

Maritime Issues - Internal regulation on gas emissions: IMO's MARPOL Annex VI new sulphur limit enters into force

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【概要 : Summary】

One of the main measures to reducing emissions in maritime transport is the introduction of the International Maritime Organisation (IMO)'s new global sulphur limit, which came into force on 1 January 2020. As of this date, in countries that have acceded to the IMO's International Convention for the Prevention of Pollution from ships (MARPOL) Annex VI, the sulphur content of bunker fuel is limited to 0.5% m/m (mass by mass) for ships operating outside designated Emission Control Areas (ECAs). The significant reduction of SOx emissions from ships is expected to have major health and environmental benefits in particular near ports and in coastal areas.

As the preparation time to comply with the new global 0.5% sulphur limit has come to an end and also refiners of marine fuels have now to deliver a significantly higher quantity of low-sulphur fuel, this report gives a first glance on the new situation. It also indicates some of the problems related to the implementation and controlling of the compliance with the new sulphur limit.



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【記事 : Article】

1. The IMO2020 and measures of compliance and control

The IMO's ship pollution rules are contained in the "International Convention on the Prevention of Pollution from Ships", known as MARPOL 73/78. The 1997 MARPOL Protocol and the new Annex VI introduced Sulphur Emission Control Areas (SECAs) and Emission Control Areas (ECAs) for SOx, NOx and PM in order to minimize airborne emissions from ships in specified areas. Also the reduction of SOx emissions at a global level and tighter restrictions in designated ECAs was set up in a revised Annex VI, adopted in October 2008. On 1 January 2015, the sulphur limit in ECAs/SECAs was further reduced to 0.1% m/m sulphur content for marine fuels. For ships operating outside ECAs, the sulphur limit was reduced from 3.50% m/m to the new limit of 0.50% m/m since 1 January 2020.

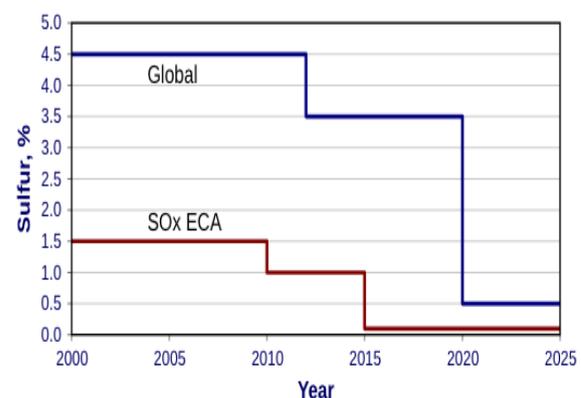


Table 1: The MARPOL Annex VI sulphur limits, in %

Source: <https://www.dieselnet.com/standards/inter/imo.php>

Currently, there are 95 parties to the MARPOL Annex VI, representing 96.71% of the world merchant shipping fleet by tonnage. Therefore, there is a majority affected by the new sulphur limit.

In the past years, detailed preparatory work has been done and the IMO issued a series of guidelines. The “2019 GUIDELINES FOR CONSISTENT IMPLEMENTATION OF THE 0.50% SULPHUR LIMIT UNDER MARPOL ANNEX VI” have the main purpose to allow administrations, port states, ship-owners, shipbuilders and fuel oil suppliers for a smooth changeover to the new 0.5% sulphur limit. Ships can meet the new sulphur limit by using low-sulphur compliant fuel oil, or gas or another low-sulphur alternative fuel. It was expected that the shipping industry would mainly switch to the utilisation of very low-sulphur fuel oil (VLSFO). The high-sulphur fuel oil (HSFO) fuels can only be used on board of ships with exhaust gas cleaning systems (EGCS) or “scrubbers”, which “clean” the emissions before they are released into the atmosphere. EGCS are accepted if flag States approve them as an alternative means to meet the sulphur limit requirement. However, the EGCS or scrubbers with open-loop systems are already banned from several ports and regions. Regarding fuel oil availability, the Regulation 18 of MARPOL Annex VI requires each Party to “take all reasonable steps to promote the availability of fuel oils, which comply with this Annex and inform the Organization of the availability of compliant fuel oils in its ports and terminals”. Parties are required to notify the IMO when a ship has presented evidence of the non-availability of compliant fuel oil. The IMO issued also a standard reporting form for fuel oil non-availability (“Fuel Oil Non-Availability Report (FONAR)”, which should be utilised if there is no compliant fuel oil available at a port for ships that have not been fitted with scrubbers, or are not equipped to use alternative fuel such as LNG.

Regarding the fuel oil quality, MARPOL Annex VI regulation 18.3 specifies the requirements in terms of fuel oil quality, for fuel oil for combustion purposes delivered to and used on board ships.

