Risk Focus: Inventory of Hazardous Materials (IHM)

A guide for shipowners to ensure compliance with ship recycling legislation
Background

For the last 30 years or so, ship recycling – also known as ship breaking, dismantling, scraping, and other terms – has been centred primarily in India, Bangladesh and Pakistan, where the vast majority of ships are broken at 'beaching' facilities. Along with China, where the 'alongside' method of ship recycling is preferred and Turkey, which uses the 'landing' method, these 5 main countries account for more than 95% of annual ship recycling volume.

Ship recycling can and should be a safe and environmentally sound industry. It employs a large workforce in South Asia where almost nothing is wasted during the dismantling and recycling process. However, working practices found at the majority of the world's ship recycling facilities have routinely fallen short of internationally acceptable standards, with environmental concerns and frequent loss of life reported by pressure groups and, over recent years, mainstream media.

Cutting apart very large steel structures is a complex business. Although a high proportion of the ship structure provides a ready supply of steel and other metals there are also significant amounts of plastics and other materials that must be handled carefully and appropriately. Hazardous materials such as asbestos are a constant concern. The traditional beaching methods commonly used during dismantling make it difficult to ensure worker safety and containment of pollutants.

The Green Passport

In a bid to help ensure that workers breaking ships were forewarned of potential or known hazardous materials inherent in the ship's structure or fixed equipment, the International Maritime Organization (IMO) introduced the concept of an Inventory of Hazardous Materials – then known as a Green Passport – as part of their voluntary Guidelines on Ship Recycling (2003).

It was envisaged that the Green Passport would be produced by the shipyard at construction stage and successive owners of the ship would maintain its accuracy throughout the ship's working life. The Green Passport would then be delivered with the ship to the recycling facility, providing information on the potentially hazardous materials on board.

A guide to help ensure your IHM is compliant

The advent of international and regional legislation is driving the marine industry towards achieving compliance, at all stages of a ship's life.

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Light fittings find further use on land. Furthermore, new steel production from recycled steel requires only one third of the energy used for steel production from raw materials. Recycling thus makes a positive contribution to the global conservation of energy and resources and, in the process, employs a large, if predominantly unskilled, workforce.

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The Inventory of Hazardous Materials (IHM)

Over the last decade international and regional ship recycling legislation has been adopted, some of which is already in force. The cornerstone of this legislation is the IHM, which is based on the same concept as the Green Passport but with two key differences:

Firstly, compiling and maintaining an Inventory of Hazardous Materials is no longer a voluntary requirement, but is mandatory for all ships over 500GT.

Secondly, and crucially, the IHM is expected to be significantly more accurate than the old Green Passport with sampling of unknown hazardous materials expected as standard.

The guide aims to explain the key concepts, processes, and requirements of the IHM, based upon guidance materials, experience and best practice.

There are 2 key pieces of ship recycling legislation that need to be considered when compiling an IHM.

IMO Hong Kong Convention

The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 (the “Convention”) is aimed at ensuring that, when being recycled at the end of their operational lives, ships over 500GT do not pose any unnecessary risks to human health, safety and the environment.

The Convention was adopted in 2009 but – at the time of writing – is yet to enter into force. Entry into force requirements are widely expected to be met during 2020/2021.

Based upon the 2003 voluntary guidelines, regulations in the Convention cover: the design, construction, operation and preparation of ships to facilitate safe and environmentally sound recycling without compromising the safety and operational efficiency of ships; the operation of ship recycling facilities in a safe and environmentally sound manner; and the establishment of an enforcement mechanism for ship recycling, including certification and reporting requirements.

A key requirement of the Convention is for ships over 500GT to maintain an IHM during operation, in accordance with published MEPC Guidelines for the Development of the Inventory of Hazardous Materials.

Furthermore, once ratified, ship recycling facilities will be expected to prepare a Ship Recycling Facility Plan and national authorities will be required to take measures to ensure that facilities under their jurisdiction comply with the Convention.

