

How to comply with MARPOL Annex V

*New amendments governing cargo classification
and the discharge of cargo hold wash water*



Introduction

As of 1 January 2013, amendments to MARPOL Annex V^{1,2}, mean that shippers have new responsibilities regarding cargo classification (crew responsibilities are outlined separately in the enclosed poster) which also affect the ability of the crew to discharge residues and wash water into the marine environment. From this date shippers will need to consider whether or not the cargo and hence residues, including those contained in wash water are 'harmful to the marine environment' (HME), as illustrated in Figure 1. This booklet sets out the requirements as well as the concept and process of classification of cargoes as HME.

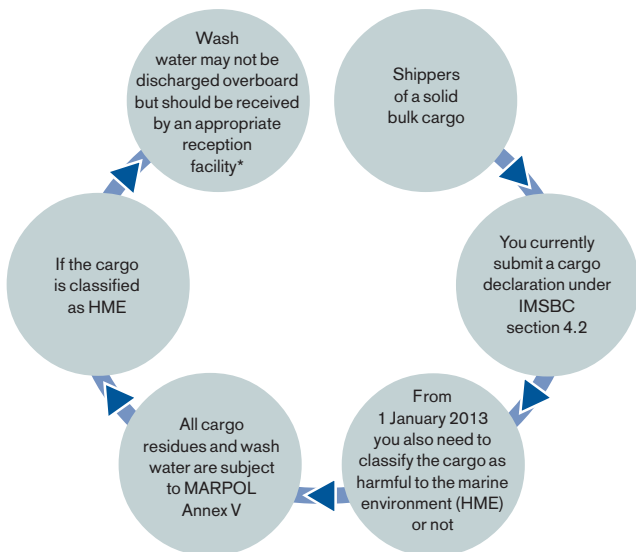


Figure 1. How the HME classification affects wash water discharge at sea.

* Outside Special Areas the discharge of HME cargo residues contained in hold wash water is allowed, *under certain predefined conditions*, until 31 December 2015.

MARPOL Annex V

The discharge of wash water and any non-recoverable cargo residues contained therein is primarily controlled through MARPOL Annex V, where it is classed as garbage and therefore subject to the controls specified within Regulations 4.1.3 and 6.1.2 of the recent amendments to MARPOL². In essence the discharge of cargo residues contained in wash water is governed by the following criteria:

- No discharge of cargo residues should occur less than 12 nautical miles from the nearest land, or the nearest ice shelf.
- No discharge of cargo residues should occur within the six MARPOL defined 'Special Areas'³ (the Mediterranean, the

'Gulfs' area, the wider Caribbean including the Gulf of Mexico, the Baltic Sea, the North Sea and the Antarctic). The discharge of cargo residues contained in wash water is only permitted if both the destination and departure ports are within the Special Area and the ship will not transit outside the Special Area between these ports, and only provided that no adequate reception facilities (RF) exist. In such instances discharge of non-recoverable, non-HME cargo residues in hold wash water should take place as far out to sea as is practicable and, in any event, no less than 12 nautical miles from the nearest land or the nearest ice shelf.

- No discharge of any cargo residues specified as HME. Hold wash water should be discharged to a suitable reception facility.

Note: due to a reported lack of adequate reception facilities at present, MEPC Circular 810⁴ allows the discharge of HME cargo residues contained in hold wash water until 31 December 2015 outside Special Areas providing that;

- based on the information from the relevant port authorities, the master determines that there are no adequate RFs at the receiving terminal or at the next port of call,
- the ship is en-route and as far as practicable (but at least 12 nautical miles) from the nearest land,
- before washing solid bulk cargoes are removed (and bagged for discharge ashore) as far as practicable (and the holds swept),
- filters are used in the bilge wells to collect any remaining solid particles and
- that the discharge is recorded in the garbage record book with the flag state notified utilising the revised consolidated format for reporting alleged inadequacies of port reception facilities stated in MEPC.1/Circ.469/Rev.2.

It is still a requirement for receiving terminals to provide adequate port reception facilities for this waste stream, this circular only provides flexibility for ship owners and operator in the case when receiving terminals have failed to meet their obligations under the Annex.

