Guide of Good Practices for the Transport of Wine in Flexitanks

- Introduction and background ................................................................. 3
- A. Selection of Flexitank
  A.1 Choice of Flexitank ............................................................... 4
  A.2 Flexitank Identification ........................................................... 4
- B. Selection of Container
  B.1 Container Selection Checklist .................................................. 5
  B.2 Container Condition Checklist .................................................. 5
- C. Flexitank Fitting to Container
  C.1 Flexitank Handling ................................................................. 6
  C.2 Tank Fitting Location ............................................................... 6
  C.3 Tank Fitting Procedure ............................................................. 6
  C.4 Tank Fitting Materials Checklist ............................................. 7
  C.5 Bulk Head ................................................................. 8
  C.6 The Bottom Valve ............................................................... 8
  C.7 Closing the Container Doors ................................................... 9
  C.8 Labelling of the Container ...................................................... 9
  C.9 Documentation ................................................................. 9
- D. Wine Loading
  D.1 Wine Quality – Preparing the Wine for Transport in Flexitank .......... 10
  D.2 Preparation of Loading .......................................................... 10
  D.3 Loading the Wine ............................................................... 11
  D.4 Top Valves ................................................................. 11
  D.5 Bottom Valves ............................................................... 12
  D.6 Sampling ................................................................. 12-13
  D.7 Disconnecting the Hose ....................................................... 14
  D.8 Closing the Container .......................................................... 15
  D.9 Seals ................................................................. 15
  D.10 Documentation ............................................................... 15
  D.11 Leaving the Container ....................................................... 15
- E. Transporting the Flexitank
  E.1 Trucking the Flexitank ........................................................... 16
  E.2 Transporting the Flexitank by Railway ........................................ 16
  E.3 Shipping the Container Overseas ............................................. 17-18
- F. Discharging the Wine from the Flexitank
  F.1 Positioning the Container ....................................................... 19
  F.2 Container Check ............................................................... 20
  F.3 Opening the Container .......................................................... 21
  F.4 Wine Quality Control ........................................................... 21
  F.5 Discharge ................................................................. 22
  F.6 Empty Flexitank ............................................................... 22-23

Document published September 2008 by Performance BiB
Site: www.b-i-b.com
e-mail: Performance@b-i-b.com
Layout and editing: Bent C Tryk A/S, Denmark
Technical coordination: S.a.r.l. Intersection Communication, Montpellier, France
Printing: Arceaux 49, Montpellier, France
Photos on cover: Laura West
The images remain property of the photographers.
Program financed by the Languedoc Roussillon Region within the “Contrat de Filière Agroalimentaire” budget and by the Drire.
**Introduction and Background**

The flexitank transport system is the largest bag-in-box system and in its basic form consists of a large flexible plastic bag and a dry-goods shipping container. Sizes are usually 24,000 litres for the flexitank and 20’ for the container. The bag is positioned inside the container and then filled with fluid. After transport, it is emptied at the destination.

This apparently simple process has, however, raised a certain number of issues.

With this guide, we address the majority of known issues related to the *Transport of Wine in Flexitanks* and offer general solutions to make the flexitank transport system safer and to secure the quality of the wine transported.

In brief, the following recommendations are issued in an attempt to:

a) raise the quality of wine transported in flexitank
b) lower the rate of incidents caused by wrongful handling of flexitank, container or wine
c) create a better mutual understanding among the partners involved in the process – flexitank suppliers, wineries, shipping companies, surveyors and insurance companies

Even though this publication is intended to lower the rate of incidents with flexitank transport of wine, it is still strongly advisable for each player to have procedures for handling of claims in place. If a claim is to be made, evidence must be available, and procedures must have been followed for identification of the responsible party.

Each section is written for one link in the process:

A) Selection of Flexitank
B) Selection of Container
C) Flexitank Fitting (into the container)
D) Wine Loading
E) Transport of the Flexitank
F) Discharging the Wine from the Flexitank

The pages of this publication may be copied and used as checklists in each step of the process or as inspiration if a business wishes to create its own checklist. However, it is important to note that it is each company’s responsibility to make sure that the practices adopted are fully compliant with their specific conditions and legal requirements. Neither the author of the present document nor the Performance BiB Association will be held responsible for the consequences of the application of these recommendations, but the guidelines represented will hopefully be of help when procedures for the handling of wine and flexitanks are established.

