

ECONOMIC COMMISSION FOR EUROPE**INLAND TRANSPORT COMMITTEE**

Working Party on the Transport of Dangerous Goods

Eighty-third session

Geneva, 5-9 November 2007

Item 8 of the provisional agenda

**Interim report on the progress of work in the
informal working group MEMU**

(MEMU – mobile explosive manufacturing unit)

Submitted by Germany

1. Reference is made to the report (ECE/TRANS/WP.15/192) item 7 of the WP.15 meeting in May 2007 in Geneva.

2. **Work report / presentation of results**

During the period under review from the 82nd to the 83rd session of the WP 15, two further meetings (3rd and 4th meeting) of the informal working group “MEMU’s” were held in Germany (Bonn).

The 4th meeting was held on 11 and 12 October with the following participants: Finland, France, Germany, Ireland, Latvia, Norway, Poland, Spain, Sweden and the United Kingdom as well as several manufacturers/operators of MEMUs from different states.

Owing to the very complex problem, namely to place the MEMUs as a special type of dangerous goods transport involving several dangerous goods under special conditions in one vehicle for the first time under the umbrella of the ADR, the working group did not achieve its aim to present a complete draft text for the inclusion of MEMUs in the ADR at the 83rd session of WP 15.

At the 4th meeting, about 85% to 90% of the necessary texts concerning the chapters

- Requirements for the construction, testing and approval of the tanks and bulk containers of MEMUs (new chapter 6.12) Requirements for the use of MEMUs (new chapter 4.7)
- Provisions for the loading and unloading of MEMUs (supplements in 7.5)
- Requirements for the vehicle crews of MEMUs (supplements in 8)
- Requirements concerning the construction and approval of vehicles of the type MEMU (supplements in 9)

were elaborated.

Coordination of the texts for the chapters

- Additional requirements for MEMUs (9.8, some remaining work)
- General provisions for dispatch (5.1)
- Marking (5.3)
- Documentation (5.4)
- Transitional measures (1.6)
- Security (1.10)

which, however, already exist as proposals is still necessary. In conclusion, the working group has to perform the final editorial review of all new MEMU texts (the complete text currently elaborated by the working group is reproduced in Annex).

To finish this work, Germany has invited the participants to a (final) 5th meeting of the working group in Bonn on 10 and 11 December 2007.

It has to be assumed that then a complete MEMU text will be drafted which can be submitted as a formal document at the 84th meeting of the WP.15 in May 2008.

Right from the start of the work there was the aim of including the new requirements in the 2009 edition of the ADR. Owing to the complexity of the subject and the challenge to appropriately deal with all contributions and subjects within the working group, it was not possible to present a formal document in due time for the 83rd session of the WP.15. The working group, therefore, asks the WP.15 and the Secretariat to agree to a final discussion in May 2008 and – after adoption of the proposed texts - to the inclusion of these texts in the 2009 ADR.

3. **Summary of essential security-related aspects of the MEMU texts**

3.1 Construction and testing requirements for MEMU “transport containers”

Only tanks and bulk containers BK 2 are admitted for the carriage of the different dangerous goods on the MEMU. Owing to the frequently prismatic form of the “containers” which is required on the vehicle, special “MEMU tanks” were defined. The wall thickness of these containers are determined on the basis of the tank material, the testing and approval procedures are prescribed or have to be approved by the competent authorities. Thus, the MEMU tanks have, in a differentiated form, advantages as compared with the tanks in accordance with 6.7 and 6.8 of ADR as well as the ADR-compliant BK 2 containers which are also permitted.

3.2 Requirements for the tank for UN 3375 ammonium nitrate emulsion (matrix)

After difficult discussions the working group agreed that the material selection for the tank to carry UN 3375 on the MEMU is up to the competent authority but that the risk of confinement of the ammonium nitrate in the case of an unwanted reaction in the tank has to be effectively counteracted by suitable pressure-relief measures.

