



สำนักงานการบินพลเรือนแห่งประเทศไทย
The Civil Aviation Authority of Thailand

Guidance Material
for the Preparation of Dangerous Goods Section
in the Operations Manual – Helicopter

CAAT-GM-OPS-DGOMH

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0. Introduction

0.1 Background

Guidance Materials (GM) are issued by the Civil Aviation Authority of Thailand and contain information about standards, practices and procedures required to be complied.

0.2 Purpose

This GM provides guidance for the Operation Manual (OM) acceptance process for Helicopter Operators.

0.3 Applicability

This GM is applicable to all operators of Thai registered aircraft of where operations manuals include the handling of dangerous goods and weapons. The information given below is for guidance only and the application of relevant section in the Operation Manual Part A and D depending on operator type of operations and policies as follows;

a) Approved DG operators

All sections shall be applicable.

b) Non-Approved DG operators

If the red text “**Non-DG Approved carriers shall be omitted this section**” written below the header. The section shall not be applicable to Non-Approved DG operators.

0.4 Reference

- a) Doc 9284 ICAO Technical Instructions for the safe Transport of Dangerous Goods by Air
- b) IATA Dangerous Goods Regulations
- c) Doc 9481-AN/928 Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods
- d) Air Operator Certificate Requirements
- e) ประกาศกรมการขนส่งทางอากาศเรื่องการเดินทางด้วยเฮลิคอปเตอร์ของผู้ดำเนินการเดินอากาศ พ.ศ. 2557
- f) Thailand Civil Aviation Regulation - Air Operations (TCAR-OPS)

1. Dangerous Goods and Weapons

1.1 Policy on the Transport of Dangerous Goods (ICAO TI 7; 4.2 IATA DGR 1.4.2)

Editorial Note 1: The following text indicate where the operator needs to add text to describe their specific operation. The notes must be replaced with the operator’s own text before submission to the CAAT.

Editorial Note 2: The following text makes numerous references to the International Civil Aviation Organization’s Technical Instructions for the Safe Transport of Dangerous Goods by Air (Technical Instructions). Should the Operator have decided to use the IATA Dangerous Goods Regulations (latest edition) instead of the International Civil Aviation Organization Technical Instruction for the safe Transport of Dangerous Goods by air (ICAO Doc 9284 AN/905), references to the ICAO Technical Instructions (latest edition) should be amended accordingly.

1.1.1 Approval for the Transport of Dangerous Goods (ICAO TI 7; 4.2 IATA DGR 1.4.2)

a) DG Approved Operator

Dangerous goods can only be carried according to the International Civil Aviation Organization’s Technical Instructions for the Safe Transport of Dangerous Goods by Air (Technical Instructions), irrespective of whether the flight is wholly or partly within or wholly outside the territory of a State. An approval must be granted by CAAT before dangerous goods can be carried on an aircraft, except as identified in 1.2 General exception and 1.2.7 Items that may be carried by passengers and crews below. An additional approval or an exemption may be required to permit the transport of some dangerous goods (see 1.1.2. Forbidden Dangerous Goods below).

Furthermore, due to the differences in the type of operations carried out by helicopters compared with aeroplanes, there may be circumstances when the full provisions of the Technical Instructions are not appropriate or necessary, due to the operations involving unmanned sites, remote locations, mountainous areas or construction sites, etc. In such circumstances and when appropriate, the CAAT may grant an approval in order to permit the carriage of dangerous goods without all of the normal requirements of these Instructions being fulfilled. When States other than the CAAT have notified ICAO that they require prior approval of such operations, approval must also be obtained from the States of Origin and destination, as appropriate.

Editorial Note 1: Insert Text - *[Operator Name]* holds an CAAT approval for the transport of dangerous goods by air.

Editorial Note 2: Should the Operator’s policy prohibit the carriage of certain dangerous goods (e.g. radioactive material) these restrictions should be stated.

Editorial Note 3: Insert Text - The following *[person or post holder]* is assigned responsibility for the Approval held: *[Job Title/Name and contact details]*

Editorial Note 4: As queries regarding the carriage of dangerous goods will often be escalated to the nominated person, arrangements need to be established to ensure continuity of supervision in the absence of the person nominated by the operator as having overall responsibility for the transport of dangerous goods by air.

b) NON-DG Approved Operator

Dangerous goods can only be carried according to the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air (Technical Instructions), irrespective of whether the flight is wholly or partly within or wholly outside the territory of a State. An approval must be granted by CAAT before dangerous goods can be carried on an aircraft, except as identified in 1.2 General exception and 1.2.7 Items that may be carried by passengers and crews.

Editorial Note 1: Insert Text- *[Operator Name]* does not hold an CAAT approval for the transport of dangerous goods by air.

Editorial Note 2: As queries regarding the carriage of dangerous goods will often be escalated to the nominated person, arrangements need to be established to ensure continuity of supervision in the absence of the person nominated by the operator as having overall responsibility for the transport of dangerous goods by air.

1.1.2 Forbidden Dangerous Goods (ICAO TI 1; 1.1, 2.1 7; 4.2 IATA DGR 2.1, 1.4.2)

Note: Non-DG Approved carriers shall be omitted this section

Certain dangerous goods, which are normally forbidden, may be specifically approved for air transport by the State of Origin and the State of the Operator (CAAT):

- a) To transport dangerous goods forbidden on passenger and/or cargo aircraft where Special Provision A1/A2 applies; or Special Provision A1/A2 applies; or
- b) for other purposes as specified in the ICAO Technical Instructions; provided that in such instances an overall level of safety in transport which is at least equivalent to the level of safety provided for in the Technical Instructions is achieved.

In instances of extreme urgency or when other forms of transport are inappropriate or full compliance with the prescribed requirements is contrary to public interest, the States concerned may grant an exemption from the provisions of the Technical Instructions provided that in such instances an overall level of safety in transport which is at least equivalent to the level of safety provided for in the Technical Instructions is achieved. For the purposes of exemptions, "States concerned" are the States of Origin, Operator, transit, overflight and destination. For the State of overflight, if none of the criteria for granting an exemption are relevant, an exemption may be granted based solely on whether it is believed that an equivalent level of safety in air transport has been achieved

For example, since controls exist for quantities of some explosives which may be carried to or from specific airfields in Thailand, operators must seek advice from CAAT as to the suitability of the intended airfield of loading and unloading when Class 1 dangerous goods are being carried under an A2 Approval.

Dangerous goods carried in accordance with an exemption or approval must comply with the conditions on the exemption or approval, as well as those on the permanent approval unless these have been varied by the exemption or further approval.

Editorial Note 1: The operator’s procedure for ensuring relevant personnel are made aware of the details of short-term approvals and exemptions regarding the dangerous goods (e.g. through the issue of crew notices) should be described. It is recommended that when dangerous goods are carried under a specific exemption or approval, a copy of that document be carried on board the aircraft.

Editorial Note 2: Operators holding specific non-expiring approvals or exemptions related to the carriage of dangerous goods should provide details of these and the conditions of carriage specified therein.

1.2 General Exceptions

1.2.1 Airworthiness and Operational Items (ICAO TI 1; 2.2 IATA DGR 2.5)

An approval is not required for dangerous goods which are required to be aboard the aircraft as follows:

- a) items for airworthiness or operating reasons or for the health of passengers or crew, such as batteries, fire extinguishers, first-aid kits, insecticides, air fresheners, life rafts, escape slides, life-saving appliances, portable oxygen supplies, tritium signs, smoke hoods, passenger service units;
- b) aerosols, alcoholic beverages, perfumes, colognes, liquefied gas lighters and portable electronic devices containing lithium metal or lithium ion cells or batteries (provided that the batteries meet the provisions applicable when carried by passengers and crew) carried aboard an aircraft by the operator for use or sale on the aircraft during the flight or series of flights, but excluding non-refillable gas lighters and those lighters liable to leak when exposed to reduced pressure; and
- c) dry ice intended for use in food and beverage service aboard the aircraft; and
- d) alcohol-based hand sanitizers and alcohol-based cleaning products carried aboard an aircraft by the operator for use on the aircraft during the flight or series of flight for the purposes of passenger and crew hygiene;
- e) electronic devices such as electronic flight bags, personal entertainment devices, credit card readers, containing lithium metal or lithium ion cells or batteries and spare lithium batteries for such devices carried aboard an aircraft by the operator for use on the aircraft during the flight or series of flights, provided that the batteries meet the provisions applicable to the carriage of portable electronic devices containing lithium or lithium ion cells or batteries by passengers (see the entry for ‘Batteries’ in the table produced at 1.2.7 Items that may be carried by passengers and crews (ICAO TI Table 8-1 or IATA DGR Table 2.3A). Spare lithium batteries must be individually protected so as to prevent short circuits when not in use.

Note — Dangerous goods intended as replacements for those referred to in 1.2.1 a, b and c above may not be carried without the approval referred to in 1.1.1 and unless consigned and accepted for transport in accordance with the ICAO TI.

1.2.2 Conditions for Carriage of Portable Electronic Devices (PEDs) and Spare Batteries (ICAO TI 1; 2.2.1 e) IATA DGR 2.3.5.8)

Editorial Note 1: Conditions for the carriage and use of these electronic devices and for the carriage of spare batteries must be provided in the operations manual and/or other appropriate manuals as will enable flight crew, cabin crew and other employees to carry out their responsibilities. Operators should either explain these conditions or specify that spares may not be carried.

Editorial Note 2: Operators should state the procedure to handle, loading and stow electronic flight bags, such as tablet or notebook, that Flight Crew use during flight and aircraft on ground.

1.2.3 Veterinary Aid (ICAO TI 1; 1.1.5.1 b), 1.1.5.4 IATA DGR 1.2.7.1 (b), 1.2.7.4)

Editorial Note: Operators should describe their policy and procedures for transport Veterinary Aid.

An approval is not required for dangerous goods which are carried for use in flight as veterinary aid or as a humane killer for an animal. Such dangerous goods must be stowed and secured during take-off and landing and at all other times when deemed necessary by the pilot-in-command. The dangerous goods must be under the control of trained personnel during the time when they are in use on the aircraft.

Dangerous goods may be carried on a flight made by the same aircraft before or after a flight for which they are required as veterinary aid or as a humane killer for an animal, (e.g. training flights and positioning flights prior to or after maintenance), when it is impracticable to load or unload the dangerous goods immediately before or after the flight, subject to the following conditions:

- a) the dangerous goods must be capable of withstanding the normal conditions of air transport;
- b) the dangerous goods must be appropriately identified (e.g. by marking or labelling);
- c) the dangerous goods may only be carried with the approval of the operator;
- d) the dangerous goods must be inspected for damage or leakage prior to loading;
- e) loading must be supervised by the operator;
- f) the dangerous goods must be stowed and secured in the aircraft in a manner that will prevent any movement in flight which would change their orientation;
- g) the pilot-in-command must be notified of the dangerous goods loaded on board the aircraft and their loading location. In the event of a crew change, this information must be passed to the next crew;
- h) all personnel must be trained commensurate with the functions for which they are responsible; and
- i) the provisions of 1.14 Dangerous Goods Reporting Requirements apply.

1.2.4 Medical Aid for a Patient (ICAO TI 1; 1.1.5.1 a), 1.1.5.4 IATA DGR 1.2.7.1 (a), 1.2.7.4)

Editorial Note: Operators should describe their policy and procedures for transport of Medical Aid for Patient.

An approval is not required for dangerous goods which:

- a) are placed on board an aircraft with the approval of the operator; or
- b) form part of the permanent equipment of the aircraft when it has been adapted for specialized use, to provide, during flight, medical aid for a patient, such as gas cylinders, drugs, medicines, other medical material (e.g. sterilizing wipes) and wet cell or lithium batteries, providing:
 - i) The gas cylinders have been manufactured specifically for the purpose of containing and transporting that particular gas;
 - ii) The drugs and medicines and other medical matter are under the control of trained personnel during the time when they are in use;
 - iii) The equipment containing wet cell batteries is kept, and when necessary secured, in an upright position to prevent spillage of the electrolyte; and
 - iv) Proper provision is made to stow and secure all the equipment during take-off and landing and at all other times when deemed necessary by the commander in the interests of safety.

These dangerous goods may also be carried on a flight made by the same aircraft to collect a patient or after that patient has been delivered (e.g. training flights and positioning flights prior to or after maintenance), when it is impracticable to load or unload the goods at the time of the flight on which the patient is carried, subject to the following conditions:

- a) the dangerous goods must be capable of withstanding the normal conditions of air transport;
- b) the dangerous goods must be appropriately identified (e.g. by marking or labelling);
- c) the dangerous goods may only be carried with the approval of the operator;
- d) the dangerous goods must be inspected for damage or leakage prior to loading;
- e) loading must be supervised by the operator;
- f) the dangerous goods must be stowed and secured in the aircraft in a manner that will prevent any movement in flight which would change their orientation;
- g) the pilot-in-command must be notified of the dangerous goods loaded on board the aircraft and their loading location. In the event of a crew change, this information must be passed to the next crew;
- h) all personnel must be trained commensurate with the functions for which they are responsible; and
- i) the provisions of 1.14 Dangerous Goods Reporting Requirements apply.

Note 1— The dangerous goods carried may differ from those identified above due to the needs of the patient. These provisions apply both to dedicated air ambulances and to temporarily modified aircraft.

Note 2— For dangerous goods that passengers are permitted to carry as medical aid, see 1.2.7 Items permitted in baggage)

1.2.5 Excess baggage being Sent as Cargo (ICAO TI 1; 1.1.5.1 h) IATA DGR 1.2.7.1 (h))

Editorial Note: Operators should describe their policy and procedures for transport of excess baggage being sent as cargo.

An approval is not required for dangerous goods contained within items of excess baggage being sent as cargo provided that:

- a) the excess baggage has been consigned as cargo by or on behalf of a passenger;
- b) the dangerous goods may only be those that are permitted by and in accordance with 1.2.7 Item permitted in baggage to be carried in checked baggage; and
- c) the excess baggage is marked with the words “Excess baggage consigned as cargo”.

With the aim of preventing dangerous goods, which a passenger is not permitted to have, from being taken aboard an aircraft in excess baggage consigned as cargo, any organization or enterprise accepting excess baggage consigned as cargo should seek confirmation from the passenger, or a person acting on behalf of the passenger, that the excess baggage does not contain dangerous goods that are not permitted and seek further confirmation about the contents of any item where there are suspicions that it may contain dangerous goods that are not permitted.

1.2.6 Instructions on the Carriage of Employees of the Operator (ICAO TI 7; 4.2)

Note: Non-DG Approved carriers shall be omitted this section

There is no restriction of the carriage of employees on an aircraft carrying dangerous goods which are permitted on a passenger aircraft, providing the requirements of the Technical Instructions are complied with when an aircraft is carrying dangerous goods which can only be carried on a cargo aircraft, employees of the operator can also be carried provided they are in an official capacity it is intended this be interpreted as meaning they have duties concerned with the preparation or undertaking of a flight or on ground once the aircraft has landed, although not necessarily in connection with an aircraft see also 1.7.2 Prohibition on the carriage of passenger with cargo aircraft only.

1.2.7 Provisions for Dangerous Goods Carried by Passenger and Crew (Items Permitted in Baggage, Including) (ICAO TI 8; 1.1, Table 8-1, IATA DGR 2.3, Table 2.3A)

Editorial Note 1: International standards permit the carriage of the dangerous goods listed below by passengers or crew members either as or in carry-on baggage or checked baggage or on their person. Additional restrictions implemented by countries in the interests of aviation security may, however, limit or forbid the carriage of some of these items.

Editorial Note 2: Certain items listed are permitted only with the operator’s approval. The operator’s policy towards the carriage of items listed as requiring operator’s approval should be established. This should include details of how passengers are expected to declare their intention to carry an item, how its proper preparation will be confirmed and how details will be passed to ground handlers (as required). If case-by-case consideration

is considered appropriate for items requiring operator approval, the person or role within the operation that may grant approval for the carriage of such items and the basis upon which approvals will be granted should be stated.

Baggage intended to be carried in the cabin that is placed in the cargo compartment must only contain dangerous goods permitted in checked baggage. When baggage intended as carry-on is taken by the operator and placed into the cargo compartment for carriage, the operator must confirm with the passenger that dangerous goods which are only permitted in carry-on baggage (e.g. lithium batteries, including power banks) have been removed.

- a) An approval is not required for those dangerous goods which, according to the Technical Instructions, can be carried by passengers or crew members.
- b) Passengers or crew are forbidden to carry dangerous goods either as or in carry-on baggage, checked baggage or on their person unless the dangerous goods are permitted in accordance with the table below and:
 - c) carried by passengers or crew for personal use only;
 - d) contained in baggage that has been separated from its owner during transit (e.g. lost baggage or improperly routed baggage); or
 - e) contained within items of excess baggage sent as cargo as permitted by 1.2.5

The entry in the table that most appropriately describes the item or article must be selected. For instance, electronic cigarettes must meet the requirements of the entry for “Battery-powered portable electronic smoking devices” not the entry for lithium batteries or non-spillable batteries.

An item or article that contains multiple dangerous goods must meet all applicable entries. For instance, the restrictions and conditions for entries 1) and 14) apply to an avalanche backpack that contains lithium batteries and gas cartridges.

