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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

Forty-second session
Geneva, 3 – 11 December 2012
Item 2 (d) of the provisional agenda
Recommendations made by the Sub-Committee on its thirty-ninth, fortieth and forty-first sessions and pending issues: Miscellaneous proposals for amendments to the Model Regulations on the Transport of Dangerous Goods

Lamps containing small quantities of dangerous goods

Transmitted by the Global Lighting Association (GLA)[1]

Introduction

1. At the fortieth session of the Sub-Committee the expert from the United Kingdom presented informal document INF.12 which raised various questions relating to the transport of light bulbs containing small quantities of dangerous goods. Following on from that paper the expert from the United Kingdom submitted informal document INF.18 at the forty-first session which gave further details on the dangerous goods contained within lamps together with an initial proposal for text to be included in the Model Regulations which was presented to aid discussion. The discussion of this paper is recorded in the report of the last meeting as follows (ST/SG/AC.10/C.3/82):

> "121. Most experts agreed that work on this issue should be pursued. Some aspects of the proposal should be clarified, notably the question of waste lamps since the industry argue that used lamps no longer contain dangerous goods, and the question of lamps containing radioactive material, since such lamps should not be exempted if they are not exempted under the Class 7 provisions as agreed by IAEA. The expert from the United Kingdom welcomed further explanations from other experts

[1] In accordance with the programme of work of the Sub-Committee for 2011-2012 approved by the Committee at its fifth session (refer to ST/SG/AC.10/C.3/76, para. 116 and ST/SG/AC.10/38, para. 16).

intersessionally as regards lamps containing dangerous goods so that a further developed proposal could be submitted at a later session.".

2. The Sub-committee raised several questions for further clarification as basis for decision and further discussion on this issue during next session in December 2012. GLA was invited to submit a proposal for the forty-second session of the Sub-Committee with adequate expertise meeting all raised questions as forwarded to GLA by the expert from the United Kingdom.

3. The GLA would like to highlight that there are already exemption criteria for lamps in the Model Regulations as previously mentioned at the last session in INF.18 from the United Kingdom:

(a) Compressed gas in lamps (Division 2.2):

The existing exemption for light bulbs containing gases of Division 2.2 (in 2.2.2.4) was newly discussed due to concerns of competent authorities particularly with regard to waste bulbs. It was argued that the exemption for gases of Division 2.2 can only be utilised if "they are packaged so that the projectile effects of any rupture of the bulb will be contained within the package". It was explained that from practical experience, waste lamps are not usually packaged in this way but according to information provided by GLA this is only the case for lamps without compressed gas. Otherwise, unpacked waste lamps containing compressed gas exceeding 200 kPa would not be exempted.

(b) Mercury in lamps (UN3506 "Mercury contained in manufactured articles"):

The ICAO Technical Instructions use special provision A69 to exempt articles containing limited amounts of mercury, gallium or inert gas from the provisions of the Technical Instructions when carried as cargo. This special provision was amended at the twenty–third meeting of the Dangerous Goods Panel in 2011 to include provisions for lamps containing mercury. It is worth noting that the quantity of mercury permitted in lamps is greater than the quantity permitted in "articles", i.e. 1 g of mercury per lamp, 30 g mercury per package whereas articles are limited to 100 mg each and limited to 1 g of mercury per package. This implies that the air mode has accepted that the intrinsic construction of a lamp affords greater safety than other articles containing mercury.

(c) Radioactive material in lamps (UN2911 "Radioactive material, excepted package – articles"):

The IAEA has recently revised the provisions relating to radioactive materials contained within instruments or manufactured articles (which would include lamps) which will be published in the next publication of TS-R-1 (see ST/SG/AC.10/C.3/2012/58 and the new text for paragraph 2.7.2.2.2 (b)). Essentially the IAEA have now concluded that the Competent Authority may exempt consignments of consumer goods with small quantities of radioactive material from transport regulation, but they are not obliged to, as this may conflict with national law. Lamps containing radioactive material may be subject to UN2911 "Radioactive material, excepted package – articles" in case of high number of lamps during transport if exceeding the definition criteria of Class 7 which depends on activity per consignment and specific activity of the material (electrode or gas filling). The IAEA did not however consider lamps which contain a mixture of UN2911 Class 7 with dangerous goods of other classes.

One lamp may contain multiple dangerous goods but which cannot have impact on each other meaning that there is no dangerous reaction within the lamp. This is one important condition for lamp technology; otherwise the operation of lamps would

not meet legal requirements for consumer products. Therefore, all contained dangerous goods should be seen.