3.3 Carriage of goods of Class 1

Owing to the necessity of using goods of Class 1 (detonators and detonator assemblies) when employing the MEMUs, the possibility of carrying certain quantities of packaged goods of Class 1 in a special compartment on the MEMU was provided for. This

compartment has to be protected against external thermal impact. The competent authority may change the admissible quantities in the individual case.

3.4 Classification of the MEMU's under a vehicle category in Part 9

Owing to the essential difference as regards the loading of EX/III vehicles with a maximum useful load of 160000 kg of goods of Class 1 and the MEMUs with a maximum of 200 kg of goods of Class 1 but a large quantity of goods of Class 5.1, a new vehicle category "MEMU" is proposed, since the category EX/III is considered as not applicable. The requirements for vehicles of the type "MEMU", though, essentially correspond to the EX/III vehicles but are slightly less stringent than those of Chapter 9.3.

Annex

Draft Texts

October 2007 rev.0

Please note:

- Texts which are still under consideration are put in square brackets: [...].
- Comments are put in triple brackets: (((...))).
- All items which need some final work are highlighted: 6.12.x.y.
- Text from the Dresden/Bonn meeting (March/August 2007): specimen.
- The change tracking mode is not used as its usability is limited after several changes from different authors.

CHAPTER 1.2

DEFINITIONS AND UNITS OF MEASUREMENT

1.2.1 Definitions

...

“*Mobile explosives manufacturing unit*” (MEMU) means ~~a vehicle mounted with~~¹ a unit for manufacturing and charging explosives from dangerous goods that are not explosives. The unit consists of various tanks and bulk containers and process equipment as well as pumps and related equipment. The unit may be fixed to the vehicle (MEMU vehicle)¹ or constitute a separate demountable unit, e. g. CSC-container or swap body unit. The unit may have compartments for packaged explosives.

¹((FIN: Was it agreed in the last meeting to delete “a vehicle mounted with” because otherwise the result would be “a vehicle may be fixed to the vehicle ...”?)) ((D: If a MEMU is considered as a unit without a vehicle chassis do we have to re-think the wording of several provisions? The understanding, at the beginning, was that a MEMU consists of the manufacturing unit including the vehicle chassis; now we understand the MEMU as the “manufacturing plant” and the whole transport unit we call “MEMU vehicle”.))

[Note: Even though the definition of MEMU includes the expression “manufacturing and charging explosives” the requirements for MEMUs apply only to transport and not to manufacturing and charging of explosives. These operations, their approval etc. must comply with the national regulations, moreover taking into account that the use of “MEMUs” is forbidden in some Contracting Parties.]

CHAPTER 1.6

TRANSITIONAL MEASURES

...

1.6.5.xx MEMUs constructed and approved prior to 1 January 2009 in accordance with the provisions of national law but which do not, however, conform to the requirements applicable as from 1 January 2009 may continue to be used with the approval of the competent authority of the country of use. ((FIN))

CHAPTER 4.7

USE OF MOBILE EXPLOSIVES MANUFACTURING UNITS (MEMUS)

NOTE 1: For packaging, see Chapter 4.1; for portable tanks, see Chapter 4.2; for fixed tanks (tank vehicles), demountable tanks, tank-containers and tank swap bodies with shells made of metallic materials, see Chapter 4.3; for fibre-reinforced plastics (FRP) tanks, see Chapter 4.4; for vacuum operated waste containers, see Chapter 4.5

NOTE 2: For requirements concerning construction, equipment, type approval, tests and marking, see Chapters 6.7, 6.8, 6.9, 6.11 and 6.12.

4.7.1 Use

4.7.1.1 Substances classified in Classes 3, 5.1, 6.1 and 8 may be carried on MEMUs conforming to Chapter 6.12, in portable tanks if their carriage is permitted according to Chapter 4.2; or in fixed tanks, demountable tanks, tank containers or tank swap bodies if their carriage is permitted according to Chapter 4.3; or in fibre-reinforced plastics (FRP) tanks if their carriage is permitted according to Chapter 4.4; or in bulk containers, if their carriage is permitted according to Chapter 7.3.

