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Ships and marine technology — Aluminium shore gangways for seagoing vessels

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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

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Foreword

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This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 1, *Maritime Safety*.

This fourth edition cancels and replaces the third edition (ISO 7061:2015), which has been technically revised.

The main changes are as follows:

— the inclination angle text has been corrected,

— the test methods have been updated, and

— the marking has been corrected to align with IMO MSC.1/Circ.1331.[1]

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.

Ships and marine technology — Aluminium shore gangways for seagoing vessels

1 Scope

This document specifies requirements and guidance for aluminium shore gangways.

This document applies to gangways designed to be carried on board ships, to provide a lightweight, convenient and safe means of access from ship to shore, for use primarily by the ship's crew. These gangways can also be used for access from ship to ship when conditions are favourable.

The gangways to which this document applies are not intended to carry wheeled traffic such as loaded trolleys.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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/

3.1
gangway
bridge structure to allow safe embarkation and disembarkation from ship to shore or access to another ship

3.2
side frame
longitudinal-strength member of the *gangway* (3.1) to which the *cross-members* (3.3), stanchions, roller or wheels and the lifting lugs, etc. are attached

3.3
cross-member
part that holds the *side frame* (3.2) in position and provides support for the *decking plate* (3.4)

3.4
decking plate
flat-topped corrugated section or plate serving as the type A gangway floor

3.5
step
batten or small section fitted on the *decking plate* (3.4), or arc-shaped material fixed directly at both *side frames* (3.2) to give better foot grip when the *gangway* (3.1) is inclined from the horizontal position

3.6
guard rail
hand and intermediate guide, supported by stanchions, to prevent people falling from the *gangway* (3.1)

3.7
anti-slip securing part
hook plate, eye pad or angle section at the upper end of the *gangway* (3.1) to ensure that the gangway is firmly connected to shipboard structure to prevent slipping

3.8
removable connection part
part that disconnects and connects two parted sections of the gangway body, so as to connect firmly the two parted sections of the gangway body to one complete *gangway* (3.1), or to disconnect the one complete gangway into two sections

4 Types

4.1 General

A gangway can be designed into two types: decking plate gangway and arc-shaped steps gangway. The gangway body can be designed as one section, which can also be designed as two sections as required.

4.2 Type A: decking plate gangway

The type A gangway has the decking plate with anti-slip steps and is used horizontally or with an inclination angle of up to 30° from the horizontal (see Figure 1).

4.3 Type B: arc-shaped steps gangway

The type B gangway has arc-shaped steps that support loading, and the maximum inclination angle of use is 55° from the horizontal (see Figure 2).

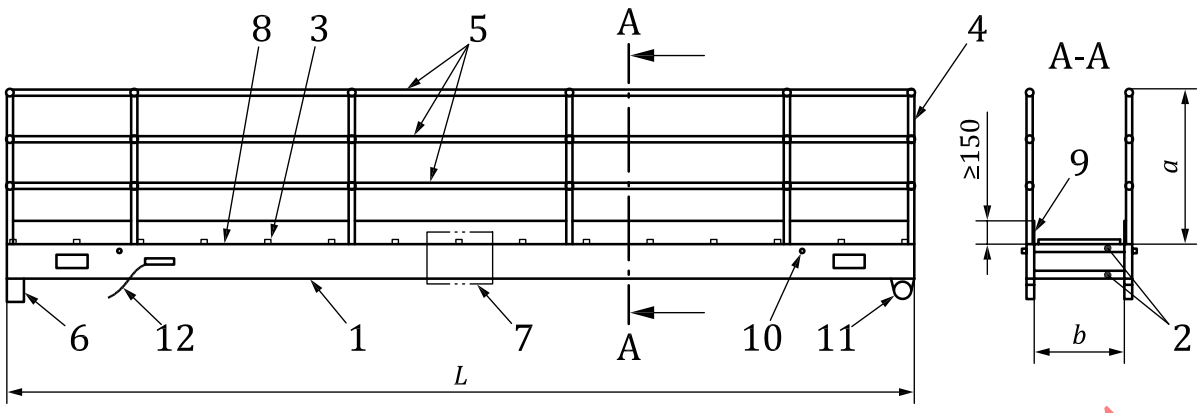
5 Dimensions

5.1 General

The dimensions of the type A gangway shall be in accordance with Figure 1.

