



BSI Standards Publication

Swimming pool equipment

Part 2: Additional specific safety requirements and test methods for ladders, stepladders and handle bends

National foreword

This British Standard is the UK implementation of EN 13451-2:2015. It supersedes BS EN 13451-2:2001 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee SW/136/8, Swimming pools and aquatic equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

Swimming pool equipment - Part 2: Additional specific safety requirements and test methods for ladders, stepladders and handle bends

Équipement de piscine - Partie 2: Exigences de sécurité et méthodes d'essai complémentaires propres aux échelles verticales, aux échelles à inclinaison et aux mains courantes

Schwimmbadgeräte - Teil 2: Zusätzliche besondere sicherheitstechnische Anforderungen und Prüfverfahren für Leitern, Treppenleitern und Griffbögen

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European foreword

This document (EN 13451-2:2015) has been prepared by Technical Committee CEN/TC 136 “Sports, playground and other recreational facilities and equipment”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2016 and conflicting national standards shall be withdrawn at the latest by June 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13451-2:2001.

In relation to EN 13451-2:2001, the following significant modifications have been made:

- a) the scope has been updated by referring to EN 15288-1 and EN 15288-2;
- b) the normative references have been updated;
- c) the terms and definitions have been modified;
- d) dimensions for the ladder have been modified;
- e) dimensions for the step ladder have been modified;
- f) examples of easier access to the pool to address the needs of older persons and persons with disabilities has been added as an informative annex;
- g) a bibliography has been added.

EN 13451, *Swimming pool equipment*, consists of the following parts:

- *Part 1: General safety requirements and test methods;*
- *Part 2: Additional specific safety requirements and test methods for ladders, stepladders and handle bends;*
- *Part 3: Additional specific safety requirements and test methods for inlets and outlets and water/air based water leisure features;*
- *Part 4: Additional specific safety requirements and test methods for starting platforms;*
- *Part 5: Additional specific safety requirements and test methods for lane lines and dividing line;*
- *Part 6: Additional specific safety requirements and test methods for turning boards;*
- *Part 7: Additional specific safety requirements and test methods for water polo goals;*
- *Part 10: Additional specific safety requirements and test methods for diving platforms, diving springboards and associated equipment;*

— *Part 11: Additional specific safety requirements and test methods for moveable pool floors and moveable bulkheads.*

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1 Scope

This part of EN 13451 specifies safety requirements for ladders, stepladders and handle bends in addition to the general safety requirements of EN 13451-1.

The requirements of this specific standard take priority over those in EN 13451-1.

This part of EN 13451 is applicable to manufactured ladders, stepladders and handle bends used for pool access and egress for use in classified swimming pools as specified in EN 15288-1 and EN 15288-2.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13451-1:2011, *Swimming pool equipment - Part 1: General safety requirements and test methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13451-1:2011 and the following apply.

3.1

ladder

vertical structure with horizontal treads and two handrails used for access and egress from the water to the surrounding area

3.2

stepladder

inclined structure with horizontal treads and handrail(s) used for access and egress from the water to the surrounding area

3.3

tread

area of the step which comes into contact with the foot of the user while ascending or descending

3.4

step

horizontal component intended to bear the load of the user

3.5

handle bends

structures designed to assist access and egress from the water to the surrounding area

4 Safety requirements

4.1 Dimensions

4.1.1 General

The dimensions indicated in the Figures 1 to 3 shall be complied with. The design of the equipment does not need to comply with the examples given.

The cross section of parts designed to be gripped can be round, oval, a rounded rectangular or elliptical and shall be between 25 mm and 50 mm.