Active devices must meet defined standards for electromagnetic radiation to ensure that the operation of the devices does not interfere with aircraft systems.

Where an entry requires compliance with specific UN tests or Special Provisions,

if considered necessary (e.g. to grant the operator’s approval for carriage), passengers should be able to confirm that the applicable requirements have been met. For items such as batteries, the passenger should be able to obtain confirmation from the manufacturer or distributor of the item.

Editorial Note 3: Operators that allow cabin baggage to be transferred to the cargo compartment should describe the means of obtaining the confirmations from passengers.

Note 1 — The following dangerous goods may be commonly carried by passengers on other modes of transport, however, they are prohibited either as or in carry-on baggage or checked baggage:

- personal medical oxygen devices that utilize liquid oxygen;

- electroshock weapons (e.g. tasers) containing dangerous goods such as explosives, compressed gases, lithium batteries, etc.;
- “strike anywhere” matches;
- lighter fuel and lighter refills;
- premixing burner lighter without a means of protection against unintentional activation; and
- battery-powered lighters powered by a lithium ion or lithium metal battery (e.g. laser plasma lighters, tesla coil lighters, flux lighters, arc lighters and double arc lighters) without a safety cap or means of protection against unintentional activation.

Note 2. — Exceptions found in the Technical Instructions from the restrictions on carriage by passengers and crew (e.g. by application of a Special Provision) are not reproduced in the tables below. The following dangerous goods are not subject to the Technical Instructions:

- Radio-pharmaceuticals contained within the body of a person as the result of medical treatment; and
- Energy efficient lamps when in retail packaging and intended for personal or home use

Note 3. — Air Cylinders for purposes such as scuba diving: if empty or at a pressure less than 200 kPa at 20° (2 Bar or 29 PSI) air cylinders are not classified as dangerous goods so are permitted for carriage by passenger or crew.

Example ICAO TI Table 8-1 Provisions for Dangerous goods carried by Passenger and Crew (Current Edition)

The Operator must provide either ICAO TI table 8-1 or IATA DGR table 2.3A matched with Operator’s Policy.

Table 8-1. Provisions for dangerous goods carried by passengers or crew

Dangerous Goods	Location		Approval of the operator(s) is required	Restrictions
	Checked baggage	Carry-on baggage		
Batteries				
1) lithium batteries (including portable electronic devices)	Yes (except for g) and h))	Yes	(see c) and d))	<p>a) each battery must be of a type which meets the requirements of each test in the UN <i>Manual of Tests and Criteria</i>, Part III, subsection 38.3;</p> <p>b) each battery must not exceed the following:</p> <ul style="list-style-type: none"> - for lithium metal batteries, a lithium content of 2 grams; or - for lithium ion batteries, a Watt-hour rating of 100 Wh; <p>c) each battery may exceed 100 Wh but not exceed 160 Wh Watt- hour rating for lithium ion with the approval of the operator;</p> <p>d) each battery may exceed 2 grams but not exceed 8 grams lithium content for lithium metal for portable medical electronic devices with the approval of the operator;</p> <p>e) portable electronic devices containing batteries should be carried as carry-on baggage; however, if carried as checked baggage:</p>

				<ul style="list-style-type: none"> - measures must be taken to prevent unintentional activation and to protect the devices from damage; and - the devices must be completely switched off (not in sleep or hibernation mode); <ul style="list-style-type: none"> • for lithium metal batteries, a lithium content of 0.3 grams; or • for lithium ion batteries, a Watt-hour rating of 2.7 Wh. <p>f) batteries and heating elements must be isolated in portable electronic devices capable of generating extreme heat, which could cause a fire if activated, by removal of the heating element, battery or other components;</p> <p>g) spare batteries, including power banks:</p> <ul style="list-style-type: none"> - must be carried as carry-on baggage; and - must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch); <p>h) baggage equipped with a lithium battery(ies) exceeding:</p> <ul style="list-style-type: none"> - for lithium metal batteries, a lithium content of 0.3 grams; or - for lithium ion batteries, a Watt-hour rating of 2.7 Wh <p>must be carried as carry-on baggage unless the battery(ies) is removed from the baggage, in which case the battery(ies) must be carried in accordance with g);</p>
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				i) no more than two spare batteries meeting the requirements of c) or d) may be carried per person.
2) Non-spillable wet, nickel-metal hydride, and dry batteries	Yes	Yes	No	<p>a) for a non - spillable battery:</p> <ul style="list-style-type: none"> i) must meet the requirements of Special Provision A67; ii) each battery must not exceed a voltage of 12 volts and a Watt-hour rating of 100 Wh; iii) each battery must be protected from short circuit by the effective insulation of exposed terminals; iv) no more than two spare batteries per person may be carried; and v) if contained in equipment, the equipment must be either protected from unintentional activation, or each battery must be disconnected and its exposed terminals insulated; <p>b) for a dry battery or nickel-metal hydride battery, each battery must comply with Special Provision A123 or A199, respectively; and</p> <p>c) batteries and heating elements must be isolated in battery- powered equipment capable of generating extreme heat, by removal of the heating element, battery or other components.</p>
3) Battery-powered portable electronic smoking devices (e.g. e-cigarettes, ecigs, ecigars, epipes, personal vaporizers, electronic nicotine delivery systems)	No	Yes	No	<p>a) if powered by lithium batteries, each battery must comply with restrictions of 1) a), b) and g);</p> <p>b) the devices and/or batteries must not be recharged on board the aircraft; and</p> <p>c) measures must be taken to prevent unintentional activation of the heating element while on board the aircraft.</p>

<p>4) Mobility aids (e.g. wheelchairs) powered by:</p> <ul style="list-style-type: none"> • spillable batteries; • non-spillable wet batteries; • dry batteries; • nickel-metal hydride batteries; or • lithium ion batteries 	<p>Yes</p>	<p>(see e))</p>	<p>Yes</p>	<p>a) for use by passengers whose mobility is restricted by either a disability, their health or age, or a temporary mobility problem (e.g. broken leg);</p> <p>b) the passenger should make advance arrangements with each operator and provide information on the type of battery installed and on the handling of the mobility aid (including instructions on how to isolate the battery);</p> <p>c) in the case of a dry battery or nickel-metal hydride battery, each battery must comply with Special Provision A123 or A199, respectively;</p> <p>d) in the case of a non-spillable wet battery:</p> <ul style="list-style-type: none"> i) each battery must comply with Special Provision A67; and ii) a maximum of one spare battery may be carried per passenger; <p>e) in the case of a lithium ion battery:</p> <ul style="list-style-type: none"> i) each battery must be of a type which meets the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38.3; ii) when the mobility aid does not provide adequate protection to the battery: <ul style="list-style-type: none"> - the battery must be removed in accordance with the manufacturer's instructions; - the battery must not exceed 300 Wh; - the battery terminals must be protected from short circuit (by insulating the terminals, e.g. by taping over exposed
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				<p>terminals);</p> <ul style="list-style-type: none"> - the battery must be protected from damage (e.g. by placing each battery in a protective pouch); and - the battery must be carried in the cabin; <p>iii) a maximum of one spare battery not exceeding 300 Wh or two spare batteries not exceeding 160 Wh each may be carried. Spare batteries must be carried in the cabin.</p>
Flames and fuel sources				
5) Cigarette lighter Small packet of safety matches	No	(see b))	No	<p>a) no more than one per person;</p> <p>b) must be carried on the person</p> <p>c) must not contain unabsorbed liquid fuel (other than liquefied gas); and</p> <p>d) if a cigarette lighter is powered by lithium batteries, each battery must comply with restrictions of 1) a), b) and g) and 3) b) and c).</p>
6) Alcoholic beverages containing more than 24 per cent but not more than 70 per cent alcohol by volume	Yes	Yes	No	<p>a) must be in retail packagings; and</p> <p>b) no more than 5 L total net quantity per person.</p> <p><i>Note.— Alcoholic beverages containing not more than 24 per cent alcohol by volume are not subject to any restrictions.</i></p>
7) Internal combustion engines or fuel cell engines	Yes	No	No	<p>Measures must be taken to nullify the hazard. Refer to Special Provision A70 for more information.</p>
8) Fuel cells containing fuel	No	Yes	No	<p>a) fuel cell cartridges may only contain flammable liquids, corrosive substances, liquefied flammable gas, water reactive substances or hydrogen in metal hydride;</p>

Spare fuel cell cartridges			<p>b) refuelling of fuel cells on board an aircraft is not permitted except that the installation of a spare cartridge is allowed;</p>
			<p>c) the maximum quantity of fuel in any fuel cell or fuel cell cartridge must not exceed:</p> <ul style="list-style-type: none"> - for liquids 200 mL; - for solids 200 grams; - for liquefied gases, 120 mL for non-metallic fuel cell cartridges or 200 mL for metal fuel cell or fuel cell cartridges; and - for hydrogen in metal hydride, the fuel cell or fuel cell cartridges must have a water capacity of 120 mL or less
			<p>d) each fuel cell and each fuel cell cartridge must conform to IEC 62282-6-100 Ed. 1, including Amendment 1, and must be marked with a manufacturer’s certification that it conforms to the specification. In addition, each fuel cell cartridge must be marked with the maximum quantity and type of fuel in the cartridge;</p> <p>e) fuel cell cartridges containing hydrogen in metal hydride must comply with the requirements in Special Provision A162;</p> <p>f) no more than two spare fuel cell cartridges may be carried by a passenger;</p> <p>g) fuel cells containing fuel are permitted in carry-on baggage only;</p> <p>h) interaction between fuel cells and integrated batteries in a device must conform to IEC 62282-6-100 Ed. 1, including Amendment 1. Fuel cells whose sole function is to charge a battery in the device are not permitted;</p>

				<p>i) fuel cells must be of a type that will not charge batteries when the portable electronic device is not in use and must be durably marked by the manufacturer: “APPROVED FOR CARRIAGE IN AIRCRAFT CABIN ONLY” to so indicate; and</p> <p>j) in addition to the languages which may be required by the State of Origin for the markings specified above, English should be used.</p>
Gases in cylinders and cartridges				
9) Cylinders of oxygen or air required for medical use	Yes	Yes	Yes	<p>a) no more than 5 kg gross mass per cylinder;</p> <p>b) cylinders, valves and regulators, where fitted, must be protected from damage which could cause inadvertent release of the contents;</p> <p>c) advance arrangements recommended; and</p> <p>d) the pilot-in-command must be informed of the number of oxygen or air cylinders loaded on board the aircraft and their loading location(s).</p>
10) Cartridges of Division 2.2 worn for the operation of mechanical limbs	Yes	Yes	No	Spare cartridges of a similar size are also allowed, if required, to ensure an adequate supply for the duration of the journey.
11) Cartridge of hydrocarbon gas contained in hair styling equipment	Yes	Yes	No	<p>a) no more than one per person;</p> <p>b) the safety cover must be securely fitted over the heating element; and</p> <p>c) spare cartridges must not be carried.</p>

<p>≠12) Cartridges of Division 2.2 with no subsidiary hazard fitted into a self-inflating personal safety device, intended to be worn by a person, such as a life-jacket or vest</p>	Yes	Yes	Yes	<p>a) no more than two personal safety devices per person;</p> <p>b) the personal safety device(s) must be packed in such a manner that they cannot be accidentally activated;</p> <p>c) must be for inflation purposes;</p> <p>d) no more than two cartridges are fitted into each device; and</p> <p>e) no more than two spare cartridges per device.</p>
<p>13) Cartridges of Division 2.2 with no subsidiary hazard for other than a self-inflating personal safety device</p>	Yes	Yes	Yes	<p>a) no more than four cartridges per person; and</p> <p>b) the water capacity of each cartridge must not exceed 50 mL.</p> <p><i>Note.— For carbon dioxide, a gas cartridge with a water capacity of 50 mL is equivalent to a 28 g cartridge.</i></p>
<p>14) Cartridges and cylinders of Division 2.2 with no subsidiary hazard contained in an avalanche rescue backpack</p>	Yes	Yes	Yes	<p>a) no more than one avalanche rescue backpack per person;</p> <p>b) the backpack must be packed in such a manner that it cannot be accidentally activated;</p> <p>c) may contain a pyrotechnic trigger mechanism which must not contain more than 200 mg net of Division 1.4S; and</p> <p>d) the airbags within the backpack must be fitted with pressure relief valves.</p>
Radioactive material				
<p>15) Radioisotopic cardiac pacemakers or other medical devices</p>	n/a (see restrictions)	n/a (see restrictions)	No	<p>Must be implanted into a person or fitted externally as the result of medical treatment.</p>

Mercury				
16) Small medical or clinical thermometer which contains mercury	Yes	No	No	a) no more than one per person; and b) must be in its protective case.
Other dangerous goods				
17) Non-radioactive medicinal articles (including aerosols), toiletry articles (including aerosols) and aerosols in Division 2.2 with no subsidiary hazard	Yes	Yes	No	a) no more than 0.5 kg or 0.5 L total net quantity per single article; b) no more than 2 kg or 2 L total net quantity of all articles (e.g. four aerosol cans of 0.5 L each) per person; c) release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents; and d) the release of gas must not cause extreme annoyance or discomfort to crew members so as to prevent the correct performance of assigned duties.
18) Dry ice	Yes	Yes	Yes	a) no more than 2.5 kg per person; b) used to pack perishables that are not subject to these Instructions; c) the package must permit the release of carbon dioxide gas; and d) when carried as checked baggage, each package must be marked: i) “DRY ICE” or “CARBON DIOXIDE, SOLID”; and ii) the net weight of dry ice or an indication that the net weight is 2.5 kg or less.

19) Cartridges in Division 1.4S (UN 0012 or UN 0014 only)	Yes	No	Yes	<p>a) no more than 5 kg gross mass per person;</p> <p>b) must be securely packaged;</p> <p>c) must not include ammunition with explosive or incendiary projectiles; and</p> <p>d) allowances for more than one person must not be combined into one or more packages.</p>
20) Permeation devices	Yes	No	No	Instructions on how to package permeation devices for calibrating air quality monitoring equipment are found in Special Provision A41.
21) Non-infectious specimens in flammable solutions	Yes	Yes	No	Instructions on how to package and mark specimens are found in Special Provision A180.
22) Refrigerated liquid nitrogen	Yes	Yes	No	<p>Must be contained in insulated packagings (e.g. dry shippers) that would not allow the build-up of pressure and be fully absorbed in a porous material so that there is no free liquid that could be released from the packaging.</p> <p>Refer to Special Provision A152 for more information.</p>
23) Dangerous goods incorporated in security-type equipment, such as attaché cases, cash boxes, cash bags, etc.	Yes	No	Yes	The security-type equipment must be equipped with an effective means of preventing accidental activation and the dangerous goods incorporated in the equipment must meet the conditions of Special Provision A178.

Table 8-2 Provisions for instruments carried by OPCW and government agencies

Dangerous Goods	Location		Approval of the operator(s) is required	Restrictions
	Checked baggage	Carry-on baggage		
1) Instruments containing radioactive material (i.e. chemical agent monitor (CAM) and/or rapid alarm and identification device monitor (RAID-M))	Yes	Yes	Yes	<ul style="list-style-type: none"> a) the instruments must not exceed the activity limits specified in Table 2-14 of these Instructions; b) must be securely packed; and c) must be carried by staff members of the Organization for the Prohibition of Chemical Weapons (OPCW) on official travel.
2) A mercurial barometer or mercurial thermometer	No	Yes	Yes	<ul style="list-style-type: none"> a) must be carried by a representative of a government weather bureau or similar official agency; b) must be packed in a strong outer packaging, having a sealed inner liner or a bag of strong leakproof and puncture-resistant material impervious to mercury, which will prevent the escape of mercury from the package irrespective of its position; and c) the pilot-in-command must be informed of the barometer or thermometer.

The Organization for the Prohibition of Chemical Weapons (OPCW) and government agencies listed in the table below may carry specified instruments containing dangerous goods when:

- a) carried by staff members on official travel;
- b) contained in baggage that has been separated from its owner during transit (e.g. lost baggage or improperly routed baggage); or
- c) contained within items of excess baggage sent as cargo as permitted by 1.2.5.

1.2.7.1 Procedure for Granting Approval for certain items in baggage (ICAO TI 7; 4.2 IATA DGR 1.4.2.2)

Goods acceptable with operator Approval, as Checked Baggage Only, Goods Acceptable with operator Approval as Carry-on Baggage Only and Goods Acceptable with operator Approval as Baggage address dangerous goods that are permitted in passenger or crew baggage only when the operator concerned approve such carriage.

Editorial Note: The operator should establish procedures that identify the approval process and any company specific requirements that may apply to items that are approved for carriage. More detail on the recommended practice is set out in IATA DGR 1.4.2.2.

1.2.7.2 Procedure for Carriage of Battery Powered Mobility Aids (ICAO TI 7; 2.13, Table 8-1 no. 2), 4) IATA DGR 2.3.2.2 - 2.3.2.4)

Editorial Note 1: International standards permit the carriage of the dangerous goods listed below by passengers or crew members either as or in carry-on baggage or checked baggage or on their person. Additional restrictions implemented by countries in the interests of aviation security may, however, limit or forbid the carriage of some of these items.

