December 2014

MARE world

the magazine of MARE MARITIME CO SA

MARE
MARITIME COMPANY S.A.

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The magazine is published by Mare Maritime CO S.A.

Its purpose is to provide to our office and ship personnel, as well as to our business associates, a balanced mix of "Mare" news, training material, special features, shiping history, and the opportunity to express their views.

Correspondence should be adressed as follows:

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MARE

MARE world

CHAMBER OF SHIPPING OF AMERICA

MARE'S USA AWARD

On the 14th of November 2013 in a ceremony which took place in Washington D.C., Mare received an award for its environmental operating policy. This award was granted by the American Chamber of Shipping and was based on the fact that Mare's Fleet managed to comply in the last two years with chamber's requirements.

ENVIRONMENTAL ACHIEVEMENT AWARD

Issued by the

CHAMBER OF SHIPPING OF AMERICA

This certificate is awarded to the

MARE MARITIME COMPANY S.A

Attesting that nine vessels received individual environmental achievement awards on November 13, 2013. These nine vessels operated a total of thirty-three years in environmental excellence. Congratulations to the sea-going and shore staff for this achievement.

Chairman of the Board

President

CHAIRMAN'S MESSAGE

Following the recent market trend, Mare Maritime's management considered necessary to expand its activities and establish a new base in Singapore. Being based for many years in major maritime centers like London and Athens/Greece, it became apparent that a new base in the Far East was required to serve Mare's clients of that area.

The vibrant and dynamic economies of Far East countries have created an environment suitable for shipping activities. Being close to the manpower, cargoes resources and the shipbuilding activities and being subject to favorable legislative regimes, constitutes an attraction for shipping business. Mare has been connected with many

MARE EXPANDS TO THE FAR EAST

companies in the area since early 70's and kept these associations alive until today. There is no doubt that Mare Maritime Singapore with its cooperation with Mare in Athens will be able to provide very competitive and efficient services in technical and commercial management, crew training, newbuilding supervision, Maritime consultancy and inspections of all types and sizes of vessels, especially tankers, chemicals and gas carriers.

Mare Maritime Singapore personnel consists of experienced personnel who have spent many years in ship management offices and have gained experience in all facets of maritime operations.

It is expected that following the history of the mother company in Athens, Mare Maritime Singapore will have a very successful future.

Emmanuel Papalexis

Chairman

MAGSAYSAY

23 April 2014
MR. EMMANUEL PAPALEXIS
Chairman
Mare Maritime Company S. A.

Dear Mr. Papalexis,

Greetings from Magsaysay!
We would like to take this opportunity to extend our deep appreciation for the outstanding contribution and support that you have extended to the various Magsaysay "We Care" programs. Seatrade Asia Awards recently presented us with the Corporate Social Responsibility Award for our commitment to education, environmental awareness, promotion of health and wellness, volunteerism and community engagement. We were also cited for our relief and rehabilitation efforts that benefited those directly affected by Typhoon Yolanda (Haiyon). The volunteerism displayed by our employees, crew members and their families and the overwhelming support from various stakeholders like you have significantly made a difference. We were able to provide monetary and in kind support through relief distributions, supply power generator sets and water purification equipment and extend sanitation assistance to the adopted communities. We were also able to provide fisher folks with fishing boats as part of the Livelihood Assistance Program, which was coordinated thru Homer Foundation, Inc. Today, 140 boats have been distributed in various coastal communities.
We are elated to share this CSR Award with you. Thank you for being our partner in the various Magsaysay "We Care" programs. We look forward to your unwavering support as we continue to care for the welfare of our employees, crew members, their families and the communities we serve.
Sincerely

MARLON R. RONO
President

Taken at Tanauan, Leyte during the boat launching.

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A New Entry In Mare's Fleet

Mare is proud to announce that on 31 October 2014 a new vessel came under the management of Mare Maritime. EVERRICH 7 is a chemical carrier of 22,780 dwt and can carry a big variety of chemical and oil products. Presently she is loaded and sailing from Argentina to India.

Mare is running this vessel under the HSQEE and TMSA systems.

TPL SHIPPING

MARE

MARITIME COMPANY S.A.

Categorization Of Chemical Cargo

Category X: Noxious Liquid Substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a major hazard to either marine resources or human health and, therefore, justify the prohibition of the discharge into the marine environment;

Category Y: Noxious Liquid Substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a hazard to either marine resources or human health or cause harm to amenities or other legitimate uses of the sea and therefore justify a limitation on the quality and quantity of the discharge into the marine environment;

Category Z: Noxious Liquid Substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a minor hazard to either marine resources or human health and therefore justify less stringent restrictions on the quality and quantity of the discharge into the marine environment; and

Other Substances: substances which have been evaluated and found to fall outside Category X, Y or Z because they are considered to present no harm to marine resources, human health, amenities or other legitimate uses of the sea when discharged into the sea from tank cleaning of deballasting operations. The discharge of bilge or ballast water or other residues or mixtures containing these substances are not subject to any requirements of MARPOL Annex II.

SHALE OIL AND OIL SANDS

The use of shale oil is going back many years. The first shale oil extraction is reported to be in 1684, however in the course of history the method of extracting shale oil has been changed. This new technology is called **fracking**. Hydraulic fracking is the fracturing of rock by pressurized liquid. It is a method in which water is mixed with sand and chemicals and the mixture is injected at high pressure into the well to create a fracture of the rock. The first time this kind of technique was used was in 1987. By 2010 it was estimated that 60% of all new oil and gas was produced by hydraulic fracture. Since last year this method is used in the United States very extensively.

The technique of hydraulic fracture is used to increase the rate at which fluids such as petroleum or natural gas can be recovered from subterranean natural reservoirs. These reservoirs are typically sandstones, limestones or dolomite rocks but also include unconventional reservoirs as shale rock.

Hydraulic fracturing enables the production of natural gas and oil from rock formation deep below the earth surface (1500 to 6100 metres).

OIL SANDS

Oil sands are loose sands containing mixtures of sand clay and water saturated with a dense and extremely viscous form of petroleum which is referred to as bitumen. Natural bitumen deposits are reported in many countries but found in extremely large quantities in Canada. The estimated worldwide deposits of sand oil are more than 2 trillion barrels. These estimates include deposits that have not yet been discovered. Proven reserves of bitumen contain approximately 100 billion barrels of oil and total natural bitumen reserves are estimated at 249 billion barrels globally, of which 177 billion barrels or 71% are in Canada.

It should be noted that oil extracted from tar sands is very damaging to the environment. It is producing 3 times the greenhouse gas emissions of conventionally produced oil because of the energy required to extract and process tar sands oil.

Natural Gas

It is undoubtedly the fastest growing sector in fossil fuel. It is also the most environmentally friendly producing less carbon sulfur oxide (SOx) and nitrogen oxide (NOx). The demand in trade of LNG is increasing by 8% per year. Traditionally the natural gas has been transported by pipelines, presently 5% of the world production is being transported in liquefied state by ships, the gas carriers. According to statistics there are about 400 vessels transporting LNG, however it is expected by 2025 that 15% of the world's natural gas exports will be done by gas carriers in liquid form.

