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ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE

Working Party on the Transport of Dangerous Goods

Joint Meeting of Experts on the Regulations annexed to the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN)*

Twelfth session
Geneva, 21-25 January 2008
Item 4 (c) of the provisional agenda

PROPOSALS FOR AMENDMENTS TO THE REGULATIONS ANNEXED TO ADN

Miscellaneous proposals for amendments**

Special authorizations

Transmitted by the Central Commission for the Navigation of the Rhine (CCNR)

1. In accordance with the objectives set by the Inland Transport Committee at its sixty-eighth session, in its programme of work 2006-2010 (ECE/TRANS/166/Add.1, programme activity 02.7 (b)), the Joint Meeting of Experts is mandated to consider proposed amendments relating expressly to the Regulations annexed to the European Agreement concerning the

* This meeting is organized jointly by the Economic Commission for Europe and the Central Commission for the Navigation of the Rhine.

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International Carriage of Dangerous Goods by Inland Waterways and pertaining to administrative and technical questions concerning their implementation, in order to ensure the necessary updating of these provisions and the introduction of a uniform, harmonized and coherent system for the regulation of the national and international transport of dangerous goods by inland waterway throughout Europe.

2. Pursuant to this mandate, CCNR proposes the following amendments to the provisions of the annexed Regulations concerning special authorizations.

3. Make the following amendments to section 1.5.2:

- In 1.5.2.1.3, replace “established by the Administrative Committee” with “contained in subsection 3.2.4.1”;
- In 1.5.2.2.1, amend the first sentence of the second paragraph to read as follows: “The application shall conform to the model contained in subsection 3.2.4.1”;
- In 1.5.2.2.2, second sentence, replace “established by the Administrative Committee” with “contained in subsection 3.2.4.3”.

4. After Table C and the related notes, add a section 3.2.4 to read as follows:

“3.2.4 Modalities for the application of section 1.5.2 on special authorizations concerning transport in tank vessels

3.2.4.1 Model special authorization under section 1.5.2

**Special authorization
under 1.5.2 of ADN**

Under 1.5.2 of ADN, the transport in tank vessels of the substance specified in the annex to this special authorization shall be authorized in the conditions referred to therein.

Before transporting the substance, the carrier shall be required to have it added to the list referred to in 1.16.1.2.5 of ADN by a recognized classification society.

This special authorization shall be valid

(places and/or routes of validity)

It shall be valid for two years from the date of signature, unless it is repealed at an earlier date.

Issuing State:

Competent authority:

Date:

Signature:

3.2.4.2 Application form for special authorizations under section 1.5.2

For applications for special authorizations, please answer the following questions and points.*
Data are used for administrative purposes only and are treated confidentially.

Applicant

.....
(Name) (Company)

.....

()

.....
(Address)

Summary of the application

Authorization for transport in tank vessels of as a substance of
Class

Annexes

(with brief description)

Application made:

At:

Date:

Signature:
(of the person responsible for the data)

1. General data on the dangerous substance

1.1 Is it a pure substance , a mixture , a solution ?

1.2 Technical name (if possible ADN nomenclature [or ADR, RID, IMDG Code or UN No.]).

1.3 Synonym.

1.4 Trade name.

1.5 Structure formula and, for mixtures, composition and/or concentration.

* For questions not relevant to the subject of the application, write “not applicable”.

1.6 Hazard class and, where applicable [classification code], packing group.

1.7 Substance identification number (if known).

2. Physico-chemical properties

2.1 State during transport (e.g. gas, liquid, molten, ...).

2.2 Density of liquid at 20 ° C or at the transport temperature if the substance is to be heated or refrigerated during transport.

2.3 Transport temperature (for substances heated or refrigerated during transport).

2.4 Melting point or range ° C.

2.5 Boiling point or range ° C.

2.6 Vapour pressure at 15 ° C, 20 ° C, 30 ° C, 37.8 ° C, 50 ° C, (for liquefied gases, vapour pressure at 70 ° C), (for permanent gases, filling pressure at 15 ° C).

2.7 Cubic expansion coefficient in K⁻¹

2.8 Solubility in water at 20 ° C
Saturation concentration in mg/l or miscibility with water at 15 ° C

Complete partial none
(Indicate concentration)

2.9 Colour.

2.10 Odour.

2.11 Viscosity in mm²/s

2.12 Flow time (ISO 2431-1996)s.

2.13 Solvent separation test

2.14 pH of the substance or aqueous solution (indicate concentration).

