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Economic Commission for Europe

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Working Party on the Transport of Dangerous Goods

Joint Meeting of Experts on the Regulations annexed to the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN)

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Agenda item 4 (b)
Proposals for amendments to the Regulations annexed to ADN: Other proposals

Opening of openings in the cargo tanks

Required operational measures concerning cargo tanks

Submitted by the European Barge Union (EBU), ERSTU (European River Sea Transport Union) and the European Skippers' Organisation (ESO)

Introduction

1. Prior to tankers being unloaded, the cargo is sampled before being pumped over into the shore tanks. This can prevent a new cargo from the tanker adversely affecting the quality of the product already held in the shore tanks - or causing other problems. What is less well known, on the other hand, is that in addition to the sampling of the cargo there are now numerous measures performed on cargo tanks for inspection purposes that are carried out by employees of the transshipment site or by specialist companies (see annex 1).

2. The regulatory authority has singled out the removal of cargo samples from cargo tanks from the list in annex 1 and subjected them to special regulation: according to Table C of the ADN the use of an enclosed sampling device is prescribed in the case of approximately 100 cargoes (referring to rows in Table C). A partially enclosed sampling device is to be used in the case of 180 cargoes (referring to 180 rows in Table C). In the case of the remaining cargoes (also approx. 180 rows in Table C) open sampling is possible via the sampling port. Protection objectives fall within the ambit of environmental protection, security and health protection. If the product characteristics so require, cargo tanks should remain sealed as far as possible.

3. Most of the inspection measures referred to in annex 1 require the cargo tanks to be opened. To this end, after a ship has been loaded in accordance with 7.2.4.22.1, the prevailing overpressure in the cargo tanks needs to be reduced by opening the release device for a period of at least 10 minutes. For the remaining inspection measures it is then permitted to open the cargo tanks in accordance with 7.2.4.22.2. The very act of venting the cargo tanks, which are typically under pressure after filling, means that a release of gaseous components of the cargo to the ambient air is unavoidable. There is no alternative to venting.

4. There are different technical solutions for the sampling devices. Annex 2 shows the most prevalent solution.

Description of the problem

5. Both partially enclosed, and especially also enclosed sampling – where this is consistent with the legislator's thinking – cause considerable practical difficulties. Because changing cargoes is the norm in tanker shipping, the sampling device must be clean before sampling. The provision of cleaned (but typically new) bottles to accommodate the samples is not a problem. However, flushing the shipboard components of the device entails serious problems:

a) Flushing is a process whereby any residues of the previous cargo, or water, is flushed out of the system before the actual sample can be taken. The duration of the flushing procedure is a measure fraught with uncertainty because it is not known whether and to what extent the device is contaminated. Flushing operations easily generate a quantity of between 5 -10 litres per tank of the cargo subsequently to be disposed of. For a vessel with 8 cargo tanks that corresponds to as much as 80 litres.

b) It transpired from a poll of specialist companies in the shipping industry that notwithstanding the greatest possible care when flushing, 30% of transport movements of highly pure chemicals are contaminated with the initial cargo samples. As actual contamination of the cargo is extremely rare, contaminated cargo samples regularly result in the initial assumption that the sampling system components had not been sufficiently well flushed. According to the ADN the only option in such circumstances is to repeat the sampling once more, or even several times over.

c) The cost and effort of repeated sampling can be immense. Laboratory analysis of the sample takes between 60 minutes and 5 hours. If repeated samples need to be taken, then an individual aboard the vessel needs to take the samples in question. The process on board ship typically takes between 40 - 90 minutes. The journey between the ship and the laboratory can also take several hours. In the event of an unfortunate combination of circumstances it can take up to one day until samples are available enabling the cargo to be pumped into the shore tank. Each repetition generates new flushing liquids. Each repetition increases the risk of incidents/accidents.

