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Working Party on the Transport
of Dangerous Goods

REPORT OF THE WORKING PARTY ON ITS SIXTY-SIXTH SESSION
(3-7 May 1999)

Addendum 1

Consolidated text of Parts 8 and 9 after the first reading

Note: In view of the discussions at the session of the Working Party and at that of the subsequent joint meeting (25-28 May 1999), the secretariat renumbered Parts 12 and 13 as Parts 8 and 9.

PART 8

**REQUIREMENTS FOR VEHICLE CREWS, EQUIPMENT,
OPERATION AND DOCUMENTATION**

CHAPTER 8.1

GENERAL REQUIREMENTS CONCERNING TRANSPORT UNITS
AND EQUIPMENT ON BOARD

8.1.1 **Transport units**

A transport unit loaded with dangerous goods may in no case include more than one trailer (or semi-trailer) [10 204 (1)].

8.1.2 **Documents to be carried on the transport unit [10 381]**

8.1.2.1 In addition to the documents required under other regulations, the following documents shall be carried on the transport unit:

- (a) The transport documents prescribed in Annex A, paragraph [5.4.2], covering all the dangerous goods carried and, when appropriate, the container packing certificate prescribed in paragraph [5.4.4];
- (b) The instructions in writing prescribed in section [5.4.3], relating to all the dangerous goods carried [10 381 (2) (c)];
- (c) A copy of the main text of the special agreement(s) concluded in accordance with [paragraphs 1 ... and 10 ...], if transport is carried out on the basis of such agreement(s).

8.1.2.2 Where the provisions of this Annex [or of Annex A]* require the following documents to be drawn up, they shall likewise be carried on the transport unit:

- (a) The certificate of approval referred to in paragraph [9.1.2] for each transport unit or element thereof;
- (b) The driver's training certificate prescribed in paragraph 8.2.1;
- [(c) The permit authorizing the transport operation, as prescribed in paragraphs 5.4.1.2.1 (c), 5.4.1.2.6.1 (j), 2.2.41.1 (13) and 2.2.52.1 (7).]*

* Note by the secretariat: In order to avoid misunderstandings on the interpretation of the paragraph, the secretariat suggests that a reference should be added to the paragraphs in which this permit is required.

- 8.1.2.3 The instructions in writing prescribed in paragraph 5.4.3 shall be kept in a readily identifiable form in the driver's cab. The carrier shall ensure that the drivers concerned understand and are capable of carrying out these instructions properly [10 385 (4) and (6)].
- 8.1.2.4 Instructions in writing which are not applicable to the goods which are on board the vehicle shall be kept separate from pertinent documents in such a way as to prevent confusion [10 385 (5)].
- 8.1.3 Fire-fighting appliances [10 240]**
- 8.1.3.1 Every transport unit carrying dangerous goods shall be equipped with:
- (a) At least one portable fire extinguisher of minimum capacity 2 kg dry powder (or equivalent rating for suitable extinguishants) suitable for fighting a fire in the engine or cab of the transport unit, and such that, if it is used to fight a fire involving the load, it does not aggravate the fire and, if possible, controls it; however, if the vehicle is equipped with a fixed fire extinguisher, automatic or easily brought into action for fighting a fire in the engine, the portable extinguisher need not be suitable for fighting a fire in the engine;
 - (b) In addition to the equipment prescribed under (a) above, at least one portable fire extinguisher of minimum capacity 6 kg dry powder (or equivalent rating for suitable extinguishants) suitable for fighting a tyre/brake fire or one involving the load, and such that, if it is used to fight a fire in the engine or cab of the transport unit, it does not aggravate the fire. Motor vehicles with a permissible maximum laden weight of 3.5 tons or less may be equipped with a portable fire extinguisher of a minimum capacity of 2 kg of powder.
- 8.1.3.2 The extinguishing agents contained in the fire extinguishers with which a transport unit is equipped shall be such that they are not liable to release toxic gases into the driver's cab or under the influence of the heat of the fire.
- 8.1.3.3 The portable fire extinguishers conforming to the provisions of paragraph 8.1.3.1 above shall be fitted with a seal verifying that they have not been used. In addition, they shall bear a mark of compliance with a standard recognized by a competent authority and an inscription indicating the date when they should next be inspected.

8.1.4

Miscellaneous equipment [10 260]

Every transport unit carrying dangerous goods shall be equipped with:

- (a) For each vehicle, at least one scotch of a size suited to the weight of the vehicle and to the diameter of the wheels;
- (b) The necessary equipment to take the general actions referred to in the safety instructions set out in paragraph 5.4.3, in particular:
 - Two self-standing warning signs (e.g. reflective cones or triangles or flashing amber lights which are independent from the electrical equipment of the vehicle);
 - A suitable warning vest or warning clothing (e.g. as described in European Standard EN 471) for each member of the vehicle crew;
 - A pocket lamp (see also 8.3.4) for each member of the vehicle crew.
- (c) The necessary equipment to take the additional and special actions referred to in the safety instructions in writing set out in paragraph [5.4.3].

CHAPTER 8.2

REQUIREMENTS CONCERNING THE TRAINING OF THE VEHICLE CREW

8.2.1 General requirements concerning the training of drivers [10 315, 11 315 and 71 315]

- 8.2.1.1 Drivers of vehicles with a permissible maximum weight exceeding 3.5 tonnes carrying dangerous goods, drivers of vehicles referred to in paragraph 8.2.1.3 and drivers of other vehicles referred to in paragraph 8.2.1.4 shall hold a certificate issued by the competent authority or by any organization recognized by that authority stating that they have participated in a training course and passed an examination on the particular requirements that have to be met during carriage of dangerous goods.
- 8.2.1.2 Drivers of vehicles specified in paragraph 8.2.1.1 shall attend a basic training course. Training shall be given in the form of a course approved by the competent authority. Its main objectives are to make drivers aware of hazards arising in the carriage of dangerous goods and to give them basic information indispensable for minimizing the likelihood of an incident taking place and, if it does, to enable them to take measures which may prove necessary for their own safety and that of the public and the environment, for limiting the effects of an incident. This training, which shall include individual practical exercises, shall act as the basis of training for all categories of drivers covering at least the subjects defined in 8.2.2.3.3.
- 8.2.1.3 Drivers of vehicles carrying dangerous goods in fixed tanks or demountable tanks with a capacity exceeding 1,000 litres, drivers of battery-vehicles with a total capacity exceeding 1,000 litres and drivers of vehicles carrying dangerous goods in tank-containers with an individual capacity exceeding 3,000 litres on a transport unit, shall attend a specialization training course for transport in tanks covering at least the subjects defined in 8.2.2.3.3.
- 8.2.1.4 Irrespective of the permissible maximum weight of the vehicle, drivers of vehicles carrying substances or articles of Class 1 (see special provision S01 in Chapter 8.5) or certain radioactive material (see special provisions 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 [240 104 or 240 105].
- 8.2.1.5 By means of appropriate endorsements on his certificate made every five years by the competent authority or by any organization recognized by that authority, a vehicle driver shall be able to show that he has in the year before the date of expiry of his certificate completed a refresher training course and has passed corresponding examinations.

The new period of validity shall begin with the date of expiry of the certificate.