European Union Ship Recycling Regulation

The EU Regulation entered into force in December 2013. It applies to ships of at least 500GT flying the flag of an EU member state, and to ships visiting the EU flying the flag of a non-EU member state.

The EU Regulation is mostly aligned with the IMO Convention and, by 31 December 2020, all ships entering EU waters – regardless of flag – will be expected to maintain an IHM (see Figure 1). The IHM lists additional hazardous materials that need to be addressed in addition to the IMO requirements.

The Regulation makes reference to the European Maritime Safety Agency’s Best Practice Guidance on the Development of the IHM document. It should be noted that the Introduction to this document states: “EMSA’s Best Practice Guidance is a non-binding document and nothing in this guidance document should be construed as generating mandatory requirements on any of the involved parties.”

In addition to the IHM, the Regulation requires the establishment of a list of approved ship recycling facilities (the ‘EU List’). Ships flying the flag of an EU member state can only be recycled at a facility on the EU List. Such facilities are required to meet design, construction and operation requirements of the EU and can be located outside of the EU.

For facilities located in third countries (i.e. those located outside the EU), requirements and procedures for inclusion on the EU List were published by the EC in a Technical Guidance Note. By applying for inclusion on the EU List, facilities located in third countries accept that they will be subject to on-site inspections by the EC, or agents acting on its behalf.

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What is in an IHM?
The Inventory consists of:

- Part I: Specific hazardous materials contained in ship structure or fixed equipment, as detailed in Tables A and B of the MEPC Guidelines Appendix I, including additional EU Regulation hazardous materials as appropriate (see Figure 2).
- Part II: Operationally generated wastes, as detailed in Table C of the MEPC Guidelines (see Appendix)
- Part III: Stores, as detailed in Tables C and D of the MEPC Guidelines (see Appendix)

Part I of the IHM should be compiled at new build prior to the ship entering service or, for existing ships, during operation.

Parts II and III of the IHM are only to be compiled once a decision has been taken to recycle the ship.

Loosely fitted equipment, for example portable extinguishers, should be listed in Part II.

Additional items that may also be included are:

- Light fittings and associated iridescent or special purpose coatings
- Loosely fitted equipment, for example portable extinguishers
- Structure or fixed equipment, as detailed in Tables A and B
- Alloys, such as steels, aluminium, brasses, bronzes, plating and solders, provided they are used in general construction, such as hull, superstructure, pipes or housings for equipment and machinery, are not required to be listed in the Inventory.

Who is responsible for compiling the IHM?

For new builds, the shipbuilder is responsible for compiling with the relevant international requirements on installing HM on board new-build ships. In this respect, the conformity of Part I of the Inventory at the design and construction stage should be ascertained by reference to Suppliers’ Declarations of Conformity and related Material Declarations (MD) collected from suppliers. Further details follow.

Part I of the Inventory for existing ships should be developed by the shipowner.

As detailed in the IMO guidelines and the EMSA Best Practice Guidance, there are a number of key considerations that should be taken into account.

Key considerations

Definition of Ship

The Convention and the Regulation both define a ship as:

- A vessel of any type whatsoever operating or having operated in the marine environment and includes submersibles, floating craft, floating platforms, self-elevating platforms, Floating Production Storage and Offloading Units (FPSUs), and Floating Production Storage and Offloading Units (FPSOs), including a vessel stripped of equipment or being towed.

As such, the requirement for an IHM is not just limited to marine assets; the offshore industry also needs to take note.

The Convention and the Regulation do not apply to warships, naval auxiliary or other ships owned or operated by a state and used only on government non-commercial service.

Hazardous Materials Experts

Inventories are not only essential for safe and environmentally sound recycling, but they provide benefits with respect to the maintenance and operation of a ship. The development of an IHM will not only help to ensure compliance with the Convention and the EU Regulation, but can also aid compliance with existing SOLAS, ISM Code and Safety Management System requirements.