(((Report of the first WG meeting: “26. Following a vote, a (provisionally) complete list of substances that should be carried on a vehicle for the manufacture of explosives was drawn up: UN 3375, UN 1942, UN 3218, UN 1396, UN 1309, UN 3219, UN 3287, UN 2790, UN 1202, UN 3295, UN 1268, UN 3287 sodium dichromate solution, UN 3141 potassium (pyro) antimonate, emulsifier (not a dangerous substance), aluminium powder (not a dangerous substance).” Doesn’t the reference to the classes only go too far? Should the list of the first meeting be taken into account?)))

4.7.1.2 Subject to the approval of the competent authority (see 7.x) explosive substances or articles of Class 1 may be carried in packages, in compartments on MEMUs conforming to Chapter 6.12, if their packaging is permitted according to Chapter 4.1 and their carriage is permitted according to Chapter 7.2 and 7.5.

4.7.2 Operation

4.7.2.1 The following provisions apply for operation of tanks;

- (a) For tanks with a capacity of 1000 litres or more; the provisions of Chapter 4.3 and 4.4, except 4.3.1.4, 4.3.2.3.1 and 4.3.3, apply to the carriage on MEMUs, and are supplemented by the provisions of 4.7.2.2 and 4.7.2.3 below.
- (b) For tanks with a capacity of less than 1000 litres; the provisions of Chapter 4.3, except 4.3.1.4, 4.3.2.1, 4.3.2.3.1, 4.3.3 and 4.3.4, apply to the carriage in MEMUs and are supplemented by the provisions of 4.7.2.2, 4.7.2.3 and 4.7.2.4 below.

4.7.2.2 The following provisions apply for minimum thickness of shells throughout use;

- (a) For tanks with a capacity of 1000 litres or more; with shells not of a circular cross-section, for example box-shaped or elliptical shells, which cannot be calculated according to 6.8.2.1.18 footnote 2, the thickness of these shells shall not, throughout its use, fall below the minimum values given in the table in 6.12.x.x.
- (b) For tanks with a capacity of less than 1000 litres; the thickness of the-se shells shall not, throughout its use, fall below the minimum values given in the table in 6.12.x.y

4.7.2.3 Flexible discharge pipes, whether permanently connected or not, and hoppers which may contain mixed or sensitised explosive substances shall be empty during carriage.

4.7.2.4 When applicable to carriage in tanks, the special provisions (TU) of 4.3.5 shall also apply as indicated in Column (13) of Table A in Chapter 3.2.

4.7.2.5 Operators shall ensure that all compartments for carriage of packaged explosives on MEMUs, and all closures for other dangerous goods shall be locked for carriage. [and that process locks are applied when manufacturing is not taking place. (((Note: = EU ESETF recommendation = covered by 1.10.3.3!)))]

CHAPTER 5.1

GENERAL PROVISIONS

((Proposals by UK))

5.1.3 Empty uncleaned packagings (including IBCs and large packagings), tanks, vehicles, MEMUs and containers for carriage in bulk

5.1.3.1 Empty uncleaned packagings (including IBCs and large packagings), tanks (including tank-vehicles, battery-vehicles, demountable tanks, portable tanks, tank-containers, MEGCs, MEMUs), vehicles and containers for carriage in bulk having contained dangerous goods of the different classes other than Class 7, shall be marked and labelled as if they were full.

NOTE: For documentation, see Chapter 5.4.

