TECHNICAL REPORT

ISO/TR 24666

Second edition
2023-09

Sports and recreational facilities — Probes for entrapment/entanglement on playground equipment — Collection of data

Installations sportives et récréatives — Gabarits d'évaluation du coincement/happement sur les équipements d'aires de jeux — Recueil de données

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

Reference number
ISO/TR 24666:2023(E)

© ISO 2023

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2023 – All rights reserved

Contents

Page

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 83, *Sports and other recreational facilities and equipment*.

This second edition cancels and replaces the first edition (ISO/TR 24666:2022), which has been technically revised.

The main changes are as follows:

— amendment of Table 1;

— amendment of Clause 6;

— amendment of Table A.5;

— amendment of Table B.2;

— amendment of Table C.2;

— amendment of Table F.1;

— amendment of Table G.3;

— inclusion of new Annex I;

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

Introduction

This document summarizes information about different regional and national standards on playground safety in order to provide a reference point for different types of entrapments and probes/gauges.

Some standards apply to entrapment tests universally, regardless of the intended user age group, on the basis that it is very difficult to control users when products are installed in a free access environment. Other standards apply to specific entrapment probe tests related to specific intended user age groups. For cases where user age references are provided in the standard, see Annex A to Annex I.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

Sports and recreational facilities — Probes for entrapment/entanglement on playground equipment — Collection of data

1 Scope

This document compiles a collection of different probes/gauges for assessing common playground equipment safety performance to eliminate known safety hazards such as entrapment and entanglement hazards on playground, playspaces, and associated equipment used in different countries/regions around the world. It also explains some historical content of origins, the purpose and some rationales for the dimensions and shape of each of those probes.

These test probes and gauges, their dimensions and related historic rationale for their existence are applicable to playground equipment manufacturers, designers, installers, assemblers, owners, operators and inspectors alike and are necessary tools to the reduction of serious, life-threatening and debilitating injuries to the public playground intended users.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TR 20183, *Sports and other recreational facilities and equipment — Injury and safety definitions and thresholds — Guidelines for their inclusion in standards*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TR 20183 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Rationale for anthropometrics and scoping of intended user groups in developing safety standards to reduce serious injury

4.1 ASTM F1487-21 (US) standard consumer safety performance specification for playground equipment for public use

4.1.1 Reference document for anthropometry

Reference document for anthropometry – Anthropometry of Infants, Children, and Youths to age 18 for Product Safety Design[12].

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

4.1.2 Defined age groups

The range of age and size users encompassed by this consumer safety performance specification is the 5th percentile 2-year-old to the 95th percentile 12-year-old:

a) maximum user — 12-year-old child; measurement characteristics are the 95th percentile values for combined sexes;

b) minimum user — 2-year-old child; measurement characteristics are the 5th percentile values for combined sexes;

c) age groupings —preschool (2 years to 5 years), school age (5 years to 12 years), and (2 years to 12 years).

4.2 ASTM F2373-11(2017) (US) standard consumer safety performance specification for public use play equipment for children 6 months to 23 months

4.2.1 Reference document for anthropometry

Reference document for anthropometry – Anthropometry of Infants, Children, and Youths to age 18 for Product Safety Design[12].

4.2.2 Defined age groups

The range of age and size users encompassed by this consumer safety performance specification is the 5th percentile 6-month-old to the 95th percentile 23-month-old:

a) maximum user — 23-month-old child; measurement characteristics are the 95th percentile values for combined sexes;

b) minimum user — 6-month-old child; measurement characteristics are the 5th percentile values for combined sexes;

c) age groupings — toddler (6 months to 23 months).

4.3 U. S. consumer product safety commission handbook for public playground 2010 (US)

4.3.1 Reference document for anthropometry

Reference document for anthropometry – Anthropometry of Infants, Children, and Youths to age 18 for Product Safety Design[12].

4.3.2 Defined age groups

The range of age and size users encompassed by this consumer safety guideline is the 5th percentile 2-year-old to the 95th percentile 12-year-old:

a) school-age user – 5th percentile 5-year-old to 95th percentile 12-year-old child, measurement characteristic values for combined sexes;

b) preschool user – 5th percentile 2-year-old to 95th percentile 5-year-old child, measurement characteristic values for combined sexes;

c) toddler – 5th percentile 6-month-old to 95th percentile 23-month-old child, measurement characteristic values for combined sexes.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

4.4 EN 1176-1:2017 (European Union) Playground equipment and surfacing

4.4.1 Reference document for anthropometry

The base anthropometric data used in Europe is:

a) SAE SP-450:1977;

b) DIN 33402-2:2005.

Both sources are shown aligned with each other for any given body dimension. The data are presented as a condensed set of tables giving minimum and maximum values for common body dimensions.

4.4.2 Defined age groups

There is no defined age range in EN 1176-1:2017.

4.5 AS 4685.1:2021 (Australia) Playground equipment and surfacing

NOTE AS 4685.1:2021 is significantly harmonized with the EN 1176-1:2017.

For reference document for anthropometry, see 4.4.1.

4.6 CSA Z614-20 (Canada) Children's playspaces and equipment

4.6.1 Reference document for anthropometry

Reference document for anthropometry – Anthropometry of Infants, Children, and Youths to age 18 for Product Safety Design[12].

4.6.2 Defined age groups

The range of age and size users encompassed by this standard is the dimensions of the 95th percentile 18-month-old to the 95th percentile 12-year-old.

4.7 JPFA-SP-S: 2014 (JAPAN) standard on playground equipment safety and its annex 2: playground equipment for toddlers aged under 3

4.7.1 Reference document for anthropometry

Diagram of measurements (preschool-age) and data for 1-year olds to 6-year olds from the development of child anthropometric database and simulation technology for human injury[13].

Data for 10-year and 12-year-old from AIST Japanese Body Dimension Data, 1997-98[15].

Diagram of measurements (school age) from Compact Compendium of Architectural Design References (1996)[14].

Part of data for 3-year olds from Infant/Toddler Body Measurements Report (1973)[16].

Part of data for 6-year olds from Anthropometric Charts and Table (1970)[17].

