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Ships and marine technology — Aluminium shore gangways for seagoing vessels

Navires et technologie maritime — Planchons en aluminium pour navires de haute mer

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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 documents 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 8, *Ships and marine technology*, Subcommittee SC 1, *Lifesaving and fire protection*.

This third edition cancels and replaces the second edition (ISO 7061:1993), which has been technically revised.

Ships and marine technology — Aluminium shore gangways for seagoing vessels

1 Scope

This International Standard specifies requirements for aluminium shore gangways.

This International Standard 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 may also be used for access from ship to ship when conditions are favourable.

This International Standard applies to gangways suitable for use horizontally or inclined up to an angle of 30° from the horizontal. For angles of inclination less than 55°, special consideration of the design of steps and decking may be necessary.

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

Users of this International Standard, while observing its requirements, should, at the same time, ensure compliance with any statutory requirements, rules and regulations, applicable to the individual ship concerned.

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.

ISO 209, *Aluminium and aluminium alloys — Chemical composition*

ISO 630-1, *Structural steels — Part 1: General technical delivery conditions for hot-rolled products*

ISO 1181, *Fibre ropes — Manila and sisal — 3-, 4- and 8-strand ropes*

ISO 1346, *Fibre ropes — Polypropylene split film, monofilament and multifilament (PP2) and polypropylene high-tenacity multifilament (PP3) — 3-, 4-, 8- and 12-strand ropes*

ISO 1460, *Metallic coatings — Hot dip galvanized coatings on ferrous materials — Gravimetric determination of the mass per unit area*

ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods*

ISO 2408, *Steel wire ropes for general purposes — Minimum requirements*

ISO 6361-2, *Wrought aluminium and aluminium alloys — Sheets, strips and plates — Part 2: Mechanical properties*

ISO 6362-2, *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 2: Mechanical properties*

ISO 8501-1, *Preparation of steel substrates before application of paints and related products — Visual assessment of surface cleanliness — Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings*

ISO 10074, *Anodizing of aluminium and its alloys — Specification for hard anodic oxidation coatings on aluminium and its alloys*

3 Types

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

3.1 Type A decking gangway

The surface of type A gangway is provided with the decking plate and anti-slip steps, with the maximum inclination degree of 30° (see Figure 1).

3.2 Type B anti-slip arc steps gangway

This surface is designed directly as anti-slip arc step to position side stringers and support loading, the lower side of which is equipped with a guard board, with the maximum inclination degree of 55°, defined as type B gangway.

4 Definitions

For the purposes of this International Standard, the following definitions apply.

4.1 gangway

Bridge structure to allow safe embarkation and disembarkation from ship to shore or access to another ship.

4.2 side stringer

Longitudinal-strength member of the gangway to which the cross-members, stanchions, roller or wheels and the lifting lugs, etc. are attached.

4.3 cross-member

Part that holds the side stringer in position, and provides support for the decking.

4.4 decking

Flat-topped corrugated section or plate serving as the gangway floor.

4.5 step

Batten or small section fitted proud of the decking, or anti-slip arc material fixed directly at both sides of stringers for load bearing to give better foot grip when the gangway is inclined from the horizontal position.

4.6 guard rail

Hand and intermediate guide, supported by stanchions, to prevent people falling from the gangway.

4.7 anti-slip securing parts

Hooked to the hook plate, eye pad or angle section at the upper end of side stringer, so as to facilitate the gangway's firm connection with shipboard structure to avoid slip.