- 8.2.1.6 Initial or refresher basic training courses and initial or refresher specialization training courses may be given in the form of comprehensive courses, conducted integrally, on the same occasion and by the same training organization.
- 8.2.1.7 Initial training courses, refresher courses, practical exercises, examinations and the role of competent authorities shall comply with the provisions of section 8.2.2 [Appendix B.4].
- 8.2.1.8 All training certificates conforming to the requirements of this section and issued in accordance with the model shown in 8.2.2.8.3 by the competent authority of a Contracting Party or by any organization recognized by that authority shall be accepted during their period of validity by the competent authorities of other Contracting Parties.
- 8.2.1.9 The certificate shall be prepared in the language or one of the languages of the country of the competent authority which issued the certificate or recognized the issuing organization and, if this language is not English, French or German, also in English, French or German, except where otherwise provided by agreements concluded between the countries concerned with the transport operation.
- 8.2.2 Special requirements concerning the training of drivers [Appendix B.4]**
- 8.2.2.1 The necessary knowledge and skills shall be imparted by training covering theoretical courses and practical exercises. The knowledge shall be tested in an examination [240 100 (2)].
- 8.2.2.2 The training provider shall ensure that the training instructors have a good knowledge of, and take into consideration, recent developments in regulations and training requirements relating to the transport of dangerous goods. The training shall be practice-related. The training programme shall conform with the approval, on the subjects set out in paragraphs 8.2.2.3.2 to 8.2.2.3.5 [240 102 to 240 105]. The initial training and refresher training shall also include individual practical exercises (see 8.2.2.4.5 [240 106]) [240 300].
- 8.2.2.3 Structure of training [240 101 to 240 105]**
- 8.2.2.3.1 Initial and refresher training shall be given in the form of a basic course and, when applicable, specialization courses.
- 8.2.2.3.2 Subjects to be covered by the basic course will be, at least:

- (a) General requirements governing the carriage of dangerous goods;
- (b) Main types of hazard;
- (c) Information on environmental protection in the control of the transfer of wastes;
- (d) Preventive and safety measures appropriate to the various types of hazard;
- (e) What to do after an accident (first aid, road safety, basic knowledge about the use of protective equipment, etc.);
- (f) Labelling and marking to indicate danger;
- (g) What a driver should and should not do during the carriage of dangerous goods;
- (h) Purpose and the method of operation of technical equipment on vehicles;
- (i) Prohibitions on mixed loading in the same vehicle or container;
- (j) Precautions to be taken during loading and unloading of dangerous goods;
- (k) General information concerning civil liability;
- (l) Information on multimodal transport operations;
- (m) Handling and stowage of packages.

8.2.2.3.3

Special subjects to be covered by the specialization course for transport in tanks shall be, at least:

- (a) Behaviour of vehicles on the road, including movements of the load;
- (b) Specific requirements of the vehicles;
- (c) General theoretical knowledge of the various and different loading and discharge systems;
- (d) Specific additional provisions applicable to the use of those vehicles (certificates of approval, approval marking, marking and labelling, etc.).

8.2.2.3.4

Special subjects to be covered by the specialization course for the transport of substances and articles of Class 1 shall be, at least:

- (a) Specific hazards related to explosive and pyrotechnical substances and articles;
- (b) Specific requirements concerning mixed loading of substances and articles of Class 1.

8.2.2.3.5 Special subjects to be covered by the specialization course for the transport of radioactive material of Class 7 shall be, at least:

- (a) Specific hazards related to ionizing radiation;
- (b) Specific requirements concerning packing, handling, mixed loading and stowage of radioactive material;
- (c) Special measures to be taken in the event of an accident involving radioactive material.

8.2.2.4 Initial training programme [240 106]

8.2.2.4.1 The minimum duration of the theoretical element of each initial course or part of the comprehensive course shall be as follows:

Basic course	18 teaching units <u>1</u> /
Specialization course for transport in tanks	12 teaching units <u>1</u> /
Specialization course for transport of substances and articles of Class 1	8 teaching units
Specialization course for transport of radioactive material of Class 7	8 teaching units

8.2.2.4.2 The total duration of the comprehensive course may be determined by the competent authority, who shall maintain the duration of the basic course and the specialized course for tanks, but may supplement it with shortened specialized courses for Classes 1 and 7.

8.2.2.4.3 Teaching units are intended to last 45 minutes.

- 8.2.2.4.4 Normally, not more than eight teaching units are permitted on each day of the course.
- 8.2.2.4.5 The individual practical exercises shall take place in connection with the theoretical training, and shall at least cover first aid, fire-fighting and what to do in case of an incident or accident.
- 8.2.2.5 Refresher training programme [240 107]**
- 8.2.2.5.1 Refresher training courses undertaken at regular intervals serve the purpose of bringing the drivers' knowledge up to date; they shall cover new technical, legal and substance-related developments.
- 8.2.2.5.2 Refresher courses shall have been completed before the period referred to in 8.2.1.5 [10 315 (3)] has expired.
- 8.2.2.5.3 The duration of each refresher course shall be of at least one day.
- 8.2.2.5.4 Normally, not more than eight teaching units shall be permitted on each day of the course.
- 8.2.2.6 Approval of training [240 200 to 240 203]**
- 8.2.2.6.1 The training courses shall be subject to approval by the competent authority.
- 8.2.2.6.2 Approval shall only be given with regard to applications submitted in writing.
- 8.2.2.6.3 The following documents shall be attached to the application for approval:
- (a) A detailed training programme specifying the subjects taught and indicating the time schedule and planned teaching methods;
 - (b) Qualifications and fields of activities of the teaching personnel;
 - (c) Information on the premises where the courses take place and on the teaching materials as well as on the facilities for the practical exercises;
 - (d) Conditions of participation in the courses, such as number of participants.
- 8.2.2.6.4 The competent authority shall organize the supervision of training and examinations.
- 8.2.2.6.5 Approval shall be granted in writing by the competent authority subject to the following conditions:

- (a) The training shall be given in conformity with the application documents;
- (b) The competent authority shall be granted the right to send authorized persons to be present at the training courses and examinations;
- (c) The competent authority shall be advised in time of the dates and the places of the individual training courses;
- (d) The approval may be withdrawn if the conditions of approval are not complied with.

8.2.2.6.6 The approval document shall indicate whether the courses concerned are basic or specialization courses, initial or refresher courses.

8.2.2.6.7 If the training body, after a training course has been given approval, intends to make any alterations with respect to such details as were relevant to the approval, it shall seek permission in advance from the competent authority. This applies in particular to changes concerning the training programme.

8.2.2.7 Examinations [240 400 to 240 402]

8.2.2.7.1 Examinations for the initial basic course

8.2.2.7.1.1 After completion of the basic training, including the practical exercises, an examination shall be held on the basic course.

8.2.2.7.1.2 In the examination, the candidate has to prove that he has the knowledge, insight and skill for the practice of professional driver of vehicles carrying dangerous goods as provided in the basic training course.

8.2.2.7.1.3 For this purpose the competent authority, or the examination body approved by that authority, shall prepare a catalogue of questions which refer to the items summarized in 8.2.2.3.2 [240 102]. Questions in the examination shall be drawn from this catalogue. The candidates shall not have any knowledge of the questions selected from the catalogue prior to the examination.

8.2.2.7.1.4 A single examination for comprehensive courses may be held.

8.2.2.7.1.5 Each competent authority shall supervise the modalities of the examination.

8.2.2.7.1.6 The examination shall take the form of a written examination or a combination of a written and oral examination. Each candidate shall be asked at least 25 written questions. The

duration of the examination shall be at least 45 minutes. The questions may be of a varying degree of difficulty and be allocated a different weighting.

8.2.2.7.2 Examinations for initial specialization courses for transport in tanks and for the transport of explosive substances and articles and radioactive material

8.2.2.7.2.1 After having sat the examination on the basic course and after having attended the specialization course for carriage in tanks and/or for the carriage of explosive or radioactive materials, the candidate shall be allowed to take part in the corresponding examination.

8.2.2.7.2.2 This examination shall be held and supervised on the same basis as in 8.2.2.7.1 [240 400].

8.2.2.7.2.3 At least 15 questions shall be asked with respect to each specialization course.

8.2.2.7.3 Examinations for refresher courses

8.2.2.7.3.1 After having undertaken a refresher training course the candidate shall be allowed to take part in the corresponding examination.

8.2.2.7.3.2 The examination shall be held and supervised on the same basis as set out in 8.2.2.7.1 [240 400].

8.2.2.7.3.3 At least 15 questions shall be asked with respect to the refresher training course.

8.2.2.8 Certificate of driver's training

8.2.2.8.1 According to 8.2.1.8 [10 315 (a)], the certificate shall be issued:

(a) After completion of a basic training course, provided the candidate has successfully passed the examination in accordance with 8.2.2.7.1 [240 000];

(b) If applicable, after completion of a specialization course for transport in tanks or transport of explosive substances or articles or of radioactive material, or after having acquired the knowledge referred to in special provisions S01 and S11 in Chapter 8.5 [11 315 (3) or 71 315 (3)], provided the candidate has successfully passed an examination in accordance with 8.2.2.7.2 [240 401].

8.2.2.8.2 The certificate shall be renewed if the candidate furnishes proof of his participation in a refresher course in accordance with 8.2.1.5 [10 315 (3)] and if he has

successfully passed an examination in accordance with 8.2.2.7.3 [240 402].

