

Implementation of
ISO 1496-3:1995

Series 1 freight containers — Specification and testing —

**Part 3: Tank containers for liquids,
gases and pressurized dry bulk**

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

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Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	iii
Text of ISO 1496-3	1

National foreword

This British Standard reproduces verbatim ISO 1496-3:1995 and implements it as the UK national standard, incorporating amendment 1 February 2006. It supersedes BS 3951-2.3:1992 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **[A1]** **<A1]**. Tags indicating changes to ISO text carry the number of the ISO amendment. For example, text altered by ISO amendment 1:2006 is indicated by **[A1]** **<A1]**.

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.

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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 25 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
1496-3

Fourth edition
1995-03-01

Series 1 freight containers — Specification and testing —

Part 3:

Tank containers for liquids, gases and
pressurized dry bulk

Conteneurs de la série 1 — Spécifications et essais —

*Partie 3: Conteneurs-citernes pour les liquides, les gaz et les produits
solides en vrac pressurisés*



Reference number
ISO 1496-3:1995(E)

Contents

	Page
Foreword	iii
Introduction	1
1 Scope	1
2 Normative references	1
3 Definitions	1
4 Dimensions and ratings	3
4.1 External dimensions	3
4.2 Ratings	3
5 Design requirements	3
5.1 General	3
5.2 Corner fittings	4
5.3 Base structure	4
5.4 End structure	4
5.5 Side structure	5
5.6 Tank	5
5.7 Optional features	6
6 Testing	6
6.1 General	6
6.2 Test No. 1 — Stacking	7
6.3 Test No. 2 — Lifting from the four top corner fittings	7
6.4 Test No. 3 — Lifting from the four bottom corner fittings	8
6.5 Test No. 4 — External restraint (longitudinal)	8
6.6 Test No. 5 — Internal restraint (longitudinal) (dynamic)	9
6.7 Test No. 6 — Internal restraint (lateral)	9
6.8 Test No. 7 — Rigidity (transverse)	9
6.9 Test No. 8 — Rigidity (longitudinal)	10
6.10 Test No. 9 — Load-transfer area test	10
6.11 Test No. 10 — Walkways (where provided)	10
6.12 Test No. 11 — Ladders (where provided)	10
6.13 Test No. 12 — Pressure test	11
7 Identification and marking	11
Annex A (normative) Diagrammatic representation of capabilities appropriate to all types and sizes of tank containers, except where otherwise stated	12
Annex B (normative) Details of requirements for load-transfer areas in base structures of containers	16
Annex C (normative) Dimensions of gooseneck tunnels (where provided)	20
Annex D (normative) Dynamic longitudinal impact test	21
Bibliography	25
Figure B.1 — Zones for longitudinal members	17
Figure B.2 — Minimum number of pairs of load-transfer areas — 1CC, 1C and 1CX containers (if fitted), and 1BBB, 1BB, 1B and 1BX containers	17
Figure B.3 — Minimum number of pairs of load-transfer areas — 1AA, 1A and 1AX containers without gooseneck tunnel	18
Figure B.4 — Minimum number of pairs of load-transfer areas — 1AAA, 1AA, 1A and 1AX containers with gooseneck tunnel (with minimum localized structure)	18
Figure B.5 — Minimum requirements for load-transfer areas near the gooseneck tunnel	19
Figure C.1	20
Figure D.1 — Minimum SRS Curve (5 % Damping)	24
Table 1 — Container types ²	7
Table 2 — Forces to be applied in stacking test	7
Table D.1 — Tabular representation of some data points for the minimum SRS curve in Figure D.1	24

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.

International Standard ISO 1496-3 was prepared by Technical Committee ISO/TC 104, *Freight containers*, Subcommittee SC 2, *Specific purpose containers*.

This fourth edition cancels and replaces the third edition (ISO 1496-3:1991), of which it constitutes a technical revision by the addition of types 1AAA and 1BBB as well as a load-transfer area test (see 6.10 and Figure A.19) and by the suppression of grapple-arm lifting areas and attendant tests and requirements.

ISO 1496 consists of the following parts, under the general title *Series 1 freight containers — Specification and testing*:

- *Part 1: General cargo containers for general purposes*;
- *Part 2: Thermal containers*;
- *Part 3: Tank containers for liquids, gases and pressurized dry bulk*;
- *Part 4: Non-pressurized containers for dry bulk*;
- *Part 5: Platform and platform-based containers*.

