

Freight containers —

Part 1: General —

Section 1.5 Guide to the handling and securing of series 1 freight containers

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Committees responsible for this British Standard

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- Aluminium Federation
- Associated Offices Technical Committee
- Association of Wagon Builders and Repairers
- British Airways
- British Industrial Truck Association
- British Ports Federation and the National Association of Ports Employers
- British Railways Board
- Department of Transport (Transport Industries)
- Freight Transport Association
- General Council of British Shipping
- Health and Safety Executive
- Institute of Freight Forwarders Ltd.
- Institute of Materials Management
- Lloyds Register of Shipping
- Ministry of Defence
- PIRA
- Road Haulage Association Ltd.
- Shipowners Refrigerated Cargo Research Association
- Society of Motor Manufacturers and Traders Ltd.

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Foreword

This Section of BS 3951, which is one of a series relating to freight containers, has been prepared under the direction of the Packaging and Freight Containers Standard Policy Committee and supersedes BS 3951-1.5:1977.

The Section is based on ISO 3874:1988 "Series 1 freight containers-Handling and securing" including amendment 2:1993 published by the international Organisation for Standardization(ISO).

While the recommendations of the standard are for the handling and securing of freight containers complying with the requirements of BS 3951, many of the recommendations may also be applied to other containers and to other loads in transit.

A list of other publications providing further relevant information is given in Annex A.

WARNING. This standard gives in 4.2.4 and Figure 1 an example of eccentricity of gravity corresponding to an eccentricity of 5 %. An eccentricity of 5 % is the maximum that should be permitted in normal operating conditions.

Other British Standards giving information related to the handling of freight containers are BS 5073:1982 "Guide to the stowage of goods on freight containers" and BS 5237:1985 "Specification for lifting twistlocks".

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 to iv, pages 1 to 30, an inside back cover 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.

1 Scope and field of application

1.1 This British Standard specifies methods of handling and securing series 1 freight containers built and tested to comply with the latest editions of BS 3951-2.1 to BS 3951-2.5.

Freight containers built to earlier editions of BS 3951-2 may not possess the same capabilities.

1.2 This British Standard defines basic principles and procedures to ensure safe operation of containers in all surface modes of transport.

1.3 Methods of handling and securing are described for both loaded and empty containers.

The conditions for lifting different types of loaded and empty containers are laid down in clause 6.

2 References

2.1 Normative references

This Section of BS 3951-2 incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on the inside back cover. For dated references, only the edition cited applies; any subsequent amendments to or revisions of the cited publication apply to this Section of BS 3951 only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

2.2 Informative references

This Section of BS 3951-2 refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Definitions

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

3.1

empty container

a container in tare condition

3.2

loaded container

a container in other than tare condition

3.3

eccentricity of the centre of gravity

longitudinal and/or lateral horizontal differences between the centre of gravity of any container (empty or loaded, with or without fittings and appliances) and the geometric centre of the diagonals of the centres of the four bottom corner fittings

3.4

mobile centre of gravity

the centre of gravity of a container loaded with liquid, bulk, hanging or similar cargo which is liable to move under dynamic conditions

4 Basic requirements

4.1 General

4.1.1 The requirements of all relevant national and international regulations shall be complied with.

4.1.2 The container and any equipment which may be used in its operation shall be adequately maintained.

4.1.3 Doors, lids, closures, removable or foldable parts and any loose equipment shall be properly secured.

4.1.4 All personnel engaged in handling and securing operations shall have received proper instructions, especially with regard to safety matters.

4.1.5 It shall be known whether the container is empty or loaded; unless otherwise ascertained, a container should be treated as loaded.

4.1.6 Strong winds and other environmental conditions can have an effect on handling equipment and additional care shall be taken when operating in such condition.

4.2 Loading, packing and emptying

4.2.1 When a cargo is loaded or packed and secured, where necessary, this shall be carried out in accordance with good and recommended practices so that the cargo does not impose on the container forces in excess of those for which it has been designed and so that the fundamental requirements specified in **4.2.2** to **4.2.4** have been complied with.

4.2.2 The equipment used for loading and emptying the container shall only impose loads which are not in excess of those for which the container was designed.

4.2.3 The total mass of all items loaded or packed into the container, including dunnage, securing equipment, and similar equipment shall not exceed the maximum permitted payload, i.e. the maximum permissible operating gross mass minus the tare.

4.2.4 The cargo shall be distributed throughout the container to ensure that the centre of gravity is kept as central and as low as possible

- to avoid excessive tilting;
- to avoid overstressing either the container or the handling equipment;
- to avoid unacceptable vehicle axle loading;
- to avoid lack of vehicle stability;
- to avoid unacceptable load concentrations.

Eccentricity of the centre of gravity for the loaded container varies with the distribution of load within the container; designers of containers and handling equipment should take this fact into account. As an example, when 60 % of the load by weight is distributed in 50 % of the container length measured from one end (see Figure 1), the eccentricity corresponds to 5 %.

