



Flexible intermediate bulk containers — Non-dangerous goods



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- Australian Institute of Packaging
- Australian Maritime Safety Authority
- Department of Environment and Science, Qld
- International Cargo Handling Co-ordination Association Australia

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Preface

This Standard was prepared by Standards Australia Committee PK-011, Flexible Intermediate Bulk Containers, to supersede AS 3668—1989.

This Standard incorporates Amendment No. 1 (April 2020). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The objective of this Standard is to provide specifications and type tests to ensure flexible intermediate bulk containers are suitable for non-dangerous solid materials in powder and granular form.

Committee PK-011 reviewed ISO 21898, *Packaging — Flexible intermediate bulk containers (FIBCs) for non-dangerous goods*, but decided not to adopt it as an Australian Standard because it does not meet Australian requirements.

The terms “normative” and “informative” are used in Standards to define the application of the appendices to which they apply. A “normative” appendix is an integral part of a Standard, whereas an “informative” appendix is only for information and guidance.

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NOTES

Australian Standard®

Flexible intermediate bulk containers — Non-dangerous goods

1 Scope

This Standard specifies material, construction and design requirements, together with type tests and type test performance requirements for single-trip and multi-trip intermediate bulk containers manufactured from flexible materials to contain non-dangerous solid materials in powder or granular form, and designed to be lifted from above.

This Standard takes no account of the particular requirements relating to materials, construction and performance that would need to be applied to intermediate bulk containers used for the conveyance and storage of substances deemed dangerous in legislation relating to dangerous goods.

NOTE Guidance to users on selection and use of containers is given in [Appendix A](#).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

NOTE Documents for informative purposes are listed in the Bibliography.

AS 2582.3, *Complete, filled transport packages — Methods of test, Method 3: Stacking tests using a static load*

AS 2582.4, *Complete, filled transport packages — Methods of test, Method 4: Vertical impact test by dropping*

ISO 13934-1, *Textiles — Tensile properties of fabrics — Part 1: Determination of maximum force and elongation at maximum force using the strip method*

ASTM G154-98, *Practice for operating fluorescent ultraviolet (UV) lamp apparatus for exposure of non-metallic materials*

3 Terms and definitions

For the purpose of this Standard the definitions below apply.

3.1

competent person

person who has acquired, through education, training, qualification or experience or a combination of these, the knowledge and skill enabling that person to perform the task required

3.2

flexible intermediate bulk container

bulk bags

FIBC

container manufactured from flexible materials having a capacity of not more than 3 m³ and designed to be lifted from above multiple times

Note 1 to entry: For further information on FIBC lifting and filling, refer to AFIBCA *Code of Practice for Supply and Use of FIBCs*. Section 7(c).

3.3

FIBC, single-trip

FIBC to be used for one filling and one discharge only

Note 1 to entry: An FBIC of this category cannot be reused.

3.4

FIBC, multi-trip

FIBC designed to be used for more than one filling and discharge

Note 1 to entry: An FIBC of this category cannot be reused if damaged.

3.5

FIBC type

A1

FIBCs of like design, manufactured using like materials and methods of construction (giving at least equal performance), to the same nominal cross-sectional dimensions

Note 1 to entry: Within a type, the design circumference dimension may be increased by 10 % by comparison with samples passing the type test, provided the same geometry is maintained. Where the FIBC type has a base-fitted discharge spout, a reduction of discharge spout diameter of the same design is permitted.

Note 2 to entry: The presence or absence of an inner liner does not constitute a change of type.

Note 3 to entry: Change of ultraviolet inhibitor, or the addition of anti-static agent, or the addition or change of pigment to a maximum of 3 % by mass, does not constitute a change of type.

3.6

working load limit

WLL

DEPRECATED: safe working load
maximum load which the FIBC may carry in service

3.7

type test

test or series of tests conducted to determine whether the FIBC type meets the requirements of this Standard

4 Materials, design and construction requirements

4.1 Materials

FIBCs may be manufactured from a considerable variety of sheet and woven materials. The properties of the selected materials may be further modified by suitable additives, e.g. to improve the exposure life and strength and to reduce the effect of static electricity.

All materials of construction shall, after complete immersion in water for not less than 24 h, retain at least 85 % of the tensile strength measured after conditioning to equilibrium at 67 % relative humidity or less. The tensile strength should be measured by the method of test appropriate to the material used.

NOTE For example, ISO 13934-1 specifies tensile strength test requirements for tensile properties, seam tensile properties, tear properties and seam slippage for textile fabrics.

All load-bearing materials of the FIBC shall after being tested in accordance with the test described in [Clause 4.5](#), retain at least 50 % of the original values for breaking force and elongation of the materials.