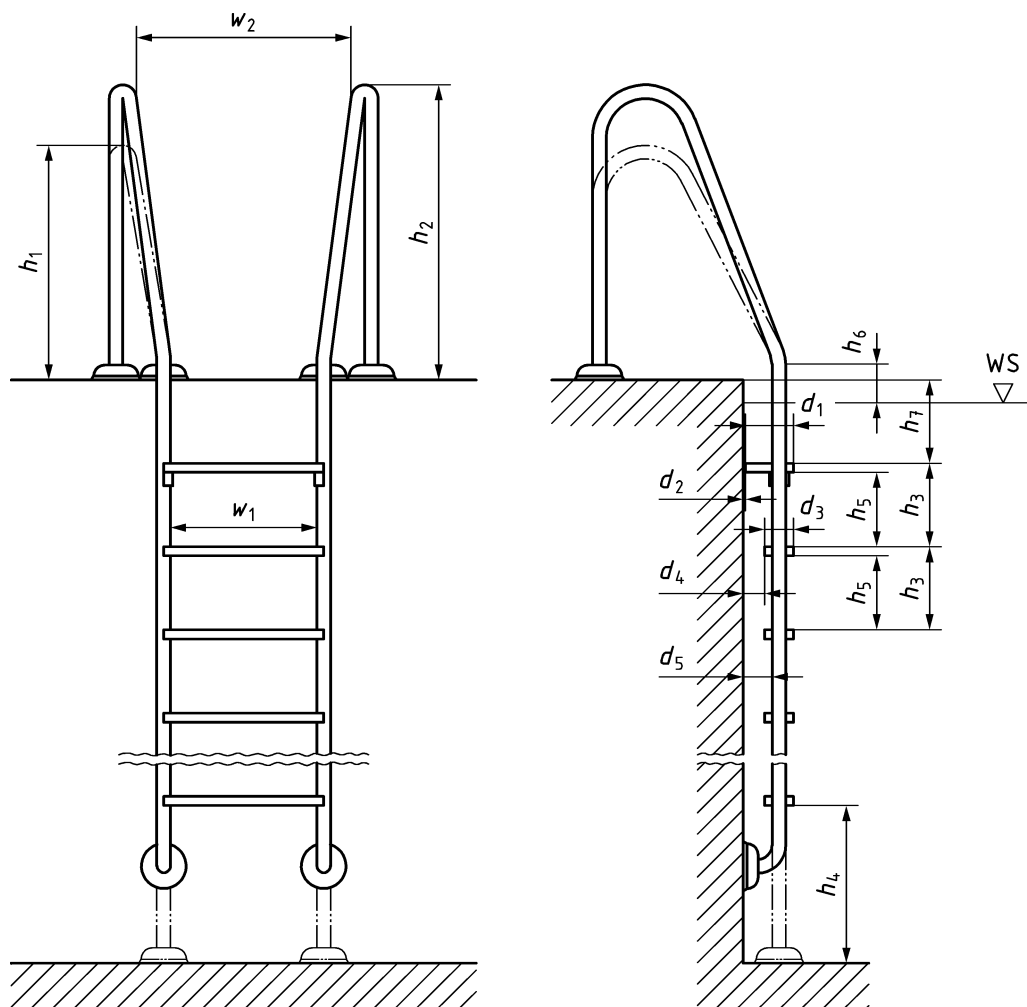
4.1.2 Ladders

NOTE Recessed ladders not protruding into the pool and asymmetric handle bends splaying to the pool surround and having a difference in height are preferred.

If there is a distance between w_1 and w_2 , then it shall widen in an even transition on each side.

The front edge of all other treads shall be in the same vertical plane as the first tread with the plane having a tolerance of ± 10 mm from the top to the bottom of the ladder.

The rise between each tread (h_3) shall be equal. The upper tread shall be flush with the pool edge or comply with the dimensions given in Figure 1 and Table 1.



Key
 WS water surface

Figure 1 — Example of ladder

Table 1 — Dimensions of a ladder

Dimension in Figure 1	Minimum mm	Maximum mm
w_1	450	600
w_2	w_1	800
h_1	750	h_2
h_2	750	950
h_3	230	300
h_4	110	—
h_5	175	—
h_6	200	h_2
h_7	—	0
	or $h_{3/2}$	h_3
d_1	75	—
d_2	0	8
d_3	50	d_1
d_4	0	8
	or 25	75
d_5	25	110

4.1.3 Stepladders

4.1.3.1 General

Stepladders shall have at least one handrail.

Treads designed as circular tubular rungs are not allowed.

