

Case Study 1 (Compulsory)

An UN portable tank container is to be used to transport 20,000L of Hydrogen peroxide, aqueous solution, stabilized containing 65% hydrogen peroxide from a chemical plant in Dusseldorf, Germany to Cork, Ireland. The tank will be transported by road to the nearest rail freight hub, where it will be transferred to a railway wagon for carriage to a channel port. It will then be shipped to Dublin and on arrival in Ireland will be picked up by a road haulier for transport to the final destination

- a) What is the UN number and packing group applicable to this substance?

UN 2015, PG I

Ref ADR 3.2 Table, B, Table A column 4

- b) What is the applicable tank instruction and what type of vehicle is required to carry this tank?

UN Portable Tank Instruction T9

FL Vehicle

Ref ADR 3.2 Table A Columns 8 & 14

- c) With respect to the requirements for the tank

- i) What is the minimum test pressure?

4 Bar

- ii) What is the minimum thickness of the shell?

6 mm

- iii) Is there a requirement to protect the pressure relief valve with a frangible (bursting) disc?

No, 6.7.2.8.3 does not apply

- iv) Are openings below the level of the liquid allowed?

No, not allowed

- v) What is the maximum degree of filling allowed?

Per TP2 the degree of filling shall not exceed $95/1 + \alpha(t_r - t_f)$

Ref ADR 4.2.5.2.6, 6.7.3.2.8.3, 4.2.5.3

- d) i) Demonstrate how the goods should be identified on the transport document

UN 2015 HYDROGEN PEROXIDE, AQUEOUS SOLUTION, STABILISED, 5.1 (8), I,

- ii) What language(s) must be used on the transport document?

German as this is both the language of the forwarding county and an official ADR language

- iii) When empty the tank will be returned to the consignor by the consignee. What is the easiest available option for meeting the requirements for a transport document for the return?

Take the document that accompanied the full tank and strike out the quantity and write EMPTY UNCLEANNED RETURN

Ref ADR 5.4.1.1.1 a, b, c, 5.4.1.4.1, 5.4.1.1.6.2.3

- e) Considering the intended routing of the consignment how should the tank and carrying vehicle be placarded and plated? Explain your answer providing all applicable details and dimensions.

The tank should be placarded with Class 5.1 and 8 placards on all four sides. Minimum dimensions 250 x 250 mm with a line 12.5 mm inside the border and class numbers in digits 25 mm high.

As the tank will be transferred to a railway wagon, the carrying vehicle should display two blank orange plates front and rear of the vehicle. The two sides of the tank should bear orange plates displaying the HIN number 559 and the UN number 2015. The plates should have a black border and centre dividing line on the numbered plates 15 mm wide and the numbers must be 10 cm high.

Ref: ADR 5.3.1.1.1, 5.3.1.2, 5.3.1.7.1, 5.3.2.1.1, 5.3.2.1.2, 5.3.2.2, Table A column 20

- f) Will the driver collecting the tank from Dublin port be able to use the Dublin Tunnel which is rated as a Category C tunnel?

No, The B tunnel code for tank carriage means the tank cannot enter category B, C, D or E tunnels

Ref: ADR Table A column 15, 8.6.4

- g) After encountering a traffic delay on the M50 due to a major accident, the driver realises that due to available Tacograph hours he will have to stop overnight on his way to Cork. What options are available to him in terms of where he can park the vehicle? It is not a sleeper cab and there are no supervised vehicle parks on the route.

S20 applies meaning that supervision of vehicles is required as the carriage exceeds the relevant threshold of 3,000L in tanks. The remaining options are to use a public or private park where the vehicle is unlikely to suffer damage from other vehicles or an open space separate from the motorway and dwellings where the public are unlikely to assemble.

Ref: ADR Table A column 19, 8.5 S20, 8.4.

Case Study 2

800 kg of Explosive, Blasting Type B with the classification code 1.5D and tradename Emgel is to be shipped from England to Ireland packed in 20 kg plastic bags (non-woven plastic film).

