

Paper 2 July 2021

Complete Case study 1 and either Case Study 2 or 3 Time allowed: 2 hours

Case Study 1 (Compulsory)

100 kg of 4-Nitrosophenol (UN3236) is to be shipped by road from Germany to a customer in Spain.

- a) i) What is the minimum number of packages required? Explain your answer.
2 packages. Packing method OP7 applies to 4-nitrosophenol and per P520 the maximum quantity per package is 50 kg.
ii) Is the packaging required to be UN approved?
Yes, as all the elements of 4.1.1 apply including 4.1.1.1.3

Ref: ADR 2.2.41.4, 3.2.1 columns 1 & 8, 4.1.4.1 P520, 4.1.1.3

- b) i) What marks and labels must be applied to the packages? Provide all relevant details.
The packages must be marked with the UN number UN3236 in characters 12 mm high as each package is greater than 30 kg
The packages must be labelled with the no 4.1 label, 100 x 100 mm with a line 5 mm inside the border.
ii) Is it necessary to apply a No 1 explosives label?
No, as note 2 does not apply to the entry in the list of known self-reactive substances.

Ref: ADR 5.2.1.1, 5.2.12.1.1, Table A columns 1 & 5, 5.2.2.2.1.1.2, 2.2.41.4

- c) What, if any, orange plates are required to be displayed on the carrying vehicle? Justify your answer.
Two blank orange plates are required one in front and one at the back of the vehicle as the quantity carried is above the small load threshold of 20 kg derived from its transport category 1 below which orange plates are not required.

Ref: ADR Table A Column 15, 1.1.3.6.3, 5.3.2.1.1

- d) What information relating to the goods must be shown on the transport document?
Illustrate your answer
UN 3236 SELF REACTIVE SOLID, TYPE D, TEMPERATURE CONTROLLED (4-nitrosophenol), 4.1, (D), Control Temperature +35°C, Emergency temperature +40°C
2 packages Total quantity 100 kg

Ref: ADR 5.4.1.1.1 a b c e f k, 5.4.1.2.3.1, Table A Column 6, 3.3 SP 274, 3.1.2.8

- e) What is the maximum load of this substance permitted to be carried on a vehicle?
20,000 kg

Ref ADR Table A column 18, 7.5.11 CV15, 7.5.5.3

- f) i) Does the carrying vehicle need to be equipped with a shovel, drain seal and collecting container?
Yes, required for goods bearing the No 4.1 label

Ref: [ADR 8.1.5.3](#)

- g) Is an audible temperature alarm required to be fitted to the vehicle?
No only required if the control temperature was less than +25°C. The control temperature is +35°C, so no requirement

Ref: [ADR Table A column16, 7.2.4 V8, 7.1.7.4.2](#)

- h) The driver wishes to stop overnight at a motel. Does the vehicle need to be supervised?
No, supervision requirements would only apply if the load exceeded 2,000 kg. However, he would need to ensure that the temperature is monitored every 4-6 hours

Ref [ADR Table A 19, 8.5 S18](#)

Case Study 2

An Irish manufacturer has ordered 20,000 L of 60% Sulphuric acid solution to be delivered in bulk from a supplier in the Netherlands

- a) Select an appropriate UN number, proper shipping name and packing group for this delivery?

UN 1830 SULPHURIC ACID, PG II (as it contains more than 51% sulphuric acid)

Ref ADR 3.2.2 Table B, 3.2.1 Table A

- b) The customer's is only set up to unload tankers from the bottom. Explain how this would influence the choice between using a UN portable tank container or a fixed ADR road tanker for the delivery

The applicable tank code for a UN portable tank is T8 which does not allow for bottom openings and hence is unsuitable.

The applicable ADR tank code is an L4BN which per the B- code has bottom openings with 3 closures. Thus, only the ADR tank will satisfy the customer's needs

Ref ADR 3.2.1 Table A Columns 10 & 12, 4.2.5.2.6, 4.3.4.1.1

- c) What formula should be used to determine the maximum degree of filling of the tank?

As it is a corrosive substance in a tank with a spring-loaded safety valve the relevant formula is $98/1+\alpha(50-T_F)$

Ref ADR 4.3.2.2.1 (b)

- d) What is the interval between periodic tests for this tank?

6 years (for a fixed ADR tank)

Ref: ADR 6.8.2.4.2

- e) What plates and placards must be displayed on the transport unit? Provide all relevant details and explanations

As the tank is carrying a single substance it is sufficient to display numbered orange plates at the front and back of the vehicle. The plates should bear the HIN number 80 in the upper half and the UN number 1830. The standard dimensions of the plates are 30 cm high by 40 cm wide with a black border 15 mm wide and numerals 10 cm high with a 15 mm wide brush stroke.

The tank should be placarded on the back and sides with No 8 corrosive placards of minimum dimensions 250 x 250 mm, line 12.5 mm from outside border, class number 25 mm high.

Ref: ADR 5.3.2.1.6, 3.2.1 Columns 1 & 20, 5.3.2.2.1, 5.3.2.2.2, 5.3.4.1, 5.3.1.7.1.

- f) i) Indicate how the goods should be described on the transport document

UN1830 SULPHURIC ACID, 8, II, (E)

- ii) What languages are required on the document

Dutch as the language of the consignor and one of French, German or English.

iii) When empty the tank vehicle is returning to the consignor. How would you provide a transport document for the return journey?