2.15 Other information.

3. Technical safety properties

3.1 Auto-ignition temperature in accordance with IEC 60079-4 (corresponds to DIN 51 794) ° C; where applicable, indicate the temperature class in accordance with IEC 50 014.

3.2 Flash-point

For flash-points up to 175 °C

Closed-cup test methods - non-equilibrium procedure

ABEL method: EN ISO 13736:1997

ABEL-PENSKY method: DIN 51755-1:1974 and DIN 51755-2:1978 or AFNOR method: M07-019

PENSKY-MARTENS method: EN ISO 2719:2004

LUCHAIRE apparatus: French standard AFNOR T 60-103:1968

TAG method: ASTM D 56-02

Closed-cup test methods - equilibrium procedure

Rapid equilibrium procedure: EN ISO 3679:2004; ASTM D 3278-96:2004

Closed-cup equilibrium procedure: EN ISO 1523:2002; ASTM D 3941-90:2001

For flash-points above 175 °C

In addition to the above-mentioned methods, the following open-cup test method may be applied:

CLEVELAND method: EN ISO 2592:2002; ASTM D 92-02b

3.3 Explosion limits:

Determination of upper and lower explosion limits in accordance with EN 1839:2004.

3.4 Maximum safe gap in accordance with IEC 60079-1:2003

3.5 Is the substance stabilized during transport? If so, provide data on the stabilizer:
.....

3.6 Decomposition products in the event of combustion on contact with air or under the influence of an external fire:

3.7 Is the substance fire intensifying?

3.8 Abrasion (corrosion) mm/year.

3.9 Does the substance react with water or moist air by releasing flammable or toxic gases?
Yes/no. Gases released:

3.10 Does the substance react dangerously in any other way?

3.11 Does the substance react dangerously when reheated?
Yes/no

4. Physiological hazards

4.1 LD₅₀ and/or LC₅₀ value. Necrosis value (where applicable, other toxicity criteria in accordance with 2.2.61 of ADN).

CMR properties

4.2 Does decomposition or reaction produce substances posing physiological hazards?
(Indicate which substances where known)

4.3 Environmental properties (see 2.4.2.1 of ADN)

Acute toxicity:

LC₅₀ 96 hr for fish mg/l

EC₅₀ 48 hr for crustacea mg/l

E_rC₅₀ 72 hr for algae mg/l

Chronic toxicity:

NOEC mg/l

BCF mg/l or log K_{ow}

Easily biodegradable yes/no

5. Data on hazard potential

5.1 What specific damage is to be expected if the hazard characteristics produce their effect?

Combustion

Injury

Corrosion

- Intoxication in the event of dermal absorption
- Intoxication in the event of absorption by inhalation
- Mechanical damage
- Destruction
- Fire
- Corrosion
- Environmental pollution

6. Data on the transport equipment

6.1 Are particular loading requirements envisaged/necessary (what are they)?

7. Transport of dangerous substances in tanks

7.1 With which materials is the substance to be carried compatible?

8. Technical safety requirements

8.1 Taking into account the current state of science and technology, what safety measures are necessary in the light of the hazards posed by the substance or liable to arise in the course of the transport process as a whole?

8.2 Additional safety measures

- Use of stationary or mobile techniques to measure flammable gases and flammable liquid vapours
- Use of stationary or mobile techniques (toximeters) to measure concentrations of toxic substances

3.2.4.3 Criteria for assignment of substances

A. Columns (6), (7) and (8): Determination of the type of tank vessel

1. Gases (criteria according to 2.2.2 of ADN)

- Without refrigeration: type G pressure
- With refrigeration: type G refrigerated

2. Halogenated hydrocarbons

Substances that may only be transported in a stabilized state

Toxic substances (see 2.2.61 of ADN)

Flammable (flash-point < 23 °C) or corrosive substances (see 2.2.8 of ADN)

Substances with an auto-ignition temperature \leq 200 °C

Substances with a flash-point < 23 °C and an explosivity range > 15 % at 20 °C

Benzene and mixtures of non-toxic and non-corrosive substances containing more than 10% benzene

Environmentally hazardous substances, Acute or Chronic Category 1 (group N1 in accordance with 2.2.9.1.10.2)