4.7.2 Range of age and size

The range of age and size users encompassed by the consumer safety performance standard, JPFA-SF -S:2014, are based on the median size (average by age) of pre-school children ages 3 to 6 years and elementary school students around the ages of 6 to 12 years. CSA Z614, ASTM F1487, ASTM F2373 and CPSC Handbook on Public Playground Safety recommend supervision for children from 3 to 6 years and that children under 3-years-old be accompanied by a guardian at all times when using public parks.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

4.8 SS 457:2017 (Singapore) Specification for playground equipment for public use

4.8.1 Reference document for anthropometry

Reference document for anthropometry – Anthropometry of Infants, Children, and Youths to age 18 for Product Safety Design[12].

4.8.2 Defined age groups

Children age and size based on 5th percentile 2-year-old to 95th percentile 12-year-old.

4.9 MS 966:2017 (Malaysia) Playground equipment – Safety performance for public use – Specification

4.9.1 Reference document for anthropometry

Reference document for anthropometry – Anthropometry of Infants, Children, and Youths to age 18 for Product Safety Design[12].

4.9.2 Defined age groups

Children age and size based on 5th percentile 2-year-old to 95th percentile 12-year-old.

5 International inventory of probes/gauges and test method procedures used to identify specific playground equipment safety hazards

5.1 International inventory of probes/gauges and test method procedures

See Table 1.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

© ISO 2023 – All rights reserved

Table 1 — International inventory of probes/gauges and test method procedures used to identify specific playground equipment safety hazards

Probes	ASTM F 1487-21	ASTM 2373-11	AS 4685.1:2021 and AS 4685.6:2021	CPSC 2010 Handbook #325	CSA Z614-20	EN 1176-1:2017 EN1176-6:2017+AC:2019	JPFS-SP-S:2014	MS 966:2017	SS 457:2017
Head – completely bound (Head and feet first)	Clause 6.1, Figures A.1.1 to A.1.3	Clause 6.1.1 to 6.1.2, Figure A.1.3	Clause 4.2.7.2 and Annex D.2.1	Clauses 3.3, and 3.3.1, Appendix B.2.4, B.2.5	Clauses 12.2.2, 12.2.3 Figure 3, Figure 4	Clause 4.2.7.2 and Annex D.2.1.2	Clause 4.4.1; Figure 4.4.1 (1) to (5)	Clause 6.1.1 to Clause 6.1.3, Figure 1 to 3	Clause 6.1.1 to Clause 6.1.3, Figure A.1.1 to Figure A1.3
Head – Partly bound (neck)	Clauses 6.1.3, 6.1.4.1 to 6.1.4.7, Figures A1.4 to A.1.9	Clause 6.1.3 to 6.1.4, Figures A.1.4 to A.1.8	Clause 4.2.7.2 and Annex D.2.2	Clause 3.3.2, Appendix B.2.5.6	Clause 12.2.4, 12.2.5 Figure 5, Figure 6	Clause 4.2.7.2 and Annex D.2.2.2	Clause 4.4.2; Figures 4.4.2 (1) to (4)	Clause 6.1.4, Figure 4 to 9	Clause 6.1.4, Figure A.1.4 to A1.9
Clothing entanglement	Clause 6.4, Figure A1.14 to A.1.19	Clause 6.4, Figures A.1.09, A.1.10, A.1.13 to A.1.17	Clause 4.2.7.3 and Annex D.3	Clause 3.2, Appendix B.2.3	Clause 12.4 Figure 7 to Figure 18	Clause 4.2.7.3 and Annex D.3.2.1	Clause 4.4.4; Figures 4.4.4 (1) to (2) and Clause 4.4.6; Figures 4.4.6 (1) to (3)	-	Clause 6.4, Figures A.1.14 to A1.19
Full Body	-	-	Clause 4.2.7.4 NO PROBE	-	-	Clause 4.2.7.4 NO PROBE	Clause 4.4.8; Figures 4.4.8 and 4.4.9; Figure 4.4.9 NO PROBE	-	-
Foot and Leg entrapment	-	-	Clause 4.2.7.5 NO PROBE	-	-	4.2.7.5 NO PROBE	Clause 5.11.1, paragraph 6; Figure 5.11.1 (5)	-	-
Finger entrapment	-	Clause 6.5.2, Figure A.1.18	Clause 4.2.7.6 and Annex D.4	-	-	4.2.7.6 and Annex D.4.2	Clause 4.4.3; Figure 4.4.3	-	-
Crush and Shear Hazard/ Variable gaps	Clause 6.5	Clause 6.5, Figures A.1.13 to A1.16	Clause 4.2.6 and 4.2.7.2 NO PROBE	Clauses 3.1, 5.3	Clause 12.5 Figure 19	4.2.6 and 4.2.7.2 NO PROBE	Clause 5.11.1 paragraphs 1 to 8; Figure 5.11.1 (1) to (5) NO PROBE	Clause 6.5, Figure 20	Clause 6.5, Figure A.1.20

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

Table 1 *(continued)*

Probes	ASTM F 1487-21	ASTM 2373-11	AS 4685.1:2021 and AS 4685.6:2021	CPSC 2010 Handbook #325	CSA Z614-20	EN 1176-1:2017 EN1176-6:2017+AC:2019	JPFS-SP-S:2014	MS 966:2017	SS 457:2017
Protrusion	Clause 6.3, Figure A.1.10 to A.1.13	Clauses 6.3, A.1.9 to A.1.12	Clause 4.6 & 4.7 and Annex E (part 6)	Clauses 3.2, 5.3, Appendix B.1, B.2.1	Clause 12.3.3 Figure 7, Figure 8 Figure 11, Figure 12	Clauses 4.6 & 4.7 and Annex E (part 6)	Clause 4.4.5; Figure 4.4.5	Clause 6.3, Figures 10 to 13	Clauses 6.3, A.1.10 to A.1.13
Sharp Points or Edges	Clauses 3.1.37, 3.1.37.1 3.1.38, 6.2	Clause 17, 6.2	Clause 4.2.5	Clauses 3.4, 5.3.6.4	Clauses 12.3.1, 12.3.2, 12.3.4		Clause 4.4.7	Clauses 3.36, 3.37	Clauses 6.2, 3.1.37, 3.1.38

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

5.2 Probes and gauges figures

See Annex A to Annex H.

6 Summary

This “tool box” of probes and gauges can continue to be a collaborative effort and can be used to assist standards development organizations working in playgrounds and related activities around the world. To ensure accuracy in measuring for conformity, the probes and gauges are calibrated by the manufacturer at the time of purchase and dimensions are checked for accuracy by the operator at least once every 12 months.