Editorial Note 2: Certain items listed are permitted only with the operator's approval. Requirements apply to some items regarding the means by which they are prepared for transport (e.g. wheelchairs and battery-powered mobility devices) or the professional status of the passenger (e.g. Chemical Agent Monitoring Equipment). The operator's policy towards the carriage of items listed as requiring operator's approval should be established. This should include details of how passengers are expected to declare their intention to carry an item, how its proper preparation will be confirmed and how details will be passed to ground handlers (as required). If case-by-case consideration is considered appropriate for items requiring operator approval, the person or role within the operation that may grant approval for the carriage of such items and the basis upon which approvals will be granted should be stated.

An approval is not required for those dangerous goods which, according to the Technical Instructions, can be carried by passengers or crew members as per the following table: 8-1

Editorial Note 3: Should it be necessary to transfer carry-on baggage to the hold (e.g. due to the size of the baggage preventing proper stowage in the cabin) it is necessary for cabin crew to verify that the baggage contains no dangerous goods that are permitted for carriage in carry-on baggage only (e.g. spare lithium batteries, heat producing articles etc).

Editorial Note 4: reference to ensure that passenger will notify the operator in case SSR (Special Services Request for Mobility Aids) handling is required.

("ensure" a passenger will notify by way of text in an Operations Manual; suggest adding a clear explanation on website of what is expected of passenger of reduced mobility. Also, it must be stated how operator will ensure that battery powered mobility aids will be prepared safely)

Editorial Note 5: This should include details of how passengers are expected to declare their intention to carry an item, how proper preparation will be confirmed and how details will be passed to ground handlers (as required).

1.2.7.2.1 Wheelchairs/Mobility Aids with Non-Spillable Wet Batteries or with Batteries which Comply with Special Provision A123 or A199

Battery-powered wheelchairs or other similar mobility aids for use by passengers whose mobility is restricted by either a disability, their health or age, or a temporary mobility problem (e.g. broken leg), with non-spillable wet batteries which comply with Special Provision A67 or nickel-metal hydride batteries which comply with Special Provision A199 or dry batteries which comply with Special Provision A123:

- a) The mobility aid must be prepared for transport to prevent:
 - i) unintentional activation; and
 - ii) non-spillable batteries are not permitted to contain any free or unabsorbed liquid.
- b) The operator must secure, by use of straps, tie-downs or other restraint devices, a battery powered mobility aid with installed batteries. The mobility aid, the batteries, electrical cabling and controls must be protected from damage including by the movement of baggage, mail or cargo
- c) The operator must verify that:
 - i) The passenger has confirmed that the battery is a non-spillable wet battery that complies with special provision A67, or a nickel-metal hydride battery which complies with Special Provision A199 or dry battery which complies with Special Provision A123.
 - ii) The battery terminals are protected from short circuit, e.g. by being enclosed within a battery container;
 - iii) The battery is either:
 - (a) Adequately protected against damage by the design of the mobility aid and Securely attached to the wheelchair or mobility aid and the electrical circuits must be isolated following the manufacturer's instructions; or
 - (b) removed by the user, if the mobility aid is specifically designed to allow it to be, following the manufacturer's instructions.
- d) A passenger may carry a maximum of;
 - i) one spare wet, non-spillable battery meeting Special Provision A67; or
 - ii) two spare nickel-metal hydride batteries meeting Special Provision A199 or dry batteries meeting Special Provision A123.

- e) The operator must ensure that any battery(ies) removed from the wheelchair/mobility aid or spare batteries are carried in strong, rigid packagings which must be carried in cargo compartment (see IATA DGR 9.3.14.5 and Figure 9.3.C);
- f) The operator must inform the pilot-in-command of the location of mobility aids with installed batteries, removed batteries and spare batteries.
- g) It is recommended that passengers make advance arrangements with each operator.

1.2.7.2.2 Wheelchairs/Mobility Aids with Spillable Batteries

Battery-powered wheelchairs or other similar mobility aids for use by passengers whose mobility is restricted by either a disability, their health or age, or a temporary mobility problem (e.g. broken leg), with spillable batteries:

- a) The operator must secure, by use of straps, tie-downs or other restraint devices, a battery powered mobility aid with installed batteries. The mobility aid, the batteries, electrical cabling and controls must be protected from damage including by the movement of baggage, mail or cargo
- b) The operator must verify that:
 - i) The battery terminals are protected from short circuits, e.g. by being enclosed within a battery container;
 - ii) The battery is fitted, where feasible, with spill-resistant vent caps;
- c) The battery is either;
 - i) securely attached to the wheelchair or mobility aid and the electrical circuits are isolated following the manufacturer's instructions; or
 - ii) removed from the mobility aid following the manufacturer's instructions when the mobility aid cannot be maintained in an upright position.
- d) The operator must load, stow, secure and upload a mobility aid with a spillable battery in an upright position. If the wheelchair or mobility aid cannot be loaded, stowed, secured and unloaded always in an upright position or if the mobility aid does not adequately protect the battery, the operator must remove the battery. The removed battery must be carried in strong, rigid packagings as follows;
 - i) Packagings must be leak-tight, impervious to battery fluid and be protected against upset by securing to pallets or by securing them in cargo compartments using appropriate means of securement (other than by bracing with freight or baggage) such as by use of restraining straps, brackets or holders;

- ii) Batteries must be protected against short circuits, secured upright in these packagings and surrounded by compatible absorbent material sufficient to absorb their total liquid contents; and
 - iii) These packagings must be marked “BATTERY, WET, WITH WHEELCHAIR” or “BATTERY, WET, WITH MOBILITY AID” and be labelled with the “Corrosive” label and with the “Package Orientation” label.
- e) The operator must inform the pilot-in-command of the location of mobility aids with installed batteries and removed batteries.
 - f) It is recommended that passengers make advance arrangements with each operator.

1.2.7.2.3 Wheel Chairs/Mobility Aids with Lithium Batteries

Lithium-ion battery powered wheelchairs or other similar mobility aids for use by passengers whose mobility is restricted by either a disability, their health or age, or a temporary mobility problem (e.g. broken leg), subject to the following conditions;

- a) The batteries must be of type which meets the requirements of each test in UN manual of tests and criteria, Part III, subsection 38.3;
- b) The operator must secure, by use of straps, tie-downs or other restraint devices, a battery powered mobility aid with installed batteries. The mobility aid, the batteries, electrical cabling and controls must be protected from damage including by the movement of baggage, mail or cargo.
- c) The operator must verify:
 - i) the battery terminals are protected from short circuits, e.g. by being enclosed within a battery container;
 - ii) The battery is either:
 - (a) Adequately protected against damage by the design of the mobility aid and Securely attached to the wheelchair or mobility aid and the electrical circuits are isolated following the manufacturer’s instructions; or
 - (b) removed by the user, if the mobility aid is specifically designed to allow it to be, following the manufacturer’s instructions. The battery removed from the mobility aid must not exceed 300 Wh.
- d) A passenger may carry a maximum of one spare lithium ion battery not exceed 300 Wh or two spare batteries each not exceeding 160 Wh;
- e) The operator must ensure that any battery removed from the mobility and any spare batteries are carried in the passenger cabin. The removed or spare batteries must be protected from damage (e.g. by placing each battery in a protective pouch);
- f) The operator must inform the pilot-in-command of the location of the mobility aid with an installed

An operator or the operator's handling agent and the airport operator must ensure that information on the types of dangerous goods which they are forbidden to transport aboard an aircraft is communicated effectively to passengers. This information must be presented at each of the places at an airport where tickets are issued, boarding passes are issued, passenger baggage is dropped off and aircraft boarding areas are maintained, and at any other location where passengers are issued boarding passes and/or checked baggage is accepted. This information must include visual examples of dangerous goods forbidden from transport aboard an aircraft.

An operator, of passenger aircraft, should have information on those dangerous goods which may be carried by passengers made available prior to the boarding pass issuance process on their websites or other sources of information.

Editorial Note 2: Operators must describe the means of promulgating information to passengers. The operations manual must include information on how passengers will be notified and acknowledge, when required, of the restriction on the carriage of dangerous goods before, during, and after ticketing/booking, boarding pass issuance and check-in processes.

1.4 Marking and Labelling of Packages (ICAO TI 5; 2.0, 3.0, IATA DGR 7)

1.4.1 Marking and Labelling

a) DG Approved Operator

Articles and substances meeting the dangerous goods classification criteria are assigned a 'UN Number' under the United Nations classification system. This consists a four-digit number preceded by the capital letters 'UN'. Packages of dangerous goods must be marked with the UN Number(s) applicable to their contents.

Packages containing dangerous goods can also be identified by labels indicating the hazard of the goods by their class or division or by the presence of certain handling labels/marks.

Note — When dangerous goods marks or labels are seen on items not declared as dangerous goods, it is often an indication that they do contain such goods. Undeclared dangerous goods must not be loaded on an aircraft and reporting procedures must be implemented (see 1.14 Dangerous Goods Reporting Requirement)

During the course of air transport, including storage, dangerous goods markings and labels must not be covered or obscured by any part of or attachment to the packaging or any other label or marking

b) NON-DG Approved Operator

Articles and substances meeting the dangerous goods classification criteria are assigned a 'UN Number' under the United Nations classification system. This consists a four-digit number preceded by the capital letters 'UN'. Packages of dangerous goods must be marked with the UN Number(s) applicable to their contents.

Packages containing dangerous goods can also be identified by labels indicating the hazard of the goods by their class or division or by the presence of certain handling labels/marks.

Note — When dangerous goods marks or labels are seen on items not declared as dangerous goods, it is often an indication that they do contain such goods. Undeclared dangerous goods must not be loaded on an aircraft and reporting procedures must be implemented (see 1.14 Dangerous Goods Reporting Requirement)

Editorial Note 1: As no approval for the transport of dangerous goods is held, dangerous goods bearing any UN Number, hazard label; the radioactive material, excepted package handling label; the lithium battery handling mark; the environmentally hazardous substances mark; or the excepted or limited quantities mark must not be loaded on an aircraft (except as identified in 1.2 General Exception).

1.4.2 Example of the Hazard and Handling Labels and Marks

CLASS 1 – EXPLOSIVE

Class 1 (with exploding bomb symbol) – explosives generally not permitted on an aircraft.



Class 1 (without exploding bomb symbol): Divisions 1.4B, 1.4F, 1.5 and 1.6 - explosives not permitted on an aircraft in normal circumstances.



* Division and compatibility group

** Compatibility group

CLASS 2 – GASES

Flammable gas
(Division 2.1)



Non-flammable, non-toxic gas
(Division 2.2)



Toxic gas (Division 2.3)



CLASS 3 – FLAMMABLE LIQUID



CLASS 4 – FLAMMABLE SOLIDS; SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION; SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES

Flammable solid
 (Division 4.1)



Substance liable to spontaneous combustion (Division 4.2)



Substance which, in contact with water, emits flammable gas (Division 4.3)



CLASS 5 – OXIDISING SUBSTANCES AND ORGANIC PEROXIDES

Oxidizing substance
 (Division 5.1)



Organic peroxide (Division 5.2) (flame may be black or white)



CLASS 6 – TOXIC AND INFECTIOUS SUBSTANCES

Toxic substance (Division 6.1)



Infectious substance (Division 6.2)



The bottom part of the label should bear the inscription:

“INFECTIOUS SUBSTANCE — In case of damage or leakage immediately notify public health authority”.

CLASS 7 – RADIOACTIVE MATERIAL

Category I



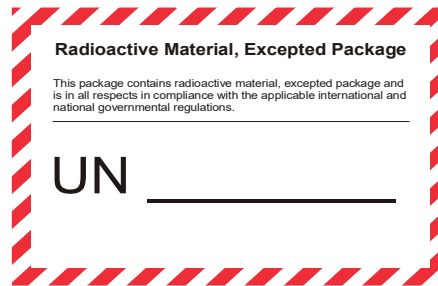
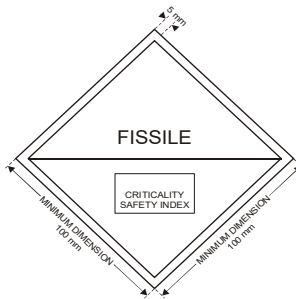
Category II



Category III



Criticality safety index label



CLASS 8 – CORROSIVE



CLASS 9 – MISCELLANEOUS DANGEROUS SUBSTANCES AND ARTICLES, INCLUDING ENVIRONMENTALLY HAZARDOUS SUBSTANCES

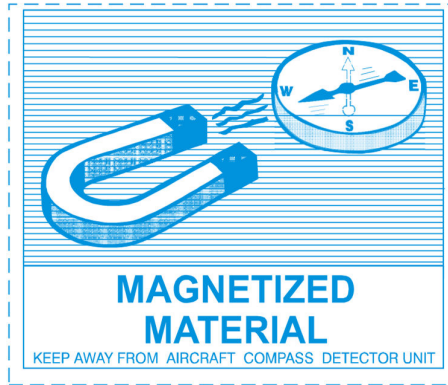
Class 9 label for Section I, IA and IB lithium battery shipments



HANDLING LABELS

Packages of dangerous goods may also bear labels providing handling information; these are:

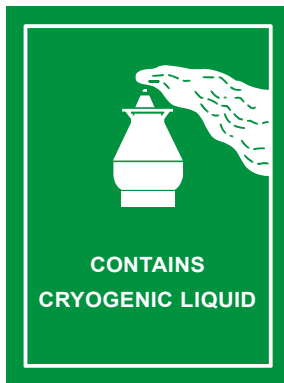
Magnetized material



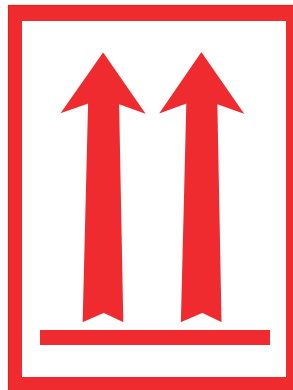
Cargo aircraft only



Cryogenic liquid label

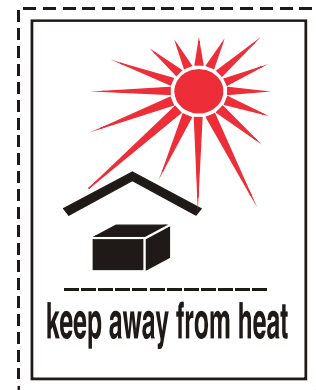


Package orientation



(red or black)

Keep away from heat



LITHIUM BATTERIES MARK



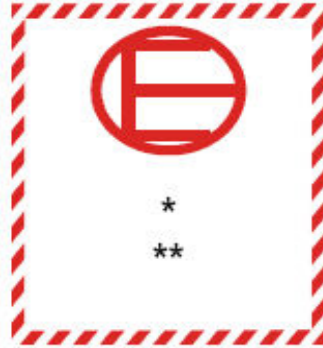
*Place for UN number(s)

Application of the lithium battery mark to a consignment of lithium batteries (of any type) indicates that the Shipper has determined specific requirements have been met. Such consignments do not need to be accompanied by a dangerous goods transport document (Shipper's Declaration) and no acceptance check is required.

Note: The mark illustrated in Figure of these Regulations may continue to be used until 31 December 2026.

EXCEPTED QUANTITIES MARK

Packages containing excepted quantities of dangerous goods can be identified from the following:



Hatching and symbol of the same colour, black or red, on white or suitable contrasting background.

* Place for class or, when assigned, the division number(s).

** Place for name of shipper or consignee, if not shown elsewhere on the package.

LIMITED QUANTITIES MARK

Packages containing limited quantities of dangerous goods can be identified from the following:



Many dangerous goods when in reasonably limited quantities present a reduced hazard during transport and can safely be carried in good quality packagings that have not been tested and marked as is required for UN Specification packagings required for larger quantities of dangerous goods. Packages containing limited quantities of dangerous goods must be marked with a diamond shaped mark. When presented for carriage by air, the mark must additionally include a “Y” which indicates compliance with the provisions of the ICAO Technical Instructions, some of which are more stringent than those of the UN Model Regulations and of other modes of transport.

Note — The mark depicted here but without the ‘Y’ indicates that the package contains dangerous goods in limited quantities as permitted by surface transport regulations (ADR/IMDG) which may not be acceptable for air transport. A package so marked and offered for transport in the absence of a dangerous goods transport document must be reported to the appropriate authority where the goods are discovered as a discovery of undeclared dangerous goods.

ENVIRONMENTALLY HAZARDOUS SUBSTANCES MARK



Packages containing environmentally hazardous substances (UN No. 3077 and UN 3082) must be durably marked with the environmentally hazardous substance mark and the packages must also bear a Class 9 hazard label.

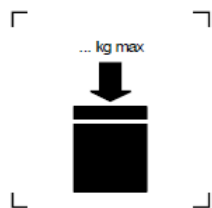
Notes —

1. The environmentally hazardous substance mark may also appear on packages containing substances other than UN 3077 and UN 3082 when required by other international or national transport regulations.
2. The environmentally hazardous substance mark is not required on single packagings and combination packagings packed in accordance with Special Provision A197. If a shipper prefers to send the item as environmentally hazardous substances (UN 3077 or UN 3082 only) all applicable parts of the Regulations must be followed.

