

## METHANOL OCEAN TANKERS AND NITROGEN INERTING

### BEST PRACTICES RECOMMENDATION:

*All newly constructed methanol tankers should be built with nitrogen (N<sub>2</sub>) inerting capability.*



### INTRODUCTION:

The transport of methanol and other chemicals by sea is governed by the IMO (The International Maritime Organization) which is a specialized agency of the United Nations, responsible for the safety and security of shipping and the prevention of marine pollution by ships.

One of IMO's most important committees is the Maritime Safety Committee which is IMO's senior technical body on safety related matters. It works through a number of sub-committees, including the Committee on the Safe Transport of Dangerous Cargoes, the Fire Protection Committee, and the Ship Design & Equipment Committee whose goal is to set standards for the construction of new vessels.

Up until the mid-1980's, methanol was considered by IMO an unclassified chemical, which meant there were no restrictions as to the type of vessel in which methanol could be transported, as methanol was considered a benign product. In fact, the first purpose-built methanol tanker, the "Celchem Catalyst" built in 1981, was a single skin vessel with large tanks of 6,000 cbm which were not inerted during loading or discharge. The vessel served in methanol service for over 20 years without incident.



In the mid 1980's, Safety of Life at Sea (SOLAS) regulations were revised due to concerns about explosions for products with flash points of 60 degrees Celsius or less. Methanol, with a flash point of 16 degrees Celsius, fell under this regulation which applied to all new building tankers with keels laid after July 1, 1986. This regulation is basically still the governing regulation for the transport of methanol today.

The regulation requires that Annex I vessels (regulations governing oil and oil product tankers) use inert gas during loading and discharge to prevent an explosive air mixture in the cargo tanks. Annex II vessels (regulations governing the rules for chemical tankers) were allowed to either use inert gas like the Annex I vessels, or they were required to have tanks less than 3000 cubic meters (cbm). The thought was that with smaller tanks a static discharge was less likely, thus reducing the risk of an explosion. The problem for chemicals like methanol was that conventional inert gas generators that use the vessel's waste flue gases would cause the methanol to go off-test, causing the methanol to fail the permanganate time test. In the mid 1980's

## Methanol Ocean Tankers and Nitrogen Inerting (cont.)

N2 generators were not practically available at a cost and size that made sense so the smaller tank solution was a sensible alternative.

As N2 generators became more available in the 90's, interest peaked with methanol products. In 1999, the first purpose-built methanol tanker was delivered with N2 generators on board. During the following decade, most owners immediately recognized the safety advantage of N2 inerting of their methanol cargo tanks and took delivery of IMO Type II tonnage (vessels required to have tanks less than 3,000 cbm), as well as N2 inerting or IMO Type III tonnage (vessels with tanks greater than 3,000 cbm) and again with N2 inerting for the carriage of methanol. However, some owners stayed with the IMO Type II vessels featuring smaller tanks, but did not add N2 inerting. It must be pointed out that these vessels still meet all the requirements of IMO, the U.S. Coast Guard, and other international marine organizations with regard to safety. However, it is in the interest of both producers and consumers to be proactive and ahead of governmental bodies when it comes to methanol safety, no matter how small the risk.



### 2. MARPOL Annex II: Ship types

**IMO Ship Type 1**

is a chemical tanker intended for the transportation of products considered to present the greatest overall hazard. The quantity of cargo required to be carried in a Type 1 ship should not exceed 1,250 m3 in any one tank

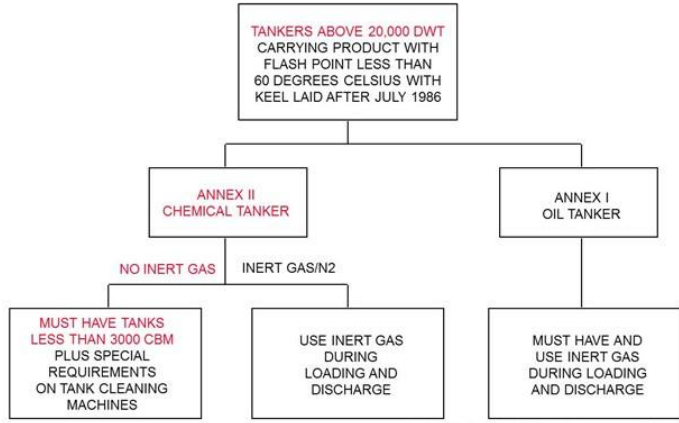
**IMO Ship Type 2**

is intended to transport products with appreciably severe environmental and safety hazards which require significant preventive measures to preclude escape of such cargo. The quantity of cargo required to be carried in a Type 2 ship should not exceed 3000 m3 in any one tank

**IMO Ship Type 3**

is a chemical tanker intended to transport products with sufficiently severe environmental and safety hazards. These products require a moderate degree of containment to increase survival capability in a damaged condition. There is no filling restriction for chemicals assigned to Ship Type 3

### SOLAS REGULATION FOR PRODUCTS WITH LOW FLASH POINT



DCS 4175 976-2013

\*METHANOL FLASH POINT 16 DEGREES CELSIUS

### Conclusions:

Vessels with N2 inerting are safer than vessel without N2 inerted tanks. This has been proven by a series of incidences involving fires on-board non-inerted methanol vessels over the past decade. While the possibility of an explosion on a methanol tanker remains extremely low, the global methanol industry needs to be both proactive and aggressive when it comes to safety. The recommended “best practice” is that all newly constructed methanol tankers should be built with N2 inerting capability.

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