However, in order to ensure that the above benefits are realised, the services of IHM service providers should be called upon to offer help and advice, at any stage in the development of an IHM.

Although it is possible for shipowners to develop IHMs using their own resources, compiling an Inventory and taking of samples for any unknown items or materials in the ship’s structure or fixed equipment is a complex process and one that should only be undertaken with expert guidance.

The IHM guidelines which accompany the Convention state that, for existing ships, the procedures for the development of the IHM "should be carried out by the shipowner, who may draw upon expert assistance."

The EMSA Best Practice Guidance goes further and recommends that for new builds expert assistance may also be sought by the shipbuilder. The Best Practice Guidance also provides further information on the expected knowledge, experience and qualifications that such an expert should possess, regardless of whether the IHM is being compiled at build or during operation:

- Individual IHM experts are the national experts with the IHM job of compiling inventories, with such experts being compiled by the most relevant international and EU legislation.

- IHM expert company is an entity employing or contracting individual IHM experts to conduct any relevant work or task in relation to the IHM for the purpose of compiling or updating inventories.

As demand for IHM compilation increases, so do the numbers of Hazardous Materials Experts offering services to shipowners. The major Classification Societies have implemented procedures for approval of such experts and are considered to be well-placed to offer further advice on the suitability of expert parties. Some Class Societies will only certify and subsequently certify an IHM if one of their preferred experts has compiled the Inventory.

Therefore, it is always worth checking with Class before proceeding with the development of an IHM.

Standard format of the Inventory

The Convention and the Regulation both refer to the same standard format for the IHM, and for the most part the structure and layout of the IHM is in accordance with the published format – regardless of which expert company compiles the Inventory or which Class Society subsequently verifies the Inventory.

Concerns have been raised that such Declarations are frequently not made available, or are inaccurate, and this applies at new build stage and for existing ships (during compilation, or as part of ongoing maintenance of the Inventory). The Convention and the Regulation both refer to the same standard format for the IHM, and for the most part the structure and layout of the IHM is in accordance with the published format – regardless of which expert company compiles the Inventory or which Class Society subsequently verifies the inventory.

The legislation requires that suppliers should make ‘Declarations’ regarding the presence of hazardous materials listed in Tables A and B if they exceed specified threshold values. However, it should be noted that there is not a universally accepted electronic format and the various Expert Companies and Classification Societies involved in the process have different designs and/or software packages.

It is again recommended that Class is consulted prior to compiling an IHM, to ensure that they will accept the format of the Inventory.

Supplier Declaration of Conformity and Material Declarations

Information provided by suppliers of materials and equipment is considered to be key to the development and ongoing maintenance of the IHM.

The legislation requires that suppliers should make ‘Declarations’ regarding the presence of hazardous materials listed in Tables A and B if they exceed specified threshold values.

Standard formats for the Declarations are available in the IMO guidelines.

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The EMSA Best Practice Guidance provides advice on additional steps to be taken if there are any concerns about Declarations, as summarised overleaf.  


IHM Part I – requirements for new ships

Part I of the Inventory for new ships should be developed at the design and construction stage. As much information as possible should be obtained, throughout the build process.

Reference should be made to the IMO guidelines for the development process, which is based on three main steps:

1. Collection of hazardous material information, based upon information provided by suppliers
2. Assessment of the collected information, including identification of all systems/products which contain hazardous materials above applicable threshold values
3. Preparation of the IHM, using the standard format

The collection of the hazardous materials information is therefore expected to involve the entire shipbuilding supply chain, as shown in Figure 3.

It should be noted that the non-legally binding EMSA Best Practice Guidelines state the following:

“However, in practice, there were cases where random sampling checking proved that [Material Declarations] were not accurate. Therefore, the shipbuilder should establish a quality assurance policy for performing random checking of materials provided by the suppliers. The checking of the materials may include visual checking and/or random samples which will be tested by indicative or field testing and/or random samples to be tested by specific testing. The entity carrying out the hazardous materials survey and sampling should be an IHM expert as defined in this guidance document. The shipowner may also establish a policy for performing random checking of materials for new ships. In this context, the same process as for carrying out random checking by the shipbuilder may be applied.”

