

**Class 9**  
**Reformatted Packing**  
**Instructions**

**900****PACKING INSTRUCTION 900****900**

Vehicles, machines or equipment containing internal combustion engines or batteries must meet the following requirements:

- a) except as otherwise provided for in this Packing Instruction, fuel tanks must be drained of fuel and tank caps fitted securely. Special precautions are necessary to ensure complete drainage of the fuel system of vehicles, machines or equipment incorporating internal combustion engines, such as lawn mowers and outboard motors, where such machines or equipment could possibly be handled in other than an upright position. When it is not possible to handle in other than an upright position, vehicles, except those with diesel engines, must be drained of fuel as far as practicable, and if any fuel remains, it must not exceed one-quarter of the tank capacity. Vehicles equipped with diesel engines are excepted from the requirement to drain the fuel tanks, provided that a sufficient ullage space has been left inside the tank to allow fuel expansion without leakage, and the tank caps are tightly closed. A careful check must be made to ensure there are no fuel leakages;
  - b) for flammable gas-powered vehicles, machines or equipment, pressurized vessels containing the flammable gas must be completely emptied of flammable gas. Lines from vessels to gas regulators, and gas regulators themselves, must also be drained of all trace of flammable gas. To ensure that these conditions are met, gas shut-off valves must be left open and connections of lines to gas regulators must be left disconnected upon delivery of the vehicle to the operator. Shut-off valves must be closed and lines reconnected at gas regulators before loading the vehicle aboard the aircraft;
  - c) if non-spillable batteries, as defined in Packing Instruction 806, are installed, they must be securely fastened in the battery holder of the vehicle, machine or equipment and be protected in such a manner as to prevent damage and short circuits;
  - d) if spillable batteries are installed, they must be securely fastened in the battery holder of the vehicle, machine or equipment and be protected in such a manner as to prevent damage and short circuits. However, if it is possible for the vehicle, machine or equipment to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 433 or 800 as applicable;
  - e) dangerous goods required for the operation of the vehicle, machine or equipment, such as fire extinguishers, tire inflation canisters, safety devices, etc., must be securely mounted in the vehicle, machine or equipment. Aircraft may also contain other articles and substances which would otherwise be classified as dangerous goods but which are installed in that aircraft in accordance with the pertinent airworthiness requirements and operating regulations. If fitted, life-rafts, emergency escape slides and other inflation devices must be protected such that they cannot be activated accidentally. Vehicles containing dangerous goods identified in Table 3-1 as forbidden on passenger aircraft may only be transported on cargo aircraft; and
  - f) in the event that vehicles, machines or equipment containing internal combustion engines are being shipped in a dismantled state such that fuel lines have been disconnected, those fuel lines must be sealed securely.
  - + g) when internal combustion engines are being shipped separately, all fuel, coolant or hydraulic systems remaining in or on the engine must be drained as far as practicable and all disconnected fluid pipes must be sealed with leak-proof caps, which are positively retained.
  - + h) Vehicles equipped with theft-protection devices, installed radio communications equipment or navigational system must have such devices, equipment or system disabled.
- + Replacements for the dangerous goods permitted in paragraphs a) to e) must not be carried under this packing instruction.

Notes: No change.

**902****PACKING INSTRUCTION 902****902**

Magnetized material will be accepted only when:

- a) devices, such as magnetrons and light meters have been packed so that the polarities of the individual units oppose one another;
- b) permanent magnets, where possible, have keeper bars installed;

- c) the magnetic field strength at a distance of 4.6 m from any point on the surface of the assembled consignment:
  - 1) does not exceed 0.418 A/m; or
  - 2) produces a magnetic compass deflection of 2 degrees or less.

*Determination of shielding requirements*

≠ The magnetic field strength of magnetized materials must be measured using measuring devices having a sensitivity sufficient to measure magnetic fields greater than 0.0398 A/m within a tolerance of plus or minus 5 per cent, or with a magnetic compass sensitive enough to read a 2 degree variation, preferably in 1 degree increments or finer. If the maximum field strength observed at a distance of 2.1 m is less than 0.159 A/m or there is no significant compass deflection (less than 0.5 degree), the article is not restricted as a magnetized material. Methods of determining if a magnetized article meets the definition of a magnetized material include:

- a) When an oersted meter is used, it is placed on one of two points positioned 4.6 m apart and located in an area that is free from magnetic interference other than the earth's magnetic field. The oersted meter is then aligned with the second point and "balanced" to a zero reading. The magnetic article is then placed on the other point and the magnetic field strength is measured by reading the meter while rotating the package 360 degrees in its horizontal plane. If the maximum field strength observed is 0.418 A/m or less, the article is acceptable for air transport. When the maximum field strength exceeds 0.418 A/m, shielding should be applied until a reading of 0.418 A/m or less has been attained.
- b) When a magnetic compass is used as a sensing device, it should be placed on one of two points positioned 4.6 m apart which are aligned in an East/West direction and in an area that is free from any magnetic interference other than the earth's magnetic field. The packaged item to be tested is placed on the other point and rotated 360 degrees in its horizontal plane for indication of compass deflection. When the maximum compass deflection observed is 2 degrees or less, the article is acceptable for air transport. When the maximum compass deflection of an item exceeds 2 degrees, shielding must be applied until the maximum deflection is not more than 2 degrees.

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*Note.— For loading restrictions, see Part 7;2.10.*

Notes: No change.

PI 904

**904**

**PACKING INSTRUCTION 904**

**904**

Solid carbon dioxide (dry ice) when offered for transport by air must be packed in accordance with the general packing requirements of Part 4, Chapter 1 and be in packaging designed and constructed to permit the release of carbon dioxide gas to prevent a build-up of pressure that could rupture the packaging. Arrangements between shipper and operator(s) must be made for each shipment, to ensure that ventilation safety procedures are followed. The dangerous goods transport document requirements of Part 4, Chapter 1 are not applicable provided alternative documentation containing the information required by 5;4.1, excluding the packing instruction number and packing group, is supplied.

*Note.— For loading restrictions see Part 7;2.11; for special marking requirement see Part 5;2.4.7.*

Notes: No change.

PI 905

**905**

**PACKING INSTRUCTION 905**

**905**

The description 'Life-saving appliances, self-inflating' (UN 2990) is intended to apply to life-saving appliances that present a hazard if the self-inflating device is activated accidentally.

≠ Life-saving appliances, such as life-rafts, life vests, aircraft survival kits or aircraft evacuation slides, may only contain the dangerous goods listed below:

- a) Division 2.2 gases, in cylinders as permitted in Packing Instruction 200; these may be connected to the life-saving appliance;
- b) signal devices (Class 1), which may include smoke and illumination signal flares; signal devices must be packed in plastic or fibreboard inner packagings;
- c) small quantities of flammable substances, corrosive solids and organic peroxides (Class 3, Class 8, Division 4.1 and 5.2), which may include a repair kit and not more than 30 strike-anywhere matches. The organic peroxide may only be a component of a repair kit and the kit must be packed in strong inner packaging. The strike-anywhere matches must be packed in a cylindrical metal or composition packaging with a screw-type closure and be cushioned to prevent movement;
- d) electric storage batteries (Class 8) and lithium batteries (Class 9); and

e) first aid kits which may include flammable, corrosive and toxic articles or substances.

≠ The appliances must be packed, so that they cannot be accidentally activated, in strong outer packagings and, except for life vests, the dangerous goods must be in inner packagings packed so as to prevent movement. The dangerous goods must be an integral part of the appliance without which it would not be operational and in quantities which do not exceed those appropriate for the actual appliance when in use.

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Passenger restraint systems consisting of a cylinder charged with a non-liquefied, non-flammable compressed gas and no more than two actuating cartridges per passenger restraint system that meet the requirements of the State of Manufacture must be packed in strong outer packagings so they cannot be accidentally activated.

Life-saving appliances may also include articles and substances not subject to these Instructions which are an integral part of the appliance.

Notes: No change.

PI 906

<b>906</b>	<b>PACKING INSTRUCTION 906</b>	<b>906</b>
The general packing requirements of Part 4, Chapter 1 must be met.		

Notes: No change. Recommend the DGP working group consider harmonizing with UN P002. P002 requires UN packaging for UN1841, UN1931, and UN2969.