Annex A, Annex B and Annex C form an integral part of this part of ISO 1496. Annex D is for information only.

Foreword to amendment 1

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

Amendment 1 to ISO 1496-3:1995 was prepared by Technical Committee ISO/TC 104, *Freight containers*, Subcommittee SC 2, *Specific purpose containers*.

Introduction

The following grouping of container types is used for specification purposes in ISO 1496:

Part 1	
General purpose	00 to 09
Specific purpose	
closed, vented/ventilated	10 to 19
open top	50 to 59
Part 2	
Thermal	30 to 49
Part 3	
Tank	70 to 79
Dry bulk, pressurized	85 to 89
Part 4	
Bulk, non-pressurized (box type)	20 to 24
Bulk, non-pressurized (hopper type)	80 to 84
Part 5	
Platform (container)	60
Platform-based with incomplete superstructure and fixed ends	61 and 62
Platform-based with incomplete superstructure and folding ends	63 and 64
Platform-based with complete superstructure	65 to 69

NOTE 1 Container types 90 to 99 are reserved for air/surface containers (see ISO 8323).

1 Scope

1.1 This part of ISO 1496 specifies the basic specifications and testing requirements for ISO series 1 tank containers suitable for the carriage of gases, liquids and solid substances (dry bulk) which may be loaded or unloaded as liquids by gravity or pressure discharge, for international exchange and for conveyance by road, rail and sea, including interchange between these forms of transport.

1.2 Except where otherwise stated, the requirements of this part of ISO 1496 are minimum requirements. 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.

1.3 The container types covered by this part of ISO 1496 are given in Table 1.

1.4 The marking requirements for these containers shall be in accordance with the principles embodied in ISO 6346.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 1496. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 1496 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 668:1988, *Series 1 freight containers — Classification, dimensions and ratings*.

ISO 830:1981, *Freight containers — Terminology*.

ISO 1161:1984, *Series 1 freight containers — Corner fittings — Specification*.

ISO 6346:1984, *Freight containers — Coding, identification and marking*.

Ⓐ¹ ISO 6487, *Road vehicles — Measurement techniques in impact tests — Instrumentation*. Ⓐ¹

3 Definitions

For the purposes of this part of ISO 1496, the definitions given in ISO 830, together with the following, apply. However, for practical reasons, certain definitions taken and adapted from ISO 830 are given below.

3.1

tank container

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

3.2

framework

tank mountings, end structure and all load-bearing elements not present for the purposes of containing cargo, which transmit static and dynamic forces arising out of the lifting, handling, securement and transporting of the tank container as a whole

3.3

tank(s)

vessel(s) and associated piping and fittings which are designed to contain the cargo carried

3.4

compartment

a section of the tank formed by the shell, ends or complete bulkheads

NOTE 2 Baffles, surge plates or other perforated plates do not form tank compartments within the meaning of this definition.

Table 1 — Container types

Type of cargo and ISO type code designation ^a					Minimum test pressure ^b bar gauge ^c	Code basis			
Liquids		Gases	Dry bulk			UN MM	IMO/IMDG tank type		
Non-dangerous	Dangerous		Horizontal discharge	Tipping discharge			2	1	5
70 ^d					0,45				
71	73		85	87	1,5	+	+		
72	74		86	88	2,65	+	+	+	
	75				4	+		+	
	76				6	+		+	
		77			10 (10,5)	+		+	(+)
		78			22				
		79			Open				

NOTE For all containers, other than 1D and 1DX, it is essential that the design requirements of 5.1.5 are also taken into consideration.

^a The ISO type code designation does not imply the approval of any competent authority for the transport of specific goods or products the tank container may carry. The type code depends only on the test pressure (see 6.13).

^b The test pressure given is the minimum value of the respective class. Any tank container with a test pressure in the range between a given minimum pressure and the next higher minimum pressure belongs to the lower class.

^c 1 bar = 100 kPa. Test pressure is expressed in bars since relevant intergovernmental codes, often implemented by national legislation, retain this unit of pressure.

^d The number 70 may, in addition, be used to designate tank containers for which the type code relevant to the test pressure is not used.

