Packaging and Marking

1. Non –refillable Propene cylinders are to be packed 12 to a box in fibreboard boxes for distribution to hardware stores. What marks and labels should be displayed on the boxes?
   The box will have to be labelled with the label no 2.1 flammable gas label and marked with the UN number, UN 1077
   Notes: Even though it is in Class 2, the proper shipping name is not required for non-refiillable cylinders. Orientation marks are not required for a gas. Non-refillable pressure receptacles must be carried in an outer packaging as per ADR 4.1.6.9. Thus the box is an outer packaging rather than an overpack and therefore an overpack mark is not required.

   Ref: ADR 3.2 Table B, Table A Column 5, 5.2.1.1, 5.2.2.1.1

2. You are asked to ship 90 kg of Azodicarbonamide formulation, Type B, Temperature controlled. When tested, the SADT for the packages used was found to be 42C.

What is the minimum number of packages required?

What information must be shown on the packages and transport document (ignore packaging approval markings or consignor/consignee information)?

According to the table of known self-reactive substances, azodicarbonamide formulations Type B are assigned to UN 3232 and packing method OP5. Looking up OP5 in P520 shows that the maximum mass per package for solids is 25 kg. Thus 4 packages will be required.

The packages will have to display 4.1 and 1 labels according to the dangerous goods list entry and also note 2 in the table of known self reactive substances and the mark UN 3232.

The Transport document will have to display the following

UN 3232 SELF-REACTIVE SOLID, TYPE B, TEMPERATURE CONTROLLED (X% Azodicarbonamide), 4.1 (1), (B)

Control Temperature 32C, Emergency Temperature 37C

4 x description of packages

Notes: The control and emergency temperatures are determined from the measured SADT for the packages, according to the Table in 7.1.7.3.5 as 32C for control and 37C for emergency temperatures

The entry for Azodicarbonamide found in Table B for UN 3242 is not suitable as SP215 associated with this entry states that it may only be used for the pure substance or formulations with an SADT greater than 75C.

Ref ADR 2.2.41.4, 3.2 Table A, 4.1.4.1 P520, 5.2.1.1, 5.2.2.1.1, 5.4.1.1, 5.4.1.2.3.1, 7.1.7.3.5

3. What information must be shown on combination packages and the transport document for a shipment of 70% isopropylcumyl hydroperoxide in a Type A diluent

According to the table of known peroxides isopropylcumyl hydroperoxide in a Type A diluent (with ≤72% peroxide and ≥ 28% diluent) is assigned to UN3109 and packing method OP8

The packages must show labels numbers 5.2 and also 8 as note 13 in the organic peroxides tables indicates that such a peroxide also carries a corrosive risk. The packages must also show the UN number UN 3109 and two orientation marks as the packages contain liquids in combination packages

The transport document must show

UN 3109 ORGANIC PEROXIDE TYPE F, LIQUID (70% iospropylcumyl hydroperoxide), 5.2 (8), (D)

The inclusion of the number 8 label in the transport document is implied by special provision 122

Ref: ADR 2.2.52.4, 5.2.1.1, 5.2.1.10.1, 5.2.2.1, 3.2 Table A, 3.3 SP122, 274, 3.1.2.8

4. As a freight forwarder, state three reasons why you would refuse to accept the following consignment if presented for carriage by road

Package

Marks and labels found on package

1H2/Z15/S/02/IRL 1234

UN 1687

Information on the transport document

UN 1687 SODIUM AZIDE, 6.1, II, (D/E)

2 X OT Plastic drums Net quantity 40 kg

The packaging approval is only for PG III (Z code) but the material is PG II
The plastic drum was manufactured in 02 so is more than 5 years old and cannot be used without CA approval
The packaging capacity is exceeded – the transport document indicates a net quantity of 40 kg in two plastic drums, but the permitted gross mass per drum is only 15 kg according to the packaging approval code
The Tunnel code is incorrect – it changed from (D/E) to (E) when ADR2017 became applicable
Ref: ADR 3.2 Table A, 4.1.4.1 P002, 5.2.1.1, 5.2.2.1.1, 5.4.1.1.1, 6.1.3.1,

5. A company received a plastic drum from Germany containing 37 litres of a dilute aqueous solution which was classified as 'Corrosive Liquid, Acidic, Inorganic, N.O.S.', UN3264, Class 8, PG III. The drum was UN tested (1H2/X108/S/10) and was contained in a 205 litre metal drum (1A2/Y1.5/110/11/D). The 205 litre drum was packed with vermiculite, an absorbant/cushioning material. Is this shipment compliant with the regulations?

No. P001 applies which requires either single packages UN approved for liquids or combination packages. The plastic drum cannot be regarded as a single package as it is only UN approved for solids and inner receptacles, and if used as the inner packaging in a combination package it is only allowed to hold 30 L as a plastic inner receptacle. The outer steel drum is approved for liquids but not solids or inner receptacles, so cannot be used as the outer layer of a combination package as it appears to be used in this example. The liquid could be placed directly in the steel drum, but then there would be a likely issue of corrosion of the metal.