Notifications received where fuel oil suppliers have failed to meet the requirements are available to view on the IMO Global Integrated Shipping Information System (GISIS). Furthermore, the authorities will have to implement the sulphur testing and verification with a sensible and uniform approach in order to allow for a standardised treatment of ship operators and bunker suppliers in global maritime transport of all jurisdictions. Therefore, the IMO’s 2019 Guidelines also aim at ensuring a consistent implementation and enforcement of the new IMO 2020 sulphur limit across port and flag states. The port state control (PSC) can detain ships carrying non-compliant fuel without having to determine if it has been used or not, and is expected to significantly discourage non-compliance when in international waters. Certain ports have banned the use of open-loop scrubbers within their areas. Sanctions against non-compliance are established by individual Parties to MARPOL and their flag and port States. Instead, the IMO does not set fines or sanctions. However, regarding the control of the supplied fuel quality, also the IMO monitors the sulphur content of fuel oil used on ships globally. Samples are taken of residual fuel oil as well as distillate fuel oil, respectively low sulphur fuel oil. The yearly average sulphur content of the residual fuel oils tested in 2017 was 2.54%. The worldwide average sulphur content for distillate fuel in 2017 was 0.08%.

According to the European Commissioner for Transport Adina Vălean, the entry into force of the 2020 global sulphur cap is an important milestone for the entire maritime sector and will contribute to further reduce emissions of harmful air pollutants around the globe.

2. New amendments on using scrubbers and varying regional sulphur limit rules

Besides the global introduction of the 0.5% sulphur limit for all parties acceded to MARPOL Annex VI, there is a general trend of stricter local air pollution regulations in several countries and

regions. In fact, the EGCS with open-loop systems are already banned from several ports and regions. In the EU, the European Union Sulphur Directive (Directive (EU) 2016/802) stipulates a maximum of 0.10% sulphur content for ships in EU ports. In certain EU Member States, the Water Framework Directive constrains the discharge of scrubber water. Belgium and Germany have prohibited the discharge of scrubber water in many areas, constraining the operation of open-loop scrubbers. With no common EU practice agreed yet, other EU Member States may follow suit. Also in China, discharging wastewater from EGCS or scrubbers with open-loop systems is already banned within China's inland ECAs, port waters and the Bohai Bay waters. A full ban on open-loop scrubbers from the country's ECA could be also adopted. Also Singapore has prohibited the EGCS discharge from open-loop systems.

Furthermore, in China, the geographical coverage of its 0.50% sulphur areas is expanded to a 12-nautical-mile zone covering the entire Chinese coastline, as of 1 January 2019.

In the US state California, the Air Resources Board (ARB) enforced a 0.10% sulphur limit within 24 nautical miles of the Californian coast. The regulation does not allow any other compliance options than low-sulphur marine gas or diesel oil (DMA or DMB). A temporary research exemption may be granted, allowing the use of a scrubber.

Moreover, a number of countries have not ratified the MARPOL Annex VI including Argentina, Bahrain, Colombia, Ecuador, Egypt, Hungary, Israel, Mexico, Oman, Pakistan, Qatar, Thailand and Venezuela. Therefore, it is not applied in their territorial waters. Instead, other countries that have ratified Annex VI have not yet adopted appropriate legislation to give effect to their obligations.

3. The first impact of the implementation of the new 2020 sulphur limit

3.1. Availability and price rise of compliant fuels

The introduction of the 2020 global sulphur limit

has a wide impact on the ship owners and operators as well as on the refiners regarding the utilisation and supply of the compliant marine fuels. Since the introduction date of the IMO 2020 sulphur limit has been decided, member states, the shipping industry and fuel oil suppliers have been preparing for this change.

The shipping industry consumes about 5 million barrels per day (bpd) of marine bunker fuels, and the rule changes have an impact on the more than 50,000 merchant ships globally. Although it is still unclear how much the price rise for VLSFO will be exactly, the choice to use VLSFO fuels come at substantially higher costs. It is estimated that the price for a tonne for fuel oil of \$400 (£303) will rise to as much as \$600 a tonne, according to the International Chamber of Shipping. The current estimates see tens of billions of dollars per year as extra costs for the world shipping fleet due to the necessary fuel switch under the MARPOL Annex VI new sulphur limit.

A recent survey of ship owners revealed that 66% of shippers were considering to opting for the more expensive low Sulphur fuel oil (LSFO) after 1 January 2020. Only 13% were intending to retrofit scrubbers to their ships and just 8% were considering LNG as an option. A recent report by Swedish SEB estimated that fewer than 2,000 ships would have scrubber systems installed before the 2020 deadline. Taking into account the number of existing scrubber manufacturers and their production capabilities, there must be a deficit in scrubbers' availability in the next few years. This could lead to an increase of financial challenges and consequently the VLSFO prices.

