CONTENTS

CARRIAGE OF AMMONIUM NITRATE FERTILIZERS

1. CLASSIFICATION

The Ammonium nitrate fertilizers are categorized as follows in the IMSBC code:

- **AMMONIUM NITRATE UN 1942** (**Group B** / **Class 5.1**)
- **AMMONIUM NITRATE BASED FERTILIZER UN 2067** (**Group B / Class 5.1**)
- **AMMONIUM NITRATE BASED FERTILIZER UN 2071** (**Group B / Class 9**)
- **AMMONIUM NITRATE BASED FERTILIZER** (**Group C**)
- **AMMONIUM NITRATE BASED FERTILIZER MHB (Group B)**

Reference shall be made to IMSBC code for detailed description, characteristics, hazards, stowage and segregation requirements, emergency procedures of the cargo.

Depending on the group of cargo to be carried, the vessel shall be fitted with bulkheads insulated to CLASS “A-60” Standard, spectacle flanges for isolating the fuel tank heating arrangements etc.

Ammonium nitrate cargo shall be carried only if listed in the IMSBC certificate / Document of Compliance for ships carrying dangerous goods.

2. PROPERTIES AND CHARACTERISTICS (HAZARDS OF AMMONIUM NITRATE FERTILIZERS UN 1942/2067/2071)

This cargo is an oxidizer and supports combustion. A major fire aboard a ship carrying this cargo may involve a risk of an explosion in the event of contamination (e.g. fuel oil) or secure confinement. An adjacent detonation may also involve a risk of explosion. If heated, the cargo decomposes, giving off toxic gases and gases which support combustion. Ammonium nitrate dust might be irritating to skin and mucous membranes. This cargo is hygroscopic and will cake if wet.

UN 2071 cargo may be subject to self-sustaining decomposition if heated. The temperature in such a reaction can reach 500°C. Decomposition, once initiated may spread throughout the remainder of the cargo, producing gases which are toxic.

3. PRECAUTIONS WHEN CARRYING AMMONIUM NITRATE FERTILIZERS UN 1942/2067/2071

Cargo shall not be accepted for loading when the temperature of the cargo is above **40°C**.

Prior to loading, the shipper shall provide the master with a certificate signed by the shipper stating that all the relevant conditions of the cargo required by the IMSBC Code, including the individual schedule, have been met.

Bunkering of fuel oil in spaces adjacent to the cargo spaces for this cargo, other than the engine-room, shall not be allowed during cargo operations.

The fuel tanks situated under the cargo spaces to be used for the transport of this cargo shall be pressure tested to ensure that there is no leakage of manholes and piping systems leading to the tanks. Tank vent pipes passing through the cargo space must be carefully inspected for holes.

All electrical equipment (if fitted), other than those of approved intrinsically safe type, in the cargo spaces to be used for this cargo shall be electrically disconnected from the power source. This disconnection shall be tagged and must be in addition to the removal of a fuse, at a point external to the cargo space. This situation must be maintained while the cargo is on board.

Due consideration shall be given to the possible need to open hatches in case of fire to provide maximum ventilation and to apply water in an emergency, and the consequent risk to the stability of the ship due to the liquefication of the cargo.

This cargo shall be kept as dry as practicable. A hatch cover watertight test shall be conducted before loading. Bilge lines shall have spades installed to isolate the lines. This cargo shall not be handled during precipitation. During handling of this cargo, all non-working hatches of the cargo spaces into which this cargo is loaded, or to be loaded, shall be closed.

As far as reasonably practicable, combustible securing and protecting materials shall not be used. When wooden dunnage is necessary, only a minimum shall be used.

The master and officers are to note that the ship’s fixed gas fire-extinguishing installation will be ineffective on the fire involving this cargo and that applying copious amounts of water may be necessary. Pressure on the fire mains shall be maintained for firefighting and fire hoses shall be laid out or be in position and ready for immediate use during loading and discharging of this cargo.

