

# THE OFFERING OF DANGEROUS GOODS FOR CARRIAGE BY AIR



An information booklet for the shipping of dangerous goods by air

Aviation Safety is **Everyone's** Responsibility

## **PREFACE**

This booklet "The Offering Of Dangerous Goods For Carriage By Air" is intended as an aid to those personnel involved in shipment of dangerous goods. It is not a regulatory document and is no substitute for the training that is required by law.

Several references to regulatory documents appear in this booklet. Readers should recognise that regulations change and the references may not be current at the time they read this document. The regulatory references used in this booklet are:

- Civil Aviation Rule Part 92 — The Carriage of Dangerous Goods By Air
- International Civil Aviation Organisation, Technical Instructions for the Safe Transport of Dangerous Goods by Air
- International Air Transport Association, Dangerous Goods Regulation

## **DANGEROUS GOODS**

Dangerous goods are those articles or substances that could be hazardous in transportation. Many common items from the home or workshop, as well as a variety of industrial chemicals or substances, may harm passengers, airline employees, or aircraft. To minimise the risk from such materials, the government and airlines have established a program of regulations for dangerous goods.

## **Contents**

INTRODUCTION .....	1
THE PLAYERS .....	2
THE REGULATIONS.....	3
CLASSIFYING MATERIALS.....	4
PACKING GROUPS .....	6
PROPER SHIPPING NAME and UN NUMBER.....	6
NET QUANTITY LIMITATIONS.....	8
PACKAGING OPTIONS .....	8
MARKING AND LABELLING .....	11
DOCUMENTATION .....	14
STATE AND OPERATOR VARIATIONS.....	16
CONCLUSIONS .....	16

## **INTRODUCTION**

Airlines often get questions from people who need guidance when intending to send dangerous goods by air. To help resolve some of those questions, the Civil Aviation Authority has prepared this brief booklet in the general principles and procedures involved.

This booklet is by no means a substitute for the regulations themselves or for more detailed training, which is required by Part 92 and necessary to fully understand the application of dangerous goods regulations. Offerers must recognise that shipping dangerous goods is no job for the casual amateur. The rules are complicated, requiring considerable planning to assure that shipments are prepared correctly. The point to remember in working with these complicated rules is that there are two fundamental goals of the regulations:

1. **To package dangerous goods so that their hazards are contained within the package.** When correctly packaged, the articles and substances may be transported with relatively little risk.
2. **To communicate the presence of the dangerous goods.** The established marking, labelling, and documentation procedures tell those who handle the shipments about what is inside. If there is ever a leak or some other incident, people need to know what is contained in the package.

Each person involved needs to have the training and information to do his or her job correctly so that these two goals are met. If not, there could be very unfortunate consequences, as the air carrier industry has learned from hard experience. Leaking packages of any kind are an obvious problem, but if the contents are a mystery, there can be bigger problems - including injury or death for passengers and crew.

This booklet provides guidance on locating the correct national and international regulations for use in preparing and offering air shipments of dangerous goods. In reviewing these regulations, we discuss -

- |                            |                                 |
|----------------------------|---------------------------------|
| → Classification           | → Packaging Options             |
| → Packing Groups           | → Marking                       |
| → Proper Shipping Names    | → Labelling                     |
| → UN Numbers               | → Documentation                 |
| → Net Quantity Limitations | → State and Operator Variations |

As offerers become familiar with these ideas, they will see that the methods of packaging and describing dangerous goods are very rigid, and that quantities of dangerous goods authorised for air shipment are tightly controlled. These factors - prescribed by regulation - will have significant influences on the movement of commodities that are dangerous goods and must be understood from the beginning of the transportation process.

In order for these technical details to make sense, it is vital to understand the functions of those involved in transporting dangerous goods.

## THE PLAYERS

<b>Role</b>	<b>Function</b>
<b>Offerer</b>	<b>The party that offers dangerous goods for transportation.</b> Responsible for determining whether a material is regulated, and then assigning classification and proper shipping name. Must prepare package correctly before offering for transportation.
<b>Carrier</b>	<b>The party that accepts dangerous goods for transportation.</b> Carriers must assure that each package is in apparent good order for transportation, by verifying that its marks and labels, and the accompanying documentation, are correct.
<b>Packaging Manufacturer</b>	<b>The party that supplies packagings that it represents as conforming to any UN/ICAO packaging specifications.</b> Under Part 92, there is no definition of a packaging manufacturer but it may be implied that this is the party that submits the packaging for testing and applies for the specification markings to be placed on a packaging, even if that packaging is assembled from components fabricated by other parties. In other words, the manufacturer is the party who <i>receives approval from the CAA authorising the application of the markings that certify the packaging complies with applicable regulations.</i>

One of the first steps in understanding these rules is learning who the players are and how they fit into the transportation process. Although many different kinds of companies - chemical manufactures, distributors, air freight forwarders, truckers, brokers, dealers, warehousing firms - can be involved in dangerous goods shipments, there are fundamentally three roles: Offerer, carrier, packaging manufacturer. A single company can play more than one of these roles at any one time. For example, a forwarder acts as a carrier when it *accepts* a shipment from a chemical manufacturer; it becomes an offerer when it *offers* the same shipment to an airline. The key is to focus on the *functions* of a person at a given time.