I wish to thank Performance BiB members, V&S and other contributors:


*Svendborg, Denmark, August 18th 2008*

*Laura West*
A. Selection of Flexitank

A.1 Choice of Flexitank

- Accept single use flexitanks only.
- Prefer ISO 9001-certified manufacturers.
- Ensure correct flexitank size (max. 24,000 litres).
- Accept only flexitanks with proof of material properties:
  - material suitable for contact with food stuffs (according to EU and FDA/US).
  - efficient gas barrier (for an update on specific and relevant up-to-date industry standard values, refer to www.b-i-b.com).
- Consider any recyclability of the flexitank materials.

Wrong: Unsuitable materials may not last the journey.
Choose the flexitank with care.

A.2 Flexitank Identification

Flexitank should be marked with

- Name of manufacturer
- Individual number for identification – must be visible from right hand container door when flexitank is full.
- “Food Use”-marking – must be visible from right hand container door when flexitank is full. Compulsory for shipments into the EU.

Correct: Flexitanks must be individually numbered.
B. Selection of Container

B.1 Container Selection Checklist

The container
- **MUST** be made of 2.0 mm steel (1.6 mm is too weak and must be reinforced with 2.0 mm at ends and corners).
- sides and end must be fully corrugated – NO flat decal panels!
- must be rated a minimum of 5,000 kg above the flexitank load.
- must have vertical recesses in door pillars.
- must have a minimum of 2 locking bars, each with two locking brackets.
- should preferably be at least 6 months of age.
- should preferably have a steel floor (although this is very rare).

B.2 Container Condition Checklist

- **NO ODOUR** in container from paint or previous goods at moment of opening container doors – aeration in an attempt to help or cure is **NOT** permitted!
- **NO PUNGENT ODOUR** in container after 15 min of doors closed.
- Container floor must be clean and absolutely **free of objects**.
- no protruding bolts or nails.
- NO splinters, burrs or holes.
- Container walls must be smooth:
  - **NO SHARP EDGES**.
  - **NO BURRS** on container floors or walls.
  - Perform the Glove Test* as part of container control.
- Container walls must not show signs of fresh paintworks.
- Container must show **NO** signs of any deformity and be free from rust or any damage.
- Door latches must not be bent or broken.

* Glove Test: With a cotton glove on your hand, run it over all surfaces to check for edges and burrs. If hand/glove moves freely, container surfaces are fine. Please also refer to Container Owners’ Associations standards.

Is this fresh paint? Does the container smell after 15 minutes with doors closed?
C. Flexitank Fitting to Container

C.1 Flexitank Handling
- Transport new and unused flexitank in stable box of low inner friction.
- Do not step on a flexitank or a box containing a new flexitank; if you must step on a flexitank, do NOT wear shoes.

C.2 Tank Fitting Location
Flexitank fitting should take place
- under cover
- on sealed surface
- wind protected
- dust and gravel free
- with NO smoking!

C.3 Tank Fitting Procedure
Observe the following during the fitting procedure.
- Allow trained staff only
- Do not step on a flexitank
  - If you must, do NOT wear shoes
- Instructions from flexitank provider must be carefully followed
  - These may be very specific
- Do NOT alter or force flexitank, valves or fitting materials in ANY way, as construction may suffer.
- NO smoking!
- If flexitank is damaged in any way, it must be rejected
- If there is a problem with the fitting, contact flexitank and/or fitting material supplier.

Correct: Never wear shoes when fitting a flexitank.
C.4 Tank Fitting Materials Checklist

- Use NO cardboard.
- Use NO wood.
- Use NO smelly material.
- Use NO material which may absorb and release odour.
  - If in doubt: smell at it. Mouldy or solvent-like smells may affect the wine.
- Bulk heads must be those recommended by flexitank producer, be free of defects and have sufficient strength.
- Remember case for sample bottle if required.

Reject unsuitable containers and fitting materials, even though immediate shortage may occur. In the long run, this will improve future deliveries and reduce insurance claims.

Correct: A flexitank is being installed (Trans Ocean Flexitank).
C.5 Bulk Head

- The bulk head is a vital part of the flexitank concept designed for the use with a specific flexitank only.
- Bulk head must be fitted in exact accordance with specific instructions from the supplier.
- Bulk head must not be made of wood.
- Bulk head must be very firm and fixed with great care.

Wrong: Bulk head does not lock properly.

