

## **Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals**

Sub-Committee of Experts on the Transport of Dangerous Goods

3 July 2017

### **Fifty-first session**

Geneva, 3 June-7 July 2017

Item 7 of the provisional agenda

**Global harmonization of transport of dangerous goods regulations with the Model Regulations**

## **Outcome of the twenty-seventh session of the Editorial and Technical Group**

**Transmitted by the International Maritime Organization (IMO)**

### **Introduction**

1. The twenty-seventh session of the Editorial and Technical Group of the Sub-Committee on Carriage of Cargoes and Containers met from 8 to 12 May 2017 at IMO Headquarters in London. The report of the Group is contained in document CCC 4/6.
2. Based on proposals submitted to the Group, E&T 27 prepared draft editorial corrections to the IMDG Code (amendments 38-16), adopted by resolution MSC.406 (96). In this context, the Group highlighted all editorial corrections related to UN Model Regulations, as set out in annex 1 to this document, for the consideration of the Sub-Committee.
3. E&T 27 also prepared draft amendment 39-18 to the IMDG Code, based on the harmonization with the amendments to the nineteenth revised edition of the UN Model Regulations, proposals agreed in principle by CCC 3 and proposals referred by CCC 3 to E&T 27 for further consideration. In this context, the Group highlighted all amendments related to UN Model Regulations, as set out in annex 2 to this document, for the consideration of the Sub-Committee.
4. Furthermore, with regard to the information required in addition to the dangerous goods description and during the consideration of amendments to 5.4.1.5.5 of the IMDG Code on the indication of self-reactive substances, organic peroxides and polymerizing substances, the Group noted that 5.4.1.5.4 and 5.4.1.5.5 could be further amended or merged and the UNSCETDG should be informed accordingly.

### **Other related matters**

5. With regards to the Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS) Guide, E&T 27 prepared a draft consolidated version of the EmS Guide, which was based on MSC/Circ.1025, MSC.1/Circ.1025/Add.1, MSC.1/Circ.1262, MSC.1/Circ.1360, MSC.1/Circ.1438, MSC.1/Circ.1476 and MSC.1/Circ.1522. The draft consolidated EmS Guide is expected to be considered by CCC 4 and subsequent approval by the Maritime Safety Committee, together with the next set of the amendments to the IMDG Code.

## **Proposal**

6. The Sub-Committee is invited to note the information provided above, consider the draft editorial corrections and amendments as set out in annexes 1 and 2 and take action as appropriate.

## Annex 1

### Draft editorial corrections to the English version of the IMDG Code amendment 38-16 adopted by resolution msc.406(96)

Note: The highlighted (light blue) text is related to UN Model Regulations.

#### PART 4 PACKING AND TANK PROVISIONS

##### Chapter 4.1 Use of packagings, including intermediate bulk containers (IBCs) and large packagings

#### 4.1.4 List of packing instructions

##### 4.1.4.1 Packing instructions concerning the use of packagings (except IBCs and large packagings)

P200 In paragraph (3)(a) replace the reference to "(4)" with "(5)", to read as follows:

- "(a) For compressed gases, the working pressure shall be not more than two thirds of the test pressure of the pressure receptacles. Restrictions to this upper limit on working pressure are imposed by special packing provision "o" in (5) below. In no case shall the internal pressure at 65°C exceed the test pressure."

In paragraph (3)(b) and (b)(i) replace the reference to "(4)" with "(5)", to read as follows:

- "(b) For high pressure liquefied gases, the filling ratio shall be such that the settled pressure at 65°C does not exceed the test pressure of the pressure receptacles.

The use of test pressure and filling ratios other than those in the table is permitted, except where (5), special packing provision "o" applies, provided that:

- (i) the criterion of (5), special packing provision "r" is met when applicable; or".

In paragraph (3)(d) replace the reference to "(4)" with "(5)" to read as follows:

- "(d) For UN 1001, acetylene, dissolved, and UN 3374 acetylene, solvent free, see (5), special packing provision "p".

