

Best Practice Guidelines for loading, transport and unloading of Flexitanks



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DISCLAIMER

This document is intended for information only and sets out guidelines for the safe loading, transport and unloading of Flexitanks. The information provided in these guidelines is offered in good faith and, while it is accurate as far as the authors are aware, no representations or warranties are made with regards to its completeness. It is not intended to be a comprehensive guide for the safe (un)loading and transport of Flexitanks. No responsibility will be assumed by Cefic in relation to the information contained in this Guideline. Each company should decide, based on their own decision-making process, to apply the guidance contained in this document, in full, partly or to adopt other measures.

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1. Introduction

A Flexitank, also known as a Flexitank system, is a soft, light bladder, fitted within a standard 20-foot drybox container (see also chapter Definitions and Abbreviations for further details). The scope of these guidelines is restricted to the use of Flexitanks for the transport of bulk non-dangerous liquid cargoes within a general purpose (GP) 20-foot freight container. The bladder is generally intended for single use. Under the aspect of sustainability, it is important that the Flexibag system should be recyclable.

For the purpose of this guideline a Flexitank system as described in PAS 1008 will be referred to as a Flexitank. The bladder will be referred to as the Flexibag.

Transportation in Flexitanks of bulk chemical products not classified as dangerous goods is becoming an attractive alternative to transport in ISO tank containers. In the early days, a Flexitank damage resulted in leaks, loss of cargo and subsequent clean-up activities. The root cause was typically attributed to inappropriate handling and fitting and impact forces during transport of the Flexitank. In recent years, Flexitank producers and operators have achieved major improvements in bag manufacturing, container selection criteria, as well as safe loading and unloading practices. This has led to a reduction in the number of spills and leaks. These improvements, in combination with a continuous search by shippers for lower cost options for the transport of certain types of non-dangerous cargoes, has resulted in a significant increase of the number of Flexitank movements over the last decade.

Incidents involving Flexitanks pose a higher risk to result in a loss of containment compared to tank containers. The use of Flexitanks for the carriage of non-dangerous liquid chemicals should therefore only be carried out with the appropriate equipment and following the right operating procedures.

The continuous increase in use of Flexitanks and the importance of this intermodal transport unit make a review necessary. Certain areas of the 2018 Guideline have been updated, including: compatibility test criteria for a safe using of "Flexibag materials", scope of responsibilities of each agent of the Flexitank Supply Chain, ISO 14001 or equivalent standard for Flexibag disposer and driver skills for road transport "leg".

2. Objective and scope

The purpose of this document is to provide guidelines that assist chemical companies, their customers and logistics service providers in preventing or mitigating unsafe situations in the supply chain of Flexitanks by promoting best industry practices today. These guidelines should also be taken into account in the case of customer collections.

The scope of these guidelines includes:

- Equipment selection comprising Flexitank type and its connections;
- Requirements for vendors and service providers;
- Product allowance criteria;
- Standard operating procedures;



- Incident management.

In all circumstances, the applicable national or international regulations take precedence over any recommendations made in these guidelines.

These guidelines are subject to continuous improvement and are expected to be updated on a periodic basis.

