

COA - Container Owners Association

Code of Practice for Flexitanks

A Code of Practice, developed by the Container Owners Association, for the Testing and Manufacturing of Flexitanks and for the Operation of Flexitank/Container Combinations.



CONTAINER OWNERS ASSOCIATION

www.containerownersassociation.org

COA Code of Practice for the Manufacture of Flexitanks and Operation of Flexitank/Container Combinations

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Notes and Contact

Note 1

Flexitank Management Group

The Code is administered by a Flexitank Management Group (FMG) comprising:

- a. Two shipping lines (Maersk Line and Hapag-Lloyd)
- b. Two flexitank companies (Trans Ocean Bulk Logistics and Braid Logistics)
- c. One technical expert Peter Hartwig (Technical University of Dresden)

The COA Secretariat has acted as Chairman and the COA Flexitank Manager as Co-ordinator of this FMG.

Note 2

Contact Information

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Introduction

This Code of Practice has been prepared by the Container Owners Association to improve the quality and safety of flexitanks being shipped in containers, thereby reducing flexitank failures and damage to containers. The COA recommends that shipping lines should use the data from the tests detailed in this Code when deciding which flexitanks to accept, with the primary objective of eliminating flexitank failures and reducing container damage and thereby ensure safe operations and environmental protection. Although the majority of flexitanks are transported in 20ft containers, this Code of Practice recognises that 30ft and 40ft containers are also used, and the Code also applies to these sizes.

The Code consists of:

1. A Summary of the Key Points that flexitank companies should adopt to improve the quality of flexitanks and safeguard the environment.
2. Criteria which should be met in five Key Areas: Container selection; Testing of flexitank/container combinations and flexitank materials; Marking and Labelling; Incident management and insurance; and Training

Schedule of Implementation

The work to prepare this Code was undertaken by a Management Implementation Group (MIG), established by the Board of Directors of the COA (see Note 1). A draft Code was presented to a first meeting of interested parties, on 4 December 2008. Following this meeting, the Code was endorsed by the COA as a Provisional Code of Practice, effective 1 January 2009.

In 2009, the procedure for rail impact testing of Flexitank/Container Combinations was finalised by the Management Implementation Group and is included in Part 2 of this Document.

Following feedback from all sectors of the industry, a number of amendments were made to the Code, resulting in this Version (“Version 3”), which was valid from 1 September 2011.

COA’s Role in Preparing/Implementing the Flexitank Code of Practice

1. The COA is responsible for:
 - a. The preparation and publication of the Flexitank Code of Practice.
 - b. Recording and publishing the COA Standard Rail Impact Test Report and other Reports for all those who have done the test (if required).
 - c. Managing and storing test data, photographs and other information.
 - d. Promoting and recommending the Code to all industry sectors.
2. The COA is NOT responsible for:

Enforcing the implementation of the Code by individual Shipping Lines. Individual shipping lines will always have the final responsibility for:

- a. Which flexitanks they accept.
- b. Which cargoes they accept.

Liability Exclusion

The Container Owners Association, COA Flexitank Management Group and Flexitank Steering Committee accept no liability whatsoever for any incidents or accidents that may occur during the course of the Flexitank/ Container Combination rail impact tests; or as a result of the recommendations in this Code of Practice being followed.

Definitions

Internal auditor - a person within the company trained in auditing techniques.

External auditor - someone employed as an auditor by a certification company holding ISO 17021 certification. This will generally be the same person providing ISO 9001 certification.

Flexitank Code of Practice: Summary of Key Points

To comply with the COA Flexitank Code of Practice, manufacturers and operators of flexitanks for use in shipping containers shall meet the following requirements:

Number	Item	See Part
1	The criteria used for selecting containers to transport flexitanks should be as detailed in Part 1 of this Code.	1
2	The flexitank system shall be tested against and comply with the Flexitank Test Criteria specified in Part 2 of this Code.	2
3	Flexitanks shall be designed and selected in such a way as to avoid permanent negative influence on the cargo and the container. Flexitank shall be fully compatible with the cargo intended to be carried.	2
4	The flexitank shall be marked with the following information (which must be visible when the right-hand door of the container is opened): a. Unique flexitank number. b. Manufacturer's name and / or recognised logo.	3
5	An A4 size Caution Label shall be applied to the container's left-hand door.	3
6	Insurance terms for flexitank shipments shall be checked by the legal departments of shipping lines; but in any case there should be insurance cover for not less than US\$5 million per single incident for all parties involved in the chain.	3
7	Both the flexitank shipper and operator shall have emergency plans in place. Emergency contact details of the flexitank operator shall be clearly marked.	3 / 4
8	Flexitank manufacturers and / or operators shall prepare manuals for flexitank fitting, loading and discharge.	5
9	Flexitank operators should comply with, as a minimum, the instructions given in the flexitank manufacturer's manual.	5
10	The filling volume shall be controlled by at least one of two methods. Either: a. calibrated measuring equipment; or b. the weight of the cargo.	5
11	The flexitank manufacturer and operator shall be certified to ISO 9001 (or similar Quality Assurance programme).	

Number	Item	See Part
12	The following details are required when a flexitank shipment booking is made: a. Cargo shall be booked as “non-hazardous bulk liquid in flexitank”. b. The Material Safety Data Sheet (MSDS) conforming to the information required in annex B. shall be provided. c. COA impact test reference number.	
13	Flexitank companies shall be an Associate Member of the Container Owners Association.	