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## Annex 2

### Draft amendments (39-18) to the IMDG Code (part 1)

*Note: This document contains only the relevant amendments (39-18) to the IMDG Code, except draft amendments obtained by the proposals directly submitted to E&T 27. The highlighted (light blue) text is related to UN Model Regulations. The text in square brackets requires further attention and consideration.*

## Chapter 1.4

### Security provisions

#### 1.4.3 Provisions for high consequence dangerous goods

1.4.3.2.1 At the end, insert the following note:

**Note:** In addition to the security provisions of this Code, competent authorities may implement further security provisions for reasons other than safety of dangerous goods during transport. In order to not impede international and multimodal transport by different explosives security marks, it is recommended that such marks be formatted consistent with an internationally harmonized standard (e.g. European Union Commission Directive 2008/43/EC)."

## PART 2 CLASSIFICATION

### Chapter 2.0 Introduction

#### 2.0.5 Transport of wastes

Add the following new paragraph 2.0.6:

#### "2.0.6 Transport of articles containing dangerous goods N.O.S.

**Note:** For articles which do not have an existing proper shipping name and which contain only dangerous goods within the permitted limited quantity amounts specified in column (7a) of the Dangerous Goods List, see UN 3363 and special provision 301 of chapter 3.3.

2.0.6.1 Articles containing dangerous goods may be classified as otherwise provided by this Code under the proper shipping name for the dangerous goods they contain or in accordance with this section. For the purposes of this section "article" means machinery, apparatus or other devices containing one or more dangerous goods (or residues thereof) that are an integral element of the article, necessary for its functioning, and that cannot be removed for the purpose of transport. An inner packaging shall not be an article.

2.0.6.2 Such articles may in addition contain batteries. Lithium batteries that are integral to the article shall be of a type proven to meet the testing requirements of the Manual of Tests and Criteria, part III, sub-section 38.3, except when pre-production prototype batteries or batteries of a small production run, consisting of not more than 100 batteries, are installed in the article. Where a lithium battery installed in an article is damaged or defective, the battery shall be removed.

2.0.6.3 This section does not apply to articles for which a more specific proper shipping name already exists in the Dangerous Goods List of chapter 3.2.

2.0.6.4 This section does not apply to dangerous goods of class 1, class 6.2 or radioactive material contained in articles.

2.0.6.5 Articles containing dangerous goods shall be assigned to the appropriate class determined by the hazards present using, where applicable, the Precedence of Hazards table in 2.0.3.6 for each of the dangerous goods contained in the article. If dangerous goods classified as class 9 are contained within the article, all other dangerous goods present in the article shall be considered to present a higher hazard.

2.0.6.6 Subsidiary hazards shall be representative of the primary hazard posed by the other dangerous goods contained within the article. When only one dangerous good is present in the article, the subsidiary hazard(s), if any, shall be the subsidiary hazard(s) identified in column (4) of the Dangerous Goods List. If the article contains more than one dangerous good and these could react dangerously with one another during transport, each of the dangerous goods shall be enclosed separately (see 4.1.1.6)."

## Chapter 2.1 Class 1 – Explosives

### 2.1.3 Classification procedure

#### 2.1.3.5 Assignment of fireworks to hazard divisions

2.1.3.5.5 Amend note 2 to read as follows:

"**Note 2:** "Flash composition" in this table refers to pyrotechnic substances in powder form or as pyrotechnic units as presented in the fireworks that are used in waterfalls, or to produce an aural effect or used as a bursting charge, or propellant charge unless:

..."