Offerer, carrier, packaging manufacturer - each party has an essential job. However, the most important functions belong to the offerer, as will be seen throughout this booklet. Without accurate information about an article or substance and correct shipment preparation, the other players cannot perform their jobs. Packaging manufacturers cannot be certain that they are supplying the right containers if they do not know the properties of the materials that are expected to go into their packages. And carriers cannot know that a material requires the special handling appropriate to dangerous goods if such items are not correctly identified.

The system does have built-in checks. For example, air carriers will review shipments at time of acceptance to help assure that all components, marks, labels, and documentation are in order. If the offerer has not done his or her job right, the package cannot legally be transported and should be refused until the carrier is satisfied that all details are in order. If a package is found to contain undisclosed dangerous goods, the CAA is notified for appropriate action, which may result in fines or other penalties.

So in order for shipments to move without problems, offerers must start the packages off right. To do that job, of course, they must know the regulations.

## **THE REGULATIONS**

<b>Title</b>	<b>Application to Air Mode</b>
Rule Part 92 — Carriage of Dangerous Goods By Air	Rules published by the New Zealand Civil Aviation Authority under the Civil Aviation Act 1990 and its amendments. This document lays the foundation for applying the international regulations for air shipments to, from or within New Zealand. It also includes exceptions from the international regulations when the shipment is destined for movement only within New Zealand.
Technical Instructions for the Safe Transport of Dangerous Goods by Air	International government regulations published by the International Civil Aviation Organisation (ICAO), the United Nations Organisation responsible for international aviation matters. The ICAO document has legal status in New Zealand and many other countries.
Dangerous Goods Regulations	An airline industry "field document," published by the International Air Transport Association (IATA). Based on the ICAO Technical Instructions, the IATA Dangerous Goods Regulations include essential information about many airline industry standards and conventions.

The responsibilities of each player are defined by government regulations. In order to know what to do with dangerous goods, offerers, carriers, and packaging manufacturers must know the regulations that apply to them. Three regulatory documents are involved in the air transport of dangerous goods, presenting the uninitiated with a bewildering amount of information. For this reason, each party needs to know how the rules apply before the pressures of shipping deadlines set in.

Within New Zealand, the starting point for any discussion of regulations governing the air transport of dangerous goods is Part 92 Carriage Of Dangerous Goods By Air. The form of international regulations recognised by Part 92 is the Technical Instructions for the Safe Transport of Dangerous Goods, published by the International Civil Aviation Organisation (ICAO). ICAO is the United Nations body with authority over air transport issues, and its Dangerous Goods Panel meets every two years to review and update the Technical Instructions.

Through Part 92.7 General carriage requirements, the Civil Aviation Authority requires offerers to offer and air carriers to accept packages of dangerous goods prepared in accordance with the Technical Instructions. There are, however, certain variations from the ICAO Technical Instructions that may be observed when dangerous goods are being carried on domestic operations, and these variations are spelled out in Part 92.11 and 92.157. Offerers should be familiar with these variations in order to be avail themselves of the lessor requirements for domestic operations.

Once familiar with the rules in Part 92, offerers may use the classification and hazard communication requirements of the ICAO Technical Instructions to prepare their air shipments. In CAA's view, ICAO may be used for either domestic or international air shipments. Under the Land Transport rules for the carriage of dangerous goods on land, shipments prepared in accordance with ICAO will also be acceptable for road transportation to or from an air segment.

The ability to use the ICAO Technical Instructions is important because, as already mentioned, airlines operate in a global environment. Many of our major trading partners - Australia, United States, the United Kingdom, Japan - have already adopted ICAO as their own internal requirements for handling dangerous goods by air. Airlines, therefore, need to be able to keep their training as streamlined as possible, and, to avoid costly and potentially confusing "double training" in both domestic and international regulations, many countries will not accept shipments that are not prepared in accordance with the international classification, packaging, and communication standards.

In saying that international standards have a significant role for the airlines, we need to stress that the ICAO standards are actually used in the air carrier industry in a form published by the International Air Transport Association (IATA) as the Dangerous Goods Regulations. These regulations are an important airline industry reference, known world-wide as a source of information about requirements and procedures recognised throughout the airline industry. For example, IATA gives details about preparing the airline industry's standard "Shipper's Declaration for Dangerous Goods," along with information about preparing an accompanying air waybill. Such air waybill details are not covered by ICAO, and since ICAO has no jurisdiction on air waybill matters (an air carrier industry document with commercial rather than safety implications) one could not reasonable expect ICAO to cover such information.

The CAA does recognise that the use of the IATA Dangerous Goods Regulations will ensure compliance with the ICAO Technical Instructions. For this reason, references to both documents have been included throughout this booklet.

## CLASSIFYING MATERIALS

### Hazard Class

#### Designator

#### General Properties

Class 1 Explosives. (includes 6 sub-subdivisions and 13 compatibility groups)

*Note: In New Zealand, packages for explosives must first be classified through a formal process with the Department of Labour.*

Class 2 Gases.