Wrong: In this case, the valve is protruding. The flexitank fitting should be rejected. Rough handling may cause the construction to fail! Bottom valves need sufficient space.

C.6 The Bottom Valve

Valves, and in particular bottom valves, are weak points in the flexitank construction. If the flexitank has a bottom valve

- show particular care to it.
- secure valve at the correct angle.
- ensure correct support.
- secure the valve with a clip, if provided.
- make sure the valve is closed during and after fitting.
- cap (if available) must be placed over valve.
C.7 Closing the Container Doors

- Closing the container doors must not affect the flexitank or the fitting.
- The fitting is incorrect or the container inadequate if the doors interfere with:
  - the flexitank or.
  - the fitting materials or.
  - in particular with the valve.

Fitting must be corrected before loading, or the performance of the flexitank may suffer severely.

C.8 Labelling of the Container

Labelling of the container is not compulsory, but it may prevent serious accidents.

- Place flexitank door opening warning on left hand door.
  - Size minimum A4.
  - Languages: English and Spanish plus sketches (see illustration).
- Warning on door handles.
  - Size minimum A6-A7.
  - Languages: English and Spanish.
- Warning on side of container.
  - Size A4-A3.
  - Colour: Bright.
  - Languages: English and Spanish.

C.9 Documentation

- Paperwork should list:
  - container number.
  - flexitank number (and type if relevant).
  - all seal numbers.
  - location, date and time of fitting.
  - name of person responsible for fitting including a contact phone number.
  - signature of person responsible for fitting.
D. Wine Loading

D.1 Wine Quality – Preparing the Wine for Transport in Flexitank

Wine must be
- cold stabilised and adequately filtered**
- sulphur stable at all times**
- microbiologically stable**
- preferably low in sugar**
- adjusted in SO2 to 45-55 mg/l immediately before loading**
- low in dissolved oxygen (aim at below 1 mg/l)
- low in CO2 – preferably 0.6 g/l
- (however, depending on wine, shipping lane and destination, up to 1 g/l may be acceptable)**

* Sharp-edged precipitations in tank during transport may damage material.
** If wine is not stable, undesired fermentation may occur. This may cause the container to bulge and in extreme cases cause the flexitank to burst under great pressure, which may severely injure individuals in the proximity of the container! SO2-adjustment and stability are means to prevent such unwanted fermentation.
*** Bulging of the container may occur if CO2 is released due to strong movements and/or hot conditions; low CO2 levels are therefore important.

D.2 Preparation of Loading

- Open right hand door only! Do not open left hand door at any stage
- Upon opening container door, check for pungent or mouldy smells
- Visually check the flexitank for damage or faulty fitting
- Check and verify container number
- Check and verify flexitank number

In case of any discrepancy, contact fitting depot.

Correct: Inline filtration of wine during loading.
Correct: Using a flowmeter to measure the amount of wine during loading.

Photo: Laura West
D.3 Loading the Wine

- Hygienic measures must be taken very seriously and all possible sources of contamination excluded.
- All hoses, pumps and valves must be sterile.
- Feeding hose to flexitank must be adequately supported during loading in order to protect valve; if necessary, use strap, bucket or similar support.
- In line filtration: depth filtration followed by 0.2-0.65µm membrane filtration.
- Use calibrated flow-meter during loading.
- Follow any specific instructions from flexitank supplier (may be specific for each flexitank-design).
- NEVER overfill the flexitank*.
- NEVER underfill the flexitank*.
- If wine amount is insufficient, contact flexitank supplier prior to hauling.
- Note exact amount of wine measured via flowmeter on commercial documents.

* Overfilling or underfilling the flexitank will lead to stress of flexitank material and container.

D.4 Top valves

- If the flexitank has a top loading valve
  - make sure the flexitank is not damaged during the loading procedure by.
    - working on top of the flexitank, or
    - using an unsupported hose
  - rinse flexitank surface and valve thoroughly after loading
    - Disinfecting with ethanol is recommended
- If the flexitank is fitted with a vent valve, make sure the hose is flushed thoroughly with wine from the flexitank and left filled with the wine. Rinse thoroughly afterwards.
- When working on top of a flexitank, there may be specific or local health and safety procedures to consider.
D.5 Bottom Valves

- If the flexitank is fitted with a bottom valve, make sure the feeding hose is supported adequately.
- After filling, close valve, rinse it and place cap over opening.