3. Risk assessment

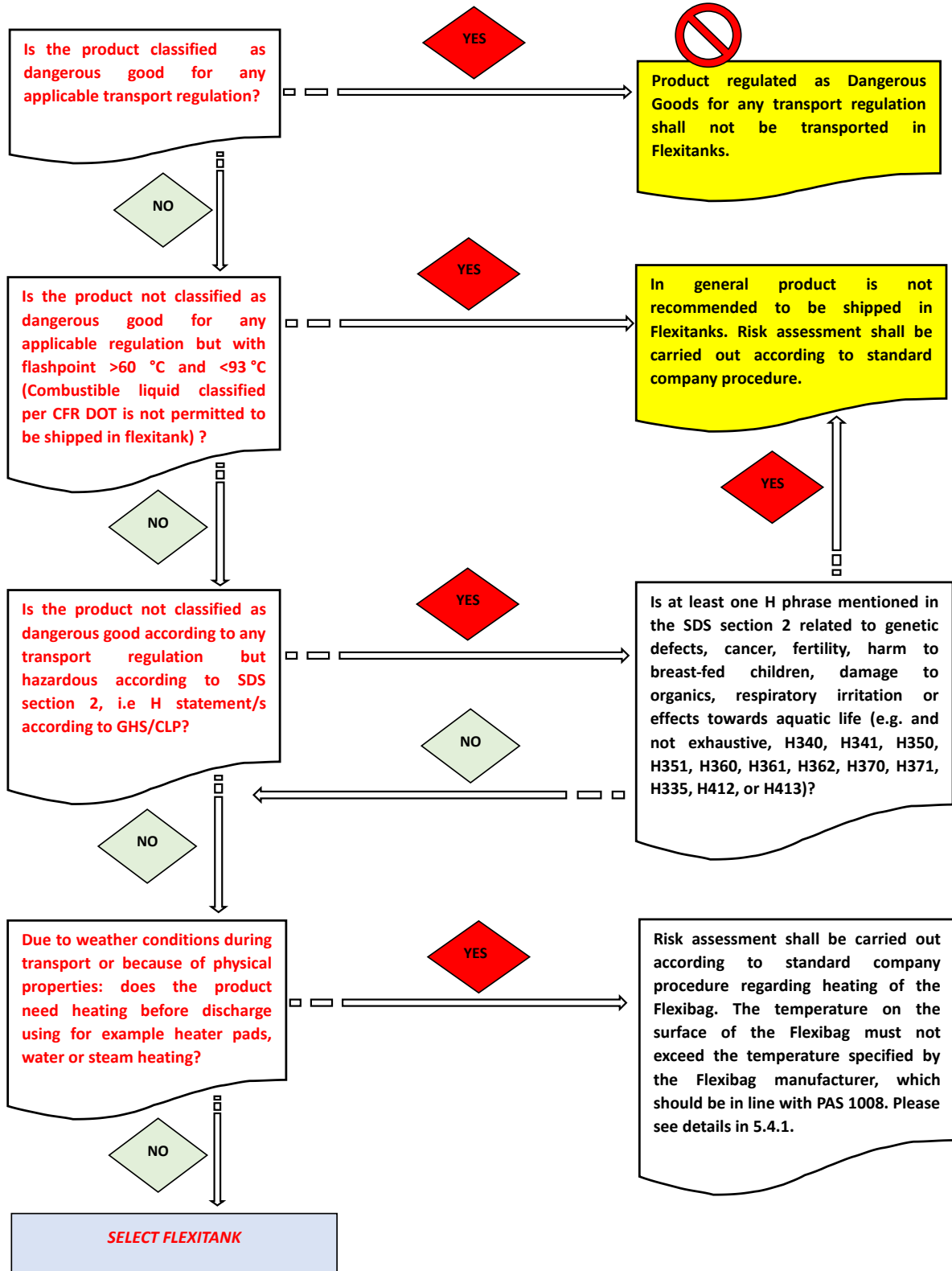
Flexitanks shall only be used for the transport of bulk liquids that are not classified as a dangerous good according to the provisions of the International Maritime Dangerous Goods (IMDG) Code ([see also chapter Definitions and Abbreviations](#)) of [International Maritime Organization](#) (IMO). The IMDG Code provides a list of products classified as dangerous goods for sea transport (see also chapter 14 of the corresponding Safety Data Sheet).

In addition, a number of non-dangerous goods (not classified as dangerous for sea transport) may have certain other hazards and be regulated as a hazardous substance or mixture according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). For these goods, a risk assessment should be carried out (see decision tree below), taking into account the hazards of the product and the specific transport conditions. Based on the outcome of this risk assessment, a decision should be taken whether or not the product should be allowed for transport in Flexitanks.

Furthermore, the cargo must be compatible with the Flexibag material of construction, entirely inert with the Flexibag material, meaning it does not react with or cause any degradation to the material. Additionally, the cargo must be free from any potential risks of degradation or reaction with the Flexibag material. An evaluation of the product compatibility needs to be completed by the shipper and operator and form part of the risk assessment ([see also section 4.2](#)). The manufacturer of the Flexibag is obliged to provide compatibility information and advice.

Only products that have been assessed for risk and compatibility and have been confirmed by all parties as safe and reliable should be accepted for transport in a Flexitank. The risk assessment should take into account responsibilities for incident management.

FLEXITANK SYSTEM RISK REVIEW / CONSIDERATIONS FLOW CHART



4. Equipment requirements

4.1 Container

Containers used for the carriage of Flexitanks should be 20ft GP containers, rated to a minimum gross mass of 30,480 kg and conforming to the provisions of ISO 1496. The containers shall display a valid CSC plate and is recommended to be less than 5 years old.

Containers for the carriage of Flexitanks should meet the shipping line condition criteria, e.g. UCIRC (Unified Container Inspection & Repair Criteria) or IICL (Institute of International Container Lessors) and in addition meet the requirements of the latest version of the [COA Code of Practice](#). If there is any doubt about the structural integrity of the container or its suitability for installing or transporting a Flexitank, the container should be rejected and replaced.

It is a requirement to inform the shipping line and /or the container owner when placing the order that the container is to be used for a Flexitank and to confirm the specified requirements.