IMO divides liquefied gases into the following groups:

- LPG - Liquefied Petroleum Gas
- LNG - Liquefied Natural Gas
- LEG - Liquefied Ethylene Gas
- NH3 - Ammonia
- Cl2 - Chlorine
- Chemical gases

U.S. Gas production increased by 35% in the last 10 years. US exports of LPG's increased in 2013 to about 7 million tons and expected to be increased further to 19 million tons by 2019.

The IMO gas carrier code define liquefied gases as gases with vapour pressure higher than 2.8 bar with temperature of 37.8°C. IMO gas code chapter 19 defines which products that are liquefied gases and have to be transported with gas carriers. Some products have vapour pressure less than 2.8 bar at 37.8°C, but are defined as liquefied gases and have to be transported according to chapter 19 in IMO gas code. Propylene oxide and ethylene oxides are defined as liquefied gases. Ethylene oxide has a vapour pressure of 2.7 bar at 37.8°C. To control temperature on ethylene oxide we must utilise indirect cargo cooling plants.

Products not calculated as condensed gas, but still must be transported on gas carriers, are specified in IMO's gas code and IMO's chemical code. The reason for transportation of non-condensed gases on gas carriers is that the products must have temperature control during transport because reactions from too high temperature can occur.

Condensed gases are transported on gas carriers either by atmospheric pressure (fully cooled) less than 0.7 bars, intermediate pressure (temperature controlled) 0.5 bars to 11 bars, or by full pressure (surrounding temperature) larger than 11 bars. It is the strength and construction of the cargo tank that is conclusive to what over pressure the gas can be transported.

LPG

LPG - Liquefied Petroleum Gas is a definition of gases produced by wet gas or raw oil. The LPG gases are taken out of the raw oil during refining, or from natural gas separation. LPG gases are defined as propane, butane and a mixture of these. Large atmospheric pressure gas carriers carry most of the LPG transported at sea. However, some LPG is transported with intermediate pressure gas carriers. Fully pressurised gas carriers mainly handle coastal trade. LPG can be cooled with water, and most LPG carriers have direct cargo cooling plants that condenses the gas against water.

The sea transport of LPG is mainly from The Persian Gulf to Japan and Korea. It is also from the north- west Europe to USA, and from the western Mediterranean to USA and Northwest Europe. LPG is utilised for energy purposes and in the petro-chemical industry

L N G

LNG - Liquefied Natural Gas is a gas that is naturally in the earth. LNG mainly contains Methane, but also contains Ethane, Propane, and Butane etc. About 95% of all LNG are transported in pipelines from the gas fields to shore, for example, gas pipes from the oil fields in the North Sea and down to Italy and Spain. Gas carriers transport the remaining 5%. When LNG is transported on gas carriers, the ROB and boil off from the cargo is utilised as fuel for propulsion of the vessel. Cargo cooling plants for large LNG carriers are very large and expensive, and they will use a lot of energy. Small LNG carriers have cargo-cooling plants, and can also be utilised for LPG transportation.

The sea transport of LNG is from the Persian Gulf and Indonesia to Japan, Korea and from the Mediterranean to Northwest Europe and the East Coast of USA and from Alaska to the Far East.
LNG is used for energy purposes and in the petrochemical industry.

Worldwide LPG trade is expected to reach 73 million tons in the next 4 years from 51 million years in 2012.

GAS TANKER TYPES

Gas carriers can be grouped into six different categories according
to the cargo carried and the carriage condition, i.e.

(a) Fully pressurised ships
(b) Semi-refrigerated/semi-pressurised ships
(c) Semi-pressurised/fully refrigerated ships
(d) Fully refrigerated LPG ships
(e) Ethylene ships
(f) LNG ships

Ship types (a), (b) and (c) are most suitable for the shipment of smallersize cargoes of LPG and chemical gases on short-sea and near-sea routes whereas ship type (d) is used extensively for the carriage of large-size cargoes of LPG and ammonia on the deep-sea routes.

(a) Fully pressurised ships

These ships are the simplest of all gas carriers in terms of containment systems and cargo-handling equipment and carry their cargoes at ambient temperature. Type C tanks - pressure vessels fabricated in carbon steel with a typical design pressure of 17.5 barg, corresponding to the vapour pressure of propane at 45°C, must be used. Ships with higher design pressures are in service: 18 barg is quite common - a few ships can accept up to 20 barg. No thermal insulation or reliquefaction plant is necessary and cargo can be discharged using either pumps or compressors.

Because of their design pressure the tanks are extremely heavy. As a result, fully pressurised ships tend to be small with maximum cargo capacities of about 4,000 m3 and they are used to carry primarily LPG and ammonia. Ballast is carried in double bottoms and in top wing tanks. Because these ships utilise Type C containment systems, no secondary barrier is required and the hold space may be ventilated with air.

(b) Semi - refrigerated ships

These ships are similar to fully pressurised ships in that they incorporate Type C tanks - in this case pressure vessels designed typically for a maximum working pressure of 5-7 barg. The ships range in size up to 7,500 m3 and are primarily used to carry LPG. Compared to fully pressurised ships, a reduction in tank thickness is possible due to the reduced pressure, but at the cost of the addition of refrigeration plant and tank insulation. Tanks on these ships are constructed of steels capable of withstanding temperatures as low as –10°C. They can be cylindrical, conical or spherical in shape.

(c) Semi - pressurised / fully refrigerated ships

Constructed in the size range 1,500 to 30,000 m3, this type of gas carrier has evolved as the optimum means of transporting the wide variety of gases, from LPG and VCM to propylene and butadiene, found in the busy coastal gas trades around the Mediterranean and Northern Europe. Like the previous two types of ship, SP/FR gas tankers use Type C pressure vessel tanks and therefore do not require a secondary barrier. The tanks are made either from low temperature steels to provide for carriage temperatures of –48°C which is suitable for most LPG and chemical gas cargoes or from special alloyed steels or aluminium to allow the carriage of ethylene at –104°C (see also ethylene ships). The SP/FR ship's flexible cargo handling system is designed to be able to load from, or discharge to, both pressurised and refrigerated storage facilities.

(d) Fully refrigerated LPG ships

Fully refrigerated (FR) ships carry their cargoes at approximately atmospheric pressure and are generally designed to transport large quantities of LPG and ammonia. Four different cargo containment systems have been used in FR ships: independent tanks with double hull, independent tanks with single side shell but double bottom and hopper tanks, integral tanks and semi-membrane tanks, both these latter having a double hull. The most widely used arrangement is the independent tank with single side shell with the tank itself a Type A prismatic free-standing unit capable of withstanding a maximum working pressure of 0.7 barg. The tanks are constructed of low-temperature steels to permit carriage temperatures as low as –48°C. FR ships range in size from 10,000 to 100,000 m3.