PI 908

<b>908</b>	<b>PACKING INSTRUCTION 908</b>	<b>908</b>
The general packing requirements of Part 4, Chapter 1 must be met.		
Polymeric beads or granules, expandable, impregnated with flammable gas or liquid as a blowing agent and plastic moulding materials in dough, sheet or extruded rope form must be packed in wooden (4C1, 4C2), plywood (4D), fibreboard (4G) or reconstituted wood (4F) boxes with sealed inner plastic liner, plywood drums (1D), fibre drums (1G) with sealed inner plastic liner or in metal (1A1, 1A2, 1B1, 1B2) packagings.		
<i>Note.— For loading restrictions see Part 7;2.12.</i>		

Notes: No change.

<b>909</b>	<b>PACKING INSTRUCTION 909</b>	<b>909</b>
The general packing requirements of Part 4, Chapter 1 must be met.		
Ammonium nitrate fertilizers (UN 2071) must be carried in:		
<ul style="list-style-type: none"> <li>a) rigid, sift-proof packagings (1A2, 1B2, 3A2, 1D, 1G, 1H2, 3H2 or 4C2); or</li> <li>b) 5L2, 5L3, 5H2, 5H3 or 5H4 bags.</li> </ul>		
White asbestos (UN 2590) must be carried in:		
<ul style="list-style-type: none"> <li>a) rigid, sift-proof packagings (1A2, 1B2, 3A2, 1D, 1G, 1H2, 3H2, 4C2, 4D, 4G, 4F, 4H1 or 4H2); or</li> <li>b) 5L2, 5L3, 5H2, 5H3 or 5H4 bags, which must be palletized and unitized by methods such as shrink-wrapping in plastic film or wrapping in fibreboard secured by strapping.</li> </ul>		

Notes: No change.

The requirements of Part 3, Chapter 4 must be met.

Single packagings are not permitted.

**COMBINATION PACKAGINGS:**

*INNER:*

Glass or earthenware (IP.1)	5 kg
Plastic (IP.2)	5 kg
Metal (IP.3, IP.3A)	5 kg
Paper (IP.4)	5 kg
Plastic bag (IP.5)	5 kg
Fibre (IP.6)	5 kg
Paper, plastic/aluminium (IP.10)	5 kg

*OUTER:*

<i>Boxes</i>	<i>Drums</i>	<i>Jerricans</i>
aluminium	aluminium	aluminium
fibreboard	fibre	plastic
plastic	plastic	steel
plywood	plywood	
reconstituted wood	steel	
steel		
wooden		

Notes: No change.

PI 910

Consumer commodities are materials that are packaged and distributed in a form intended or suitable for retail sale for purposes of personal care or household use. These include items administered or sold to patients by doctors or medical administrations. Except as otherwise provided below, dangerous goods packed in accordance with this Packing Instruction do not need to comply with Part 4, Chapter 1 or Part 6 of these Instructions; they must, however, comply with all other applicable requirements.

- a) Each packaging must be designed and constructed to prevent leakage that may be caused by changes in altitude and temperature during air transport.
- b) Inner packagings that are breakable (such as earthenware, glass or brittle plastic) must be packed to prevent breakage and leakage under conditions normally incident to transport. These completed packagings must be capable of withstanding a 1.2 m drop on solid concrete in the position most likely to cause damage.
- c) When filling receptacles for liquids, sufficient ullage (outage) must be left to ensure that neither leakage nor permanent distortion of the receptacle will occur as a result of an expansion of the liquid caused by temperatures likely to prevail during transport. Unless specific requirements are prescribed in national rules or international agreements, liquids must not completely fill a receptacle at a temperature of 55°C. At this temperature a minimum ullage of 2 per cent should be left. The primary packaging (which may include composite packaging), for which retention of the liquid is a basic function, must be capable of withstanding, without leakage, an internal pressure which produces a pressure differential of not less than 75 kPa or a pressure related to the vapour pressure of the liquid to be conveyed, whichever is the greater. The pressure related to the vapour pressure must be determined by the method shown in Part 4;1.1.6.1. Tests on sample receptacles must be carried out to demonstrate the capability of the primary packaging to withstand the above pressure.
- d) Stoppers, corks or other such friction-type closures must be held securely, tightly and effectively in place by positive means. The closure device must be so designed that it is extremely improbable that it can be incorrectly or incompletely closed and must be such that it may be easily checked to determine that it is completely closed.