It is recommended that Class and/or Flag is consulted to ascertain if they have specific policies or procedures that insist upon the EMSA Best Practice Guidance being followed.

IHM Part I – requirements for existing ships

Part I of the Inventory for existing ships should be developed by the shipowner, with reference made to the IMO guidelines’ examples, which are based on five main steps.

It is recommended that, when possible, IHM compilation takes place during drydock and that the shipowner draws upon expert assistance by contracting a suitably qualified Hazardous Materials Expert Company to assist with all five steps:

1. Collection of hazardous material information, based upon information provided by suppliers
2. Assessment of the collected information, including identification of all systems/products which contain hazardous materials above applicable threshold values
3. Preparation of the IHM, using the standard format

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It is recommended that Class and/or Flag is consulted to ascertain if they have specific policies or procedures that insist upon the EMSA Best Practice Guidance being followed.

Note: The classification ‘potentially containing’ should only be used if a comprehensive justification – such as the impossibility of conducting sampling without compromising the safety of the ship and its operational efficiency – can be provided. This classification is not recommended as there seems to be little value in compiling an IHM that states the ship’s structure or fixed equipment potentially contains hazardous materials; it could be seen to create more questions than answers. Limited, targeted sampling is strongly recommended.

4. Onboard visual/sampling check, with sample points clearly marked on the ship plan, supported by photographs, with sample results clearly referenced.

Samples may be tested by a variety of methods, including indicative or field tests. However, it is recommended, in order to avoid dispute, that “specific testing” should be used. These tests are repeatable, reliable and can demonstrate definitively whether a known type of a hazard exists or not. Specific tests are to be carried out by a suitably accredited laboratory, working to international standards or equivalent, with a written report provided.

IHM Expert Companies and Classification Societies are well-placed to offer further advice on sampling, and associated costs.

5. Preparation of Part I of the IHM and supporting documentation, using the standard format.

Figure 3 Supply chain involvement, based upon Appendix 3 Figure 1 of the IMO guidelines.

Certification and Surveys

Once the IHM has been compiled, ships shall be subject to the following surveys:

- initial
- renewal
- additional
- final

Initial and renewal surveys must verify that the IHM Part I complies with the requirements of the Convention and/or the EU Regulation. They should take place prior to the issuance of the relevant Certificate or Statement of Compliance or, for new ships, prior to entering into service.

Additional surveys may be made at the request of the shipowner or the Classification Society or, if the IHM has an impact on the IHM, to ensure that the ship continues to comply with the requirements of the Regulation, and that Part I of the IHM is amended as necessary. It is recommended that Class, or whoever issues the certification, is consulted as to whether an additional survey is required, considering that interpretations of the term 'significant' are likely to vary.

The Final Survey must verify that the IHM (Parts I, II and III) and the Ship Recycling Plan comply with the requirements of the Convention and/or the Regulation, and that the ship recycling facility where the ship is to be recycled is authorized as appropriate.

Ongoing maintenance of the IHM

Regardless of whether the Inventory is compiled, verified and certified at new build or during operation, one of the most crucial requirements of the legislation is the life-cycle management of the IHM. Without proper maintenance of the Inventory, all the good work during the initial compilation process can be undone and confidence in the contents of the IHM will be lost.

Shipowners should establish procedures on board the ship and within their company to ensure each IHM is maintained and updated throughout the operational life of the ship, reflecting new installations containing any Tables A and B hazardous materials, including additional EU Regulation materials (as appropriate). The IHM should be maintained and updated as required by the ship recycling facility to help develop a ship-specific Ship Recycling Plan (SRP).