- a) i) Explain the meaning of the elements of the classification code 1.5D?
1.5 Very insensitive substances having a mass explosion hazard which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of carriage.
D Secondary detonating explosive substance or black powder or article containing a secondary detonating explosive substance, in each case without means of initiation and without a propelling charge, or article containing a primary explosive substance and having two or more effective protective features.

- ii) What UN number applies to this material?
UN 0331

Ref: ADR 2.2.1.1.5, 2.2.1.1.6, Table B, Table A Columns 1 & 3b

- b) i) Do the bags need to be UN certified?
Yes, Packing instruction P116 applies which requires that the packaging complies with all of 4.1.1. including 4.1.1.3 which specifies that the packaging must meet the relevant UN tests.
- ii) Are inner packagings required?
No, PP64 allows that when the outer bags are plastic film, inner packagings are not required.

Ref ADR Table A columns 8 & 9, 4.1.1.3, 4.1.4 P116, PP64

- c) What marks and labels need to be displayed on the bags? Include all relevant details.
The bags must be marked with the UN number, proper shipping name and commercial name of the explosive i.e. UN 0331 EXPLOSIVE, BLASTING TYPE B Emgel. The UN number must be in characters at least 6 mm high. English would be the most appropriate language for the proper shipping name which must be in at least one of English, French or German
The bags must display the No 1.5 label. The label shall be 100 x 100 mm with a line 5 mm inside the border. The label should be applied near the proper shipping name.

Ref: ADR Table A columns 5, 6, 3.3 SP617, 5.2.1.1, 5.2.1.5, 5.2.2.1.1, 5.2.1.1.6, 5.2.2.2.1.1.2

- d) i) Can the shipment be carried on an EX II vehicle?
No, an EX III vehicle is specified in column 14 of table A
- ii) As regards requirements for electrical equipment for approval of new vehicles what distinguishes an EX II and EX III vehicle?
A battery master switch must be fitted to an EX III vehicle, not required for EX II

Ref ADR Table A column 14, 9.2.2.1, 9.2.2.8

- e) Will the driver be able to use the Dublin Port tunnel which is a category C tunnel?
No, cannot enter a category C tunnel irrespective of the quantity carried

Ref ADR Table A column 15, 8.6.4

- f) Under what conditions may the goods be unloaded in a public place?
The goods may only be unloaded in a public place if special permission has been granted by the competent authorities and a distance of 50 m is maintained between stationary vehicles. Different class labels must be handled separately. For emergency safety reasons it is possible to unload without CA notification.

Ref ADR Table A column 19, 8.5 S1

- g) What is the duration of the additional specialised training that the driver must have completed?
8 teaching units of 45 minutes each

Ref ADR 8.2.2.4.1

- h) i) What placards and plates that must be displayed on the carrying vehicle? Provide all relevant dimensions.
Class 1.5 placards must be displayed on the back and sides of the vehicle – 250 x 250 mm with a line 12.5 mm inside the outer border
Blank orange plates must be displayed at the front and back of the vehicle 40x30 cm with a black border 15 mm wide.

- ii) Who is responsible for displaying the orange plates?
The carrier

Ref ADR 5.3.1.5.1, 5.3.1.7.1, 5.3.2.1.1, 5.3.2.2.1, 1.4.2.2.1(f)

- i) The transporting vehicle has a maximum permissible gross mass of 6 ton
i) What is the minimum total capacity of fire extinguishant required for the vehicle?
8 kg

- ii) what is the minimum number of extinguishers required?
2

Ref ADR 8.1.4.1

Case Study 3

A shipment of UN 2309 in 12 x 1100L IBC (31A) is to be transported on an articulated vehicle from Italy to Ireland

a) (i) Are these IBCs allowed? Explain your answer. 7

Yes, Packing instruction IBC02 is shown against UN 2309 in Table A. This packing instruction allows the use of 31A steel IBCs.