(d) Other hazardous substances:

At the forty-first session, the expert from the United Kingdom presented informal document INF.18 proposing a solution for other very small quantities of hazardous substances in lamps: for the list of classifications of solid hazardous substances as contained in lamps, see INF.18 of 41st session (e.g. Mercury compounds, Thallium compounds, Sodium etc.). INF.18 proposes a "three-step-approach" using limit values per lamp and per package for each substance contained, where for each substance applies:

(i) Group 1: $0 < x \leq 1$ g: safe packaging required, not subject to dangerous goods regulation;

(ii) Group 2: $1 < x \leq 3$ g: safe packaging with drop test for package with a drop test requirement of 0.8 m required with use of proper cushion material to avoid lamp breakage, not subject to other regulations;

(iii) Group 3: $x > 3$ g: subject to dangerous goods regulation for the contained dangerous goods.

The different substances inside a lamp do not react dangerously with each other, otherwise the operation of a lamp would not satisfy the customer: all operation values of lamps are defined and tested (life time, colour rendering, brightness etc.), stabilized conditions during life time has to be assured by quality management, there is no possibility for dangerous chemical or physical reactions inside the lamp.

4. The GLA supports the conclusions of the United Kingdom in informal document INF.18 from the last session in that as the majority of lamps contain very small quantities of dangerous goods, are subject to a manufacturers' quality management system and have robust packaging arrangements, a special provision or adequate criteria for lamps in the Model Regulation seems to be justified to exempt them from dangerous goods regulations if meeting certain conditions.

5. GLA responses to the questions/issues raised by members of the Sub-Committee during forty-first session for further clarification may be found in informal document INF.3.

Draft Proposals

6. Presented below are various options for draft proposals based on the United Kingdom informal document INF.18 as submitted at the forty-first session of the Sub-Committee as possible option for text that could be developed in the Model Regulations based on the background information on lamps presented in this paper. For clarification, the term lamps should be defined as also recommended by the expert from the United States of America [(see par.16)].

Option 1

7. This proposal is based on comments made by the expert from the United States of America during forty-first session of Sub-Committee and on informal document INF.18. GLA considers that it is the best solution because of clearly defined provisions at exactly one sub-section.

8. Insert a new paragraph 1.1.1.9 for exemption of lamps containing dangerous goods if contained in a strong package as follows:

"Solid dangerous goods, when contained in lamps in a quantity of not more than 1 g and packaged so that there is not more than 30 g of substance per package are not subject to these Regulations under the following conditions:

(a) The lamps are subject to a manufacturer's quality management system and are certified as meeting the requirements of that quality management system; and

(b) Each lamp is individually packed in an inner packaging or surrounded by adequate cushioning material which is designed to protect the lamp from damage during transport; and

(c) Inner packaging (when present) or lamps shall be packed into strong outer packaging so designed and constructed such that they are capable of passing a drop test of not less than 0.5 m. The packages shall still be fit for transport purposes and there shall be no damage to the contents.

For used (waste), damaged or defective lamps each containing not more than 1 g of dangerous goods are not subject to these Regulations if the lamps are packed in strong packaging prepared for safe transport to the collection/recycling facility.

This paragraph shall not be used for mercury contained in lamps for which a proper shipping name already exists in Chapter 3.2–List of Dangerous Goods.".

Option 2

9. This proposal is based on informal document INF.18

Comment: GLA believes it is a good solution to use the special provision 301 for UN3363 to clarify that lamps do not pose significant transport risk under defined conditions but that these conditions should be different to the provisions of Chapter 3.4 ("Limited Quantities"), thus with clear distinction from machinery/apparatus containing dangerous goods.

10. Add new special provision 3XX in Chapter 3.3 applicable to UN3363 for exemption of lamps containing dangerous goods if contained in strong package.

"Solid dangerous goods, when contained in lamps in a quantity of not more than 1 g and packaged so that there is not more than 30 g of substance per package are not subject to these Regulations under the following conditions:

(a) The lamps are subject to a manufacturer's quality management system and are certified as meeting the requirements of that quality management system; and

(b) Each lamp is individually packed in an inner packaging or surrounded by adequate cushioning material which is designed to protect the lamp from damage during transport; and

(c) Inner packaging (when present) or lamps shall be packed into strong outer packaging so designed and constructed such that they are capable of passing a drop test of not less than 0.5 m. The packages shall still be fit for transport and there shall be no damage to the contents.

For used (waste), damaged or defective lamps each containing not more than 1 g of dangerous goods are not subject to these Regulations if the lamps are packed in strong packaging prepared for safe transport to the collection/recycling facility."