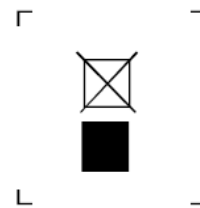
Intermediate Bulk Containers (IBCs)

Editorial Note: There are only permitted for the transport of UN 3077 Environmentally hazardous substance, solid, n.o.s. The maximum permitted stacking load applicable when the IBC is in use must be displayed on a symbol as follows:

IBCs capable of being stacked



IBCs NOT capable of being stacked



1.5 Detailed Assignments of Responsibilities (ICAO TI 7; 4.2, IATA DGR 1.4.2)

Editorial Note 1: Operators need to assign the key responsibilities associated with the carriage of dangerous goods. For example, it may be intended for acceptance checks of consignments of dangerous goods cargo to be conducted by suitably trained ground staff of the operator or alternatively by a designated handling agent. Duties associated with the carriage of dangerous goods /and for an operator not holding approval for their carriage as cargo include:

Key Person(s)	Responsibilities
Person Nominated as Responsible for Operator's **	<ul style="list-style-type: none"> • Oversight and control of the carriage of dangerous goods. • Ensuring all necessary permissions, approvals and exemptions are held. • Generation (or acceptance) of relevant procedures. • Responding to queries regarding the carriage of dangerous goods.
Cargo Department/ Cargo Sales Agents **	<p>For DG Approval Operator</p> <ul style="list-style-type: none"> • Arrangement of the carriage of dangerous goods only in accordance with the operator's stated policies. • Recognition of undeclared dangerous goods. <p>For Non-DG Approval Operator</p> <ul style="list-style-type: none"> • Ensuring procedures are implemented to ensure dangerous goods as cargo are not carried. • Recognition of undeclared dangerous goods. • Ensuring that notices, giving information about the transport of dangerous goods, are displayed in sufficient number and prominence at cargo acceptance points.
Persons receiving or handling general cargo, mail and stores	<ul style="list-style-type: none"> • Recognition of undeclared dangerous goods. • Dealing with dangerous goods that are found damaged or leaking during processing for transport. • If there is a dangerous goods incident or accident, or if undeclared dangerous goods are detected, a report is made to the appropriate Authority.
Persons receiving or handling dangerous goods *	<ul style="list-style-type: none"> • Acceptance procedures for dangerous goods are carried out as required by the Technical Instructions. • Inspection procedures during the processing of dangerous goods for transport are carried out as required by the Technical Instructions.

Key Person(s)	Responsibilities
	<ul style="list-style-type: none"> • Dealing with dangerous goods that are found damaged or leaking during processing for transport. • Dangerous goods are loaded, segregated, stowed and secured on an aircraft in accordance with the Technical Instructions. • Generation of written information to the commander (NOTOC). • Provision of written information about dangerous goods loaded on board to the commander for signature. • Retention of documentation on the ground. • Recognition of undeclared dangerous goods. • If there is a dangerous goods incident or accident, or if undeclared dangerous goods are detected, a report is made to the appropriate Authority.
Reservations	<ul style="list-style-type: none"> • Ensuring that information is provided with the passenger ticket or in another manner such that prior to or during the check-in process the passenger receives the information. • Considering passenger requests for approval of the operator for items of dangerous goods requiring such approval.
Persons handling passengers	<ul style="list-style-type: none"> • Ensuring that the provisions concerning passengers and dangerous goods are complied with. • Ensuring that notices are displayed in sufficient number and prominence at each of the places at an airport where tickets are issued, passengers checked in and aircraft boarding areas maintained, and at any other location where passengers are checked in. • With the aim of preventing dangerous goods which passengers are not permitted to have from being taken on board an aircraft in their baggage, seeking confirmation from a passenger about the contents of any item where there are suspicions that it may contain dangerous goods. • When baggage intended as carry-on is taken by the operator and placed into the cargo compartment for carriage, seeking confirmation from the passenger that dangerous goods which are only permitted in carry-on baggage (e.g. lithium batteries, including power banks) have been removed.

Key Person(s)	Responsibilities
	<ul style="list-style-type: none"> Ensuring that the discovery of prohibited dangerous goods (after a passenger has checked in) is reported to the appropriate Authority (see <i>1.14 Dangerous Goods Reporting Requirements</i>).
Cabin Crew	<ul style="list-style-type: none"> Ensuring that the provisions concerning passengers and dangerous goods are complied with. When baggage intended as carry-on is taken by the operator and placed into the cargo compartment for carriage, seeking confirmation from the passenger that dangerous goods which are only permitted in carry-on baggage (e.g. lithium batteries, including power banks) have been removed. Responding to a dangerous goods incident or accident in the cabin. Ensuring that a dangerous goods incident or accident in the cabin, or the discovery of prohibited dangerous goods (after a passenger has boarded), is reported to the appropriate Authority (see <i>1.14 Dangerous Goods Reporting Requirements</i>).
Operations Personnel **	<p>For DG Approval Operator</p> <ul style="list-style-type: none"> If there is an aircraft incident or accident, information is passed to emergency services and state Authorities as required by the Technical Instructions If there is a dangerous goods incident or accident, or if undeclared dangerous goods are detected a report is made to the appropriate Authority. <p>For NON-DG Approval Operator</p> <ul style="list-style-type: none"> If there is a dangerous goods incident or accident, or if undeclared dangerous goods are detected, a report is made to the appropriate Authority.
Flight Crew*	<p>For DG Approval Operator</p> <ul style="list-style-type: none"> Recognition of undeclared dangerous goods. Signature of NOTOC to indicate receipt of information. If an in-flight emergency occurs, as soon as the situation permits, passage of details of dangerous goods on board to the appropriate Air Traffic Services Unit. Responding to a dangerous goods incident or accident in the cabin (if operation does not have cabin crew).

Key Person(s)	Responsibilities
	<ul style="list-style-type: none"> If there is a dangerous goods incident or accident, or if undeclared dangerous goods are detected a report is made to the appropriate Authority (see 1.14 <i>Dangerous Goods Reporting Requirements</i>). <p>For NON-DG Approval Operator</p> <ul style="list-style-type: none"> Recognition of undeclared dangerous goods. Responding to a dangerous goods incident or accident in the cabin (if operation does not have cabin crew). <p>If there is a dangerous goods incident or accident, or if undeclared dangerous goods are detected a report is made to the appropriate Authority (see 1.14 <i>Dangerous Goods Reporting Requirements</i>).</p>
Trainers	Provision of initial and recurrent dangerous goods training commensurate with the responsibilities of the personnel concerned.
Compliance Monitoring Manager, Auditors and Safety Manager	<ul style="list-style-type: none"> Ensuring that activities are monitored for compliance with dangerous goods requirements and that these activities are carried out properly under the supervision of the relevant head of functional area. Ensuring the initiation and follow-up of internal occurrence / accident investigations.
*	Non-Approved DG carrier the responsibilities shall not required
**	Different responsibilities between Non-Approval and Approved DG operator

Editorial Note 2: In practice a ground handling agent may carry out some or all of the procedures for processing dangerous goods cargo for air transport. A ground handling agent must be provided with sufficient information to enable these procedures to be actioned. Operators should specify whether they utilize suitably qualified personnel of the operator or of a handling agent at the various aerodromes of the operation.

Editorial Note 3: The operator can describe key responsibilities related with operator’s organization moreover than above.

1.6 Acceptance Procedure (ICAO TI 7; 1.2, 1.3, 1.4 IATA DGR 9.1.2, 9.1.3, 9.1.4)

Note: Non-DG Approved carriers shall be omitted this section

Before a consignment consisting of a package or overpack containing dangerous goods or a freight container containing radioactive material or a unit load device containing dangerous goods is first accepted for carriage by air, the operator must, by use of a checklist, verify the following:

- a) the documentation or, when provided, the electronic data is compliant with the applicable requirements;
- b) the quantity of dangerous goods stated on the dangerous goods transport document is within the limits per package on a passenger or cargo aircraft as appropriate;
- c) the package, overpack or freight container marks accord with the details stated on the accompanying dangerous goods transport document and is clearly visible;
- d) where required, the letter in the packaging specification marking designating the packing group for which the design type has been successfully tested is appropriate for the dangerous goods contained within. This does not apply to overpacks where the specification marking is not visible;
- e) proper shipping names, UN numbers, labels, and special handling instructions appearing on the interior package(s) are clearly visible or reproduced on the outside of an overpack;
- f) the labelling of the package, overpack or freight container is as required for the consignment;
- g) the outer packaging of a combination package or the single packaging is permitted by the applicable packing instruction, and when visible is of the type stated on the accompanying dangerous goods transport document;
- h) the package or overpack does not contain different dangerous goods which require segregation from each other; and
- i) the package, overpack, freight container or Unit Load Device (ULD) is not leaking and there is no indication that its integrity has been compromised.

The operator must be able to identify the person who performed the acceptance check.

Editorial Note 1: An acceptance check is not required for dangerous goods in excepted quantities, radioactive material in excepted packages and lithium batteries consigned in accordance with Section II of the applicable packing instruction.

Editorial Note 2: Persons conducting dangerous goods acceptance checks must have received dangerous goods training commensurate with this responsibility. Acceptance checks conducted in the Thailand must only be conducted by a person who has successfully completed training applicable to this role from a CAAT Approved Dangerous Goods Training programme.

1.7 Loading, Handling and Stowage Including (ICAO TI 7; 2.4.3, IATA DGR 9.3)

When dangerous goods subject to the provisions herein are loaded in an aircraft, the operator must protect the packages of dangerous goods from being damaged, including by the movement of baggage, mail, stores or other cargo. Particular attention must be paid to the handling of packages during their preparation for transport, the type of aircraft on which they are to be carried and the method required to load that aircraft, so that accidental damage is not caused through dragging or mishandling of the packages.

Editorial Note: NON-DG Approved Operator. The general information should describe and align with the operator's policy.

1.7.1 Inspections for Damage or Leakage (ICAO TI 7; 3.1 IATA DGR 9.3.6, 9.4.1)

Note: Non-DG Approved carriers shall be omitted this section

A package or overpack containing dangerous goods must not be loaded onto an aircraft or into a ULD unless it has been inspected immediately prior to loading and found free from evidence of leakage or damage. A ULD must not be loaded aboard an aircraft unless the device has been inspected and found free from any evidence of leakage from or damage to any dangerous goods contained therein. Packages or overpacks containing dangerous goods must be inspected for signs of damage or leakage upon unloading from the aircraft or ULD.

1.7.2 Prohibition on The Carriage of Passengers With “Cargo Aircraft Only” Dangerous Goods (ICAO TI 7; 2.4.1 IATA DGR 9.3.4)

Note: Non-DG Approved carriers shall be omitted this section

Dangerous goods identified as suitable for transport only on a cargo aircraft must not be carried on an aircraft on which passengers are being carried. In this context “passenger” excludes a crew member, an operator’s employee (see 1.2.6 instructions on the carriage of employees of the operator), an authorized representative of an Authority and a person with duties in respect of a particular shipment of dangerous goods or other cargo on board.

1.7.3 Prohibition on the Carriage of Dangerous Goods on the Flight Deck or in a Cabin Occupied by Passengers (ICAO TI 7; 2.1, IATA DGR 9.3.1)

Note: Non-DG Approved carriers shall be omitted this section

Dangerous goods must not be carried in the cabin of an aircraft occupied by passengers or on the flight deck, except as provided for in the Technical Instructions. However, when helicopters are carrying passengers, the State of the Operator may grant an approval to permit the carriage of dangerous goods either:

- a) in the cabin, when those dangerous goods are associated with and accompanied by the passengers; or
- b) in cargo compartments that do not meet the Class B or C classification requirements.

Editorial Note: Operators should identify any approval held in accordance with the above provisions.

1.7.4 External Carriage of Dangerous Goods (ICAO TI 7;7.1.2 IATA DGR 9.3.4.1)

Note: Non-DG Approved carriers shall be omitted this section

When dangerous goods are prepared for open external carriage (e.g. suspended from a helicopter or in open external carrying devices), consideration should be given to the type of packaging used and protection of those packagings where necessary from the effects of airflow and weather (e.g. by damage from rain or snow).

When dangerous goods are carried suspended from a helicopter, the operator must ensure that consideration is given to the dangers of static discharge upon landing or release of the load.

1.7.5 Detail of the Location and the Numbering System of Cargo Compartment (ICAO TI 7; 4.2, IATA DGR 1.4.2.1 (c), DOC 9481 1; 1.1)

Note: Non-DG Approved carriers shall be omitted this section

Editorial Note: The operators should describe aircraft cargo compartment or refer to another source document related with this subject.

A passenger aircraft is defined in the IATA DGR, Appendix A as “an aircraft that carries any person other than a crew member, an operator’s employee in an official capacity, an authorized representative of an appropriate national authority or a person accompanying a consignment or other cargo.”

A cargo aircraft is defined in Appendix A as “any aircraft, other than a passenger aircraft, which is carrying goods or property.”

Class A: A Class A cargo or baggage compartment is one in which:

- a) the presence of a fire would easily be discovered by a crew member while at his or her station;
- b) each part of the compartment is easily accessible in flight.

Class B: A Class B cargo or baggage compartment is one in which:

- a) there is sufficient access in flight to enable a crew member to effectively reach any part of the compartment with the contents of a fire extinguisher;
- b) when the access provisions are being used, no hazardous quantity of smoke, flames or extinguishing agent will enter any compartment occupied by the crew or passengers; and
- c) there is a separate approved smoke detector or fire detector system to give warning at the pilot or flight engineer station

Class C: A Class C cargo or baggage compartment is one not meeting the requirements for either a Class A or B compartment but in which:

- a) there is a separate approved smoke detector or fire detector system to give warning at the pilot or flight engineer station;
- b) there is an approved built-in fire-extinguishing system controllable from the pilot or flight engineer station;
- c) there are means of excluding hazardous quantities of smoke, flames, or extinguishing agent from any compartment occupied by the crew or passengers; and
- d) there are means of controlling ventilation and draughts within the compartment so that the extinguishing agent used can control any fire that may start within the compartment.

Class D: A Class D cargo or baggage compartment is one in which:

- a) a fire occurring in it will be completely confined without endangering the safety of the aeroplanes or the occupants;

- b) there are means of excluding hazardous quantities of smoke, flames, or other noxious gases from any compartment occupied by the crew or passengers;
- c) ventilation and draughts are controlled within each compartment so that any fire likely to occur in the compartment will not progress beyond safe limits; and
- d) consideration is given to the effect of heat within the compartment on adjacent critical parts of the aircraft.

For compartments of 14.2 m³ or less, airflow of 42.5 m³ per hour is acceptable.

Class E: A Class E cargo compartment is one on aero planes used only for the carriage of cargo and in which:

- a) there is a separate approved smoke or fire detector system to give warning at the pilot or flight engineer station;
- b) there are means of shutting off the ventilating airflow to or within the compartment, and the controls for these means are accessible to the flight crew in the crew compartment;
- c) there are means of excluding hazardous quantities of smoke, flames or noxious gases, from the flight crew compartments; and
- d) the required crew emergency exits are accessible under any cargo loading conditions.

Note — Further definitions and explanatory material on typical cargo compartment locations can be found in the ICAO publication Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods (Doc 9481-AN/928)

1.7.6 Segregation and Separation (ICAO TI 7; 2.2, IATA DGR 9.3.2)

Note: Non-DG Approved carriers shall be omitted this section

Dangerous goods must be loaded, stowed and secured on an aircraft as required by the Technical Instructions. This includes segregating packages from each other when they contain incompatible dangerous goods, the separation of explosives of different division numbers and compatibility groups (when required), securing packages in a manner that will prevent any movement. Dangerous goods must also be protected so they cannot be damaged by the movement of baggage, mail, stores or other cargo.

Editorial Note 1: Operators holding approval for the carriage of dangerous goods should determine how such goods shall be secured to prevent movement in flight, to protect from damage by the movement of other items and to achieve adequate segregation whilst maintaining accessibility (if required) taking into account the types of aircraft operated and whether dangerous goods are to be carried underslung.

Additionally, it is appropriate to amend the following tables to reflect the operator's policy towards the separation of dangerous goods from other cargo (e.g. toxic substances and foodstuffs).

Packages and overpacks containing UN 3480 — Lithium ion batteries prepared in accordance with Section IA or Section IB of Packing Instruction 965 and packages and overpacks containing UN 3090 — Lithium metal batteries

prepared in accordance with Section IA or Section IB of Packing Instruction 968 must not be stowed on an aircraft next to, or in a position that would allow interaction with, packages or overpacks containing dangerous goods which bear a Class 1, other than Division 1.4S, Division 2.1, Class 3, Division 4.1 or Division 5.1 hazard label. To maintain acceptable segregation between packages and overpacks, the segregation requirements shown in Table 7-1 must be followed. The segregation requirements apply based on all hazard labels applied on the package or overpack, irrespective of whether the hazard is the primary or subsidiary hazard.

Editorial Note 2: As UN3480 and UN3090 may only be carried on cargo aircraft, operators that do not conduct cargo aircraft operations should delete 1.3.5.3 and the columns for Class 9 within the table below.