No welding, burning, cutting or other operations involving the use of fire, open flame, spark- or arc-producing equipment shall be carried out in the vicinity of the cargo spaces containing this cargo. Smoking shall not be allowed on deck and in the cargo spaces. "NO SMOKING" signs shall be displayed on deck whenever this cargo is on board.

Precautions shall be taken to avoid the penetration of this cargo into other cargo spaces, bilges and other enclosed spaces.

The cargo spaces carrying this cargo shall not be ventilated during voyage. The hatches of the cargo spaces, whenever this material is on board, shall be kept free to be capable of being opened in case of an emergency.

Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be given to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

4. HEAT SOURCES

All Ammonium nitrate cargoes should be isolated from heat sources and potential heat sources.

Of the above cargoes, cargoes other than "AMMONIUM NITRATE (UN No.1942)" can be loaded by controlling the FOT temperature to ensure that the FO Temperature is less than 50 degrees Celsius (in fuel tanks adjacent to cargo spaces) even when the spectacle flanges are removed.

AMMONIUM NITRATE (UN No.1942) shall not be loaded in cargo spaces adjacent to fuel oil tank(s), unless heating arrangements for the tank(s) are disconnected and remain disconnected during the entire voyage.

The temperature of these cargoes shall be monitored and recorded daily during the voyage to detect decomposition, which may result in heating and oxygen depletion.

5. SELF-SUSTAINING DECOMPOSITION (SSD)

When pure ammonium nitrate is heated directly (by a hot flame or similar) it will decompose, giving off various gases. The addition of some chemicals will make this worse, whereas other chemicals can reduce the effect.

Certain fertilizers can exhibit self-sustaining decomposition (SSD) which means decomposition continues even when the heat source is removed. SSD is more likely when there is a higher concentration of ammonium nitrate in the fertilizer. The likelihood is also increased with higher concentrations of chlorides.

If SSD starts, firefighting techniques that aim to starve the fire of oxygen (for example smothering with CO2 or by shutting down the hold ventilation) do not prevent spreading of the decomposition and heating. Cooling (e.g., with lots of water) is the only effective response.

To assess the risk of SSD in a cargo, the “trough” test has been used as laid out in the IMSBC Code Appendix 2.

However, a limitation of the trough test is that a relatively small quantity (a few kilograms) of the fertilizer is tested. When compared to the very large quantities carried on a bulk carrier which can retain heat, the trough test sample can more readily lose heat to the atmosphere.

6. MASTER’S VIGILANCE

The Master shall receive a full declaration in advance of loading, and that the declaration shall be scrutinised, not just simply accepted as received. The Master shall pay particular attention to the declared Bulk Cargo Shipping Name (BCSN).

The declaration should be received as early as possible to allow for clarification to be sought in good time, thereby preventing delays. The requirements on testing and cargo composition should also be confirmed as complete and correct.

Despite being assigned Group C, the schedule for AMMONIUM NITRATE BASED FERTILIZER – GROUP C comes with the following warning:

"**When this cargo is heated, it will decompose and give off toxic gases with the risk of toxic fumes in the cargo hold, adjacent spaces and on deck**."

The crew should not relax whenever the cargo is on board just because this is a Group C cargo. The crew shall ensure that heat sources (and potential heat sources) are removed from the holds, this includes restricting hot work activities and isolating hold lighting.

The crew should monitor the cargo including the AMMONIUM NITRATE BASED FERTILIZER – GROUP C, and especially any MHB cargo on passage for some or all of the following:

- A drop in the oxygen level
- A rise in the carbon monoxide levels
- A rise in the methane levels
- Unusual smells from the hold
- Pressurisation within the hold (notable when the sampling port is opened)
- Any water dripping out of the sampling port when opened
- Small amounts of dust escaping from the sampling ports when opened.
- A rise in hold temperature, although temperature changes may well not be noted until chemical decomposition is well under way.

These can all be signs of chemical decomposition and Company / Operators shall be informed if these signs are observed.