Having a consolidated document listing similar probes and gauges used in 9 different national and regional standards, as well as probes and gauges that are different amongst standards, can assist standards writers, designers, instructors, and manufacturers. It helps those wishing to produce products for a variety of international markets and enables them to easily ascertain the differences between multiple standards.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

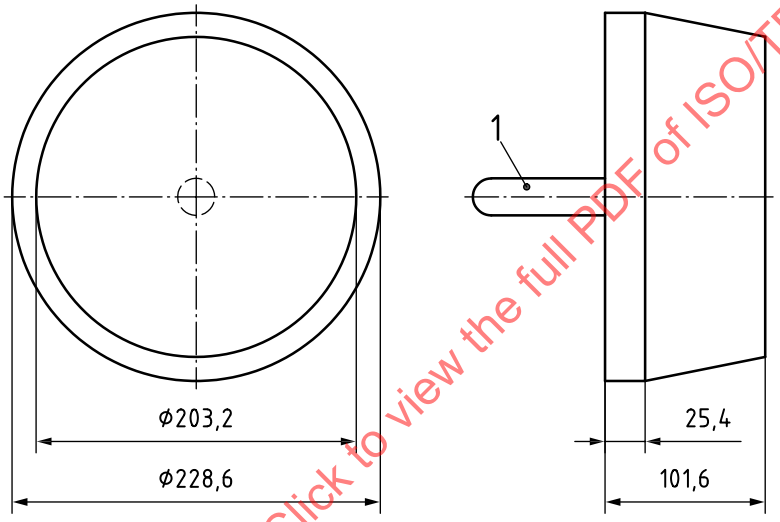
Annex A
(informative)

Completely bound opening head entrapment

A.1 Feet first entry

Figure A.1 shows the probe (large head) used in North America and some regions in the Asia-Pacific area. It applies to playgrounds, ASTM 2-12, Canada 18 months to 12 months. Table A.1 provides an overview of references to large head probe in North America and Asia-Pacific area.

Dimensions in millimetres



Key

1 handle

Figure A.1 — Large head probe with 228,6 mm diameter

Table A.1 — Overview of references to large head probe in North America and Asia Pacific area

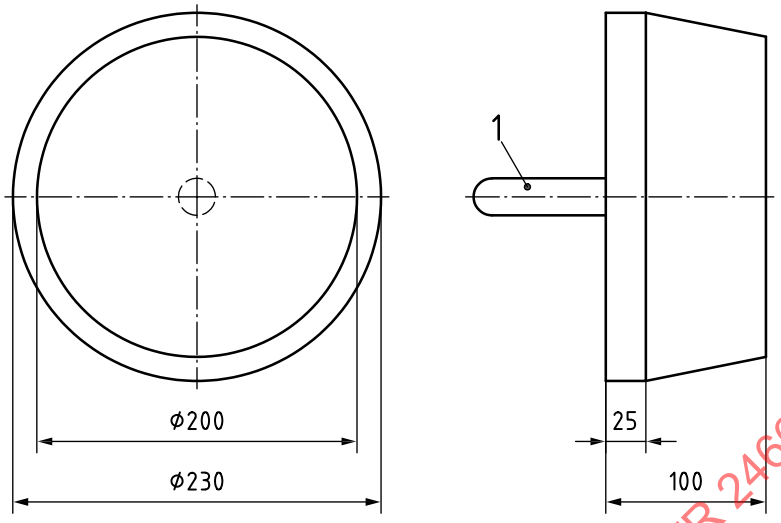
Country	US	US	US	Canada	Singapore	Malaysia
Standard	ASTM F1487-21	ASTM F2373-11	CPSC Doc.325-10	CSA-Z614-20	SS 457:2017	MS 966:2017
Clause	6.1.1.1, 6.1.2	6.1, 6.1.1.1, 6.1.2, 6.1.2.1, 6.1.3, 6.1.4.2	B.2.4 and B.3.3	12.2.2.2, 12.2.3.1,12.2.4.3, 12.5.5	6.1.1 to 6.1.3	_
Figure	Figure A.1.3	Figure A.1.3	Figure B.8	Figure 4	6.1, 6.1.1.1, Figure A.1.3	6.1, 6.1.1.1, Figure 3
Age range	2 years to 12 years	6 months to 23 months	0,5 years to 12 years	1,5 years to 12 years	2 years to 12 years	2 years to 12 years

Figure A.2 shows the probe (large head) used in Europe and Australia. Table A.2 provides an overview of references to large head probe in Europe and Australia.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

Dimensions in millimetres



Key

1 handle

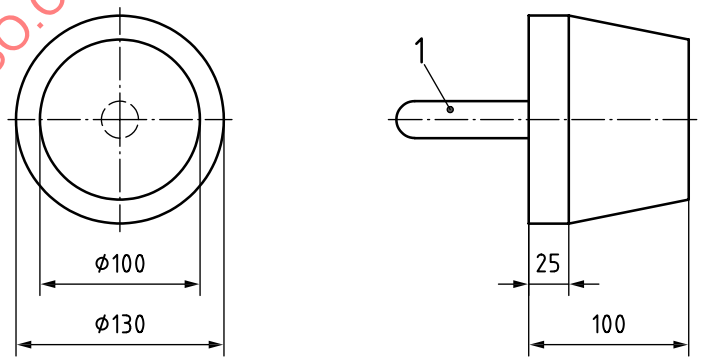
Figure A.2 — Universal large head probe with 230 mm diameter

Table A.2 — Overview of references to large head probe in Europe and Australia

Country/Region	Australia	Europe
Standard	AS 4685.1:2021	EN 1176-1:2017
Clause	4.2.7.2 and Annex D.2	4.2.7.2 and Annex D
Figure	Figure D.1, Probe D	Figure D.1, Probe D
Age range	all ages	all ages

Figure A.3 shows the probe (small head) used in Europe and Australia. Table A.3 provides an overview of references to small head probe in Europe and Australia.