These problems are now occurring ever more frequently. The analytical technique in the laboratories has become far more sophisticated. Tankers' sampling device components on the other hand cannot be cleaned by any other means than by flushing, which is associated with the uncertainties previously described. Actual contamination of the cargo on the other hand is extremely rare and then raise far more difficult issues. What needs to be understood is that contaminated cargo samples are initially systematically attributed to a contaminated sampling device – until proven otherwise.

6. In the shipping industry's opinion no short-term solution to the problem is possible with the existing technical equipment. The existing sampling technology often yields unrealistic results. The practice of sampling mandated by the ADN creates the impression of a reliable procedure which is also supposed to be environmentally friendly into the bargain. Whether this reliable procedure is actually achieved is extremely questionable. Moreover, the attempt to achieve a procedure complying with the ADN causes considerable effort and expense.

Solution

7. A short-term solution to the problems, for most of the substances for which Table C requires a partially enclosed or enclosed sampling device, is to revert to open sampling.

Reason

8. Occupational safety objectives are met by the wearing of regulation personal protection equipment.

Open sampling obviates the disposal problems incurred by flushing liquids.

Compared with gases released during venting, the release of gases from a depressurised tank is vanishingly small.

In the case of sampling from unpressurised tanks, exposure to gaseous cargo components is only of short duration and in small quantities.

The small quantity of gas that escapes from an unpressurised tank during open sampling does not justify the considerable cost and effort incurred by partially enclosed or enclosed sampling – especially as these procedures can be expected to cause numerous problems.

On aggregate, repeated sampling causes considerably more harm to the environment than exposure to gaseous cargo components in the case of open sampling.

On the one hand the vessel's main engine needs to be started in order to be able to operate the cargo unloading pumps either electrically or mechanically (fuel consumption), and on the other the laboratory equipment needs to be brought back into operation (high power consumption). The repeat sampling followed by transfer to the laboratory occasionally incurs considerable fuel consumption as a result of using vehicles (distances of up to 300 km are possible).

As vessels typically have to leave the terminal jetty if they do not possess the analytical sign-off, this gives rise to additional hazards and problems as regards moorings and their accessibility.

Annex 1: Various measures affecting the tank for inspection purposes

Annex 2: Schematic representation of a sampling device

Annex 1

Examples of cargo tank measures as required by operations

Prior to loading
- Inspection for cleanliness or to ensure tank is empty

Once loading has commenced:
- Sample taken upon commencement of loading (at a filling level of between 10 and 30 cm)

Upon completion of loading:
- Draw-through sample (extracting a sample through all layers using a narrow neck bottle, i.e. from the surface to the tank bottom)
- Layer sample (withdrawal of a sample from defined depths within the tank, occasionally required for products that are not homogeneous)
- Temperature measurement
- Measurement of the filling level (measurement of the filled depth and void height)
- Detection of water
- Bottom sample (water/product interface in the case of mineral oils)

Before unloading:
- Detection of water
- Bottom sample (water/product interface in the case of mineral oils)
- Draw-through sample (extracting a sample through all layers using a narrow neck bottle, i.e. from the surface to the tank bottom)
- Layer sample (withdrawal of a sample from defined depths within the tank, occasionally required for products that are not homogeneous)
- Temperature measurement
- Ullage measurement (measurement of the void space above the cargo)
- Measurement of the filling level (measurement of the filled depth and void height)

After unloading
- Ensuring tank is empty

If necessary (by crew or authorised individuals):
- Measurement of the gas concentration at different heights within the tank (e.g. during/after degassing of the tanks)

Annex 2

Schematic representation of a sampling device together with legend

Legend:

1 Tank

2 Liquid

3 Sampling tube

4 Pump

5 Sampling device

6 Active carbon filter

7 Sample flask

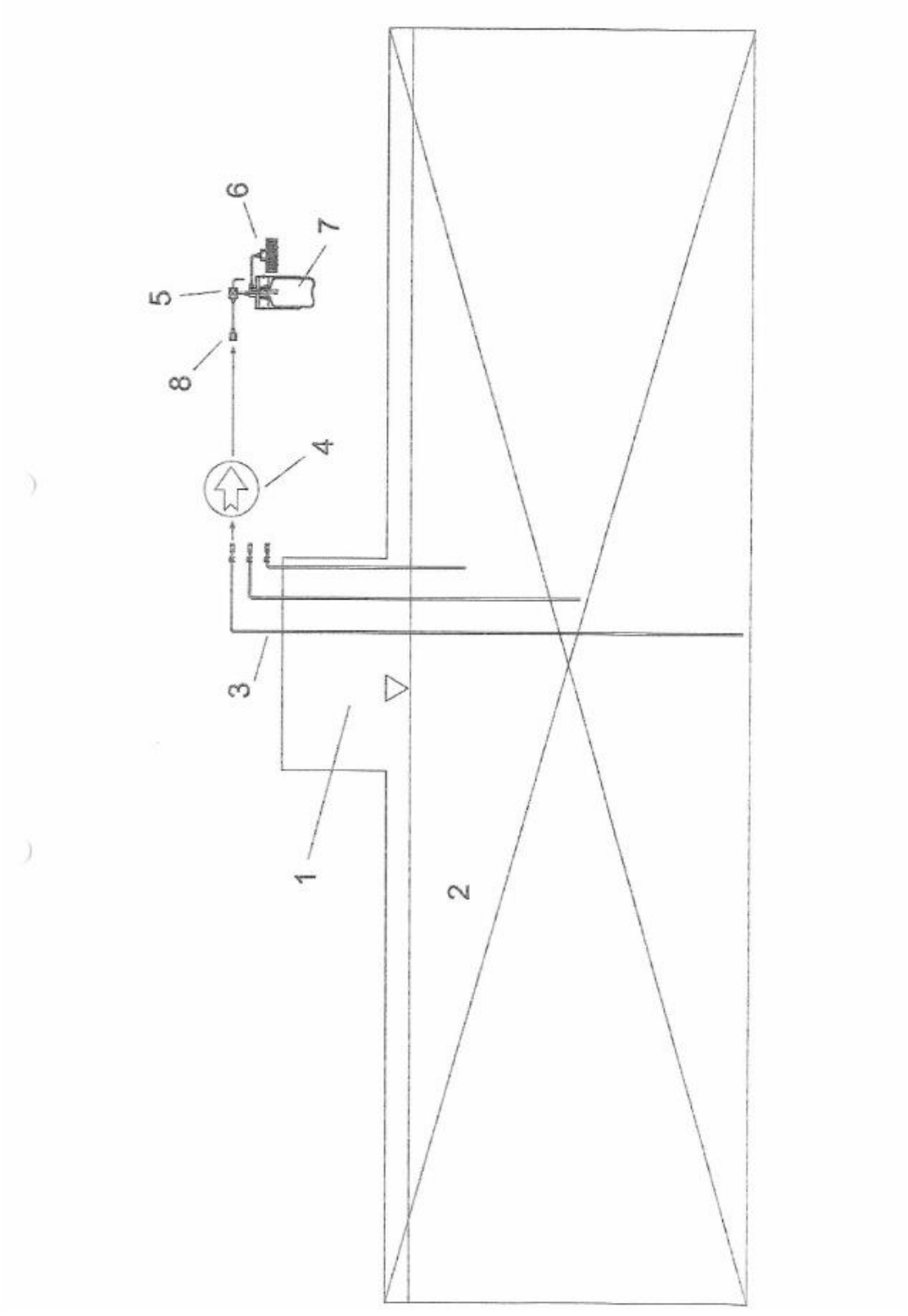
8 Coupling

9 Filler valve

10 Filler needle