D.6 Sampling

- All samples must be drawn from sample tap directly at flexitank valve
  - If drawn from storage tank, they are not considered valid.
  - If drawn from flexitank after loading, they are no longer valid.

- Number and storage of samples to be drawn must be agreed on between
  - wine supplier
  - flexitank supplier
  - forwarder
  - wine recipient
  - insurance agents
• Recommendations for sample validity
  - Use glass bottles
  - Fill them as high as possible
  - Store samples cold

A sample to follow the bulk load may be required; it may be placed in a special device in the bulkhead, if bulkhead is designed for this. On arrival, this sample is bound to differ in taste from the bulk load, as it has been exposed to more heat and oxygen and is therefore of limited value for sensory comparison.

Samples stored at winery premises should be kept a minimum of 3 months at a temperature of preferably below 5°C, and at no stage above 10°C.

Wrong: Top valve flexitank at time of arrival; flexitank has not been cleaned after loading.
Correct: Rinse valve and bulk head carefully after loading.

Wrong: Valve at time of arrival; valve has not been cleaned prior to shipment.
Correct: Wipe dry before closing the doors.
D.7 Disconnecting the hose

- Make sure that no wine spillage is left.
  - Rinse spillings off.
  - Wipe dry.
  - Ideally, disinfect with ethanol.
- Follow all instructions from the flexitank supplier.

Correct: Bulk head in place, flexitank filled, cleaned and ready to ship.

Wrong: Bulk head is an instable construction and does not offer sufficient support; valve has not been cleaned after loading; valve is protruding and will interfere with doors.
D.8 Closing the Container

- Make sure all valves are properly shut and secured and all caps and covers in place.
- If main valve is squeezed by the container door, the flexitank fitting is incorrect.
  Valve should NOT be forced into position. If forced or tampered with, valve may leak during voyage causing wine losses as well as damage to other goods.
- Ensure sufficient space between valve and door for the valve to move slightly during sea transport.

D.9 Seals

- Container doors and all valves must be secured with individually numbered metal seals.
- Seal numbers must be transferred to report following official documents.

D.10 Documentation

- Documents should include:
  - name and address of winery loading the wine.
  - wine name and vintage.
  - cellar tank number.
  - flexitank manufacturer particulars.
  - individual flexitank number.
  - individual container number.
  - location, date and time of loading.
  - name and contact phone number of relevant contact for wine loading.
  - signature of person responsible for wine loading.

D.11 Leaving the Container

- Hot and temperate climatic zones:
  - Do NOT leave the container in the sun, as sunlight heats container walls very fast.
  - Always seek as cool and shady a position as possible.
    - Heat has a negative impact on wine quality.
    - Heat may affect flexitank materials and allow increased oxygen and contaminant ingress.
- Cold climatic zones:
  - Do NOT leave the container to freeze overnight.
    - Small crystals of ice from wine or condensation may damage bag and barrier during transport.
    - Wine may precipitate under cold conditions.
    - General wine quality may suffer if wine is frozen.
E. Transporting the Flexitank

In the transport link, always keep an eye out for containers marked with flexitank labels.

E.1 Trucking the Flexitank

Caution! – The contents of the flexitank are unhampered, and the flexitank material is flexible. The load moves heavily and unpredictably.

- All movements during haulage must be very gentle.
- Abrupt braking should be avoided.

E.2 Transporting the Flexitank by railway

Some flexitank operators may not recommend railway transport due to high stress on flexitank and container.
Different railway lines and different operation systems are reported to cause different levels of stress.
Follow any recommendations from flexitank provider.
E.3 Shipping the container overseas

- Choose a direct lane.
- Avoid routings with transhipments – particularly in tropical regions.
  - Heat exposure is much higher on land than on the sea.
- If transhipment is inevitable, any stop-over should be very brief.

On board the vessel:
- Whenever possible, the container should be stowed away from any heat source.
  - Heat sources include: sun, engine, powered refrigerated (reefer) containers, panel walls below deck with heated oil, others.
- To avoid stress on flexitank and load, stow container in a position where extreme movements are less likely to occur.
- Whenever the container is handled, look out for:
  - spillage (from leaking flexitank)
  - bulging container walls (from poor container quality, drops during handling, or uncontrolled fermentation)
- Avoid dropping container even just a few centimetres. The unusually heavy load will damage the container.

It is often recommended to stow wine containers below deck; but temperatures below deck may be higher than on deck.