8.2.2.8.3

The certificate shall have the layout of the model below. It is recommended that the format shall be the same as the European national driving permit, namely A7 (105 mm x 74 mm), or a double sheet that can be folded to that format [Appendix B.6].

Model of certificate

1

ADR – TRAINING CERTIFICATE FOR DRIVERS
OF VEHICLES CARRYING DANGEROUS GOODS
in tanks 1/ other than in tanks 1/

Certificate No.

Distinguishing sign of issuing State

Valid for class(es) 1/ 2/

in tanks	other than in tanks
1	1
2	2
3	3
4.1, 4.2, 4.3	4.1, 4.2, 4.3
5.1, 5.2	5.1, 5.2
6.1, 6.2	6.1, 6.2
7	7
8	8
9	9

until (date) 3/

2

Surname

First name(s)

Date of birth Nationality

Signature of holder

Issued by

Date

Signature 4/

Renewed until

By

Date

Signature 4/

1/ Strike out what does not apply.
2/ For extension to other classes, see page 3.
3/ For renewal, see page 2.

4/ and/or seal (or stamp) of issuing authority.

3

EXTENDED TO CLASS(ES) 5/
in tanks

1

2

3 Date

4.1, 4.2, 4.3

5.1, 5.2 Signature and/or seal or stamp

6.1, 6.2

7

8

9

other than in tanks

1

2

3 Date

4.1, 4.2, 4.3

5.1, 5.2 Signature and/or seal or stamp

6.1, 6.2

7

8

9

4

For national regulations only

5/ Strike out what does not apply.

8.2.3 Training of all persons, other than those drivers referred to in section 8.2.1, involved in the carriage of dangerous goods by road [10 316]

8.2.3.1 Persons whose duties concern the carriage of dangerous goods by road shall have received training in the requirements governing the carriage of such goods appropriate to their responsibilities and duties. This requirement shall apply to individuals such as personnel who are employed by the road vehicle operator or the consignor, personnel who load or unload dangerous goods, personnel in freight forwarding or shipping agencies and drivers not referred to in 8.2.1.

8.2.3.2 The training shall take the following form, appropriate to the responsibility and duties of the individual concerned:

(a) General awareness training

Personnel shall be familiar with the general requirements of the provisions for the carriage of dangerous goods by road.

(b) Function-specific training

Personnel shall receive detailed training, directly commensurate with their duties and responsibilities, in the provisions of the regulations concerning the carriage of dangerous goods by road.

(c) Safety training

Commensurate with the degree or risk of injury or exposure arising from an incident involving the carriage of dangerous goods, including loading and unloading, personnel shall receive training covering the hazards and dangers presented by dangerous goods.

The training provided shall aim to make personnel aware of the safe handling and emergency response procedures, together with an awareness of the requirements of other modes of transport, where the carriage of dangerous goods will involve a multimodal transport operation.

8.2.3.3 Details of all training undertaken shall be kept by both the employer and the employee and shall be verified upon commencing any new employment. The training of personnel involved in the carriage of dangerous goods by road shall be periodically supplemented with refresher training to take account of changes in regulations.

CHAPTER 8.3

MISCELLANEOUS REQUIREMENTS TO BE COMPLIED WITH BY THE VEHICLE CREW

8.3.1 Passengers

Apart from members of the vehicle crew, no passengers may be carried in transport units carrying dangerous goods [10 325].

8.3.2 Use of fire-fighting appliances

The crew of the vehicle must know how to use the fire-fighting appliances [10 340].

8.3.3 Prohibition on opening packages

A driver or a driver's assistant may not open a package containing dangerous goods [10 414 (3)].

8.3.4 Portable lighting apparatus

A vehicle may not be entered by persons carrying lighting apparatus comprising a flame. In addition, the lighting apparatus used shall not exhibit any metal surface liable to produce sparks [10 353 (1)].

8.3.5 Prohibition on smoking

Smoking shall be prohibited during handling operations in the vicinity of vehicles and inside the vehicles [10 416].

8.3.6 Running the engine during loading or unloading

Except where the engine has to be used to drive the pumps or other appliances for loading or unloading the vehicle and the laws of the country in which the vehicle is operating permit such use, the engine shall be shut off during loading and unloading operations [10 431].

8.3.7 Use of the parking brake

No transport unit carrying dangerous goods may be parked without the parking brakes being applied [10 503].

8.3.8

Parking of a vehicle constituting a special danger

If the nature of the dangerous goods carried in the parked vehicle constitutes a source of special danger to road-users (e.g. in the event of substances dangerous to pedestrians, animals or vehicles spilling over the road) and the crew of the vehicle is unable to eliminate the danger quickly, the driver shall alert the nearest competent authorities, or cause them to be alerted, immediately. He shall also, where necessary, take the measures prescribed in the instructions in writing (see 8.1.2.1 (b)) [10 507].

CHAPTER 8.4

REQUIREMENTS CONCERNING THE SUPERVISION OF VEHICLES [10 321]

Vehicles carrying dangerous goods in the quantities shown in special provisions S01 (6) and [S14–S21] of Chapter 8.5 for a given substance according to column [...] of table A of Chapter 3.2 shall be supervised or alternatively may be parked, unsupervised, in a secure depot or secure factory premises. If such facilities are not available, the vehicle, after having been properly secured, may be parked in an isolated position meeting the requirements of paragraphs (i), (ii) or (iii) below:

- (i) A vehicle park supervised by an attendant who has been notified of the nature of the load and the whereabouts of the driver;
- (ii) A public or private vehicle park where the vehicle is not likely to suffer damage from other vehicles; or
- (iii) A suitable open space separated from the public highway and from dwellings, where the public does not normally pass or assemble.

The parking facilities permitted in paragraph (ii) shall be used only if those described in paragraph (i) are not available, and those described in paragraph (iii) may be used only if facilities described in paragraphs (i) and (ii) are not available.

CHAPTER 8.5

**ADDITIONAL REQUIREMENTS RELATING TO PARTICULAR
CLASSES OR SUBSTANCES**

In addition to the requirements of Chapters 8.1 to 8.4, when reference is made to them in column [...] of table A of Chapter 3.2, the following requirements shall apply to the carriage of the substances or articles concerned. In the event of conflict with the requirements of Chapters 8.1 to 8.4, the requirements of this Chapter shall take precedence.

S01: Additional requirements concerning the carriage of explosive substances and articles (Class 1)

(1) Special training of drivers [11 315]

- (a) Irrespective of the permissible maximum weight of the vehicle, the requirements of section 8.2.1 shall apply to drivers of vehicles carrying substances or articles of Class 1;
- (b) Drivers of vehicles carrying substances or articles of Class 1 shall attend a specialized training course covering at least the subjects defined in 8.2.2.3.4;
- (c) If, according to other regulations applicable in the country of a Contracting Party, a driver has followed equivalent training under a different regime or for a different purpose, covering the subjects referred to in paragraph (b), the specialization course may be totally or partially dispensed with.

(2) Approved official [11 311]

If the national regulations so provide, the competent authority of a country party to ADR may require an approved official to be carried in the vehicle at the carrier's expense.

(3) Prohibition of fire and naked flame [11 354]

The use of fire or naked flame shall be prohibited on vehicles carrying substances and articles of Class 1, in their vicinity and during the loading and unloading of these substances and articles.

(4) Halts for operational requirements [11 509]

When vehicles carrying substances and articles of Class 1 are obliged to stop for loading or unloading operations in a public place, a distance of at least 50 m shall be maintained between the stationary vehicles.

(5) Convoys [11 520]

- (a) When vehicles carrying substances and articles of Class 1 travel in convoy, a distance of not less than 50 m shall be maintained between each transport unit and the next.
- (b) The competent authority may lay down rules for the order or composition of convoys.

(6) Supervision of vehicles [11 321]

The requirements of Chapter 8.4 shall be applicable only when substances and articles of Class 1 having a total mass of explosive substance of more than 50 kg are carried in a vehicle.

In addition, these substances and articles shall be supervised at all times in order to prevent any malicious act and to alert the driver and the competent authorities in the event of loss or fire.

Empty packagings are exempted.

S02: Additional requirements concerning the carriage of flammable liquids or gases*

(1) Portable lamps

Closed vehicles carrying liquids having a flashpoint of 61° C or below or flammable substances or article of Class 2, shall not be entered by persons carrying lighting apparatus other than portable lamps so designed and constructed that they cannot ignite any flammable vapours or gases which may have penetrated into the interior of the vehicle [10 353 (2)].