Dimensions in millimetres



Key

1 handle

Figure A.3 — Small head probe with 130 mm diameter

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

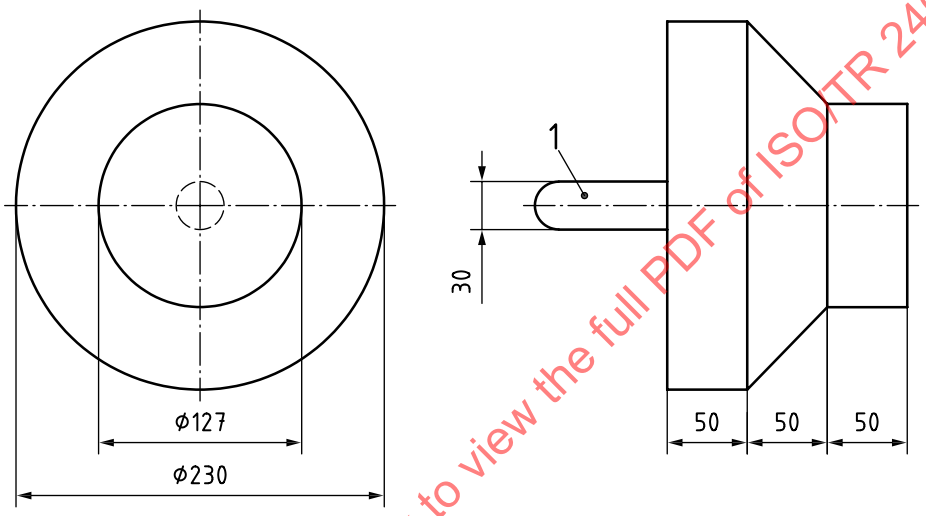
Table A.3 — Overview of references to small head probe in Europe and Australia

Country/Region	Australia	Europe
Standard	AS 4685.1:2021	EN 1176-1:2017
Clause	4.2.7.2 and Annex D.2	4.2.7.2
Figure	Figure D.1 and Probe E	Figure D.1, Probe E
Age range	all ages	all ages

A.2 Head and feet first entry

Figure A.4 shows the probe used in Japan. Table A.4 provides an overview of references to small head probe in Japan.

Dimensions in millimetres



Key

1 handle

Figure A.4 — Large and small head probe with 230 mm and 130 mm diameters

Table A.4 — Overview of references to small head probe in Japan

Country	Japan
Standard	JPFA-SP-S:2014
Clause	1.5.1
Figure	Figure 1.5.1 (1), JPFA Inspection Tool A
Age range	3 years to 12 years

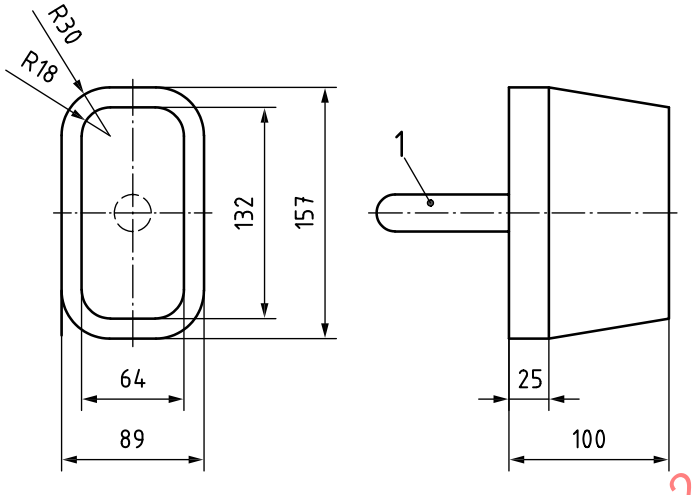
A.3 Feet first entry

Figure A.5 shows the probe used in Europe and Australia. Table A.5 provides an overview of references to torso probe in Europe and Australia.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

Dimensions in millimetres



Key

1 handle

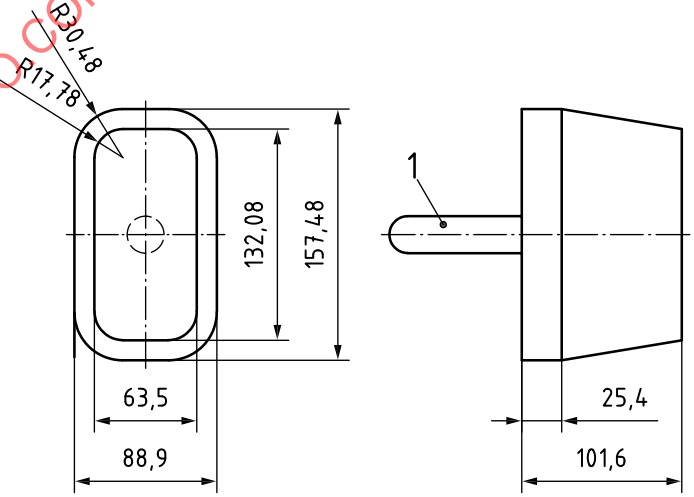
Figure A.5 — Torso Probe (Europe and Australia)

Table A.5 — Overview of references to torso probe in Europe and Australia

Country/Region	Australia	Europe
Standard	AS 4685.1:2021	EN 1176-1:2017
Clause	4.2.7.2 and Annex D.2	4.2.7.2 and Annex D
Figure	Figure D.1, Probe C	Figure D.1, Probe C
Age range	all ages	all ages

Figure A.6 shows the probe used in Northern America and some regions in the Asia-Pacific area. Table A.6 provides an overview of references to torso probe in North America and Asia-Pacific area.

Dimensions in millimetres



Key

1 handle

Figure A.6 — Torso Probe (North America and Asia-Pacific area)

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

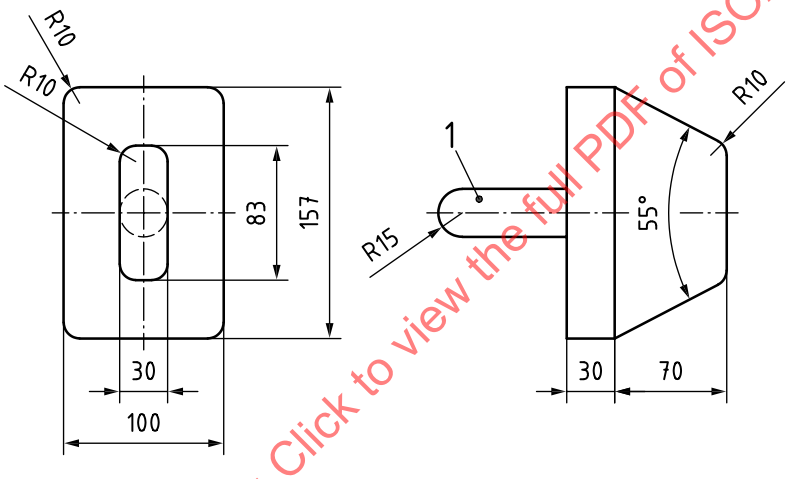
© ISO 2023 – All rights reserved

Table A.6 — Overview of references to torso probe in North America and Asia-Pacific area

Country	US	US	Canada	Singapore	Malaysia
Standard	ASTM F1487-21	CPSC Doc.325-10	CSA Z614-20	SS 457:2017	MS 966:2017
Clause	6.1	B.2.4 and B.3.3	12.2	6.1.2	5.8.1 6.1
Figure	Figure A.1.2	Figure B6 (toddler)	Figure 3	Figure A.1.2	Figure 2
		Figure B7			
Age range	2 years to 12 years	0,5 months to 23 months	1,5 years to 12 years	2 years to 12 years	2 years to 12 years
		2 years to 12 years			

Figure A.7 shows the probe used in Japan. Table A.7 provides an overview of references to torso probe in Japan.