CHAPTER 5.3

((Proposals by UK))

PLACARDING AND MARKING OF CONTAINERS, MEGCS, MEMUS, TANK-CONTAINERS, PORTABLE TANKS AND VEHICLES

NOTE: For marking and placarding of containers, MEGCs, MEMUs, tank-containers and portable tanks for carriage in a transport chain including a maritime journey, see also 1.1.4.2.1. If the provisions of 1.1.4.2.1 (c) are applied, only 5.3.1.3 and 5.3.2.1.1 of this Chapter are applicable.

...

5.3.1.1.4 Containers, MEGCs, MEMUs, tank-containers, portable tanks or vehicles containing goods of more than one class need not bear a subsidiary risk placard if the hazard represented by that placard is already indicated by a primary or subsidiary risk placard.

...

5.3.1.4 *Placarding of vehicles for carriage in bulk, tank-vehicles, battery vehicles, MEMUs and vehicles with demountable tanks*

((Existing text becomes 5.3.1.4.1))

5.3.1.4.2 ((insert after the note of 5.3.1.4)) For MEMUs only tanks and bulk containers with a capacity of more than [500] litres shall be placarded in accordance with 5.3.1.4.1.

((ALTERNATIVE PROPOSAL))

5.3.1.4.2 For MEMUs only tanks and bulk containers with a capacity of more than [500] litres shall be placarded with placards corresponding to the label in conformity with No. 5.1 in section 5.2.2.2.2.

5.3.1.4.3 For MEMUs tanks and bulk containers with a capacity of less than or equal to [500] litres need not be placarded.

...

5.3.1.6 *Placarding of empty tank-vehicles, battery-vehicles, MEGCs, MEMUs, tank-containers, portable tanks and empty vehicles and containers for carriage in bulk*

5.3.1.6.1 Empty tank-vehicles, vehicles with demountable tanks, battery-vehicles, MEGCs, MEMUs, tank-containers and portable tanks uncleaned and not degassed, and empty vehicles and containers for carriage in bulk, uncleaned, shall continue to display the placards required for the previous load.

...

5.3.2.1 *General orange-coloured plate marking provisions*

...

5.3.2.1.2 When a hazard identification number is indicated in Column (20) of table A of Chapter 3.2, tank-vehicles, battery vehicles or transport units having one or more tanks carrying dangerous goods shall in addition display on the sides of each tank, each tank compartment or each element of battery vehicles, clearly visible and parallel to the longitudinal axis of the vehicle, orange-coloured plates identical with those prescribed in 5.3.2.1.1. These orange-coloured plates shall bear the hazard identification number and the UN number prescribed respectively in Columns (20) and (1) of table A of Chapter 3.2 for each of the substances carried in the tank, in a compartment of the tank or in an element of a battery vehicle. For MEMUs these requirements shall only apply to tanks and bulk containers with a capacity of more than [500] litres.

...

5.3.2.1.7 The requirements of 5.3.2.1.1 to 5.3.2.1.5 are also applicable to empty fixed or demountable tanks, battery-vehicles, tank-containers, portable tanks and MEGCs, uncleaned, not degassed or not decontaminated, MEMUs, uncleaned, as well as to empty vehicles and containers for carriage in bulk, uncleaned or not decontaminated.

CHAPTER 5.4

DOCUMENTATION

((Proposals by UK))

5.4.1.1.6.2.2 For empty means of containment other than packagings, uncleaned, which contain the residue of dangerous goods of classes other than Class 7 and for empty uncleaned receptacles for gases with a capacity of more than 1000 litres, the particulars according to 5.4.1.1.1 (a) to (d) are preceded by "EMPTY TANK-VEHICLE", "EMPTY DEMOUNTABLE TANK", "EMPTY TANK-CONTAINER", "EMPTY PORTABLE TANK", "EMPTY BATTERY-VEHICLE", "EMPTY MEGC", "EMPTY MEMU", "EMPTY VEHICLE", "EMPTY CONTAINER" or "EMPTY RECEPTACLE", as appropriate, followed by the words "LAST LOAD:". Moreover, paragraph 5.4.1.1.1 (f) does not apply.