[Applicability: all substances of Class 3 or substances with a Class 3 subsidiary risk; Class 2]

(2) Operation of combustion heaters during loading or unloading

The operation of combustion heaters of vehicles of type FL (see Part 9) is forbidden during loading and unloading and at loading sites [10 300 (2)].

(3) Precautions against electrostatic charges

In the case of vehicles of type FL, a good electrical connection from the vehicle chassis to earth shall be established before tanks are filled or emptied. In addition, the rate of filling shall be limited [10 417].

* Note by the secretariat: Are these requirements applicable to liquids of Classes 4.1, 4.2, 4.3 and 5.2? [No, according to WP.15.]

S03: Special provisions concerning the carriage of infectious substances

For transport units carrying dangerous substances of Class 6.2, the requirements of 8.1.3.1 (b), 8.1.3.3 and section 8.3.4 shall not apply [marginals 62 240 and 62 353].

S04: Additional requirements concerning carriage under controlled temperatures

Maintenance of the prescribed temperature is essential for safe carriage. In general, there shall be:

- thorough inspection of the transport unit prior to loading;
- instructions to the carrier about the operation of the refrigeration system, including a list of the suppliers of coolant available en route;
- procedures to be followed in the event of loss of control;
- regular monitoring of operating temperatures; and
- availability of a back-up refrigeration system or spare parts.

[41 105 (4), 52 105 (2)]

The temperature of the air space within the transport unit shall be measured by two independent sensors and the output shall be so recorded that temperature changes are readily detectable.

The temperature shall be checked every four to six hours and logged.

[41 105 (5); 52 105 (3), 2nd and 3rd sentences]

If the control temperature is exceeded during carriage, an alert procedure shall be initiated involving any necessary repairs to the refrigeration equipment or an increase in the cooling capacity (e.g. by adding liquid or solid coolant). There shall also be frequent checking of the temperature and preparations for implementation of the emergency procedures. If the emergency temperature (see also paragraphs [2.2.41.1 (19) and 2.2.52.1 (15)-(18)]) is reached, the emergency procedures shall be set in operation.

[41 105 (6), 52 105 (4)]

[Applicability: Class 4.1, 41° to 50°; Class 5.2, 11° to 20°]

S05: Special provisions common to the carriage of radioactive material of Class 7 in excepted packages (UN Nos. 2908, 2909, 2910 and 2911) only

The requirements of the instructions in writing of 8.1.2.1 (b) and sections 8.2.1, 8.3.1, 8.3.4 and 8.3.8 shall not apply.

S06: Special provisions common to the carriage of radioactive material of Class 7 other than in excepted packages

The provisions of section 8.3.1 shall not apply to vehicles carrying only packages, overpacks or containers bearing category I-WHITE labels (UN, para. 7.2.3.1.3; IAEA, para. 573).

The provisions of section 8.3.4 shall not apply provided there is no subsidiary risk [Class 7, other than excepted packages] [marginal 71 353].

Other additional requirements or special provisions

S07: When gases or articles designated with letters T, TO, TF, TC, TFC, TOC are being carried, each member of the vehicle crew shall be provided with a respiratory protective device enabling them to escape (e.g. escape hood or mask with a combined gas/particle cartridge A1B2E1K1-P2, as described in European standard EN14) [21 260].

S08: When a transport unit is loaded with more than 2,000 kg of these substances, stops for service requirements shall as far as possible not be made near inhabited places or frequented places. A longer stop near such places is permissible only with the consent of the competent authorities.

[Applicability: substances of 33°, 34°, 43° and 44° of Class 4.1 (marginal 41 509);

Class 5.2, 3°, 4°, 13° and 14° (marginal 52 509)]

S09: During the carriage of these substances, stops for service requirements shall as far as possible not be made near inhabited places or frequented places. A longer stop near such places is permissible only with the consent of the competent authorities.

[Class 4.1, 31°, 32°, 41° and 42° - marginal 41 509
Class 5.2, 1°, 2°, 11° and 12° - marginal 52 509
Class 6.1 - marginal 61 509
Class 6.2, 1° and 2° - marginal 62 509]

S10: During the period April to October, when a vehicle is stationary, the packages shall, if the legislation of the country in which the vehicle is halted so requires, be effectively protected against the action of the sun, e.g. by means of sheets placed not less than 20 cm above the load.

[Applicability: UN 1051, UN 1614 - Class 6.1, 1° (marginal 61 515)]

- S11:** (1) Irrespective of the permissible maximum weight of the vehicle, the requirements of section 8.2.1 shall apply.
- (2) Drivers shall attend a specialized training course covering at least the subjects defined in 8.2.2.3.5.
- (3) If, according to other regulations applicable in the country of a Contracting Party, a driver has followed equivalent training under a different regime or for a different purpose covering the subjects referred to in paragraph (2), the specialization course may be totally or partially dispensed with [marginal 71 315, Class 7, UN Nos. other than 2908, 2909, 2910, 2911].

S12: If the total number of packages containing radioactive material carried does not exceed 10, and the sum of the transport indices does not exceed 3, special provision S11 need not be applied. However, drivers shall then receive appropriate training, commensurate with and appropriate to their duties, which provides them with an awareness of the radiation hazards involved in the carriage of radioactive material. Such awareness training shall be confirmed by a certificate provided by their employer.

S13: When a consignment cannot be delivered, it shall be placed in a safe place; the competent authority should be informed as soon as possible and requested for instructions on how to proceed [UN, para. 7.1.6.6.1; IAEA, para. 582].

[Class 7, all entries]

S14: The provisions of Chapter 8.4 concerning the supervision of vehicles shall apply when the total mass of these substances in the vehicle exceeds 100 kg [Class 4.1, 26°] [marginal 41 321]

S15: The provisions of Chapter 8.4 concerning the supervision of vehicles shall apply to substances of hazard group 4 whatever their mass and to substances of hazard group 3 when the total mass of such substances in the vehicle exceeds 100 kg. However, the provisions of Chapter 8.4 need not be applied when the loaded compartment is locked and the packages carried are otherwise protected against any illicit unloading.

[marginal 62 321]

S16: The provisions of Chapter 8.4 concerning the supervision of vehicles shall apply when the total mass of these substances in the vehicle exceeds 500 kg.

[Class 4.1, 41° and 42°, Class 4.2, 11° and 12°]

In addition, vehicles carrying more than 500 kg of these substances shall be subject at all times to supervision to prevent any malicious act and to alert the driver and competent authorities in the event of loss or fire.

[marginals 41 321, 52 321]

- S17:** The provisions of Chapter 8.4 concerning the supervision of vehicles shall apply when the total mass of these substances in the vehicle exceeds 1,000 kg.
- [Class 2, 1°T, TF, TC, TO, TFC, TOC; 2°T, TF, TC, TO, TFC, TOC; 3°F
Class 4.1, 21° to 25°, 31°, 32°, 43° and 44°
Class 5.2, 1°, 2°, 13° and 14°
Class 6.1, 1° to 5° and PG I
Class 8, bromine (14°)
Class 9, 13°(b)]
- [marginals 21 321, 41 321, 52 321, 61 321, 81 321, 91 321]
- S18:** The provisions of Chapter 8.4 concerning the supervision of vehicles shall apply when the total mass of such substances in the vehicle exceeds 2,000 kg.
- [Class 4.1, 33°, 44°, 45° and 46°
Class 5.2, 3°, 4°, 15° and 16°]
- [marginals 41 321 and 52 321]
- S19:** The provisions of Chapter 8.4 concerning the supervision of vehicles shall apply when the total mass of such substances in the vehicle exceeds 5,000 kg.
- [Class 3, 6°, 11° to 19°, 27° and 28° and toxic or highly toxic substances of 41°
Class 4.1, 35°, 36°, 47° and 48°
Class 5.2, 5°, 6°, 17° and 18°
Class 6.1, PG II
Class 9, PG III]
- [marginals 31 321, 41 321, 52 321, 61 321 and 91 321]
- S20:** The provisions of Chapter 8.4 concerning the supervision of vehicles shall apply when the total mass of these substances in the vehicle exceeds 10,000 kg.
- [Class 2, 2°F, 3°A and 3°O
Class 3, 1° to 5° (a) and (b), 7° (b), 21° to 26° and substances with a slight risk of toxicity of 41°
Class 4.2, PG I and 22°
Class 6.1, PG I
Class 9, PG I and 5°]
- [marginals 21 321, 31 321, 42 321, 61 321 and 91 321]
- S21:** The provisions of Chapter 8.4 concerning the supervision of vehicles shall apply to all material, in whatever mass. In addition, these goods shall be subject at all times to supervision to prevent any malicious act and to alert the driver and the competent authorities in the event of loss or fire. However, the provisions of Chapter 8.4 need not be applied where:

- (a) The loaded compartment is locked and the packages carried are otherwise protected against illicit unloading; and
- (b) The dose rate does not exceed 5FSv/h (0.5 mrem/h) at any accessible point on the outer surface of the vehicle.