Ref: ADR 3.2 Table A, 4.1.4.1 P001, 6.1.3.1

6. Can Cyclobutyl chloroformate be carried in any of the following tanks?

Cyclobutyl chloroformate is assigned to UN 2744 with UN tank instruction T7 and ADR tank instruction L4BH. Thus:

T4 Tank No – see portable tank hierarchy 4.2.5.2.5

L10CH Yes, suitable in place of L4BH see table in 4.3.4.1.2

L4BN No, not hermetically sealed

T15 Yes - see portable tank hierarchy 4.2.5.2.5

S4AH No – only suitable for solids, not liquids

L4DH Yes, suitable in place of L4BH see table in 4.3.4.1.2

Ref: ADR 3.2 Table B Table A 4.2.5.2.5, 4.3.4.1.2

7. Can Dichlorosilane be carried in the following tanks?

Dichlorosilane is assigned to UN 2189 with an ADR tank instruction PxBH. Looking up Table 4.3.3.2.5 we see that the minimum test pressure x for this gas is 10 BAR. Thus:

P20DH Yes, Table 4.3.3.2.5 shows the minimum test pressure (10 Bar) which the

tank exceeds while 4.3.3.1.2 tank hierarchy shows that a P#DH can replace a P*BH

P5BH No, the tank has an insufficient pressure rating

Ref: ADR 3.2 Table B Table A, 4.3.3.1.2, 4.3.3.2.5

8. A transport company is planning to start bulk transport of Bitumen with a flash point greater than 250C. Carriage will be between 100 and 200C. You are asked to advise as to what type of tanks are required, the placarding and marking of the vehicle and the product information that must be shown in the transport document
   The product will have to be classified as UN 3257 ELEVATED TEMPERATURE LIQUID N.O.S. as it is transported below its flashpoint but as a liquid above 100C

Thus an LGAV tank will be required under the ADR tank system. (Bitumen is usually transported in fixed road tankers – it could also be carried in T3 UN portable tanks but because of the additional weight associated with tank container frames, they would only make sense if engaging in multimodal transport)

The tank will have to display Class 9 placards and the elevated temperature on the back and sides. Orange plates showing 99 and 3257 will have to be displayed at the front and back of the vehicle. (this is the preferred plating option, as the tanks will always be dedicated to this single substance, so can avoid having to display plates on the side of the tank)

The transport document will have to contain the following

UN 3257 ELEVATED TEMPERATURE LIQUID N.O.S. (Bitumen), 9, III, D plus the total quantity carried.

Ref: ADR 2.2.9.1.13, 2.2.9.3, 3.2 Table A 5.3.1.4, 5.3.3, 5.3.2.1.6, 5.4.1.1.1

9. Hydrogen peroxide and peroxyacetic acid mixture, stabilised containing 4% peroxyacetic acid

is to be shipped in 1,000 L 31HA1 IBCs from Dublin to Cork

a) Are these IBC's allowed?

Yes, IBC 02 which applies to UN 3149 allows the use of such IBC's

b) What marks and labels must be applied to the IBCs?

The IBC must be marked with the UN number UN3149 on two opposite sides of the IBC

as it is greater than 450L in characters 12 mm high

Orientation arrows are also required on two opposite sided as the IBC must be vented

according to IBC special provision B5

The IBC must be labelled with no 5.1 and 8 labels on two opposite sides again because

the capacity is greater than 450 L

Ref: ADR Table B, Table A, Columns 5 & 8, 4.1.4.2 IBC02, B5, 5.2.1.1, 5.2.1.4, 5.2.1.10, 5.2.2.1.1, 5.2.2.1.7

10. An Ethanol based hand sanitiser with a flash point of 24.5C is to be distributed in fibreboard boxes containing 12 x 1L bottles. According to ADR what labels and marks need to be applied to the boxes? (You need to recognise that this qualifies for LQ marking)

Ethanol solution with a flashpoint of 24.5C is assigned to UN 1170 PG III. This allows the boxes to qualify as limited quantity packages as the inner bottle are less than the 5L inner packaging limit and the total weight of the box will not exceed 30 kg – 12x1L bottles will weigh approx. 12 kg.

Thus, the boxes just need to be marked with the Limited Quantity mark and because you have liquids in a combination package, orientation arrows on two opposite sides are also required. No labels are required.

Ref: ADR Table B, Table A Column 7a, 3.4.7.1, 5.2.1.10

11. A company wishes to ship 3L of acetaldehyde packed together with 15 kg of potassium hydrogen fluoride in fibreboard boxes. (This is a mixed packaging combined with a labelling/marking question)

a) Is this possible?

Acetaledhyde = UN1089, Clas3 3, MP7 and MP17 apply

Potassium hydrogen fluoride, solid = UN1811 (you know it is a solid because of kg in the question), Class 8 MP 10 applies

MP7 is not relevant (different classes involved). MP17 allows packing with other classes but requires the acetaldehyde in max 0.5 L per inner and 1L per package

MP10 allows packing with other classes subject to a limit of 5 kg

So, yes mixed packaging is allowed.

b) What is the minimum number of inner and outer packages required?

Because of the size restrictions you require a minimum of 9 inner packages and 3 outer packages i.e. each package can only contain 2 x 0.5L acetaldehyde and 1 x 5kg potassium hydrogen fluoride.State another aspect that must be checked before proceeding with the packaging

The goods must not react dangerously with each other (There is usually 1 mark going for this add

on question in a mixed packaging question)

c) What labels and marks are required on the packages?

Class 3, 8 and 6.1 labels

Marks UN 1089, UN1811 plus orientation arrows two opposite sides because acetaldehyde is a Liquid

Ref: ADR Table B, Table A columns 5, 9b, 4.1.10 MP10, MP17, 5.2.1.1, 5.2.1.10, 5.2.2.1.1.