3.5

gas

fluid substance having a vapour pressure greater than an absolute pressure of 300 kPa¹⁾ at 50 °C or as otherwise defined by the competent authority

3.6

liquid

fluid substance having a vapour pressure not greater than an absolute pressure of 300 kPa¹⁾ at 50 °C

3.7

dry bulk

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

3.8

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 as defined in 3.9

3.9

competent authority

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

3.10

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

3.11

test pressure

the gauge pressure at which the tank is tested (see 6.13.2)

3.12

total capacity

that volume of water which will completely fill the tank at 20 °C

3.13

ullage

that portion of the total capacity of the tank not occupied by its cargo, expressed as a percentage of the total capacity

3.14

test platform

device, either stationary or moving, used to support the tank container under test and directly receiving the impact

3.15

damping ratio

ratio of actual damping coefficient to critical damping coefficient $\langle A_1 \rangle$

¹⁾ 300 kPa = 3 bar

A₁ 3.16**single degree of freedom system
SDOF system**

system for which only one coordinate is required to completely describe that system at any instant of time

3.17**shock response spectrum
SRS**

plot of the maximum response experienced by a **single degree of freedom system**, as a function of its own natural frequency, in response to an applied shock

3.18**minimum shock response spectrum
minimum SRS**

reference curve representing the minimum shock response spectrum for a test to be valid (see Figure D.1)

3.19**octave**

doubling of frequency **A₁**

4 Dimensions and ratings**4.1 External dimensions**

The overall external dimensions and tolerances of tank containers covered by this part of ISO 1496 shall be those established in ISO 668, except that tank containers may be of reduced height, in which case they shall be designated 1AX, 1BX, 1CX and 1DX. No part of the tank container, its associated fittings and/or equipment shall project beyond these specified overall external dimensions.

4.2 Ratings

The values of the rating, R , the maximum gross mass of the container, shall be those specified in ISO 668. However, taking account of the high density of many fluid cargoes, the values of the rating R chosen for the design and testing of 1BBB, 1BB, 1B, 1CC and 1C tank containers may be higher than those specified in ISO 668. For all containers in operation, such values shall in no case exceed the rating allowed for 1AAA, 1AA and 1A containers in ISO 668.

5 Design requirements**5.1 General**

All tank containers shall be capable of fulfilling the following requirements for the framework, the design and construction of the tank and any optional provisions.

5.1.1 The ability of the tank container to withstand the specified design loadings shall be established by calculation or test.

5.1.2 The strength requirements for tank containers are given in diagrammatic form in Annex A (these requirements are applicable to all tank containers as complete units except where otherwise stated).

5.1.3 The strength requirements for corner fittings (see also **5.2**) are specified in ISO 1161.

5.1.4 The tank container shall be capable of withstanding the test loads and loadings specified in clause 6.

5.1.5 Each tank container shall be designed to withstand the effects of inertia of the tank contents resulting from transport motions. For design purposes, these effects may be taken to be equivalent to loadings of $2Rg$ longitudinally, Rg laterally and $2Rg$ vertically²⁾. These loadings may be considered individually to be evenly distributed and to act through the geometric centre of the tank. Vertical loadings are total loadings including dynamic effects. It should be noted that the above loadings do not give rise to an increase in pressure in the vapour space. For design purposes, an equivalent pressure loading may be used.

5.1.6 Each tank container shall be capable of withstanding the requirements of **5.1.5** and the static head produced in the tank container while loaded to its rating R . Due regard shall be given to the liquid/dry bulk of highest density that is to be carried and to any compartmentation of the tank.

5.1.7 As the effects of loads encountered under any dynamic operating condition should only approach, but not exceed, the effects of the corresponding test loads, it is implicit that the capabilities of tank containers indicated in Annex A and demonstrated by the tests described in clause 6 shall not be exceeded in any mode of operation.

5.1.8 Any closure in a tank container, which if unsecured could lead to a dangerous situation, shall be provided with an adequate securing system having, so far as may be practicable, external indication of the positive securement of that closure in the appropriate operating position.

5.1.9 Fork-lift pockets shall not be provided in tank containers.

NOTE 3 Fork-lift transport of tank containers is considered dangerous because of stability problems with loaded or partly-loaded tanks and the danger of impact damage from the forks of fork-lift trucks.

²⁾ See 6.1.1, note 6.