- Division 2.1 — Flammable gases
- Division 2.2 — Non-flammable, non-toxic gases
- Division 2.3 — Toxic gases

Class 3	Flammable liquids.
Class 4	Flammable solids; Substances liable to spontaneous combustion; Substances which, in contact with water, emit flammable gases. <ul style="list-style-type: none"><li>→ Division 4.1 - Flammable Solids</li><li>→ Division 4.2 - Substances liable to spontaneous combustion</li><li>→ Division 4.3 - Substances which, in contact with water, emit flammable gases</li></ul>
Class 5	Oxidizing Substances and Organic Peroxide <ul style="list-style-type: none"><li>→ Division 5.1 – Oxidizing Substances</li><li>→ Division 5.2 - Organic Peroxides</li></ul>
Class 6	Toxic and Infectious Substances <ul style="list-style-type: none"><li>→ Division 6.1 - Toxic Substances</li><li>→ Division 6.2 - Infectious Substances</li></ul>
Class 7	Radioactive Material.
Class 8	Corrosives.
Class 9	Miscellaneous Substances and Articles.

The population of articles and substances that are called dangerous goods is divided into hazard classes, which identify the threats they may pose in transportation. Technical definitions for all hazard classes are found in the regulations. In the IATA Dangerous Goods Regulations, they are found in Section 3, "Classification" for all non-radioactive materials, and, for Class 7, Section 10, "Radioactive Material". This information corresponds to Part 2 in the ICAO Technical Instructions. Each hazard class has specific criteria that are used to determine whether a substance belongs in that class. For example, the flash point - the lowest temperature at which a liquid gives off flammable vapours - is used to establish whether liquids are flammable enough to be placed in Class 3.

The responsibility for determining whether a material is hazardous, and in which hazard class it belongs, rests with the offerer. While the classification process is relatively straightforward for well-known substances (e.g., acetone), the process of classifying materials by using the hazard class criteria is especially important when a new chemical or mixture of chemicals is to be transported. For this reason, offerers must know the essential technical characteristics of the materials they wish to ship. With the necessary technical data, they must review the classification criteria and determine whether and how the substance is regulated.

*Note: One important exception to the offerer's responsibility for classification comes in Class 1 (explosives). Under New Zealand regulations, packages for explosives must be classified by the Department of Labour.*

## **PACKING GROUPS**

Packing Group I	Great Danger
Packing Group II	Medium Danger
Packing Group III	Minor Danger

Materials in several hazard classes or divisions - specifically, 3, 4, 5 (except for liquid oxidisers), 6.1 and 8 - are grouped according to the degree of hazard posed by the substances. These groupings, "Packing Groups," are keyed to the testing required for the packagings prescribed for the materials. Packagings for materials in Packing Group I are subjected to the most rigorous testing because such materials are the most dangerous, while those in Packing Groups II and III have correspondingly less stringent testing requirements with the reduction in danger.

The determination of the Packing Group for a material is discussed in the classification section. Offerers need to know the Packing Group of a specific product to determine the net quantity of material permitted to be shipped in one package, since in appropriate instances (e.g., products shipped as "flammable liquid, n.o.s.") the distinction is clearly made in the regulations.

## **PROPER SHIPPING NAME and UN NUMBER**

Regulated materials must be described to the carrier in very specific ways. In addition to its appropriate classification, each regulated dangerous goods shipment has a single correct description, known as the "proper shipping name." Without determining the proper shipping name, an offerer cannot establish the net quantity permitted in a packaging or the correct packaging to be used. The complete list of proper shipping names appears in Table 4.2, the "List of Dangerous Goods" in IATA (Table 3-1, the "Dangerous Goods List" in ICAO).

While many substances and articles are listed specifically by name in the regulations, there are also generic proper shipping names, for mixtures or new compounds, which simply describe the hazard posed by the material. For example, "flammable liquid, n.o.s." is a common generic proper shipping name; the "n.o.s." means "not otherwise specified." Many generic proper shipping names, denoted in ICAO and IATA's commodity lists with asterisks, must be modified by adding technical names of hazardous constituents in parentheses after the shipping descriptions. These modifications must appear on package markings and shipping papers.

For most proper shipping names there are also four-digit identification numbers, usually preceded by the letters "UN" (a few exceptions are those items which, under the IATA Dangerous Goods Regulations, have been assigned airline-industry identifiers in the 8000 series, and are preceded by the letters "ID"). These UN and ID numbers are used to reduce confusion that could arise as a result of misunderstood or mispronounced proper shipping names and to assist in locating emergency response guidance, in the event that there is an incident involving the material.

For example, **Acetal**, a flammable liquid, has been designated **UN1088**. Because it is a flammable liquid, it is placed into **Class 3** and assigned to **Packing Group II**. The extract from the ICAO Technical Instructions shown on Page 7 illustrates how this information is presented in Table 3-1, the "Dangerous Goods List". Each entry in the table appears with the name of the appropriate **hazard label(s)**, the **Packing Instructions**, and the **net quantity limitations** per package.