Requirements for end-of-life ships

Once a decision to recycle a ship has been taken there are some additional requirements for a shipowner to consider, some of which involve working in partnership with an authorized recycling facility.

In brief, ships destined for recycling shall:

- only be recycled at Ship Recycling Facilities that are authorized in accordance with the Convention or, in the case of EU-flagged ships, are published on the EU List
- only be recycled at facilities fully authorized to handle the materials identified in the IHM
- conduct operations in the period prior to entering the Ship Recycling Facility in accordance with the relevant IMO guidelines

The SRP should be developed in accordance with the aforementioned guidelines and should include information concerning the establishment, maintenance, and monitoring of Safe-for-entrance and Safe-for-hot work conditions as per the type and amount of materials – including those identified in the Inventory of Hazardous Materials – to be recycled.

The SRP will be tacitly or explicitly approved by the Competent Authority authorizing the ship recycling facility. To date, most of the member states who have ratified the Convention appear to prefer tacit approval. Although this removes a possible delay, it does mean that a potential governmental safeguard is not available to the Owner to alter the risks in the country of the ship recycling facility.

Final Survey

Once the above end-of-life requirements have been met, a Final Survey prior to the ship being taken out of service and before the recycling of the ship has started will be required.

This survey shall verify:

1. That Parts I, II and III of the IHM are in accordance with the requirements of the Convention and/or EU Regulation
2. That the SRP properly reflects the information contained in the IHM and contains information concerning the establishment, maintenance and monitoring of Safe-for-entrance and Safe-for-hot work conditions
3. That the Ship Recycling Facility (ies) where the ship is to be recycled holds a valid authorization in accordance with the Convention or, for EU-flagged ships, is on the EU List

Some Classification Societies are already offering Final Survey services ahead of the Convention entering into force, but it should be noted that experience is currently limited, and evidence of how end-of-life requirements are to be completed satisfactorily – by all parties concerned and for all ships going for recycling – is not available.


Case Study – how compliance can reduce risk and increase competitive edge


Although reported in the media that the ship was available for redeployment or conversion, a decision was taken to sell the ship to a cash buyer for scrap.

The ship transferred to a grey or black-listed flag, and authorities were not informed of the decision to go direct for scrapping in a non-OECD country, as the UK would have had to refuse export. Contrary to media reports the ship arrived on a beach in South Asia.

Furthermore, the ship had not compiled a Convention or Regulation compliant Inventory of Hazardous Materials, which would have alerted the authorities to the issue of radio-active substances. This is a well-known issue with vessels that trade in certain areas such as the North Sea, due to naturally occurring radioactive materials. These can accumulate in sludge or contaminate surfaces. If IHM guidelines were followed, this would have been easy to find, plan and manage.

As would the issue of asbestos and other hazardous material likely to be inherent in the structure and fixed equipment of a ship built in the mid-1980s.

So far, a fairly normal example of probable legislative avoidance.

What happened next was not expected.

The case was brought to the attention of the Bangladesh Courts via a Public Interest Litigation (PIL) filed by the Bangladesh Environmental Lawyers Association (BELA) – a member of the NGO Shipbreaking Platform – often thought of as the ‘Greenpeace’ of the ship recycling world.

An injunction to stop the scrapping of the vessel was issued in August 2017, and in November 2019, the High Court Division of the Supreme Court of Bangladesh effectively ruled that the import and breaking of the ship was in fact a case of illegal dumping of radioactive waste.

This led to financial and reputational implications for the shipowner, the cash buyer, the recycling facility, and all those associated with the project.