- Cargo tank internal pressure > 50 kPa at the following temperatures: liquid 30 °C, gaseous phase 37.8 °C
 - Without refrigeration: type C pressure (400 kPa)
 - With refrigeration: type C refrigerated
- Cargo tank internal pressure \leq 50 kPa at the following temperatures: liquid 30 °C, gaseous phase 37.8 °C but with cargo tank internal pressure > 50 kPa at 50 °C
 - Without water spraying: type C pressure (400 kPa)
 - With water spraying: type C with high-velocity vent valve opening pressure of 50 kPa
- Cargo tank internal pressure \leq 50 kPa at the following temperatures: liquid 30 °C, gaseous phase 37.8 °C with cargo tank internal pressure \leq 50 kPa at 50 °C
 - type C with high-velocity vent valve opening pressure as calculated, but at least 10 kPa

2.1 Mixtures for which type C is required in accordance with the criteria referred to in 2 above but for which certain data are lacking

In cases where the internal pressurization of the tank cannot be calculated owing to a lack of data, the following criteria may be used

- Initial boiling point \leq 60 °C type C (400 kPa)

- | | | |
|--|--------|--|
| – 60 °C < initial boiling point ≤ 85 °C | type C | with high-velocity vent valve opening pressure of 50 kPa and with water spraying |
| – 85 °C < initial boiling point ≤ 115 °C | type C | with high-velocity vent valve opening pressure of 50 kPa |
| – 115 °C < initial boiling point | type C | with high-velocity vent valve opening pressure of 35 kPa |

3. Substances which are flammable only (see 2.2.3 of ADN)

- | | | |
|--|---------------|---|
| – Flash-point < 23 °C
with 175 kPa ≤ Pv 50 < 300 kPa | | |
| • Without refrigeration: | closed type N | pressure (400 kPa) |
| • With refrigeration: | closed type N | refrigerated with high-velocity vent valve opening pressure of 50 kPa |
| – Flash-point < 23 °C
with 150 kPa ≤ Pv 50 < 175 kPa: | closed type N | with eductor opening pressure of 50 kPa |
| – Flash-point < 23 °C
with 110 kPa ≤ Pv 50 < 150 kPa | | |
| • Without water spraying: | closed type N | with high-velocity vent valve opening pressure of 50 kPa |
| • With water spraying: | closed type N | with high-velocity vent valve opening pressure of 10 kPa |
| – Flash-point < 23 °C
with Pv 50 < 110 kPa: | closed type N | with high-velocity vent valve opening pressure of 10 kPa |

- | | | |
|--|-------------|---------------------|
| <ul style="list-style-type: none"> – Flash-point ≥ 23 °C
but ≤ 60 °C: | open type N | with flame-arrester |
| <ul style="list-style-type: none"> – Substances with a flash-point > 60 °C
heated to less than 15 K
from the flash-point, N.O.S. (...): | open type N | with flame-arrester |

4. Corrosive substances

– Corrosive substances liable to produce corrosive vapours

- | | | |
|---|---------------|--|
| <ul style="list-style-type: none"> • Substances assigned to
packing group I or II in
the list of substances and
having a vapour pressure*
greater than 12.5 kPa
valve (125 mbar) at 50 °C or | closed type N | cargo tank walls
must be distinct
from vessel hull;
high-velocity
vent valve/safety
opening pressure of
10 kPa |
| <ul style="list-style-type: none"> • Substances liable to react
dangerously with water
(for example acid chlorides) | | |
| <ul style="list-style-type: none"> • Substances containing gases
in solution | | |

– Corrosive acids:

- | | | |
|---|-------------|--|
| <ul style="list-style-type: none"> • Substances assigned to
packing group I or II in
the list of substances and
having a vapour pressure*
of 12.5 kPa (125 mbar)
or less at 50 °C or | open type N | cargo tank walls
must be distinct
from vessel hull |
| <ul style="list-style-type: none"> • Substances assigned to
packing group III in
the list of substances and
having a vapour pressure*
of 6.0 kPa (60 mbar)
or greater at 50 °C or | open type N | cargo tank walls
must be distinct
from vessel hull |

* If the data are available, the sum of the partial pressures of the dangerous substances may be used in place of the vapour pressure.