4.2 Flexibag

The Flexibag shall be manufactured out of virgin, high quality, food contact approved materials (not recycled) and shall meet the requirements of the COA Code of Practice for Flexitanks that was published [on the COA site](#) and the latest version of PAS1008. In case of multilayer Flexibags only the inner layer (with contact to the product) must be of virgin material.

The manufacturer should be certified and [listed in the COA Flexitank Quality Management List](#) (FQML) with the status COA Member Certificate of Compliance. The minimum requirement is that the manufacturer complies with PAS1008.

The most common material used for Flexibag manufacturing is polyethylene (PE) but other materials, like PVC, can also be used. The material of construction of the Flexibag and valves etc. must be compatible with the liquid content (product to be carried) and subsequent uses of that content, like food and pharmaceuticals.

In case of signs or evidences of a technical non-conformity for PE/PP resistance in the Flexibag, some resistance tests need to be performed for the material, including, tension and strength, stretch, tears, impact, homogeneity, etc. in order to verify its suitability. Standardised tests or similar methods carried out with the same materials may be checked too.

For new products the compatibility must be tested in advance. However, when the new product has similar chemical properties to other products already being carried, the new product may be carried without compatibility testing. In addition to material compatibility the Flexitank shall be tested in accordance with the provisions of PAS1008.

For quality reasons, criteria and methods for checking the chemical compatibility between the materials of the Flexibag, and the chemicals being transported, shall be conducted. There should be compatibility / homologation tests carried out to ensure that there is no migration, degradation or reaction between the Flexibag materials and the chemical goods transported bearing in mind the whole transportation time



including all maritime operations. Manufacturers of Flexibag and manufacturers of chemicals should give their approval for transporting goods in an appropriate way for the Flexitank selected for using.

The volume Flexitank can vary up to 24,000 l. Flexitanks have strict requirements on filling degree against its design volume. The filling degree shall be in accordance with the manufacturers' specifications. Short load and overload out of the safe tolerance are both prohibited. The maximum loading weight should not exceed 24,000 kg.

4.2.1 Pressure relief and vent valves

Flexibag may be fitted for emergency with safety device (PRV-Pressure relief valve) instead of being intended to work in normal (un)loading condition. It is always part of the (un)loading procedure to include operations which assure avoiding overpressure and/or any operation which would trigger the PRV.

PRV could introduce potential leaking point of the Flexitank so its use should be limited for those products that may ferment or release gas in transit. If a PRV is installed in the Flexibag for such loading/product purposes, then a risk review should be completed by the user to determine if benefit and justifies to use a Flexibag for such products.

Manual vent valves (with hose and tap) have a different design to the PRV. It is not triggered by overpressure, instead it is manual open/close to release air trapped in the Flexibag during loading. This consequence has been a typical issue for foaming product, extra air being trapped in the Flexibag. By opening the manual valve tap in the last stage of loading, the air can be released so product can be loaded according to target weight. Also, sometimes such products, like latex, are usually sensitive to air that contributes to skinning formation while releasing air as much as possible right after loading can minimize the skinning issue. Normally the tap is closed immediately after air pressure is released.

Manual vent valves, as above mentioned, are intended to be used in normal loading operation instead of overpressure emergency in transit. Finally, they do not create an open channel to the atmosphere so the leaking risk is much lower.

4.3 Bulkheads

Use of bulkheads of adequate strength and rigidity is strongly recommended to prevent pressure on the doors. The bulkhead shall consist of highly-resistant metal or similar material and made of less number of pieces to minimise the training efforts for the people involved using bulkheads. This should also be considered for Flexitank systems designed to operate without bulkheads. Wooden bulkheads are however forbidden. The board used in bulkhead system shall be made of material that is resistant to water and moist and not fragile which may become a sharp point if broken.

4.4 Loading equipment

The filling process needs to be done in a controlled manner taking into account bag capacity to avoid over or underfilling. Filling with a compressor/ pressure is not allowed.

4.5 Lining on walls of the freight container

Each manufacturer should establish the Flexitank lining because this shall be adapted to the used containers. There are numerous types of solutions. The lining can be applied to the floor and walls of the container, it should be insulating, resistant to water and moist and shall be free of over-extensions or grazes.

5. Operating procedures

5.1. General

Safety transport of liquid cargoes in Flexitanks, includes the selection of container, mounting, quality and design of the bag and the road transport leg of the entire Flexitank transport operation. It should be checked if the material to be carried is a non-dangerous good (see chapter 14 on SDS) and if the risk assessment has not revealed ([see section 3, "Risk assessment"](#)) any unacceptable risks or incompatibility of the product with the bag material.