Table 3-1. Dangerous Goods List

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
<b>A</b>												
Accumulators, electric, see Batteries, etc. (UN Nos. 2794, 2795, 2800, 3028, 3252)												
Acetal	1088	3		Liquid flammable			II	E2	305 Y305	5 L 1 L	307	60 L
Acetaldehyde	1089	3		Liquid flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		304	30 L
Acetaldehyde ammonia	1841	9		Miscellaneous		A48	III	E1	906	200 kg	906	200 kg
Acetaldehyde oxime	2332	3		Liquid flammable			III	E1	309 Y309	60 L 10 L	310	220 L
Acetic acid, glacial	2789	8	3	Corrosive & Liquid flammable			II	E2	809 Y809	1 L 0.5 L	813	30 L
Acetic acid solution, more than 80% acid, by mass	2789	8	3	Corrosive & Liquid flammable			II	E2	809 Y809	1 L 0.5 L	813	30 L
Acetic acid solution, more than 10% but less than 50% acid, by mass	2790	8		Corrosive			III	E1	818 Y818	5 L 1 L	820	60 L
Acetic acid solution, not less than 50% but not more than 80% acid, by mass	2790	8		Corrosive			II	E2	809 Y809	1 L 0.5 L	813	30 L
Acetic anhydride	1715	8	3	Corrosive & Liquid flammable			II	E2	809 Y809	1 L 0.5 L	813	30 L
Acetoin, see Acetyl methyl carbinol												
Acetone	1090	3		Liquid flammable			II	E2	305 Y305	5 L 1 L	307	60 L
Acetone cyanohydrin, stabilized	1541	6.1			AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4	A2			FORBIDDEN		FORBIDDEN	
Acetone oils	1091	3		Liquid flammable			II	E2	305 Y305	5 L 1 L	307	60 L

2009-2010 EDITION

## NET QUANTITY LIMITATIONS

Before offering a shipment for air transportation, an offerer must know in advance whether the material will travel on passenger-carrying aircraft or cargo-only aircraft. The distinction is important because it has a direct influence on the net quantity of a material permitted in a package. For example, some materials permitted to be carried aboard cargo aircraft only are prohibited on passenger aircraft. In other cases, the net quantity per package permitted on passenger aircraft is smaller than when the same material is moved by cargo aircraft only.

This distinction is readily apparent in ICAO's " Dangerous Goods List " (the "List of Dangerous Goods" in IATA), since each entry has instructions for "Passenger Aircraft" shipment and "Cargo Aircraft" shipments. Packages prepared in accordance with the instructions appropriate to cargo aircraft must be so identified with the black-and-orange CARGO AIRCRAFT ONLY label, and the accompanying documentation must state that a shipment is eligible for cargo aircraft only.

A shipment that bears the CARGO AIRCRAFT ONLY label must fly on only that type of aircraft. However, a package authorised for passenger aircraft may travel on either type of aircraft.

Referring back to Page 7, you will see that **Acetal**, has two Parallel packing Instructions. One line - showing **Packing Instructions 305** and **307**, reflecting the requirements for **specification packaging** - limits shipments on passenger aircraft to 5 litres per package, while up to 60 litres per package may be shipped by cargo aircraft only. The second line for Acetal - showing **Packing Instruction Y305**, reflecting requirements for **limited quantities packaging** - restricts shipment to 1 litre per package.

## PACKAGING OPTIONS

There are generally three available packaging options for dangerous goods shipped under the international standards:

1. "specification packaging"
2. "limited quantities" packaging
3. "excepted quantities" packagings

There are specific quantity limitations for each material under each option. A brief discussion of the options follows below.

**Specification Packaging:** Under the international standards, specification packagings are generally **performance-tested** packagings, developed and tested under the United Nations packaging specifications. As mentioned earlier, the severity of tests used to qualify packagings is keyed, in part, to the Packing Group of the material that is intended to go in the packaging.

Internationally recognised testing specifications are found in Section 6 (and Section 10 for radioactive materials) in the IATA Dangerous Goods Regulations (Part 6 of the ICAO Technical Instructions).

The performance testing requirements illustrate clearly why a offerer must know the technical characteristics of the chemical being shipped. A typical testing regime (e.g., for a drum intended to contain flammable liquid) includes a drop test, a leakproofness test, internal pressure (hydraulic) test, and a stacking test. The Packing Group become important with reference to the drop test, since the drop height varies with the Packing Group. The internal pressure test is keyed to the vapour pressure of the liquid that is to be packaged. Also important and sometimes overlooked for combination

packagings is the requirement for inner packagings to satisfy an internal pressure test (see 5.0.2.9 in IATA; or 4;1.1.6. in ICAO), and this, too, is linked to the vapour pressure of the material.

**Limited Quantities Packaging:** Certain materials in Packing Groups II and III are eligible to be transported under packaging exceptions for "limited quantities." These exceptions allow use of non-specification combination packagings (i.e., packagings that have not been submitted for testing against the UN testing regime) for net quantities of materials that are further limited than for specification packagings, provided that the packages are capable of surviving a 1.2-meter (4-foot) drop test. Materials authorised for packaging under limited quantity exceptions are shown in the IATA Alphabetical List of Dangerous Goods with italicised packing instructions preceded by the letter "Y." (In ICAO, the limited quantities exceptions are discussed in Part 3 Chapter 4.) Limited quantities shipments are subject to all communication and documentation requirements.