1 Part 1 Container Selection for Transporting Flexitanks

1.1 General

It is critical that containers selected for flexitank shipments conform to certain industry-accepted criteria, to ensure that they are both suitable for carriage as well as satisfy the tests described in Part 2 of this Code. Specifically, the container shall be specified and tested according to ISO 1496 – Part 1.

The following criteria are compulsory for full compliance with this Code of Practice and have been chosen to maximise safety. They represent the minimum criteria and can be supplemented by additional or more stringent criteria at the discretion of the flexitank operator or shipping line.

Dialogue should take place between the approved flexitank operator and the carrier in the country of origin, so that the shipping line recognises the need to supply containers conforming to this part of the standard.

It should be stressed that it is in the interests of all parties to supply containers conforming to this standard in order to avoid containers being rejected.

1.2. Applicability

Part 1 of the Code applies to flexitank operators only (Flexitank manufacturers are exempt from all paragraphs of Part 1).

1.3. Minimum Gross Weight

Containers selected for flexitank transport should have, as a first option, a gross weight rating of not less than 30 tonnes.

Where a 30-tonne gross rated container is not available, the permitted cargo mass should not exceed 0.6 of the container's declared maximum payload, where the container has been tested and fully certified according to ISO requirements.

Higher transported weights and/or lower rated containers can be used providing the testing detailed in Part 2 of this document is successfully demonstrated.

1.4. Fully Corrugated Sides

Both side walls should be corrugated for the entire length of the side wall. Any container with flat decal panels shall be rejected.

1.5. Door Locking Bars

Shall conform to ISO 1496.

All locking bar cams should lock into both top and bottom locking bar cam retainers correctly.

Handles should position freely into door handle retainers and door handle catches should close fully.

1.6. Doors

Structural parts of the door: vertical sections, upper and lower 'C' sections should be free from buckling and dents. All hinges should be in working order and free moving.

1.7. Floor

Any container with any of the following features should be rejected (unless a suitable repair can be undertaken):

- a. Gouge greater than 15mm deep irrespective of length.
- b. Gouge more than 6mm deep and greater than 150mm wide irrespective of length.
- c. Delamination or other damage (affecting floor strength).
- d. Difference in height between adjacent planks / panels greater than 10mm.
- e. Holes other than nail holes.

1.8. CSC Plate

A valid and current CSC plate shall be correctly attached to the container.

1.9. Side and front panel damage and repairs

Side and front panels shall be examined by the container operator's depot or their nominated representative to verify whether the quality of the repair is satisfactory, or determine whether damage is acceptable.

Repairs to panels are acceptable if they comply with IICL guidelines or a similar 'repair manual for steel freight containers'. If there is any doubt concerning the strength of a repair, the container shall be rejected.

1.10. Container return

After discharge of the flexitank, the container shall be redelivered to the shipping line completely empty and in the same condition that it was selected as per the terms and conditions on the bill of lading.

Recommended Container Selection Check List

Containers selected for the carriage of flexitanks should meet the following criteria:

Side Walls

- a. Weld seams to side walls shall be smooth and free from sharp edges, weld splatter and objects.
- b. Repair seams shall be covered with tape.
- c. There shall be identical corrugations over the full length; there shall be no logo panel or any flattened corrugations.

Container Interior: Floor

- a. The container shall be free from transferable or non-transferable dry dust, carbon dust, sand, dirt or depot yard dust.
- b. There shall be no damp floor stains.
- c. There shall be no large burn marks.
- d. The container shall be free from debris, dunnage, volcano ashes and previous cargo residue.
- e. The floor shall be free from splinters and protruding nails, screws and other fixings.

Container Interior: Walls

- a. There shall be no excessive scratches to the interior.
- b. The inside walls and roof shall be free from large areas of rust or flaking paint.
- c. There shall be no transferable stains.

Container Interior: General

- a. The container shall be free from any types of residues and previous cargo odours.
- b. The shoring slots (at door end) shall be straight and free from dents and obstructions.
- c. Where lashing bars are required, these should be checked for suitability.

Door Hardware

- a. Door gear fixing and bolt heads on the inside of the doors shall be free from sharp points and edges.

Exterior: General

- a. The exterior shall be free from hazardous markings or markings relating to previous cargo.

2

Part 2

Test criteria: FCCs and Flexitank Materials

Section A

Flexitank/Container Combination Rail Impact Test Criteria

1. General

- 1.1. This test method is intended to prove the ability of Flexitanks and their installations in ISO shipping containers to withstand the effects of a longitudinal impact.
- 1.2. Testing shall be conducted by facilities that meet the test provisions required for the COA impact test and are approved for this purpose by the COA.
- 1.3. The test container shall be built according to ISO standards to meet ISO criteria and shall be a used container, with normal wear and tear and be rated at 30 tonnes gross for 20ft units and 32 tonnes gross for 40ft units, which represents containers in general service.
- 1.4. Any scheduled test shall be announced to the COA with at least 3 weeks lead-time.

2. Permitted design variations

- 2.1. The following variations in Flexitank design from an already tested prototype are permitted without additional testing:
 - a. A decrease in the tested design capacity, not reducing material layer thickness or strength characteristics.
 - b. Installation of a top-valve.
 - c. An increase in any material layer thickness provided the thickness stays within the range permitted by the material testing procedures specifications.
 - d. Specifically, any modification to or removal of any ancillary equipment applied during any testing shall not be permitted without submission of the changes or removal request to the COA's Flexitank Management Group for approval or without further testing in accordance with the requirements set out in this document.
- 2.2. Any other change in specification of the material, construction or fittings will not be covered and should be tested separately. Specifically no increase in the capacity of the flexitank is permitted.