Flexitank suppliers should provide a manual including the process description of the container selection, Flexibag fitting, container lining, bulkhead installation, loading, labeling and unloading. For the loading/filling of the Flexitank, it is recommended that a trained person, responsible for and knowledgeable about the correct filling and handling of the Flexitank, and another person, responsible for and with expertise on the loading equipment and facility, execute and monitor together the entire loading operation. This is consistent with principles for the loading of tank trucks and tank containers, as established in the [Cefic-ECTA-FECC Best Practice Guidelines for Safe \(Un\)Loading of Road Freight Vehicles](#).

A checklist for all container/Flexitank checks should be used ([see section 8](#)) and it is recommended to make pictures of the selected container, including all four sides and inside of the container, and the CSC plate. During all activities the required PPE should be used, based on the physical and chemical properties of the material to be loaded into the Flexitank.

5.2. Loading/filling

5.2.1. Container preparation

5.2.1.1. Visual outside check of the container

The container is preferred to be less than 5 years old, should have a valid CSC plate ([see section 4.1](#)). The suitability of the combination of the Flexibag and container should be checked according to manufacturer instructions and the loading limit according to manufacturers' specifications ([see section 4, "Equipment requirements"](#)).

A visual check of the container should be carried out to be sure that the container is structurally undamaged ([see Section 4 Equipment requirements](#)).

The exterior of the container must be free from 'dangerous goods' markings or markings relating to previous cargoes.

The container should have two proper operational locking bars on each door and doors must be able to be operated and secured as intended.

5.2.1.2. Visual inside check of the container

The container must be free of any previous damage.

Identical corrugations must be in place over the full length and there must not be a logo panel or any flattened corrugations.

The container must be dry, rust free, in a clean condition, free from sharp edges and from residue or odors of all previous cargoes.

Lashing fittings at bottom rails and corner posts should not be damaged as they could cause punctures.

Door recesses for bulkhead fixings must be in good condition and free from dents and obstructions.

5.2.1.3. Preparation and installation of the Flexibag

The following precautions should be taken for the preparation and installation of the Flexibag inside the container. The party who installs the Flexibag into the container should use a checklist ([see chapter 8. Checklists](#)) that includes all relevant points for a correct assembly of the Flexitank. In any case there must be a good coordination between the involved parties (Loader and CTU Operator) to demonstrate that all checklists have been completed:

- The inner wall of the container must be covered with protection layers that extend to the full height of the filled Flexibag (usually approximately 2/3 of the total container height). This is a protection of the Flexibag from abrading against bare material. Usually corrugated cardboard is used.
- During floor protection and Flexibag installation shoes should not be worn inside the container to avoid destruction of the protection material and to guarantee a clean surface. During the whole transportation process, it is not allowed to physically step on the Flexibag in order not to damage the Flexibag surface (e.g., sharp items in shoe sole).
- The Flexibag must only be fitted and positioned inside containers by specially trained personnel and placed in a position according to manufacturer instructions.
- The Flexibag should be visually checked for obvious damage.
- Installation of bulkheads should be carried out according to the manufacturers' instructions.

5.2.2. Filling/loading

- After Flexibag installation the filling process can start. The following precautions and recommendations are important: unintended movement should be prevented by securing the vehicle with wheel chocks.
- Check that bulkhead and valve used in the Flexitank system do not make contact with the interior container doors.
- The hose should be connected and secured to reduce the stress on the valve as described in the loading manual. The filling hose must be secured by using a hose support at the level of the valve to prevent stress on the hose and coupling.
- Filling must be done exclusively with tested, dedicated hoses that are stored in an appropriate manner by the filler.
- All valves must be in the correct position before starting the loading process.
- As an additional precaution, the container's left door must be properly closed before loading is started.
- Spill protection devices like a collecting bag or drip tray should be used.
- It should be ensured that no gases (air, nitrogen) enter the Flexibag before, during or after filling.

- After starting the pump, the tightness of the connections of pump and hoses should be checked.
- It is recommended to start the filling process with a lower filling rate (recommendation: 200 litres per minute until 2.000 litres have been loaded) and to increase the filling rate to the standard recommended flow rate. A standard filling rate of 500-700 liters per minute is recommended. The maximum filling rate must follow Flexitank manufacturer's specification. The product flow rate must accordingly be gradually lowered before completion, to avoid overfilling.
- Avoid pumping air in the Flexibag.
- The Flexibag must be filled to its correct capacity and tolerance according to the manufacturers' instructions.
- Two independent filling weight measures may be available on site to double check how much product has been loaded in case the major measuring equipment misfunctions.

5.2.3. Stop filling/loading

The following important recommendations for stopping the filling process should be considered:

- Stop filling once the target volume has been reached.
- Install appropriate measures to avoid spillage from the hose and the valve at the end of the loading.
- Care should be taken not to introduce air into the Flexibag.
- Ensure that the valve is fully locked in the closed position.
- Remove the loading hose once the filling is completed and place the valve cap onto the valve.
- Use a collection tray during the disconnection process.
- Check if there are any visually detectable leakages from the Flexitank.
- No part of the Flexitank or bulkhead should touch the doors when fully loaded. Close the right-hand door once finished and place the custom seal in its proper place.
- Check if there are any visible deformations of the GP freight container after loading.