If it is expected that the stepladder is used with a high frequency in both directions a greater width as given in 4.1.3.2 and 4.1.3.3 is recommended to make sure that two persons can pass (e.g. minimum 940 mm). If the width of the ladder exceeds 1 200 mm at least one additional handrail is required, which is at least 600 mm away from the other handrail(s).

NOTE See Annex A for examples of easier access to the pool to address the needs of older persons and persons with disabilities.

To prevent accidents caused by entrapment due to swimming underneath, the following applies:

- a) if the width of stepladder is $> 1\ 100$ mm the closing of the open sides with an adequate device is mandatory;
- b) if the width of stepladder is $\leq 1\ 100$ mm and access to the area underneath the stepladder is possible, both sides shall be open and the stepladder shall be placed with min. 600 mm free space to each side.

The distance between the top step and the wall shall be no more than 8 mm.

4.1.3.2 Fixed stepladders

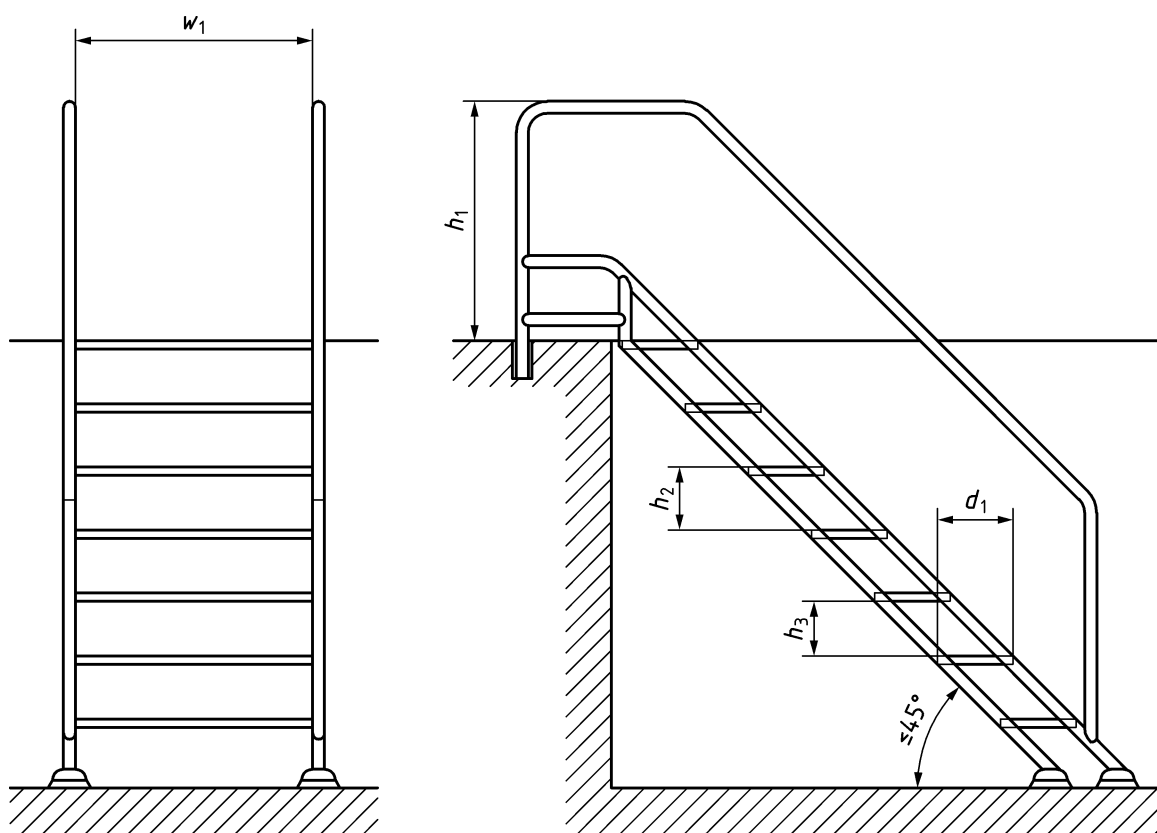
The handrails shall have a vertical height (h_1) between 750 mm and 950 mm and shall lead back to the pool surround (see Figure 2). The ends of the handrails shall be bent downwards to a radius of at least 50 mm up to the horizontal line or in a curve of not less than 100° . The handrails shall have the same inclination as the stepladder itself.