[Class 7, all entries] [marginal 71 321]

PART 9

**REQUIREMENTS CONCERNING THE CONSTRUCTION AND
APPROVAL OF VEHICLES**

CHAPTER 9.1

GENERAL REQUIREMENTS CONCERNING THE CONSTRUCTION
AND APPROVAL OF VEHICLES

9.1.1 General provisions [220 301]

9.1.1.1 For the purposes of Part 9:

"ECE Regulation": means a regulation annexed to the Agreement concerning the adoption of uniform technical prescriptions for wheeled vehicles and the conditions for reciprocal recognition of approvals granted on the basis of these prescriptions (1958 Agreement, as amended);

["Vehicle": means a chassis-cab vehicle, a tractor for semi-trailer or a trailer-chassis or a trailer with a self-supporting body intended for the transport of dangerous goods;]

"Base vehicle": means an incomplete vehicle meeting the requirements of Chapter 9.2;

"Vehicle type": means vehicles which do not differ essentially with regard to the constructional features specified in Chapter 9.2;

"EX/II" or
"EX/III" vehicle: means a vehicle intended for the carriage of explosive substances and articles (Class 1);

"FL vehicle": means a vehicle intended for the carriage of liquids having a flash-point of 61E C or less (with the exception of diesel fuel complying with standard EN 590: 1993, gas oil, and heating oil (light) - UN number 1202 - with a flashpoint as specified in standard EN 590: 1993) or flammable gases, in tank-containers of more than 3,000 litres capacity, fixed tanks or demountable tanks or a battery-vehicle of more than 1,000 litres capacity intended for the carriage of flammable gases;

"OX vehicle": means a vehicle intended for the carriage of hydrogen peroxide, stabilized or hydrogen peroxide, aqueous solution stabilized with more than 60 per cent hydrogen peroxide (Class 5.1, UN number 2015) in tank-containers of more than 3,000 litres capacity, fixed tanks or demountable tanks;

"AT vehicle": means a vehicle, other than that of type FL or OX, intended for the carriage of dangerous goods in tank-containers of more than 3,000 litres capacity, fixed tanks or demountable tanks or a battery vehicle of more than 1,000 litres capacity other than a vehicle of type FL;

"Other": means a vehicle other than an EX/II, EX/III, OX, FL or AT vehicle.

9.1.1.2 Vehicles carrying dangerous goods shall comply with the construction requirements for which this Part provides.

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

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

9.1.2.1 EX/II, EX/III, FL, OX and AT vehicles shall be subject to an annual technical inspection in their country of registration to make sure that they conform to the relevant provisions of this Part, and to the general safety regulations (concerning brakes, lighting, etc.) in force in their country of registration; if these vehicles are trailers or semi-trailers coupled behind a drawing vehicle, the drawing vehicle shall be subject to technical inspection for the same purposes.

[10 282 (1)]

[10 221 (5)] When vehicles are required to be fitted with an endurance braking system, the manufacturer shall issue a declaration of conformity with subsection 9.2.3.3. This declaration shall be presented at the first technical inspection.

Note: For transitional provisions, see also [marginal 10 605] [paragraph 10...].

9.1.2.1.2 Conformity of EX/II, EX/III, FL, OX and AT vehicles with the requirements of this Part is subject to a certificate of approval issued by the competent authority of the country of registration for each vehicle whose inspection yields satisfactory results. It shall be drawn up in the language or one of the languages of the country issuing it, and also, if that language is not English, French, or German, in English, French or German, unless agreements concluded between the countries concerned in the transport operation provide otherwise. It shall conform to the model shown in 9.1.2.1.5 [Appendix B.3] [10 282 (2)].

9.1.2.1.3 A certificate of approval issued by the competent authorities of one Contracting Party for a vehicle registered in the territory of that Contracting Party shall be accepted, so long as its validity continues, by the competent authorities of the other Contracting Parties.

9.1.2.1.4 The validity of a certificate of approval shall expire not later than one year after the date of the technical inspection of the vehicle preceding the issue of the certificate. The next approval term shall, however, be related to the last nominal expiry date, if the technical inspection is performed within one month before or after that date. However, in the case of tanks subject to

compulsory periodic inspection this provision shall not mean that tightness (leakproofness) tests, hydraulic pressure tests or internal inspections of tanks have to be carried out at intervals shorter than those laid down in Chapters 6.8 and 6.9.

The certificate of approval shall have the same layout as the model below. Its dimensions shall be 210 mm x 297 mm (format A4). Both front and back shall be used. The colour shall be white, with a pink diagonal stripe. The approval certificate for a vacuum-operated waste tank-vehicle shall bear the following remark: "vacuum-operated waste tank-vehicle" [Appendix B.3].

9.1.2.2 Type approval

9.1.2.2.1 [10 281] At the request of the manufacturer or his duly accredited representative, base vehicles of new motor vehicles and their trailers which are subject to approval according to paragraph 9.1.2.1.2 above may be type approved by a competent authority in accordance with ECE Regulation No. 105 2/ provided that it has been amended so that its requirements correspond to those of Chapter 9.2 of this Part. 3/ This type approval, granted by one Contracting Party, shall be accepted by the other Contracting Parties as ensuring the conformity of the base vehicle when the approval of the complete vehicle is obtained, provided that no modification of the base vehicle alters its validity.

9.1.2.2.2 When the base vehicle has been type-approved, compliance with paragraph 9.2.4.7.2 and, for EX/II and EX/III vehicles, with paragraphs 9.2.4.4 and 9.2.4.5, shall be verified on the completed vehicle.

**CERTIFICATE OF APPROVAL FOR VEHICLES
CARRYING CERTAIN DANGEROUS GOODS**

NOTE 1: The dimensions of the certificate shall be 210 x 297 mm (format A4). Both front and back shall be used. The colour shall be white, with a pink diagonal stripe.

NOTE 2: The approval certificate for a vacuum-operated waste tank-vehicle shall bear the following remark: "vacuum-operated waste tank-vehicle".

**CERTIFICATE OF APPROVAL FOR VEHICLES
CARRYING CERTAIN DANGEROUS GOODS**

1. Certificate No.
testifying that the vehicle specified below fulfils the conditions prescribed by the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) for its acceptance for the international carriage of dangerous goods by road.
2. Manufacturer and type of vehicle
.....
3. Registration number (if any) and Chassis number
.....
4. Name and business address of carrier, operator or owner
.....
.....
5. The vehicle specified above has undergone the inspections prescribed in ADR, Annex B, marginals 10 282/10 283* and fulfils the conditions required for its acceptance for the international carriage by road of dangerous goods of the following classes, item numbers and letters (where necessary the name of the substances or the substance identification number shall be given):
6. Remarks
.....
.....

* Delete if not applicable.

7. Valid until Stamp of issuing service at:

Date:

Signature:

8. Validity extended until Stamp of issuing service at:

Date:

Signature:

9. Validity extended until Stamp of issuing service at:

Date:

Signature:

10. Validity extended until Stamp of issuing service at:

Date:

Signature:

11. Validity extended until Stamp of issuing service at:

Date:

Signature:

NOTE 1: Every vehicle shall be the subject of a separate certificate unless otherwise required, e.g. for Class 1.

NOTE 2: This certificate must be returned to the issuing service when the vehicle is taken out of service; if the vehicle is transferred to another carrier, operator or owner, as specified in item 4; on expiry of the validity of the certificate; and if there is a material change in one or more essential characteristics of the vehicle.

CHAPTER 9.2

**REQUIREMENTS CONCERNING THE CONSTRUCTION
OF BASE VEHICLES**

9.2.1 Base vehicles of motor vehicles and their trailers intended
[220 500] for the carriage of dangerous goods shall comply with the
 requirements of this Chapter according to the table below.

