

INTERNATIONAL  
STANDARD

ISO  
23055

First edition  
2020-01

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**Ships and marine technology — Design  
requirements for international ballast  
water transfer connection flange**

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Reference number  
ISO 23055:2020(E)

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Published in Switzerland

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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](http://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](http://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 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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 3, *Piping and machinery*.

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](http://www.iso.org/members.html).

## Introduction

It is recognized that transfer of ballast water between a ship and a shore-side facility, or another ship, can be necessary to manage ballast water treatment.

In order for ships and shore facilities to connect the ballast water transfer piping in an efficient manner, a standardized interface flange is necessary. This type of connection would be similar to the international fire main ship/shore connection required by the International Convention for the Safety of Life at Sea (SOLAS).

The need for a standardized international flange for ballast water transfer systems has been presented to the International Maritime Organization (IMO) Marine Environmental Protection Committee (MEPC). A standard transfer connection will help enable efficient transfer of ballast water between ships and facilities in accordance with the Guidelines of the International Maritime Organization (IMO Resolution MEPC.153(55) – G5).

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# Ships and marine technology — Design requirements for international ballast water transfer connection flange

## 1 Scope

This document specifies the material requirements and dimensions of an international flange for the transfer of ballast water between a ship and a shore reception facility, or between ships.

It does not address any reconfiguration of the ship's ballast water piping system necessary to connect to the shore-side, e.g. construction of piping from the ship lower machinery levels to the main deck transfer area.

## 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 terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1

#### **international flange for ballast water transfer systems**

pipe fitting installed on both the ship and shore side of a ballast water transfer system, having standardized dimensions to facilitate worldwide connectivity

### 3.2

#### **maximum allowable working pressure**

highest stress to which a piping system component can be subjected, based on materials, thickness and design calculations

## 4 Abbreviated terms

DN	diameter nominal
PN	pressure nominal
MAWP	maximum allowable working pressure

## 5 Materials and equipment

### 5.1 General

International flanges for ballast water transfer systems shall be flat-faced and of steel or equivalent material construction. Flanges shall be galvanically compatible with the piping system to which they are installed. All other parts of the system shall be constructed of materials suitable for the service

intended. Fasteners shall be of corrosion-resistant materials that are galvanically compatible with the material of the flange.

Flanges shall be designed and manufactured in accordance with the dimensions specified in [Clause 7](#).

To meet the dimensional and pressure-rating requirements of this document, the flanges should meet the design and testing requirements of a recognized national or international flange standard, such as DIN 2632, DIN 2633, BS EN 1092, ASME B16.5, JIS B2220, GB/T 2501 or other equivalent design standard.

## 5.2 Pressure rating

The flange shall have a minimum pressure rating of not less than 1 MPa (145 psig).

NOTE Normally, a flange of at least a PN 10 rating satisfies this requirement.

## 5.3 Non-metallic materials

Gaskets and associated parts shall be of materials suitable for the MAWP and seawater service.

## 5.4 Accessories

The international flange for ballast water transfer systems shall be supplied with eight bolts and the corresponding nuts and washers.

## 6 Workmanship

Welding personnel shall be qualified in accordance with recognized standards, and welding materials in accordance with recognized standards shall be utilized.

## 7 Dimensions

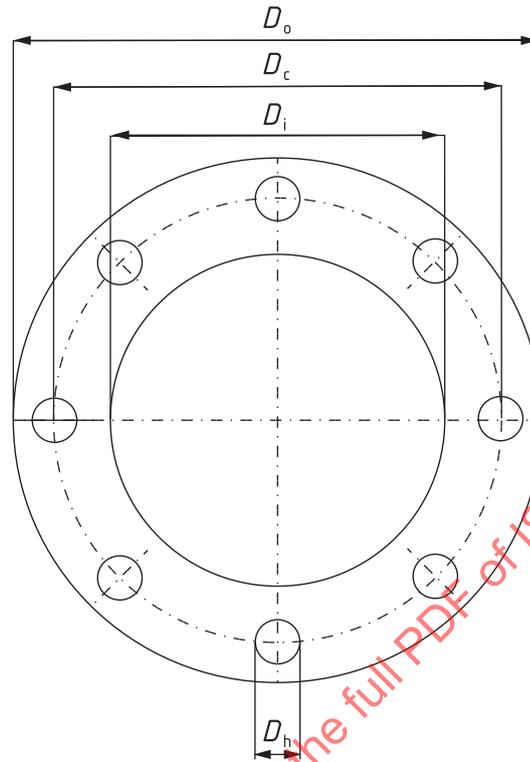
7.1 The dimensions of the international flange for ballast water transfer systems shall be in accordance with [Table 1](#) and [Figure 1](#). Bolt holes shall be evenly spaced (i.e. the centres of the 8 holes are 45 degrees apart for DN 200).