## PART III DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND EXCEPTIONS

### Chapter 3.2 Dangerous Goods List

#### 3.2.1 Structure of the Dangerous Goods List

In the Dangerous Goods List, in the heading of column (4), replace "risk" by "hazard", and amend the following entries:

3090	in column (6), insert "387";	in column (8), insert "P911", "LP905" and "LP906"
3091	in column (6), insert "387";	in column (8), insert "P911", "LP905" and "LP906"
3480	in column (6), insert "387";	in column (8), insert "P911", "LP905" and "LP906"
3481	in column (6), insert "387";	in column (8), insert "P911", "LP905" and "LP906"

**Chapter 3.3**  
**Special provisions applicable to certain substances, materials or articles**

SP 188 In sub-paragraph .3, replace "2.9.4.1 and 2.9.4.5" by "2.9.4.1, 2.9.4.5, 2.9.4.6 and 2.9.4.7"

In the first paragraph after sub-paragraph .8, at the end, add the following sentence:

"As used in this special provision "equipment" means apparatus for which the lithium cells or batteries will provide electrical power for its operation."

SP 296 Replace "risk" by "hazard".

Add the following new special provisions:

"389 This entry only applies to lithium ion batteries or lithium metal batteries installed in a cargo transport unit and designed only to provide power external to the cargo transport unit. The lithium batteries shall meet the requirements of 2.9.4.1 to .7 and contain the necessary systems to prevent overcharge and overdischarge between the batteries.

..."

"392 For the transport of fuel gas containment systems designed and approved to be fitted in motor vehicles containing this gas the provisions of subsection 4.1.4.1 and chapter 6.2 of this Code need not be applied when transported for disposal, recycling, repair, inspection, maintenance or from where they are manufactured to a vehicle assembly plant, provided the following conditions are met:

...

.3 If a fuel gas containment system is equipped with two valves or more integrated in line, the two valves shall be closed as to be gastight under normal conditions of transport. If only one valve exists or only one valve works, all openings with the exception of the opening of the pressure relief device, shall be closed as to be gastight under normal conditions of transport;..."

**Chapter 4.1**  
**Use of packagings, including intermediate bulk containers (IBCs)**  
**and large packagings**

**4.1.4 List of packing instructions**

**4.1.4.1 Packing instructions concerning the use of packagings (except IBCs and large packagings)**

P907 At the beginning, add a new box with the following sentence:

"This instruction applies to UN 3363."

Insert the following new packing instructions:

P911	PACKING INSTRUCTION	P911
<p>This instruction applies to damaged or defective cells and batteries of UN Nos. 3090, 3091, 3480 and 3481 liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of transport.</p>		
<p>The following packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:</p>		
<p>For cells and batteries and equipment containing cells and batteries:</p>		
<p>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2).</p>		
<p>The packagings shall conform to the packing group I performance level.</p>		
<p>(1) The packaging shall be capable of meeting the following additional performance requirements in case of rapid disassembly, dangerous reaction, production of a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours of the cells or batteries:</p> <ul style="list-style-type: none"> <li>(a) The outside surface temperature of the completed package shall not have a temperature of more than 100°C. A momentary spike in temperature up to 200°C is acceptable;</li> <li>(b) No flame shall occur outside the package;</li> <li>(c) No projectiles shall exit the package;</li> <li>(d) The structural integrity of the package shall be maintained;</li> <li>(e) The packagings shall have a gas management system (e.g. filter system, air circulation, containment for gas, gas tight packaging, etc.), as appropriate.</li> </ul> <p>(2) The additional packaging performance requirements shall be verified by a test as specified by the competent authority<sup>a</sup>.</p> <p>A verification report shall be available on request. As a minimum requirement, the cell or battery name, the cell or battery number, the mass, type, energy content of the cells or batteries, the packaging identification and the test data according to the verification method as specified by the competent authority shall be listed in the verification report.</p> <p>(3) When dry ice or liquid nitrogen is used as a coolant, the requirements of section 5.5.3 shall apply. The inner packaging and outer packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.</p>		
<p>Additional requirement: Cells or batteries shall be protected against short circuit.</p>		
<p><sup>a</sup> <i>The following criteria, as relevant, may be considered to assess the performance of the packaging:</i></p> <ul style="list-style-type: none"> <li>(a) <i>The assessment shall be done under a quality management system (as described e.g. in section 2.9.4.5) allowing for the traceability of tests results, reference data and characterization models used;</i></li> <li>(b) <i>The list of hazards expected in case of thermal runaway for the cell or battery type, in the condition it is transported (e.g. usage of an inner packaging, state of charge (SOC), use of sufficient non-combustible, electrically non-conductive and absorbent cushioning material, etc.), shall be clearly identified and quantified; the reference list of possible hazards for lithium cells or batteries (rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours) can be used for this purpose. The quantification of these hazards shall rely on available scientific literature;</i></li> <li>(c) <i>The mitigating effects of the packaging shall be identified and characterized, based on the nature of the protections provided and the construction material properties. A list of technical characteristics and drawings shall be used to support this assessment (Density [kg·m<sup>-3</sup>], specific heat capacity [J·kg<sup>-1</sup>·K<sup>-1</sup>], heating value [kJ·kg<sup>-1</sup>], thermal conductivity [W·m<sup>-1</sup>·K<sup>-1</sup>], melting temperature and flammability temperature [K], heat</i></li> </ul>		