See examples as follows:

"EMPTY TANK-VEHICLE, LAST LOAD: UN 1098 ALLYL ALCOHOL, 6.1 (3), I" or
"EMPTY TANK-VEHICLE, LAST LOAD: UN 1098 ALLYL ALCOHOL, 6.1 (3), PG I".

CHAPTER 6.12

REQUIREMENTS FOR THE CONSTRUCTION, EQUIPMENT, TYPE APPROVAL AND INSPECTION OF TANKS, BULK CONTAINERS AND SPECIAL COMPARTMENTS FOR EXPLOSIVES OF MOBILE EXPLOSIVE MANUFACTURING UNITS (MEMUS)

NOTE 1: For portable tanks, see Chapter 6.7; for fixed tanks (tank-vehicles), demountable tanks and tank containers and tank swap bodies, with shells made of metallic materials, see Chapter 6.8; for fibre-reinforced plastics tanks see Chapter 6.9; for vacuum operated waste tanks see Chapter 6.10; for bulk containers see Chapter 6.11.

NOTE 2: This Chapter applies to fixed tanks, demountable tanks, tank-containers, tank swap bodies, bulk containers [other than those tanks mentioned in note 1] and special compartments for explosives.

6.12.1 Scope

6.12.1.1 The requirements of ~~6.12.1.2 to 6.12.5~~ this Chapter are applicable to tanks, bulk containers and compartments intended for the carriage of dangerous goods on MEMUs.

6.12.1.2 Bulk containers intended for the carriage of dangerous goods on MEMUs shall comply with the requirements for bulk containers of type BK2. (((move to 6.12.2?)))

6.12.2 General Provisions

6.12.2.x Tanks shall meet the requirements of chapter 6.8, notwithstanding the minimum capacity defined in section 1.2.1 for fixed tanks, as modified by the special provisions of ~~6.12.2.1.1 and 6.12.2.1.2~~ this Chapter.

6.12.2.1 Where a single tank or bulk container contains more than one substance each substance shall be separated by at least two walls with drained air space between.

6.12.2.2 Tanks shall meet the requirements of marking of chapter 6.8.2.5.2 other than the tank code and special provisions. (((correct place? move to 6.12.3.1 and 6.12.3.2?)))

6.12.3 Tanks

6.12.3.1 Tanks with a capacity of at least 1000 litres

6.12.3.1.1 These tanks shall meet the requirements of section 6.8.2.

6.12.3.1.2 Where a safety valve is required by the provisions of 6.8.2, a tank shall also have a bursting disc, or other suitable means of pressure relief, approved by the competent authority.

6.12.3.1.3 For shells not of a circular cross-section, for example box-shaped or elliptical shells, which cannot be calculated according to 6.8.2.1.18 footnote 2 6.8.2.1.4 and the technical code mentioned therein, the ability to withstand the permissible stress may be demonstrated in a suitable manner by a pressure test specified by the competent authority.

These tanks shall meet the requirements of section 6.8.2.1 other than 6.8.2.1.3, 6.8.2.1.4, 6.8.2.1.13 to 6.8.2.1.22 inclusive.

The thickness of these shells shall not be less than the values given in the table below:

Material	Minimum thickness
Stainless austenitic steels	2.5 mm
Other steels	3 mm
Aluminium alloys	4 mm
Pure aluminium of 99.80%	6 mm

Protection of the tank against damage through lateral impact or overturning shall be provided. Protection shall be provided according to 6.8.2.1.20 or the competent authority shall approve alternative protection measures.

6.12.3.2 Tanks with a capacity of less than 1000 litres

6.12.3.2.1 The construction of these tanks shall meet the requirements of section 6.8.2.1 other than 6.8.2.1.3, 6.8.2.1.4, 6.8.2.1.6, 6.8.2.1.10 to 6.8.2.1.23 inclusive and 6.8.2.1.28.