Take the transport document that accompanied the goods, strike out the quantity and replace with EMPTY UNCLEANNED RETURN

Ref: ADR 5.4.1.1.1 a b c d k, 5.4.1.4.1, 5.4.1.1.6.2.3

g) Prior to shipping the bulk material, the customer requires a 1L sample to verify that it meets their purity specifications. How would you package mark and label the sample?

The 1 L sample can be shipped as a limited quantity package in a combination box as it will satisfy both the LQ inner package limit of 1 L and the total package weight of not more than 30 kg. The package must be marked with the Limited Quantity mark and orientation arrows on two opposite sides. No labels are required.

Ref: ADR 3.4.1, 3.2.1 column 7a, 3.4.2, 3.4.7.1, 5.2.1.10.1

h) i) As the driver exits Dublin port, he sees a tunnel sign indicating that he is approaching a category C tunnel. Can he proceed and enter the tunnel or must he use the alternative route?

Yes, he is carrying a load with an E tunnel which means he is only restricted from entering category E tunnels.

ii) During a roadside inspection at the entrance to the tunnel it is found that there is insufficient fire extinguishant capacity on board the vehicle. What is the fixed penalty for such an offence and who is liable?

It is a category II offence and thus the penalty is €250 payable by the carrier as the responsible party

iii) When asked for Instructions in writing the driver, who is Romanian presents, a copy in Romanian only. Is this acceptable?

Yes, they are in the language of the driver.

Ref: ADR 3.2.1 Column 15, 8.6.4, 5.4.3.2 CDGRR Schedule 2 offence No 16

Case Study 3

A road haulier is asked to transport 7,200 kg of 2-amino-4-chlorophenol in fibre drums from a chemical supplier in Denmark to a customer in Italy. The supplier also wishes to ship 4 x 1 L samples of phosphoric acid solution to a separate customer on the same industrial site to check if it meets their specification for use in the manufacture of soft drinks.

- a) What are the UN numbers and class of the two substances?

2-amino-4-chlorophenol: UN 2673, Class 6.1

Phosphoric acid, solution: UN 1805, Class 8

Ref: ADR 3.2.2 Table B, 3.2.1 Table A Column 3a

- b) The 4 X1L phosphoric acid samples are packed in a fibreboard box. How should this package be marked and labelled? Justify your answer.

The box will qualify as a limited quantity package as the quantity per inner packaging is below the LQ limit of 5L and the total weight of the packages will be much less than 30 kg.

Thus, the package just needs to be marked with the Limited Quantity mark and orientation arrows on opposite sides as it is a liquid. Labels are not required.

Ref: ADR 3.4.1, 3.4.2 Table A column 7a, 3.4.7.1, 5.2.1.10.1

- c) i) Illustrate how the goods should be identified on a transport document

UN 2673 2-amino-4-chlorophenol, 6.1, II, (D/E)

The phosphoric acid solution does not need to be shown on the transport document as it is a Limited Quantity package.

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

Danish as the language of the consignor and one of French, German or English

- iii) How long is the carrier required to retain a copy of the transport document?

3 months

Ref: ADR 5.4.1.1 a, b, c, d, k, 5.4.1.4.1, 5.4.4.1

- d) Considering its intended use, what precautions should be taken when stowing the phosphoric acid solution on board the vehicle?

CV 28 applies to the toxic substance which requires that it must be separated by a partition or a distance of 0.8 m from the phosphoric acid solution which will be used for soft drinks for human consumption (or by other packages, not relevant in this instance)

Ref: ADR 3.2.1 Column 18, CV 28, 7.5.4 a, b, c

- e) The driver needs to stop overnight to comply with his driving hours limits. What are his options as regards leaving the vehicle unattended? A secure depot or the supervised vehicle park is not available. Explain your answer.

S19 applies to the toxic substance as he is carrying 7,200kg which is above the 5,000kg threshold at which the provisions in 8.4.1 apply. The remaining options are a public or private par where the vehicle is unlikely to sustain damage or an open space away from building, highways and the public.

Ref: ADR 3.2.1 Column 19, S19, 8.4.1 b, c.

- f) As he approaches Italy, the driver wishes to use one of the tunnels through the Alps which is categorised D. Can he use this tunnel?

Yes, the tunnel code for the toxic substance is (D/E) and he is allowed to enter a D tunnel when the goods are packaged.

Ref: ADR 3.2.1 Column 15, 8.6.4

- g) i) Name two items of general equipment that must be on board for protection of the vehicle crew?

Hi vis vest, portable lighting apparatus, eye protection, protective gloves

- ii) Name an additional item of equipment that is required considering the nature of the load

An emergency escape mask because of the Class 6.1 substance

The shovel, drain seal and collecting container are not required as the Class 8 substance is a limited quantity which exempts from the equipment requirements

Ref: ADR 8.1.5.2, 8.1.5.3, 3.4.1

- h) When the 2-amino-4-chlorophenol is unloaded the driver notices a small spillage on the floor of the vehicle. What should he do?

CV13 applies which requires that the vehicle is thoroughly cleaned before reuse and the other packages checked for contamination.

Ref: ADR 3.2.1 Column 18, CV13

- i) i) How should the vehicle be plated and placarded when carrying all the goods?

The vehicle should display blank orange plates front and back of the vehicle

No placards are required for the packaged goods.

- ii) What should the driver do with the orange plates when the toxic substance is unloaded and he is proceeding to deliver the phosphoric acid samples?

He should cover or close the orange plates – orange plates are not required for LQ dangerous goods.

Ref: ADR 5.3.2.1.1, 5.3.2.1.8