**Excepted Quantities Packaging:** Very small quantities of certain dangerous goods are authorised to be shipped without hazard labels or specific dangerous goods documentation under the "excepted quantity" provisions. The eligible materials are shown in Section 2.7 of the IATA Dangerous Goods Regulations, including Table 2.7.A, (see Part 3 Chapter 5 in ICAO). A red-bordered label is presented as the conventional way of satisfying the package marking requirement.

General packaging requirements, which apply in virtually every case, are spelled out in the introductions to the Packing Instructions (Section 5 in IATA; Part 4 in ICAO). Among these general provisions are requirements that the packaging material(s) in direct contact with the dangerous goods must be resistant to any chemical or other action of the goods; and the materials of the packagings must not contain substances which may react dangerously with the contents, form hazardous products or significantly weaken the packagings.

Shown below are **Packing Instruction 305** and **Packing Instruction Y305**, extracted from the IATA Dangerous Goods Regulations to illustrate the format used to present packaging options.

**PACKING INSTRUCTION 305**

STATE VARIATIONS: BEG-03, SAG-01, USG-04/04															
OPERATOR VARIATIONS: AA-01, AM-03, AS-02, BW-01, CI-01, CO-06, CS-06, Do-02, FX-02/15, HA-01, IR-06, LC-02/04, LY-04, MX-03, QY-02, UA-01/02, UX-04, XK-05															
This instruction applies to flammable liquids in packing Group II and UN 3248 on passenger and cargo aircraft.															
The General packing Requirements of 5.0.2 must be met.															
<i>Single packagings are not permitted.</i>															
<b>COMBINATION PACKAGINGS</b>															
<b>INNER PACKAGINGS</b>															
Desc.	Glass, Earthenware		Plastic			Metal (not aluminium)			Aluminium		Glass ampoule				
Spec.	IP1		IP2			IP3			IP3A		IP8				
Unit	L		L			L			L		L				
Max. Qty	1.0		5.0			5.0			5.0		0.5				
<b>OUTER PACKAGINGS</b>															
Type	Drums					Jerricans			Boxes						
Desc.	Steel	Aluminium	Plywood	Fibre	Plastic	Steel	Aluminium	Plastic	Steel	Aluminium	Wood	Plywood	Reconstituted wood	Fibre-board	Plastic
Spec.	1A2	1B2	1D	1G	1H2	3A2	3B2	3H2	4A	4B	4C1 4C2	4D	4F	4G	4H2

**PACKING INSTRUCTION Y305**

STATE VARIATIONS: BEG-03, SAG-01, USG-04

OPERATOR VARIATIONS: AA-01, AM-03, AS-02, BW-01, CI-01, CO-6, CS-06, DO-02, DE-01, FX-02/15, GA-03, GF-04, HA-01, IJ-12, IR-06, KE-07, KQ-08, LC-02/04, LH-01, LX-02, LY-04, MH-14, MX,03, OU-04, QY-02, SV-02, SW-02, YN-04, UA-01/02, UU-08, UX-02, XK-03/05

This instruction applies to Limited Quantities of flammable liquids in Packing Group II and UN 3248.

The General Packing Requirements of Subsection 5.0.2 to 5.0.4 (with the exception of 5.0.2.3, 5.0.2.5, 5.0.2.11(f), 5.0.2.11(g) and 5.0.2.14) must be met except that the packagings do not have to meet the marking and testing requirements of 6.0.4 and Subsection 6.3. Packagings must meet the construction criteria specified in Subsections 6.1 and 6.2 and the test criteria specified in Subsection 6.6.

The requirements of Subsection 2.8 must be met.

*Single packagings are not permitted.*

Limited quantities of flammable liquids assigned to this packing instruction must be packed in one of the following inner packagings.

The inner packagings must be packed in one of the following sturdy outer packagings with sufficient cushioning/absorbent material so as to prevent movement/leakage.

For UN 1106, UN 1125, UN 1158, UN 1160, UN 1214, UN 1235, UN 1289, UN 1296, UN 1297, UN 1815, UN 1922, UN 2266, UN 2353, UN 2359, UN 2379, UN 2383, UN 2386, UN 2395, UN 2399, UN 2535, UN 2733, UN 2924, UN 2945, UN 3274, UN 3286, UN 3371, and UN 3469 earthenware or glass inner packagings and glass ampoules must be packed with compatible absorbent material in tightly closed metal or rigid plastic receptacles before being packaged in outer packagings.

The maximum quantity in each outer package must not exceed the quantity shown in Column H of the List of Dangerous Goods.

The gross weight of the completed package must not exceed 30 kg (66 lb).

