Circular

Carriage of fertilizers

Recently we have seen a number of claims related to cargoes of fertilizers. The most seen claims are wetting or caking of the fertilizer. Burnt fertilizer claims are less frequent but are more devastating and often resulting in a total loss of the vessel. With this circular MSIG Europe aims to promote further awareness about the risks associated with the loading and transportation of fertilizers.

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What are fertilizers?

Any natural or manufactured material is considered a fertilizer if it contains at least 5% of one or more of the three primary nutrients – Nitrogen (**N**), Phosphorous (**P**), or Potassium (**K**), also referred to as NPK. There are several types of fertilizers in the market, however the most common are Urea, Ammonium Nitrate and Sodium/ Potassium Nitrate.

Urea has no special hazards. It is non-combustible or has a low fire-risk. This cargo (either pure or impure) may, in the presence of moisture, damage paintwork or corrode steel.

Ammonium Nitrate is commonly used in agriculture as a high-nitrogen fertilizer, and it has also been used as an oxidizing agent in explosives, including improvised explosive devices. If heated strongly, this cargo decomposes, giving off toxic and other gases which can trigger combustion. Ammonium nitrate dust can be irritating to skin and mucous membranes.

Potassium Nitrate is a strong oxidizing agent. If shocked or heated or in contact with organic materials this cargo may ignite, causing fire or an explosion.

Sodium Nitrate although non-combustible, mixtures with combustible material are readily ignited and may burn fiercely.

In fact many fertilizers can slowly corrode metals particularly in the presence of water or moisture. Furthermore, all these cargoes are hygroscopic and will cake if damp and wet.

Classification by the IMSBC Code

Some of these products such as Potassium Chloride and Super Phosphate, are harmless, whilst others such as Ammonium Nitrate fertilizers are inherently dangerous and exposed to risk of explosion.

As such, the International Maritime Solid Bulk Cargoes (IMSBC) Code lists fertilizers in different categories. All fertilizers fall into one of three categories:

Type A: Oxidizers belonging to Class 5.1;
Type B: NPK/NP/NK fertilizers capable of self-sustaining decomposition belonging to Class 9;
Type C: Non-hazardous.

UN Resistance to Detonation Test for class 5.1 (type A) fertilizers

Fertilizers belonging to class 5.1 (Type A), when transported in bulk by sea, need to pass the official UN Resistance to Detonation Test. A test sample is confined in a steel tube and subjected to detonation shock from an explosive booster charge. The test is to be carried out twice in a row. If in each test one or more of the samples is crushed by less than 5% the sample is deemed to satisfy the resistance to detonation requirements. These test certificates must be kept on board. Several European countries demand that the test is not older than 3 months

Preservation of quality

Fertilizers are normally manufactured as high quality materials in the form of granules. It is in the interest of all parties concerned with the handling and storage of fertilizers to ensure that the quality is maintained right up to the point of usage: namely no moisture pick up or caking, free from contamination and of minimal dust content.

To preserve the quality of the fertilizers, sufficient packing is required. The following methods of packing are used.

1. Packed in customized bags on pallets;
2. In big bags;
3. In flexible intermediate bulk containers (FIBC);
4. Loose in bulk.

Prior to loading the Master should obtain a Material Safety Data Sheet (MSDS) for the cargo to be loaded and should familiarize himself, and comply fully, with the provisions of the IMSBC Bulk Code. This should also include familiarization with the Emergency Procedures.

Furthermore the Shipper should provide the Master with a cargo declaration prior loading together with the relevant additional documentation if the cargo is class 5.1 (Type A).

In addition, the general principles for the preservation of quality of all fertilizers are:

- Prevention of moisture pick up and caking
  This may require covering bulk material with plastic sheets during storage or transportation and keeping storage buildings closed as much as possible to prevent ingress of moist air. If the passage is subject to variable temperatures, condensation may form on the ship's structure and fall on to the cargo. Therefore, it is of importance that the ventilation is controlled to avoid sweating.

- Prevention of contamination
  Storage areas should be cleaned before the fertilizer is introduced. Access areas should be kept clean during storage. Spillage should be cleared up as soon as practicable.

- Prevention of product breakdown
  Fertilizers, particularly of Type A, should not be stored in direct sunlight or in conditions where temperature cycling can occur.

- Fire and explosion prevention
  Ammonium Nitrate based fertilizers should be stored in an explosion free environment, away from heat sources and open fire. Contamination with oils, acids, organic materials and alkalis should be prevented and adequate fire precautions should be in place.

> *"Potassium chloride and super phosphate, are harmless whilst others, such as Ammonium Nitrate fertilizers are inherently dangerous and exposed to risk of explosion".*

Recommendations

Prior loading any fertilizer, the composition, type, class and corresponding proper safety and emergency procedures must be accurately determined. Once this has been established, the proper MSDS and IMSBC sections must be consulted and followed in full.

The cargo holds must be completely cleaned, washed and rinsed with fresh water and be dry and free from any previous cargo remnants, paint and rust flakes. The hatches must be kept well maintained in a good operating condition without any hydraulic leakages. Rubber hatch cover seals, compression bars, coaming tables must be in clean and undamaged condition and to be inspected weather tightness in seaway conditions.

All sources of heat must be kept away from ammonium nitrate-based fertilizers, regardless of their classification. Potential heat sources include heated double bottom bunker tanks, engine room bulkheads, light bulbs/cargo lights, heating systems, steam pipes, electric motors, live electrical cabling and naked flames. Therefore, all lights and other heat sources in cargo holds should be switched off prior to loading and should remain off throughout the voyage and as long as the fertilizer is on board.

Electrical circuits within cargo holds should be properly isolated while the cargo is on board. Welding or any other form of hot work that could affect the cargo should not be permitted while the fertilizer is on board.

In case of bagged fertilizer, it is of importance that the surveyor should check the quality and quantity of the fertilizer during loading and discharging, together with the storage facilities at the discharging port.

MSIG Europe recommends appointing professional services of a qualified cargo surveying company to assist the Master prior and during loading.

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