P911	PACKING INSTRUCTION	P911
<p><i>transfer coefficient of the outer packaging [<math>W \cdot m^{-2} \cdot K^{-1}</math>], ...);</i></p> <p>(d) <i>The test and any supporting calculations shall assess the result of a thermal runaway of the cell or battery inside the packaging in the normal conditions of transport;</i></p> <p>(e) <i>In case the SOC of the cell or battery is not known, the assessment used shall be done with the <b>highest</b> possible SOC corresponding to the cell or battery use conditions;</i></p>		
<p>(f) <i>The surrounding conditions in which the packaging may be used and transported shall be described (including for possible consequences of gas or smoke emissions on the environment, such as ventilation or other methods) according to the gas management system of the packaging;</i></p> <p>(g) <i>The tests or the model calculation shall consider the worst case scenario for the thermal runaway triggering and propagation inside the cell or battery: this scenario includes the worst possible failure in the normal transport condition, the maximum heat and flame emissions for the possible propagation of the reaction;</i></p> <p>(h) <i><b>These scenarios shall be assessed over a period long enough to allow all the possible consequences to occur (e.g. 24 hours).</b></i></p>		

#### 4.1.4.3 Packing instructions concerning the use of large packagings

Insert the following new packing instructions:

LP906	PACKING INSTRUCTION	LP906
<p>This instruction <b>applies to damaged</b> or defective batteries of UN Nos. 3090, 3091, 3480 and 3481 liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of transport.</p>		
<p>The following large packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met: For a single battery and batteries contained in a [single item of equipment]: Rigid large packagings conforming to the packing group I performance level, made of:</p> <ul style="list-style-type: none"> <li>steel (50A);</li> <li>aluminium (50B);</li> <li>metal other than steel or aluminium (50N);</li> <li>rigid plastics (50H);</li> <li>plywood (50D);</li> <li>rigid fibreboard (50G).</li> </ul> <p>(1) The large packaging <b>shall</b> be capable of meeting the following additional performance requirements in case of rapid disassembly, dangerous reaction, production of a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours of the battery:</p> <ul style="list-style-type: none"> <li>(a) The outside surface temperature of the completed package shall not have a temperature of more than 100 °C. A momentary spike in temperature up to 200°C is acceptable;</li> <li>(b) No flame shall occur outside the package;</li> <li>(c) No projectiles shall exit the package;</li> <li>(d) The structural integrity of the package shall be maintained; and</li> <li>(e) The large packagings shall have a gas management system (e.g. filter system, air circulation, containment for gas, gas tight packaging etc.), as appropriate.</li> </ul> <p>(2) The additional large packaging performance requirements shall be verified by a test as specified by the competent authority<sup>a</sup>.</p> <p>A verification report shall be available on request. As a minimum requirement, the battery name, the battery</p>		