Under the timeframe stipulated under MARPOL Annex V by MEPC.1/Circ.791⁵ (ie. from 1 January 2013 until December 2014) the shipper must take all reasonable measures to provisionally classify cargoes as HME or not. From 1 Jan 2015 the shipper should provide a complete classification for the cargo to be shipped. The shipper must also declare whether the cargo is HME or not to the port state authorities in the port of loading and unloading.

How to classify cargoes as HME (or not)

In order to classify a dry bulk cargo under MARPOL Annex V 2012 guidelines¹ a cargo is considered HME if it fails any of seven specified criteria, classed according to the UN Globally Harmonized System of Classification and Labelling of Chemicals (UN GHS) as acute toxicity, chronic toxicity, carcinogenicity, mutagenicity, reproductive toxicity, repeated exposure of specific target organ toxicity [STOT] and the presence of plastics, rubber or synthetic polymers. Please see the summary of classification criteria on pages 10-11 for the specific data requirements for each criterion. When conducting laboratory testing the methods approved by the Organisation for Economic Co-operation and Development (OECD) are recommended.

Once an assessment of all seven criteria is complete it may be useful to complete a summary table (as illustrated in Figure 2). An example of the process of classification has been illustrated in Figure 3.

Criteria	Met	Not met*
1	X	
2		X
3		X
4	X	
5	X	
6	X	
7	X	

Figure 2. An example summary box.

* Any one of the seven criteria not met = cargo is classed as 'harmful to the marine environment' (HME).

There are three main stages in the classification of a cargo using the seven criteria:

- 1 A literature search of available information,
- 2 Laboratory testing for toxicity, biodegradation and bioaccumulation,
- 3 The comparison of the biodegradation and bioaccumulation data with published carcinogenicity, mutagenicity and reproductive toxicity (collectively known as CMR) as well as STOT studies, if necessary.

International Maritime Solid Bulk Cargoes Code (IMSBC)

All vessels carrying solid bulk cargoes (except for grains⁶ transported in bulk, which are considered under the International Grains Code of 1991) are already required to comply with the IMSBC Code. The cargo declaration form as required in section 4.2 of the Code should now contain a provisional declaration stating whether the cargo is HME or not. This declaration (an example of which is illustrated on page 12) could additionally be

provided in a material or product safety data sheet (SDS) or a letter of declaration regarding HME. As cargoes must already be tested by the shipper for the IMSBC physical parameters listed in the example declaration, it would be sensible to carry out any additional testing required for determination of HME at the same time.

