

Samples – your best defence



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Have we ensured that the cargo is shipped in apparent good order and condition? In this article, we will look at best practices that members can follow to ensure they have a good defence when facing alleged contamination claims.

What's the problem?

One of the functions of the bill of lading is that it is the evidence of receipt of the goods on board. It is the duty of the master to ensure that the information shown on the bill of lading is accurate, including that regarding cargo quality. However, in most cases, the ship's staff are not able to assess the condition of the cargo on a tanker, due to loading via a closed system and limited resources on board to check the quality of the cargo. Also, although the master has every right to clause the bills, we have seen that most charterparties require a clean bill of lading. As a result, bills of lading may not be an accurate reflection of the quality of cargo on board.

Most cargo contamination claims are brought against the member at the discharge port. In most cases, the onus lies on the shipowner to prove that the contamination did not occur on board. Given the difficulties identified above, the ship becomes an easy target even if she was not at fault and the cargo was contaminated before it was loaded. Under these circumstances, sampling becomes vital as it can provide the shipowner with an important means of confuting any alleged cargo contamination claims.

When to take samples

It is very important to take samples at each of the stages of loading and discharging so that they can be compared, to identify the source of the contamination. The stages are:

1. Shore tank sample prior to loading.
2. Manifold sample at the start of loading, preferably with the manifold valve closed if possible; thereafter, spot checks should be carried out during the whole loading operation.
3. Manifold samples during loading whenever there is a change in the shore tank.
4. First foot samples from the cargo tank once cargo is received in the tanks.
5. Final cargo tank samples after completion of loading.
6. Cargo tank samples prior to commencement of discharge at the discharge port.
7. Manifold samples at the start of discharge.
8. Shore tank sample at the discharge port if there is any pre-existing cargo in the tank.

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Who should take the samples?

Cargo surveyors attending at load and discharge ports are more often than not attending on behalf of the shipper and the consignee, and are not obliged to provide samples to the ship. The ship might be handed a sample at the load port for delivery to the receiver at the discharge port. This sample is not the property of the ship. Whether samples are provided to the ship or not, it is recommended that the ship's crew draw samples to protect the interest of the shipowner. Every effort should be made to get the cargo surveyor to sign and seal these samples; however, if the surveyor declines, then a senior officer should sign and seal the sample, and keep it in their safe custody. It is recommended that a ship's officer always supervises the sampling on board to check that the correct and safe sampling procedure is used based on the material safety data sheet (MSDS) of the cargo and that the sampling equipment and bottles are in a good and clean condition appropriate to hold the sample.

Sampling procedure

It is difficult to generalise the sampling procedure for the various liquids which are carried in bulk because of the diversity of the cargoes, the variety of loading procedures and the differing effects on human health and the environment. Safety is vital and utmost care should be taken to avoid any exposure at the time of sampling. Certain chemical cargoes might also require antidotes to be carried on board in case there is exposure to the chemical. The MSDS should be reviewed and the crew should have appropriate training before they undertake any activities where the risk of exposure is high. Hazards must be mitigated by the correct use of personal protective equipment and other safety equipment.

Samples should be drawn in compliance with the industry best practices as set out in publications such as:

- *ASTM D 4057 – Standard Practice for Manual Sampling of Petroleum and Petroleum Products;*
- *ASTM E 300 – Standard Practice for Sampling Industrial Chemicals;*
- *BS 3195 – Methods for Sampling Petroleum Products;*
- *BS 5309 – Methods for Sampling Chemical Products;*
- *API Manual of Petroleum Measurement Standards, Chapter 8 – Standard Methods of Sampling Petroleum and Petroleum Products;*
- *ISO 5555 Animal and Vegetable Fats and Oils – Sampling.*

In general, a 'running' sample taken by use of a bottle and sample cage is the preferred method; however, for non-homogenous cargoes, zone sampling is required to produce a representative composite sample. The properties of some chemical cargoes require that special sampling procedures be adopted such as excluding air, using specialist sample valves or 'closed' sampling methods due to the toxicity or flammability of the cargo. Appropriate safety procedures must be observed and the person taking the samples should always be protected from exposure to the cargo.