**COMBINATION PACKAGINGS**

**INNER PACKAGINGS**

Desc.	Glass, Earthenware	Plastic	Metal (not aluminium)	Aluminium	Glass ampoule
Unit	L	L	L	L	L
Max. Qty	0.5	0.5	0.5	0.5	0.5

**OUTER PACKAGINGS**

Type	Drums					Jerricans			Boxes						
	Steel	Alu-minium	Ply-wood	Fibre	Plastic	Steel	Alu-minium	Plastic	Steel	Alu-minium	Wood	Ply-wood	Reconstituted wood	Fibre-board	Plastic
PPR															83

**Particular Packing Requirements (PPR)**

83. Solid plastic boxes must be used

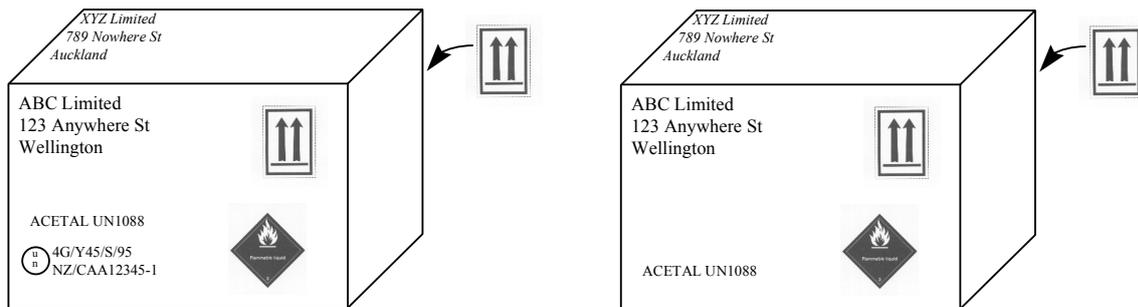
## MARKING AND LABELLING

If a specification package is selected, it must be marked to show that it has been tested in accordance with the specifications. Details on this marking requirement are shown in Section 7 of the IATA Dangerous Goods Regulations (Part 6, Chapter 2 in ICAO)

Offerers must recognise that if they are responsible for putting the specification markings on a package, then they must assure that the package has satisfied all requirements, including chemical compatibility and performance of all tests. This last point on testing is essential. Careful record keeping is required in this area, since Civil Aviation Authority or Department of Labour inspectors may want to see all evidence of package testing when they conduct routine inspections of offerer facilities or investigate incidents.

Once the correct package has been selected and filled, it must be marked and labelled with the correct hazard information. The required hazard labels for each proper shipping name are identified in the IATA List of Dangerous Goods (ICAO Dangerous Goods List), and the proper shipping name and UN number must appear on the package in association with the label. Note that for most generic - i.e., "n.o.s." - proper shipping names, additional technical names for the hazardous constituents are required to appear on the package and accompanying documentation. Handling labels, such as the CARGO AIRCRAFT ONLY and the orientation arrows, must be applied when appropriate.

Shown below are examples of shipments of **Acetal, Class 3, UN1088**, as they would be prepared for transportation in **specification packaging** and **limited quantity packagings**. Appropriate **hazard labels** and **package markings** are included in these illustrations. Note the markings include the **proper shipping name** (Acetal) and **UN Number** (UN1088), and that the hazard and **orientation labels** are placed on the boxes. A **UN specification marking** also appears on the specification package, indicating that it has been performance tested and found capable of satisfying the requirements for **Packing Group II**.



Required package labels and markings for Acetal, Class 3, UN 1088, in UN Specification packaging

Required package labels and markings for Acetal, Class 3, UN 1088, in Limited Quantity Packaging.

# IATA/ICAO HAZARD AND HANDLING LABELS

Except for Radioactive and Handling Labels, text indicating the nature of risk on label is optional.

## HAZARD LABELS

### CLASS 1



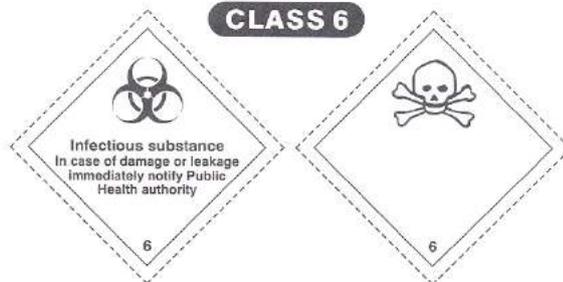
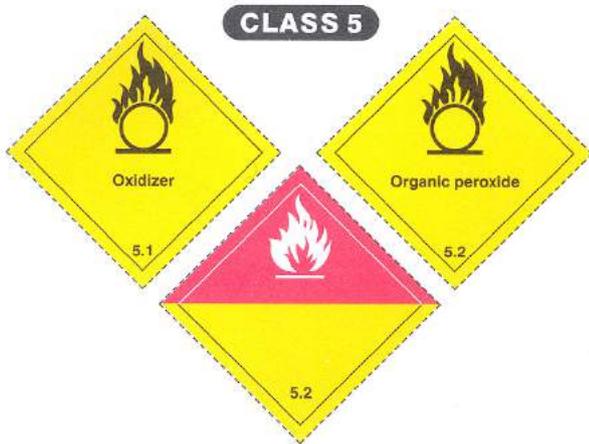
\* Articles bearing the Explosive labels shown above and falling into Divisions 1.1, 1.2, 1.4F, 1.5 and 1.6 are normally forbidden.