LP906	PACKING INSTRUCTION	LP906
<p>number, the mass, type, energy content of the batteries, the large packaging identification and the test data according to the verification method as specified by the competent authority shall be listed in the verification report.</p> <p>(3) When dry ice or liquid nitrogen is used as a coolant, the requirements of section 5.5.3 shall apply. The inner packaging and outer packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.</p>		
<p><b>Additional requirement:</b> Batteries shall be protected against short circuit.</p>		
<p><sup>a</sup> <i>The following criteria, as relevant, may be considered to assess the performance of the large packaging:</i></p> <p>(a) <i>The assessment shall be done under a quality management system (as described e.g. in section 2.9.4.5) allowing for the traceability of tests results, reference data and characterization models used;</i></p> <p>(b) <i>The list of hazards expected in case of thermal runaway for the battery type, in the condition it is transported (e.g. usage of an inner packaging, state of charge (SOC), use of sufficient non-combustible, electrically non-conductive and absorbent cushioning material etc.), shall be clearly identified and quantified; the reference list of possible hazards for lithium batteries (rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours) can be used for this purpose. The quantification of these hazards shall rely on available scientific literature;</i></p> <p>(c) <i>The mitigating effects of the large packaging shall be identified and characterized, based on the nature of the protections provided and the construction material properties. A list of technical characteristics and drawings shall be used to support this assessment (Density [<math>\text{kg}\cdot\text{m}^3</math>], specific heat capacity [<math>\text{J}\cdot\text{kg}^{-1}\cdot\text{K}^{-1}</math>], heating value [<math>\text{kJ}\cdot\text{kg}^{-1}</math>], thermal conductivity [<math>\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}</math>], melting temperature and flammability temperature [<math>\text{K}</math>], heat transfer coefficient of the outer packaging [<math>\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}</math>], ...);</i></p> <p>(d) <i>The test and any supporting calculations shall assess the result of a thermal run-away of the battery inside the large packaging in the normal conditions of transport;</i></p> <p>(e) <i>In case the SOC of the battery is not known, the assessment used shall be done with the highest possible SOC corresponding to the battery use conditions;</i></p> <p>(f) <i>The surrounding conditions in which the large packaging may be used and transported shall be described (including for possible consequences of gas or smoke emissions on the environment, such as ventilation or other methods) according to the gas management system of the large packaging;</i></p> <p>(g) <i>The tests or the model calculation shall consider the worst case scenario for the thermal runaway triggering and propagation inside the battery: this scenario includes the worst possible failure in the normal transport condition, the maximum heat and flame emissions for the possible propagation of the reaction;</i></p> <p>(h) <i>The scenario consequences shall be assessed over a period covering all possible consequences (e.g. 24 hours).</i></p>		

## Chapter 5.2

### Marking and labelling of packages including IBCs

#### 5.2.2 Labelling of packages including IBCs

Add the following new subsection 5.2.2.1.13:

"5.2.2.1.13 Labels for articles containing dangerous goods transported as UN Nos. 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547 and 3548

- .1 **Packages containing articles or articles** transported unpackaged shall bear labels according to 5.2.2.1.2 reflecting the hazards established according to 2.0.6. If the article contains one or more lithium batteries with, for lithium metal batteries, an aggregate lithium content of 2 g or less, and for lithium ion batteries, a Watt-hour rating of 100Wh or less, the lithium battery mark (5.2.1.10.2) shall be affixed to the package or unpackaged article. If the article contains one or more lithium batteries with, for lithium metal batteries, an aggregate lithium content of more than 2 g and for lithium ion batteries, a Watt-hour rating of more than 100Wh, the lithium battery label (5.2.2.2.2 No. 9A) shall be affixed to the package or unpackaged article.
- .2 When it is required to ensure articles containing liquid dangerous goods remain in their intended orientation, orientation marks meeting 5.2.1.7.1 shall be affixed and visible on at least two opposite vertical sides of the package or of the unpackaged article where possible, with the arrows pointing in the correct upright direction."