The use of like materials in the manufacture of FIBCs is recommended to promote recyclability.

4.2 Design

The FIBC shall be designed so that the maximum design height of fill shall not exceed the minimum base width or diameter by more than the ratio of 2:1.

NOTE Inner liners may be provided.

4.3 Construction

All stitched seams and joints shall be locked off, or back sewn or a minimum 20 mm tail provided. All sewing threads shall be of manmade fibre.

4.4 Ultraviolet protection

Protection against ultraviolet radiation shall be provided by the addition of carbon black or other suitable inhibitors. These additives shall be compatible with the materials to be carried in the FIBC.

For polyolefins, the protection provided by a loading of 0.3 % by mass of an appropriate benzophenone shall represent the minimum ultraviolet stabilization required. Other types of ultraviolet stabilizers, such as benzotriazoles and hindered amines, may be employed, singly or in combinations, provided they exhibit similar protection to the benzophenone type stabilizers at the loading specified above.

For other materials sufficient ultraviolet stabilizers shall be added to the material to ensure ultraviolet resistance at least equal to that required for polyolefins.

4.5 UV resistance test

The apparatus for testing resistance to UV degradation shall be in accordance with ASTM G154-98, using a UV-B lamp.

The test specimen shall be exposed to a fluorescent UV-B lamp and condensation for at least 200 h as follows:

- (a) *UV radiation only* — Test cycle of 8 h at 60 °C.
- (b) *Condensation only* — Test cycle of 4 h at 50 °C.

The test procedure shall alternate between the UV radiation and condensation for at least 200 h.

After exposure is complete, the specimen shall be tested for braking force and elongation at break, in accordance with ISO 13934-1. Compare the values with the results performed on simultaneous cut test specimens that have been stored under dark and cool conditions.

5 Performance requirements

NOTE 1 A check should be made of the relevant Commonwealth, state and territory legislation to determine if any such legislation lays down a more stringent requirement for any component part of the FIBC.

NOTE 2 The purchaser or a Regulatory Authority may require that the supplier provide a statement that the FIBC conforms to this Standard.

5.1 General

The FIBC type shall be subjected to four type tests as follows:

- (a) Top lift test (see [Clause 5.3](#) and [Appendix C](#)).
- (b) Cyclic top lift test (see [Clause 5.4](#) and [Appendix D](#)).
- (c) Stacking test (see [Clause 5.5](#) and [Appendix E](#)).
- (d) Drop impact test (see [Clause 5.6](#) and [Appendix F](#)).

For FIBC type with fixed vertical dimension, one specimen of the FIBC type shall be submitted for each test.

For FIBC Type with variable vertical dimension, one specimen with the shortest vertical dimension and one specimen with the longest vertical dimension of the FIBC type shall be submitted for each test.

Failure of any one of the above tests shall be deemed to constitute non-conformance with this Standard.

5.2 Selection of FIBCs for test

Where the FIBC type covers a range of capacities, the FIBC size selected for the type tests shall be that whose mass, when the FIBC is filled to the nominated filling level with the specified test contents, most closely corresponds to the stated safe working load (SWL).

5.3 Top lift

When the FIBC is tested in accordance with [Appendix C](#), there shall be —

- (a) no leakage of contents;
- (b) no breakage of any of the lifting devices to the extent that any lifting device ceases to support its load;
- (c) no deformation of rings, hooks, shackles or swivels forming part of the integral lifting gear of the FIBC; and
- (d) for a FIBC tested with a liner fitted, no protrusion of the liner beyond the outer surface of the FIBC except through the closure(s) where this is a design feature, and any such liner protrusions through the closure(s) shall not contain any of the contents of the FIBC.

5.4 Cyclic top lift

When the FIBC is tested in accordance [Appendix D](#) there shall be —

- (a) no leakage of contents;
- (b) no breakage of any of the lifting devices to the extent that any lifting device ceases to support its load;
- (c) no deformation of rings, hooks, shackles or swivels forming part of the integral lifting gear of the FIBC; and
- (d) for a FIBC tested with a liner fitted, no protrusion of the liner beyond the outer surface of the FIBC except through the closure(s) where this is a design feature, and any such liner protrusions through the closure(s) shall not contain any of the contents of the FIBC.

5.5 Stacking

When the FIBC is tested in accordance with [Appendix E](#), there shall be no leakage of contents nor protrusion of the liner, if fitted.

5.6 Drop impact

When the FIBC is tested in accordance with [Appendix F](#), there shall be no leakage of contents nor protrusion of the liner, if fitted.

6 Marking and statement of conformance

6.1 Bag label information

The FIBC shall be durably and conspicuously marked by means of a permanently attached label, or by other means, with the following data:

- (a) Name and address of the supplier.