TECHNICAL SPECIFICATIONS		VEHICLE					OTHER
		EX/II	EX/III	AT	FL	OX	
9.2.2	ELECTRICAL EQUIPMENT						
9.2.2.2	– wiring		X	X a/	X	X	
9.2.2.3	– battery master switch		X		X		
9.2.2.4	– batteries	X	X		X		
9.2.2.5	– tachographs		X		X		
9.2.2.6	– permanently energized circuits		X		X		
9.2.2.7	– electrical installations at rear of cab		X		X		
9.2.3	BRAKING	X	X	X	X	X	X h/
9.2.3.1	– special provisions	X	X	X	X	X	X h/
9.2.3.2	– anti-lock		X c/ e/	X c/ e/	X c/ e/	X c/ e/	
9.2.3.3	– endurance		X d/ e/	X d/ e/	X d/ e/	X d/ e/	
9.2.3.4.1	– safety braking system	X					
9.2.3.4.2	– safety braking system		X				
9.2.4	FIRE RISKS						
9.2.4.2.1	– cab: materials	X	X				
9.2.4.2.2	– cab: thermal shield					X	
9.2.4.3	– fuel tanks	X	X		X	X	
9.2.4.4	– engine	X	X		X	X	
9.2.4.5	– exhaust system	X	X	TRANS/WP.15/157/Ad	X		
9.2.4.6	– endurance braking		X	d.1	X	X	
9.2.4.7.1	– combustion heaters	X f/	X f/	page 33	X f/	X f/	
9.2.4.7.2							
9.2.4.7.5							
9.2.4.7.3	– combustion heaters				X f/		
9.2.4.7.4							
9.2.4.7.6	– combustion heaters	X	X				
9.2.5	SPEED LIMITATION	X a/	X a/	X a/	X a/	X a/	X a/
9.2.6	COUPLING DEVICE	X	X				

Notes to table

a/ In the case of AT vehicles carrying tank-containers, this requirement shall apply only to vehicles first registered after 1 July 1999.

Applicable to all AT vehicles carrying tank-containers as from 1 January 2005 [10 605].

b/ Applicable to all vehicles first registered after 30 June 1997 [10 221 (4)].

c/ Applicable to vehicles first registered after 30 June 1993 in respect of motor vehicles (tractors and rigid vehicles) having a maximum mass exceeding 16 tonnes and trailers (i.e. full trailers, semi-trailers and centre-axle trailers) with a maximum mass exceeding 10 tonnes.

Applicable to motor vehicles authorized to tow trailers with a maximum mass exceeding 10 tonnes, first registered after 30 June 1995 [10 221 (1)].

d/ Applicable to all vehicles, except for transport units comprising a motor vehicle and a trailer, in which case the requirement shall apply only to motor vehicles first registered after 30 June 1993 [10 221 (2)].

e/ Mandatory compliance for all vehicles as from 1 January 2010 [10 221 (3)].

f/ Applicable to motor vehicles equipped after 30 June 1999. Mandatory compliance by 1 January 2010 for vehicles equipped before 1 July 1999 [10 222 (3)].

g/ Applicable to motor vehicles with a maximum mass of 12 tonnes registered after 31 December 1987 [10 261 (2)].

9.2.2 Electrical equipment

9.2.2.1 General provisions

[220 510] The electrical installation as a whole shall meet the provisions of subsections 9.2.2.2 to 9.2.2.6 in accordance with the table of section 9.2.1.

9.2.2.2 Wiring [250 511]

9.2.2.2.1 The size of conductors shall be large enough to avoid overheating. Conductors shall be adequately insulated. All circuits shall be protected by fuses or automatic circuit breakers, except for the following:

- from the battery to the cold start and stopping systems of the engine
- from the battery to the alternator
- from the alternator to the fuse or circuit breaker box
- from the battery to the starter motor
- from the battery to the power control housing of the endurance braking system (see subsection 9.2.3.3), if this system is electrical or electromagnetic
- from the battery to the electrical lifting mechanism for lifting the bogie axle.

The above unprotected circuits shall be as short as possible.

9.2.2.2.2 Cables shall be securely fastened and positioned in such a way that the conductors are adequately protected against mechanical and thermal stresses.

9.2.2.3 Battery master switch [220 512] [amended in accordance with TRANS/WP.15/155, annex].

9.2.2.3.1 A switch for breaking the electrical circuits shall be placed as close to the battery as possible.

9.2.2.3.2 The control device for the switch shall be installed in the driver's cab. It shall be readily accessible to the driver and be distinctively marked. It shall be protected against inadvertent operation by either adding a protective cover, by using a dual movement control device or by other suitable means.

9.2.2.3.3 The switch shall have a casing with protection degree IP 65 in accordance with IEC Standard 529.

- 9.2.2.3.4 The cable connections on the switch shall have protection degree IP 54. However, this does not apply if these connections are contained in a housing which may be the battery box. In this case it is sufficient to insulate the connections against short circuits, for example with a rubber cap.
- 9.2.2.4 Batteries
- [220 513] The battery terminals shall be electrically insulated or covered by the insulating battery box cover. If the batteries are not located under the engine bonnet, they shall be fitted in a vented box.
- 9.2.2.5 Tachographs
- [220 514] The electrical supply to the tachograph shall be provided via a safety barrier connected directly to the battery. The tachograph and the safety barrier shall meet the requirements for associated electrical equipment according to European Standard EN 50 020.
- 9.2.2.6 Permanently energized installations
- [220 515] Those parts of the electrical installation, other than the tachograph, which remain energized when the battery master-switch is open, shall be suitable for use in a hazardous area and shall meet the appropriate requirements of European Standard EN 50 014 and one of European Standards EN 50 015 to 50 020 or EN 50 028. The requirements for the relevant gas group according to the product being carried shall be met.
- 9.2.2.7 Provisions concerning that part of the electrical installation situated to the rear of the driver's cab
- [220 516] The whole installation shall be so designed, constructed and protected such that it cannot provoke any ignition or short-circuit under normal conditions of use of vehicles and that these risks can be minimized in the event of an impact or deformation. In particular:
- 9.2.2.7.1 Wiring
- The wiring located to the rear of the driver's cab shall be protected against impact, abrasion and chafing during normal vehicle operation. Examples of appropriate protection are given in figures 1, 2, 3 and 4 below. However, the sensor cables of anti-lock braking devices do not need additional protection.

FIGURES

9.2.2.7.2 Lighting

Lamp bulbs with a screw cap shall not be used.

9.2.2.7.3 Electrical connections

Electrical connections between motor vehicles and trailers shall have a protection degree IP54 in accordance with IEC standard 529 and be designed to prevent accidental disconnection. Examples of appropriate connections are given in ISO 12 098:1994 and ISO 7638:1985.

9.2.3 Braking equipment

9.2.3.1 General provisions

[220 520] In addition to the following technical provisions, to be applied in accordance with the table of section 9.2.1, motor vehicles and trailers intended for use as transport units for dangerous goods shall fulfil all relevant technical requirements of ECE Regulation No. 13 4/ in its latest amended form applicable at the time of the vehicle approval.

9.2.3.2 Anti-lock braking system [220 521]

9.2.3.2.1 Motor vehicles having a maximum mass exceeding 16 tonnes, or authorized to tow a trailer with a maximum mass exceeding 10 tonnes, shall be equipped with an anti-lock braking system of category 1 according to ECE Regulation No. 13, 4/ Annex 13.

9.2.3.2.2 Trailers having a maximum mass exceeding 10 tonnes shall be equipped with an anti-lock braking system of category A according to ECE Regulation No. 13, 4/ Annex 13.

9.2.3.3 Endurance braking system [220 522]

9.2.3.3.1 Endurance braking system means a system intended to stabilize vehicle speed on a long descent, without the use of the service, secondary or parking braking systems.