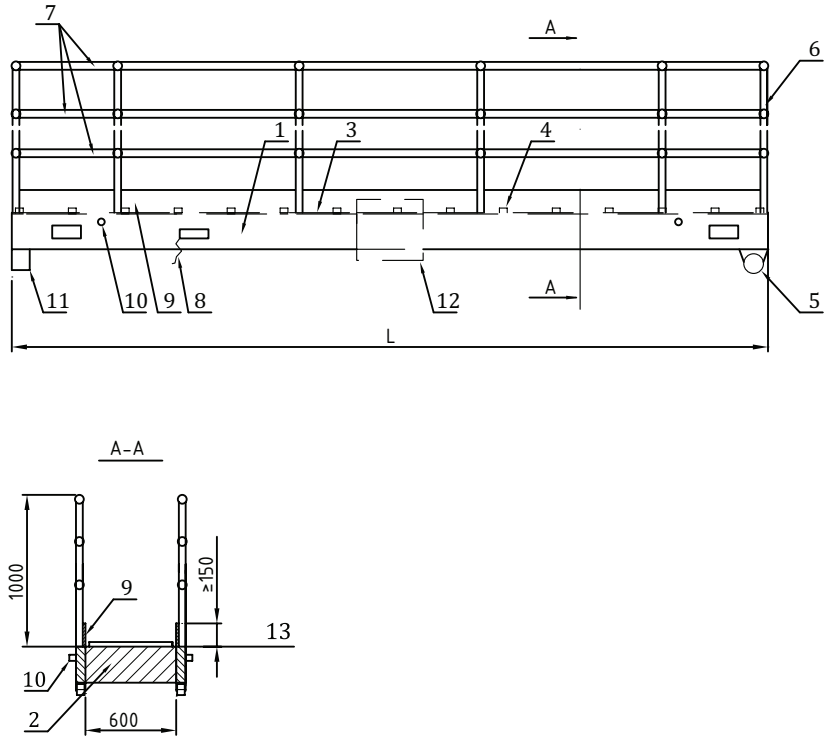
4.8 removable connection parts

Hooked to the side stringer at the end of 2 parted sections of gangway, facilitating the securing parts' disconnection and connection, so as to connect firmly the 2 parted section of gangway as 1 gangway, or to disconnect 1 complete gangway into 2 sections.

5 Dimensions

5.1 The dimensions of an aluminium shore gangway type A shall be in accordance with Figure 1. 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.

Dimensions in millimetres



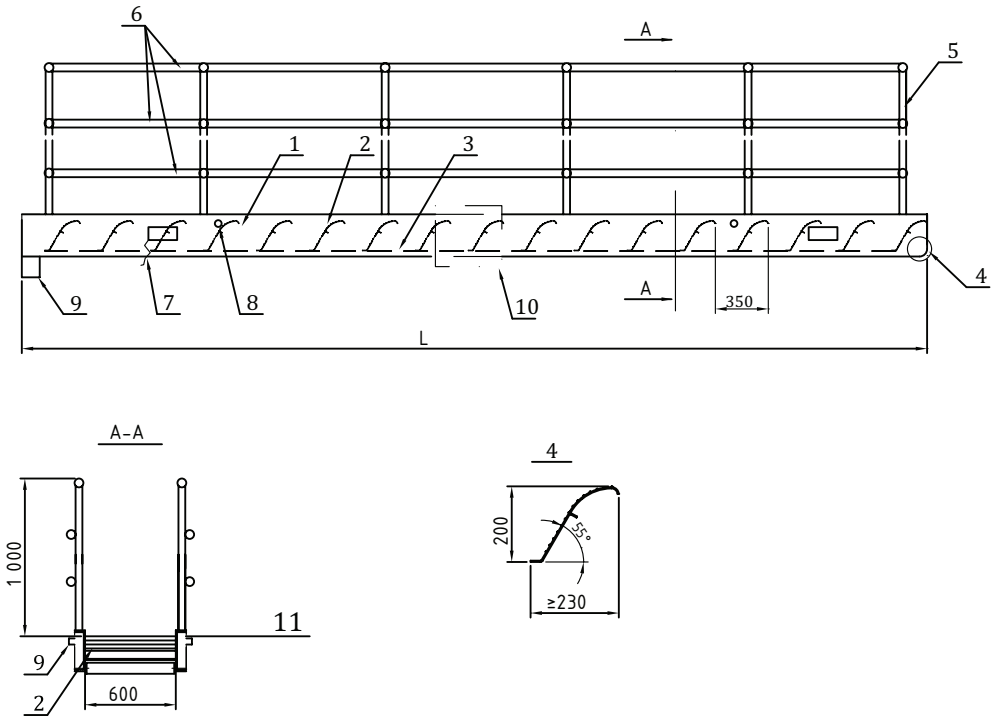
Key

1	side frame	8	securing device
2	cross member	9	toe-board
3	deck or decking plate	10	lifting lug
4	anti-slip step	11	anti-slip securing part
5	roller or wheel	12	removable connecting part
6	stanchion	13	decking or floor
7	handrail		

NOTE The width of 600 mm is net width.

Figure 1 — General arrangement of a gangway type A

5.2 See Figure 2 for the dimensions of gangway type B.



Key

1	side frame	7	securing device
2	anti-slip arc step	8	lifting lug
3	decking plate	9	anti-slip securing part
4	roller or wheel	10	removable connecting part
5	stanchion	11	upper surface of anti-slip tread
6	handrail		

NOTE The width of 600 mm is net width.

Figure 2 — General arrangement of a gangway type B

6 Materials

The materials for aluminium gangway components shall comply with the requirements of Table 1. Alternative materials may be used provided that they are at least as suitable in all respects for the intended duty and are equally acceptable to the purchaser.