5.2.4. Labelling/markings

The container shall display a mark to warn that the container is loaded with a Flexitank filled with liquid cargo in accordance with the provisions of PAS1008. Additionally, the gross weight of the fitted Flexitank, including the bladder, bulkhead, fitting material, shall also be mentioned on the marking. Markings shall be located on the Flexitank, in such a way that when fitted within a GP freight container, they are visible when the right-hand door of the GP freight container is open. A Flexitank warning mark shall be affixed to the outside of the left-hand door, in such a position that it is obvious to the operator and acts as a warning before opening the right-hand door.

The Flexitank warning mark shall not obscure any other markings present on the container. Marks shall have a minimum dimension of 210 x 297mm (A4) and are made of a material designed to remain intact in arduous marine conditions for a minimum of 90 days.

The warning mark shall contain a pictorial warning and text with as a minimum the following information:

- Keep left hand door shut.
- Container loaded with Flexitank, containing liquid cargo.
- No fork-lift.

5.3. Temperature

The temperature of the loaded product should not exceed the temperature specified by the Flexibag manufacturer, which should be in line with PAS 1008.

5.4. Unloading

The following important recommendations for the unloading process should be taken into account. In general, the precautions and recommendations mentioned for the loading process should also be considered during unloading (like using hose support or the supervision of unloading process):

- Right hand door of the CTU should be opened carefully.
- Left hand door should be kept closed until the Flexitank is substantially empty.
- The necessary measures for spill protection should be taken.
- All markings shall be removed from the container after the Flexitank has been removed from the container and the container is clean and safe.

5.4.1. Heating of cargo prior to unloading

Due to weather conditions during transport or because of the physical properties of the product, it may be necessary to apply a heating system to smoothen the unloading process. If there is a need to use heating systems, the method and devices used to warm up the product should be part of the risk assessment.

It is recommended to consider, but not limited to, the following elements:

- the heating media's (either electricity or steam) availability at unloading point should be checked in advance;
- the desired temperature should be kept below the maximum loading temperature specified by the manufacturer, calculated as specified in PAS1008;
- the influence of the Flexitank design should be considered, e.g., a multi-layer tanks versus single layer;
- an outer layer should be selected that is built of material which provides additional risk mitigation benefits such as:
 - mechanical stability to accommodate for the influence of the heating devices;
 - prevention of the occurrence of localized hot spots and potential loss of integrity due to thinning;
 - resistance to things like welding burs or sharp angles that could puncture the bag should the heating device protection become ineffective.
- the capability of the heating system to raise the cargo temperature should be taken into account, considering ambient cargo temperature and environmental temperature;
- ensure that only trained and competent personnel conduct the heating and that the SOP is followed during installation of the heating system;
- the cargo should be suitable for heating and have a melting point not exceeding the maximum temperature of the Flexitank;
- the cargo should remain static during heating;
- heating should be carried out close to the unloading point.

5.5. Flexibag disposal and assurance

After discharge of the Flexibag, the linings and all auxiliary equipment shall be removed from the container and safely disposed of or recycled for other use as agreed between the shipper and the consignee, in accordance with local regulations. The company responsible for the disposal or recycling of the Flexibag should be certified according to ISO 14001 or equivalent standard and where required shall be authorized according

to applicable local regulations. Used Flexibag material is not intended for recycling in Flexibag manufacturing due to potential quality issues.

5.6. Specific requirements for different modes of transport

Legal restrictions on the maximum authorized vehicle weight for road and intermodal transport shall be taken into account.

For sea transport the Verified Gross Mass (VGM) must be determined according to the SOLAS regulation.

5.7. Sampling

Taking samples from Flexibag can only be completed from the bottom valve. This should be carried out by trained operators using dedicated sampling device according to Flexitank supplier/user procedures. Sample may be not representative of the cargo.

The sampling procedure must follow and be part of a complete risk analysis where necessary equipment and PPE requirements are established.

Drivers should never be involved in the sampling process.

6. Flexitank manufacturer and operator qualifications

6.1. Flexitank manufacturer qualifications

Flexibag manufacturers should be listed on the COA Flexitank Quality Management List (FQML) with all required audits, i.e.:

- The manufacturer has implemented a Quality Management System according to ISO 9001;
- The manufacturer has an installation, operating and training instruction manual, revised at least every 3 years;
- Manufacturer has performed material tests, including loading and discharging valves, according to PAS 1008 with renewal every 3 years;
- The manufacturer has performed Flexitank system rail impact tests according to PAS 1008 with renewal every 5 years.