8. Substances that must be transported at elevated temperatures

For substances that must be transported at elevated temperatures, the type of cargo tank shall be determined on the basis of the transport temperature, using the following table:

Maximum transport temperature T in °C	Type N	Type C
$T \leq 80$	2	2
$80 < T \leq 115$	1 + remark 25	1 + remark 26
$T > 115$	1	1

1 = cargo tank type: independent tank

2 = cargo tank type: integral tank

Remark 25 = remark No. 25 in column (20) of the list of substances contained in Chapter 3.2, Table C.

Remark 26 = remark No. 26 in column (20) of the list of substances contained in Chapter 3.2, Table C.

9. Substances with long-term effects on health - CMR substances (Categories 1A and 1B in accordance with the criteria of Chapters 3.5, 3.6 and 3.7 of GHS*), provided that they are already assigned to Classes 2 to 9 by virtue of other criteria

C carcinogenic

M mutagenic

R toxic to reproduction

closed type N

cargo tank walls must be distinct from vessel hull; high-velocity vent valve opening pressure of at least 10 kPa, with water-spray system, if the internal pressurization of the tank is more than 10 kPa

* Since there is no official international list of CMR substances of Categories 1A and 1B, pending the availability of such a list, the list of CMR substances of Categories 1 and 2 in Directives 67/548/EEC and 88/379/EEC of the Council of the European Union, as amended, shall apply.

10. Substances that float on the water surface ('floaters') or sink to the bottom of the water ('sinkers') (criteria in accordance with GESAMP),* provided that they are already assigned to Classes 2 to 9 and that type N is required on that basis

closed type N

cargo tank walls must
be distinct from vessel
hull

B. Column (9): Determination of state of cargo tank

(1) Refrigeration system

Determined in accordance with A.

(2) Possibility of heating the cargo

A possibility of heating the cargo shall be required:

- When the melting point of the substance to be transported is + 15 °C or greater,
or
- When the melting point of the substance to be transported is greater than 0 °C
but less than + 15 °C and the outside temperature is no more than 4 K above the
melting point. In column (20), reference shall be made to remark 6 with the
temperature derived as follows: melting point + 4 K.

(3) Water-spray system

Determined in accordance with A.

(4) Cargo heating system on board

- For substances that must not be allowed to solidify owing to the possibility of
dangerous reactions on reheating, and
- For substances that must be maintained at a guaranteed temperature of not less
than 15 K below their flash-point.

* IMO publication: "The Revised GESAMP Hazard Evaluation Procedure for Chemical Substances Carried by Ships", GESAMP Reports and Studies No. 64, IMO, London, 2002.

C. Column (10): Determination of opening pressure of high-velocity vent valve in kPa

For vessels of type C, the opening pressure of the high-velocity vent valve shall be determined on the basis of the internal pressure of the tanks, rounded up to the nearest 5 kPa.

To calculate the internal pressure, the following formula shall be used:

$$P_{\max} = P_{\text{Obmax}} + \frac{k \cdot v_a (P_0 - P_{\text{Da}})}{v_a - \alpha \cdot \delta_t + \alpha \cdot \delta_t \cdot v_a} - P_0$$

$$k = \frac{T_{\text{Dmax}}}{T_a}$$

In this formula:

- P_{\max} : Maximum internal pressure in kPa
- P_{Obmax} : Vapour pressure at maximum absolute liquid surface temperature in kPa
- P_{Da} : Vapour pressure at absolute filling temperature in kPa
- P_0 : Atmospheric pressure in kPa
- v_a : Free relative volume at filling temperature compared with cargo tank volume
- α : Cubic expansion coefficient in K^{-1}
- δ_t : Average liquid temperature increase through reheating in K
- T_{Dmax} : Maximum absolute vapour pressure in K
- T_a : Filling temperature in K
- k : Temperature correction factor
- t_{ob} : Maximum liquid surface temperature in $^{\circ}\text{C}$

In the formula, the following basic data are used:

- P_{Obmax} : At 50 $^{\circ}\text{C}$ and 30 $^{\circ}\text{C}$
- P_{Da} : At 15 $^{\circ}\text{C}$

P_0	:	101.3 kPa
v_a	:	5% = 0.05
δ_t	:	5 K
T_{Dmax}	:	323 K and 310.8 K
T_a	:	288 K
t_{ob}	:	50 °C and 30 °C

D. Column (11): Determination of maximum degree of filling of cargo tanks

If, in accordance with the provisions under A above:

- Type G is required: 91% however, in the case of deeply refrigerated substances: 95%
- Type C is required: 95%
- Type N is required: 97% however, in the case of substances in a molten state and of flammable liquids with $175 \text{ kPa} \leq P_{v50} < 300 \text{ kPa}$: 95%.