A typical fully refrigerated LPG carrier would have up to six cargo tanks, each tank fitted with transverse wash plates, and a centre line longitudinal bulkhead to improve stability. The tanks are usually supported on wooden chocks and are keyed to the hull to allow expansion and contraction as well as prevent tank movement under static and dynamic loads. The tanks are also provided with anti-flotation chocks. Because of the low temperature carriage conditions, thermal insulation and reliquefaction plant must be fitted. The FR gas carrier is limited with respect to operational flexibility. However, cargo heaters and booster pumps are often used to allow discharge into pressurised storage facilities. Where Type A tanks are fitted, a complete secondary barrier is required. The hold spaces must be inerted when carrying flammable cargoes. Ballast is carried in double bottoms and in top-side tanks or, when fitted, side ballast tanks.

(e) Ethylene ships

Ethylene ships tend to be built for specific trades and have capacities ranging from 1,000 to 30,000 m3. This gas is normally carried fully refrigerated at its atmospheric pressure boiling point of –104°C. If Type C pressure vessel tanks are used, no secondary barrier is required; Type B tanks require a partial secondary barrier; Type A tanks require a full secondary barrier and because of the cargo carriage temperature of – 104°C the hull cannot be used as a secondary barrier, so in this case a separate secondary barrier must be fitted. Thermal insulation and a high capacity reliquefaction plant are fitted on this type of vessel. As mentioned, many ethylene carriers can also carry LPG cargoes thus increasing their versatility. Ballast is carried in the double bottom and wing ballast tanks and a complete double hull are required for all cargoes carried below –55°C whether the tanks are of Type A, B or C.

(f) LNG ships

LNG carriers are specialised vessels built to transport large volumes of LNG at its atmospheric pressure boiling point of –163°C. These ships are now typically of between 120,000 and 130,000 m^3 capacity and are normally dedicated to a specific project where they will remain for their entire contract life, which may be between 20-25 years. Apart from a few notable exceptions built during the early years of LNG commercial transportation these ships are of three types: (1) Gaz Transport membrane (Figure 1), (2) Technigaz membrane (Figure 2) and (3) Kvaerner Moss spherical independent TypeB

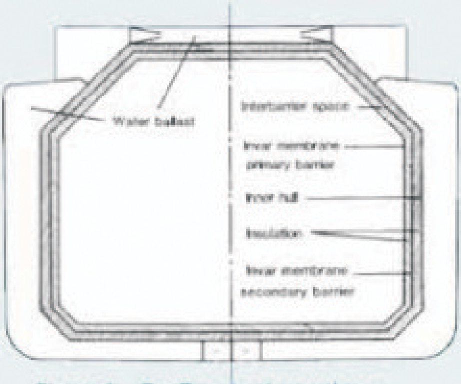


Figure 1 – Gaz Transport membrane

All LNG ships have double hulls throughout their cargo length, which provides adequate space for ballast; the membranes have a full secondary barrier, the spheres a drip-pan type protection. Another characteristic common to all is that they burn the cargo boil-off as fuel (permitted with methane cargo, being lighter than air at ambient temperature - but not propane or butane which are heavier than air gases).

Hold spaces around the cargo tanks are continuously inerted except in the case of spherical Type B containment where hold spaces may be filled with dry air provided that there are adequate means for inerting such spaces in the event of cargo leakage being detected. Continuous gas monitoring of all hold spaces is required.

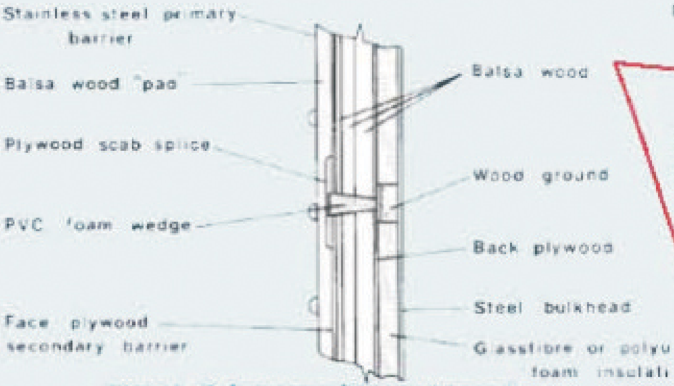
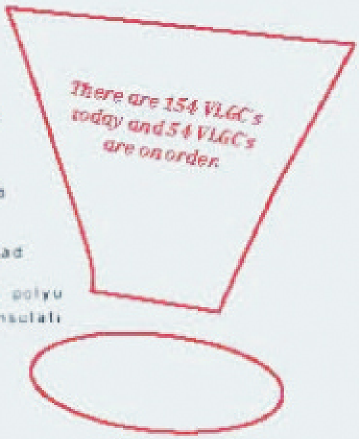


Figure 2 - Technigaz membrane containment



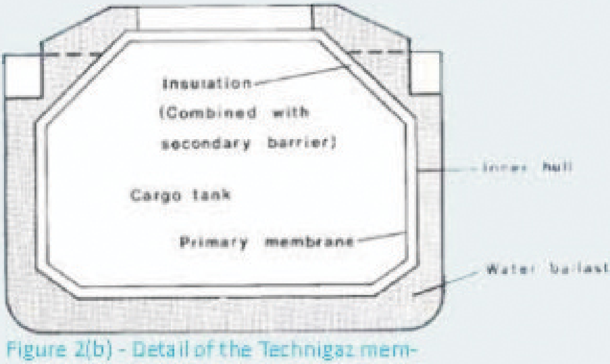


Figure 2(b) - Detail of the Technigaz membrane's barrier and insulation construction

To date, reliquefaction plants have not been fitted to LNG vessels because, being a much colder cargo than LPG, the necessary equipment is much more costly and it has been more economic to burn the boil-off gas in steam turbine propulsion plants. However, due to the rising cost of oil fuel and increasing value accredited to LNG, future designs of LNG ships tend towards the provision of greater tank insulation (to reduce boil-off), a reliquefaction plant and diesel engined main propulsion.

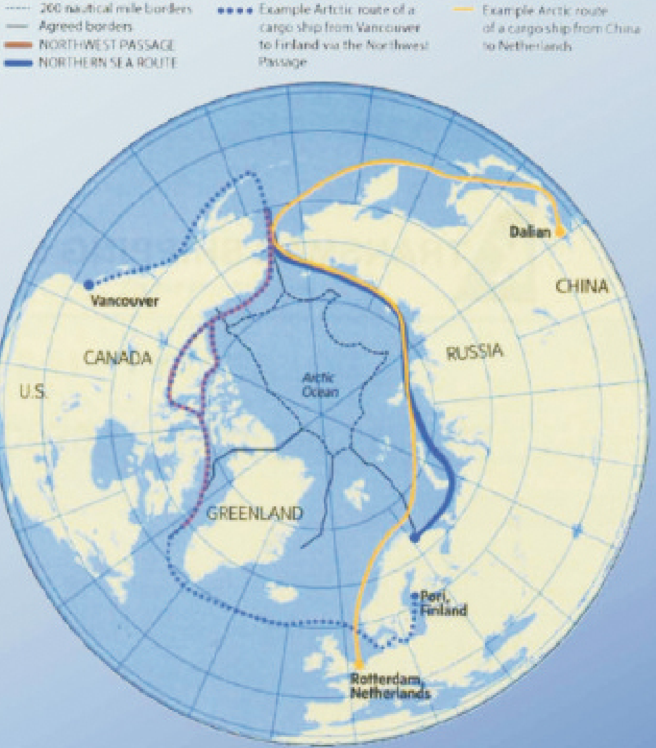
Baltic and North Sea Emission Control Areas

(max 1% sulphur since July 1, 2010)

A Shortcut Between Europe And Asia
The Arctic Route

It seems that more and more vessels are using the Arctic route when sailing between Europe and Asia. It has been reported that about 70 vessels passed through this route during 2013. It is estimated that the Northwest passage will be open to international shipping for approximately two months per year.