(ii) What danger marks and labels should be applied to the IBCs? Be specific in your answer. Note. The material is not an environmentally hazardous substance

As the IBCs have a capacity greater than 450 L each IBC should be marked on two opposite sides with the UN number, UN 2309 in characters 12 mm high.

As the IBCs have a capacity greater than 450L, class 3 labels should be displayed on two opposite sides of each IBC, minimum dimension 100 x 100 mm, with a 2 mm line 5 mm inside the border.

Reference(s): ADR 3.2 Table A, Columns, 1, 5, 8, 4.1.4.2, 5.2.1.1, 5.2.1.4, 5.2.2.1.1, 5.2.2.1.7, 5.2.2.2.1.1.2

b) Can a flat-bed vehicle be used to carry the consignment? Explain your answer 3

Yes, it can. There are no special loading provisions shown against the entry and thus open or closed vehicles are acceptable according to 7.2.1

Reference ADR Table A, column 16, 7.2.1

c) (i) Indicate how the dangerous goods information should be shown in the transport document 7

UN 2309 OCTADIENES, 3, II, (D/E)
12 x 1100 L steel IBCs Total quantity 13,200 L

(ii) What language(s) should the transport document be prepared in?
Italian as the language of the forwarding country and one of English, German or French

(iii) The empty uncleaned IBCs are to be returned to the consignor. Can the transport document for the full IBCs be reused for the return journey? Explain your answer.
Yes, provided the total quantity of dangerous goods is deleted/struck out and replaced by the words "EMPTY UNCLEARED RETURN"

Reference: ADR 5.4.1.1.1 (a-f), 5.4.1.4.1, 5.4.1.1.6.2.3

d) During the journey the driver needs to leave the vehicle unattended and rest overnight, but does not have access to a secure depot or secure factory premises or a supervised vehicle park. What other options are available to the driver? 5
S20 applies to the goods and as the load is greater than 10,000 kg (assuming 1L is approx 1 kg) the provisions of Chapter 8.4 for supervision of vehicles apply. The remaining options are to use a public or private vehicle park where the vehicle is not likely to suffer damage

from other vehicles; or a suitable open space separated from the public highway and from dwellings, where the public does not normally pass or assemble.

Reference: ADR Table A column 19, 8.5 S20, 8.4.1 (b) & (c).

e) An Irish driver collects the trailer when it arrives off the ferry, but requires a copy of the instructions in writing in English. Who is responsible for providing him with the instructions in writing? 2

The carrier – his employer

Reference: ADR 5.4.3.2

f) Describe the orange plates that must be displayed on the transport unit when carrying the load. 2

Reflectorized blank orange plates of 40 cm base by 30 cm high with a black border 15 mm wide

(Note: reduced size plates would not be acceptable considering the size of the transport unit required to carry the load)

Reference: ADR5.3.2.2.1

g) Is it necessary to carry an emergency escape mask? 2

No, an emergency escape mask is only required if carrying goods with labels no 2.3 or 6.1

Reference: ADR 8.1.5.3

h) i) After unloading it is noticed that some liquid has leaked onto the floor of the trailer. Explain what actions should be taken next. 4

The vehicle or container shall be cleaned as soon as possible and in any case before reloading.

If it is not possible to do the cleaning locally, the vehicle or container shall be carried, with due regard to adequate safety, to the nearest suitable place where cleaning can be carried out.

ii) At what point would it be necessary to submit an incident report to the national competent authority?

If more than 333 L had been lost, in accordance with the criteria specified in ADR 1.8.5.3 for transport category 2 goods

Reference: ADR 7.5.8.1, 1.8.5.3, Table A column 15

i) Does the carrier need a written security plan? 3

No, The IBCs are considered packages, and per Table 1.10.3.1.2 Class 3 flammable liquids of packing group II as per note b are not deemed to be high consequence dangerous goods, irrespective of the quantity and thus are excluded from the provisions of 1.10.3 including 1.10.3.2 which calls for a security plan

Reference: [ADR Table 1.10.3.1.2, 1.10.3.2](#)