Sampling equipment

Sampling equipment and bottles come in a variety of shapes, materials and sizes. Selection of the equipment and the container should be based on the product to ensure that there will be no interaction between the product and the container, which could affect the integrity of either. The following should be considered as a general guide:

- Internal surfaces should be designed to minimise corrosion, encrustation and clingage.
- Inspection cover/cap should be of sufficient size to facilitate filling, inspection and cleaning.
- Sample containers should be clean and free from all substances (such as water, dirt, lint, washing compounds, naphtha and other solvents, soldering fluxes, acids, rust and oil) that might contaminate the cargo sample. Reuse of containers should be avoided; however, if necessary, the containers should be cleaned by a method that has been determined as acceptable for the intended use, for example, by rinsing with a suitable solvent.
- The equipment should be designed to allow safe transfer of the product both from the tank to the container and from the container to the analytical apparatus without affecting the sample product or the safety of the person handling the sample.
- The sampling equipment should be cleaned using a method that has been determined as acceptable for the intended use, for example, by rinsing with a suitable solvent.
- The sample container should be large enough to contain the required sample volume and have sufficient ullage space for expansion and mixing of the sample.
- Glass containers are suitable for many test and storage requirements. Clear glass bottles can be easily examined visually for cleanliness, and allow for visual inspection of the sample. Dark glass bottles offer protection to cargo samples that are affected by light.

- Plastic bottles may be used for certain liquids after ensuring that the sample would not be affected by problems such as solubility, contamination or loss of light components, or would not lead to failure of the sample bottle.
- Certain products can be stored in metal (tin, aluminum or stainless steel) cans. However, it is difficult to check the cleanliness of the cans prior to use. Certain products might become contaminated due to oxidation and corrosion on the can surface.
- Sample bottle closures/caps vary in their chemical resistance depending on the sealing insert. Appropriate sealing caps should be used. Waxed cardboard disc inserts are suitable for most petroleum products. Aluminum disc inserts are unsuitable for acids and alkalis.
- The master should ensure that adequate and appropriate sampling equipment and containers along with labels and seals are available on board, especially when the ship carries different grades of cargo.

Checking of samples

Ship staff might not have the means to analyse the sample, but should be able to check for:

- general physical appearance;
- colour and brightness;
- presence of water (if apparent);
- odour and taint (for non-toxic cargoes – refer to the MSDS for the cargo);
- other physical impurities visible to the eye; and
- the approximate pour point of the cargo if it is heated cargo.

Loading of cargo should be stopped immediately if the manifold samples show such apparent deviations. Further investigation should be carried out and the master should note protest. We recommend the member to also notify the club.

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Labelling and storage of samples

All samples drawn should be sealed, labelled, retained and recorded. The following information should be recorded on the labels and the sample log for easy cross-reference and traceability:

1. Ship's name and operational status before loading, after loading and before discharge.
2. Product name.
3. Sample source – tank number, manifold number.
4. Sample type – top, middle, bottom, dead bottom, running, composite.
5. Identity of sampler – surveyor, crew member.
6. Date and time.
7. Location – port, berth, anchorage.
8. Seal number.

Sample bottles should be sealed in order to preserve the sample in the event of a dispute. Ship staff should ensure that the correct seal numbers are recorded in the sample log and other cargo documentation. Marked samples should be retained in a dedicated sample locker, ideally for at least 12 months. Samples should not be exposed to extreme temperatures and should be kept in darkness. When no longer required, disposal should be by the appropriate means in accordance with MARPOL requirements. Samples of cargoes that are known to react should not be stowed together.

Conclusion

It is very important that a strict and diligent sampling procedure is adopted and included in the ship's operations manual and that the staff are trained appropriately to follow the best practices required to carry the various grades of cargo that the ship transports.