6.12.3.2.2 The equipment of these tanks shall meet the requirements of section 6.8.2.2.1. Where a safety valve is required by the provisions of 6.8.2, a tank shall also have a bursting disc, or other suitable means of pressure relief, approved by the competent authority.

6.12.3.2.3 The thickness of these shells shall not be less than the values given in the table below:

Material	Minimum thickness
Stainless austenitic steels	2.5 mm
Other steels	3 mm
Aluminium alloys	4 mm
Pure aluminium of 99.80%	6 mm

6.12.3.2.4 Tanks may have constructional parts that are without a radius of convexity. The shortest non-supported measurement of such parts shall not be greater than 100 x [times] the wall thickness. Such supportive measures may be curved walls, corrugated walls or ribs.

6.12.3.2.5 Welds shall be skilfully made and shall afford the fullest safety. Welding shall be performed by skilled welders using a welding process whose effectiveness (including any heat treatments required) has been demonstrated by test.

6.12.3.2.6 The initial and periodic inspections of these tanks shall be carried out in responsibility of the user / [or] owner of the MEMU. Shells and their equipment shall be subject to

visual examination of their external and internal condition and a leakproofness test to the satisfaction of the competent authority

6.12.4 Items of equipment

6.12.4.1 Tanks with bottom discharge for UN 1942 and UN 3375 may have only two closures. One of these closures may be the product mixing or discharge pump or auger.

6.12.4.2 Any piping after the first closure shall be of a fusible material (i.e. rubber hose) or have fusible elements.

6.12.4.3 In order to avoid any loss of contents in the event of damage to the external pumps and discharge fittings (pipes), the first closure and its seatings shall be protected against the danger of being wrenched off by external stresses or shall be so designed as to withstand them. The filling and discharge devices (including flanges or threaded plugs) and protective caps (if any) shall be capable of being secured against any unintended opening.

6.12.4.4 Venting systems in accordance with 6.8.2.2.6 on tanks for UN 3375 may be substituted by “goose necks”. Such equipment shall be protected against the danger of being wrenched off by external stresses or shall be so designed as to withstand them.

6.12.5 Special Compartments for explosives

Compartments for packages of explosives containing detonators and/or detonator assemblies and those containing substances or articles of compatibility group D shall be designed to provide effective segregation such that there is no danger of transmission of detonation from the detonators and/or detonator assemblies to the substances or articles of compatibility group D. Segregation shall be achieved by the use of separate compartments or by placing one of the two types of explosive in a special containment system. Either method of segregation shall be approved by the competent authority. If the material used for the compartment is metal, the complete inside of the compartment shall be covered with materials providing suitable fire resistance. The explosives compartments shall be located where they are protected from impact and from damage on rough terrain and dangerous interaction with other dangerous goods on board and from ignition sources on the vehicle e.g. exhausts etc..

NOTE: Materials classified as class B-S3-d2 according to standard EN 13501-1:2002 are deemed to fulfil the fire resistance requirement.

Inspection of MEMUs

MEMU with its equipment shall be initially inspected and approved by the competent authority or a body designated by it.

CHAPTER 7.5

PROVISIONS CONCERNING LOADING, UNLOADING AND HANDLING

...

7.5.5 Limitation of the quantities carried

...

7.5.5.2 *Limitations with respect to explosive substances and articles*

...

7.5.5.2.3 *Carriage of explosives on MEMUs*

Carriage of explosives on MEMUs is only permitted subject to the following conditions:

- (a) The competent authority shall authorize the transport operation within its territory.
- (b) The type and quantity of packaged explosives carried shall be limited to those necessary for the quantity of material to be manufactured on the MEMU, and in any case shall not exceed
 - 200kg of explosives of compatibility group D and
 - a total of 400 units of detonators or detonator assemblies, or a mixture of both

unless otherwise approved by the competent authority.