3. Test apparatus

3.1. Test platform

The test platform may be any suitable structure capable of sustaining without significant damage a shock of the prescribed severity with the container-under-test mounted securely in place. The test platform shall be:

- a. equipped with means of ensuring a direct load transfer through the bottom corner fittings at the end of impact, e.g.

solid stop blocks.

- b. Equipped with four devices, in good condition, for securing the container-under-test in accordance with ISO 1161:1984 (Series 1 Freight containers – Corner fittings – Specification); and
- c. Equipped with a cushioning device to provide a suitable duration of impact.

3.2. Impact creation

The impact shall be created by:

- a. The test platform striking a stationary mass; or
- b. The test platform being struck by a moving mass.

When the stationary mass consists of two or more railway vehicles connected together, each railway vehicle shall be equipped with cushioning devices. Free play between the vehicles shall be eliminated and the brakes on each of the railway vehicles shall be set.

4. Measuring and recording system

4.1. Unless otherwise specified, the measuring and recording system shall comply with ISO 6487:2002 (Road vehicles – Measurement techniques in impact tests – Instrumentation).

4.2. The following equipment shall be available for the test:

- a. Two accelerometers with a minimum amplitude range of 200 g, a maximum lower frequency limit of 1 Hz and a minimum upper frequency limit of 3000 Hz. Each accelerometer shall be rigidly attached to the container-under-test at the outer end or side face of the two adjacent bottom corner fittings closest to the impact source. The accelerometers shall be aligned so as to measure the acceleration in the longitudinal axis of the container. The preferred method is to attach each accelerometer to a flat mounting plate by means of bolting and to bond the mounting plates to the corner fittings.
- b. A means of measuring the velocity of the moving test platform or the moving mass at the moment of impact.
- c. An analogue-to-digital data acquisition system capable of recording the shock disturbance as acceleration versus time history at a minimum sampling frequency of 1000 Hz. The data acquisition system shall incorporate a low-pass anti-aliasing analogue filter with a corner frequency set to a minimum of 200 Hz and a maximum of 20% of the sampling rate, and a minimum roll off rate of 40 dB/octave.
- d. A means of storing the acceleration versus time histories in electronic format so that they can be subsequently retrieved and analysed.
- e. A means to record deformations of the container side walls, the front wall and the doors at a minimum of per figure 1 to 4 defined locations plus spots of maximum deformation at least before and after each test to a minimum accuracy of $\pm 1\text{mm}$. The preferred method is to span a plane adverted to the outer faces of the wall-dedicated corner fittings that can be taken as a reference plane for each measurement; and
- f. A means to monitor that any fitted valve does not touch the container interior before, during and after each impact.

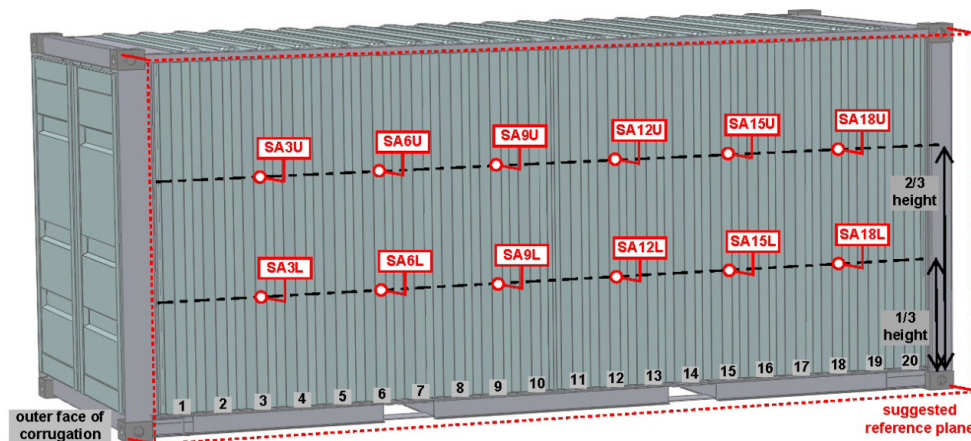


Figure 1: measurement locations on side wall A (SA), L = lower location, U = upper location

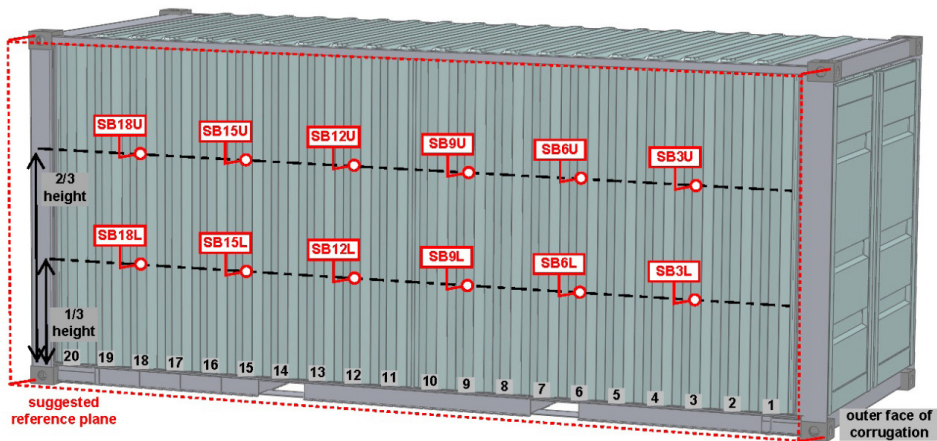


Figure 2: measurement locations on side wall B (SB), L = lower location, U = upper location