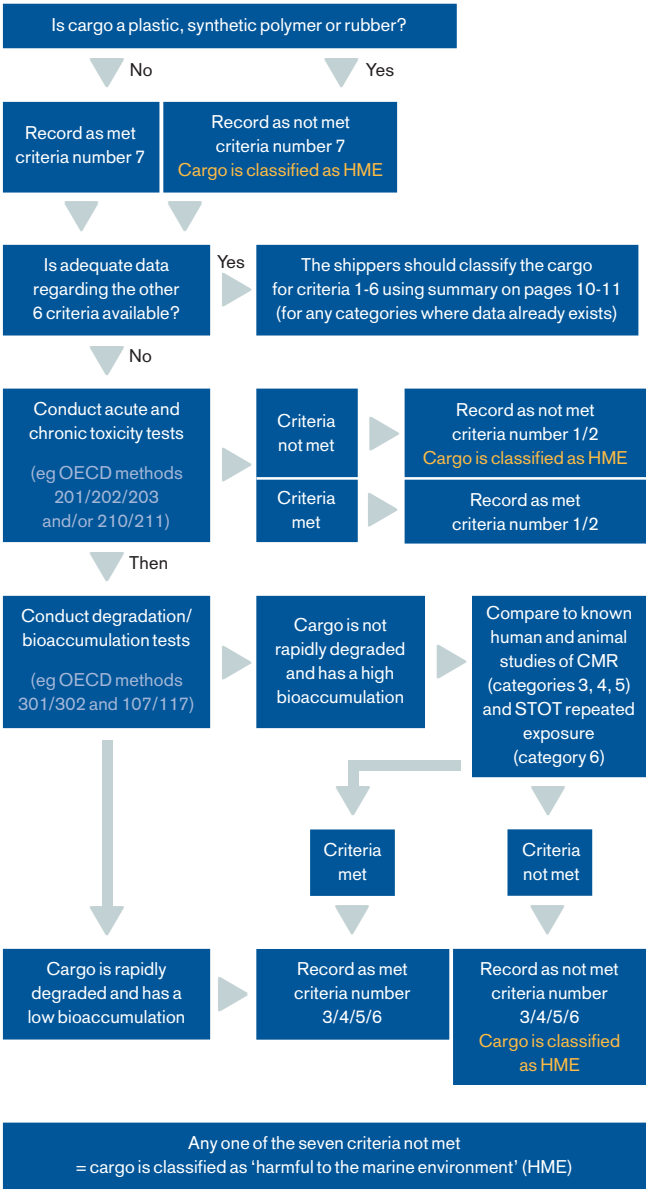


Figure 3. Flow diagram illustrating an example of how to gather data required for HME classification.

Common questions

What testing facilities can I use?

There are no known 'approved' laboratories, however the following conditions are strongly recommended:

- The facility should be familiar with eco-toxicity testing for the UN GHS system and the IMSBC code physical hazard tests,
- Studies should be carried out to internationally standardised guidelines such as OECD or the International Standards Organisation (ISO) documents. In certain cases national standards derived from the OECD tests guidelines may also be applicable,
- Care should be taken to ensure that laboratories carrying out such studies are compliant with OECD and good lab practice (GLP),
- Reports created should contain a statement of quality assurance.

How do I classify metals?

When looking to classify inorganic compounds, minerals and metals the concept of degradability has limited or no meaning and the rate of dissolution becomes the key to toxicity. Within the UN GHS guideline part 4⁷ there is a section devoted to the testing of metals. A good guide has also been published by the International Council on Mining and Metals – *Ore and concentrates an industry approach to EU hazard classification*⁸. This organisation has also published a document entitled *Metals Environmental Risk Assessment Guidance (MERAG)*, which may be helpful.

How do I classify mixtures, blends and batches?

When looking to classify mixtures or blends when test results for the mixture itself are not available, data on individual substances may be used to determine the classification, making use of factors such as dilution and batching. These factors are termed 'bridging principles' and further detail on their use can be obtained from the UN GHS guidelines part 4⁷. Of most interest is the fact that if a diluent is the same toxicity or lower, then the classification is based on the original compound. In all cases of two or more classifications the most stringent classification will apply. When batches of cargo are known to be produced by, or under the control of, the same manufacturer they can be presumed to be largely equivalent and only one classification is required (unless there is reason to believe there is significant variation). This may help avoid some unnecessary extra testing.

Note: Re-testing is recommended if the blending of cargoes has

the potential to cause a change in the toxicity of its constituent compounds.

What about cargo dust on deck?

Regulation 1.2 of MARPOL Annex V stipulates that the term 'cargo residues' does not include cargo dust remaining on the deck after sweeping or dust on the external surfaces of the ship and thus this dust is excluded from the definition of 'garbage' within the Annex.

What about the discharge of boiler / economiser wash down (sooty) water?

There has been much recent discussion regarding the classification and discharge of boiler/economiser wash down water. It has been proposed by several states that this waste could be regarded as 'other similar discharges' essential to the operation of a vessel, but this classification has not been agreed upon, and it is therefore not currently considered under the 2012 guidelines. In the meantime it is advisable to contact the relevant port authority, as to ascertain their domestic restrictions and regulations, for discharging boiler/economiser wash down water.

What is the definition of wash water?

When discussing wash water the regulations are referring to the waste water created from the cleaning up of non-recoverable cargo residues and small quantities of cleaning agents contained within it; this will mainly be in the cargo hold.

Are there adequate reception facilities?