9.2.3.3.2 Motor vehicles having a maximum mass exceeding 16 tonnes or authorized to tow a trailer with a maximum mass exceeding 10 tonnes shall be fitted with an endurance braking system which complies with the following requirements:

- (a) The endurance braking system may be a single device or a combination of several devices. Each device may have its own control;

- (b) All three endurance braking control options provided for in ECE Regulation No. 13, 4/ shall be permitted, but, in the case of a failure of the anti-lock system, integrated or combined retarders shall be switched off automatically;
- (c) The effectiveness of the endurance braking system shall be controlled by the anti-lock braking system such that the axle(s) braked by the endurance braking system cannot be locked by the endurance braking system at speeds above 15 km/h. However, this provision shall not apply to that part of the braking system constituted by natural engine braking;
- (d) The endurance braking system shall comprise several stages of effectiveness, including a low stage appropriate for the unladen condition. Where the endurance braking system of a motor vehicle is constituted by its engine, the different gear ratios shall be considered to provide the different stages of effectiveness;
- (e) The performance of the endurance braking system must be such that it fulfils the requirements of ECE Regulation No. 13, 4/ Annex 5 (Type II A test), with a laden vehicle mass comprising the laden mass of the motor vehicle and its authorized maximum towed mass but not exceeding a total of 44 tonnes;
- (f) If the motor vehicle does not fulfil the performance requirements for the endurance braking system as defined in paragraph (e) above, it shall at least fulfil the requirements of ECE Regulation No. 13, 4/ Annex 5, and shall be restricted to being coupled only to a trailer fitted with an endurance braking system. Such a motor vehicle must be fitted with a control device for the endurance braking system on the trailer.

9.2.3.3.3 If a trailer is equipped with an endurance braking system it shall fulfil the requirements of ECE Regulation No. 13, 4/ Annex 5, and the provisions of paragraphs 9.2.3.3.2 (a) to (d) above.

9.2.3.4 Emergency braking devices for trailers

9.2.3.4.1 Trailers shall be equipped with an effective system for braking or restraining them if they become detached from the motor vehicle towing them [EX/II, 11 204 (1) (c)].

9.2.3.4.2 Trailers shall be fitted with an effective braking device which acts on all the wheels, is actuated by the drawing vehicle's service-brake control and automatically stops the trailer in the event of breakage of the coupling.

Note: The use of trailers equipped only with an inertia braking system shall be limited to a maximum load of 50 kg net explosive mass [11 204 (2) (c); EX/III].

9.2.4 Prevention of fire risks

9.2.4.1 General provisions [220 530]

The following technical provisions shall apply in accordance with the table of section 9.2.1.

9.2.4.2 Vehicle cab [220 531]

9.2.4.2.1 Only material not readily flammable shall be used in the construction of the driver's cab. This provision will be deemed to be met if, in accordance with the procedure specified in ISO standard 3795:1989, samples of the following cab components have a burn rate not exceeding 100 mm/min: seat cushions, seat backs, safety belts, head lining, opening roofs, armrests, all trim panels including door, front, rear, and side panels, compartment shelves, head restraints, floor coverings, sun visors, curtains, shades, wheel housing covers, engine compartment covers, mattress covers and any other interior materials, including padding and crash-deployed elements, that are designed to absorb energy on contact by occupants in the event of a crash.

9.2.4.2.2 Unless the driver's cab is made of materials which are not readily flammable, a shield made of metal or other suitable material of the same width as the tank shall be fitted at the rear of the cab. Any windows in the rear of the cab or in the shield shall be hermetically closed and made of fire-resistant safety glass with fire-resistant frames. Furthermore, there shall be a clear space of not less than 15 cm between the tank and the cab or the shield.

9.2.4.3 Fuel tanks [220 532]

The fuel tanks for supplying the engine of the vehicle shall meet the following requirements:

- (a) In the event of any leakage, the fuel shall drain to the ground without coming into contact with hot parts of the vehicle or the load.
- (b) Fuel tanks containing petrol shall be equipped with an effective flame trap at the filler opening or with a closure enabling the opening to be kept hermetically sealed.

9.2.4.4 Engine [220 533]

The engine propelling the vehicle shall be so equipped and situated to avoid any danger to the load through heating or ignition. In the case of EX/II and EX/III vehicles the engine shall be of compression-ignition construction and shall be placed forward of the front wall of the load compartment: it may nevertheless be placed under the load compartment, provided this is done in such a way that any excess heat does not constitute a hazard to the load by raising the temperature on the inner surface of the load compartment above 80E C.

9.2.4.5 Exhaust system [220 534]

The exhaust system as well as the exhaust pipes shall be so directed or protected to avoid any danger to the load through heating or ignition. Parts of the exhaust system situated directly below the fuel tank (diesel) shall have a clearance of at least 100 mm or be protected by a thermal shield. The exhaust system of EX/II and EX/III vehicles shall be so constructed and situated that any excess heat shall not constitute a hazard to the load by raising the temperature on the inner surface of the load compartment above 80E C.

9.2.4.6 Vehicle endurance braking [220 535]

Vehicles equipped with endurance braking systems emitting high temperatures placed behind the rear wall of the driver's cab shall be equipped with a thermal shield securely fixed and located between this system and the tank or load so as to avoid any heating, even local, of the tank wall or the load.

In addition, the thermal shield shall protect the braking system against any outflow or leakage, even accidental, of the load. For instance, a protection including a twin-shell shield shall be considered satisfactory.

9.2.4.7 Combustion heaters [220 536]

9.2.4.7.1 [reserved]

9.2.4.7.2 The combustion heaters and their exhaust gas routing shall be designed, located, protected or covered so as to prevent any unacceptable risk of heating or ignition of the load. This requirement shall be considered as fulfilled if the fuel tank and the exhaust system of the appliance conform to provisions similar to those prescribed for fuel tanks and exhaust systems of vehicles in subsections 9.2.4.3 and 9.2.4.5 respectively.

9.2.4.7.3 The combustion heaters shall be put out of operation by at least the following methods:

- (a) Intentional manual switching off from the driver's cabin;
- (b) Stopping of the vehicle engine; in this case the heating device may be restarted manually by the driver;
- (c) Start up of a feed pump on the motor vehicle for the dangerous goods carried.

9.2.4.7.4 Afterrunning is permitted after the combustion heaters have been put out of operation. For the methods of paragraphs 9.2.4.7.3 (b) and (c) above the supply of combustion air shall be interrupted by suitable measures after an afterrunning cycle of not more than 40 seconds. Only heaters shall be used for which proof has been furnished that the heat exchanger is resistant to the reduced afterrunning cycle of 40 seconds for the time of their normal use.

9.2.4.7.5 The combustion heater shall be switched on manually. Programming devices shall be prohibited.

9.2.4.7.6 Combustion heaters with gaseous fuels are not permitted [11 222 (1)].

9.2.5 Speed limitation device [220 540]

Motor vehicles (rigid vehicles and tractors for semi-trailers) with a maximum mass exceeding 12 tonnes, shall be equipped with a speed limitation device according to the provisions of ECE Regulation No. 89. 5/ The set speed V as defined in paragraph 2.1.2 of ECE Regulation No. 89 5/ shall not exceed 85 km/h.

9.2.6 Coupling devices of trailers

Coupling devices of trailers shall comply with ECE Regulation No. 55 6/ or Directive 94/20/EC 7/

CHAPTER 9.3

**ADDITIONAL REQUIREMENTS CONCERNING THE CONSTRUCTION
OF VEHICLE BODIES (EX/II AND EX/III)**

9.3.1 Materials to be used in the construction of vehicle bodies

No materials likely to form dangerous compounds with the explosive substances and articles carried shall be used in the construction of the body [11 210].

9.3.2 Combustion heaters

Combustion heaters shall not be installed in load compartments of EX/II and EX/III vehicles [11 222 (2)].

9.3.3 EX/II vehicles [11 204 (1)]

The vehicles shall be designed, constructed and equipped so that the explosives are protected from external hazards and the weather. They shall be either closed or sheeted. Sheeting shall be resistant to tearing and be of impermeable material, not readily flammable. It shall be tautened so as to cover the vehicle on all sides, with an overlap of not less than 20 cm down the sides of the vehicle, and be kept in position by a lockable device.

The load carrying compartment of closed vehicles shall not have windows and all openings shall have lockable, close-fitting doors or covers.

9.3.4 EX/III vehicles [11 204 (2)]

These vehicles shall be closed. The loading surface, including the front wall, shall be continuous. The insulating and heat resisting properties of the body shall be at least equivalent to those of a partition consisting of a metal outer wall lined with a layer of fire-proofed wood of 10 mm thickness; or the body shall be of a construction which shall ensure that no flame penetration of the wall or hot spots of more than 120E C on the inner wall surface will occur within 15 minutes from the start of a fire resulting from the operation of the vehicle, such as a tyre fire. All the doors shall be capable of being locked. They shall be so placed and constructed as to overlap the joints.