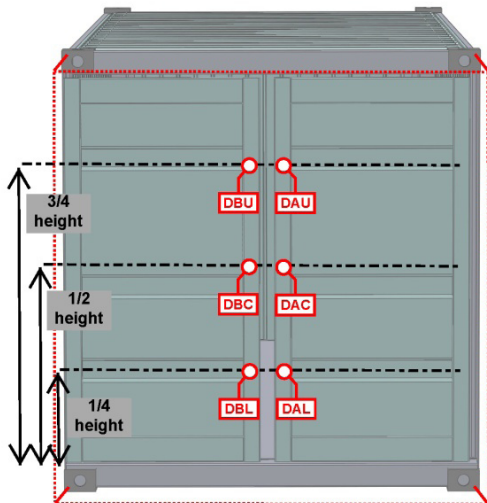


Figure 3: measurement locations on doors (DA, DB), L = lower location, C = central location, U = upper location

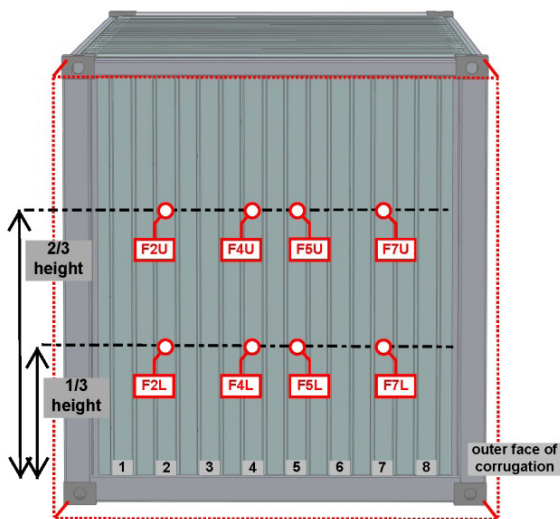


Figure 4: measurement locations on front wall (F), L = lower location, U = upper location

5. Procedure

5.1. The Flexitank Manufacturer shall be responsible for fitting the Flexitank, lining, bulkhead and other required installations to the test container and this must be in accordance with the Flexitank Manufacturer's installation guide.

5.2. Filling of the Flexitank may be undertaken before or after mounting on the test platform. The Flexitank shall be filled with water to 100% of the Flexitank nominal capacity.

5.3. The mass of the container including the fitted Flexitank shall be measured and recorded for the empty and filled state.

5.4. The container-under-test shall first be oriented in a way that the container doors are facing the impact. The container shall be secured on the test platform using all four of its corner fittings so as to restrain its movement in vertical and transverse directions. Any clearance between the corner fittings of the container-under-test and the load transfer devices in longitudinal direction at the impacting end of the test platform shall be minimised. In particular, impacting masses shall be free to rebound after impact.

5.5. An impact shall be created (see 3.2) such that for a single impact an acceleration amplitude of 2G (gravitational unit) at a given low-pass filtering of 16Hz (4-pole Butterworth) is registered in the accelerometer signals from the bottom corner fittings. Repeated impacts may be required to achieve this result but the test results for each impact shall be considered individually.

5.6. The container-under-test shall then be oriented in a way that the container front wall is facing the impact with all arrangements as described in 5.4 and an impact shall be created as per 5.5.

5.7. Following an impact described in 5.5, the Flexitank, its installations and the container-under-test shall be examined and the results recorded.

5.8. The objectives of the test

a. The Flexitank/Container combination shall not show leakage or permanent deformation or abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and transfer from one means of transport to another shall be satisfied.

b. The bulkhead (if installed) and any other installation shall not be touching the doors either before or after each impact, while any fitted valve may not be touching the container interior at any time.

c. The maximum container deformations are to be measured as described in 4.2e with:

i. The deformations after each impact test should not exceed:

- Front wall: 40mm.
- Side walls: 40mm.
- Doors: 6mm.

ii. The maximum permanent/residual deformations after discharge as per ISO/TR15070:1996/Amd1:2005(E)¹ should not exceed:

- Front wall: 7mm.
- Side walls: 8mm.
- Doors: 6mm.

6. Reporting

6.1. The above tests shall be reported and documented by a recognised company, accepted by the COA in the form of a COA Standard Rail Impact Test Report.

6.2. The recorded acceleration-time history of all performed impacts per 5.5 shall be filed with the COA for archiving.

6.3. COA Full members reserve the right to witness an announced test.

¹ Reference: Amendment 1 to ISO/TR 15070:1996 was prepared by Technical Committee ISO/TC 104, Freight containers, Subcommittee SC1, General purpose container)

Section B: Materials Testing

All designs of flexitank should be submitted to the following tests on the flexitank material to demonstrate the ability of the product to prevent loss of containment when subjected to normal environmental stresses and conditions.

These tests must be to a suitable internationally recognised standard.

A list of recognised tests can be found in Appendix D.

1. **Puncture resistance or impact strength.**
2. **Seal (weld) strength.**
3. **Tensile strength and elongation.**
4. **Tear Resistance.**
5. **Temperature tolerance.**

This test should be the same test as the Tensile Strength and Elongation test.

All raw materials should be subjected to a minimum of six hours conditioning at Max and Min temperatures as specified by the flexitank manufacturer.