- (c) [MEMUs shall not be used for general (non specific) carriage of explosives.]
(((depending on the texts in part 9)))
- (d) Packaged explosives shall only be carried in compartments that meet the construction and placing requirements of 6.12.5.
- (e) No other dangerous goods may be carried in the same compartment as the packaged explosives.
- (f) Packaged explosives shall only be loaded onto the MEMU once the loading of other dangerous goods has been completed and immediately prior to carriage.
- [(g) When mixed loading is permitted between explosives and substances of Class 5.1 (UN 1942 and UN 3375) the aggregate is treated as explosives under Class 1 for the purposes of [placarding,] segregation, stowage and maximum permissible load [as well as drivers training (((what was adopted concerning the amendment in 8.2.1.4?)))]].]

CHAPTER 8.2

REQUIREMENTS CONCERNING THE TRAINING OF THE VEHICLE CREW

8.2.1 General requirements concerning the training of drivers

...

8.2.1.3 Drivers of vehicles carrying dangerous goods in fixed tanks or de-mountable tanks with a capacity exceeding 1 m³, drivers of battery-vehicles with a total capacity exceeding 1 m³ and drivers of vehicles carrying dangerous goods in tank-containers, portable tanks or MEGCs with an individual capacity exceeding 3 m³ on a transport unit and drivers of MEMUs, shall attend a specialization training course for carriage in tanks covering at least the subjects defined in 8.2.2.3.3.

8.2.1.4 Drivers of vehicles carrying substances or articles of Class 1 (see additional requirement S1 in Chapter 8.5), [MEMUs carrying mixed loads of substances and articles of Class 1 and substances of Class 5.1 (see 7.5.5.2.3) ((which conclusion was drawn from the discussion? see also 7.5.5.2.3 (g))))] or certain radioactive material (see special pro-visions S11 and S12 in Chapter 8.5) shall attend specialization training courses covering at least the subjects defined in 8.2.2.3.4 or 8.2.2.3.5.

CHAPTER 9.1

SCOPE, DEFINITIONS AND REQUIREMENTS FOR THE APPROVAL OF VEHICLES

9.1.1 Scope and definitions

...

9.1.1.2 Definitions

“*MEMU vehicle*” means a vehicle mounted with a mobile explosives manufacturing unit (MEMU) for manufacturing and charging explosives from dangerous goods that are not explosives.

9.1.2 Approval of EX/II, EX/III, FL, OX, AT and MEMU vehicles

NOTE: No special certificates of approval shall be required for vehicles other than EX/II, EX/III, FL, OX, AT and MEMU vehicles, apart from those required by the general safety regulations normally applicable to vehicles in the country of origin.

9.1.2.1 General

EX/II, EX/III, FL, OX, AT and MEMU vehicles shall comply with the relevant requirements of this Part.

((Note: rest of 9.1.2.1 and 9.1.2.2 remains unchanged))

Inspection of MEMUs

MEMU with its equipment shall be initially inspected and approved by the competent authority or a body designated by it.

9.1.2.3 Annual technical inspection

EX/II, EX/III, FL, OX, AT and MEMU vehicles shall be subject ...

9.1.3 Certificate of approval

9.1.3.1 Conformity of EX/II, EX/III, FL, OX, AT and MEMU vehicles with the requirements of this Part ...

...

9.1.3.5 Model for certificate of approval for vehicles carrying certain dangerous goods: add “MEMU” in row 7

CHAPTER 9.2

REQUIREMENTS CONCERNING THE CONSTRUCTION OF VEHICLES

9.2.1 EX/II, EX/III, FL, OX, AT and MEMU vehicles shall comply with the requirements of this Chapter, according to the table below.

For vehicles other than of EX/II, EX/III, FL, OX, AT and MEMUs: ...

((Rest remains unchanged.))

In the table of 9.2.1 insert a new column "MEMU" and enter the "X"-marking in the same rows as for EX/III; notes "a" to "g" do not apply.