The dimensions of the type B gangway shall be in accordance with Figure 2.

Dimensions in millimetres

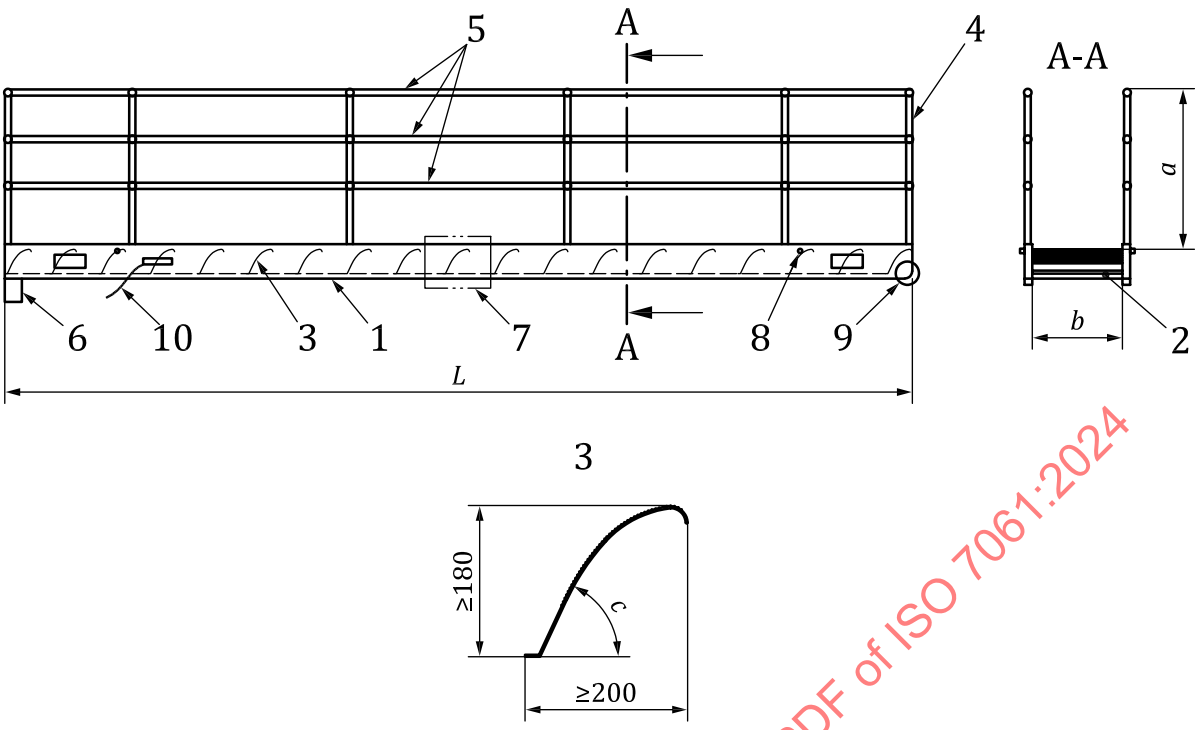


Key

1	side frame	7	removable connection part
2	cross-member	8	decking plate
3	anti-slip step	9	toe-board
4	stanchion	10	lifting lug
5	handrail and guard rail	11	roller or wheel
6	anti-slip securing part	12	securing device
L	overall length	*b*	minimum net width
a	handrail height		

Figure 1 — General arrangement of a Type A gangway

Dimensions in millimetres



Key

1	side frame	6	anti-slip securing part
2	cross-member	7	removable connection part
3	arc-shaped step	8	lifting lug
4	stanchion	9	roller or wheel
5	handrail and guard rail	10	securing device
L	overall length	*b*	minimum net width
a	handrail height	*c*	arc degree

Figure 2 — General arrangement of a Type B gangway

5.2 Overall length

The minimum overall length, *L*, shall be 2 m, with optional increments of approximately 0,5 m up to a length of 9 m. For gangways longer than 9 m, the increments shall be approximately 1 m in length, until the desired overall length is attained (see Figure 1 and Figure 2).

5.3 Width

The net width, *b*, shall be at least 600 mm, and may be up to 1 000 mm with increments of 50 mm at the request of the purchaser (see Figure 1 and Figure 2).

5.4 Distance between steps

Anti-slip steps of the type A gangway shall be spaced at regular intervals of 300 mm to 400 mm longitudinally.