All these issues can be avoided when applicable legislation and guidance documents are followed, even ahead of the Hong Kong Convention entering into force:

• Specified hazardous materials onboard can be assessed by experts and an IHM Part I compiled, and certified by Class

• A Final Survey can be held to verify that the IHM (Parts I, II and III) and the Ship Recycling Plan comply with relevant legislation, and that the Ship Recycling Facility:
  - holds a Hong Kong Convention statement of compliance (ahead of the Convention entering into force); or
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### APPENDIX

#### Table C - Potentially hazardous items

<table>
<thead>
<tr>
<th>No.</th>
<th>Properties</th>
<th>Goods</th>
<th>Inventory</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Part I</td>
</tr>
<tr>
<td>C-1</td>
<td>Liquid</td>
<td>Oiliness</td>
<td>Kerosene</td>
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<td>White spirit</td>
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<td>Hydraulic oil</td>
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<td>Oiliness</td>
<td>Anti-seize compounds</td>
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<td>Liquid</td>
<td>Oiliness</td>
<td>Fuel additive</td>
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<td>Liquid</td>
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<td>Engine coolant additives</td>
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<td>Oiliness</td>
<td>Boiler and feed water treatment and test re-agents</td>
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<td>Evaporator dosing and descaling acids</td>
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<td>Oiliness</td>
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<tr>
<td>C-15</td>
<td>Liquid</td>
<td>Oiliness</td>
<td>Chemical refrigerants</td>
</tr>
<tr>
<td>C-16</td>
<td>Liquid</td>
<td>Oiliness</td>
<td>Battery electrolyte</td>
</tr>
<tr>
<td>C-17</td>
<td>Liquid</td>
<td>Oiliness</td>
<td>Alcohol, methylated spirits</td>
</tr>
<tr>
<td>C-18</td>
<td>Gas</td>
<td>Explosibility/inflammability</td>
<td>Acetylene</td>
</tr>
<tr>
<td>C-19</td>
<td>Gas</td>
<td>Explosibility/inflammability</td>
<td>Propane</td>
</tr>
<tr>
<td>C-20</td>
<td>Gas</td>
<td>Explosibility/inflammability</td>
<td>Butane</td>
</tr>
<tr>
<td>C-21</td>
<td>Gas</td>
<td>Explosibility/inflammability</td>
<td>Oxygen</td>
</tr>
<tr>
<td>C-22</td>
<td>Gas</td>
<td>Explosibility/inflammability</td>
<td>CO₂</td>
</tr>
<tr>
<td>C-23</td>
<td>Gas</td>
<td>Explosibility/inflammability</td>
<td>Perfluorocarbons (PFCs)</td>
</tr>
<tr>
<td>C-24</td>
<td>Gas</td>
<td>Explosibility/inflammability</td>
<td>Methane</td>
</tr>
<tr>
<td>C-25</td>
<td>Gas</td>
<td>Explosibility/inflammability</td>
<td>Hydrofluorocarbon (HFCs)</td>
</tr>
<tr>
<td>C-26</td>
<td>Gas</td>
<td>Explosibility/inflammability</td>
<td>Nitrous oxide (N₂O)</td>
</tr>
<tr>
<td>C-27</td>
<td>Gas</td>
<td>Explosibility/inflammability</td>
<td>Sulfur hexafluoride (SF₆)</td>
</tr>
<tr>
<td>C-28</td>
<td>Gas</td>
<td>Explosibility/inflammability</td>
<td>Bunkers; fuel oil</td>
</tr>
<tr>
<td>C-29</td>
<td>Liquid</td>
<td>Oiliness</td>
<td>Grease</td>
</tr>
<tr>
<td>C-30</td>
<td>Liquid</td>
<td>Oiliness</td>
<td>Waste oil (sludge)</td>
</tr>
<tr>
<td>C-31</td>
<td>Liquid</td>
<td>Oiliness</td>
<td>Bilge and/or waste water generated by the after-treatment systems fitted on machineries</td>
</tr>
<tr>
<td>C-32</td>
<td>Liquid</td>
<td>Oiliness</td>
<td>Oily liquid cargo tank residues</td>
</tr>
<tr>
<td>C-33</td>
<td>Liquid</td>
<td>Oiliness</td>
<td>Ballast water</td>
</tr>
<tr>
<td>C-34</td>
<td>Liquid</td>
<td>Oiliness</td>
<td>Raw sewage</td>
</tr>
<tr>
<td>C-35</td>
<td>Liquid</td>
<td>Oiliness</td>
<td>Treated sewage</td>
</tr>
<tr>
<td>C-36</td>
<td>Liquid</td>
<td>Oiliness</td>
<td>Non-oily liquid cargo residues</td>
</tr>
<tr>
<td>C-37</td>
<td>Liquid</td>
<td>Oiliness</td>
<td>Gas</td>
</tr>
<tr>
<td>C-38</td>
<td>Gas</td>
<td>Explosibility/inflammability</td>
<td>Fuel gas</td>
</tr>
</tbody>
</table>