### Chapter 5.3

#### Placarding and marking of cargo transport units

Amend the title of chapter 5.3 to read "Placarding and marking of cargo transport units and bulk containers".

#### 5.3.1 Placarding

5.3.1.1.1 Replace the sub-paragraphs .1 to .3 as follows:

".1 Enlarged labels (placards) and marks and signs shall be affixed to the exterior surfaces of a cargo transport unit or bulk container to provide a warning that the contents of the unit or bulk container are dangerous goods and present **hazards**, unless the labels and/or marks affixed to the packages are clearly visible from the exterior of the cargo transport unit or bulk container.... "

### Chapter 5.4

#### Documentation

#### 5.4.1 Dangerous goods transport information

#### 5.4.1.5 Information required in addition to the dangerous goods description

5.4.1.5.5 Replace the paragraph as follows:

"**For self-reactive substances, organic peroxides and polymerizing substances** which require temperature control during transport, the control and emergency temperatures (see 7.3.7.2) shall be indicated on the dangerous goods transport document, as follows:

"Control temperature: ... °C Emergency temperature: ... °C". "

### Chapter 6.2

#### Provisions for the construction and testing of pressure receptacles, aerosol dispensers, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas

#### 6.2.2 Provisions for UN pressure receptacles

### 6.2.2.1 Design, construction and initial inspection and test

Insert a new paragraph 6.2.2.1.8 to read as follows:

"6.2.2.1.8 The following standards apply for the design, construction and initial inspection and test of UN pressure drums, except that inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5:

Reference	Title	Applicable for Manufacture
ISO 21172-1:2015	Gas cylinders – Welded steel pressure drums up to 3 000 litres capacity for the transport of gases – Design and construction – Part 1: Capacities up to 1 000 litres  <i>NOTE: Irrespective of section 6.3.3.4 of this standard, welded steel gas pressure drums with dished ends convex to pressure may be used for the transport of corrosive substances provided all applicable requirements of this Code are met.</i>	Until further notice
ISO 4706: 2008	Gas cylinders – Refillable welded steel cylinders – Test pressure 60 bar and below	Until further notice
ISO 18172-1:2007	Gas cylinders – Refillable welded stainless steel cylinders – Part 1: Test pressure 6 MPa and below	Until further notice

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## PART 7 PROVISIONS CONCERNING TRANSPORT OPERATIONS

### Chapter 7.3 Consigning operations concerning the packing and use of cargo transport units (CTUs) and related provisions

#### 7.3.7 Cargo transport units under temperature control

Replace the provisions of 7.3.7 as follows:

#### "7.3.7 Cargo transport units under temperature control

##### 7.3.7.2 General provisions

##### 7.3.7.2.6 Derivation of control and emergency temperatures

Type of receptacle	SADT <sup>a</sup> /SAPT <sup>a</sup>	Control temperature	Emergency temperature
Single packagings and IBCs	20°C or less over 20°C to 35°C over 35°C	20°C below SADT/SAPT 15°C below SADT/SAPT 10°C below SADT/SAPT	10°C below SADT/SAPT 10°C below SADT/SAPT 5°C below SADT/SAPT
Portable tanks	≤ 45°C	10°C below SADT/SAPT	5°C below SADT/SAPT

<sup>a</sup> i.e. the SADT/SAPT of the substance as packed for transport.

**Appendix A**  
**List of generic and N.O.S. proper shipping names**

In the table, for class 2.1, under "General entries", after 3510, add the following new entry:

2.1	See 2.0.6.6	3537	ARTICLES CONTAINING FLAMMABLE GAS, N.O.S.
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