Variations in the inside and outside diameter are acceptable depending on the type of flange connection design. The bolt circle diameter ( $D_c$ ) shall be as specified in [Table 1](#).

**Table 1 — Standard dimensions for the international flange for ballast water transfer systems (DN 200)**

Description	Dimension (mm)
Outside diameter ( $D_o$ )	340
Inside diameter ( $D_i$ )	218 - 222 (see <a href="#">7.1</a> for allowable variations)
Bolt circle diameter ( $D_c$ )	295
Bolt hole diameter ( $D_h$ )	22
Flange thickness ( $t$ )	24 (minimum)
Bolts and nuts diameter	20

7.2 Larger flanges and piping diameters can be required for high-capacity ballast water transfer systems. [Annex A](#) specifies the dimensions of DN 300 flanges.



#### Key

- $D_o$  outside diameter
- $D_c$  bolt circle diameter
- $D_i$  inside diameter
- $D_h$  bolt hole diameter

**Figure 1 — Example of international ballast water shore connection flange**

NOTE 1 The flange bolt holes can be provided with a notched connection to the outside edge of the flange to allow for minor adjustments during connection. This alternative design is described in [Annex B](#).

NOTE 2 The number of bolt holes and therefore the spacing between holes (in degrees) will change as the flange diameter is increased.

EXAMPLE A twelve-bolt flange, such as in [Annex A](#), will have bolt holes equally spaced 30 degrees apart.

## 8 Marking

Flanges shall be permanently marked in English with the following minimum information:

- a) manufacturer name;
- b) PN number (e.g. PN 10) and nominal diameter (DN 200);
- c) a reference to this document, i.e., ISO 23055.

## 9 Quality assurance

Unless otherwise specified in a contract or purchase order, the contractor is responsible for the performance of all inspection requirements. The contractor may use his/her own or any other facilities suitable for the performance of inspection requirements. The purchaser may perform any of the inspections set forth in the specification where such inspections are deemed necessary.

## 10 Ordering information

Orders for international flanges for ballast water transfer systems shall include the following:

- a) PN rating (minimum PN 10);
- b) nominal diameter (DN). (e.g. DN 200);
- c) design standard (e.g. DIN, BS EN, JIS, ASME, GB/T flange design);
- d) a reference to this document (i.e. ISO 23055);
- e) type of end connection (e.g. socket weld, slip-on);
- f) preservation (coating) – if necessary.

## 11 Installation

The international flange for ballast water transfer systems shall be installed in accordance with the manufacturer's instructions.

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## Annex A (normative)

### Design of a flange for ballast water transfer systems of larger capacity

The dimensions of the flange for larger ballast water transfer systems shall be in accordance with [Table A.1](#). Variations of the inside diameter ( $D_i$ ) are permissible based on the type of the flange connection and on the thickness of the connected piping.

**Table A.1 — DN 300 flange**

Description	Dimension (mm)
Outside Diameter ( $D_o$ )	445
Inside diameter ( $D_i$ )	327,6 (DN 300) – See A1 for variations
Bolt circle diameter ( $D_c$ )	400
Bolt hole diameter ( $D_h$ )	22
Flange thickness ( $t$ )	26 (minimum)
Bolts and nuts diameter	20
Number of holes	12

NOTE Dimensions, number of bolt holes and hole spacing are different from those of a DN 200 flange.