BRITISH STANDARD

BS ISO 9669:1990
(including Amendment 1:1992)

Implementation of ISO 9669:1990

Series 1 freight containers — Interface connections for tank containers

UDC 621.869.88:621.642.06:621.643.412

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PKM/18, Freight containers, upon which the following bodies were represented:

British Industrial Truck Association
British International Freight Association
British Railways Board
Chamber of Shipping
Department of Transport (Transport Industries)
European Portable Tank Association (British Section)
Federation of the Electronics Industry
Health and Safety Executive
Institute of Logistics
Lloyd's Register of Shipping
Ports Safety Organisation
Road Haulage Association Ltd.
Shipowners Refrigerated Cargo Research Association
Society of Motor Manufacturers and Traders Limited

This British Standard, having been prepared under the direction of the Consumer Products and Services Sector Board, was published under the authority of the Standards Board and comes into effect on 15 July 1995

The following BSI references relate to the work on this standard:
Committee reference PKM/18
Draft for comment 90/42076 DC

ISBN 0 580 24361 3

Amendments issued since publication

Amd. No.	Date	Comments

Contents

National foreword

This British Standard reproduces verbatim ISO 9669:1990 including Amendment 1:1992 and implements it as the UK national standard. It supersedes BS 3951-2.6:1992 which is withdrawn.

This British Standard is published under the direction of the Consumer Products and Services Sector Board whose Technical Committee PKM/18 has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international committee any enquiries on interpretation, or proposals for change, and keep UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

NOTE International and European Standards, as well as overseas standards, are available from Customer Services, BSI, 389 Chiswick High Road, London W4 4AL.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the ISO title page, pages ii to iv, pages 1 to 9 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

INTERNATIONAL STANDARD

ISO 9669

First edition
1990-10-15

AMENDMENT 1
1992-07-01

Series 1 freight containers — Interface connections for tank containers

AMENDMENT 1: Sections 3 and 4

Conteneurs de la série 1 — Interfaces des équipements pour conteneurs-citernes
AMENDEMENT 1: Sections 3 et 4

Reference number
ISO 9669 : 1990/Amd.1: 1992 (E)

Contents

Descriptors: Containers, freight containers, tank containers, flange connections, specifications, dimensions.

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Amendment 1 to International Standard ISO 9669:1990 was prepared by Technical Committee ISO/TC 104, *Freight containers*, Sub-Committee SC 2, *Specific purpose containers*.

Annex A of this amendment is for information only.

blank

Section 1. General

Introduction

This International Standard aims to reduce problems in the operation of tank containers caused by a multiplicity of different interface connections. The combined efforts of the manufacturing and operational sectors of the industry have been devoted to establishing a certain degree of international standardization, while recognizing the requirements of the various national standards applicable in areas where tank containers are operated.

It also aims to ensure that tank containers fitted with flanged interface connections are compatible with the flanges specified by the national standards used in the countries in which the container may travel. Such compatibility will improve safety in operation by limiting the variety of connections with which the authorities and their emergency services have to deal.

1.1 Scope

This International Standard specifies the characteristics of interface connections for tank containers complying with ISO 1496-3.

Section 1 gives the definitions and the testing and welding requirements for interface connections.

Section 2 gives a range of flange connections for tank containers, type codes 70 to 77 and 85 to 88.

Section 3[1)] specifies the dimensions and characteristics of man-hole openings and man-hole lids for tank containers intended to contain liquids or pressurized dry bulk, with a test pressure not exceeding 600 kPa for containers of type codes 70 to 76 and 85 to 88.

Section 4[1)] specifies the requirements for the interface connection screw threads.

1.2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1496-3:—, *Series 1 freight containers — Specification and testing — Part 3: Tank containers for liquids, gases and pressurized dry bulk*[2)].

1.3 Definitions

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

1.3.1
tank container

a freight container which includes two basic elements, the tank or tanks and the framework, and complies with the requirements of ISO 1496-3

1.3.2
gas

a fluid substance having a vapour pressure greater than an absolute pressure of 300 kPa[3)] at 50 °C or as otherwise defined by the competent authority (see **1.3.6**)

1.3.3
liquid

a fluid substance having a vapour pressure not greater than an absolute pressure of 300 kPa[3)]at 50 °C

1.3.4
dry bulk

assemblies of separate solid particles normally substantially in contact with one another which are or may be rendered capable of fluid flow

1.3.5
dangerous goods

those substances classified as dangerous by the United Nations Committee of experts on the transport of dangerous goods or by the competent authority (see **1.3.6**)

1.3.6
competent authority

the authority or authorities designated as such in each country or in each specific case by the government concerned for the approval of tank containers

1.3.7
maximum allowable working pressure

that pressure assigned for operation by either a competent authority or other responsible person to a particular tank, above which that tank is not intended to be operated

---

1) Will be published later as an amendment to this International Standard.