- e) Inner packagings must be tightly packed in strong outer packagings and must be so packed, secured or cushioned as to prevent any breakage, leakage or significant movement within the outer packaging(s) during normal conditions of transport. Absorbent material must be provided for glass or earthenware inner packaging(s) containing consumer commodities in Class 2 or 3 or liquids of Division 6.1, in sufficient quantity to absorb the liquid contents of the largest of such inner packagings contained in the outer packaging. Absorbent and cushioning material must not react dangerously with the contents of the inner packagings. Notwithstanding the above, absorbent material may not be required if the inner packagings are so protected that breakage of the inner packagings and leakage of their contents from the outer packaging will not occur during normal conditions of transport.
- f) Packagings (including closures) in direct contact with dangerous goods must be resistant to any chemical or other action of such goods; the materials of the receptacles must not contain substances which may react dangerously with the contents, form hazardous products or significantly weaken the receptacles.
- g) Each completed package as prepared for shipment must not exceed a gross mass of 25 kg.
- h) Class 2 substances must be further limited to aerosol products containing non-toxic compressed or liquefied gas(es) that are necessary to expel liquids, powders or pastes, packed in inner non-refillable non-metal receptacles not exceeding 120 mL capacity each, or in inner non-refillable metal receptacles not exceeding 820 mL capacity each (except that flammable aerosols must not exceed 500 mL capacity each), subject in either case to the following provisions:
  - 1) the pressure in the aerosol must not exceed 1 500 kPa at 55°C and each receptacle must be capable of withstanding without bursting a pressure of at least 1.5 times the equilibrium pressure of the contents at 55°C;
  - 2) if the pressure in the aerosol exceeds 970 kPa at 55°C but does not exceed 1 105 kPa at 55°C, an inner IP.7, IP.7A or IP.7B metal receptacle must be used;
  - 3) if the pressure in the aerosol exceeds 1 105 kPa at 55°C but does not exceed 1 245 kPa at 55°C, an IP.7A or IP.7B metal receptacle must be used;
  - 4) if the pressure in the aerosol exceeds 1 245 kPa at 55°C, an IP.7B metal receptacle must be used;
  - 5) IP.7B metal receptacles having a minimum burst pressure of 1 800 kPa may be equipped with an inner capsule charged with a non-flammable, non-toxic compressed gas to provide the propellant function. In this case, the pressures indicated in 1), 2), 3) or 4) above do not apply to the pressure within the capsule. The quantity of gas contained in the capsule must be so limited such that the minimum burst pressure of the receptacle would not be exceeded if the entire gas content of the capsule were released into an aerosol.
  - 6) the liquid contents must not completely fill the closed receptacle at 55°C;
  - 7) each aerosol exceeding 120 mL capacity must have been heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect; and
  - 8) the valves must be protected by a cap or other suitable means during transport.
- i) For aerosols containing a biological or medical preparation which will be deteriorated by a heat test and which are non-toxic and non-flammable, packed in inner non-refillable receptacles not exceeding 575 mL capacity each, the following provisions are applicable:
  - 1) the pressure in the aerosol must not exceed 970 kPa at 55°C;
  - 2) the liquid contents must not completely fill the closed receptacle at 55°C;
  - 3) one aerosol out of each lot of 500 or less must be heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect; and
  - 4) the valves must be protected by a cap or other suitable means during transport.
- j) Except for aerosols, inner packagings must not exceed:
  - 1) 500 mL for liquids; and
  - 2) 500 g for solids.
- k) Consumer commodities shipped according to these provisions may be shipped in a unit load device prepared by a single shipper provided that no other dangerous goods are included in the unit load device.
- l) The gross mass on the dangerous goods transport document must be shown as:
  - 1) for one package, the actual gross mass of the package;
  - 2) for more than one package, either the actual gross mass of each package or as the average mass of the packages. (For example, if there are 10 packages and the total gross mass of them is 100 kg, the dangerous goods transport document may show this as 'average gross mass per package 10 kg'.)

Notes: No change.

**911****PACKING INSTRUCTION 911****911**

The general packing requirements of Part 4, Chapter 1 must be met.