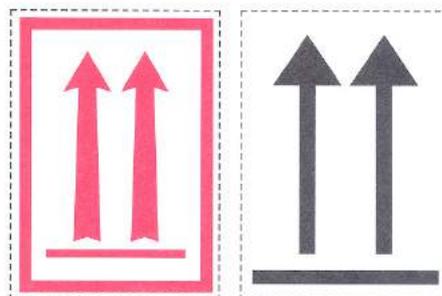
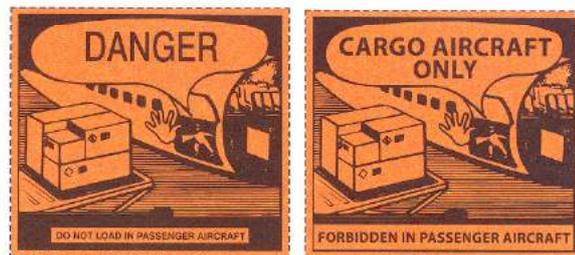
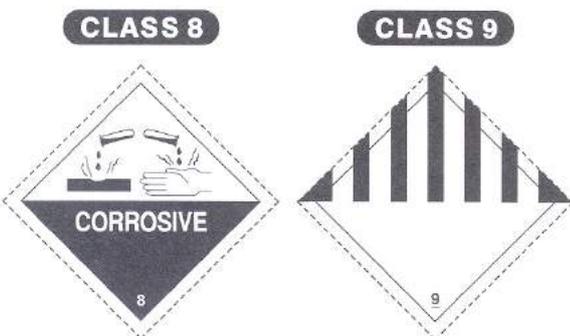
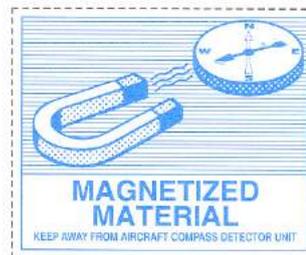
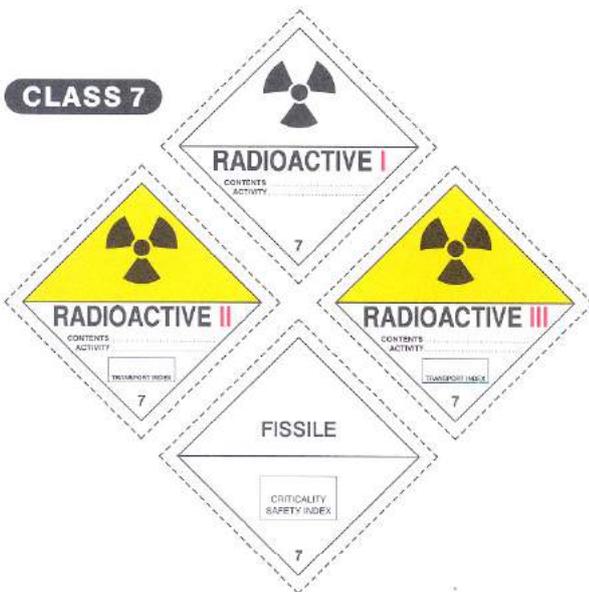
# IATA/ICAO HAZARD AND HANDLING LABELS

Except for Radioactive and Handling Labels, text indicating the nature of risk on label is optional.

## HAZARD LABELS



## HANDLING LABELS



## **DOCUMENTATION**

In transportation, the presence of dangerous goods must be communicated not only through the marks and labels on the package, but also through shipping papers accompanying the materials. The air waybill, the airline contract for carriage, is not normally used to transmit the required dangerous goods information (except when dry ice is used to refrigerate non-hazardous materials, or when the shipment is in excepted quantities).

ICAO requires use of a Dangerous Goods Transport Document. As indicated in the IATA *Dangerous Goods Regulations*, this is separate from the air waybill, and takes the form of a red-bordered airline industry document called the Shippers Declaration for Dangerous Goods. It gives full details of the shipment, including:

- Name/Address of shipper and consignee
- Aircraft type (Cargo aircraft only must also be noted on the air waybill when indicated)
- Airports of origin and destination
- Shipment type (i.e., radioactive or non-radioactive)
- Proper shipping name (and technical name, if appropriate)
- Hazard class
- UN/ID number
- Subsidiary risk (if any)
- Quantity and type of packaging
- Packing Instruction
- Any special authorisations
- Additional handling information
- Shipper's certification

The IATA Dangerous Goods Regulations contains examples of completed Shipper's Declarations, along with guidance on preparing the accompanying air waybill. An example of a completed Shipper's Declaration for Dangerous Goods is given on the next page.