The samples then need to be reconditioned in a lab environment and retested. All materials should still be within published specification.

Tests 1 – 4 shall be conducted at a minimum of once per 100 flexitanks manufactured as part of the internal/ external QC program. Flexitank manufacturers must be able to demonstrate to the external auditor that the results are in compliance with their published specifications.

Test 5 shall be conducted initially on all plastic films and subsequently on any new material where the supplier or resin composition has changed. These tests must be witnessed and certified by an officially registered external auditor.

6. **Valve Leakage Testing**

In-house method.

Pressure tests must be conducted on 100% of all incoming valves before putting them into the flexitank production.

Valves should be tested in accordance with an internationally recognised standard approved by the COA flexitank steering committee and listed in appendix D of the COA flexitank code of practice. Test pressures and times must be specified by flexitank manufacturer if not included in the specified standard).

3 Part 3

Container and Flexitank labelling

3.1. Introduction

Flexitanks cannot be used to ship hazardous goods. However, adhesive warning and information labels should be placed on containers, enabling the instant identification of a Flexitank Container Combination and any dangers that may be present if warnings are not heeded.

All labels must be sea-water resistant and all types must be strong enough to still be readable after normal shipping conditions.

The flexitank itself must also be marked for traceability.

3.2. Container Marking

a. Responsibility

Flexitank operators are responsible for marking containers with flexitank information.

b. Door warning label

This shall be a minimum size of A4 (210 x 297mm). It should be affixed to the outside of the left hand door, in such a position that it is obvious before opening the left hand door.

The label must contain a warning about keeping the left hand door shut, along with a pictorial warning. The label should include the operator's brand name, logo and COA impact test reference number. These warnings must be both written and pictorial and should be in the following languages; English, French, Spanish, German and Chinese. Other languages may be added if required.

The label must also contain emergency contact information.

3.3. Flexitank Marking

The flexitank shall be marked with the following information (which must be visible when the right-hand door of the container is opened):

- a. Unique flexitank number.
- b. Manufacturer's name and / or recognised logo .

3.4. Removal of Markings

All flexitank labels should be removed as follows:

- c. The label on the left hand door should be removed once the cargo has been discharged.
- d. All other labels shall be removed once the flexitank has been removed and the container has been cleaned prior to redelivery. Failure to comply with these instructions could result in future mis-identification of the container.

4 Part 4 Incident management and Insurance

Section A:

Responsibilities and Reaction to Incidents

4.1. Introduction

This covers the responsibilities of Carriers, Intermodal Operators, Merchant's/ Consignors, Flexitank Operators and Manufacturer's and the responses required to deal with incidents during transport.

4.2. Definitions

Merchant - the party, which may be the Merchant, consignor or consignee, contracting with the Carrier for carriage.

Consignee - the party to whom the cargo is consigned.

Manufacturer - the party that manufactures the flexitank, bulkheads and ancillary equipment.

Flexitank operator - the party who operates the flexitank. (This may or may not be the same party as the flexitank manufacturer).

Carrier - the party engaged in the transport of the cargo.

Intermodal Operator - the party engaged in the intermodal aspect of a shipment maybe either "carrier" or "merchant" haulage.

Flexitank system - Flexitank and ancillary equipment (such as bulkheads) which have been tested and is in accordance with this Code of Practice.

MSDS - Material Safety Data Sheet.

Cargo Surveyors - Independent cargo surveyor used to establish the facts of any incident on behalf of a party.

4.3. Responsibilities and declaration of contents

Flexitank Operator: is an organisation that operates flexitanks as per this Code of Practice. The Code of Practice expects that the flexitank system which is tested within a container under part 2 is the same system as used in day to day shipments. The Flexitank Operator may source the parts of the flexitank system from different manufacturers providing the system used has:

- a. Been tested and is in full compliance with this Code.
- b. Tested to the capacity or higher contracted to the Merchant.
- c. Instructions and training provided to the Merchant on fitting and filling the flexitank are in accordance with this Code.
- d. Container marked in accordance with Code under part 3.
- e. Been checked for compatibility of the cargo.
- f. Emergency response plan.

The Flexitank Operator should have a contract in place with the Merchant to manage any incidents on behalf of the Merchant.

Merchant/ Consignor/ Consignee or contracting party for the cargo who is contracting with the Carrier for shipment: Henceforth referred to as Merchant. This party has a duty to ensure that;

- a. The Flexitank Operator appointed is compliant with this Code of Practice.
- b. The commodity is correctly declared to the Flexitank Operator and an accurate Material Safety Data Sheet (MSDS) is supplied to ensure compatibility with the flexitank.
- c. The container supplied by the Carrier is checked in accordance with the Code of Practice.
- d. The flexitank is fitted in accordance to the Flexitank Operators instructions.
- e. The flexitank is filled to the capacity declared by the Flexitank Operator as per the contract between the Merchant/ Consignor and the Flexitank Operator.
- f. The cargo type with supporting MSDS and Flexitank Operator, the capacity per flexitank and gross weight of the container to be shipped are declared to the carrier.

The Merchant will be responsible to the carrier for all costs which may arise from the cargo leaking and/or causing damage to the container as per the clauses on the Bill of Lading. In the event of leakage of the cargo this could be, but not be limited to the following:

- a. Cleaning on vessel/ terminal or costs arising during intermodal shipment arranged by the carrier (if merchant haulage then the intermodal operator would act as the carrier and the ocean carrier only as the supplier of the container).
- b. Fines imposed by Port Authorities or Environmental Agencies.
- c. Operational costs such as re-stowing containers to allow discharge.
- d. Survey costs.
- e. Cargo transfer to another flexitank or packing acceptable to the carrier.damage to other containers and their contents
- f. Repairs for any damage caused to the container supplied by the ocean carrier/ container operator as per the clauses on the bill of laden or contract.