6.2. Operator qualification and training

Flexitank service providers should have in place a detailed installation, operating and training instruction manual. They should provide training to all parties in the transport chain, including shippers, loading and discharge operators, to ensure that all personnel have received training in both general awareness and their specific functions. Training requirements should be designed for all personnel engaged in the installation and operation of Flexitank systems. The training scheme should provide for the appropriate level of competence to ensure a safe and reliable Flexitank system. Training records should be maintained by the service providers.

6.3 Drivers skills for the road transport “leg”

Driver skills requirements have similarities with tank container transport so specific skills are needed for safe driving road transport of Flexitanks. Drivers should be trained in "Behaviour-based training - BBS" considering Flexitank transport of first and last mile part of the intermodal maritime chain.

Transport units with electronic stability control and anti-rollover system may support drivers in driving stability avoiding possible sloshing movements of the liquid against the walls of the container due also to the high center of gravity.

7. Incident Management

7.1. General

Incident management includes accident response and incident investigation.

For the purpose of this guideline the term “incident” includes accidents and near misses. An “accident” is a sudden event that is not planned or intended and that leads to injury or illness to people, danger to health and/or damage to property or the environment. A near miss incident might have led to injury or illness to people, danger to health and/or damage to property or the environment.

7.2. Accident Response

Accident response involves the actions taken immediately after the accident to deal with the consequential damage, like damage to the environment. In case of severe consequential damage, or a high risk for further consequential damage, emergency response needs to be initiated.

Accident response procedures, including emergency response procedures, should be developed and established before any service or operation involving Flexitanks is started. These procedures should include the details of response and emergency contacts in every country/region potentially impacted in case of an accident.

7.3. Incident Investigation

Incident investigation involves not only investigating but also reporting, analyzing and documenting actual safety, health, environmental or regulatory compliance incidents. Effective incident investigation provides the opportunity to learn from incidents and to use the information to take corrective action and prevent re-occurrence. This requires investigating and identifying the root causes of an incident and addressing these root causes by corrective actions. It also requires reviewing the effectiveness of such actions: whether they have prevented or mitigated the risk for recurrence of similar incidents.

The incident investigation process needs to be initiated as soon as immediate actions after the accident or near miss have been taken. Flexitank logistics operations are comparable to other logistics operations where packaging and packaging preparation activities are involved. Hence some Flexitank logistics incidents may require an investigation into how the Flexibag was fabricated, how the Flexibag was fitted into the container or how the Flexibag was filled. As a consequence, the incident report has to include reference information about the Flexibag, the Flexibag fitting and the Flexitank loading.

Similar to other logistics activities, there are many parties involved in Flexitank logistics. Since there are plenty of methods on how to investigate incidents, some parties involved in an incident may have their own method for investigating incidents.

When there is no agreed method available amongst the logistics partners involved in the Flexitank incident, the [“Cefic, ECTA, FECC Guidelines for investigation of logistics incidents and identifying root causes”](#) is recommended to assist in the incident management process. These guidelines assist in:

- the incident investigation;
- the root causes identification;
- the development of mutually agreed actions to prevent re-occurrence.

8. Checklists

The use of the following checklists is recommended as they ensure that all checks are performed consistently and can be part of a documentation process.

These checklists have been designed for the typical activities that take place in the supply chain of Flexitanks and are intended to be used for every Flexitank operation.

The checklists can only cover the most important key steps and relevant issues in the supply chain of Flexitanks and are therefore not exhaustive. These checklists must be adapted to the company's needs, taking into account the Flexitank manufacturer's recommendation and should be reviewed on a regular basis.

8.1. Checklist for container selection

- Is the container preferably less than 5 years old and upgraded to gross weight of 30.480 Kg?
- Are identical corrugations used over the full length of the container (i.e., no logo panel or any flattened corrugations)?
- Are all weld seams to side walls smooth and free from sharp edges, weld splatter and objects?
- Is the container free from any types of residues and previous cargo odours?
- Are there any damp floor stains or large burn marks on the container?
- Is the floor free from splinters and protruding nails, screws and other fixings?
- Are the inside walls and roof free of large areas of rust or flaking paint or holes?
- Are there any dents and obstructions at the door end?
- Are the structural parts of the doors free from buckling and dents?
- Are there two proper operational locking bars on each door?
- Is the door gear fixed and bolt heads on the inside of the doors free from sharp points and edges?
- Is the exterior free from hazardous markings or markings relating to previous cargoes?
- Did you make pictures of the selected container before fitting the Flexibag (all four sides and the inside of the container, CSC plate)?