The expectation is that sailings through the Arctic will be increasing with time, as global warming will make the ice thinner and as a result new routes might be created. The route directly over the North Pole will be 20% shorter than the Northern Sea route.



Comparing the route Vancouver/Finland, the northwest passage is more than 1000 nautical miles shorter than the route through the Panama Canal.

IMO is developing now the Polar Code to apply to voyages through the Arctic. This code will stipulate the design, construction, equipment, operational training etc.

MARE MARITIME SINGAPORE PTE LTD

As it has been mentioned in the Chairman's message (page 3), Mare Maritime Singapore Pte Ltd has been established earlier this year to continue Mare's shipping services in the area and to be closer to its clients in the region.

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Mr. Manvanth Kunjur
Operations manager

Mr.Diptendu Parmanick
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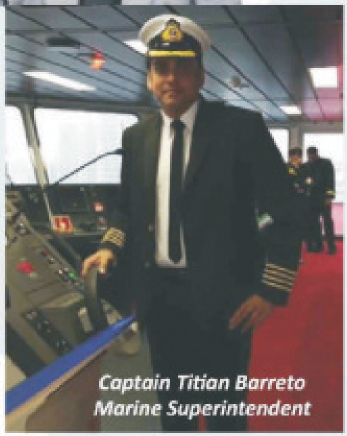


Captain Titian Barreto
Marine Superintendent

Mr. Akshay Tewari
Assistant Technical Superintendent

Mr. lim Thiam Seng
Accountant

Ritee Kapur
HR Manager

Ms. Mandy Chan
Hr & Admin Executive

Magsaysay Wins Labor and Employee Engagement Award at Asian CSR Awards 2013

The Asian CSR Awards recognized Magsaysay Maritime Corporation as the winner of the Labor and Employee Engagement Award held last September 24, 2013 at the Grand Hyatt Hotel, Bali, Indonesia. The award was accepted by Magsaysay Maritime Corporation President, Marlon R. Roño.

Magsaysay was acknowledged for on how it manages employee relationships and ensures welfare and protection through its integrated and long-term programs for seafarers and families such as Magsaysay Savings Program (MSP), MagVolunteer Program, Scholarship (Cadetship) Program, Happily Healthy Program and Communication Program (100% Connectivity).

Since 2003, Asian CSR Awards have annually honoured Asia's outstanding CSR projects and companies. The awards seek to identify companies as well as to provide role models of best practices for other corporations.

New Amendments Of Marpol Annex V (Into Force Since 1st January 2013)

Revised MARPOL Annex V set new regulatory requirements regarding the disposal of garbage from ships and came into force on 1 January 2013. The new amendments prohibit the disposal of almost all kinds of garbage at sea with the exemption under specific requirements of food waste, animal carcasses, cargo residues contained in wash water and environmental friendly cleaning agents. As a result of these regulations more and more ships will dispose their ship-generated waste to reception facilities ashore. MARPOL Annex V applies to all ships.

Generally, discharge is restricted to food wastes, identified cargo residues, animal carcasses, and identified cleaning agents and additives in washwater which are not harmful to the marine environment. Garbage discharge regulations do not apply when the discharge of garbage from a ship was a necessary action for the purpose of securing the safety of a ship and those on board or saving life at sea. In such cases an entry should be made in the Garbage Record Book, or in the ship's official log-book for ships of less than 400 gross tonnage.

According to revised MARPOL Annex V shipboard generated garbage is grouped into the following categories:

1. **Plastics** - Garbage that consists of or includes plastic in any form, including synthetic ropes, synthetic fishing nets, plastic garbage bags and incinerator ashes from plastic products. Garbage under this category is prohibited to be discharged at sea.
2. **Food wastes** – Spoiled or unspoiled food substances. Food wastes may be discharged at sea under specific circumstances/requirements (refer to the simplified overview of the discharge provisions of the revised MARPOL Annex V developed by IMO).
3. **Domestic Wastes** – Garbage generated mainly in the accommodation spaces on board the ship (e.g. drinking bottles, papers, cardboard etc). Garbage under this category is prohibited to be discharged at sea.
4. **Cooking Oil** – Edible oil or animal fat used for the preparation or cooking of food. Garbage under this category is prohibited to be discharged at sea.
5. **Incinerator ashes** - Ash and clinkers resulting from shipboard incinerators used for the incineration of garbage. Garbage under this category is prohibited to be discharged at sea.
6. **Operational wastes** - Solid wastes (including slurries) that are collected on board during normal maintenance or operations of a ship, or used for cargo stowage and handling. Operational wastes also includes cleaning agents and additives contained in cargo hold and external wash water that may be harmful to the aquatic environment. Operational wastes does not include grey water, bilge water, or other similar discharges essential to the operation of a ship (boiler/economizer blowdown, gas turbine washwater, machinery wastewater etc). Garbage under this category is prohibited to be discharged at sea.

7. **Cargo residues** - Remnants of any cargo which remain on the deck or in holds following loading or unloading. This category does not include cargo dust remaining on the deck after sweeping or dust on the external surfaces of the ship. Such garbage may be discharged at sea under specific circumstances/requirements (refer to the simplified overview of the discharge provisions of the revised MARPOL Annex V developed by IMO). It is essential to remember that besides other requirements (e.g. distance from shore) cargo residues in order to be discharged at sea they should not be harmful to the marine environment. Cargo residues which are considered harmful to the marine environment are classified according to the criteria of the United Nations Globally Harmonized System for Classification and Labelling of Chemicals (UN GHS) meeting parameters such as: acute aquatic toxicity category 1, chronic aquatic toxicity category, carcinogenicity, mutagenicity, reproductive toxicity etc

8. **Animal Carcasses** – Bodies of any animals that are carried on board as cargo and that die or are euthanized during the voyage. Discharge of such wastes permitted at sea under specific circumstances/requirements (refer to the simplified overview of the discharge provisions of the revised MARPOL Annex V developed by IMO).

9. **Fishing Gear** - Physical device that may be placed on or in the water or on the sea-bed with the intended purpose of capturing marine or fresh water organisms. Garbage under this category is prohibited to be discharged at sea.