4.3 Securing for handling and transportation

The cargo shall be stowed and secured to prevent damage which might otherwise result from dynamic conditions encountered during handling and transportation.

5 Handling

5.1 Handling by specified lifting methods (see clause 6)

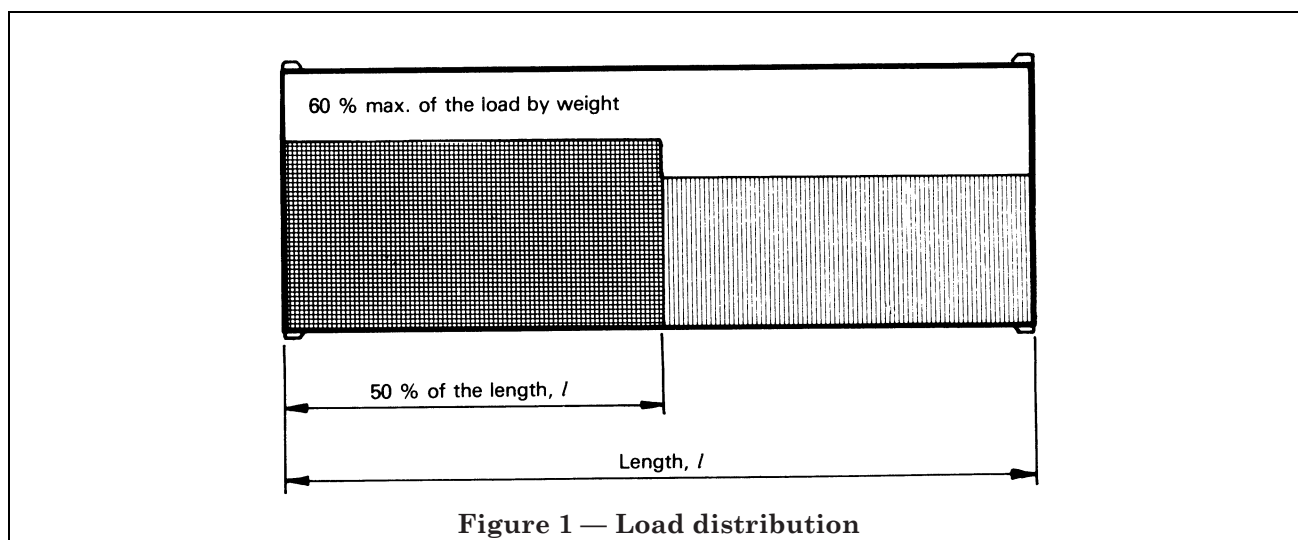
5.1.1 Care shall be taken to ensure that the equipment used is suitable for the load and is safely attached to the container and that the container is free to be handled.

5.1.2 In the case of a single-point lift, special attention should be paid to the risk of the container tilting owing to eccentricity of centre of gravity.

5.1.3 Care shall be taken when lifting a container the centre of gravity of which is mobile or eccentric, e.g. a tank container, a bulk container, a container with a liquid bulk bag, a container with hanging cargo or a thermal container with a refrigerating unit (integral or clip-on).

5.2 Handling by other methods

Containers may be handled by methods other than those specified in clause 6 but only after careful evaluation of the equipment by means of which the container is to be handled and of the methods of operation envisaged, with respect to International container Standards.



6 Specified lifting methods

6.1 General

6.1.1 The lifting methods specified in 6.2 to 6.11 are summarized in Table 1.

Table 1 — Summary of specified lifting methods

Sub-clause	Description	Illustration
6.2	Top lift spreader	
6.3	Top lift sling	
6.4	Bottom lift sling	
6.5	Side lift: method 1	
6.6	Side lift: method 2	
6.7	Side lift: method 3	

Table 1 — Summary of specified lifting methods

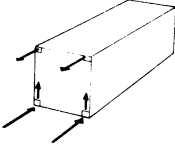
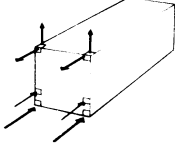
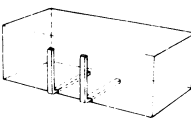
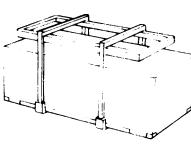
Sub-clause	Description	Illustration
6.8	End lift: method 1	
6.9	End lift: method 2	
6.10	Fork-lift	
6.11	Grappler lift	

Table 2 — Size designations referred to in Table 3 to Table 13

Nominal length		Nominal height			
m	ft	2 438 mm (8 ft 0 in)	2 591 mm (8 ft 6 in)	2 896 mm (9 ft 6 in)	< 2 438 mm (8 ft 0 in)
12	40	1A	1AA	1AAA	1AX
9	30	1B	1BB	1BBB	1BX
6	20	1C	1CC	—	1CX
3	10	1D	—	—	1DX

NOTE All units have a nominal width of 2 438 mm (8 ft 0 in).

6.1.2 The headings “Allowed” and “Not allowed” used in Table 3 to Table 5 and Table 7 to Table 13 refer to the specified handling methods applied to differing types and sizes of containers and take into account the stresses on containers of differing types of design, their loads, where applicable, and the safety of the operation.