The new fuel types and recipes mean that the refineries will change their operations accordingly and the main challenges are related to the proper supply of compliant fuels with lower sulphur contents, besides law enforcement and control in port states. Regarding the supply of the new fuel oil needed to meet the 2020 limit, the very low sulphur fuel oil meeting the 0.50% sulphur limit

(VLSFO) was already available in various locations across Asia, Middle East, Africa and the Americas as of mid-October and during November/December 2019. Most regions have 0.5% fuel oil on offer and 0.1% sulphur marine gasoil (MGO) is available almost everywhere. Already in 2019, IMO-compliant fuel was increasingly selling in Singapore and Fujairah, the two biggest bunkering ports, and at smaller ports in China, Japan, South Korea, Columbia and Brazil. In Europe, 0.5% fuel oil is available in the Amsterdam-Rotterdam-Antwerp (ARA) hub, at Skaw in Denmark, at Gothenburg in Sweden, at Hamburg in Germany, in the Baltic Sea and at English Channel ports. In southern Europe, Las Palmas, Algeciras and Barcelona in Spain, Gibraltar and Malta, some Italian ports, Istanbul and Novorossiysk have also a supply of 0.5% sulphur limit compliant fuel oil.

In 2020, the total marine bunker fuels demand is set to reach 5.8 million b/d. Refineries are required to increase low sulphur distillate output by 2.1 million b/d and ideally the 3.5 million b/d of current high sulphur fuel (3.5% sulphur content) output should be desulphurised in the refineries, as it is expected that only 0.9 million b/d of high Sulphur fuels will be needed as of 2020.

According to the port of Rotterdam, sales of its VLSFO were increasingly sold ahead of IMO 2020 and already half of November sales were the 0.5% sulphur fuels. This means that the VLSFO percentage within total fuel oil sales grew from 1.8% in September to 51.6% in November. It shows that the new low-sulphur bunker oil VLSFO with a maximum 0.5% sulphur has become extremely popular in Europe's largest bunker port Rotterdam, because many shipping companies in Rotterdam also sail intercontinentally and not just across the North Sea, where a stricter SECA sulphur limit of 0.1% is applied.

According to a BIMCO analysis of 3 January 2020, the price levels for VLSFO and Marine Gas Oil Low Sulphur (MGO LS) are rising. After the coming into force of the new IMO2020 sulphur limit, the price for VLSFO has risen to USD 710 per metric tonne in Singapore on 2 January 2020. Regardless the

underlying cause, the price levels for VLSFO and MGO LS have risen respectively by 30% and 24% from start of December 2019 to January 2020. Also Argus Media assessed VLSFO delivered bunker prices at \$713 per tonne in Singapore and \$591.50 per tonne in Rotterdam on 2 January 2020. Such price increases are quite extraordinary for the low-sulphur fuels, which have been trading at relatively stable levels throughout 2019, as opposed to the usually more volatile HSFO. The newly implemented IMO2020 Sulphur limit will very likely affect the price development of VLSFO in 2020 and therefore also the profitability for many ship-owners and operators. Instead Platts assessed HSFO delivered bunker prices at \$347 per tonne for trades on 2 January 2020 in Singapore and \$282 per tonne in Rotterdam. These are lower than prices for VLSFO but higher compared with HSFO prices in October 2019, when HSFO prices first fell below \$200 in Rotterdam and \$300 in Singapore. Currently, the VLSFO - HSFO spread in Singapore is at US\$ 340 per metric tonne, the third highest level since low-sulphur fuel became widely available. Similarly, the MGO LS - HSFO spread is at US\$ 346 per metric tonne, the highest level since 2014. The HSFO-VLSFO price spread is one indicator commonly used by ship-owners to gauge the viability of scrubber investments. Depending on a ship's consumption, the VLSFO - HSFO price spread could cause the doubling of a ship's daily fuel costs when switching from HSFO to VLSFO. Such a rise of fuel oil costs will surely have financial implications for many companies. This may provide supporting evidence for investments already made in exhaust gas cleaning systems (EGCS).

Ship-owners are most likely to be able to pass on the additional costs associated with IMO2020 compliance and the higher shipping costs may be absorbed throughout the manufacturing and transport supply chains.