These new categories represent the categories to be used for record purposes in the Garbage Record Book. The superseded MARPOL Annex V defined six categories whereas the revised annex defines nine.

Regarding the cleaning agents mentioned above, a cleaning agent or additive is considered as not harmful for the marine environment when:

1. **The Chemical used is not a "harmful substance" in accordance with the criteria in MARPOL Annex III.** This means substances identified by criteria such as Acute (short-term) aquatic hazard, rapidly or non-rapidly degradable substances for which there are adequate chronic toxicity data available and substances for which adequate chronic toxicity data are not available. Tables containing criteria values for the identification of harmful substances as per revised MARPOL Annex III can be found HERE. Mentioned criteria are based on those developed by the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS), as amended. The GHS can be found HERE.

2. **The Chemical used does not contain any components which are known to be carcinogenic, mutagenic or reprotoxic (CMR).** In order to identify such components the GESAMP list can be used.

To sum up the above, when a ship is discharging chemicals agents from hold wash water to the sea and records such action to the Garbage Record Book then the ship should be able at any time to provide evidence that the cleaning agent or additive used was not harmful to the environment. Such evidence may be provided by the chemicals' manufacturer under the form of signed and dated statements providing information that the chemical/product meets the criteria for not being harmful to the marine environment. This might form part of a Safety Data Sheet or be a stand-alone document.

Of course the same applies for the cargo that was previously stored within the hold, meaning that hold wash water and cargo residues cannot be discharged if the previous cargo contained within the ship's hold was not declared as not being harmful to the marine environment according to Section 4.2 of the International Maritime Solid Bulk Cargoes (IMSBC) Code.

In case garbage is mixed with or contaminated by other garbage which have different discharge requirements, the more stringent requirements shall apply. For example, if a vessel is sailing within a special area and has mixed comminuted food waste with food waste that is no comminuted then according to the revised MARPOL Annex V regulations the vessel should not discharge the food waste mixture to the sea.

A simplified overview of the discharge provisions of the revised MARPOL Annex V which has entered into force on 1 January 2013 has been developed by the IMO and is presented here below

<table>
<tr><th>Type of garbage</th><th>Ships outside special areas</th><th>Ships within special areas</th><th>Offshore platforms (more than 12 nm from land) and all ships within 500 m of such platforms</th></tr>
<tr><td>Food waste comminuted or ground</td><td>Discharge permitted ≥3 nm from the nearest land, en route and as far as practicable</td><td>Discharge permitted ≥12 nm from the nearest land, en route and as far as practicable</td><td>Discharge permitted</td></tr>
<tr><td>Food waste not comminuted or ground</td><td>Discharge permitted ≥12 nm from the nearest land, en route and as far as practicable</td><td>Discharge prohibited</td><td>Discharge prohibited</td></tr>
<tr><td>Cargo residues[1] not contained in wash water</td><td rowspan="2">Discharge permitted ≥12 nm from the nearest land, en route and as far as practicable</td><td>Discharge prohibited</td><td>Discharge prohibited</td></tr>
<tr><td>Cargo residues[1] contained in wash water</td><td>Discharge permitted ≥12 nm from the nearest land, en route, as far as practicable and subject to two additional conditions[2]</td><td>Discharge prohibited</td></tr>
<tr><td>Cleaning agents and additives[1] contained in cargo hold wash water</td><td rowspan="2">Discharge permitted</td><td>Discharge permitted ≥12 nm from the nearest land, en route, as far as practicable and subject to two additional conditions[2]</td><td>Discharge prohibited</td></tr>
<tr><td>Cleaning agents and additives[1] in deck and external surfaces wash water</td><td>Discharge permitted</td><td>Discharge prohibited</td></tr>
<tr><td>Carcasses of animals carried on board as cargo and which died during the voyage</td><td>Discharge permitted as far from the nearest land as possible and en route</td><td>Discharge prohibited</td><td>Discharge prohibited</td></tr>
<tr><td>All other garbage including plastics, synthetic ropes, fishing gear, plastic garbage bags, incinerator ashes, clinkers, cooking oil, floating dunnage, lining and packing materials, paper, rags, glass, metal, bottles, crockery and similar refuse</td><td>Discharge prohibited</td><td>Discharge prohibited</td><td>Discharge prohibited</td></tr>
<tr><td>Mixed garbage</td><td colspan="3">When garbage is mixed with or contaminated by other substances prohibited from discharge or having different discharge requirements, the more stringent requirements shall apply</td></tr>
</table>

1 These substances must not be harmful to the marine environment.

2 Discharge shall only be allowed if: (a) both the port of departure and the next port of destination are within the special area and the ship will not transit outside the special area between these ports (regulation 6.1.2.2); and (b) if no adequate reception facilities are available at those ports (regulation 6.1.2.3)

The Manila Amendments

STCW standards have been in force for decades, prescribing the minimum requirements relating to training, certification and watch keeping for seafarers worldwide. Since 1978 when the Convention was first adopted, the world of shipping has radically changed; therefore skills and competencies have to meet continuous technological advances.

In this context, the Convention itself has been significantly amended twice; in 1995, where the IMO proceeded with a comprehensive revision, and in 2010 where a set of far-reaching and comprehensive amendments was adopted in order to address today's seafarers. The 2010 amendments came to be called the "Manila amendments", after the location where the convention was held.

The most significant amendments are:

New rest hours for seafarers

The STCW minimum rest hours are now harmonized with the work hour requirements adopted by the International Labour Organization including the ILO Maritime Labour Convention (MLC).

New grades of certificates of competence for Able seaman in both deck and engine

STCW 2010 introduces extensive training and certification requirements for the new grades of 'Able Seafarer Deck' and 'Able Seafarer Engine'. These are in addition to the current navigational and engine watch rating requirements which are otherwise unchanged.

New and updated training, refreshing requirements

Emphasis is given to the need for seafarers' standards of competence3 to be maintained throughout their careers. All seafarers are required to provide evidence of appropriate levels of competence in basic safety training (including survival, fire-fighting, first aid, and personal safety) every five years.