8.2. Checklist for Flexibag installation

- Is the container warning label properly secured to the left side door?
- Is the container visually checked and thoroughly swept?
- Is the Flexibag placed according to the manufacturers' manual, e.g., protection on the floor, internal walls, bulkhead etc?
- Is the end cap/ plug closed (depending on Flexibag type)?

8.3. Checklist before Flexibag filling

- Tare-weighing took place (inspection of weighting ticket took place).
- Loading equipment requirements fulfilled (a suitable pump – positive displacement type is recommended, suction hose with a sufficient length, i.e., from tank to pump, transfer hose with a sufficient length, i.e., connection from pump to Flexitank, coupling adapters, hose support straps etc. are available).

- Wheels chocked and parking brakes engaged.
- Correct loading documents available and container number and the number on the tank correspond with the loading paperwork.
- Truck and the container are visually in good condition, max total gross weight rating of the container is not lower than 30,480 kg and preferably no older than 5 years
- Flexitank obviously folded correctly.
- Earthing cable to trailer connected and checked for electrical continuity.
- Check warning label and tag are present on left hand door (Left door remain closed and secured during loading of Flexitank. Never open left-hand door during loading of Flexitank).
- Connect hose based on the instructions of Flexitank Service Providers and support it using an adjustable strap or suitable stand.
- Install appropriate measures like a drip tray to collect primary loss of containment.
- Check Flexitank number and capacity to ensure it meet the target loading quantity.
- Check whether the wall lining is in good shape and no abnormal items hanging on the D-rings at ceiling, and no holes on the walls and ceiling.
- Check whether the bulkhead is installed firmly, placed parallel to door and not in contact with container interior doors. Board shall be free of crack. If fiber board is used, it is not impaired or damaged by rain or moisture.
- Check whether the valve is located right through the cut-out hole in the bulkhead and secured to the bulkhead and can be opened or closed smoothly.
- Check whether the reinforcement bars are in right place and secured to D-rings to prevent movement in transit, if they are installed.

8.4. Checklist during Flexibag filling

- Open the valve completely.
- Start pumping slowly with reduced flow rate (recommendation: 200 litres per minute) until 2.000 litres has been loaded. After reaching this figure a normal flow speed can be used but not faster than the max. rate that Flexitank manufacturer instructs.
- Avoid pumping air.
- Product loading temperature range according to manufacturers' recommendation.
- Safe filling rate capacity according to manufacturers' recommendation.
- Monitoring is carried out throughout the loading process to ensure the Flexitank remains centered and loads evenly.
- Inspect for leakage around valves and fittings during Flexitank filling.
- Halt loading when required volume/weight of product is reached.

8.5. Checklist after filling Flexibag

- Close the valve (ensure that the locking pin has been engaged before disconnection), put the cap on the valve and secure it.
- Inspect for leakage around valves and fittings.
- Maximum gross weight observed.
- note: Verified Gross Weight \leq Maximum gross Weight mentioned on Container door.
- Ensure right hand door is fitted with an approved customs seal.
- Check if earthing cable is disconnected.
- Check if wheel chocks have been removed.

8.6. Checklist for unloading of the Flexitank

Upon arrival

- Check the container number on container with the Flexitank number on transport documents.
- Check seal numbers with seal numbers on transport documents.
- Check that Flexitank walls are straight.
- ➔ If Flexitank is bulging, check if it is due to weak walls or to overpressure. If overpressure take the appropriate measures.
- Check that the container is not dripping.
- ➔ If dripping, take the appropriate measures (e.g., place the Flexitank in a spill containment area).

Checklist at the unloading station before unloading

- Check that required Personal Protection Equipment (PPE) is used.
- Check that Flexitank is parked in a spill containment area at the unloading station to allow the recovery of any leakage.
- If during the unloading the Flexitank is tilted with the help of a tilting trailer chassis, check that the trailer is well secured.
- If during the unloading the Flexitank is tilted with the help of a tilting trailer chassis, check that the Flexitank is parked on a slope.
- Check that Flexitank is blocked with two chocks in opposite directions.
- Check that Flexitank is grounded (if required).
- Check that during the whole unloading, the left-hand door remains closed.
- Check seal number on valve with valve seal number on transport documents.
- Check that the temperature of the product is compatible with the unloading equipment (if there are any requirements for temperature/viscosity products).
- ➔ If yes, take the appropriate measures (e.g., place the Flexitank in a headed shed).
- ➔ In cases where heater pads are used, check the pressure ratings
- ➔ Check site Health and Safety requirements where heater pads are used
- Check that the hose is properly connected and secured with a support.
- Check that drip recovery bucket in place.

Checklist at the unloading station during unloading

- Check that there is no drip during the unloading on the connections.
- Check that the hose support remains correctly positioned to avoid any constraints on the valve.