**COMBINATION PACKAGINGS:***INNER:*

Glass or earthenware (IP.1)	5 kg
Plastic (IP.2)	10 kg
Metal (IP.3, IP.3A)	10 kg
Paper (IP.4)	5 kg
Plastic bag (IP.5)	5 kg
Fibre (IP.6)	5 kg
Glass ampoule (IP.8)	0.5 kg
Paper, plastic/aluminium (IP.10)	5 kg

*OUTER:**Boxes*

aluminium (4B)  
fibreboard (4G)  
plastic (4H1, 4H2)  
plywood (4D)  
reconstituted wood (4F)  
steel (4A)  
wooden (4C1, 4C2)

*Drums*

aluminium (1B2)  
fibre (1G)  
other metal (1N1, 1N2)  
plastic (1H2)  
plywood (1D)  
steel (1A2)

*Jerricans*

aluminium (3B2)  
plastic (3H2)  
steel (3A2)

**SINGLE PACKAGINGS:**

- Bags
  - paper (5M2)
  - plastic film (5H4)
- + textile (5L3)
- ≠ woven plastic (5H3)
- + Boxes
  - aluminium (4B)
  - fibreboard (4G)
  - plastic (4H2)
  - plywood (4D)
  - reconstituted wood (4F)
  - steel (4A)
  - wooden (4C1, 4C2)
- Composites
  - plastics receptacle in steel or aluminium drum (6HA1, 6HB1)
  - plastics receptacle in fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1)
  - plastics receptacle in steel or aluminium crate or box or plastic receptacle in wood, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)
- Drums
  - aluminium (1B1, 1B2)
  - ≠ fibre (1G)
  - plastic (1H1, 1H2)
  - other metal (1N1, 1N2)
  - ≠ plywood (1D)
  - steel (1A1, 1A2)
- Jerricans
  - + aluminium (3B1, 3B2)
  - plastic (3H1, 3H2)
  - steel (3A1, 3A2)

Notes: Added 1N2 drums as authorized outer packaging for combination packagings.  
Added 1N1 and 1N2 drums as authorized single packagings.  
Added composites with plastic inner packagings allowed in P001.

**913****PACKING INSTRUCTION 913****913**

The general packing requirements of Part 4, Chapter 1 must be met.

Genetically modified micro-organisms must be packed according to Packing Instruction 602, except that the packagings need not be tested as provided for in Part 6, Chapter 6. The maximum quantity in a primary receptacle must not exceed 100 mL or 100 g.

Notes: No change.

**915****PACKING INSTRUCTION 915****915**

The general packing requirements of Part 4, Chapter 1 must be met except that the requirements of Part 4;1.1.8 and 1.1.16 do not apply.

The kits may contain dangerous goods which require segregation according to Table 7-1. The packing group assigned to the kit as a whole must be the most stringent packing group assigned to any individual substance contained in the kit.

Inner packagings must not exceed 250 mL for liquids or 250 g for solids and must be protected from other materials in the kit. The total quantity of dangerous goods in any one kit must not exceed 1 L or 1 kg. The total quantity of dangerous goods in any one package must not exceed 10 kg.

Kits must not be packed with other dangerous goods in the same outer packaging.

Kits must be packed in one of the following:

- metal boxes (4A, 4B)
- wooden boxes (4C1, 4C2)
- plywood boxes (4D)
- reconstituted wood boxes (4F)
- fibreboard boxes (4G)
- plastic boxes (4H1, 4H2).

Notes: No change.

**Y915****PACKING INSTRUCTION Y915****Y915**

The requirements of Part 3, Chapter 4 must be met except that Part 3;4.3.3 does not apply.

Single packagings are not permitted.

Kits may contain dangerous goods which require segregation according to Table 7-1.

Inner packagings must not exceed 30 mL for liquids or 100 g for solids and must be protected from other materials in the kit. The total quantity of dangerous goods in any one kit and in any one package must not exceed 1 kg.

Kits must not be packed with other dangerous goods in the same outer packaging.

Kits must be packed in metal, wooden, plywood, reconstituted wood, fibreboard or plastic boxes.

Notes: No change.

**916****PACKING INSTRUCTION 916****916**

The general packing requirements of Part 4, Chapter 1 must be met except that the requirements of Part 4;1.1.2, 1.1.8, 1.1.10, 1.1.13 and 1.1.16 do not apply.

- a) For other than fuel system components, machinery or apparatus may only contain dangerous goods permitted under Part 3;4.1.2. If the machinery or apparatus contains more than one item of dangerous goods, the individual substances must not be capable of reacting dangerously together.

'Package orientation' labels (Figure 5-25), or pre-printed orientation labels meeting the same specification as either Figure 5-25 or ISO Standard 780-1985 must be affixed on at least two opposite vertical sides with the arrows pointing in the correct direction only when required to ensure liquid dangerous goods remain in their intended orientation.