E. Column (13): Determination of type of sampling connection

- 1 = *closed*:
 - Substances to be transported in pressure cargo tanks
 - Substances with T in column (3b) and assigned to packing group I
 - Stabilized substances to be transported under inert gas.
- 2 = *partly closed*:
 - All other substances for which type C is required.
- 3 = *open*:
 - All other substances.

(F) Column (14): Determination of whether a pump-room is permitted below deck

- No
 - All substances with letter T in the classification code indicated in column (3b) with the exception of substances of Class 2.
- Yes
 - All other substances.

(G) Column (15): Determination of temperature class

Flammable substances shall be assigned to a temperature class on the basis of their auto-ignition point:

Temperature class	Auto-ignition temperature T of flammable liquids and gases in °C
T1	$T > 450$
T2	$300 < T \leq 450$
T3	$200 < T \leq 300$
T4	$135 < T \leq 200$
T5	$100 < T \leq 135$
T6	$85 < T \leq 100$

When anti-explosion protection is required and the auto-ignition temperature is not known, reference shall be made to temperature class T4, considered safe.

(H) Column (16): Determination of explosion group

Flammable substances shall be assigned to an explosion group on the basis of their maximum experimental safe gaps. The maximum experimental safe gaps shall be determined in accordance with the standard contained in IEC Publication No. 79-1A.

The different explosion groups are as follows:

Explosion group	Maximum experimental safe gap in mm
II A	> 0.9
II B	≥ 0.5 to ≤ 0.9
II C	< 0.5

When anti-explosion protection is required and the relevant data are not provided, reference shall be made to explosion group II B, considered safe.

(I) Column (17): Determination of whether anti-explosion protection is required for electrical equipment and systems

- Yes
- Substances with a flash-point ≤ 60 °C.
 - Substances that must be transported while heated to a temperature less than 15 K from their flash-point.
 - Flammable gases.
- No
- All other substances.

(J) Column (18): Determination of whether personal protective equipment, escape devices, portable flammable gas detectors, portable toximeters or ambient-air-dependent breathing apparatus is required

- PP: For all substances of Classes 1 to 9;
- EP: For all substances
 - Of Class 2 with letter T or letter C in the classification code indicated in column (3b),
 - Of Class 3 with letter T or letter C in the classification code indicated in column (3b),
 - Of Class 4.1,
 - Of Class 6.1, and
 - Of Class 8,
 - CMR substances of Category 1A or 1B according to GHS;
- EX: For all substances for which anti-explosion protection is required;
- TOX: For all substances of Class 6.1,
For all substances of other classes with T in column (3b),
For CMR substances of Category 1A or 1B according to GHS;
- A: For all substances for which EX or TOX is required.

(K) Column (19): Determination of the number of cones or blue lights

For all substances of Class 2 with letter F in the classification code indicated in column (3b):	1 cone/light
For all substances of Classes 3 to 9 with letter F in the classification code indicated in column (3b) and assigned to packing group I or II:	1 cone/light
For all substances of Class 2 with letter T in the classification code indicated in column (3b)	2 cones/lights
For all substances of Classes 3 to 9 with letter T in the classification code indicated in column (3b) and assigned to packing group I or II:	2 cones/lights

(L) Column (20): Determination of additional requirements and remarks

- Remark 1:** Reference shall be made in column (20) to remark 1 for transport of UN No. 1005 AMMONIA, ANHYDROUS.
- Remark 2:** Reference shall be made in column (20) to remark 2 for stabilized substances that react with oxygen.
- Remark 3:** Reference shall be made in column (20) to remark 3 for substances that must be stabilized.
- Remark 4:** Reference shall be made in column (20) to remark 4 for substances that must not be allowed to solidify owing to the possibility of dangerous reactions on reheating.
- Remark 5:** Reference shall be made in column (20) to remark 5 for substances liable to polymerization.
- Remark 6:** Reference shall be made in column (20) to remark 6 for substances liable to crystallization and for substances for which a heating system or possibility of heating is required and the vapour pressure of which at 20 °C is greater than 0.1 kPa.
- Remark 7:** Reference shall be made in column (20) to remark 7 for substances with a flash-point of + 15 °C or greater.
- Remark 8:** Reference shall be made in column (20) to remark 8 for substances that react dangerously with water.
- Remark 9:** Reference shall be made in column (20) to remark 9 for transport of UN No. 1131 CARBON DISULPHIDE.
- Remark 10:** *No longer used.*
- Remark 11:** Reference shall be made in column (20) to remark 11 for transport of UN No. 1040 ETHYLENE OXIDE WITH NITROGEN.
- Remark 12:** Reference shall be made in column (20) to remark 12 for transport of UN No. 1280 PROPYLENE OXIDE and UN No. 2983 ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE.
- Remark 13:** Reference shall be made in column (20) to remark 13 for transport of UN No. 1086 VINYL CHLORIDE, STABILIZED.
- Remark 14:** Reference shall be made in column (20) to remark 14 for mixtures or N.O.S. entries which are not clearly defined and for which type N is stipulated under the classification criteria.