Checklist at unloading station after unloading and disconnecting

- Check that the bag is effectively empty.
- ➔ Follow the applicable procedure to empty the bag.

- ➔ Ensure that the Health Safety and Environmental requirements are met for tanks which require manipulation (rolling/folding) to facilitate a clean discharge and to minimize residue levels.
- Check that the bag with the remainder of products and the equipment of Flexitank are correctly recovered and stored according to the applicable recycling procedures.

9. Agents involved in the Flexitank distribution chain

The acceptance of the requirements proposed under these Guidelines by the Agents involved in the supply chain for transportation of liquid cargoes shipped and unloaded using CTU Flexitanks, are listed below, although this is not exhaustive. The following definitions are based on the “IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units (CTU Code) Chapter 2. Definitions”:

Shipper	The party named on the bill of lading or waybill as shipper and/or who concludes a contract of carriage (or in whose name or on whose behalf a contract of carriage has been concluded) with a carrier. Also known as the sender for road transport.
Carrier	The party who, in a contract of carriage, undertakes to perform or to procure the performance of carriage by rail, road, sea, inland waterway or by a combination of such modes. Can be further classified as: <ul style="list-style-type: none"> • Road haulier; • Rail operator; • Shipping line.
Loader	Party installing the Flexibag into GP 20-foot freight container (Fitting).
Filler	In general, this is the party filling the Flexitank. The legal responsibility depends on national and sectorial legislation.
Freight forwarder	The party who organizes shipments for individuals or other companies and may also act as a carrier. When the freight forwarder is not acting as a carrier, it acts only as an agent, in other words as a third-party logistics provider who dispatches shipments via carriers and that books or otherwise arranges space for these shipments.
Consignee	The party to whom a cargo is consigned under a contract of carriage or a transport document or electronic transport record. Also known as the receiver.
Unpacking agent (Unloader)	The party removing the Flexibag from a GP 20-foot freight container.

CTU Operator	The party who owns or operates the GP 20-foot freight container and provides empty freight containers to the consignor/shipper/loader.
Flexibag Disposer (Waste recycler, Waste agent)	Consignee of empty uncleaned Flexibag i.e., the person or undertaking under the jurisdiction of the country of destination to whom or to which the waste is shipped for recovery or disposal.

Specific responsibilities shall be signed in a contractual agreement that clearly establishes all the functional and legal responsibilities. Responsibilities may be identified too in the modal ordinary regulation if no contract has been signed.

10. Definitions and Abbreviations

20 foot GP Container	20 ft standard container, which is universally applicable (General Purpose).
Bulkhead	The bulkhead is a protective and retaining wall for the Flexibag and can have different forms (e.g., Delta Frame Bulkhead with two triangles get wedged into each other while fitted into the box container). Bulkheads are made of steel.
Carria	Carriage, as used in this document, refers to the transportation of a product by a Flexitank service provider (FSP).
COA	Container Owners Association is an international organization representing the common interests of owners of freight containers. The principle aims of the COA are to promote common standards and safe use of containers. This Organization published the COA Code of practice for a single use Flexitank system.
CSC plate	Under the International Convention for Safe Containers (CSC), each freight container is required to bear a safety approval plate permanently affixed to the rear of the freight container, usually the left-hand door.
CTU	Cargo Transport Unit means in this Guideline the Flexitank system with the Flexibag fitted in the 20 ft GP Container.
Dangerous Goods	The product is classified as dangerous goods for transport (dangerous goods class 1 – 9 according to the United Nations (UN) “Recommendation on the Transport of Dangerous Goods”).
Flexitank	Flexitank, also known as a Flexitank system, is a soft, light bladder (also called Flexibag), typically made of polyethylene, available in volumes up to 24.000 litres, fitted within a standard 20-foot GP container.
H Phrase	The H phrases (hazard statements) describe hazards emanating from the chemical substances or preparations.

Hazardous Substances	The product is classified as hazardous substance according to the “globally harmonized system on the classification and labelling of chemicals (GHS)”. Derived from GHS hazardous substances may be classified according to regional regulations like “regulation on the classification, labelling and packaging of substances and mixtures (CLP) for the European community”.
IMDG Code	The IMDG Code (International Maritime Dangerous Goods Code) is the transport regulation for dangerous goods in maritime transport and is issued by the UN organization "International Maritime Organization" (IMO).
SDS	Safety Data Sheet
PAS 1008	Publicly Available Standard 1008 for the Specification for the performance and testing of a single-use Flexitank.
PPE	Personal protective equipment (PPE) is protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury or infection.
SOLAS	The International Convention for the Safety of Life at Sea, 1974 (SOLAS), is a UN convention on maritime safety. The SOLAS Convention in its successive forms is generally regarded as the most important of all international treaties concerning the safety of merchant ships.



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