ICAO TI Table 7-1. Segregation between packages or IATA 9.3.2.1 Table 9.3.A Segregation of Packages

An “X” at the intersection of a row and column indicates that packages containing these classes of dangerous goods may not be stowed next to or in contact with each other, or in a position which would allow interaction

Hazard Label	1	2.1	2.2, 2.3	3	4.1	4.2	4.3	5.1	5.2	8	9 See 1.7.5
1	Note 1	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2
2.1	Note 2	—	—	—	—	—	—	—	—	—	X
2.2, 2.3	Note 2	—	—	—	—	—	—	—	—	—	—
3	Note 2	—	—	—	—	—	—	X	—	—	X
4.1	Note 2	—	—	—	—	—	—	—	—	—	X
4.2	Note 2	—	—	—	—	—	—	X	—	—	—
4.3	Note 2	—	—	—	—	—	—	—	—	X	—
5.1	Note 2	—	—	X	—	X	—	—	—	—	X
5.2	Note 2	—	—	—	—	—	—	—	—	—	—
8	Note 2	—	—	—	—	—	X	—	—	—	—
9 See 1.7.5	Note 2	X	—	X	X	—	—	X	—	—	—

in the event of leakage of the contents. Thus, a package containing Class 3 dangerous goods may not be stowed next to or in contact with a package containing Division 5.1 dangerous goods.

Note 1 – See the table below detailing the separation of explosive substances and articles.

- The extent to which explosives may be stowed together in an aircraft is determined by their “compatibility”. Explosives are considered to be compatible if they can be stowed together without significantly increasing either the probability of an accident or, for a given quantity, the magnitude of the effects of such an accident.

- Explosives in Compatibility Group S may be stowed with explosives in all compatibility groups.
- For explosives of different division numbers and compatibility groups, the separation scheme shown in Table 7-2 must be followed in order to maintain acceptable distances between such packages.

Note 2 — This class or division must not be stowed together with explosives other than those in Division 1.4, Compatibility Group S.

Note 3 — Packages containing dangerous goods with multiple hazards in the class or divisions which require segregation in accordance with the above table need not be segregated from other packages bearing the same UN number.

Note 4 — UN 3528, Engines, internal combustion, flammable liquid powered, Engines, fuel cell, flammable liquid powered, Machinery internal combustion, flammable liquid powered and Machinery, fuel cell, flammable liquid powered need not be segregated from packages containing dangerous goods in Division 5.1.

Editorial Note 3: Class 1 dangerous goods other than Division 1.4S may only be carried on cargo aircraft. Operators not operating cargo aircraft should (a) delete the table explaining the separation of explosive substances and articles (below) and (b) amend Note 1 to the segregation table (above) to read ‘Only Division 1.4S is permitted for carriage on passenger aircraft’.

To maintain acceptable segregation between packages and overpacks, the segregation requirements shown in Table 7-1 must be followed. The segregation requirements apply based on all hazard labels applied on the package or overpack, irrespective of whether the hazard is the primary or subsidiary hazard.

Separation of explosive substances and articles (ICAO TI table 7-2, IATA DGR 9.3.2.2)

Division and Compatibility Group	1.3C	1.3G	1.4B	1.4C	1.4D	1.4E	1.4G	1.4S
1.3C			X					
1.3G			X					
1.4B	X	X		X	X	X	X	
1.4C			X					
1.4D			X					
1.4E			X					
1.4G			X					
1.4S								

An “X” at the intersection of a row and column indicates that explosives of these divisions and compatibility groups must be loaded into separate unit load devices and, when stowed aboard the aircraft, the unit load devices must be separated by other cargo with a minimum separation distance of 2 m. When not loaded in a unit load device, these explosives must be loaded into different, non-adjacent loading positions and separated by other cargo with a minimum separation distance of 2 m. Explosive substances and articles carried under an exemption may be subject to additional separation requirements.

1.7.7 Securing and Orientation (ICAO TI 7; 2.3, 2.4.2 IATA DGR 9.3.5.2)

Note: Non-DG Approved carriers shall be omitted this section

Editorial Note: The operator must secure dangerous goods in the aircraft in a manner that will prevent any movement. For packages or overpacks containing radioactive material, the securing must be adequate to ensure that the separation requirements in 1.7.10 Loading of Radioactive Material and ICAO 7; 2.9, IATA 10.9.3.2, 10.9.3.6, and 10.9.3.7 are met at all times.

During the course of air transport, a package of dangerous goods bearing the package orientation label must be loaded and stowed aboard an aircraft and handled at all times in accordance with such a label. Single packagings with end closures containing liquid dangerous goods must be loaded and stowed aboard an aircraft with those closures upwards, notwithstanding that such single packages may also have side closures.

1.7.8 Protection Against Damage (ICAO TI 7; 2.4.3, IATA DGR 9.3.5.1)

Note: Non-DG Approved carriers shall be omitted this section

The operator must protect packages of dangerous goods from being damaged. Particular attention must be paid to handling of packages during their preparation for transport, the type of aircraft on which they are to be carried and the method required to load that aircraft, so that accidental damage is not caused through dragging or mishandling the packages.

1.7.9 Loading of Dry Ice (ICAO TI 7; 2.11, IATA DGR 9.3.10)

Dry ice (Carbon dioxide, solid; UN1845) may be carried onboard aircraft to keep food (galley or cargo) and medicine or biological materials (as cargo) in a frozen or chilled condition. Carbon dioxide gas produced by the sublimation of dry ice is an asphyxiant and will reduce the amount of available oxygen to breathe. Dry ice sublimation producing excess CO₂ gas may be dangerous in confined spaces where there is an absence of ventilation or ventilation rates are low. The signs and symptoms of CO₂ poisoning are similar to those that precede lack of oxygen, namely headache, dizziness, muscular weakness, drowsiness, and ringing in the ears. CO₂ poisoning does have a greater effect on breathing than simple lack of oxygen, causing a significant increase in the rate and depth of breathing as an early symptom. 10% carbon dioxide in air can be endured for only a few minutes whereas 12% to 15% would cause unconsciousness.

Ground staff must be informed that dry ice is being loaded or is onboard the aircraft.

Editorial Note 1: Dry ice (carbon dioxide, solid), when shipped by itself or when used as a refrigerant for other commodities, may be carried provided the operator has made suitable arrangements dependent on the aircraft type, the aircraft ventilation rates, the method of packing and stowing, whether animals will be carried on the same flight, and other factors. To prevent the incapacitation of ground and aircrew, aircraft operators must specify maximum safe quantities of dry ice per compartment of the various aircraft types operated in accordance with the above criterion and information published by the applicable aircraft manufacturer(s).

Editorial Note 2: The operator should consider and provide the maximum quantity load of dry ice into aircraft.

Example: Maximum limitation for Dry Ice per compartment of aircraft (Helicopter)

Aircraft Type	Maximum Quantity /Compartment

1.7.10 Loading of Magnetized Material (ICAO TI 7; 2.10, IATA DGR 9.3.9)

Note: Non-DG Approved carriers shall be omitted this section

Packing Instruction 953 allows the carriage of such material when the magnetic field strength at a distance of 4.6 m causes a compass deflection of not more than 2 degrees (equivalent to 0.418 A/m or 0.00525 Gauss measured at a distance of 4.6 m). Material with a magnetic field strength exceeding these limits may only be carried with the prior approval of the CAAT.

Magnetized material must be loaded so headings of aircraft compasses are maintained within the tolerances prescribed by the applicable aircraft airworthiness requirements and, where practical, in locations minimising possible effects on compasses.

Note — Masses of ferromagnetic metals such as automobiles, automobile parts, metal fencing, piping and metal construction material, even if not meeting the definition of magnetised materials, may affect aircraft compasses. As may packages or items of material which individually do not meet the definition of magnetised material, but cumulatively may have a magnetic field strength of a magnetised material.

Editorial Note: Operators should consider whether consignments of large quantities of ferromagnetic metals should be stowed as if they were classified as magnetized material. Operators, particularly of small aircraft, must establish adequate procedures to ensure that consignments described above are identified and loaded in a manner that will not affect aircraft instruments.

1.7.11 Loading of Radioactive Material (ICAO TI 7; 2.9.3, IATA DGR 10.9.3)

Note 1: Non-DG Approved carriers shall be omitted this section

Note 2: Should there exist a policy not to carry radioactive material (stated within 1.1.2 Approval for the Transport of Dangerous Goods) this section may be omitted.

Radioactive materials are articles or substances which spontaneously and continuously emit ionising radiation, which can be harmful to the health of humans and animals and can affect photographic or x-ray film. Whilst packagings used for the transport of radioactive material must provide protection from radiation, there is likely to be residual activity from packages offered for air transport.

A Transport Index (TI) is a number which represents the level of radiation at a distance of 1 metre, assigned to a single package, overpack or freight container. The TI is used to provide control over radiation exposure, to determine categories of radioactive material for the purposes of labelling, declaration, etc., to determine whether transport under exclusive use is required and to determine spacing requirements during storage and transport. The TI for each overpack or freight container must be determined as either the sum of the TIs of all the packages contained, or by direct measurement of radiation level.

Editorial Note 1: Operators that have a policy to carry radioactive materials must provide instructions on the loading of such dangerous goods based on the requirements for separation from persons, live animals and undeveloped photographic film.

Separation from Persons

Categories II — Yellow and III — Yellow packages, overpacks or freight containers must be separated from persons. The minimum separation distances in the following table that are to be applied are based upon the sum of TIs and these distances are from the surface of the packages, overpacks or freight containers to the nearest inside surface of the passenger cabin or flight deck partitions or floors, irrespective of the duration of the carriage of the radioactive material. If the packages, overpacks or freight containers are separated into groups, the minimum distance from the nearest inside surface of the passenger cabin or flight deck partitions or floors to each group is the distance applicable to the sum of the TIs within the individual groups, provided that each group is separated from each other group by at least three times the distance applicable to the one that has the larger sum of TIs.

Alternative separation distances apply when radioactive material is being carried by a cargo aircraft and in those circumstances the minimum distances must be applied as above and also to any other areas occupied by persons. Whether carried on a passenger or cargo aircraft, in accordance with the practice of keeping exposure to radiation as low as reasonable achievable, separation distances should be extended whenever feasible.

Editorial Note 2: The highest minimum distances in the following tables are included to provide for the carriage of radioactive material within very large helicopters and underslung loads. The higher figures may be removed if inappropriate to the specific operation.

Passenger or Cargo Aircraft		Cargo Aircraft Only	
Total sum of transport indexes	Minimum distance (metres)	Total sum of transport indexes	Minimum distance (metres)
0.1 – 1.0	0.30	50.1 – 60.0	4.65
1.1 – 2.0	0.50	60.1 – 70.0	5.05
2.1 – 3.0	0.70	70.1 – 80.0	5.45
3.1 – 4.0	0.85	80.1 – 90.0	5.80
4.1 – 5.0	1.00	90.1 – 100.0	6.10
5.1 – 6.0	1.15	100.1 – 110.0	6.45
6.1 – 7.0	1.30	110.1 – 120.0	6.70
7.1 – 8.0	1.45	120.1 – 130.0	7.00
8.1 – 9.0	1.55	130.1 – 140.0	7.30
9.1 – 10.0	1.65	140.1 – 150.0	7.55
10.1 – 11.0	1.75	150.1 – 160.0	7.80
11.1 – 12.0	1.85	160.1 – 170.0	8.05
12.1 – 13.0	1.95	170.1 – 180.0	8.30
13.1 – 14.0	2.05	180.1 – 190.0	8.55
14.1 – 15.0	2.15	190.1 – 200.0	8.75
15.1 – 16.0	2.25	200.1 – 210.0	9.00
16.1 – 17.0	2.35	210.1 – 220.0	9.20
17.1 – 18.0	2.45	220.1 – 230.0	9.40
18.1 – 20.0	2.60	230.1 – 240.0	9.65
20.1 – 25.0	2.90	240.1 – 250.0	9.85
25.1 – 30.0	3.20	250.1 – 260.0	10.05
30.1 – 35.0	3.50	260.1 – 270.0	10.25
35.1 – 40.0	3.75	270.1 – 280.0	10.40
40.1 – 45.0	4.00	280.1 – 290.0	10.60
45.1 – 50.0	4.25	290.1 – 300.0	10.80

Separation from Live Animals

Categories II — Yellow and III — Yellow packages, overpacks or freight containers must be separated from live animals by a distance of at least 0.5 meters for journeys not exceeding 24 hours, and by a distance of at least 1.0 meters for journeys longer than 24 hours.

Separation from Undeveloped Photographic Film

Categories II — Yellow and III — Yellow packages, overpacks or freight containers must be separated from undeveloped photographic films or plates. The minimum separation distances to be applied from the surface of the packages, overpacks or freight containers to the surface of the packages of undeveloped photographic films or plates are as follows:

Total sum of transport indexes	Duration of carriage					
	2 hours or less	2-4 hours	4-8 hours	8-12 hours	12-24 hours	24-48 hours
1	0.4	0.6	0.9	1.1	1.5	2.2
2	0.6	0.8	1.2	1.5	2.2	3.1
3	0.7	1.0	1.5	1.8	2.6	3.8
4	0.8	1.2	1.7	2.2	3.1	4.4
5	0.8	1.3	1.9	2.4	3.4	4.8
10	1.4	2.0	2.8	3.5	4.9	6.9
20	2.0	2.8	4.0	4.9	6.9	10.0
30	2.4	3.5	4.9	6.0	8.6	12.0
40	2.9	4.0	5.7	6.9	10.0	14.0
50	3.2	4.5	6.3	7.9	11.0	16.0

Note — The above table is calculated so that the radiation dose received by the films does not exceed 0.1 mSv (10 mrem).

Means of Securing

The means of securing packages or overpacks must adequately ensure that minimum separation distances are maintained at all times.

Editorial Note 3: An aircraft and equipment used regularly for the transport of radioactive material must be periodically checked to determine the level of contamination. The frequency of such checks must be related to the likelihood of contamination and the extent to which radioactive material is transported. Operators that

carry radioactive material need to define the means and frequency of checks for radioactive contamination of aircraft and equipment (e.g. unit load devices).

1.7.12 Loading of Dangerous Goods with Live Animals (ICAO TI 7; 2.9.6.3, IATA DGR 9.3.13)

Note: Non-DG Approved carriers shall be omitted this section

Live animals should not be loaded in close proximity of cryogenic liquids or Carbon dioxide, Solid (dry ice). As the vapors emitted by Carbon dioxide, Solid (dry ice) are heavier than air, they concentrate on the lower level of the hold. Therefore, live animals should be stowed above package containing Carbon dioxide, Solid (dry ice)

Categories II — Yellow and III — Yellow packages, overpacks or freight containers must be separated from live animals by a distance of at least 0.5 meters for journeys not exceeding 24 hours, and by a distance of at least 1.0 meters for journeys longer than 24 hours.

1.7.13 Loading of Cryogenic Liquids (IATA DGR 9.3.11)

Note: Non-DG Approved carriers shall be omitted this section

Packages containing liquefied refrigerated gases in open and closed cryogenic receptacles may be carried provided that the operator has made suitable arrangements dependent on the aircraft type, loading of other temperature-sensitive cargo and whether or not animals will be carried on the same flight. The operator should ensure that ground staff are informed that packages containing cryogenic liquids are being loaded or are onboard the aircraft and that appropriate precautions should be taken to ensure that after the cargo door is opened any gas build up is allowed to vent before loading personnel enter the cargo compartment.

1.7.14 Loading of UN2211, Expandable Polymeric Beads and UN3314, Plastics Moulding Compound (ICAO TI 7;2.12, IATA DGR 9.3.12)

Note: Non-DG Approved carriers shall be omitted this section

A total of not more than 100 kg net mass of expandable polymeric beads (or granules), or plastic moulding materials, referenced to Packing Instruction 957, may be carried in any inaccessible hold on any aircraft.

1.7.15 Handling of Self-Reactive Substance and Organic Peroxides (ICAO TI 7; 2.14 IATA DGR9.3.15)

Note: Non-DG Approved carriers shall be omitted this section

During the course of transport, packages or unit load devices containing self-reactive substances of Division 4.1 or organic peroxides of Division 5.2 must be shaded from direct sunlight, stored away from all sources of heat in a well-ventilated area.

1.7.16 Loading of Intermediate Bulk Containers (IBC) (ICAO TI 7; 2.15, 6; 2.4.3 IATA DGR 9.3.16)

Note: Non-DG Approved carriers shall be omitted this section

During handling and loading of intermediate bulk containers (IBCs), account must be taken of the IBC markings specified in (TI ICAO 6; 8.1, IATA figure 6.8E), if present.

1.8 Notification to Captain (NOTOC) (ICAO TI 7;4.1 IATA DGR 9.5)

Note: Non-DG Approved carriers shall be omitted this section

Editorial Note 1: For Helicopter With the approval of the State of the Operator, the information provided to the pilot-in-command may be abbreviated or be by other means (e.g. radio communication, as part of the working flight documentation such as a journey log or operational flight plan) where circumstances make it impractical to produce written or printed information or on a dedicated form. The operator should explain any such procedures that have been approved by the CAAT.

Example of such circumstance include:

- a) when the helicopter does not land in order to pick up the dangerous goods such that it is not possible to provide written information at that location;
- b) where the helicopter is in-flight and the planned load is changed prior to being picked up without the helicopter landing;
- c) when short, repetitive flights or a series of flights from different locations are undertaken by a helicopter where it is impractical to provide separate written information for each flight;
- d) where dangerous goods are picked up from an unmanned site.