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 for use 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.

Table 1 — Materials

Item number[a]	Component		Materials	ISO number	Remarks[b]
1	Side frame		Aluminium alloy	ISO 209 ISO 6361-2: ISO 6362-2	AW-AlMg5(AW5019) AW-Al SiMg(AW-6005A) AW-Al MgSi (AW-6060) AW-Al Si1MgMn (AW-6082)
2	Cross-member		Aluminium alloy	ISO 209 ISO 6361-2 ISO 6362-2	AW-Al SiMg(AW-6005A) AW-Al MgSi (AW-6060) AW-Al Si1MgMn (AW-6082)
3	Decking or deck plate		Aluminium alloy	ISO 209 ISO 6361-2	AW-AlMg5(AW5019) AW-AlMg2.5(AW-5052) AW-Al Si1MgMn (AW-6082)
4	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	—	e.g. oak
5	Roller		Carbon steel with rubber or plastics sleeve	ISO 630-1	Fe 360B
			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
	Wheel		Carbon steel with solid tyre of rubber or plastics	ISO 630-1	Fe 360B
6	Stanchion		Aluminium alloy	ISO 209 ISO 6362-2	AW-Al SiMg(AW-6005A) AW-Al MgSi (AW-6060) AW-Al Si1MgMn (AW-6082)
			Carbon steel	ISO 630-1	Fe 360B
7	Handrail	Rigid rail	Aluminium alloy	ISO 209 ISO 6362-2	AW-Al SiMg(AW-6005A) AW-Al MgSi (AW-6060) AW-Al Si1MgMn (AW-6082)
		Fibre rope	Sisal or manila	ISO 1181	See 7.9
			Polypropylene mono-filament or film rope	ISO 1346	
		Wire rope, plastics-coated	PVC-coated guard-wire rope	ISO 2408:2004	Plastics-coated

Table 1 *(continued)*

8	Securing device	Sisal or manila rope	ISO 1181	
		Polypropylene mono-filament or film rope	ISO 1346	See 7.12
9	Toe-board	Aluminium alloy	ISO 209 ISO 6361-2 ISO 6362-2	AW-AlMg5(AW5019) AW-AlMg2.5(AW-5052) AW-Al SiMg(AW-6005A) AW-Al MgSi (AW-6060) AW-AlSi1MgMn (AW-6082)
		Hardwood	—	e.g.oak
10	Lifting lug	Aluminium alloy	ISO 209 ISO 6361-2 ISO 6362-2	AW-AlMg5(AW5019) AW-Al SiMg(AW-6005A) AW-Al MgSi (AW-6060) AW-Al Si1MgMn (AW-6082)
11	Anti-slip lug	Aluminium alloy	ISO 209 ISO 6361-2	AW-AlMg5(AW5019) AW-Al MgSi(AW-6060) AW-AlSi1MgMn(AW-6082)
		Carbon steel	ISO 630-1	Fe 360B
12[d]	Removable connecting parts	Carbon steel	ISO 630-1	Fe 360B

[a] The item numbers in Table 1 refer to component parts in Figure 1.

[b] Information in brackets relates to the international registration numbers in ISO 209.

[c] The sleeve or tire may have a ribbed or flat surface.

[d] Only applicable to removable gangways.

7.2 Design loading

The assembled gangway shall be designed to withstand a uniform decking load of 4 000 N/m^2 applied to the decking and steps while the gangway is in a horizontal position. The type B gangway shall be loaded with a load equivalent to 735 N on every step.

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 factor of safety of 2 on the 0,2 % proof stress of the aluminium alloy used.

7.4 Side stringers

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

7.5 Cross-members

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

7.6 Decking

The decking shall comprise either continuous flat-topped longitudinal corrugated section, or individual flat plate section, which shall have a non-slip coating applied between the steps.

7.7 Steps

7.7.1 Steps shall be of aluminium bar or rectangular hollow section, or of hardwood, and shall be spaced at regular intervals of 300 mm to 400 mm longitudinally.

Steps shall have a minimum height of 30 mm above the decking; hardwood steps shall have a minimum section width of 40 mm in contact with the decking. All steps shall be securely fitted, and shall extend over the full width of the gangway between the toe-boards. Provision should be made for easy cleaning of the gangway between the steps, by leaving a 25 mm space between step and toe-board at each side. Water shall not gather between the steps.

7.7.2 Anti-slip step should function directly as side stringer positioning, and arc material to support loading, with the maximum arc degree of 55° (see Figure 2), located at equally spaced longitudinal intervals of 350 mm.