The distance between the neighbouring arc-shaped steps of the type B gangway, when the gangway is horizontal, shall be not less than 300 mm and not more than 350 mm at equal intervals.

5.5 Handrail height

The top handrail height, *a*, shall be not less than 1 000 mm above the decking plate of the type A gangway or above the upper surface of the arc-shaped steps of the type B gangway.

Two guard rails evenly spaced at mid-height shall be provided.

5.6 Distance between stanchions

The distance between the neighbouring stanchions shall be not more than 1 500 mm.

5.7 Arc degree

The arc degree, *c*, of the arc-shaped step of the type B gangway, when the gangway is horizontal, shall be minimum 55° and maximum 65° (see item 3 in Figure 2).

6 Materials

The main materials for gangway components should comply with Table 1. Alternative materials may be used for gangway components that are at least suitable in all respects for the intended duty and are equally acceptable to the purchaser.

Table 1 — Materials for gangway components

Item number	Component	Materials	Applicable method	Remarks [a]
1	Side frame	Aluminium alloy	ISO 209 ISO 6361-2 ISO 6362-2	AW-AlMg5(AW-5019) AW-Al SiMg(AW-6005A) AW-Al MgSi (AW-6060) AW-Al Si1MgMn (AW-6082) or other suitable alloy
2	Cross-member	Aluminium alloy	ISO 209 ISO 6361-2 ISO 6362-2	AW-AlMg5(AW-5019) AW-Al SiMg(AW-6005A) AW-Al MgSi (AW-6060) AW-Al Si1MgMn (AW-6082) or other suitable alloy
3	Step	Aluminium alloy	ISO 209 ISO 6362-2	AW-AlMg2,5(AW-5052) AW-Al SiMg(AW-6005A) AW-Al MgSi (AW-6060) AW-Al Si1MgMn (AW-6082) or other suitable alloy
		Hardwood [b]	—	e.g. oak
4	Stanchion	Aluminium alloy	ISO 209 ISO 6362-2	AW-Al SiMg(AW-6005A) AW-Al MgSi (AW-6060) AW-Al Si1MgMn (AW-6082) or other suitable alloy
		Carbon steel	ISO 630-1	Fe 360B or equivalent

Table 1 *(continued)*

Item number	Component		Materials	Applicable method	Remarks [a]
5	Handrail and guard rail	Rigid rail	Aluminium alloy	ISO 209 ISO 6362-2	AW-Al SiMg(AW-6005A) AW-Al MgSi (AW-6060) AW-Al Si1MgMn (AW-6082) or other suitable alloy
		Fibre rope	Sisal or manila	ISO 1181	See 7.9
			Polypropylene	ISO 1346	
		Wire rope	Steel wire rope	ISO 2408	Plastics-covered
6	Anti-slip securing part		Aluminium alloy	ISO 209 ISO 6361-2	AW-AlMg5(AW-5019) AW-Al MgSi(AW-6060) AW-AlSi1MgMn(AW-6082) or other suitable alloy
			Carbon steel	ISO 630-1	Fe 360B or equivalent
7	Removable connection part [c]		Carbon steel	ISO 630-1	Fe 360B or equivalent
8	Decking plate [d]		Aluminium alloy	ISO 209 ISO 6361-2	AW-AlMg5(AW-5019) AW-AlMg2,5(AW-5052) AW-Al Si1MgMn (AW-6082) or other suitable alloy

[a] The information in brackets in this column relates to the international registration numbers in ISO 209.
[b] Only applicable to anti-slip steps of the type A gangway.
[c] Only applicable to removable gangways.
[d] Only applicable to the type A gangway.

7 Design and construction

7.1 General design features

7.1.1 The manufacturer of the gangway shall be informed of any unusual or hazardous conditions affecting the criteria for design of the gangway.

7.1.2 Direct contact between dissimilar metals shall be avoided to prevent galvanic corrosion.

7.1.3 If the gangway is used on tankers or ships carrying flammable cargo, it shall be provided with an effective and marked earthing device, and shall be suitably surface-coated at the possible points of contact to prevent sparking.

7.2 Design loading

7.2.1 The type A gangway shall be designed to withstand a uniform decking load of 4 000 N/m^2 applied to the decking plate and anti-slip steps when the gangway is in a horizontal position.