As early as practicable before departure of the aircraft, but in no case later than when the aircraft moves under its own power, the operator of an aircraft in which dangerous goods are to be carried must:

- a) provide the pilot-in-command with accurate and legible written or printed information concerning dangerous goods that are to be carried as cargo; and
- b) provide personnel with responsibilities for operational control of the aircraft (e.g. the flight operations officer, flight dispatcher, or designated ground personnel responsible for flight operations) with the same information that is required to be provided to the pilot-in-command (e.g. a copy of the written information provided to the pilot-in-command). Each operator must specify the personnel (job title or function) to be provided this information in their operations manual and/or other appropriate manuals.

Note 1 — This includes information about dangerous goods loaded at a previous departure point and which are to be carried on the subsequent flight.

Note 2 — Information required above item b) should be readily available to the operator's personnel whose responsibilities most closely align with the duties of the flight operations officer/flight dispatcher described in Annex 6, Part III — International Commercial Air Transport — Helicopter, Chapter 2, 2.6 These personnel are intended to provide the information required by 2.6 to facilitate emergency response.

Except as otherwise provided, the information must include the following:

- a) the date of the flight;

- b) the air waybill number (when issued);
- c) the proper shipping name (the technical name(s) shown on the dangerous goods transport document is not required) and UN Number or ID number as listed in these Instructions. When chemical oxygen generators contained in protective breathing equipment (PBE) are being transported under Special Provision A144, the proper shipping name of “oxygen generator, chemical” must be supplemented with the statement “Aircrew protective breathing equipment (smoke hood) in accordance with Special Provision A144”.
- d) the class or division, and subsidiary hazard(s) corresponding to the subsidiary hazard label(s) applied, by numerals, and in the case of Class 1, the compatibility group;
- e) the packing group shown on the dangerous goods transport document;
- f) the number of packages and their exact loading location. For radioactive material see g) below;
- g) the net quantity, or gross mass if applicable, of each package, except that this does not apply to radioactive material or other dangerous goods where the net quantity or gross mass is not required on the dangerous goods transport document or, when applicable, alternative written documentation. For a consignment consisting of multiple packages containing dangerous goods bearing the same proper shipping name and UN number or ID number, only the total quantity and an indication of the quantity of the largest and smallest package at each loading location need to be provided. For consumer commodities, the information provided may be either the gross mass of each package or the average gross mass of the packages as shown on the dangerous goods transport document;
- h) for radioactive material the number of packages, overpacks or freight containers, their category, their transport index (if applicable) and their exact loading location;
- i) whether the package must be carried on cargo aircraft only;
- j) the aerodrome at which the package(s) is to be unloaded;
- k) where applicable, an indication that the dangerous goods are being carried under a State exemption;
and
- l) the telephone number where a copy of the information provided to the pilot-in-command can be obtained during the flight if the operator allows the pilot-in-command to provide a telephone number instead of the details about the dangerous goods on board the aircraft, as specified in 1.12 Provision of information by Pilot in command in the event of an in-flight emergency.

Note 1 — For UN 1845 Carbon dioxide, solid (dry ice), the information detailed above may be replaced by the UN number, proper shipping name, class, total quantity in each cargo compartment on the aircraft and the aerodrome at which the package(s) is to be unloaded.

Note 2 — For UN 3480 (Lithium ion batteries) and UN 3090 (Lithium metal batteries), the information detailed above may be replaced by the UN number, proper shipping name, class, total quantity at each specific loading location, the aerodrome at which the package(s) is to be unloaded and whether the package must be carried on cargo aircraft only. A full NOTOC is required when such batteries are carried under a State exemption.

Note 3 — For consumer commodities, the information provided may be either the gross mass of each package or the average gross mass of the packages as shown on the dangerous goods transport document.

Editorial Note: The telephone number where a copy of the information to the pilot-in-command can be obtained during the flight is additionally required on the NOTOC should it be intended to make it possible for the pilot-in-command to provide the appropriate Air Traffic Services Unit with a telephone number instead of details about the dangerous goods on board the aircraft in the event of an in-flight emergency.

The following dangerous goods need not appear on the NOTOC:

- Dangerous goods packed in excepted quantities
- UN 2807 Magnetized material with field strengths causing a compass deflection of not more than 2 degrees at a distance of 4.6 m
- UN 2908 Radioactive material, excepted package — empty packaging
- UN 2909 Radioactive material, excepted package — articles manufactured from natural uranium or depleted uranium or natural thorium
- UN 2910 Radioactive material, excepted package — limited quantity of material UN 2911 Radioactive material, excepted package — instruments or articles
- UN 3090 Lithium metal batteries (including lithium alloy batteries) when meeting the requirements of Packing Instruction 968, Section II
- UN 3091 Lithium metal batteries contained in equipment (including lithium alloy batteries) when meeting the requirements of Packing Instruction 970, Section II
- UN 3091 Lithium metal batteries packed with equipment (including lithium alloy batteries) when meeting the requirements of Packing Instruction 969, Section II
- UN 3164 Article, pressurized, hydraulic (containing non-flammable gas when meeting the requirements of Packing Instruction 208 a)
- UN 3164 Article, pressurized, pneumatic (containing non-flammable gas when meeting the requirements of Packing Instruction 208 a)
- UN 3245 Genetically modified micro-organisms
- UN 3245 Genetically modified organisms
- UN 3373 Biological substance, Category B

- UN 3480 Lithium ion batteries (including lithium ion polymer batteries) when meeting the requirements of Packing Instruction 965, Section II
- UN 3481 Lithium ion batteries contained in equipment (including lithium ion polymer batteries) when meeting the requirements of Packing Instruction 967, Section II
- UN 3481 Lithium ion batteries packed with equipment (including lithium ion polymer batteries) when meeting the Section II requirements of the applicable Packing Instruction 966, Section II

1.8.1 Specimen of NOTOC (ICAO TI5 7; 4.2 IATA DGR 1.4.2)

Note: Non-DG Approved carriers shall be omitted this section

Editorial Note: The operator must provide specimen of NOTOC includes information about dangerous goods loaded at a previous departure point and which are to be carried on the subsequent flight (refer 1.8).

1.8.2 The Personnel (Job Title or Function) with Responsibilities for Operational Control of an Aircraft be Provide with the Information Provide NOTOC (ICAO TI 7; 4.1.1 b) IATA DGR 9.5.1.1.1 b)

Note: Non-DG Approved carriers shall be omitted this section

Editorial Note: The operator must specify the personnel (job title or function) to be provided this information in accordance with 1.5 (Detailed Assignments of Responsibilities). The process of ground personnel transmitting this information to personnel with responsibilities for operational control of the aircraft also needs to be explained. Particular attention should be paid to the arrangements for ad hoc charters carrying dangerous goods where ongoing instructions to ensure the availability of the NOTOC may not be in place, e.g. through issuing appropriate instructions within the ground handling request.

1.8.3 Availability of NOTOC on the Ground for the Duration of Flight (ICAO TI 7; 4.1.8, IATA DGR 9.5.1.1.9)

Note: Non-DG Approved carriers shall be omitted this section

Editorial Note: A legible copy of the information to the pilot-in command must be retained on the ground. A copy must have an indication on it, or with it, that the pilot-in-command has received the information. A copy, or the information contained in it, must be readily accessible to the flight operations officer, flight dispatcher, or designated ground personnel responsible for flight operations until after the arrival of the flight.

1.9 Retention of Documents (ICAO TI 7; 4.11, IATA DGR 9.8)

Note: Non-DG Approved carriers shall be omitted this section

At least one copy of the documents appropriate to the transport by air of a consignment of dangerous goods (including consignments that fail their acceptance check) must be retained for a minimum period of three months, or such other period as specified by the States concerned, after the flight on which the dangerous goods were transported. As a minimum, the documents which must be retained are the dangerous goods

transport document (Shipper's Declaration), the acceptance checklist (when this is in a form which requires completion) including identification of the person who completed it, and the NOTOC (if the goods were carried).

Editorial Note 1: Operators should indicate where the documents appropriate to the transport by air of a consignment of dangerous goods are to be retained, e.g. within a flight file, or within the files of a handling agent(s), etc. If this to be carried out by a handling agent, procedures need to be in place, particularly for ad hoc charters.

Editorial Note 2: For Ad Hoc Charter. Many operators utilise ground handling agents to discharge certain duties with regards to the carriage of dangerous goods by air, e.g. conducting acceptance checks, NOTOC preparation and administration, aircraft loading, retention of documents, etc. Should such operators wish to undertake ad hoc charters involving the carriage of dangerous goods between stations where ongoing ground handling agreements are not in place, it would be necessary for duties to be properly assigned to the agent(s) concerned in advance of the operation of flights. Furthermore, should the agent at the station of departure not operate 24 hours a day, it must also be ensured that a copy of the NOTOC is readily available on the ground in the event of an emergency, e.g. by instructing the agent to fax or e-mail a copy of the completed NOTOC to the operator as soon as possible after the signature by the pilot-in-command has been obtained. Procedures for assigning such duties to agents (such as via the issue of ad hoc ground handling requests) should be established.

1.10 Recognition of Undeclared / Hidden Dangerous Goods (ICAO TI 7; 6, IATA DGR 2.2)

1.10.1 General Description 'Hidden' Dangerous Goods (ICAO TI 7; 6.1, IATA DGR 2.2.4)

Personnel must be alert to indications that undeclared dangerous goods are present within cargo, mail or stores. Personnel interfacing with passengers must be alert to indications that prohibited dangerous goods are carried by passengers or within their baggage.

Note — The discovery of undeclared or mis-declared dangerous goods or the discovery of dangerous goods forbidden for carriage by passengers (discovered after check-in process) must be reported to CAAT see 1.14 Dangerous Goods Reporting for reporting procedures.

With the aim of preventing undeclared dangerous goods from being loaded on an aircraft and of preventing passengers from taking on board those dangerous goods which they are not permitted to have in their baggage (see 1.2.7 Provisions for dangerous goods carried by passenger or crew or ICAO TI Table 8-1 or IATA DGR Table 2.3A), information about:

- a) General descriptions that are often used for items in cargo or in passengers' baggage which may contain dangerous goods;
- b) Other indications that dangerous goods may be present (e.g. labels, markings); and
- c) those dangerous goods which may be carried by passengers in accordance with (9.2.7 Provisions for dangerous goods carried by passenger or crew, ICAO TI Table 8-1 or IATA DGR Table 2.3A), must be provided to cargo reservations and sales staff, cargo acceptance staff, passenger

reservations and sales staff and passenger check-in staff as appropriate and must be readily available to such staff. The following is a list of general descriptions and the types of dangerous goods that may be included in any item bearing that description.

The following is a list of general descriptions that are often used for items in cargo or in passengers' baggage and the types of dangerous goods that may be included in any item bearing that description.

Aircraft on ground (AOG) spares — may contain explosives (flares or other pyrotechnics), chemical oxygen generators, unserviceable tire assemblies, cylinders of compressed gas (oxygen, carbon dioxide or fire extinguishers), fuel in equipment, wet or lithium batteries, matches

automobile parts/supplies (car, motor, motorcycle) — may include engines, including fuel cell engines, carburetors or fuel tanks that contain or have contained fuel, wet or lithium batteries, compressed gases in tire inflation devices and fire extinguishers, air bags, flammable adhesives, paints, sealants and solvents, etc.

Battery-powered devices/equipment — may contain wet or lithium batteries.

Breathing apparatus — may indicate cylinders of compressed air or oxygen, chemical oxygen generators or refrigerated liquefied oxygen

Camping equipment — may contain flammable gases (butane, propane, etc.), flammable liquids (kerosene, gasoline, etc.) or flammable solids (hexamine, matches, etc.)

Cars, car parts — see automobile parts, etc.

Chemicals — may contain items meeting any of the criteria for dangerous goods, particularly flammable liquids, flammable solids, oxidizers, organic peroxides, toxic or corrosive substances

Consolidated consignments (groupages) — may contain any of the defined classes of dangerous goods

Cryogenic (liquid) — indicates refrigerated liquefied gases such as argon, helium, neon, nitrogen, etc.

Cylinders — may contain compressed or liquefied gas

Dental apparatus — may contain flammable resins or solvents, compressed or liquefied gas, mercury and radioactive material

Diagnostic specimens — may contain infectious substances

Diving equipment — may contain cylinders of compressed gas (e.g. air or oxygen). May also contain high intensity diving lamps that can generate extreme heat when operated in air. In order to be carried safely, the bulb or battery should be disconnected

Drilling and mining equipment — may contain explosive(s) and/or other dangerous goods

Dry shipper (vapour shipper) — may contain free liquid nitrogen. Dry shippers are only not subject to the Technical Instructions when they do not permit the release of any free liquid nitrogen irrespective of the orientation of the packaging

Electrical/electronic equipment — may contain magnetized material, mercury in switch gear, electron tubes, wet or lithium batteries or fuel cells or fuel cell cartridges that contain or have contained fuel

Electrically powered apparatus (wheelchairs, lawnmowers, golf carts, etc.) — may contain wet or lithium batteries or fuel cells or fuel cell cartridges that contain or have contained fuel

Expeditionary equipment — may contain explosives (flares), flammable liquids (gasoline), flammable gas (gas for camping equipment) or other dangerous goods

Film crew and media equipment — may contain explosive pyrotechnic devices, generators incorporating internal combustion engines, wet or lithium batteries, fuel, heat-producing items, etc.

Frozen embryos — may be packed in refrigerated liquefied gas or dry ice

Frozen fruit, vegetables, etc. — may be packed in dry ice (solid carbon dioxide)

Fuel control units — may contain flammable liquids

Hot-air balloon — may contain cylinders with flammable gas, fire extinguishers, engines internal combustion, batteries, etc.

Household goods — may contain items meeting any of the criteria for dangerous goods. Examples include flammable liquids such as solvent-based paint, adhesives, polishes, aerosols (for passengers, those not permitted under Table 8-1), bleach, corrosive oven or drain cleaners, ammunition, matches, etc.

Instruments — may conceal barometers, manometers, mercury switches, rectifier tubes, thermometers, etc., containing mercury

Laboratory/testing equipment — may contain items meeting any of the criteria for dangerous goods, particularly flammable liquids, flammable solids, oxidizers, organic peroxides, toxic or corrosive substances, lithium batteries, cylinders of compressed gas, etc.

Machinery parts — may contain flammable adhesives, paints, sealants and solvents, wet and lithium batteries, mercury, cylinders of compressed or liquefied gas, etc.

Magnets and other items of similar material — may individually or cumulatively meet the definition of magnetized material (see ICAO TI 2;9.2.1 d, IATA DGR 3.9.2.2)

Medical supplies/equipment — may contain items meeting any of the criteria for dangerous goods, particularly flammable liquids, flammable solids, oxidizers, organic peroxides, toxic or corrosive substances, and lithium batteries

Metal construction material — may contain ferromagnetic material which may be subject to special stowage requirements due to the possibility of affecting aircraft instruments (see ICAO TI 2;9.2.1 d, IATA DGR 3.9.2.2)

Metal fencing — may contain ferromagnetic material which may be subject to special stowage requirements due to the possibility of affecting aircraft instruments (see ICAO TI 2;9.2.1 d, IATA DGR 3.9.2.2)

Metal piping — may contain ferromagnetic material which may be subject to special stowage requirements due to the possibility of affecting aircraft instruments (see ICAO TI 2;9.2.1 d, IATA DGR 3.9.2.2)

Passengers' baggage — may contain items meeting any of the criteria for dangerous goods not permitted under 9.2.7 Provisions for dangerous goods carried by passenger or crew, ICAO TI Table 8-1, IATA DGR Table 2.3A

pharmaceuticals — may contain items meeting any of the criteria for dangerous goods, particularly radioactive material, flammable liquids, flammable solids, oxidizers, organic peroxides, toxic or corrosive substances

photographic supplies/equipment — may contain items meeting any of the criteria for dangerous goods, particularly heat producing devices, flammable liquids, flammable solids, oxidizers, organic peroxides, toxic or corrosive substances, lithium batteries

racing car or motorcycle team equipment — may contain engines, including fuel cell engines, carburetors or fuel tanks that contain fuel or residual fuel, wet and lithium batteries, flammable aerosols, nitromethane or other gasoline additives, cylinders of compressed gases, etc.

refrigerators — may contain liquefied gases or an ammonia solution

repair kits — may contain organic peroxides and flammable adhesives, solvent-based paints, resins, etc.

samples for testing — may contain items meeting any of the criteria for dangerous goods, particularly infectious substances, flammable liquids, flammable solids, oxidizers, organic peroxides, toxic or corrosive substances

semen — may be packed with dry ice or refrigerated liquefied gas (see also dry shipper)

ships' spares — may contain explosives (flares), cylinders of compressed gas (life rafts), paint, lithium batteries (emergency locator transmitters), etc.

sporting goods/sports team equipment — may contain cylinders of compressed or liquefied gas (air, carbon dioxide, etc.), lithium batteries, propane torches, first aid kits, flammable adhesives, aerosols, etc.

Swimming pool chemicals — may contain oxidizing or corrosive substances

Switches in electrical equipment or instruments — may contain mercury

Tool boxes — may contain explosives (power rivets), compressed gases or aerosols, flammable gases (Butane cylinders or torches), flammable adhesives or paints, corrosive liquids, lithium batteries, etc.