7.8 Stanchions

Stanchions shall be constructed from carbon steel or aluminium to comply with Figure 1. They shall be fitted at regular intervals along the gangway, with a maximum permitted interval of 1 500 mm. Stanchions and associated hand guides shall be designed for a side loading at the upper guide level of 500 N/m, without permanent deformation to stanchions or rigid hand guides 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 securing device to prevent accidental displacement from the socket or base support.

7.9 Handrail and intermediate guides

Handrail and 2 intermediate guides shall be provided to comply with Figure 1 and 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 certified effective against actinic degradation for two years exposure in tropical conditions.

7.10 Toe-boards

Toe-boards shall be fitted to each side of the gangway or each side of the gangway shall also be used as the toe-board to a minimum height of 150 mm above the step.

7.11 Roller or wheels

A roller or wheels of 100 mm minimum outside diameter shall be positioned at one end of the gangway. Rollers and wheels shall be provided with self-lubricated bearings or fitted with lubrication nipples having a thread M10 × 1. 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 stringers 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 stringers, and positioned to prevent the gangway slipping from its position on the bulwarks or other supporting structure, as well as ensure the gangway to move within its movable angle.

7.15 Manufacturing tolerance

See Table 2 for the manufacturing tolerance of aluminium gangway.

Table 2 — Manufacturing tolerance of aluminium gangway

Values in millimetres

Ladder length, L	Ladder width	Ladder frame height	Distance between steps	Ladder frame torsion resistance	Flatness	
					Hogging	Sagging
L/1 000	±2,0	±2,0	±2,0	5 mm/10 m	1,5L/1 000	1,0L/1 000

7.16 Requirement of surface

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

7.16.2 Anodic oxidation treatment shall be carried out on the surface of aluminium parts of the gangway according to ISO 10074.

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 not containing asbestos shall be provided to prevent electric corrosion.

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

8 Quality of manufacture

8.1 The assembly, comprising side stringers, cross members, decking and anti-slip 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

The following tests shall be carried out at the manufacturer's works.

9.1 Type test

9.1.1 One gangway of the longest design length for each stringer type shall be tested by the methods given below and a test certificate made available to the purchaser on request.

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

9.1.3 Each gangway submitted for type test shall be fully assembled with all fittings and subjected to the tests given in 9.3.1 to 9.3.3.

9.2 Individual test

Individual gangways manufactured to a design which has been satisfactorily type-tested in accordance with 9.1 shall be subjected to the tests given in 9.3.1 and 9.3.3, if requested by the purchaser.

9.3 Test methods

9.3.1 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.

9.3.2 Initial sag

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.

9.3.3 Deflection under load

With the gangway still supported as in 9.3.2, carry out the deflection test immediately after the results of initial sag are determined. Apply, without shock, a uniform load equivalent to 4 000 N/m^2 to the longitudinal centerline of the decking. The load shall be arranged from a selection of conveniently sized sandbags or other material that will not damage the gangway, and located at equally spaced intervals of not more than 1 m. Where the design incorporates individual decking plates, apply a load equivalent to 4000 N/m^2 to each plate. Maintain the test load for 15 min before the total deflection of the gangway at each side stringer is measured. The type B gangway shall be loaded with a load equivalent to 735 N on every step.

The maximum deflection for each side stringer shall be measured as the maximum vertical distance between the string or wire stretched tightly between the support points and the base of the gangway. The average of the two readings, Y'_1 and Y'_2, is taken as the total deflection Y_T:

$$Y_T = (Y_1^{'} + Y_2^{'}) / 2 \tag{2}$$

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

$$\Delta Y = (Y_1^{'} + Y_2^{'}) / 2 - (Y_1 + Y_2) / 2 \tag{3}$$

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 sideframes;

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

c) the roller or wheels revolve freely;

d) if applicable, the stanchions, handrail and intermediate guides 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

According to the requirement of SOLAS regulation II-1/3-9, each gangway in accordance with this International Standard shall be permanently marked by means of a rating plate prominently displayed. The rating plate shall contain information relevant to the gangway, including the following:

a) the manufacturer's name or trademark;

b) the name of this product;

c) the number of this International Standard, i.e. ISO 7061;

d) the product specification: overall length and net width included;

e) the tType:A/B;

f) the design loading and safety loading;

g) the maximum permitted angle of inclination, in degrees;

h) the weight;

i) the date of manufacture;

j) the stamp of the ship inspection department.

EXAMPLE The designation of an aluminium shore gangway of overall length 9 m, limited to 30° angle of inclination, is: Gangway ISO 7061-A9–30.

Bibliography

[1] SOLAS regulation II-1/3-9, *Means of embarkation on and disembarkation from ships*

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