The maximum vertical distance (h_2) between the top surfaces of two adjacent treads shall be 250 mm. The upper tread shall be flush with the edge of the pool border.

The clear opening between two adjacent treads or the lowest step and the pool floor shall comply with the entrapment requirements according to EN 13451-1.

The maximum angle of inclination with the horizontal shall be 45° .

The front edge of the upper step and the back edge of the lower step of two adjacent treads shall be on the same vertical plane or the treads shall be overlapping.



Key

- d_1 ≥ 250 mm
- h_1 750 mm to 950 mm
- h_2 ≤ 250 mm
- h_3 according to EN 13451-1
- w_1 ≥ 600 mm

Figure 2 — Fixed stepladders

4.1.3.3 Variable Stepladders

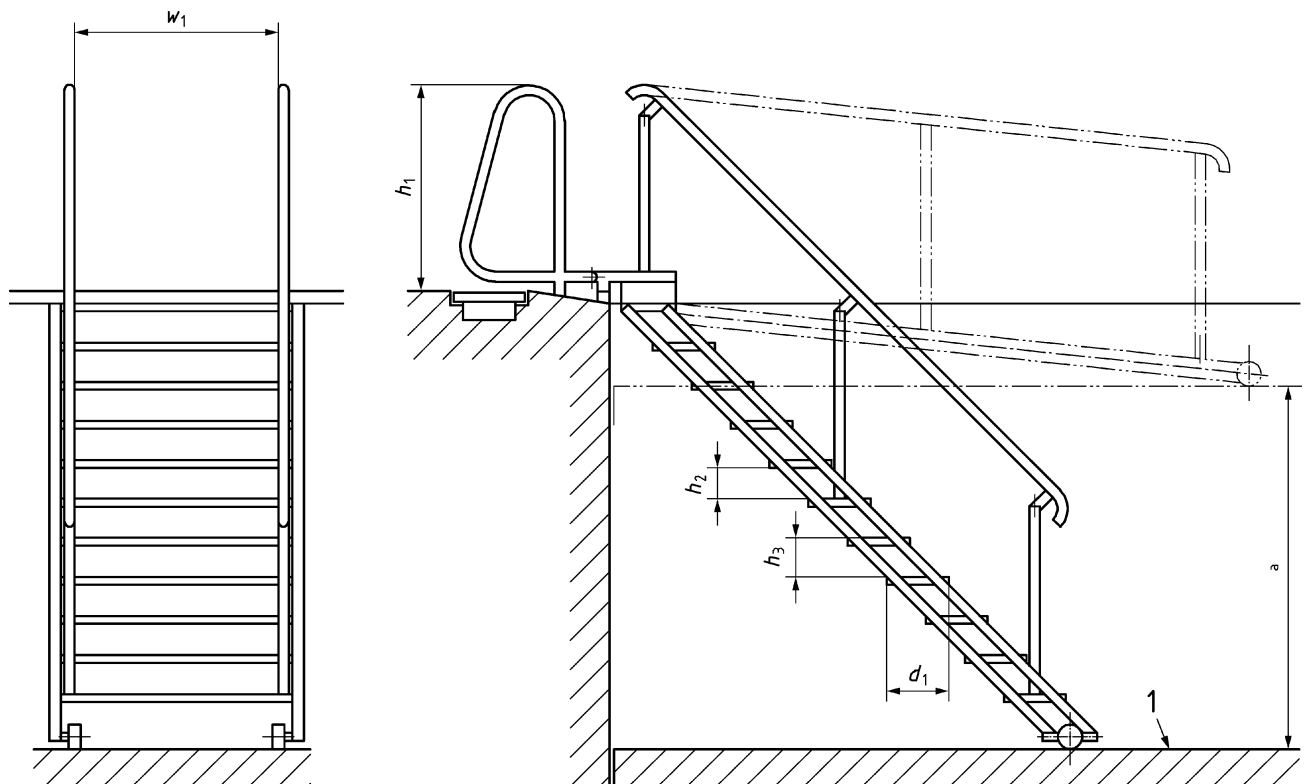
Variable stepladders are designed to be used in conjunction with movable floors. The handrails shall have the same inclination as the stepladder itself.