7.2.2 The type B gangway shall be designed to withstand a uniform load equivalent to 735 N on every step when the gangway is in a horizontal position.

7.3 Factor of safety

The allowable stress used in the design of the gangway as specified in 7.2 shall be determined by applying a safety factor of 2 to the 0,2 % proof stress of the aluminium alloy used.

7.4 Side frames

Side frames shall be constructed from the extruded hollow section, rolled section, plate material or any combination of these.

7.5 Cross-members

Cross-members attached to the side frames shall be arranged to support the decking plate, and shall be of bar, angle or hollow sections.

7.6 Decking plate

The decking plate of the type A gangway shall comprise either the continuous flat-topped longitudinal corrugated section, or the individual flat plate section. For the individual flat plate section, the decking plate shall have a non-slip coating applied between the anti-slip steps.

7.7 Steps

7.7.1 The anti-slip steps of the type A gangway shall be of aluminium bar or rectangular hollow section, or of hardwood. Anti-slip steps shall have a minimum height of 30 mm above the decking plate and a minimum width of 40 mm in contact with the decking plate.

All anti-slip steps shall be securely fitted. Provision should be made for easy cleaning of the gangway between the anti-slip steps, by leaving a 25 mm space between the anti-slip step and toe-board at each side. Water shall not gather between the anti-slip steps.

7.7.2 Arc-shaped steps of the type B gangway shall be designed to be anti-slip. These steps can operate at the maximum inclination angle of 55° while being light but rigid enough to withstand the design loading as specified in 7.2.2. Individual arc-shaped steps shall be designed to withstand a central point load of 735 N.

7.8 Stanchions

Stanchions shall be constructed from carbon steel or aluminium. Stanchions and associated guard rails shall be designed for a side loading at the top handrail of 500 N/m, without permanent deformation to stanchions or rigid guard rails when used. Stanchions of one of the following types may be fitted:

a) permanently fixed;

b) hinged, with provision made to prevent inadvertent collapse;

c) portable, with a securing device to prevent accidental displacement from the socket or base support.

7.9 Handrail and guard rail

A handrail and intermediate guard rail shall be selected from one of the following types:

a) continuous and adequately tensioned sisal, manila, polypropylene or plastics-covered wire rope, having a minimum rope diameter of 16 mm;

b) continuous rigid aluminium solid or hollow section.

In case of fibre rope or wire rope rails, a way to retighten such rails should be provided.

Polypropylene ropes shall be protected with plastics cover to avoid actinic degradation in tropical conditions.

7.10 Toe-boards

Toe-boards shall be fitted to each side of the type A gangway to a minimum height of 150 mm above the decking plate. Side frames of the gangway may also be used for part or all of the toe-boards.

7.11 Roller or wheels

A roller or wheels shall have a minimum outside diameter of 100 mm and shall be positioned at one end of the gangway. A roller or wheels shall be provided with self-lubricated bearings or fitted with lubrication nipples. To ensure protection of users' feet from movement of the gangway, roller or wheel guards shall be provided. At the maximum angle of use of the gangway, there shall be no loss of contact between the roller or wheels and the contact surface.

7.12 Securing device attachments

Suitable attachments shall be provided at appropriate points on both sides of the gangway, in order to connect the securing devices.

7.13 Lifting lugs

The gangway shall be provided with four lifting lugs securely attached to the side frames and positioned to produce a balanced lift.

7.14 Anti-slip lugs

The gangway shall be provided with anti-slip lugs securely attached to the side frames and positioned to prevent the gangway slipping from its position on the bulwarks or other supporting structures, as well as to ensure the gangway can move within its movable angle.

7.15 Manufacturing tolerance

See Table 2 for the manufacturing tolerance of the gangway.

Table 2 — Manufacturing tolerance of gangway

Dimensions in millimetres

Gangway length	Gangway width	Side frame height	Distance between steps	Side frame twisting	Flatness	
					Hogging	Sagging
$L/1\,000$	±2,0	±2,0	±2,0	$0{,}5 \times L/1\,000$	$1{,}5 \times L/1\,000$	$L/1\,000$

Key

L Overall length of the gangway in millimetres (see Figure 1 and Figure 2)

7.16 Surface requirements and guidance

7.16.1 The surface of steel parts of the gangway should be rust removed to Sa2.5 or St3 according to ISO 8501-1, or hot dip galvanized according to ISO 1460 and ISO 1461 and provided with anti-corrosion coatings.