The nature of the containment must be such that:

- 1) damage to receptacles containing the dangerous goods during air transport is unlikely; and
- 2) in the event of damage to receptacles containing the dangerous goods, no leakage of the dangerous goods from the machinery or apparatus is possible. A leakproof liner may be required.

In addition:

- i) Dangerous goods in machinery or apparatus must be packed in strong outer packagings unless the receptacles containing the dangerous goods are afforded adequate protection by the construction of the machinery or apparatus.
- ii) Receptacles containing dangerous goods must be so secured or cushioned as to prevent their breakage or leakage and so as to control their movement within the machinery or apparatus during normal conditions of transport. Cushioning material must not react dangerously with the contents of the receptacles. Any leakage of the contents must not substantially impair the protective properties of the cushioning material.
- iii) For Division 2.2 gases, the inner cylinder or pressure vessel for gases, their contents and filling densities must conform to the requirements of the State in which the cylinders or pressure vessels are filled.
- iv) The total net quantity of dangerous goods contained in one package must not exceed the following:
  - 1) 1 kg in the case of solids;
  - 2) 0.5 L in the case of liquids;
  - 3) 0.5 kg in the case of Division 2.2. gases,or any combination thereof.

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- + b) Fuel system components must be emptied of fuel as far as practicable and all openings must be sealed securely. They must be packed:
- i) in sufficient absorbent material to absorb the maximum amount of liquid which may possibly remain after emptying. Where the outer packaging is not liquid tight, a means of containing the liquid in the event of leakage must be provided in the form of a leakproof liner, plastic bag or other equally efficient means of containment;
  - ii) in strong outer packagings.

Notes: No change.

PI 917

**917**

**PACKING INSTRUCTION 917**

**917**

The general packing requirements of Part 4, Chapter 1 must be met.

Air bag inflators, air bag modules and seat-belt pretensioners must be packed in steel drums (1A2), aluminium drums (1B2), plywood drums (1D) or fibre drums (1G), plastic drums (1H2), plastic jerricans (3H2), steel jerricans (3A2), wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G), solid plastic boxes (4H2), steel or aluminium boxes (4A, 4B).

Air bag inflators, air bag modules and seat-belt pretensioners may also be transported unpackaged on cargo aircraft in dedicated handling devices when transported from where they are manufactured to vehicle assembly plants. When transported in handling devices, the following conditions must be met:

- a) air bag inflators, air bag modules or seat-belt pretensioners as fitted in the handling device must be capable of meeting the test criteria prescribed in Special Provision A56;
- b) the handling device must be completely enclosed; and
- c) each air bag inflator, air bag module or seat-belt pretensioner unit must be secured within the handling device to prevent movement in transport.

Notes: No change.

**9X1****PACKING INSTRUCTION 9X1****9X1****Lithium Batteries (UN 3090)**

The following requirements apply to cells and batteries containing lithium in any form, including lithium polymer and lithium ion cells and batteries:

The general packing requirements of Part 4, Chapter 1 must be met.

Lithium cells and batteries may only be transported under this Packing Instruction if they meet the following requirements:

- a) each cell or battery type has been determined to meet the criteria for assignment to Class 9 on the basis of tests carried out in accordance with the *Manual of Tests and Criteria*, Part III, subsection 38.3;
- b) each cell and battery must incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport;
- c) each cell and battery must be equipped with an effective means of preventing external short circuits;
- d) each battery containing cells or series of cells connected in parallel must be equipped with an effective means as necessary to prevent dangerous reverse current flow (e.g. diodes, fuses, etc.);
- e) cells and batteries must be packed in the inner packagings to effectively prevent short circuits and to prevent movement which could lead to short circuits;
- f) cells and batteries must be packed in steel drums (1A2), aluminium drums (1B2), plywood drums (1D) or fibre drums (1G), plastic drums (1H2), plastic jerricans (3H2), steel jerricans (3A2), wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G), solid plastic boxes (4H2), steel or aluminium boxes (4A, 4B) of Packing Group II.

Cells assigned to Class 9 which have been discharged to the extent that the open circuit voltage is less than the lower of:

- a) 2 volts; or
- b) two-thirds of the voltage of the undischarged cell; or batteries containing one or more such cells, are forbidden from transport.