In any using position, the clear opening between two adjacent treads or the lowest step and the pool floor shall comply with the entrapment requirements according to EN 13451-1.

NOTE 1 A recessed variable stepladder is preferred.

NOTE 2 If the front edge of the upper step and the back edge of the lower step of two adjacent treads are not on the same vertical plane any position used can cause additional entrapment hazards.

The dimensions are given in Figure 3.



Key

1	movable floor	h_2	according to EN 13451-1
a	range of adjustment	h_3	≤ 250 mm
d_1	≥ 250 mm	w_1	≥ 800 mm
h_1	750 mm to 950 mm		

Figure 3 — Variable stepladder

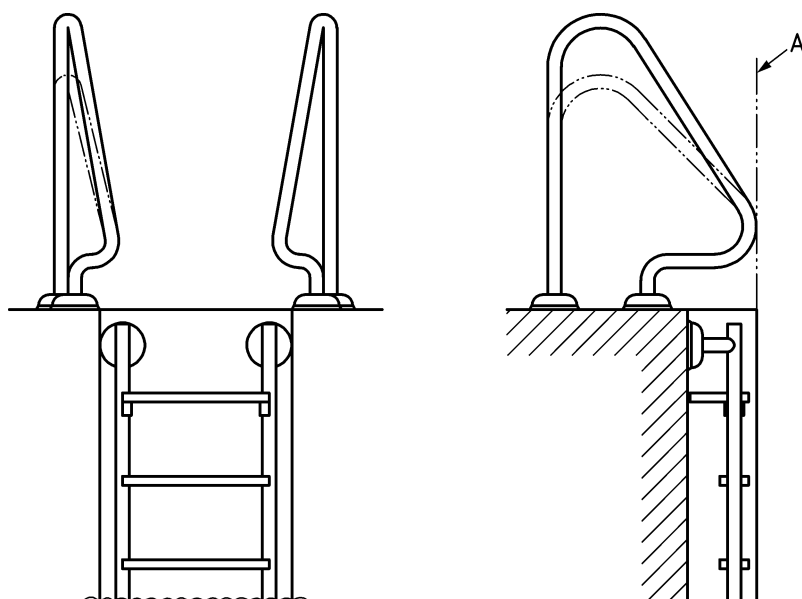
4.1.4 Handle bends

They can be a separate component of a ladder or can be used in association with built in structures.

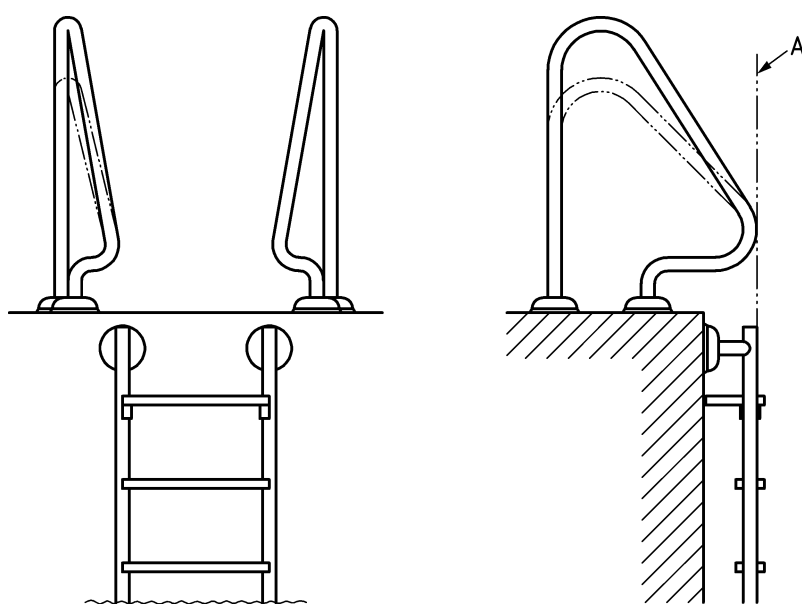
The height of the handle bends shall be between 750 mm and 950 mm from the pool surround and shall lead the user onto the pool surround.