CHAPTER 9.4

**ADDITIONAL REQUIREMENTS CONCERNING THE CONSTRUCTION OF THE BODIES OF
VEHICLES INTENDED FOR THE TRANSPORT OF DANGEROUS GOODS IN PACKAGES
(OTHER THAN EX/II AND EX/III VEHICLES)**

Additional requirements concerning the construction of the bodies of vehicles intended for the transport of given dangerous goods or specific packagings may be included in Part [7], Chapter [7.2] in accordance with the indications in column [...] of table A, contained in Chapter 3.2, for a given substance.

CHAPTER 9.5

**ADDITIONAL REQUIREMENTS CONCERNING THE CONSTRUCTION OF THE BODIES OF
VEHICLES INTENDED FOR THE TRANSPORT OF DANGEROUS SOLIDS IN BULK**

Additional requirements concerning the construction of the bodies of vehicles intended for the transport of dangerous solids in bulk may appear in Part [7], Chapter [7.3] in accordance with the indications in column [...] of table A, contained in Chapter 3.2, for a given substance.

CHAPTER 9.6

ADDITIONAL REQUIREMENTS CONCERNING VEHICLES INTENDED FOR THE
CARRIAGE OF TEMPERATURE CONTROLLED SELF-REACTIVE SUBSTANCES OF
CLASS 4.1 AND ORGANIC PEROXIDES OF CLASS 5.2

9.6.1 Insulated, refrigerated and mechanically-refrigerated vehicles intended for the carriage of temperature controlled self-reactive substances of Class 4.1 and organic peroxides of Class 5.2 shall conform to the following conditions:

- (a) the vehicle shall be such and so equipped as regards its insulation and means of refrigeration, that the control temperature prescribed in paragraphs 2.2.41.1 (19) and 2.2.52.1 (16) and in sections 2.2.41.4 and 2.2.52.4 for the substance to be carried is not exceeded. The overall heat transfer coefficient shall be not more than $0.4 \text{ W/m}^2\text{K}$;
- (b) the vehicle shall be so equipped that vapours from the substances or the coolant carried cannot penetrate into the driver's cab;
- (c) a suitable device shall be provided enabling the temperature prevailing in the loading space to be determined at any time from the cab;
- (d) the loading space shall be provided with vents or ventilating valves if there is any risk of a dangerous excess pressure arising therein. Care shall be taken where necessary to ensure that refrigeration is not impaired by the vents or ventilating valves;
- (e) the refrigerant shall not be flammable; and
- (f) the refrigerating appliance of a mechanically refrigerated vehicle shall be capable of operating independently of the engine used to propel the vehicle.

[52 248]

9.6.2 Suitable methods to prevent the control temperature from being exceeded are listed in Chapter 7.2. Depending on the method used, additional requirements concerning the construction of vehicle bodies may be included in Chapter 7.2.

CHAPTER 9.7

ADDITIONAL REQUIREMENTS CONCERNING TANK-VEHICLES (FIXED TANKS)
BATTERY-VEHICLES AND VEHICLES USED FOR THE CARRIAGE OF DANGEROUS
GOODS IN DEMOUNTABLE TANKS OR IN TANK-CONTAINERS OF A CAPACITY
GREATER THAN 3,000 LITRES
(FL, OX AND AT VEHICLES)

9.7.1 General provisions

9.7.1.1 In addition to the vehicle proper, or the units of running gear used in its stead, a tank-vehicle comprises one or more shells, their items of equipment and the fittings for attaching them to the vehicle or to the running-gear units [211 101 (1)].

9.7.1.2 Once the demountable tank has been attached to the carrier vehicle, the entire unit shall meet the requirements prescribed for tank-vehicles [211 101 (2), as amended].

Note by the secretariat: Should a paragraph be added concerning vehicles carrying tank-containers?

9.7.1.3 A battery-vehicle contains elements which are linked to each other by a manifold and permanently fixed to a transport unit. The following elements, as defined in [6.2 and 6.8] are considered to be elements of a battery-vehicle: cylinders, tubes, pressure drums, bundles of cylinders (also known as frames), shells.

9.7.2 Requirements concerning tanks

9.7.2.1 Fixed tanks or demountable tanks made of metal shall meet the relevant requirements of Chapter 6.8.

9.7.2.2 Elements of battery-vehicles shall meet the relevant requirements of Chapter 6.2 in the case of cylinders, tubes, pressure drums and bundles of cylinders and the requirements of Chapter 6.8 in the case of shells.

[9.7.2.3 Tank-containers made of metal shall meet the requirements of Chapter 6.7 in the case of United Nations multimodal portable tanks, those of Chapter 6.8 in the case of "RID/ADR" tank-containers and the relevant requirements of the IMDG Code for "IMO" tanks.]

9.7.2.4 Tanks made of fibre-reinforced plastics material shall meet the requirements of Chapter 6.9.

9.7.2.5 Vacuum-operated waste tank-vehicles shall meet the requirements of Chapter 6.10.

9.7.3 Fastenings

9.7.3.1 Fastenings shall be designed to withstand static and dynamic stresses in conditions of carriage, and [, for tanks made of metal,] minimum stresses as defined in paragraph [6.8 ...] in the case of tank-vehicles and [6.8 ...] in the case of vehicles carrying tank-containers [211 121/212 121 (1)] [in the case of tanks made of metal and tanks made of fibre-reinforced plastics material(?)]

9.7.4 Earthing of FL vehicles

9.7.4.1 Tanks made of metal or of fibre-reinforced plastics material of FL tank-vehicles and battery elements of FL battery-vehicles shall be linked to the chassis by means of at least one good electrical connection. Any metal contact capable of causing electrochemical corrosion shall be avoided. Shells shall be provided with at least one earth fitting clearly marked with the symbol "†", capable of being electrically connected. [211 126] [6.9.1.2] [6.9.2.14.3]

[Note by the secretariat: Is such a provision needed for FL vehicles carrying tank-containers? See 212 126, which is slightly different in that no connection between the chassis and the container is required. Such a provision might read as follows:

[9.7.4.2 FL vehicles carrying tank-containers made of metal or of fibre-reinforced plastics material shall be so constructed that the tank-container can be linked to the chassis by means of at least one good electrical connection. Any metal contact capable of causing electrochemical corrosion shall be avoided.]]

9.7.5 Stability of tank/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. [211 128, or alternatively, a reference to the future ECE regulation on the stability of tank-vehicles.]

9.7.6 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 (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 for the carriage of powdery or granular substances and a vacuum-operated waste tank 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. [10 220 (1)]

Note 1: This provision does not apply to vehicles used for the carriage of dangerous goods in tank-containers.

Note 2: For the protection of tanks against damage by lateral impact or overturning, see [marginal 211 127 (4) and (5) and marginal 212 127 (4) and (5)].

Notes

1/ Additional teaching units are required for practical exercises referred to in 8.2.2.4.5 below which will vary depending on the number of drivers under instruction.

2/ Regulation No. 105 (Uniform provisions concerning the approval of vehicles intended for the carriage of dangerous goods with regard to their specific constructional features).

3/ These amendments should be the subject of the 01 series of amendments to Regulation No. 105.

4/ ECE Regulation No. 13 (Uniform provisions concerning the approval of vehicles of categories M, N and O with regard to braking) (in its latest amended form). As an alternative, the corresponding provisions of Directive 71/320/EEC (originally published in the Official Journal of the European Communities No. L 202 of 6.9.1971), may apply, provided that they have been amended in accordance with the latest amended form of ECE Regulation No. 13 applicable at the time of the vehicle approval.

5/ ECE Regulation No. 89: Uniform provisions concerning the approval of: I. vehicles with regard to limitation of their maximum speed; II. vehicles with regard to the installation of a speed limitation device (SLD) of an approved type; III. speed limitation devices (SLD), as amended. As an alternative, the corresponding provisions of directives 92/6/EEC and 92/24/EEC, as amended, may apply provided that they have been amended in accordance with the latest amended form of ECE Regulation No. 89 applicable at the time of the vehicle approval.

6/ ECE Regulation No. 55 (Uniform provisions concerning the approval

of mechanical coupling components of combinations of vehicles) (in its latest amended form).

7/ Directive 94/20/EC of the European Parliament and of the Council of 30 May 1994 (originally published in the Official Journal of the European Communities No. L 195 of 29.07.1994).