Torches — micro torches and utility lighters may contain flammable gas and be equipped with an electronic starter. Larger torches may consist of a torch head (often with a self-igniting switch) attached to a container or cylinder of flammable gas

Unaccompanied passengers' baggage/personal effects — may contain items meeting any of the criteria for dangerous goods not permitted for carriage by passengers and crew. Under 9.2.7, ICAO TI Table 8-1, IATA DGR Table 2.3A

Note. — Excess baggage carried as cargo may contain certain dangerous goods, as provided for by ICAO TI 1;1.1.5.1 h), IATA DGR 1.2.7.1h)

Vaccines — may be packed in dry ice (solid carbon dioxide)

1.10.2 GHS Labelling (ICAO TI 7; 4.2, IATA DGR TABLE B.4.A)

Some everyday household items bear consumer warning labels which may or may not indicate they are classified as dangerous goods in air transport. All over the world there are different laws on how to identify the hazardous properties of chemicals

(called ‘classification’) and how information about these hazards is then passed to users (through consumer supply labels and safety data sheets for workers). This can be confusing because the same chemical can have different hazard descriptions in different countries. For example, a chemical could be labelled for supply as ‘toxic’ in one country, but not in another. For this reason, the UN brought together experts from different countries to create the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Products bearing the following GHS labels may indicate as dangerous goods:



Note — A product bearing the GHS corrosive label (depicted far right above) is NOT classified as dangerous goods if the signal word ‘Danger’ and hazard statement ‘causes serious eye damage’ applies.

Products bearing the following GHS labels (and none of the above) are NOT classified as dangerous goods:





IATA DGR TABLE B.4.A GHS pictograms and their criteria (B.4)

Pictogram							
Pictogram Name	Explosive	Gases Under Pressure	Flammable	Oxidizer Organic Peroxide	Toxic	Corrosive	Aquatic Toxicity
Appears on	Explosives		Gases Aerosols Liquids Solids	Oxidizing Gases Oxidizing Liquids Oxidizing Solids	Acute Toxicity Skin Oral Inhalation	Corrosive to Metal Skin Corrosion Serious Eye Damage	Acute Chronic
	Self Reactive Substances and Mixtures		Self Reactive Substances and Mixtures Pyrophoric Liquids and Solids	Organic Peroxides			
	Organic Peroxides		Self-Heating Substances and Mixtures				
			Substances and Mixtures, Which in Contact With Water, Emit Flammable Gases				

Notes —

1. The GHS pictograms, as shown above may indicate products which are dangerous goods for transport. There are however national and regional differences which may mean that packages bearing such pictograms are not classified as dangerous goods in transport.
2. When a substance is required to show corrosive symbol based solely on classification criteria of “serious eye damage” in the GHS classification, the substance does not meet the classification criteria of corrosive materials for transport.

IATA DGR TABLE B.4.B GHS pictograms and their criteria (B.4)

Pictogram		
Pictogram Name	Harmful	Respiratory
Appears on	Harmful to Skin Oral Inhalation	Respiratory Sensitization Carcinogenicity Toxic to Reproduction
	Skin Irritation Eye Irritation	Specific Target Organ Systemic Toxicity Single Exposure
	Respiratory Tract Irritation Narcotic Effects	Specific Target Organ Systemic Toxicity Repeated Exposure
	Skin Sensitization	Aspiration Hazard Germ Cell Mutagenicity

1.11 Provision of Information for use in Responding to Dangerous Goods Incident In-Flight (ICAO TI 7; 4.9, IATA DGR 9.5.1.2, AOCR Chapter 2; 8.9)

Editorial Note: The operator must ensure that for consignments for which a dangerous goods transport document is required by these instructions, appropriate information, which can be used on board to assist in planning the response to an emergency arising in-flight involving the dangerous goods, is immediately available at all times for use in emergency response to accidents and incidents involving dangerous goods in air transport. The information must be available to the pilot-in-command and can be provided by:

- a) The ICAO document Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods (Doc 9481); or
- b) any other document which provides appropriate information concerning the dangerous goods on board.

Notes —The procedures for responding to emergency situations see section 1.14 *Dangerous Goods Reporting Requirement*.

1.12 Provision of Information by Pilot-In-Command in the event of an In-Flight Emergency (ICAO TI 7; 4.3, IATA DGR 9.5.1.3)

Note: Non-DG Approved carriers shall be omitted this section

If an in-flight emergency occurs and the situation permits, the commander must inform the appropriate Air Traffic Services Unit of any dangerous goods on board. This information should include the proper shipping name, class/division, identified subsidiary hazard(s), compatibility group for explosives, quantity and location on board.

Editorial Note: If it is the operator's policy to provide flight crew with a telephone number where detailed information on dangerous goods on board may be obtained (on the NOTOC) this procedure should be explained.

1.13 Information to be Provide to Emergency Services in the Event of;

1.13.1 Aircraft Accident and Serious Incident (ICAO TI 7; 4.7 IATA DGR 9.6.3.1)

Note: Non-DG Approved carriers shall be omitted this section

In the event of:

- a) an aircraft accident; or
- b) a serious incident where dangerous goods carried as cargo may be involved,

Editorial Note: the operator of the aircraft carrying dangerous goods as cargo must, without delay, provide to emergency services responding to the accident or serious incident, information about the dangerous goods on board, as shown on the copy of the information provided to the pilot-in-command (NOTOC). The information must be sufficient to enable any hazards created by the dangerous goods to be minimized and include the proper shipping name, UN number, class/division, and identified subsidiary hazards, the compatibility group for explosives, the quantity and the location on board the aircraft as soon as possible, the operator must also provide this information to CAAT and the appropriate authorities of the State of the Operator and the State in which the accident or serious incident occurred.

1.13.2 Aircraft Incident (ICAO TI 7; 4.7.2 IATA DGR 9.6.3.2)

Note: Non-DG Approved carriers shall be omitted this section

Editorial Note: In the event of an aircraft incident, if requested to do so, the operator of an aircraft carrying dangerous goods as cargo must, without delay, provide to emergency services responding to the incident and to the appropriate authority of the State in which the incident occurred, information about the dangerous goods on board, as shown on the copy of the information provided to the pilot-in-command (NOTOC).

1.14 Dangerous Goods Reporting Requirements (ICAO TI 7; 4.4, 4.5, 4.6 IATA DGR 9.6.1, 9.6.2, 9.6.4)

- a) DG Approved Operator

Definitions:

Dangerous goods accident: An occurrence associated with and related to the transport of dangerous goods by air which results in fatal or serious injury to a person or major property or environmental damage.

Dangerous goods incident: An occurrence other than a dangerous goods accident associated with and related to the transport of dangerous goods by air, not necessarily occurring on board an aircraft, which results in injury to a person, property or environmental damage, fire, breakage, spillage, leakage of fluid or radiation or other evidence that the integrity of the packaging has not been maintained. Any occurrence relating to the transport of dangerous goods which seriously jeopardises an aircraft or its occupants is also deemed to be a dangerous goods incident.

Note — A dangerous goods accident or incident may also constitute an aircraft accident or incident as specified in ICAO Annex 13 — Aircraft Accident and Incident Investigation.

An operator must report dangerous goods accidents and incidents to CAAT and the State in which the accident or incident occurred in accordance with the reporting requirements of those appropriate authorities.

Note — This includes incidents involving dangerous goods that are not subject to all or part of the Technical Instructions through the application of an exception or of a special provision (e.g. an incident involving the short circuiting of a dry cell battery that is required to meet short-circuit prevention conditions in a special provision of 3; 3).

An operator must report to CAAT and the State of Origin any occasion when:

- a) dangerous goods are discovered to have been carried when not correctly loaded, segregated, separated or secured; or
- b) dangerous goods are discovered to have been carried without information having been provided to the pilot-in-command (when required) or the information is inadequate.

An operator must report any occasion when undeclared or mis-declared dangerous goods are discovered in cargo or mail. Such a report must be made to CAAT and the State in which this occurred.

An operator must report any occasion when dangerous goods that are not permitted are discovered by the operator (or the operator is advised by the entity that discovers the dangerous goods) either in the baggage or on the person of passengers (after check-in) or crew members. Such a report must be made to CAAT in which this occurred.

In addition to the requirements of the ICAO Technical Instructions for the reporting of dangerous goods occurrences (above), The Civil Aviation Authority of Thailand requirement no. 22/2562 on "Reporting of Civil Aviation Occurrence" requires that any incident which endangers or which, if not corrected, would endanger an aircraft, its occupants or any other person is reported to CAAT. Dangerous goods occurrences reportable under the Mandatory Occurrence Reporting Scheme include:

- dangerous goods found not to have been secured to prevent movement;
- damage to packages of dangerous goods;
- NOTOC errors where dangerous goods have not been stowed in accordance with loading instructions;
- failure to prepare electric wheelchairs in order to prevent accidental activation;
- electric wheelchairs found not to have been stowed and secured correctly; and
- leakage of dangerous goods from passenger baggage.

Editorial Note 1: Dangerous goods occurrences meeting the criteria of The Civil Aviation Authority of Thailand requirement no. 22/2562 on "Reporting of Civil Aviation Occurrence" also meet the definition of a dangerous goods accident or incident (above), reportable in accordance with The Civil Aviation Authority of Thailand requirement no. 22/2562 on "Reporting of Civil Aviation Occurrence " Accordingly, the report must be reported to CAAT within 72 hours.

The operator shall, upon becoming aware of an accident, or possible accident, involving an aircraft operated by the operator, notify the Authority immediately through the most expeditious means available. The operator shall also submit a formal written notification to CAAT within 3 hours after the initial notification

A dangerous goods accident and dangerous goods incident must be reported to the CAAT within 72 hours, unless exceptional circumstances prevent this. If necessary, a subsequent report shall be made as soon as possible giving all the details that were not known at the time the first report was sent. If a report has been made verbally, written confirmation shall be sent as soon as possible. Any type of accident or incident must be reported irrespective of whether the dangerous goods are in cargo, mail, stores, passengers' baggage or crew baggage.

The first and any subsequent report shall be as precise as possible and contain such of the following data that are relevant:

- Date of the incident or accident or the finding of undeclared or misdeclared dangerous goods.
- Location, the flight number and flight date.
- Description of the goods and the reference number of the air waybill, pouch, baggage tag, ticket, etc.
- Proper shipping name (including the technical name, if appropriate) and UN/ID number, when known.
- Class or division and any subsidiary hazard.
- Type of packaging, and the packaging specification marking on it.
- Quantity of dangerous goods.
- Name and address of the shipper, passenger, etc.

- Any other relevant details.
- Suspected cause of the incident or accident.
- Action taken.
- Any other reporting action taken.
- Name, title, address and telephone number of the person making the report.
- Copies of relevant documents and any photographs taken should be attached to a report.

Editorial Note 2: Operators should describe their procedures for reporting dangerous goods incidents, accidents and undeclared dangerous goods to the CAAT. Where applicable, this information should be provided to handling agents so that, as a minimum, they are advised to whom non-MOR events should be submitted.

Note — Example of Accident and Incident Occurrence Report form are available via the publications section in website <https://www.caat.or.th>

- b) Non-DG Approved Operator

Definitions:

Dangerous goods accident: An occurrence associated with and related to the transport of dangerous goods by air which results in fatal or serious injury to a person or major property or environmental damage.

Dangerous goods incident: An occurrence other than a dangerous goods accident associated with and related to the transport of dangerous goods by air, not necessarily occurring on board an aircraft, which results in injury to a person, property or environmental damage, fire, breakage, spillage, leakage of fluid or radiation or other evidence that the integrity of the packaging has not been maintained. Any occurrence relating to the transport of dangerous goods which seriously jeopardises an aircraft or its occupants is also deemed to be a dangerous goods incident.

Note — A dangerous goods accident or incident may also constitute an aircraft accident or incident as specified in *ICAO Annex 13 — Aircraft Accident and Incident Investigation*.

An operator must report dangerous goods accidents and incidents to CAAT and the State in which the accident or incident occurred in accordance with the reporting requirements of those appropriate authorities.

Note — This includes incidents involving dangerous goods that are not subject to all or part of the Technical Instructions through the application of an exception or of a special provision (e.g. an incident involving the short circuiting of a dry cell battery that is required to meet short-circuit prevention conditions in a special provision of 3;3).

An operator must report any occasion when undeclared or mis-declared dangerous goods are discovered in cargo or mail. Such a report must be made to CAAT and the State in which this occurred.

An operator must report any occasion when dangerous goods that are not permitted are discovered by the

operator (or the operator is advised by the entity that discovers the dangerous goods) either in the baggage or on the person of passengers (after check-in) or crew members. Such a report must be made to CAAT in which this occurred.

In addition to the requirements of the ICAO Technical Instructions for the reporting of dangerous goods occurrences (above), The Civil Aviation Authority of Thailand requirement no. 22/2562 on "Reporting of Civil Aviation Occurrence" requires that any incident which endangers or which, if not corrected, would endanger an aircraft, its occupants or any other person is reported to CAAT. Dangerous goods occurrences reportable under the Mandatory Occurrence Reporting Scheme include:

- failure to prepare electric wheelchairs in order to prevent accidental activation;
- electric wheelchairs found not to have been stowed and secured correctly; and
- leak or spill of dangerous goods from passenger baggage or undeclared dangerous goods.

Editorial Note 1: Dangerous goods occurrences meeting the criteria of The Civil Aviation Authority of Thailand requirement no. 22/2562 on "Reporting of Civil Aviation Occurrence" also meet the definition of a dangerous goods accident or incident (above), reportable in accordance with The Civil Aviation Authority of Thailand requirement no. 22/2562 on "Reporting of Civil Aviation Occurrence" Accordingly, the report must be reported to CAAT within 72 hours.

The operator shall, upon becoming aware of an accident, or possible accident, involving an aircraft operated by the operator, notify the Authority immediately through the most expeditious means available. The operator shall also submit a formal written notification to CAAT within 3 hours after the initial notification

A dangerous goods accident and dangerous goods incident must be reported to the CAAT within 72 hours, unless exceptional circumstances prevent this. If necessary, a subsequent report shall be made as soon as possible giving all the details that were not known at the time the first report was sent. If a report has been made verbally, written confirmation shall be sent as soon as possible. Any type of accident or incident must be reported irrespective of whether the dangerous goods are in cargo, mail, stores, passengers' baggage or crew baggage.

The first and any subsequent report shall be as precise as possible and contain such of the following data that are relevant:

- Date of the incident or accident or the finding of undeclared or misdeclared dangerous goods.
- Location, the flight number and flight date.
- Description of the goods and the reference number of the air waybill, pouch, baggage tag, ticket, etc.
- Proper shipping name (including the technical name, if appropriate) and UN/ID number, when known.

- Class or division and any subsidiary hazard.
- Type of packaging, and the packaging specification marking on it.
- Quantity of dangerous goods.
- Name and address of the shipper, passenger, etc.
- Any other relevant details.
- Suspected cause of the incident or accident.
- Action taken.
- Any other reporting action taken.
- Name, title, address and telephone number of the person making the report.
- Copies of relevant documents and any photographs taken should be attached to a report.

Editorial Note 2: Operators should describe their procedures for reporting dangerous goods incidents, accidents and undeclared dangerous goods to the CAAT. Where applicable, this information should be provided to handling agents so that, as a minimum, they are advised to whom non-MOR events should be submitted.

Note — Example of Accident and Incident Occurrence Report Form are available via the publications section in website <https://www.caat.or.th>.

1.15 Removal of Contamination (ICAO TI 7; 3.1.3 IATA DGR 9.4, 10.9.4)

a) DG Approved Operator

In the event of a spillage or leakage of dangerous goods within an aircraft, the position where the dangerous goods or ULD was stowed on the aircraft must be inspected for damage or contamination and any hazardous contamination removed. The hazard of the dangerous goods within packages concerned may be established by checking the entry on the NOTOC for that loading position or from hazard labels applied to the packages. The hazard classes and divisions of dangerous goods within a ULD may also be identified from the NOTOC or otherwise, should package labels not be visible, from the ULD tag bearing red hatchings applied to the outside of the ULD. Persons responding in the event of damage to or leakage of dangerous goods from packages must:

- identify the hazards and wear appropriate protective clothing;
- avoid handling the package or keep handling to a minimum;
- inspect adjacent packages for contamination and put aside any that may have been contaminated;
- arrange for decontamination of the aircraft and equipment; and
- In the case of infectious material, inform the appropriate public health authority or veterinary authority, and provide information to any other countries of transit where persons may have been

exposed to danger; and notify the shipper and/or the consignee.

Editorial Note 1: If it is evident that a package containing radioactive material is damaged or leaking, or if it is suspected that the package may have leaked or been damaged, access to the package must be restricted and a qualified person must, as soon as possible, assess the extent of contamination and the resultant radiation level of the package. The scope of the assessment must include the package, the aircraft, the adjacent loading and unloading areas and, if necessary, all other material which has been carried in the aircraft. When necessary, additional steps for the protection of persons, property and the environment must be taken in accordance with provisions established by the relevant competent authority, to overcome and minimize the consequences of such leakage or damage. An aircraft which has been contaminated by radioactive materials must be immediately taken out of service and not returned until the radiation level at any accessible surface and the non-fixed contamination are not more than the values specified in the Technical Instructions. In the event of non-compliance with any limit in the Technical Instructions applicable to radiation level or contamination, the operator must ensure the shipper is informed if the non-compliance is identified during transport; take immediate steps to mitigate the consequences of the non-compliance; and communicate the non-compliance to the shipper and relevant competent Authority(ies), respectively, as soon as practicable and immediately whenever an emergency situation has developed or is developing.