**SHIPPER'S DECLARATION FOR DANGEROUS GOODS**

Shipper ABC Company 1000 High Street Youngville, Ontario Canada		Air Waybill No. 800 1234 5686  Page 1 of 1 Pages Shipper's Reference Number <i>(optional)</i>				
Consignee CBA Lte 50 Rue de la Paix Paris 75 006 France		For optional use for Company logo name and address				
Two completed and signed copies of this Declaration must be handed to the operator.		<b>WARNING</b>  Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties.				
<b>TRANSPORT DETAILS</b>						
This shipment is within the limitations prescribed for: <i>(delete non-applicable)</i>		Airport of Departure:  Youngville				
<table border="1"> <tr> <td><del>PASSENGER- AND CARGO- AIRCRAFT</del></td> <td>CARGO AIRCRAFT ONLY</td> </tr> </table>		<del>PASSENGER- AND CARGO- AIRCRAFT</del>	CARGO AIRCRAFT ONLY			
<del>PASSENGER- AND CARGO- AIRCRAFT</del>	CARGO AIRCRAFT ONLY					
Airport of Destination: Paris, Charles de Gaulle		Shipment type: <i>(delete non-applicable)</i> <input checked="" type="checkbox"/> NON-RADIOACTIVE <input type="checkbox"/> RADIOACTIVE				
<b>NATURE AND QUANTITY OF DANGEROUS GOODS</b>						
Dangerous Goods Identification						
UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Packing Group	Quantity and type of packing	Packing Inst.	Authorization
UN1816	Propyltrichlorosilane	8 (3)	II	3 Plastic Drums x 30 L	813	
UN3226	Self-reactive solid type D (Benzenesulphonyl hydrazide)	Div. 4.1		1 Fibreboard box x 10 kg	430	
UN1263	Paint	3	II	2 Fibreboard boxes x 4 L	305	
UN1263	Paints	3	III	1 Fibreboard box x 30 L	309	
UN3166	Vehicle, flammable liquid powered	9		1 automobile 1350 kg G	900	
UN3316	Chemical kits	9	II	1 Fibreboard box x 3 kg	915	
UN2794	Batteries, wet, filled with acid	8		1 Wooden box 50 kg G	800	
<b>Additional Handling Information</b>  The packages containing UN3226 must be protected from direct sunlight, and all sources of heat and be placed in adequately ventilated areas. 24-hour Number: +1 905 123 4567						
I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. I declare that all of the applicable air transport requirements have been met.				Name/Title of Signatory B. Smith, Dispatch Supervisor Place and Date Youngville 1 January 2010 Signature <i>(see warning above)</i> <b>B. Smith</b>		

## **STATE AND OPERATOR VARIATIONS**

No offerer's job is complete without a review of state or operator variations which may impose further requirements on a shipment. Located in Section 2 of the IATA Dangerous Goods Regulations (Attachment 3 in ICAO) and amended in post-publication addenda circulated by both organisations, these are requirements applied by individual governments or airlines in addition to the provisions spelled out in the regulations. For example, there are 11 US variations registered by the US DOT, partly to reflect the limitations in their own internal hazardous substance transport regulations.

Among the key US variations are the emergency response communication standards discussed in USG-12 (US-12 in ICAO). As with all US variations, these requirements apply to all shipments transported to, from, or within the US that are conducted under the international standards. You should also be aware that these variations also apply to dangerous goods being carried on an American registered aircraft, regardless of where it is travelling. Offerers must be sure that they supply a valid 24-hour emergency response telephone number which may be used in emergencies to contact personnel with details about handling an emergency involving the material being transported.

Of course, international offerers must be certain to consult the variations applicable to countries of over-flight, transfer, and destination, and to assure compliance with any of those countries' requirements.

Specific airline restrictions may also be applied, representing a single carrier's voluntary decision to adopt a more restrictive policy on dangerous goods. For example, it is very common for US passenger carriers to prohibit transportation of poisons. An offerer must be aware of the policy of the carrier on which it plans to ship dangerous goods to be certain unexpected complications do not arise.

## **CONCLUSIONS**

It is a frustrating paradox that, in seeking to consolidate air transport requirements in a single set of regulations, air carriers have ended up with three separate documents. However, the following summary will guide offerers and forwarders through the potentially confusing maze of regulations.

1. Be sure to have a current copy of Rule Part 92 Carriage of Dangerous Goods By Air.
2. Since the vast majority of air carriers follow international standards for domestic and international shipments, study Part 92 to assure compliance with all conditions that apply when using the international standards.
3. Become familiar with the ICAO Technical Instructions. When international standards are applied to a shipment, this governmental document is the source for CAA interpretations and enforcement actions. State Variations are noted in the ICAO Technical Instructions as well as in the IATA Dangerous Goods Regulations.
4. Refer to the IATA Dangerous Goods Regulations for guidance on air carrier industry policies. In particular, check the use of the Shipper's Declaration for Dangerous Goods and the air waybill. Also review carrier exceptions to assure that your shipment is not forbidden by the carrier you hope to use.

5. State Variations (also noted in ICAO) are essential to review. Check not only the NZ variations but also countries of overflight, transfer, and destination. Be aware that variations may apply not only for any shipment on any carrier flying to, from, or within the country of destination or origin, but also to any carrier registered by the country of origin or destination, anywhere in the world.

In transporting dangerous goods, it is important to remember that while the regulations are frustrating, they exist for good reasons. Air carriers have had bad experiences, and people have been hurt and even killed because of dangerous goods that were not handled properly. For this reason, NZ law mandates a minimum \$250 penalty and maximum \$12,000 penalty per violation, and there are provisions for criminal prosecution allowing fines as high as \$30,000 when wilful violations have been committed.

These safety regulations are complex. But when they are properly used, with the right advance planning, they allow offerers to make safe and effective use of air carriers to move their shipments rapidly across great distances.