The use and provision of adequate port reception facilities (RF) is seen as fundamental to the overall success of MARPOL Annex V. Adequacy is defined in the MARPOL Annexes by the fact that the RF should meet the needs of vessels using the port without causing them undue delay, that it does not provide mariners with a disincentive to use and that it should contribute to the improvement of the marine environment⁹.

At present the availability of adequate reception facilities is known to be fairly low. The ability of shippers to comply with the regulations may therefore be limited by the lack of facilities at some major ports or, in particular, regions.

Further guidance

- Where data already exists for the specified criteria (such as impact assessments and health and safety for mineral extraction) this data could potentially be used to begin the

classification, provided that the producer may share the data with the shipper. For processed chemical cargoes the manufacturer may also be able to provide additional toxicity information. Common cargoes may be assessed by several shippers and the sharing of data would be beneficial during the provisional classification stage. It is also understood that some cooperation work is being undertaken to pool resources and share information, such as the work by the European Copper Institute (ECI)¹⁰.

- References such as the GESAMP Hazard Profiles, country UN GHS databases, the IMSBC code and the IMDG code (the latter identifies certain marine pollutant cargoes within its index) may be of use when determining the properties of the cargo/wash water. Looking at previously classified 'dangerous goods' safety data sheets, cargoes that are classed as environmental harmful substances (EHS) or have specific UN numbers indicating a harmful cargo, may also provide additional useful information. There are also various chemical databases on-line that may provide preliminary toxicity data for some cargoes.
- For further guidance on the UN GHS criteria and the various categories please see UN GHS 4th Edition (2011)⁷.
- It is not believed that there are any recommended test methods for criteria 7. Test methods for criteria 1 and 2 are commonly available and understood. Criteria 3, 4, 5 and 6 tend to not be tested directly but are examined through bioaccumulation and degradation tests when compared with databases of human and animal studies. For further detail on the testing methods and criteria please see the OECD guidelines document for classification of chemicals that are hazardous to the aquatic environment (2001)¹¹.
- The Port State authorities should be able to compare declarations and clarify any specific requests or queries. A list of designated authorities can be found within the BC.1/Circ 70¹².

References:

- 1 Resolution MEPC.219(63).2012 Guidelines for the implementation of MARPOL Annex V. Adopted 2 March 2012.
- 2 Resolution MEPC.201(62). Amendments to the protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973. Adopted 15 July 2011.
- 3 The other two Special Areas of the Black Sea and the Red Sea have not yet come into force. MEPC.1/Circ.778.26/01/2012.
- 4 MEPC.1/Circ.810.27/06/2013. Adequate port reception facilities for cargoes declared as harmful to the marine environment under MARPOL Annex V.
- 5 MEPC.1/Circ.791. 25/10/2012. Provisional classification of solid bulk cargoes under the revised MARPOL Annex V between 1 January 2013 and 31 December 2014.
- 6 The Grain Code defines 'grain' as including wheat, maize (corn), oats, rye, barley, rice, pulses, seeds and processed forms thereof, whose behaviour is similar to that of grain in its natural state.
- 7 UN GHS 2011.
www.unece.org/trans/danger/publi/ghs/ghs_rev04/04files_e.html
- 8 ICMM documents
<http://www.icmm.com/library/oresandconcentrates>
- 9 MEPC.1/Circ.671. 20/7/2009. Guide to good practice for port reception facility providers and users.
- 10 Formation of global copper industry 'business venture' for IMO-GHS.
- 11 OECD series on testing and assessment No27, 2001. Guidance document on the use of the harmonised system for the classification of chemicals which are hazardous to the aquatic environment.
- 12 BC.1/Circ.70. Contact names and addresses of the offices of designated national competent authorities responsible for the safe carriage of grain and solid bulk cargoes.

Notes to table

A summary of the classification criteria¹³ overleaf:

- 13 Further detail can be reviewed in part 3 and 4 of the UN GHS 2011.
- 14 Essentially substances are considered rapidly biodegradable in the environment if >70% (based on dissolved organic carbon) or >60% (CO₂ generation or O₂ depletion) of the material is degraded within a 28 day period. If no other data is available then BOD₅/COD₅ ≥ 0.5.
- 15 Bioaccumulation is measured through exposure studies in fish or shellfish and reported as a bioconcentration factor (BCF) where high = ≥ 500 or an octanol/water partition coefficient (log K_{ow}) where high = ≥ 4.