2) To be published. (Revision of ISO 1496-3:1981)

3) 300 kPa = 3 bar (the bar is currently used as a unit of pressure in relevant international codes, often implemented by national legislation).

1.3.8
test pressure

the gauge pressure at which the tank is tested

1.3.9
flange

a connecting means using bolts to interface with a similar connection

1.3.10
interface

identifiable area used to adjoin an external area

1.3.11
connections

specific points within an interface area used to join to a similar external point

1.3.12
openings

access points allowing communication with contents of the tank container

1.4 Design requirements — General

1.4.1 Testing

All interfaces are considered part of the vessel and shall be subjected to the hydraulic tests prescribed for the tank.

1.4.2 Welding

If interfaces are welded to other structures, the welds and preparation for the welds shall be to a recognized code, which may be the same as that to which the tank has been designed.

Section 2. Flange connections for containers of tank type codes 70 to 77 and 85 to 88

2.1 General

This section specifies a range of flange connections for tank containers complying with ISO 1496-3, of type codes 70 to 77 and 85 to 88, i.e. tank containers for liquids, gases and dry bulk with a maximum allowable working pressure not greater than 1 000 kPa (test pressure 1 500 kPa).

The flange connections specified are the final connections used to interface with the external loading/discharge apparatus.

2.2 Dimensions

The dimensions shall be as shown on Figure 1 and as specified in Table 1.

2.3 Flange thickness

The minimum thickness of flanges may be based on the following examples:

Material	Ultimate tensile strength	Thickness
Carbon steel	430 N/mm^2	20 mm
Stainless steel	537 N/mm^2	16 mm

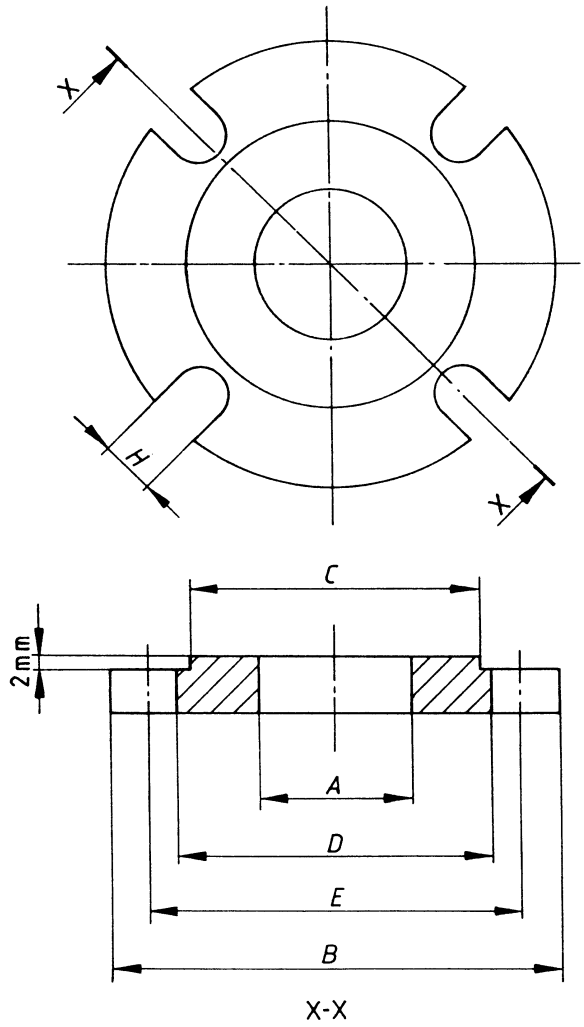

Figure 1 — Flange (see Table 1)

Table 1 — Dimensions (see Figure 1)

Dimensions in millimetres (inches)

Nominal bore *A*	Outside diameter *B*	Raised face *C*	Core diameter *D*	Pitch circle *E*	Slot size *H*
40 (1½)	150	82	82,4	101,4	19
50 (2)	165	101	101	120	19
80 (3)	200	130	131	150	19

Section 3. Man-hole openings and man-hole lids for tank containers of type codes 70 to 76 and 85 to 88

3.1 General

This section specifies certain dimensions and characteristics of man-hole openings and man-hole lids, primarily to ensure that tank containers are equipped with openings of sufficient size to allow complete internal inspection and cleaning, and to provide ease of filling and easy passage of persons in an emergency. In addition, the dimensions and characteristics specified also simplify emergency maintenance and parts replacement by providing compatibility between manufacturing sources.