Dimensions in millimetres



Key

1 handle

Figure A.7 — Torso Probe (Japan)

Table A.7 — Overview of references to torso probe in Japan

Country	Japan
Standard	JPFA-SP-S:2014
Clause	-
Figure	Inspection Tool B
Age range	3 years to 12 years

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

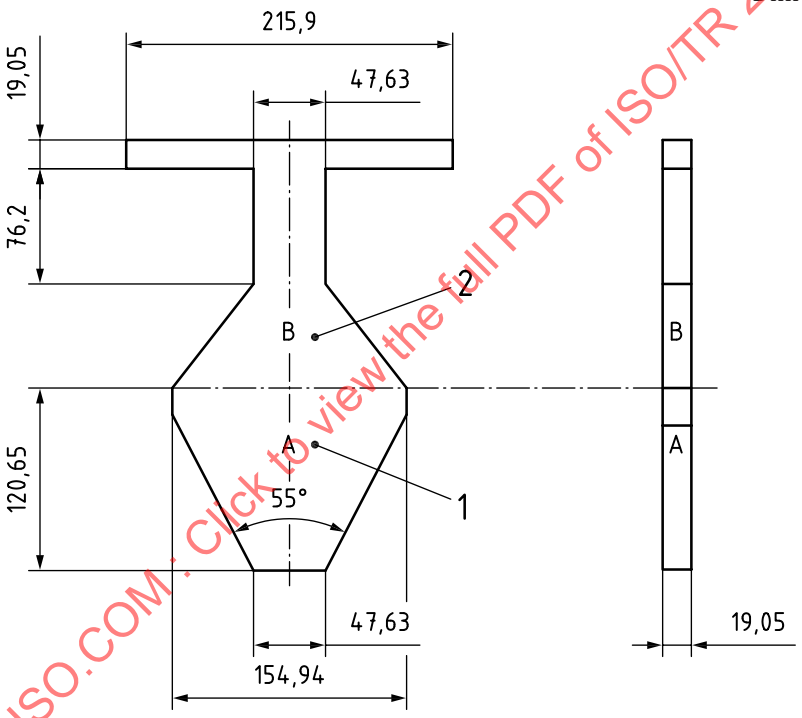
Annex B
(informative)

Partially bounded opening head/neck entrapment

B.1 Partially bounded probe: 55° angles and 19 mm thick

Figure B.1 shows the probe used in Northern America and some regions in the Asia-Pacific area. Table B.1 provides an overview of references to partially bounded probe in North America and Asia-Pacific area.

Dimensions in millimetres



Key

1 "A" portion of the probe

2 "B" portion of the probe

Figure B.1 — Partially bounded probe: 55° angles and 19 mm thick (North America and Asia-Pacific area)

Table B.1 — Overview of references to partially bounded probe in North America and Asia-Pacific area

Country	US	US	Canada	Singapore	Malaysia
Standard	ASTM F1487-21	CPSC Doc.325-10	CSA-Z614-20	SS 457:2017	MS 966:2017
Clause	6.1.4	3.3.2 and B.2.5.6	12.2.4, Annex L1 and Annex L2	6.1.4,	-

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

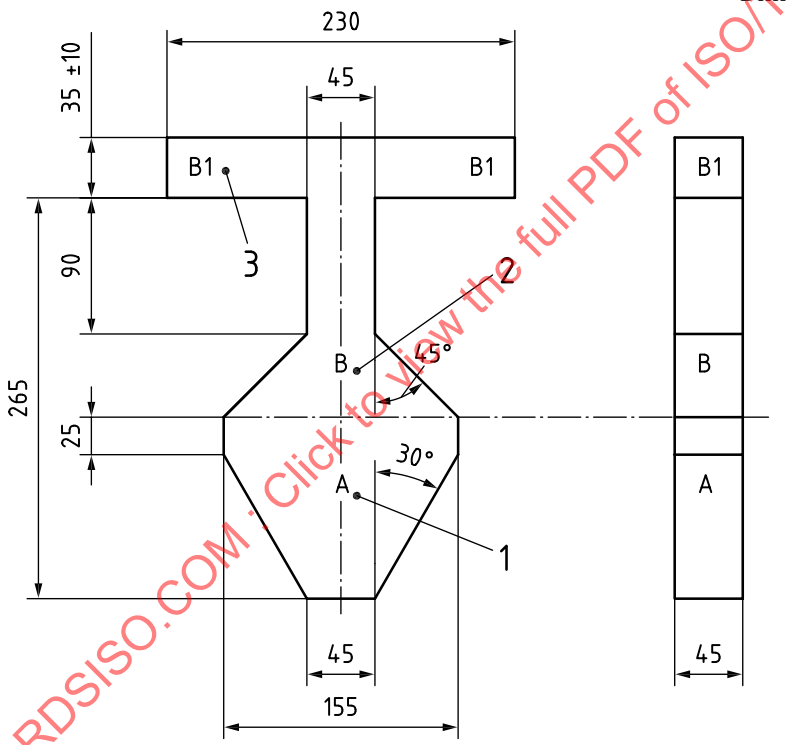
Table B.1 *(continued)*

Figure	Figure A.1.4 to 9	Figure B9 (2 to 12 years) Figure B10 (6 months to 23 months)	Figure 5 Figure L.1.1 and Figure L.1.2	Figure A.1.6	Figure 4
Age range	2 to 12 years	2 to 12 years 6 months to 23 months	1,5 to 12 years	2 to 12 years	2 to 12 years

B.2 Partially bounded probe: 45° and 30° angles / 45 mm thick

Figure B.2 shows the probe used in Europe and Australia. Table B.2 provides an overview of references to partially bounded probe in Europe and Australia.