Carrier: has due care of the shipment as per the clauses on the Bill of Laden. In event of an incident will endeavour to minimise costs and impact of any leakage by transferring the unit to safe location and to notify Merchant at earliest opportunity of the facts of the incident.

Intermodal: intermodal may be moved under carrier or merchant haulage contracts covering road, rail and barge moves or combination of. If contract is under carrier haulage then the ocean carrier will have a sub-contract with the intermodal transport supplier. If under merchant haulage the cargo owner will have a contract with the intermodal operator and the ocean carrier or container operator's interest would be in the condition of the empty container on return.

4. 4. Stages of incident management

a. Information

Following the report of an incident, the carrier or intermodal operator will endeavor to minimise the impact of any leakage and minimise costs and transfer to a safe location at the earliest opportunity. As soon as practical the facts of the incident will be reported to the Merchant (the party that hold the bill of laden for the cargo or the contract with the intermodal operator), who should immediately notify the Flexitank Operator. The Merchant should provide an MSDS for the cargo type and contact point for Flexitank Operator to the carrier.

b. Attendance

Once the container has arrived in a place where inspection can take place and all relevant permissions have been obtained, a physical inspection of the flexitank will be necessary to determine actions required. The Flexitank Operator, their agents or representatives, should determine the cause of the problem and provide best solution to get the cargo to destination. (It should be noted here that the Merchant has a contract with both carrier and flexitank operator, the carrier only has a contract with the Merchant). Independent cargo surveyors maybe appointed by the Merchant, Carrier, Flexitank Operator or Insurance Interests or when agreed, a joint survey maybe carried out. This is particularly important when costs incurred maybe high or responsibility of cargo commodity is under dispute. (This is dependent on the type of insurance coverage in place and/or whether the Carrier, Flexitank Operator or Cargo Owner requires such attendance).

c. Action

If action is required, e.g. trans-loading product to another flexitank, IBC or other bulk container, commensurate with the commodity it is essential that this is conducted quickly to restrict product loss and preserve quality of product. It is also important to ensure that any receiving vessel/container is clean and suitable for the containment of the product. Once the shipment has been placed in a safe location (all associated costs to perform this rests with the Merchant) any further actions should be managed by the Flexitank Operator on behalf of the Merchant. However any further costs to be incurred by the Carrier to complete the delivery of cargo, that

the carrier would have not normally incurred, must be agreed by the Merchant prior to being incurred carrier.

d. Completion

Once any action has been taken, all necessary documentation, customs clearance and logistics arrangements should be made promptly to minimise further costs. Completion can be defined as the point when the product is delivered back into the normal logistics chain and any quarantine area is restored to normal following incident actions.

4.5. Records

It is recommended that each party in the flexitank chain shall keep a detailed log of incidents to allow them to identify trends and take corrective and preventive actions.

This record shall contain, as a minimum, the following information:

- a. Flexitank number.
- b. Capacity of the flexitank.
- c. Container number.
- d. Date of incident.
- e. Location of incident.
- f. Type of incident.
- g. Quantity of product lost.
- h. Commodity.
- i. Volume and weight of cargo loaded.
- j. Bulkhead and ancillary equipment.
- k. Root cause (or possible root causes).
- l. Photographs of the incident including any damage to the flexitank, ancillary equipment and the shipping container.

Section B

Insurance

Flexitank operators shall maintain insurance in respect of potential product or public liabilities arising from any failure of their flexitank or operational service to a general limit of liability of not less than US\$5Million per single incident, to be placed with a first class insurer on an established insurance market.

The Flexitank Operators will provide a statement to this effect from their Insurance Broker or Underwriter at the reasonable request of a Merchant, Carrier or Intermodal Operator.

Flexitank manufacturers which do not provide flexitank transportation services and do not contract freight, should demonstrate product and public liability cover of not less than US\$5Million per single incident in respect of any liability arising from the failure of their product, attributable to manufacture, materials, design or quality control.

5

Part 5 Training

5.1. Introduction

All parties in the flexitank manufacturing and transport chain should participate in appropriate training courses.

The flexitank industry relies heavily on 3rd party depots and agents for container selection, preparation and fitting of flexitanks and also, along with independent surveyors, to inspect FCC's that have been involved in incidents.

Once training has been conducted, it is also essential that the procedures are regularly reviewed, to ensure that the up-to-date processes and documentation are being used, processes are being adhered to and any new staff are being trained by suitably experienced people using written training procedures and materials.

5.2. Training

Any third party supplier of services to flexitank operators must be trained in the specifics of that service by the flexitank operator or someone approved by them and records kept of the training given. Follow up audits must also be conducted to ensure continued compliance with procedures. Services may include but are not restricted to;

- a. Container Selection.
- b. Fitting flexitanks.
- c. Attending loads.
- d. Attending delivery.
- e. Inspecting incidents.
- f. Dealing with incidents.
- g. Any actions expected of drivers.

All training should be conducted by either the flexitank operator or someone approved by them. Records must be kept of the following.

- a. Approved trainers, internal and external.
- b. Depots and other locations where services are provided along with services provided there.
- c. Persons that have been trained.

Training records for individuals trained must contain the following, minimum, information;

- a. Date of training.
- b. Location of training.
- c. Trainer.
- d. Areas covered.