The dimensions and characteristics specified are applicable to tank containers complying with the requirements of ISO 1496-3, intended to contain liquids or pressurized dry bulk, with a specified test pressure not exceeding 600 kPa[4)], i.e. tank containers of type codes 70 to 76 and 85 to 88.

Except where otherwise stated, the requirements of this International Standard are minima. Tank containers to be used for the carriage of dangerous goods may be subject to additional international and national requirements as applied by competent authorities.

3.2 Dimensions and characteristics

3.2.1 General

The dimensions specified in this section relate particularly to the man-hole access opening into the tank. However, the use of the dimensions specified for hinge pins and sealing ring cross-sections should be considered when designing other tank openings closed by lids, for example cleaning apertures above the cargo level.

Care should be taken to ensure stability of the man-hole lid in the open position.

3.2.2 Pressure requirements

Man-hole openings and man-hole lids shall be constructed to a recognized pressure vessel code.

3.2.3 Opening diameter

The internal diameter of the man-hole opening shall be 500 mm ± 1 mm (*A* on Figure 2). Maximum out-of-roundness shall not exceed 5 mm.

3.2.4 Man-hole lid sealing ring

3.2.4.1 The man-hole lid sealing ring shall be positively retained in the man-hole lid, not in the neckring (see Figure 2).

3.2.4.2 The nominal internal diameter of the man-hole lid sealing ring shall be 490 mm (*B* on Figure 2).

3.2.4.3 The nominal cross-section of the man-hole lid sealing ring shall be 16 mm wide by 10 mm deep or 16 mm square.

3.2.4.4 The man-hole lid hinge shall be slotted to allow the use of 16 mm wide by 10 mm deep or 16 mm square sealing rings.

3.2.5 Swing bolts

3.2.5.1 There shall be six swing bolts, equally spaced around the man-hole circumference (see Figure 2).

3.2.5.2 Swing bolt hinge pins shall be located on a 285 mm radius circle at their centre (*C* on Figure 2).

3.2.5.3 Swing bolt hinge pins shall be 19 mm in diameter (*D* on Figure 2).

3.2.5.4 Swing bolt threads (see Figure 2, dimension *E*) are not specified in this International Standard. However, to ensure compatibility, it is recommended that the swing bolt thread should be ISO general purpose metric screw thread M20 (see ISO 261[1]).

3.2.6 Slots for swing bolts

Slots for swing bolts shall have a nominal width of 22 mm (*F* on Figure 2), with provision to prevent the swing bolt from slipping out of the slot as it is tightened.

3.3 Marking

Man-hole lids shall be permanently marked with their design maximum allowable working pressure and test pressure.