A summary of the classification criteria¹³

Category in red = Criteria not met

No	Criteria	Category					
1	Acute aquatic toxicity	Category 1 96hr LC ₅₀ (fish), 48hr EC ₅₀ (crustacean) or 72/96 hr ErC ₅₀ (algae) is ≤ 1.00 mg/l	Category 2 96hr LC ₅₀ (fish), 48hr EC ₅₀ (crustacean) or 72/96 hr ErC ₅₀ (algae) is > 1.00 but ≤ 10.0 mg/l	Category 3 96hr LC ₅₀ (fish), 48hr EC ₅₀ (crustacean) or 72/96 hr ErC ₅₀ (algae) is ≥ 1.00 but < 10.0 mg/l			
2	Long term (chronic) aquatic toxicity	Adequate chronic data	Category 1 Not rapidly degradable = chronic NOEC or EC _x (fish), (crustacean) or (algae) is ≤ 0.1 mg/l Rapidly degradable = chronic NOEC or EC _x (fish), (crustacean) or (algae) is ≤ 0.01 mg/l	Category 2 Not rapidly degradable = chronic NOEC or EC _x (fish), (crustacean) or (algae) is ≤ 1.0 mg/l Rapidly degradable = chronic NOEC or EC _x (fish), (crustacean) or (algae) is ≤ 0.1 mg/l	Category 3 Rapidly degradable = chronic NOEC or EC _x (fish), (crustacean) or (algae) is ≤ 1.0 mg/l		
		Inadequate chronic data	Category 1 Acute aquatic toxicity category 1	Category 2 Acute aquatic toxicity category 2	Category 3 Acute aquatic toxicity category 3	Category 4 Poorly soluble substances for which no acute toxicity is recorded	
3	Carcinogenicity	Not rapidly degradable ¹⁴ with high bioaccumulation ¹⁵ PLUS . . .	Category 1A Known human carcinogen based largely on human evidence	Category 1B Presumed human carcinogen based on demonstrated animal carcinogenicity	Category 2 Suspected carcinogen. Limited evidence of human or animal carcinogenicity		
4	Mutagenicity		Category 1A Known mutagens. Possible evidence from human epidemiological studies of mutagenicity	Subcategory 1B Positive results in: <i>In vivo</i> heritable germ cell tests in mammals or this combined with some evidence of germ cell mutagenicity or mutagenic effects in human germ cell tests without demonstration of progeny	Category 2 Suspected or possible mutagen. Positive evidence from tests in mammals and/or in some cases from <i>in-vitro</i> experiments		
5	Reproductive toxicity		Category 1A Known human reproductive toxicant based on human evidence	Category 1B Presumed human reproductive toxicant largely based on data obtained from animal studies	Category 2 Suspected human reproductive toxicant. Human or animal evidence possible with other information		
6	Repeated exposure STOT		Category 1 Substances that have produced significant toxicity in humans or that, on the basis of evidence from animal studies, have the potential to do so following repeated exposure	Category 2 Substances that are presumed to be harmful to human health at repeated exposure (animal studies with significant toxic effects relevant to humans at generally moderate exposure or human evidence in exceptional cases)			
7	Plastics		Cargo consists of, or contains: synthetic polymers, rubber, plastics or plastic feedstock pellets				

LC₅₀ = The lethal concentration of the compound that kills 50% of test organisms in a given time

EC₅₀ = Half max effective concentration

ErC₅₀ = The EC₅₀ in terms of reduction of growth rate

NOEC = No observed effect concentration

EC_x = The concentration associated with x% response

An example cargo declaration

Example Shippers Declaration

This form meets the requirements of SOLAS 1974, Chapter VI, Regulation 2 and the IMSBC code, section 4.2.