11. The use of UN3363 for lamps needs additional clarification in special provision 301 because of reference for application to requirements for limited quantities as also mentioned by the United Kingdom in informal document INF.12 of the fortieth session.

12. It is therefore proposed to amend special provision 301 to read:

"This entry only applies to machinery or apparatus (including lamps) containing dangerous goods as a residue or as an integral element. It must not be used if a more appropriate proper shipping name already exists in Chapter 3.2. Machinery or apparatus (except lamps) transported under this entry shall only contain dangerous goods which are authorized to be transported in accordance with the provisions of chapter 3.4 (Limited quantities). …"

Option 3

13. This proposal is based on informal document INF.18 as submitted by United Kingdom at the forty-first session of Sub-Committee. It was a first idea how to regulate dangerous goods in lamps but may not be adequate as a final solution for regulation because in future, new criteria for classification, new UN numbers, new proper shipping names or even new compounds in lamps may lead to the need to add this special provision to other UN numbers in the future. But the fact that lamps do not pose significant risk to transport is based on national regulation related to consumer products related with highly sophisticated quality systems of the manufacturer, and not only based on argumentation for the low quantity of contained substances.

14. Add new special provision 3XX in Chapter 3.3 applicable to the following UN entries: [1428, 1634, 1638, 1641, 1707, 1759, 2257, 2803, 3077, 3131, 3288, 3506]

"3XX Lamps each containing not more than 1 g of a hazardous substance and packaged so that there is not more than 30 g of this substance per package are not subject to these Regulations under the following conditions:

(a) The lamps are subject to a manufacturer's quality management system and are certified as meeting the requirements of that quality management system; and

(b) Each lamp is individually packed in an inner packaging or surrounded by adequate cushioning material which is designed to protect the lamp from damage during transport; and

(c) Inner packaging (when present) or lamps shall be packed into strong outer packaging so designed and constructed such that they are capable of passing a drop test of not less than 0.5 m. The packages shall still be fit for transport and there shall be no damage to the contents.

For used (waste), damaged or defective lamps each containing not more than 1 g hazardous substances are not subject to these Regulations under the condition that lamps shall be packed in strong packaging prepared for safe transport to the collection/recycling facility.".

15. Add new special provision 3YY in Chapter 3.3 applicable to the following UN entries: [1428, 1634, 1638, 1641, 1707, 1759, 2257, 2803, 3077, 3131, 3288, 3506]

"3YY Lamps each containing more than 1 g and not more than 3 g of a hazardous substance and packed so that there is not more than 30 g of this substance per package are not subject to these Regulations under the following conditions:

(a) The lamps are subject to a manufacturer's quality management system and are certified as meeting the requirements of that quality management system; and

(b) Each lamp is individually packed in an inner packaging or surrounded by adequate cushioning material which is designed to protect the lamp from damage during transport; and

(c) Inner packaging (when present) or lamps shall be packed into strong outer packaging so designed and constructed such that they are capable of passing a drop

test of not less than 0.8 m. The packages shall still be fit for transport and there shall be no damage to the contents.

For used (waste), damaged or defective lamps each containing more than 1g and not more than 3 g of hazardous substances and packaged so that there is not more than 30 g of substance per package are not subject to these Regulations under the following conditions:

(d) Lamps shall not be transported together if the dangerous goods they contain may react dangerously with each other [comment GLA: as far as GLA experts know there are no reactions between chemicals used in lamps when many lamps should break, only some might evaporate or sublimate]; and

(e) Lamps shall be packed in strong packaging which shall be constructed and closed so as to prevent any loss of contents when prepared for transport and which shall meet the packaging provisions of 4.1.1 except that 4.1.1.3, 4.1.1.4 , 4.1.1.12 and 4.1.1.14 do not apply; and

(f) Packages shall be so designed and constructed such that they are capable of passing a drop test of not less than 0.8 m. The packages shall still be fit for transport and there shall be no damage to the contents".

Definition of lamp

16. Add a definition of the term "lamp" in 1.2.1, to read as follows:

Manufactured article which as light source, creates light during defined operation conditions by using electricity but not containing the source of electricity. A lamp may be an integral component of an application (e.g. luminaire) necessary as source of electricity for lamp operation. There are other means of illumination as e. g. petroleum lamps, articles using fluorescence or phosphorescence creating light without electrical supply and therefore not meeting the definition of the term "lamp". For clarification, the term "bulb" is one outer glass component of most lamp types (some may consist of 2 or 3 "bulbs") encapsulating the process of light creation. The meaning of the term "bulb" depends on local understanding and/or individual knowledge, sometimes it only means "incandescent lamps" excluding e.g. discharge lamps.