#### Table D – Regular consumable goods potentially containing hazardous materials

<table>
<thead>
<tr>
<th>No.</th>
<th>Properties</th>
<th>Goods</th>
<th>Example</th>
<th>Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Part I</td>
<td>Part II</td>
</tr>
<tr>
<td>C-39</td>
<td>Solid</td>
<td></td>
<td>Dry cargo residues</td>
<td>X</td>
</tr>
<tr>
<td>C-40</td>
<td>Solid</td>
<td></td>
<td>Medical waste/infectious waste</td>
<td>X</td>
</tr>
<tr>
<td>C-41</td>
<td>Solid</td>
<td></td>
<td>Incinerator ash</td>
<td>X</td>
</tr>
<tr>
<td>C-42</td>
<td>Solid</td>
<td></td>
<td>Garbage</td>
<td>X</td>
</tr>
<tr>
<td>C-43</td>
<td>Solid</td>
<td></td>
<td>Fuel tank residues</td>
<td>X</td>
</tr>
<tr>
<td>C-44</td>
<td>Solid</td>
<td></td>
<td>Oily solid cargo tank residues</td>
<td>X</td>
</tr>
<tr>
<td>C-45</td>
<td>Solid</td>
<td></td>
<td>Oily or chemical contaminated rags</td>
<td>X</td>
</tr>
<tr>
<td>C-46</td>
<td>Solid</td>
<td></td>
<td>Batteries (incl. lead acid batteries)</td>
<td>X</td>
</tr>
<tr>
<td>C-47</td>
<td>Solid</td>
<td></td>
<td>Pesticides/insecticide sprays</td>
<td>X</td>
</tr>
<tr>
<td>C-48</td>
<td>Solid</td>
<td></td>
<td>Extinguishers</td>
<td>X</td>
</tr>
<tr>
<td>C-49</td>
<td>Solid</td>
<td></td>
<td>Chemical cleaner (incl electrical equipment cleaner, carbon remover)</td>
<td>X</td>
</tr>
<tr>
<td>C-50</td>
<td>Solid</td>
<td></td>
<td>Detergent/bleacher (could be a liquid)</td>
<td>X</td>
</tr>
<tr>
<td>C-51</td>
<td>Solid</td>
<td></td>
<td>Miscellaneous medicines</td>
<td>X</td>
</tr>
<tr>
<td>C-52</td>
<td>Solid</td>
<td></td>
<td>Fire fighting clothing and Personal protective equipment</td>
<td>X</td>
</tr>
<tr>
<td>C-53</td>
<td>Solid</td>
<td></td>
<td>Dry tank residues</td>
<td>X</td>
</tr>
<tr>
<td>C-54</td>
<td>Solid</td>
<td></td>
<td>Cargo residues</td>
<td>X</td>
</tr>
<tr>
<td>C-55</td>
<td>Solid</td>
<td></td>
<td>Spare parts which contain materials listed in Table A or Table B</td>
<td>X</td>
</tr>
</tbody>
</table>

Source: IMO RESOLUTION MEPC.269(68) Adopted on 15 May 2015
2015 GUIDELINES FOR THE DEVELOPMENT OF THE INVENTORY OF HAZARDOUS MATERIALS
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