General Information

Shipper:	Transport document number:
Consignee:	Carrier:
Name/means of transport:	Instructions and other matters:
Port/place of departure:	
Port/place of destination:	

Cargo Information

General description of the cargo (for solid bulk cargo – type of material / particle size):	Relevant special properties of the cargo (eg highly soluble in water. For solid bulk cargo, see section 4 of the IMSBC code):
Gross mass (Kg/tons) General cargo: Cargo units: Bulk cargo:	

Solid Bulk Cargo Information

BCSN:		
Specification of bulk cargo (if applicable): Stowage factor: Angle of repose: Trimming procedures: If potential hazard – chemical properties (Class, UN number or MHB):		Group of the cargo Group A: <input type="checkbox"/> Group B: <input type="checkbox"/> Group A and B: <input type="checkbox"/> Group C: <input type="checkbox"/>
Transportable moisture limit:	Moisture content at shipment:	Additional certificate(s) (if required) Certificate of moisture content and transportable moisture limit: <input type="checkbox"/> Exemption certificate: <input type="checkbox"/> Weathering certificate: <input type="checkbox"/> Other: <input type="checkbox"/>
EHS (see chapters 2.10 and 2.9.3 of the IMDG code): Yes / No		
Marine Pollutant (HME) (see MARPOL Annex V): Yes / No		
Note: All 7 criteria must be available by Jan 1 st 2015		

Declaration

I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded.		
Name / status, Company / organisation of signatory:	Place and date:	Signature on behalf of shipper:

Modified from the Australian Maritime Safety Authority form AMSA 268 (10/12)

Crew responsibilities under MARPOL Annex V

(inside - detachable)

MARPOL ANNEX V CREW CHECKLIST

Is the vessel more than 3 nm from the nearest land or ice shelf? **No** ▶ No 'garbage' of any sort may be discharged overboard
 ▼ Yes

Is the vessel within a MARPOL designated 'Special Area'*?

▼ No

Discharge of 'garbage' is less restricted

Split animal carcasses may only be discharged ≥ 100 nm from land in max water depth

Discharge of ground or crushed food waste **permitted** ≥ 3 nm from land while en route and should be as far out to sea as feasible

Discharge of non-ground or crushed food waste **permitted** ≥ 12 nm from land while en route and should be as far out to sea as feasible

Until December 31 2015 discharge of non-recoverable cargo residues is **permitted** when no adequate reception facilities exist, when ≥ 12 nm from land while en route and should be as far out to sea as feasible

▼

Discharge of non-recoverable cargo residues and cleaning agents or additives

▼

Is the cargo or cleaning agent classed as 'harmful to the marine environment' (HME)?

Yes

▼

Discharge of cleaning agents and additives is **permitted** within wash water

No

Discharge of non-recoverable residues is **permitted** ≥ 12 nm from land while en route and should be as far out to sea as feasible

▼ Yes

Discharge of 'garbage' is more restricted

Discharge of non-recoverable cargo residues and cleaning agents or additives is only permitted in special cases

▼

Is the cargo or cleaning agent classed as 'harmful to the marine environment' (HME)?

▼ No

Is it within wash water?

▼ No

Discharge of cargo residues is **prohibited**

▼ No

Discharge of cleaning agents and additives in deck and external surface waters is **permitted**

▼ Yes

Wash water retained on board for later disposal outside of the Special Area

▼ Yes

Cargo hold wash water may only be discharged > 12 nm from land en route and as far out to sea as feasible only if departure and destination are both within the Special Area and no adequate reception facilities are available at those ports, or in an emergency situation

Discharge of food waste not ground or crushed through a ≥ 25 mm mesh is **prohibited**

Discharge is **prohibited**

▲ Yes

DISCHARGE PROHIBITED AT SEA

Glass: Plastics: Paper: Incinerator ash:
 Floating dunnage: Cooking oil:
 Crockery: Bottles: Metal:
 Lining and packaging materials:
 Rags: Synthetic ropes

* The Mediterranean, the 'Gulfs' area, the wider Caribbean including the Gulf of Mexico, the Baltic Sea, the North Sea and the Antarctic where the disposal of garbage at sea is heavily restricted

Acknowledgement: Chart details by kind permission of the ITOFP

Acknowledgments:

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