**Lithium Batteries Contained in Equipment (UN 3091)**

The following requirements apply to cells and batteries in any form, including lithium polymer and lithium ion cells and batteries, when contained in equipment:

Lithium batteries (liquid or solid cathode) contained in equipment must meet all the requirements for authorized lithium cells and batteries as identified in a- d above, other than those related to packaging, be protected against short circuits and be securely held in place. Cells must not be capable of being discharged during transport to the extent that the open circuit voltage is less than the lower of:

- a) 2 volts; or
- b) two-thirds of the voltage of the undischarged cell.

Equipment containing lithium batteries must be packed in accordance with the general packing requirements of Part 4, Chapter 1 and be contained in strong outer packaging. The outer packaging must be waterproof or made waterproof through the use of a liner, such as a plastic bag unless the equipment is made waterproof by nature of its construction. The equipment must be secured against movement within the outer packaging and be packed so as to prevent accidental operation during air transport.

The quantity of lithium metal contained in any piece of equipment must not exceed 12 g per cell and 500 g per battery.

Not more than 5 kg of lithium batteries may be contained in any piece of equipment.

**Lithium Batteries Packed With Equipment (UN 3091)**

The following requirements apply to cells and batteries containing lithium in any form, including lithium polymer and lithium ion cells and batteries, when packed with equipment:

Lithium cells or batteries packed with equipment must meet the requirements for authorized cells and batteries as identified in a- d above other than those related to packaging. Lithium cells and batteries must be packed in fibreboard boxes (4G) or fibre drums (1G) of Packing Group II and in such a manner as to effectively prevent movement which could lead to short circuits. Such packages must not exceed 5 kg gross mass for passenger aircraft or 35 kg gross mass for cargo aircraft.

The equipment and the packages of lithium cells or batteries must be overpacked.

For the purposes of this packaging instruction, 'equipment' means apparatus requiring the lithium batteries with which it is packed for its operation.

**9X2**

**PACKING INSTRUCTION 9X2**

**9X2**

The general packing requirements of Part 4, Chapter 1 must be met.

**COMBINATION PACKAGINGS:**

*INNER:*

Glass or earthenware (IP.1)	5 L
Plastic (IP.2)	5 L
Metal (IP.3, IP.3A)	10 L

*OUTER:*

<i>Boxes</i>	<i>Drums</i>	<i>Jerricans</i>
aluminium (4B)	aluminium (1B2)	aluminium (3B2)
fibreboard (4G)	fibre (1G)	plastic (3H2)
plastic (4H1, 4H2)	other metal (1N2)	steel (3A2)
plywood (4D)	plastic (1H2)	
reconstituted wood (4F)	plywood (1D)	
steel (4A)	steel (1A2)	
wooden (4C1, 4C2)		

**SINGLE PACKAGINGS:**

- Composites
  - plastics receptacle in steel or aluminium drum (6HA1, 6HB1)
  - plastics receptacle in fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1)
  - plastics receptacle in steel or aluminium crate or box or plastic receptacle in wood, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)
- Cylinders, as permitted in Packing Instruction 200
- Drums
  - ≠ aluminium (1B1, 1B2)
  - other metal (1N1, 1N2)
  - ≠ plastic (1H1, 1H2) — not permitted for UN 1941
  - steel (1A1, 1A2)
- Jerricans
  - + aluminium (3B1, 3B2)
  - ≠ plastic (3H1, 3H2) — not permitted for UN 1941
  - ≠ steel (3A1, 3A2)

- Notes:
- Consolidated PI 907 and 914.
  - Added 1N2 drums as authorized outer packaging for combination packagings.
  - Added 1N1 and 1N2 drums as authorized single packagings.
  - Added composites with plastic inner packagings allowed in P001.
  - Added 3B2 aluminum jerricans as an authorized single packaging.
  - Deleted glass ampoule IP.8
  - PI 907 did not include 4H1 Box, the merged instruction does.

<b>Y9X3</b>	<b>PACKING INSTRUCTION Y9X3</b>	<b>Y9X3</b>																								
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Notes: Notes: Consolidated PI Y907, Y911, and Y914. No change to requirements.  
 Added other metal as an authorized drum.  
 Y914 also did not include aluminum or steel boxes or aluminum jerricans. The merged instruction does.  
 Deleted glass ampoule IP.8