Dimensions in millimetres



Key

1 "A" portion of the probe
2 "B" portion of the probe
3 "B1" shoulder portion of the probe

Figure B.2 — Partially bounded probe: 45° and 30° angles / 45 mm thick (Europe and Australia)

Table B.2 — Overview of references to partially bounded probe in Europe and Australia

Country/Region	Australia	Europe
Standard	AS 4685.1:2021	EN 1176-1:2017
Clause	4.2.7.2 and Annex D.2.2	4.2.7.2 and Annex D
Figure	Figure D.2	Figure D.2
Age range	all ages	all ages

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

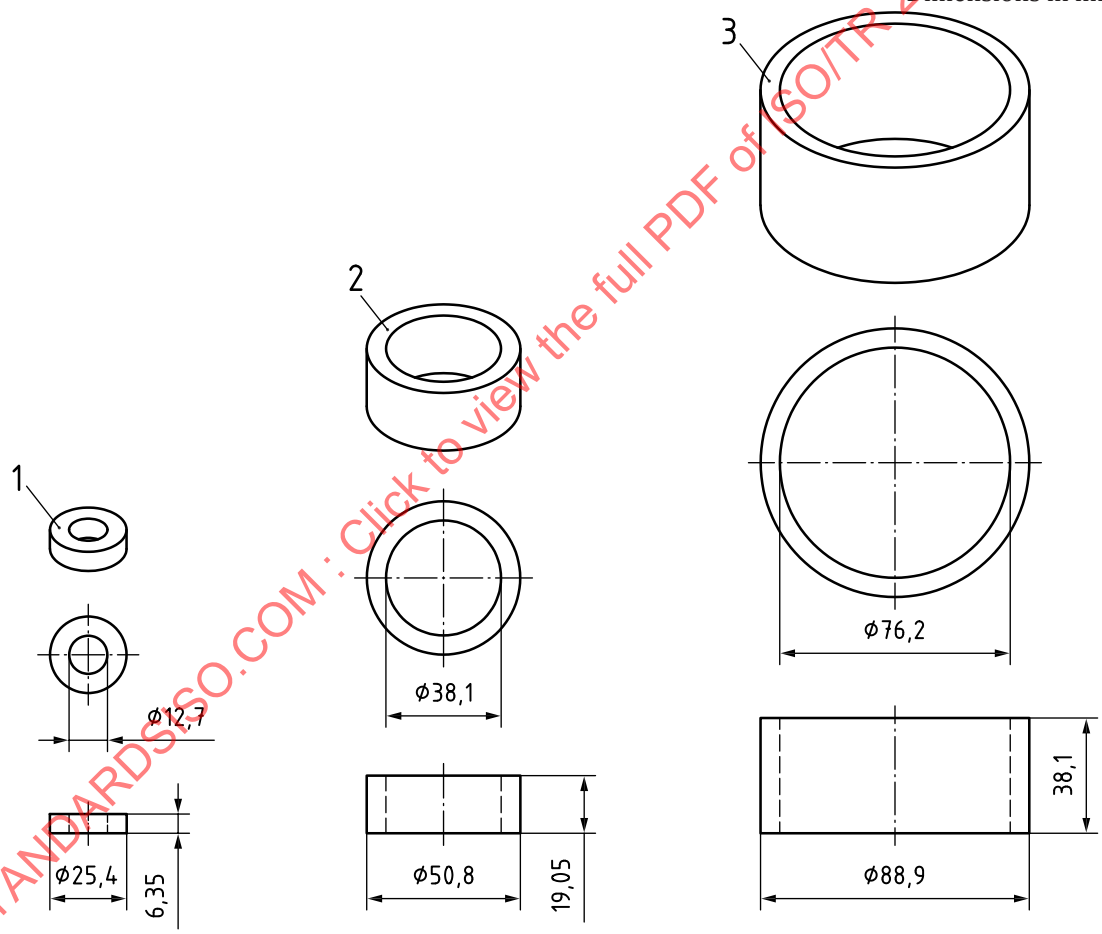
Annex C
(informative)

Protrusion hazard impalement

C.1 Body parts (skull, eye socket/ brain and internal organs)

Figure C.1 shows the gauges (three protrusion gauges) used in Northern America and some regions in the Asia-Pacific area. Table C.1 provides an overview of references to protrusion gauges in North America and Asia-Pacific area.

Dimensions in millimetres



STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

Key

1 skull / laceration gauge
2 eye socket gauge
3 internal organs gauge

Figure C.1 — 3 protrusion gauges (North America and Asia-Pacific area)

© ISO 2023 – All rights reserved

Table C.1 — Overview of references to protrusion gauges in North America and Asia-Pacific area

Country	US	US	US	Canada	Singapore	Malaysia
Standard	ASTM F1487-21	ASTM F2373-11	CPSC Doc.325:10	CSA Z614-20	SS 457:2017	MS 966:2017
Clause	6.3, 6.3.2, 6.4.1.1, 6.4.3, 6.4.4	6.3, 6.3.1.3, 6.4.1.1	3.2	12.3.1.3, 12.3.3.1, 12.3.2.2, 12.4.2, 12.4.3, 12.4.3, 12.4.4	6.3	6.3
Figure	Figure A.1.10 to A.1.13	Figure A.1.9 to A1.12	Figure B.1 and B.2	Figure 7	Figure A.1.10	Figure 10

C.2 Eye sockets

Figure C.2 shows the gauge (ring gauge) used in Europe and Australia. Table C.2 provides an overview of references to protrusion gauges in Europe and Australia.

Dimensions in millimetres

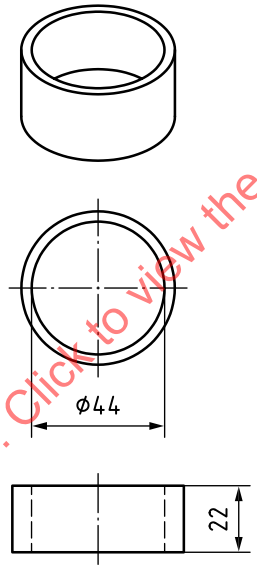


Figure C.2 — Protrusions (Europe and Australia)

Table C.2 — Overview of references to protrusion gauges in Europe and Australia

Country/Region	Australia	Europe
Standard	AS 4685.6:2021	EN 1176-6:2017+AC:2019
Clause	4.6 & 4.7 and Annex E	4.6 & 4.7 and Annex E
Figure	Figure E.1	Figure E.1

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

Annex D
(informative)

Impalement from projections on suspended components

Figure D.1 shows the gauges (3 mm gauge) used in Northern America and some regions in the Asia-Pacific area. Table D.1 provides an overview of references to 3 mm gauges in North America and Asia-Pacific area only used on suspended components.