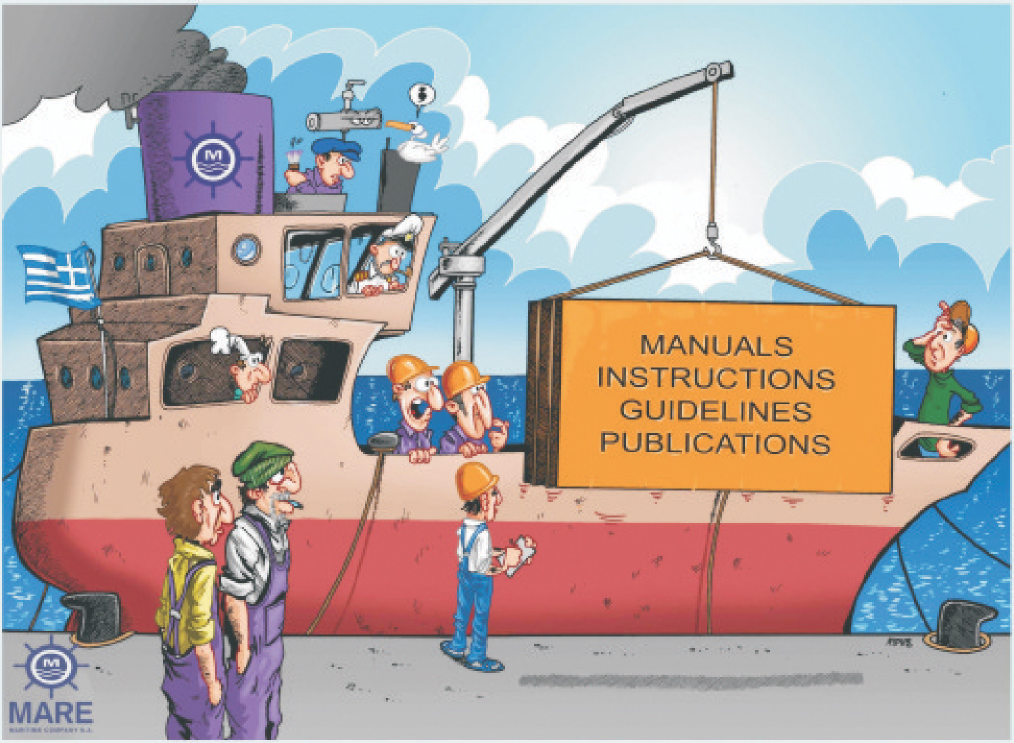
Mandatory security training

Apart from the Ship Security Officer, all shipboard personnel should undergo security training.

Additional medical standards

Specific Alcohol limits in blood or breath

These include a specific limit of 0.05% blood alcohol level or 0.25mg/l alcohol in the breath.



Seamanship, the forgotten factor

A marine superintendent point of view

It has been repeatedly observed that nowadays, Seamanship onboard commercial cargo ships tend to be extinct. If it is indeed so, one cannot help but wonder in what degree this has taken place, which factors contributed and how severe are the related consequences for the shipping industry.

But how important is the term Seamanship? In order to comprehend the gravity of the term an attempt for an analysis can be performed.

Seamanship shouldn't be interpreted only within the literal sense of the word, which involves the practical art of operating a ship. It should be attributed a wider meaning which is a combination of experience, knowledge, professionalism, safety culture and performance ability onboard a vessel. It's worth also to mention that seamanship involves a knowledge on a variety of fields and development of specialized skills including but not limited to: management, navigation, weather meteorology and forecasting, watch keeping, ship-handling, operation of deck equipment, cargo pumps, anchors and cables, communications, precise execution of various duties such as cargo handling equipment, cargo pumps, dangerous cargoes, tank cleaning operations, dealing with emergencies and more. The degree of knowledge needed within these areas is dependent upon the nature of the work, rank and the type of vessel on which a mariner is employed.

We should not omit to mention that seamanship is transferred from one generation of seamen to another. In a nutshell, seamanship is a "best practice guide" based on all aforementioned elements.

But is seamanship still at play, or it has been lost somewhere in the immense volume of bureaucracy?

Nowadays one might claim that seamanship tends to be less apparent and consequently the number of accidents tends to increase. Should one wonder why, the reasons are quite transparent: each one of us, members of the shipping community, has contributed in transforming Captain and crew to bureaucrats.

Seaman's life isn't as it used to be twenty years ago. One can recall that a ship's Master had only one or two folders behind his desk whereas nowadays there are forty. Taking into account the mass of paperwork created and maintained onboard a vessel, the additional paperwork required to meet each Oil Major's criteria, and of course adding the actual operation of the ship, Master and crew are under constant pressure. As a consequence, it is almost certain that there will be an impact both on vessel maintenance and safe operation with potentially severe and domino consequences including possibly loss of human life and environmental impact.

However, it should not be omitted that the combination of required paperwork and operational/commercial necessities increase the fatigue onboard, since the number of crew is either decreased or remains the same - at best.

The shipping industry has invested a vast amount of resources in training and education of seafarers for better performance onboard, safety and survival at sea. There are numerous training programs, manuals, requirements of the International Maritime Organization, rules and legislation that modern seamen are required to be intimately familiar with. However training and education are not enough to for safe navigation in the so-called "paper ocean" and the fearful storms blowing within. If one collected all the requirements that seafarers have to respond to, in one single volume, we would be surprised: "20 thousand leagues under the sea" - the novel of the famous writer Jules Verne - would be a small notebook compared to that book.

But are all these regulations sufficient in order to establish high quality standards and achieve good Seamanship? Could the increasing ocean of paper and bureaucracy be the main contributing factor which corroded Seamanship as we knew it?

Seamen are constantly being judged for their overall seamanship skills. In case of a marine incident it is often concluded that the root cause was human error. "Errare humanum est" - to make mistakes is part of the human nature. Many factors are taken into account while investigating reasons for accidents. Fatigue, stress, lack of experience, short period of adaptation... However in many cases, all the findings could be summarized as "lack of seamanship".

There is no objection that the ISM era has brought a level of quality in the shipping industry.

But since then, numerous new requirements and regulations came up - and are still increasing.

It is self-evident that all regulations in the form of conventions, codes, resolutions and circulars had and have only one scope which is the establishment of high standards for the Safety and Quality in the shipping industry. One can realize that most of these were deemed necessary and in fact might contribute to some improvements. However, we truly cannot express satisfaction with the overall picture of shipping as of now.

Quite possibly shipping would be drastically improved by embracing and restoring the lost traditional ideals of being simple, safe, straightforward and above all: practical. This is not feasible without reducing -as far as possible- uncontrolled bureaucracy and the associated "paper kingdom". In addition, implementation of good seamanship and achievement of Safety onboard will be attained through continuous onboard training, frequent supervision / attendances of experienced ex mariners /superintendents, management of risk and implementation of good or -as typically called- best working practices. Good seamanship commands that each one of the mariners serving onboard a vessel should have strong self-initiatives and moreover have set their personal high professional standards. Crew bonding and participation is of paramount importance for morale boosting purposes.

A glimpse of light will then be visible at the end of the tunnel: the lost seamanship.