The handle bends of ladders not completely recessed shall not protrude beyond the vertical plane of the ladders; see Figure 4 b).

The handle bends of completely recessed ladders shall not protrude beyond the vertical plane of the pool wall; see Figure 4 a).



a) Recessed ladder



b) Protruding ladder

Key

A vertical plane

Figure 4 — Handle bends

4.2 Structural integrity

The complete structure of ladders and stepladders shall comply with the requirements of EN 13451-1:2011, 4.1.

4.3 Slip resistance

The surface of the treads shall comply with the requirements of rating group 24° according to EN 13451-1:2011, Table 1.

5 Test methods

Unless otherwise specified the requirements of Clause 4 shall be verified by the most appropriate method: measurement, visual examination or practical tests.

Variable stepladders shall be tested for entrapment in the two extreme working positions.

6 Additional instructions for use

Specific instructions for safe use shall be given by the manufacturer, e.g.:

- a) to prevent hazards coming from ladders and stepladders protruding into the pool;
- b) to prevent hazards coming from users gaining access to the area underneath stepladders;
- c) to prevent hazards coming from variable stepladders during movement of the movable floor (see EN 13451-11).

Annex A (informative)

Examples of easier access to the pool to address the needs of older persons and persons with disabilities

Examples of easier access to the pool to address the needs of older persons and persons with disabilities are given in Figures A.1 to A.3.

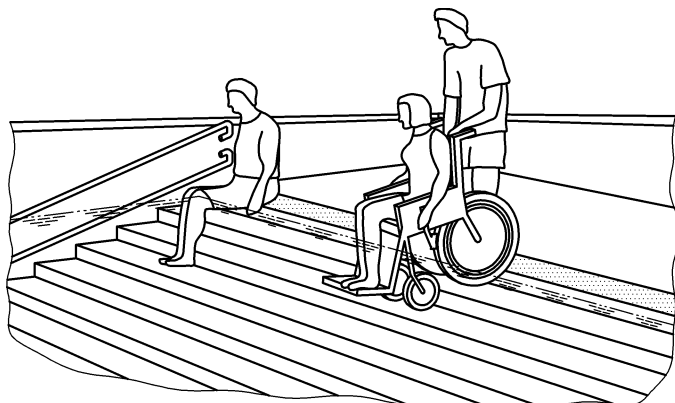


Figure A.1

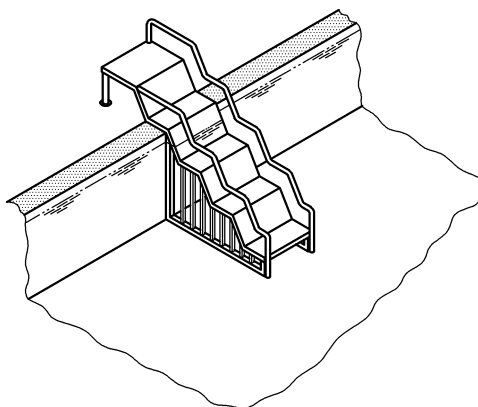


Figure A.2

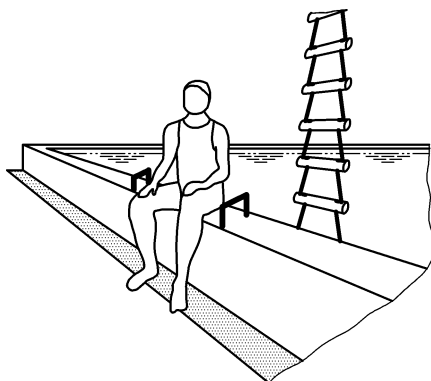


Figure A.3

Bibliography

EN 13451-11, *Swimming pool equipment - Part 11: Additional specific safety requirements and test methods for moveable pool floors and moveable bulkheads*

EN 15288-1, *Swimming pools - Part 1: Safety requirements for design*

EN 15288-2, *Swimming pools - Part 2: Safety requirements for operation*

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