7.16.2 Anodic oxidation treatment according to ISO 10074 or painting may be considered for the surface of aluminium parts of the gangway if required by the purchaser.

7.16.3 If contact of steel parts and aluminium parts of the gangway cannot be avoided, the surface of contact shall be protected particularly carefully. Polysulfide rubber pads or polytetrafluoroethylene (PTFE) anti-corrosion pads or other suitable material pads not containing asbestos shall be provided to prevent galvanic corrosion.

7.16.4 The wooden parts of the gangway should be treated properly to avoid rottenness and mould.

8 Quality of manufacture

8.1 The assembly, comprising side frames, cross members, decking plate and steps, together with all ancillary fittings, shall be visibly free from defects and distortion.

8.2 All components shall be free from exposed rough or sharp edges likely to cause injury.

8.3 Care shall be taken in the preparation, riveting, bolting or welding of aluminium or steel structures to ensure that the permissible design stresses are not exceeded.

9 Acceptance tests

9.1 General

The tests specified in 9.2 to 9.4 shall be carried out on the manufacturer's works.

9.2 Type test

9.2.1 One gangway of the longest design length for each frame type shall be tested by the methods given in 9.4 and a test certificate made available to the purchaser on request.

9.2.2 The deflection due to loading (according to 7.2) shall not exceed the value of the overall length divided by 75.

9.2.3 Each gangway submitted for type test shall be fully assembled with all fittings and subjected to the tests given in 9.4.

9.3 Individual test

Individual gangways manufactured to a design which has been satisfactorily type-tested in accordance with 9.2 shall be subjected to the tests given in 9.4.1 and 9.4.3, if requested by the purchaser.

9.4 Test methods

9.4.1 Lifting

Lift the gangway by means of the lifting lugs provided. After the test, there shall be no evidence of strain to the lugs or the adjacent structure.

9.4.2 Initial sag

Place the gangway horizontally on supports positioned at the both ends close to the anti-slip lug and the roller or wheels. Then measure the deflections due to the dead load, Y_1 and Y_2, for both side frames.

The initial sag, Y, is determined by Formula (1):

$$Y = (Y_1 + Y_2)/2 \quad (1)$$

In the case of individual testing, the initial sag shall not be greater than that recorded for the type test.

9.4.3 Deflection under load

With the gangway still supported as in 9.4.2, carry out the deflection test immediately after the results of initial sag are determined.

The type A gangway shall be loaded with a uniform load equivalent to 4 000 N/m^2. Apply, without shock, the load to the longitudinal centreline of the decking plate. The load shall be located at equally spaced intervals of not more than 1 m. Where the design incorporates individual decking plates, apply a load equivalent to 4 000 N/m^2 to each plate. Maintain the test load for 15 min before the total deflection of the gangway at each side frame is measured. The type B gangway shall be loaded with a load equivalent to 735 N on every step.

Measure the maximum deflections, Y'_1 and Y'_2, for both side frames.

The total deflection, Y_T, is determined by Formula (2):

$$Y_T = (Y'_1 + Y'_2)/2 \quad (2)$$

The deflection due to loading, ΔY, shall be calculated by subtracting the initial sag from the total deflection as in Formula (3):

$$\Delta Y = (Y'_1 + Y'_2)/2 - (Y_1 + Y_2)/2 \quad (3)$$

10 Inspections

10.1 Gangways subjected to a type test shall be inspected after testing to ensure that there are no signs of residual weakness or damage.

10.2 All gangways shall be visually checked after testing to ensure the following:

a) there is no distortion of the side frames;

b) the decking plate or anti-slip steps are adequately secured;

c) the roller or wheels revolve freely;

d) if applicable, the stanchions, handrail and intermediate guard rails can be easily erected in position;

e) removable fittings for rigid joints can be properly stowed when the gangway is dismantled;

f) the rating plate is affixed and correct.

11 Marking

Each gangway in accordance with this document shall be permanently marked at both ends by means of a rating plate prominently displayed. See SOLAS regulation II-1/3-9[2] for further information. The rating plate shall contain information relevant to the gangway, including the following:

a) manufacturer's name and trademark;

b) name of product;

c) design loading and safety loading;

d) maximum and minimum permitted angle of inclination;

e) overall length and width;

f) weight;