Capt. Charis Kanellopoulos

Marine Superintendent

Noxious Liquid Substances Carried In Bulk

Heavy chemicals	Those substances are produced in large quantities, for example: **sulphuric acid** – among the cheapest of all acids and can be produced from sulphur, air and water. It is also very versatile, being used for the production of phosphate fertilizer, explosives such as TNT, plastics such as rayon, purifying petroleum and removing oxides from metals and in storage batteries; **phosphoric acid** – used for the production of superphosphates and various other products, including detergents, paints and foodstuffs: **nitric acid** – a basic ingredient of explosives, nitrate fertilizers and many dyes, and plastics; **caustic soda** is also shipped in solution; **hydrochloric acid** – used in steel reduction process and ore reduction; **ammonia**
Molasses and alcohols	**Molasses** comes from either sugar beet or sugar cane and can be fermented into alcohols such as rum. Many **alcohols** are produced by the petrochemical industry, but some can also come from the fermentation of starch, such as ethanol. Alcohols of this type, including ethyl, methyl and propyl, are used in industrial processes (for example to make cellulose acetate, which is a thermoplastic molding compound used in the manufacture of telephones, buttons, films and many other products). **Wines and some beers** also come into this category and are being increasingly carried at sea in bulk quantities on ships which are in fact specialized chemical tankers.
Vegetable and animal fats and oils	**Edible vegetable oils** are derived from soya beans, groundnuts, cottonseed, sunflowers, olives, rape and other seeds. **Coconut and palm oil** can be used for cooking and also in the production of soap. **Industrial oils** come from linseed and castor seed. Some fats are extracted from animals including lard and fish oils.
Petrochemical products	The most complex and probably the most versatile group of chemicals carried in bulk – all are carbon compounds basically derived from oil or gas. They are extensively used in the production of fibre, artificial rubber and plastics and many are carried on liquefied gas carriers. Substances carried in chemical tankers include aromatics, such as benzene, which nowadays are derived mainly from oil but can be produced from coal. Other important petrochemicals include xylenes (used in the production of polyester fibres); phenol (previously known as carbolic acid) and styrenes.
Coal tar products	Coal tar is derived from the carbonization of coal. It can be converted into numerous products, many of which can also be produced from oil (oil and coal are both fossil fuels composed of hydrocarbons). Coal tar derivatives include benzene, phenol (used for the production of Bakelite, the first 'plastic'), naphthalene and many more. Common products which are derived from coal include nylon, aspirin, antiseptics and herbicides.

Marine Engine Emission Standards

- Background
- NOx Emission Standards
- Sulfur Content of Fuel
- Other Provisions

Background

International Maritime Organization (IMO) is an agency of the United Nations which has been formed to promote maritime safety. It was formally established by an international conference in Geneva in 1948, and became active in 1958 when the IMO Convention entered into force (the original name was the Inter-Governmental Maritime Consultative Organization, or IMCO, but the name was changed in 1982 to IMO). IMO currently groups 167 Member States and 3 Associate Members.

IMO ship pollution rules are contained in the "International Convention on the Prevention of Pollution from Ships", known as MARPOL 73/78. On 27 September 1997, the MARPOL Convention has been amended by the "1997 Protocol";, which includes Annex VI titled "Regulations for the Prevention of Air Pollution from Ships". MARPOL Annex VI sets limits on NOx and SOx emissions from ship exhausts, and prohibits deliberate emissions of ozone depleting substances.

The IMO emission standards are commonly referred to as Tier I...III standards. The Tier I standards were defined in the 1997 version of Annex VI, while the Tier II/III standards were introduced by Annex VI amendments adopted in 2008, as follows:

- 1997 Protocol (Tier I)—The "1997 Protocol" to MARPOL, which includes Annex VI, becomes effective 12 months after being accepted by 15 States with not less than 50% of world merchant shipping tonnage. On 18 May 2004, Samoa deposited its ratification as the 15th State (joining Bahamas, Bangladesh, Barbados, Denmark, Germany, Greece, Liberia, Marshal Islands, Norway, Panama, Singapore, Spain, Sweden, and Vanuatu). At that date, Annex VI was ratified by States with 54.57% of world merchant shipping tonnage.

  Accordingly, Annex VI entered into force on 19 May 2005. It applies retroactively to new engines greater than 130 kW *installed on vessels constructed on or after January 1, 2000*, or which undergo a major conversion after that date. The regulation also applies to fixed and floating rigs and to drilling platforms (except for emissions associated directly with exploration and/or handling of sea-bed minerals). In anticipation of the Annex VI ratification, most marine engine manufacturers have been building engines compliant with the above standards since 2000.

- 2008 Amendments (Tier II/III)—Annex VI amendments adopted in October 2008 introduced (1) new fuel quality requirements beginning from July 2010, (2) Tier II and III NOx emission standards for new engines, and (3) Tier I NOx requirements for existing pre-2000 engines.

  The revised Annex VI enters into force on 1 July 2010. By October 2008, Annex VI was ratified by 53 countries (including the Unites States), representing 81.88% of tonnage.

Emission Control Areas. Two sets of emission and fuel quality requirements are defined by Annex VI: (1) global requirements, and (2) more stringent requirements applicable to ships in Emission Control Areas (ECA). An Emission Control Area can be designated for SOx and PM, or NOx, or all three types of emissions from ships, subject to a proposal from a Party to Annex VI.

Existing Emission Control Areas include:

- Baltic Sea (SOx, adopted: 1997 / entered into force: 2005)
- North Sea (SOx, 2005/2006)
- North American ECA, including most of US and Canadian coast (NOx & SOx, 2010/2012).
- US Caribbean ECA, including Puerto Rico and the US Virgin Islands (NOx & SOx, 2011/2014).

NOx Emission Standards

NOx emission limits are set for diesel engines depending on the engine maximum operating speed (n, rpm), as shown in Table 1 and presented graphically in Figure 1. Tier I and Tier II limits are global, while the Tier III standards apply only in NOx Emission Control Areas.

Table 1. MARPOL Annex VI NOx Emission Limits

Tier	Date	NOx Limit, g/kWh		
		n < 130	130 ≤ n < 2000	n ≥ 2000
Tier I	2000	17.0	$45 \cdot n^{-0.2}$	9.8
Tier II	2011	14.4	$44 \cdot n^{-0.23}$	7.7
Tier III	2016†	3.4	$9 \cdot n^{-0.2}$	1.96

† In NOx Emission Control Areas (Tier II standards apply outside ECAs).

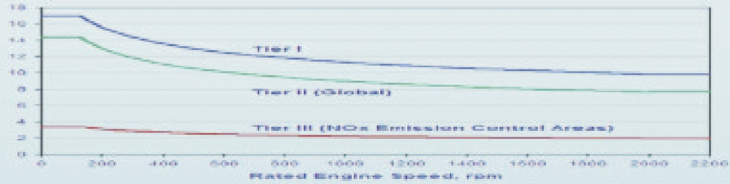


Figure 1. MARPOL Annex VI NOx Emission Limits

Tier II standards are expected to be met by combustion process optimization. The parameters examined by engine manufacturers include fuel injection timing, pressure, and rate (rate shaping), fuel nozzle flow area, exhaust valve timing, and cylinder compression volume.

Tier III standards are expected to require dedicated NOx emission control technologies such as various forms of water induction into the combustion process (with fuel, scavenging air, or in-cylinder), exhaust gas recirculation, or selective catalytic reduction.

Pre-2000 Engines. Under the 2008 Annex VI amendments, Tier I standards become applicable to existing engines installed on ships built between 1st January 1990 to 31st December 1999, with a displacement ≥ 90 liters per cylinder and rated output ≥ 5000 kW, subject to availability of approved engine upgrade kit.