4) 100 kPa = 1 bar

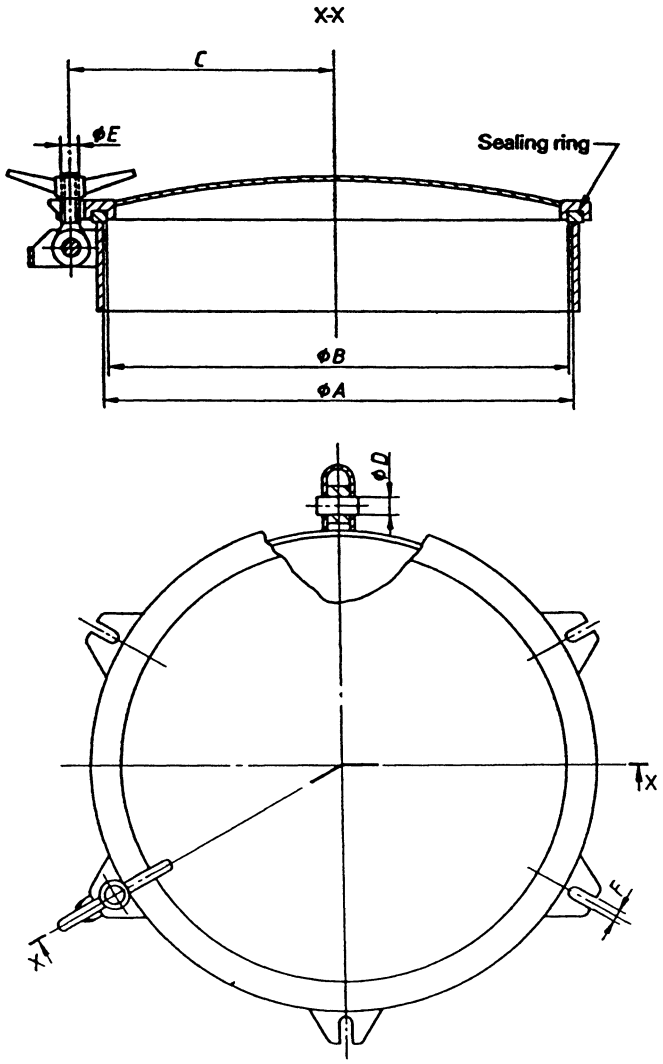

Figure 2 — Man-hole and man-hole lid dimensions

Section 4. Inlet and outlet connection screw threads for tank containers of type codes 70 to 76 and 85 to 88

4.1 General

This section specifies a range of screw threads for threaded interface connections for tank containers complying with ISO 1496-3, of type codes 70 to 76 and 85 to 88, i.e. tank containers for liquids and pressurized dry bulk with a specified test pressure not exceeding 600 kPa.

The threaded interface connections for which the screw threads are applicable are the final connections used to interface with external loading/discharge equipment, external heating and cooling sources, and air and inert gas pressure supplies.

The screw threads specified conform to ISO 228-1[2] and, for the external threads, to tolerance class A.

4.2 Symbols

The following symbols are used in **4.4**, Figure 3 and Table 2.

A Tighter class of tolerance of external pipe threads where pressure-tight joints are not made on the threads

d Basic major diameter of the external thread

d_1 $= d - 1{,}280\,654\,P$; basic minor diameter of the external thread

d_2 $= d - 0{,}640\,327\,P$; basic pitch diameter of the external thread

D $= d$; basic major diameter of the internal thread

D_1 $= D - 1{,}280\,654\,P = d_1$; basic minor diameter of the internal thread

D_2 $= D - 0{,}640\,327\,P = d_2$; basic pitch diameter of the internal thread

G Pipe thread where pressure-tight joints are not made on the threads

h Height of the thread profile with rounded crests and roots

H Height of the triangle of the thread profile

P Pitch

r Radius of rounded crests and roots

T Truncated form of thread

T_d Tolerance on the major diameter of the external thread

T_{d2} Tolerance on the pitch diameter of the external thread

T_{D1} Tolerance on the minor diameter of the internal thread

T_{D2} Tolerance on the pitch diameter of the internal thread

4.3 Dimensions

The dimensions of the screw threads shall be as given in Table 2 and as illustrated in Figure 3.

The crests of external threads shall be truncated to the limits of tolerance on the major diameter as given in Table 2.

4.4 Designation

For the purposes of this International Standard a simplified designation is used rather than the full designation in accordance with ISO 228-1.

EXAMPLE

For the purposes of this International Standard, the designation

G 1/2 T

indicates a 1/2 thread in accordance with ISO 228-1, with the external thread truncated.

The full designation in accordance with ISO 228-1 is

Internal thread: **Pipe thread ISO 228-1 – G 1/2**

External thread: **Pipe thread ISO 228-1 – G 1/2 A**

NOTE ISO 228-1 contains no symbol to indicate a truncated thread.