Written details of areas to be covered during training must be kept although these may be the same as other documentation e.g. manuals.

5.3. Auditing suppliers

Auditing of suppliers to ensure that procedures are being followed as per training must be carried out at least annually for each location and for each service supplied. An audit plan should be prepared to assist with scheduling of resources for audits and also to provide a framework for the independent auditor. These audits may be conducted by the flexitank operator or their nominated representative. Each trained person should be audited at least every two years. Audits can be take any form but records must be kept of the following

- a. Date.
- b. Location.
- c. Persons audited.
- d. Auditor(s).
- e. Services audited.
- f. Non- conformances.

5.4. Demonstration of compliance

Records of training and auditing should be made available to an independent auditor representing an officially registered external auditor who should complete and certify the supplier training and audit form. These independent audits should be conducted every two years or more frequently and the audit forms submitted to the COA.

Standard form reports are in Appendix E of this Code of Practice.

A

Appendix A

Container Selection for COA Flexitank/Container Combination Standard Rail Impact Test Report



CONTAINER OWNERS ASSOCIATION

COA Flexitank/Container Combination Standard Rail Impact Test Report

Name of Flexitank Company	Manufacturer
COA Test reference number	

Part 1: Test Location and Conditions

Name of Test Facility	Name
Date	Date
Weather/Temperature	...
Manager in Charge of Testing	
Signature of Test Manager	

Part 2: Equipment being tested

A. Container

Container Information:

Container Supplied by	
Container Number	BIC-Code

CSC Plate Information:

Container Manufacturer	
Date of Manufacture	
Current Examination (Yes/No)	
Maximum Gross Weight	
Allowable Stackable Weight	
Racking Test Load Value	
Allowable Stackable Weight (one-door off)	
Racking Test Load Value (one-door off)	
End Wall Strength (one-door off)	

Container Wall Thickness:

Side Wall	
End Wall	
Doors	

B. Flexitank

Flexitank Information:

Flexitank Serial Number	
Flexitank Model/Name	

Flexitank Specifications:

Volume – Nominal Capacity	
Volume – When Tested	
Number of Layers	

	Material	Thickness	Weight/sq metre
Layer 1			
Layer 2			
Layer 3			
Layer 4			
Layer 5			
Layer 6			

Valve Configuration:

Valve Type	Manufacturer	Model Number	Design	Size
Top				
Bottom				
Air Vent/Relief				
Other				

Bulkhead Specification:

Bulkhead Type	
---------------	--

Description of Bulkhead:

Including materials used	<p>Photo of Bulkhead to be included here.</p> <p>Photo to be taken with left door closed and from an angle of 45deg</p>
Dimensions and gauge	

Other Equipment:

Securing and Lashing Equipment	
Packing Materials	
Additional reinforcing	

Part 3: Test Results

	after filling	(after) test 1	(after) test 2	after discharge
Acceleration				
(recommended ac- celeration)		(2G towards doors)	(2G towards end wall)	
Leakage				
(rec. acceptance)	(no)	(no)	(no)	(no)
Side wall A				
(rec. acceptance)	(40 mm)	(40 mm)	(40 mm)	(8 mm)
Side wall B				
(rec. acceptance)	(40 mm)	(40 mm)	(40 mm)	(8 mm)
End wall				
(rec. acceptance)	(40 mm)	(40 mm)	(40 mm)	(7 mm)
Door				
(rec. acceptance)	(6 mm)	(6 mm)	(6 mm)	(6 mm)
Bulkhead				
(rec. acceptance)	Not touching	Not touching	Not touching	Not touching
Valve				
(rec. acceptance)	Not touching	Not touching	Not touching	Not touching

Further Comments:

B Appendix B

Material Safety Data Sheet (MSDS)

IMO regulated commodities are prohibited for carriage in flexitanks.

The MSDS shall contain the following information.

Section 1: Chemical Product and Company Identification

This section links the chemical name on the label to the MSDS. The MSDS also lists the name, address and the phone number of the company, manufacturer or distributor who provides the chemical. An emergency phone number which is available 24/7 must also be provided.

Section 2: Composition, Information or Ingredients.

This section must identify all the hazardous ingredients of the material. This section may also include OSHA Permissible Exposure Limits (PELs) and ACGIH (American Conference of Governmental Industrial Hygienists) Threshold Limit Values (TLVs).

Section 3: Hazard Identification

This section discusses the health effects one may encounter when exposed to the material. The section will describe the appearance of the material, the potential health effects and symptoms associated with exposure, routes of entry, target organs that could be affected, and so on.

Section 4: First Aid Measures

This section will describe possible first aid procedures for each route of entry. The procedures will be written so that untrained individuals can understand the information.

Section 5: Fire-Fighting Measures

This section will describe information on the fire and explosive properties of the material, extinguishing items, and general fire-fighting instructions.

Section 6: Accidental Release Measures

This section gives information on how to respond when a material spills, leaks or is released into the air. This information may include how to contain a spill or the types of equipment that may be needed for protection.

Section 7: Handling and Storage

This section discusses information on handling and storage of the material. Topics that could be described are: general warnings to prevent overexposure, handling procedures, and hygiene instructions to prevent continued exposure.

Section 8: Exposure Controls and Personal Protection

This section discusses engineering controls and personal protective equipment that would help reduce exposure to the material. The necessary personal protective equipment should be considered for eye/face protection, skin protection and respiratory protection.