CHAPTER 9.8

ADDITIONAL REQUIREMENTS CONCERNING COMPLETE AND COMPLETED MEMU VEHICLES

9.8.1 General provisions

In addition to the vehicle proper, or the units of running gear used in its stead, a mobile explosives manufacturing unit (MEMU) comprises one or more tanks and bulk containers, their items of equipment and the fittings for attaching them to the vehicle or to the running-gear units.

9.8.2 Requirements concerning tanks and bulk containers

Tanks, bulk containers and compartments for packages of explosives of MEMUs shall meet the requirements of chapter 6.12.

9.8.3 Fastenings

Fastenings shall be designed to withstand static and dynamic stresses in normal conditions of carriage, and for tanks with a volume of 1000 litres or more, meet the minimum stresses as defined in 6.8.2.1.2, 6.8.2.1.11 to 6.8.2.1.16.

9.8.4 Earthing of MEMU vehicles

Tanks, bulk containers and compartments for packages of explosives made of metal or of fibre-reinforced plastics material **of MEMU vehicles** shall be linked to the chassis by means of at least one good electrical connection. Any metal contact capable of causing electro-chemical corrosion or reacting with the dangerous goods carried in the tanks and bulk containers shall be avoided.

9.8.5 Stability of MEMU vehicles

The overall width of the ground-level bearing surface (distance between the outer points of contact with the ground of the right-hand tyre and the left-hand tyre of the same axle) shall be at least equal to 90% of the height of the centre of gravity of the laden tank-vehicle. In an articulated vehicle the mass on the axles of the load-carrying unit of the laden semi-trailer shall not exceed 60% of the nominal total laden mass of the complete articulated vehicle.

9.8.6 Rear protection of vehicles

A bumper sufficiently resistant to rear impact shall be fitted over the full width of the tank at the rear of the vehicle. There shall be a clearance of at least 100 mm between the rear wall of the tank and the rear of the bumper or the rear wall of built in vehicles (this clearance being measured from the rearmost point of the tank wall or from projecting fittings or accessories in contact with the substance being carried). Vehicles with a tilting shell with rear discharge do not require a bumper if

the rear fittings of the shell are provided with a means of protection which protects the shell in the same way as a bumper.

NOTE: This provision (~~concerning rear protection of vehicles~~) does not apply to MEMU vehicles where the tanks are protected adequately against rear impact by other means, e.g. machinery or piping not containing dangerous goods.

9.8.7 Combustion heaters

9.8.7.1 Combustion heaters shall meet the requirements of 9.2.4.7.1, 9.2.4.7.2, 9.2.4.7.5, 9.2.4.7.6 and the following:

- (a) The switch may be installed outside the driver's cab;
- ~~(b) The device may [shall] be switched off from outside the MEMU compartment;~~
and
(((need for clarification)))
- (c) It is not necessary to prove that the heat exchanger is resistant to the reduced afterrunning cycle.

9.8.7.2 No fuel tanks, power sources, combustion air or heating air intakes as well as exhaust tube outlets required for the operation of the combustion heater shall be installed in the compartment of MEMUs with built in tanks. It shall be ensured that the heating air outlet cannot be blocked. The temperature to which any equipment is heated shall not exceed 50 °C. Heating devices installed inside the compartments shall be designed so as to prevent the ignition of any explosive atmosphere under operating conditions.

[9.8.8 Additional safety requirements

9.8.8.1 MEMU vehicles shall be equipped with automatic fire extinguisher systems for the engine.

~~9.8.8.2 MEMU vehicles shall be equipped with an effective tyre pressure monitoring system on all wheels that gives the driver an automatic warning when the tyre pressure is 25 percent or more below the placard pressure for any tyre. [Existing systems not developed enough to be introduced as requirements at this stage.]~~

9.8.8.3 Protection of the load by metal thermal shields against tyre fire shall be provided.]

- - - - -