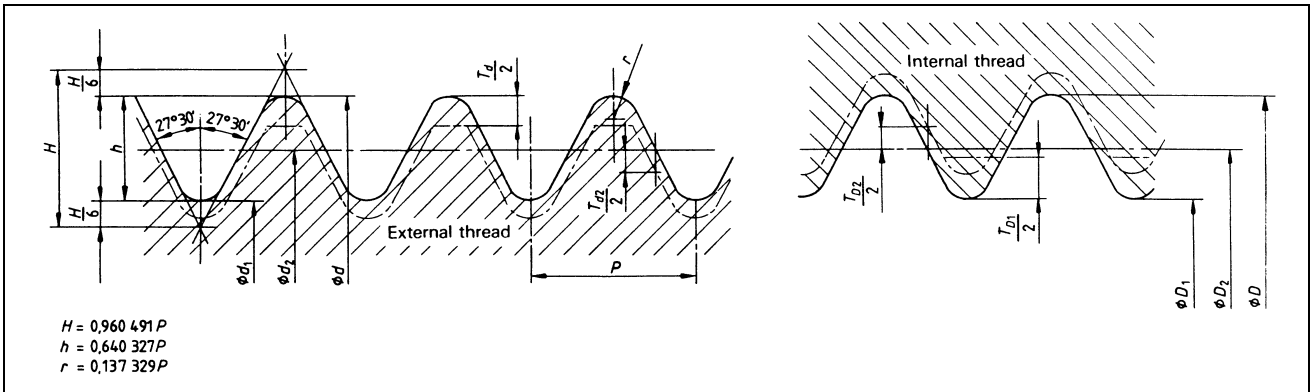

Figure 3 — Thread profile and tolerance zones

Table 2 — Thread dimensions

Designation of thread	Number of threads in 25,4 mm (1 in)	Pitch P	Basic diameters			Permissible tolerances on pitch diameter				Tolerance on the minor diameter		Tolerance on the major diameter	
			Major $d = D$	Pitch $d_2 = D_2$	Minor $d_1 = D_1$	Internal thread T_{D2}		External thread T_{d2}		Internal thread T_{D1}		External thread T_d	
						Lower deviation	Upper deviation	Lower deviation	Upper deviation	Lower deviation	Upper deviation	Lower deviation	Upper deviation
		mm (in)	mm (in)	mm (in)	mm (in)		mm (in)	mm (in)			mm (in)	mm (in)	
G 1/4 T	19	1,337 (0,052 6)	13,157 (0,578)	12,301 (0,484 3)	11,445 (0,450 6)	0	+ 0,125 (0,004 9)	– 0,125 (0,004 9)	0	0	+ 0,445 (0,017 5)	– 0,25 (0,01)	0
G 3/8 T			16,662 (0,656)	15,806 (0,622 3)	14,95 (0,588 6)								
G 1/2 T	14	1,814 (0,071 4)	20,955 (0,825)	19,793 (0,779 3)	18,631 (0,733 6)	0	+ 0,142 (0,005 6)	– 0,142 (0,005 6)	0	0	+ 0,541 (0,021 3)	– 0,284 (0,011)	0
G 3/4 T			26,441 (1,041)	25,279 (0,995 3)	24,117 (0,949 6)								
G 1 T	11	2,309 (0,909)	33,249 (1,309)	31,77 (1,250 8)	30,291 (1,192 6)	0	+ 0,18 (0,007 1)	– 0,18 (0,007 1)	0	0	+ 0,64 (0,025 2)	– 0,36 (0,014)	0
G 1 1/2 T			47,803 (1,882)	46,324 (1,823 8)	44,845 (1,765 6)								
G 2 T			59,614 (2,347)	58,135 (2,288 8)	56,656 (2,230 6)								
G 2 1/2 T			75,184 (2,96)	73,705 (2,901 8)	72,226 (2,843 6)	0	+ 0,217 (0,008 5)	– 0,217 (0,008 5)	0	0	+ 0,64 (0,025 2)	– 0,434 (0,017)	0
G 3 T			87,884 (3,46)	86,405 (3,401 8)	84,926 (3,343 6)								
G 4 T			113,03 (4,45)	111,551 (4,391 8)	110,072 (4,333 6)								
G 5 T			138,43 (5,45)	136,951 (5,301 8)	135,472 (5,333 6)								
G 6 T			163,83 (6,45)	162,351 (6,391 8)	160,872 (6,333 6)								

NOTE Dimensions are given in imperial measurements for information only.

Annex A (informative)
Bibliography

[1] ISO 261:1973, *ISO general purpose metric screw threads — General plan.*

[2] ISO 228-1:1982, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Designation, dimensions and tolerances.*

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: 020 8996 9000. Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111. Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: 020 8996 7002. Fax: 020 8996 7001.

BSI
389 Chiswick High Road
London
W4 4AL