Section 9: Physical and Chemical Properties

This section will include information about the physical and chemical properties of the material. The following characteristics should be detailed: appearance, odor, physical state, pH, vapor pressure, vapor density, boiling point, freezing/melting point, solubility in water and specific gravity or density. Indicate if these characteristics do not apply to your material.

Section 10: Stability and Reactivity

This section requires that potentially hazardous chemical reactions be identified. It addresses chemical stability, conditions to avoid, incompatibility with other materials, hazardous decomposition and hazardous polymerization.

Section 11: Toxicological Information

This section discusses data used to determine the hazards that are given in Section 3, "Hazard Identification." The following information can be addressed: acute data, carcinogenicity, reproductive effects, target organ effects, etc.

Section 12: Ecological Information

This section will help determine the environmental impact should the material ever be released into the environment.

Section 13: Disposal Considerations

This section gives important information that may be helpful in the proper disposal of the material. The information can cover disposal, recycling and reclamation.

Section 14: Transport Information

This section is designed to give basic shipping information. The basic shipping information could include: the hazardous materials description, hazard class and the identification number (UN or NA numbers).

Section 15: Regulatory Information

This section discusses information on the regulations under which the material falls. Examples of a few regulatory agencies are: OSHA, TSCA (Toxic Substance Control Act), CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act), SARA Title III (Superfund Amendments and Reauthorization Act).

Section 16: Other Information

This section should include any other important information concerning the material. This information can include: hazard ratings, preparation and revisions of the MSDS, and label information.

C Appendix C COA Flexitank Materials Standard Test Report

See separate document

D Appendix D

Approved Tests for Materials Testing

D.1. Puncture resistance or impact strength

Either:

a. ASTM F1306-90: Slow Rate Penetration Resistance of Flexible Barrier Films and Laminates.

A 3.2mm diameter hemispherical headed probe is forced into the material at 25mm/min. The force required to break is recorded.

Or:

b. ASTM D1709 – 08: Standard Test Methods for Impact Resistance of Plastic Films by Free Falling Dart Method (Method B).

A dart with 50.80mm diameter hemispherical head dropped from a height of 1.50 m. Using the staircase method as defined in the standard, average impact failure weight is calculated.

Or:

c. ASTM D4833 – 07 : Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.

A 100mm diameter specimen is clamped between circular plates of a ring clamp attachment with an opening of 45mm diameter, is subjected to puncture by a 8mm diameter solid steel rod at a controlled speed of 300mm/min. The maximum force recorded is the value of the puncture resistance of the specimen.

Or

d. ASTM D4833-07 Standard Test Method for Index Puncture Resistance of Geomembranes.

A test specimen is clamped without tension between circular plates of a ring clamp attachment secured in a tensile testing machine. A force is exerted against the center of the unsupported portion of the test specimen by a solid steel rod attached to the load indicator until rupture of the specimen occurs. The maximum force recorded is the value of puncture resistance of the specimen.

D.2. Seal (weld) strength

Either:

a. ASTM F88 - 07a: Standard Test Method for Seal Strength of Flexible Barrier Materials.

A 25.4mm (1 inch) wide sample of the seal is placed into a Universal Testing Machine. Failure mode and force can be determined. This test can also be used for mechanical seals or welds used to secure valves or other accessories.

Or

b. ASTM D6392-08 Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.

This test method presents the procedures used for determining the quality of nonbituminous bonded seams subjected to both peel and shear tests. These test procedures are intended for nonreinforced geomembranes only.

D.3. Tensile strength and elongation

Either:

a. ASTM D882 - 09 Standard Test Method for Tensile Properties of Thin Plastic Sheeting.

A 25.4 mm (1inch) wide sample placed into a Universal Testing Machine is pulled to break at a relevant test speed suggested in the standard. The force and elongation at break is determined.

Or

b. ASTM D638 - 08 Standard Test Method for Tensile Properties of Plastics (Type IV).

Test is similar to the above. Sample is shaped like a dumb-bell and dimensions are according to Type IV defined in the standard. An extensometer must be deployed to measure the elongation at break accurately as stated in the standard.

Or

c. ASTM D6693-04 Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene.

This test method covers the determination of the tensile properties of nonreinforced geomembranes in the form of standard dumb-bell-shaped test specimens when tested under defined conditions of pretreatment, temperature, and machine speed.

D.4 . Tear Resistance

ASTM D1004-08 Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.

The force required to initiate tearing on a test specimens cut out with a die conforming to the dimensions defined in the standard is recorded. The test speed is set at 51mm/min.

D.5. Valve leakage testing.

ISO 9393 - methods for the resistance to internal pressure and the leak tightness of thermoplastic valves

Specifies the test methods for the resistance to internal pressure and the leaktightness of thermoplastics valves for use in industrial applications with cold water or with industrial fluids, but excluding gas applications covered by thermoplastics- valve product standards.

Or equivalent recognised standard approved by the COA.

E Appendix E

COA Service Supplier Training and Auditing Report Form



CONTAINER OWNERS ASSOCIATION

COA Service Supplier Training and Auditing Report Form

Training

A suitable selection of training documents should be viewed to be determined by the auditor. These should be in accordance with section 5.2 of the COA Code of Practice.

Number of records viewed	Number
Notes or non conformances	

Auditing

The audit plan document should be used as a tool to select documents for inspection. The number of records to be determined by the auditor. These should be in accordance with section 5.3 of the COA Code of Practice.

Number of records viewed	Number
Notes or non conformances	

Signed	
Auditor	
Date	
Auditing Body	

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