 2 : Permanent anchors’. The requirements for safety belts are currently being revised.

The six parts of SS 528, to be read in conjunction, are as follows:

- Part 1 : Full-body harnesses
- Part 2 : Lanyards and energy absorbers
- Part 3 : Self-retracting lifelines
- Part 4 : Vertical rails and vertical lifelines incorporating a sliding-type fall arrester
- Part 5 : Connectors with self-closing and self-locking gates
- Part 6 : System performance tests

This part of SS 528 is identical with ISO 10333-4 : 2002 – ‘Personal fall-arrest systems – Part 4 : Vertical rails and vertical lifelines incorporating a sliding-type fall arrester’, published by the International Organization for Standardization.

Attention is also drawn to the following:

1. Where the words ‘International Standard’ appear, they should be interpreted as ‘Singapore Standard’.
2. The comma has been used throughout as a decimal marker in ISO 10333-4, whereas in Singapore Standards it is a practice to use a full-point on the baseline as the decimal marker.
3. The reference to International Standards shall be replaced by the following Singapore Standards:

International Standard	Corresponding Singapore Standard
ISO 10333-1 : 2000	SS 528 : Part 1 : 2006 – Specification for personal fall-arrest systems – Full-body harnesses
ISO 10333-2 : 2000	SS 528 : Part 2 : 2006 – Specification for personal fall-arrest systems – Lanyards and energy absorbers
ISO 10333-3 : 2000	SS 528 : Part 3 : 2006 – Specification for personal fall-arrest systems – Self-retracting lifelines
ISO 10333-4 : 2002	SS 528 : Part 4 : 2006 – Specification for personal fall-arrest systems – Vertical rails and vertical lifelines incorporating a sliding-type fall arrester
ISO 10333-5 : 2001	SS 528 : Part 5 : 2006 – Specification for personal fall-arrest systems – Connectors with self-closing and self-locking gates
Future part 6 to ISO 10333	SS 528 : Part 6 : 2006 – Specification for personal fall-arrest systems – System performance tests

NOTE – At the time of publication of this standard, the ‘future part 6 to ISO 10333’ has already been published as ISO 10333-6 : 2004.

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.*



## **Foreword**

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 10333 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 10333-4 was prepared by Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 4, *Personal equipment for protection against falls*.

ISO 10333 consists of the following parts, under the general title *Personal fall-arrest systems*:

- *Part 1: Full-body harnesses*
- *Part 2: Lanyards and energy absorbers*
- *Part 3: Self-retracting lifelines*
- *Part 4: Vertical rails and vertical lifelines incorporating a sliding-type fall arrester*
- *Part 5: Connectors with self-closing and self-locking gates*

Systems performance tests will be the subject of a future part 6 to ISO 10333.

Annex A forms a normative part of this part of ISO 10333.

## **Introduction**

In cases where the hazard of falling from a height exists and where, for technical reasons or for work of very short duration, safe access cannot be otherwise provided, it is necessary to consider the use of personal fall-arrest systems (PFAS). Such use should never be improvised and its adoption should be specifically provided for in the appropriate formal provisions for safety in the work place.

PFAS complying with this part of ISO 10333 should satisfy ergonomic requirements and should only be used if the work allows means of connection to a suitable anchor device of demonstrated strength and if it can be implemented without compromising the safety of the user. Personnel should be trained and instructed in the safe use of the equipment and be observant of such training and instruction.

This part of ISO 10333 is based on current knowledge and practice concerning the use of PFAS that incorporate a full-body harness as specified in ISO 10333-1.

This part of ISO 10333 presumes that the manufacturer of the PFAS, subsystems or components will, for the sake of consistency and traceability, operate a quality management system which will comply with national and regional regulations in force at the time. Guidance on the form this quality management system may take can be found in ISO 9000, *Quality management systems — Fundamentals and vocabulary*.

## Specification for personal fall-arrest systems – Part 4 : Vertical rails and vertical lifelines incorporating a sliding-type fall arrester

### 1 Scope

This part of ISO 10333 specifies requirements, test methods, instructions for use and maintenance, marking, labelling and packaging, as appropriate, for vertical rails and vertical lifelines which incorporate a sliding-type fall arrester.

When connected to a full-body harness as specified in ISO 10333-1, vertical rails and vertical lifelines which incorporate a sliding-type fall arrester constitute a personal fall-arrest system (PFAS), which will be specified in a future International Standard.

Vertical rails and vertical lifelines which incorporate a sliding-type fall arrester in accordance with this part of ISO 10333 are limited to use by a single person of total mass not exceeding 100 kg.

NOTE 1 Users of PFAS whose total mass (which includes attached tools and equipment) exceeds 100 kg are advised to seek advice from the equipment manufacturers regarding the suitability of the equipment, which may need additional testing.

NOTE 2 PFAS using vertical rails and permanent vertical lifelines inherently limit the user's horizontal movement, whereas PFAS using a temporary vertical lifeline permit significant horizontal movement by the user. Special notice should be given to the requirements which accommodate this difference.

The scope of this part of ISO 10333 does not extend to:

- a) inclined rails and lifelines, i.e. those which are installed at an angle between the true vertical and the lifeline or rail of more than 15° when viewed from the side elevation;
- b) the horizontally installed elements of compound rails or lifelines, i.e. those which have both vertically and horizontally installed elements linked by junctions.

This part of ISO 10333 does not specify those additional requirements that would apply when PFAS are subjected to special conditions of use (where, for example, there exist unusual limitations concerning access to the place of work and/or particular environmental factors). Thus treatments to ensure the durability of the materials of construction (such as heat treatment, anti-corrosion treatment, protection against physical and chemical hazards) are not specified in this part of ISO 10333, but should comply with appropriate International Standards or, failing that, with national standards or other specifications dealing with relevant physical characteristics and/or the safety of users.

### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 10333. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 10333 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1140:1990, *Ropes — Polyamide — Specification*

ISO 1141:1990, *Ropes — Polyester — Specification*

ISO 9227:1990, *Corrosion tests in artificial atmospheres — Salt spray tests*

ISO 10333-1:2000, *Personal fall-arrest systems — Part 1: Full-body harnesses*

ISO 10333-5:2001, *Personal fall-arrest systems — Part 5: Connectors with self-closing and self-locking gates*

ISO 14567:1999, *Personal protective equipment for protection against falls from a height — Single-point anchor devices*

EN 892:1996, *Mountaineering equipment — Dynamic mountaineering ropes — Safety requirements and test methods*

EN 1891:1998, *Personal protective equipment for prevention of falls from a height — Low stretch kernmantel ropes*