11 Deaeration needle

12 Septum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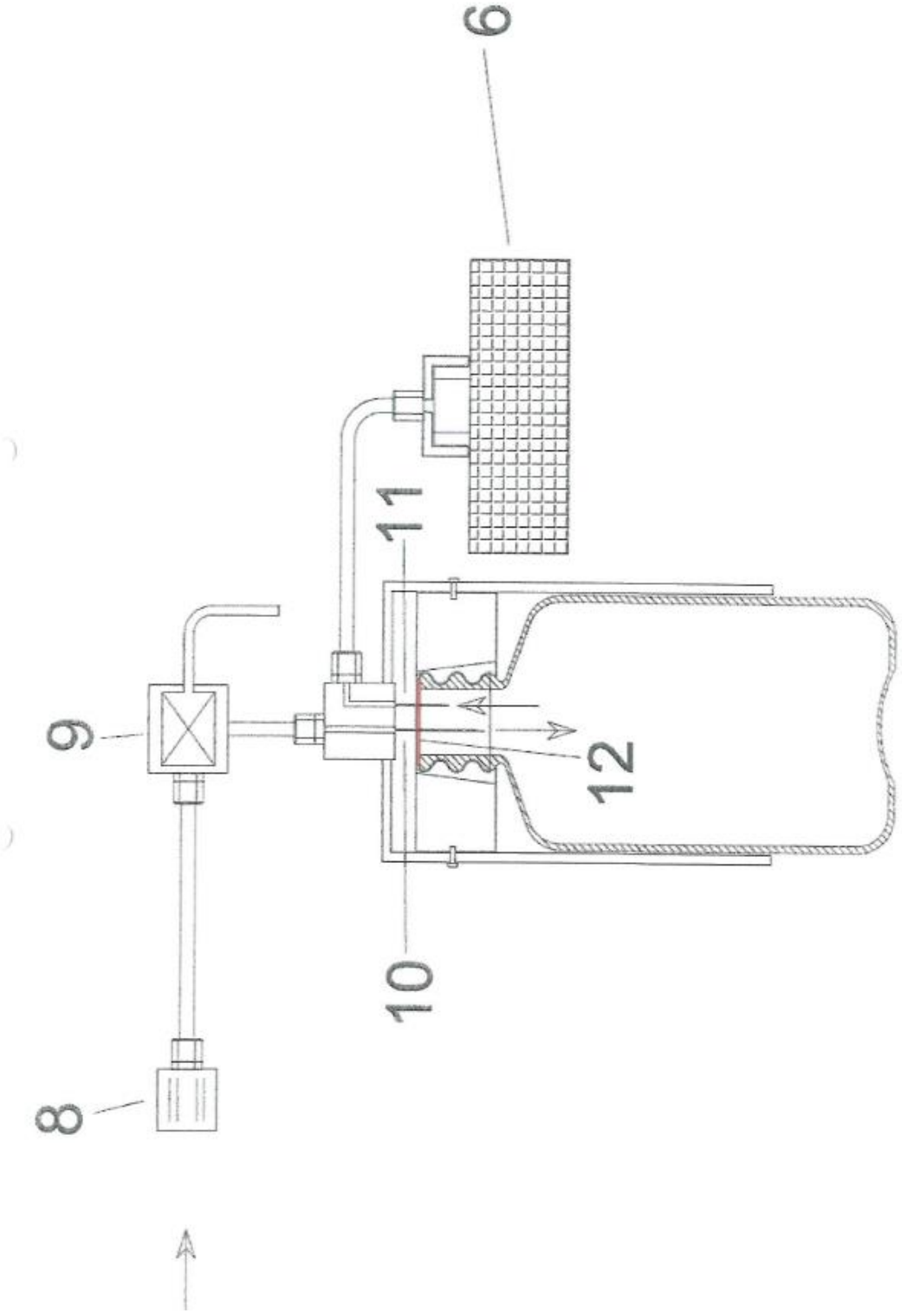
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