- Remark 15:** Reference shall be made in column (20) to remark 15 for substances that react dangerously with alkalis or acids such as sodium hydroxide or sulphuric acid.
- Remark 16:** Reference shall be made in column (20) to remark 16 for substances that may react dangerously to local overheating.
- Remark 17:** Reference shall be made in column (20) to remark 17 when reference is made to remark 6 or 7.
- Remark 18:** *No longer used.*
- Remark 19:** Reference shall be made in column (20) to remark 19 for substances that must under no circumstances come into contact with water.
- Remark 20:** Reference shall be made in column (20) to remark 20 for substances the transport temperature of which must not exceed a maximum temperature in combination with the cargo tank materials. Reference shall be made to this maximum permitted temperature immediately after the number 20.
- Remark 21:** *No longer used.*
- Remark 22:** Reference shall be made in column (20) to remark 22 for substances for which a range of values or no value is indicated in column (11).
- Remark 23:** Reference shall be made in column (20) to remark 23 for substances the internal pressure of which at 30 °C is less than 50 kPa and which are transported with water spraying.
- Remark 24:** Reference shall be made in column (20) to remark 24 for transport of UN No. 3257 ELEVATED TEMPERATURE LIQUID, N.O.S.
- Remark 25:** Reference shall be made in column (20) to remark 25 for substances that must be transported while heated in a type 3 cargo tank.
- Remark 26:** Reference shall be made in column (20) to remark 26 for substances that must be transported while heated in a type 2 cargo tank.
- Remark 27:** Reference shall be made in column (20) to remark 27 for substances for which the reference N.O.S. or a generic reference is made in column (2).
- Remark 28:** Reference shall be made in column (20) to remark 28 for transport of UN No. 2448 SULPHUR, MOLTEN.
- Remark 29:** Reference shall be made in column (20) to remark 29 for substances for which the vapour pressure or boiling point is indicated in column (2).

- Remark 30:** Reference shall be made in column (20) to remark 30 for transport of UN Nos. 1719, 1794, 1814, 1819, 1824, 1829, 1830, 1832, 1833, 1906, 2240, 2308, 2583, 2584, 2677, 2679, 2681, 2796, 2797, 2837 and 3320 under the entries for which open type N is required.
- Remark 31:** Reference shall be made in column (20) to remark 31 for transport of substances of Class 2 and UN Nos. 1280 PROPYLENE OXIDE and 2983 ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE of Class 3.
- Remark 32:** Reference shall be made in column (20) to remark 32 for transport of UN No. 2448 SULPHUR, MOLTEN, of Class 4.1.
- Remark 33:** Reference shall be made in column (20) to remark 33 for transport of UN Nos. 2014 and 2984 HYDROGEN PEROXIDE, AQUEOUS SOLUTION, of Class 5.1.
- Remark 34:** Reference shall be made in column (20) to remark 34 for transport of substances for which hazard 8 is mentioned in column (5) and type N in column (6).
- Remark 35:** Reference shall be made in column (20) to remark 35 for substances that must not have a direct system for the refrigeration system.
- Remark 36:** Reference shall be made in column (20) to remark 36 for substances that must have an indirect system for the refrigeration system.
- Remark 37:** Reference shall be made in column (20) to remark 37 for substances for which the cargo storage system must be capable of resisting the full vapour pressure of the cargo at the upper limits of the ambient design temperatures, whatever the system adopted for the boil-off gas.
- Remark 38:** Reference must be made in column (20) to remark 38 for mixtures with an initial melting point above 60 °C in accordance with ASTM D 86-01.”.