NOTE There could be exceptions in cases when combinations of container types, size, load, design and operating condition could not be taken into account in Table 3 to Table 5 and Table 7 to Table 13.

Such situations should be carefully evaluated by those competent to do so in order to decide whether a safe and satisfactory operation can be ensured.

An explanation of the size designations referred to in Table 3 to Table 13 is given in Table 2.

In Table 3 to Table 13, all requirements which are applicable to containers designated “AA” and “BB” are also applicable to containers designated “AAA” and “BBB” respectively.

6.2 Top lift spreader (see Figure 2)

6.2.1 The container is lifted by means of a spreader designed to lift containers by the top apertures of the four top corner fittings, the lifting forces being applied vertically.

6.2.2 Lifting devices shall be properly engaged. Gather devices shall impinge on corner fittings only.

6.2.3 The applicability of top lift spreaders is given in Table 3.

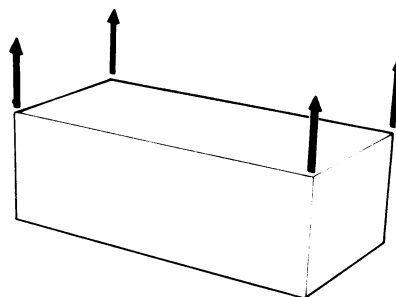


Figure 2 — Lifting by means of top lift spreader

Table 3 — Applicability of top lift spreaders

Key: ☐ Allowed ☒ Not allowed (or not applicable)

Empty container											Container type	BS 3951-1.6 code	Loaded container											
AA	A	AX	BB	B	BX	CC	C	CX	D	DX			AA	A	AX	BB	B	BX	CC	C	CX	D	DX	
											General purpose	00–19												
											Open top	50–59												
											Bulk: non-pressurized/box	20–24												
											Thermal	30–49												
											Tank for liquids and gases	70–79												
											Bulk: non-pressurized/hopper pressurized	80–89												
											Platform	60												
											Platform-based with incomplete superstructure with	complete and fixed ends	61											
												fixed free standing posts	62											
												complete and folding ends, erected condition	63 E											
												folding free standing posts, erected condition	64 E											
												complete and folding ends, folded condition	63 F											
												folding free standing posts, folded condition	64 F											
											Platform-based with complete superstructure and open-sided	65, 66 and 67												

^a Top lift possible with extensions only.

^a Top lift possible with extensions only.

6.3 Top lift sling (see Figure 3)

6.3.1 The container is lifted by all four top corner fittings with forces applied other than vertically.

6.3.2 Lifting devices shall be properly engaged. Hooks shall always be placed in an inward to outward direction.

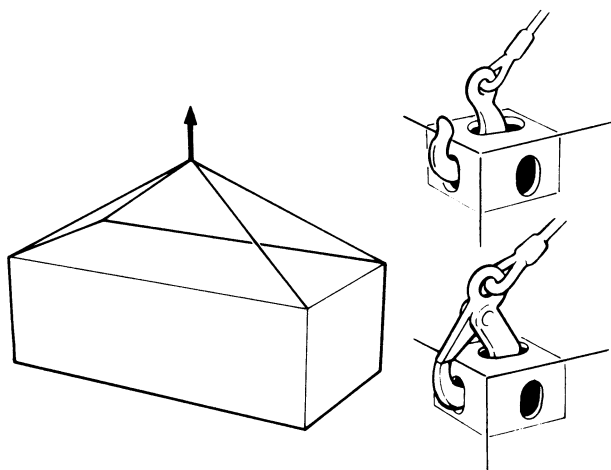


Figure 3 — Lifting by means of top lift sling

6.3.3 The applicability of top lift slings is given in Table 4.

Table 4 — Applicability of top lift slings

Key: ☐ Allowed ☒ Not allowed (or not applicable)

Empty container											Container type	BS 3951-1.6 Code	Loaded container											
AA	A	AX	BB	B	BX	CC	C	CX	D	DX			AA	A	AX	BB	B	BX	CC	C	CX	D	DX	
											General purpose	00–19										b		
											Open top	50–59										b	b	
											Bulk: non-pressurized/box	20–24										b	b	
a	a		a	a		a	a		a		Thermal	30–49										b		
											Tank for liquids and gases	70–79										b	b	
											Bulk: non-pressurized/hopper pressurized	80–89										b	b	
											Platform	60												
											Platform-based with incomplete superstructure with	complete and fixed ends	61											
												fixed free standing posts	62											
												complete and folding ends, erected condition	63 E											
												folding free standing posts, erected condition	64 E											
												complete and folding ends, folded condition	63 F											
												folding free standing posts, folded condition	64 F											
											Platform-based with complete superstructure and open-sided	65, 66 and 67												

^a Centre of gravity may be eccentric.

^b For 1D and 1DX containers, the lifting forces shall be applied at an angle not less than 60° to the horizontal, see Figure 4.

PROVISO — Centre of gravity may be mobile, e.g. liquid, bulk or hanging loads.