Testing. Engine emissions are tested on various ISO 8178 cycles (E2, E3 cycles for various types of propulsion engines, D2 for constant speed auxiliary engines, C1 for variable speed and load auxiliary engines).

Addition of not-to-exceed (NTE) testing requirements to the Tier III standards is being debated. NTE limits with a multiplier of 1.5 would be applicable to NOx emissions at any individual load point in the E2/E3 cycle.

Engines are tested using distillate diesel fuels, even though residual fuels are usually used in real life operation.

Further technical details pertaining to NOx emissions, such as emission control methods, are included in the mandatory "NOx Technical Code", which has been adopted under the cover of "Resolution 2".

Sulfur Content of Fuel

Annex VI regulations include caps on sulfur content of fuel oil as a measure to control SOx emissions and, indirectly, PM emissions (there are no explicit PM emission limits). Special fuel quality provisions exist for SOx Emission Control Areas (SOx ECA or SECA). The sulfur limits and implementation dates are listed in Table 2 and illustrated in Figure 2.

Table 2. MARPOL Annex VI Fuel Sulfur Limits

Date	Sulfur Limit in Fuel (% m/m)	
	SOx ECA	Global
2000	1.5%	4.5%
2010.07	1.0%	
2012		3.5%
2015	0.1%	
2020[a]		0.5%

a - alternative date is 2025, to be decided by a review in 2018

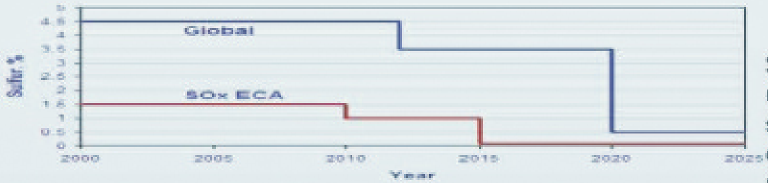


Figure 2. MARPOL Annex VI Fuel Sulfur Limits

Heavy fuel oil (HFO) is allowed provided it meets the applicable sulfur limit (i.e., there is no mandate to use distillate fuels).

Alternative measures are also allowed (in the SOx ECAs and globally) to reduce sulfur emissions, such as through the use of scrubbers. For example, in lieu of using the 1.5% S fuel in SOx ECAs, ships can fit an exhaust gas cleaning system or use any other technological method to limit SOx emissions to $\leq$ 6 g/kWh (as SO_2).

Other Provisions

Ozone Depleting Substances. Annex VI prohibits deliberate emissions of ozone depleting substances, which include halons and chlorofluorocarbons (CFCs). New installations containing ozone-depleting substances are prohibited on all ships. But new installations containing hydro-chlorofluorocarbons (HCFCs) are permitted until 1 January 2020.

Annex VI also prohibits the incineration on board ships of certain products, such as contaminated packaging materials and polychlorinated biphenyls (PCBs).

Compliance. Compliance with the provisions of Annex VI is determined by periodic inspections and surveys. Upon passing the surveys, the ship is issued an "International Air Pollution Prevention Certificate", which is valid for up to 5 years. Under the "NOx Technical Code", the ship operator (not the engine manufacturer) is responsible for in-use compliance.

This article based in part on information provided by Michael F. Pedersen of MAN Diesel A/S.

THE CHEMICAL INDUSTRY

- About 1 billion metric tons of organic and inorganic chemicals, vegetable oils and animal fats and other products are produced annually
- About 2,5 billion metric tons of clean petroleum products are produced annually
- Main products – organic chemicals (BTX, EDC, Acrylo, Glycols, Metanol, etc.), Sulphuric and Phosphoric acids, Veg. oils, MTBE, etc.

SOURCES AND PRODUCTS

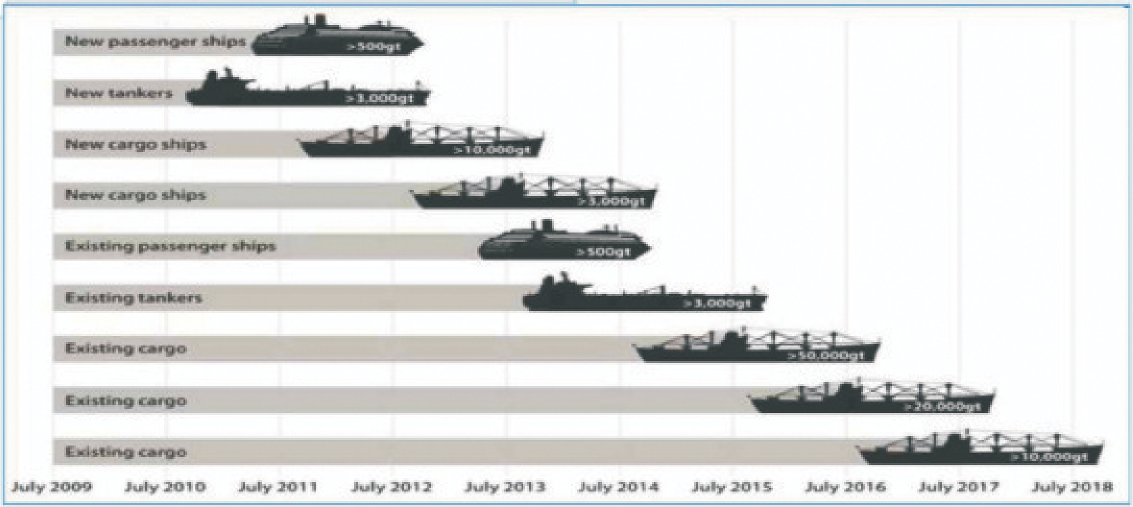
Raw materials from	Oil/Gas		Minerals	Agriculture
Primary industry	Refinery		Manufacturing	Crushers
Chemical industry	CPP	Organics (methanol, xylene, styrene, glycol,etc)	Inorganics (acids and caustic soda)	Vegitable and animal oils/fats and/or pertochemicals
	Gasoline, jetfuel, naphta, etc	Specialty chemicals		
		Plasic converters, fibres	Coatings, adhesive	Detergents, cosmetics, edible oils, spirits/wine
Finished products	Textiles, packaging, electrical, automotive, building materials, etc, etc			Home use and personal care

ECDIS compliance dates by ship type & size

Ship type	Size	New ship*	Existing ship**
Passenger	≥500 gross tons	1 July 2012	No later than 1st survey after 1 July 2014
Tankers	≥3,000 gross tons	1 July 2012	No later than 1st survey after 1 July 2015
Dry cargo	≥50,000 gross tons	1 July 2013	No later than 1st survey after 1 July 2016
	≥20,000 gross tons	1 July 2013	No later than 1st survey after 1 July 2017
	≥10,000 gross tons	1 July 2013	No later than 1st survey after 1 July 2018
	≥3,000 gross tons	1 July 2014	Not required

* A new ship is defined as one in which the keel is laid on or after the cut-off date.

** Ships may be exempt from requirements if they will be taken permanently out of service within two years of the implementation date specified.



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