Dimensions in millimetres

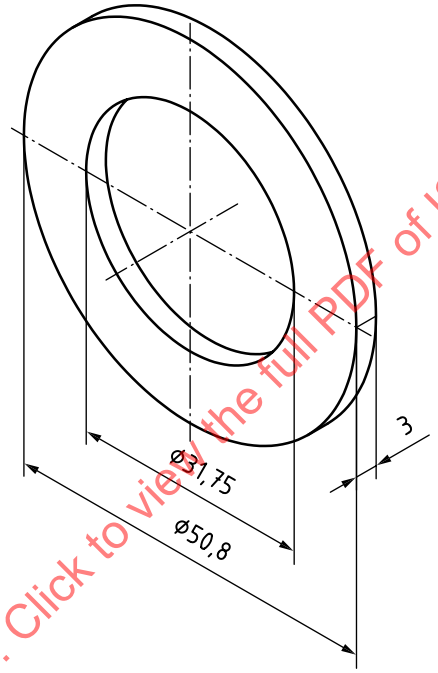


Figure D.1 — 3 mm gauge (North America and Asia-Pacific area)

Table D.1 — Overview of references to 3 mm gauges in North America and Asia-Pacific area

Country	US	US	US	Canada	Singapore	Malaysia
Standard	ASTM F1487-21	ASTM F2373-11	CPSC Doc.325	CSA Z614-20	SS 457:2017	MS 966:2017
Clause	6.3, 6.3.3, 6.4.1	6.3, 6.3.1.3, 6.4.1.1	5.3.8.5	12.3.3.4.1, 12.3.3.4.2, 12.4.2	-	-
Figure	Figure A.1.11	Figure A.1.10	Figure B.2	Figure 12	Figure A.1.11	Figure 11

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

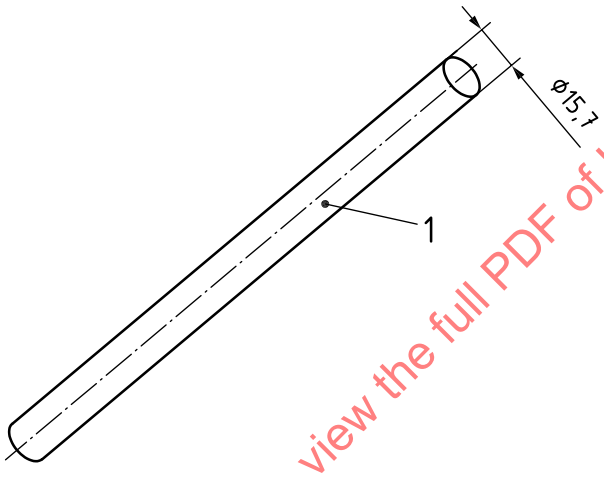
© ISO 2023 – All rights reserved

Annex E
(informative)

Common crush and shear hazard (between one or more moving accessible components)

Figure E.1 shows the rod (15,7 mm probe rod) used in Northern America and some regions in the Asia-Pacific area. Table E.1 provides an overview of references to 15,7 mm probe rod (North America and Asia-Pacific area).

Dimensions in millimetres



Key

1 rod, length not specified

NOTE Illustration of test probe as described in the references given in Table D.1.

Figure E.1 — 15,7 mm probe rod (North America and Asia-Pacific area)

Table E.1 — Overview of references to 15,7 mm probe rod (North America and Asia-Pacific area)

Country	US	US	Canada	Singapore	Malaysia
Standard	ASTM F1487-21	CPSC Doc.325	CSA Z614-20	SS 457:2017	MS 966:2017
Clause	6.5.1.1	3.1	12.5.1	6.5	6.5
Figure	Figure A.1.20	N/A	Figure 19	-	-

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

Annex F
(informative)

Finger entrapment (gaps, opening and holes)

Figure F.1 shows the probes (finger probes, 25 mm and 8 mm, 12 mm and 8,6 mm) used in Europe, Australia and Japan. Table F.1 provides an overview of finger probes and chain/variable opening probes (Europe, Australia and Japan).

Dimensions in millimetres

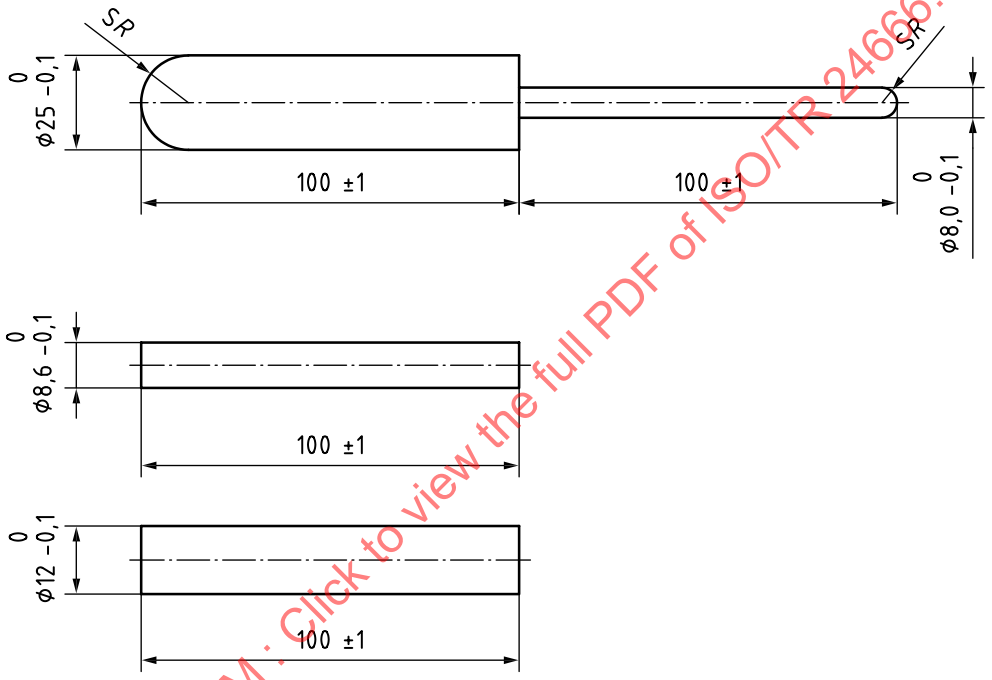


Figure F.1 — Finger probe — 25 mm and 8 mm, Chain/variable opening probes 8,6 mm and 12 mm (Europe, Australia and Japan)