Editorial Note 2: Since operators may carry thermometers, barometers or items which contain mercury under *1.2.7 provisions for dangerous goods carried by passenger and crew* (ICAO TI Table 8-1, or IATA DG 2.3A), the removal of a mercury Spillage procedure should be described.

b) Non-DG Approved Operator

In the event of a spillage or leakage of undeclared dangerous goods within an aircraft, the position where the dangerous goods or unit load device was stowed on the aircraft must be inspected for damage or contamination and any hazardous contamination removed. Persons responding in the event of damage to or leakage of dangerous goods from packages must:

- identify the hazards and wear appropriate protective clothing;
- avoid handling the package or keep handling to a minimum;
- inspect adjacent packages for contamination and put aside any that may have been contaminated;
- arrange for decontamination of the aircraft and equipment; and
- In the case of infectious material, inform the appropriate public health authority or veterinary authority, and provide information to any other countries of transit where persons may have been exposed to danger; and notify the shipper and/or the consignee.

Editorial Note 1: If it is evident that a package containing radioactive material is damaged or leaking, or if it is suspected that the package may have leaked or been damaged, access to the package must be restricted and a qualified person must, as soon as possible, assess the extent of contamination and the resultant radiation

level of the package. The scope of the assessment must include the package, the aircraft, the adjacent loading and unloading areas and, if necessary, all other material which has been carried in the aircraft. When necessary, additional steps for the protection of persons, property and the environment must be taken in accordance with provisions established by the relevant competent authority, to overcome and minimize the consequences of such leakage or damage.

Editorial Note 2: Since operators may carry thermometers, barometers or items which contain mercury under 1.2.7 provisions for dangerous goods carried by passenger and crew, the removal of mercury Spillage procedure should be described.

1.16 Conditions under which Weapons, Munitions of War and Sporting Weapons may be Carried

Note: Non-DG Approved carriers that do not carry Weapons, Munitions of War and Sporting Weapons shall omit this section.

1.16.3 Need for Approval to Transport Munitions of War

Weapons of war and munitions of war can only be carried provided an approval to do so has been granted by all the States concerned before a flight. They must be carried in the aircraft in a place which is inaccessible to passengers during flight and, in the case of firearms, unloaded, except as specified in 1.16.2 below.

1.16.4 Stowage Requirements for Munitions of War

In exceptional circumstances, weapons of war and munitions of war may be carried other than in an inaccessible place on the aircraft and may be loaded, provided an approval to do so has been granted by all the States concerned before a flight. These exceptional circumstances are intended primarily to permit the carriage of law enforcement officers, protection officers, etc.

1.16.5 Notifying Commander of the Carriage of Munitions of War

The commander must be notified before a flight if weapons of war or munitions of war are to be carried on the aircraft.

1.16.6 Carriage of Sporting Weapons When Inaccessible to Passengers During Flight

Sporting weapons and ammunition for such weapons may be carried without an approval from an Authority, provided they are stowed in a place on the aircraft which is inaccessible to passengers during flight and, in the case of firearms, unloaded.

Operators must take all reasonable measures to ensure that any sporting weapons intended to be carried by air are reported to them and operators should describe the measures in place to make passengers aware of the need to furnish the operator with details of any sporting weapon they intend to carry. For aircraft without inaccessible compartments, carriage should be prohibited unless alternative effective procedures for stowing the weapons in a place that is inaccessible to passengers are established.

2. Accident and Occurrence

Special Notification Requirements in the event of an Accident or Occurrence when Dangerous Goods are Being Carried or Have Been Offered for Air Transport without Having Been Prepared and Declared in Accordance with the ICAO Technical Instructions.

2.1 Information to be Provided by the Pilot-in-Command in the Event of an In-Flight Emergency (ICAO TI 7; 4.3 IATA DGR 9.5.1.3)

Note: Non-DG Approved carriers shall be omitted this section

If an in-flight emergency occurs and the situation permits, the commander must inform the appropriate Air Traffic Services Unit of any dangerous goods on board. This information should include the proper shipping name, class/division, identified subsidiary hazard(s), compatibility group for explosives, quantity and location on board.

Editorial Note: If it is the operator's policy to provide flight crew with a telephone number where detailed information on dangerous goods on board may be obtained (on the NOTOC) this procedure should be explained.

2.2 Information to be Provided by the Operator in the Event of an Aircraft Accident or Serious Incident Where Dangerous Goods Carried as Cargo may be Involved (ICAO TI 7; 4.7.1 IATA DGR 9.6.3)

Note: Non-DG Approved carriers shall be omitted this section

If an aircraft carrying dangerous goods as cargo is involved in an accident or serious incident where the dangerous goods may be involved, the operator must provide information, without delay, to emergency services responding to the accident or serious incident about the dangerous goods on board, as shown on the copy of the information to the pilot-in-command (NOTOC). The information must be sufficient to enable any hazards created by the dangerous goods to be minimized and include the proper shipping name, UN number, class/division, any identified subsidiary risks, the compatibility group for explosives, the quantity and the location on board the aircraft. As soon as possible, the operator must also provide this information to the CAAT and the appropriate authority of the State in which the accident or serious incident occurred.

Editorial Note: Operators must address these provisions in appropriate manuals and accident contingency plans.

2.3 Information to be Provided by the Operator in the Event of an Aircraft Incident (ICAO TI 7; 4.7.2 IATA DGR 9.6.3)

Note: Non-DG Approved carriers shall be omitted this section

In the event of an aircraft incident, if requested to do so, the operator of an aircraft carrying dangerous goods as cargo must, without delay, provide to emergency services responding to the incident and to the appropriate

authority of the State in which the incident occurred, information about the dangerous goods on board, as shown on the copy of the information provided to the pilot-in-command.

Editorial Note: Operators must address these provisions in appropriate manuals and accident contingency plans.

2.4 Dangerous Goods Accident and Incident Reports (ICAO TI 7; 4.3, 4.4, 4.5, 4.6 IATA DGR 9.6)

See section 1.14 *Dangerous Goods Reporting Requirements*.

3. Dangerous Goods Training

Training Syllabus for Transport of Dangerous Goods (Operations Personnel Including Crew Members).

3.1 Approval of Dangerous Goods Training Programmes (ICAO TI 1; 4.5.1, IATA DGR 1.5.2.1, (a), AOCR Chapter 4; 16.1, AMC1 SPA.DG.105 (a), RCAAT no.4 Section 1; Clause 6)

Insert Text - [Operator Name] hold approval for dangerous goods training programmes in the carriage of dangerous goods by air in accordance with AOCR Chapter 4; 16.1, AMC1 SPA.DG.105 (a) and RCAAT no.4 Section 1; Clause 6. This training is identified and described in the following text. Any substantive changes to this training (or proposals for sourcing training from an alternative external company) must be submitted to CAAT for the training approval to remain valid.

Editorial Note: Prior to outsourcing the provision of dangerous goods training, operators must establish that the proposed training materials are approved by the CAAT.

3.2 General Requirements Applicable to Dangerous Goods Training Programmes (ICAO TI 1; 4 IATA DGR 1.5)

To ensure that everyone involved is aware of their responsibilities in the transport of dangerous goods, no matter whether such goods are carried as cargo or are in the possession of passengers, The employer of personnel that perform functions aimed at ensuring that dangerous goods are transported in accordance ICAO Doc 9284 must establish and maintain a dangerous goods training programme.

A training programme includes elements such as methodology initial and recurrent training and assessment, instructor qualifications and competencies, training and assessment records and evaluation of its effectiveness. Operator need to determine the purpose and objective of the competency-based training programme based on the functions for which their personnel are responsible. Operator should ensure that training is designed and developed to establish clear links among the competencies to be achieved, the learning objectives, assessment methods, and course materials.

An approach to ensuring personnel are competent to perform any function for which they are responsible is provided in CAAT Guidance Material for Competency-based Approach to Dangerous Goods Training and Assessment (CAAT-GM-OPS-DGCBT).

Personnel must receive recurrent training and assessment within 24 months (Except for cabin crew members, who shall complete a recurrent training programme annually – Refer Annex 6 Chapter 12; 12.4) of previous training and assessment to ensure that competency has been maintained. However, if recurrent training and assessment is completed within the final three months of validity of the previous training and assessment, the period of validity extends from the month on which the recurrent training and assessment was completed until 24 months from the expiry month of that previous training and assessment.

As with other aviation qualifications an offence against the regulations will be committed if staff continue to work after their training qualification has expired.

Editorial Note: Operators with a policy to provide recurrent dangerous goods training and assessment at periods of less than 24 months should state that policy

The operator must maintain a record of training and assessment for personnel. The record of training and assessment must include:

- a) the individual's name;
- b) the month of completion of the most recent training and assessment;
- c) a description, copy or reference to training and assessment materials used to meet the training and assessment requirements;
- d) the name and address of the organization providing the training and assessment; and
- e) evidence which shows that the personnel have been assessed as competent.

Training and assessment records must be retained by the employer for a minimum period of 36 months from the most recent training and assessment completion month and must be made available upon request to personnel or the appropriate national authority.

3.3 Dangerous Goods Training Syllabus

The purpose of a Training Syllabus is to communicate and help organize the material in a logical and effective sequence. Additionally, it is a checklist of emphasis in alignment with the specific functions and level of proficiency, list the training aids, resources or reference points for cross references and plan the flow and timing of the delivery.

Example Training Syllabus

SYLLABUS	EMPHASIS	TEACHING AIDS	REFERENCE
Introduction to the course Why a course on dangerous goods? Safety, legal requirements.	Expand motivation through real-life examples of dangerous goods accidents such as videos, newspaper articles, photos, etc.	- VA - H - BP	DGM no. __

The syllabus here proposed cover all areas of the dangerous goods regulations and are not customised to the needs of a particular function. Personnel responsible for preparing dangerous goods consignments will require

more in-depth coverage of classification and packaging procedures and requirements, while personnel responsible for processing or accepting dangerous goods consignments will require more coverage on recognition of dangerous goods, package markings, and verifying accuracy of documentation.

The syllabus has each topic listed in the first column, with any particularly important points emphasised in the second. The third column provides suggested visual aids (VA); references to relevant background papers (BP) shown in this manual, and suggested handouts (H) found in this toolkit. The relevant Dangerous Goods Regulations (DGR) reference is shown in the fourth column.

3.4 Instructor Qualifications and Competencies (ICAO TI 1; 4.6 IATA DGR 1.5.3)

Instructors of initial and recurrent dangerous goods training must demonstrate or be assessed as competent in instruction and the function(s) that they will instruct prior to delivering such training.

Instructors delivering initial and recurrent dangerous goods training must deliver such courses at least every 24 months, or in the absence of this, attend recurrent training.

Editorial Note: In addition to the above, operators should detail the experience and aptitudes considered appropriate for the selection of trainers.

Note — Operator must ensure that the instructor receives updates to the Regulations and training material on an annual basis with the issuance of each edition of the DGR or as the Regulations are modified. Instructors must receive and understand updates to dangerous goods information and be made familiar with those changes by training or other means on an annual basis or as the Regulations are modified.

3.5 Objective of Dangerous Goods Training (ICAO 1; 4.2 IATA 1.5)

The operator must ensure that personnel are competent to perform any function for which they are responsible prior to performing any of these functions. This must be achieved through training and assessment commensurate with the functions for which they are responsible. Such training must include:

- a) general awareness/familiarization training - Personnel must be trained to be familiar with the general provisions;
- b) function-specific training - Personnel must be trained to perform competently any function for which they are responsible; and
- c) safety training - Personnel must be trained on how to recognize the hazards presented by dangerous goods, on the safe handling of dangerous goods, and on emergency response procedures.

4. Transport of Aircraft Spares, Company Material (COMAT) and Consumables which meet the Criteria of 'Dangerous Goods'

4.1 Airworthiness Consider

Aircraft components are installed in accordance with prescribed airworthiness specifications such that they do not present a hazard to the aircraft or its occupants. However, this safeguard may not apply to such items if they are shipped as cargo or stores without being packed, marked, labelled and declared in accordance with the ICAO Technical Instructions.

4.2 Assignment of Responsibilities for the Identification and Consignment of Dangerous Goods by Air

Engineering procedures should detail the dangerous goods responsibilities of all personnel involved with the procurement, receipt, inventory and shipment of dangerous goods, including shipment from line stations that do not have stores facilities.

4.3 Identification of Dangerous Goods

Dangerous goods can be found in various aircraft components, including the following:

- Chemical oxygen generators on their own or installed within Personal Breathing Equipment (PBE) or Passenger Service Units (PSU)
- Explosives cartridges of engine fire bottles and some passenger seat belts
- Line cutting explosives of helicopter winches
- Signalling flares
- Aircraft batteries
- Lithium batteries found within aircraft lighting, beacons (including personal locator beacons) or electronic devices such as electronic flight bags, personal entertainment devices, credit card readers
- Fire bottles, e.g. from APU, engines, lower cargo compartment and lavatory waste containers
- Fire extinguishers
- Oxygen cylinders
- Escape slides and life rafts
- Fuel Control Units (FCU) and fuel line components with fuel residue (e.g. after removal from aircraft)
- Tyres - when unserviceable and inflated to a pressure ≥ 200 kPa at 20° (2 Bar or 29 PSI)
- Adhesives
- Paint
- Oxidising repair kits
- Radioactive materials - ignition excitors, tritium signs (aisle and emergency exit doors) and depleted uranium counter-balance.

Some aircraft manufacturers such as Airbus and Boeing are able to provide lists of those components which are classified as dangerous goods, identified by part number. It is recommended that procedures require dangerous goods be flagged as such when creating new entries for components and consumables on inventory systems

For batteries, datasheets should be obtained in order to establish whether they are dangerous goods. In addition, when shipping lithium metal or ion batteries, evidence that each cell or battery is of the type proved to meet the requirements of each test of the UN Manual of Tests and Criteria, Part III, subsection 38.3 is also required.

4.4 Identifying dangerous goods within consumables

The dangerous goods status of consumables should be established by referencing the manufacturer’s Safety Data Sheet. Section 14 of the EU format SDS provides basic classification information, i.e. UN Number, Proper Shipping Name, Class/Division and Packing Group.

Many consumables (and everyday household items) bear consumer warning labels which indicate whether they are classified as dangerous goods in transport. Products bearing the following GHS labels are classified as dangerous goods:



Note: A product bearing the GHS corrosive label (depicted far right above) is NOT classified as dangerous goods if the signal word ‘Danger’ and hazard statement ‘causes serious eye damage’ applies.

Products bearing the following GHS labels (and none of the above) are NOT classified as dangerous goods:



4.5 Dangerous Goods Training

Persons preparing consignments of dangerous goods for transport by air must receive detailed training commensurate with their responsibilities. This training may either be provided by a CAAT Approved Dangerous Goods Training Programme, provided that as a minimum the training meets the requirements of Training in the Safe Transport of Dangerous Goods by Air, and reflects the specific responsibilities of the person receiving the training.

Procurement staff, stores personnel (other than shippers) and line engineers with responsibilities for the identification or shipment of dangerous goods must complete basic dangerous goods training and testing commensurate with their specific responsibilities. Suitable training and testing provided by a competent

instructor, through CBT or prescribed self-study books each meet the requirement to provide training at this level.

4.6 Arrangements for Shipping Dangerous Goods by Air

Consignors (shippers) of dangerous goods have a responsibility under the Regulations and the Technical Instructions to ensure that all applicable requirements are met; these include correctly classifying and identifying dangerous goods, packing them according to a prescribed method, marking and labelling packages and providing a dangerous goods transport document to the air carrier.

The air carrier is responsible for conducting a detailed acceptance check prior to carriage. This is required, even if the goods are urgently required for an 'Aircraft on Ground' (AOG) so dangerous goods must always be offered for carriage in accordance with the carrier's requirements, not simply delivered to a departing aircraft. It is imperative that airline engineering personnel who deliver dangerous goods for carriage by air are aware of this.

Procedures should explain the organization's arrangements at stores and line maintenance facilities for consignments of dangerous goods to be prepared for transport by properly qualified personnel, e.g. whether such duties will be performed in-house or by an appointed specialist freight forwarder. Procedures should also address any potential need for components classified as dangerous goods removed from AOG aircraft (e.g. PSUs, fuel system components with fuel contamination, etc.) to be shipped, including the use of a specialist freight forwarder if required.

Engineers' toolboxes must not contain aircraft spares or consumables classified as dangerous goods when carried by air in the course of their duties, unless this method of packaging complies with the applicable packing instruction and the dangerous goods have been properly prepared, declared and accepted for transport as cargo or stores in accordance with the Technical Instructions.

Editorial Note 1: The operators authorized to transport dangerous goods that should describe a policy and procedure to transport spare parts by air for maintenance purposes that should be categorized as dangerous goods.

Editorial Note 2: The operators not authorized to transport dangerous goods that should describe a policy and procedure to not transport spare parts by air for maintenance purposes that should be categorized as dangerous goods.