3.2. Enforcement and monitoring of compliance

The enforcement and monitoring compliance of the IMO 2020 sulphur limit is the task of the respective

national authorities of states that are Parties to MARPOL Annex VI. They are therefore obliged to give effect to, and enforce, its provisions. Specifically, port states should conduct initial inspections based on documents including Bunker Delivery Notes (BDN), as well as the use of remote sensing and portable devices to control sulphur contents. The port states have to be prepared to investigate reports of non-availability and to report non-availability of compliant fuel oils and terminals to the IMO. Some IMO member states, including Denmark, Japan, Marshall Islands and Singapore, underlined their readiness as flag and port states readiness to implement and enforce the sulphur 2020 limit.

Besides several other methods, the utilisation of remotely piloted aircraft systems (RPAS), also called UAVs (unmanned aerial vehicles) or drones, was considered an option for individualising non-compliant ships in SECAs. In the EU, already with the introduction of the 0.1% sulphur limit in SECAs in 2015, the compliancy of ship operators and owners with the SECA sulphur limit had to be controlled. In 2019, the European Maritime Safety Agency (EMSA) announced that it has contracted more RPAS for being utilized by EU Member States for monitoring purposes, including the vessels' emission monitoring. Also random spot checks on fuel samples from ships and/or bunker suppliers to test for sulphur will be performed.

The EU has established such regimes under the EU sulphur directive to uphold the 0.10% sulphur limit in emission control areas and for ships at berth in EU ports. Out of this practice, compliance levels with the 0.10% sulphur limit in EU ports and ECAs has been good. Therefore, it is expected that also in the non-ECA areas of the EU, the compliance with the IMO 2020 sulphur limit will be carried out in a rule-compliant way. However, there are concerns that the enforcement will probably be weak in some parts of the world. In some countries, port State control (PSC) lacks resources such as testing equipment, personnel and training to enforce effectively.

As of 1 March 2020, ships without scrubbers will not

even be allowed to carry fuel exceeding 0.50% in their fuel tanks. This will make enforcement significantly more straightforward as authorities, including port State control officers, only need to prove that the ship is carrying non-compliant fuel. This will start by checking documentation and, if they suspect non-compliance, they can take samples for testing.

If the ship is tested to have bunkered non-compliant fuels, possibly unintentionally, it will be left to the discretion of the relevant authorities as to what action they take. This could include taking no action and allowing the vessel to use the fuel but there is a risk of enforcement action. Currently, it is not possible to indicate the likely action to be taken by port State control (PSC), but it is likely to depend upon the facts of each case.

In general, since in some regions there remains the need for effective enforcement, a global level playing field needs to be achieved regarding the compliance with IMO 2020 sulphur limit.

Refineries and blenders of marine fuel will also have to take over responsibility as they will need to certify that the fuels they are supplying meet the ISO 8217 specifications and the sulphur limit's requirements.

4. Outlook

The new global 0.50% sulphur limit of the sulphur contents of ships' fuel oil is part of the IMO's response to reduce the environmental impact of maritime transport. The IMO 2020 sulphur limit is expected to greatly benefit the environment and human health. The limit is expected to reduce the overall SO_x emissions by 77% from ships, equivalent to an annual reduction of approximately 8.5 million metric tonnes of SO_x. However, it will still have to be seen if it is similar beneficial for reducing air pollution like the 0,1% sulphur limit in the SECAs/ECAs.

While the new sulphur limit is applied since 1 January 2020, the ship owners had to decide on the introduction of alternative propulsion systems,

mostly to install EGCS or to utilise VLSFO in order to meet the new rules. Some ship owners have opted for scrubbers and they could see an advantage from their investment into retro-fittings of EGCS. While EGCS poses a short-term financial burden due to the necessary investment into the EGCS, the costs of a long-term utilisation of VLSFO could prove to be higher. Given the ship owners and operators' ability to continue burning less-expensive high-sulphur fuel via scrubber technology, it could prove to be more beneficial solution.

Furthermore, the compliance with the new sulphur limit needs to be controlled. There are still several compliance related issues to be considered and solved. There are countries, even among those that are party to MARPOL Annex VI that are not be able to enforce the new sulphur limit without delay due to the delay in transposing the regulation into national law. In some countries, port State control (PSC) lacks of resources such as testing equipment, personnel and training to enforce the new rule effectively. In the EU, in order to improve maritime surveillance capabilities the European Maritime safety Agency (EMSA) has introduced new RPAS services to assist the marine surveillance operations.

Furthermore, the EU has taken action to reduce the sulphur content of marine fuels through the successful implementation of the 0.1% sulphur limit in its ECAs in the North Sea and Baltic Sea. While implementing the 0.5% sulphur limit in non-SECA areas, the EU is also actively working on the possible future designation of new ECAs like in the Mediterranean Sea. Furthermore, as presented in the European Green Deal in December 2019, the European Commission considers further measures to make shipping more sustainable such as by extending the European emissions trading to the maritime sector.

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