Containers are moved quickly and efficiently.
Wrong: Dropping, rough handling, manipulation of bottom valve or the presence of foreign objects or sharp edges in the container may result in leakers.

Conditions at place of arrival may differ from conditions at place of departure.
F. Discharging the Wine from the Flexitank on arrival at destination

Note: Discharge should always take place on a site where trailer/container can be positioned with a slight slope toward the container doors. This allows the wine to flow more freely to the valve.

All overseas transports must – for traceability and liability purposes - be accompanied by relevant documents, including wine analysis, certificate of origin for wine and description of quality and quantity, customs papers, shipper’s reference, exporter’s reference etc. These documents must be kept and recorded in case of a claim.

F.1 Positioning the container

- Bottom valve flexitanks should be discharged from a ramp with a slight slope towards the valve end of the container (doors). The slope will reduce residues – wine lost – in the flexitank considerably.

Correct: A ramp with a slight slope towards container doors should be used when unloading the wine. This will make the unloading procedure much more efficient. This container shows some dents and other signs of wear.

It is accepted as the weaknesses are in the upper regions only, which do not support the weight of the flexitank. Note No Smoking sign on wall.
F.2 Container Check

- Make sure that container walls are straight.
  - If container walls are bulging, estimate whether this is due to weak container material or to overpressure inside container.
  - If in doubt, leave container untouched. If strongly bulging, it may violently burst!
  - Take photos.
  - If container is only slightly bulging, take photos.

- Check container for dripping wine.
  - If wine is dripping from container, take photos and immediately contact shipping/transport agent.

- Compare container number on documents with actual container.
- Compare seal numbers on documents with actual seals.

Correct: Check security seal numbers before opening the container.
F.3 Opening the Container

- Cut door seals and carefully open right hand door ONLY. DO NOT open left hand door.
- If container releases a strong odour, describe odour on reception report.
- If flexitank is larger than normal, or even reaches the container top, leave flexitank.
- Do not touch. Take photos.
- If bulkhead has moved out of position, take photos.
- Check seals on valves. Compare numbers with numbers on document.
  If numbers are not identical, investigate; the responsibility is yours.
- If there is any doubt, or if theft is suspected, no wine must be discharged.
  Surveyor must be summoned.

F.4 Wine Quality Control

- Draw samples either directly from flexitank or from a valve placed immediately after flexitank discharge valve. Use a suitable devise, e.g. cap with mounted sanitizable tap.
- All equipment must be clean.
- If possible, check oxygen content in wine directly from flexitank.
- If possible, measure wine temperature directly from flexitank.
  It should be between -2 and +20ºC.
- Analyse freshly collected sample for:
  - sensory aspects (tasting – including wine-foreign aromas).
  - free sulphur.
  - volatile acids.
  - CO2.
  - other important parameters.
- Note all data in wine reception form/flexitank reception form.
- Compare results with preshipment data.
  - In case of any major deviation, consider rejection of the wine.
  - Immediately notify wine supplier and shipping agent of a possible claim.

For any deviations, have a prepared plan of internal and external action.
F.5 Discharge

- DO NOT ever discharge with air pressure.
- If wine appears sound, connect hose and discharge wine. A calibrated flowmeter should always be used.
- Discharge preferably over depth filter into freshly cleaned and disinfected storage tank.
- Ideally adjust temperature during discharge to approx. 15ºC.
- Flexitank should collapse by itself when emptied, and residuals in the tank should never exceed 50 litres.
- If amount shown on flowmeter differs from amount stated on bill of loading, investigate:
  - Is the missing amount still in the flexitank? If yes – do NOT cut flexitank open to access the wine.
  - If no – notify supplier that the amount delivered was too small.

F.6 Empty Flexitank

- The empty flexitank should be recycled if possible.
- For best recycling, cut tank open and let the wine empty out. This wine is waste and should be dealt with in accordance with your best disposal practice. Large amounts of wine waste may present an environmental hazard.

For more information, including shipping lane temperatures and levels of humidity, please visit www.b-i-b.com.

For general information on flexitank, container and incident handling, please refer to Container Owners Association’s Industry Standard for Safe Flexitank Manufacture and Operation.
Wrong: Container / bulk head are being cut to fit at time of wine loading.
NEVER manipulate flexitank, bulk head or container.
Wrong: Sparks from the angle grinder may damage the flexitank.
NEVER use fire and NEVER smoke when working with flexitanks.
Use common sense at all times!