Table F.1 — Overview of finger probes and chain/variable opening probes (Europe, Australia and Japan)

Country/Region	Australia	Europe	Japan
Standard	AS 4685.1:2021	EN 1176-1:2017	JPFA-SP-S:2014
Clause	4.2.7.6-and Annex D.4	4.2.7.6	-
Figure	Figure D.10 and D.13	Figure D.10 and D.13	Figure 1-1 Tool E & H

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

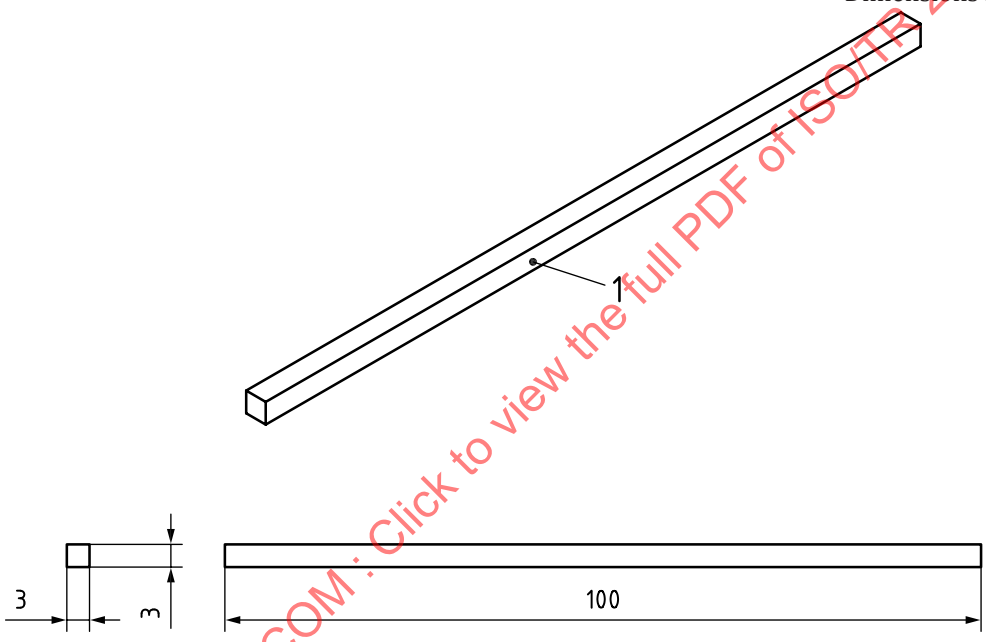
Annex G
(informative)

Entanglement hazards

G.1 Entanglement and strangulation

Figure G.1 shows the gauge (3 mm square stock gauge) used in Northern America and some regions in the Asia-Pacific area. Table G.1 provides an overview of square stock gauge (North America and Asia-Pacific area).

Dimensions in millimetres



Key

1 rigid steel stock

Figure G.1 — Square stock gauge (North America and Asia-Pacific area)

Table G.1 — Overview of square stock gauge (North America and Asia-Pacific area)

Country	US	US	US	Canada	Singapore	Malaysia
Standard	ASTM F1487-21	ASTM F2373	CPSC Doc.325	CSA Z614-20	SS 457:2017	MS 966:2017
Clause	6.4.1. 6.4.2, 6.4.3 6.4.4, 6.4.5	6.4.1. 6.4.2, 6.4.3 6.4.5	Appendix B B.2.2 and B.2.3	N/A	-	-
Figure	Figure A.1.14 to A.1.18	Figure A.1.13 to A.1.16	B.12 and B.13	N/A	Figure A.1.15 (7)	Figure 15.7

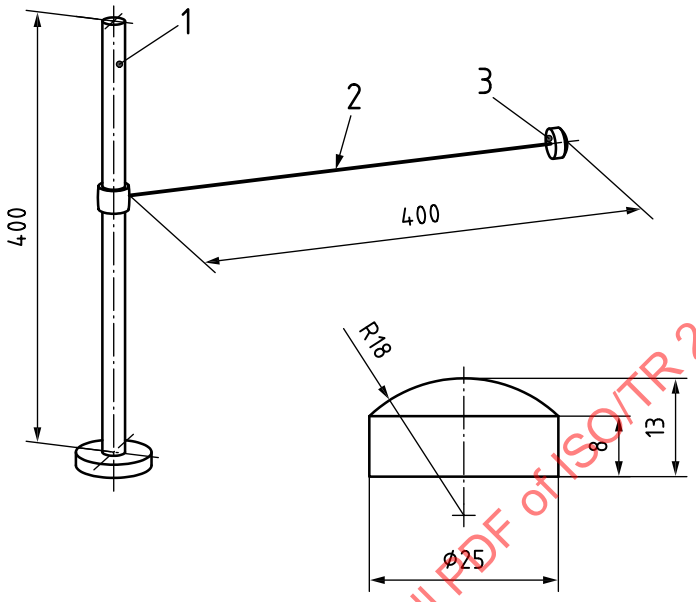
STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved

G.2 Toggle entanglement test device for sliding devices

Figure G.2 shows the device used in Canada. Table G.2 provides an overview of toggle entanglement test device (Canada).

Dimensions in millimetres



Key

1 pole maximum ø 25
2 cord ø 3
3 toggle

Figure G.2 — Toggle entanglement test device (Canada)

Table G.2 — Overview of toggle entanglement test device (Canada)

Country	Canada
Standard	CSA Z614-20
Clause	12.4.6.1, 12.4.6.2, 12.4.6.3, 12.4.6.4, 12.4.7
Figure	Figure 14 to Figure 18

Figure G.3 shows the device used in Europe. Table G.3 provides an overview of toggle entanglement test device (Europe).

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 24666:2023

© ISO 2023 – All rights reserved