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Chapter 4-2: IATA Dangerous Goods Regulations (IATA DGR)

Objectives

- This chapter will cover the basic understanding on the applicable transport regulation by Air (IATA Dangerous Goods Regulations : IATA DGR)
- The Background, Development and Principles of IATA DGR will be explained.
- Sections of IATA DGR will be briefly elaborated.
- It covers Basic Hazard Classification and Hazard Communication under IATA DGR.
- The core element of the IATA DGR will be explained on how to read the information in Blue Pages (4.2 DG List)
- The Training Requirements under IATA DGR will be explained.
- The example of how to use IATA DGR will also be demonstrated.

1. Introduction

1.1 Background of IATA DGR

To provide procedures for the shipper and operator by which the articles and substances with hazardous properties can be safely transported by air on all air commercial transport. In 1953, the Member airlines of IATA recognized the growing need to transport by air, article and substances having hazardous properties which, if uncontrolled, could adversely affect the safety of the passengers, crew and/or aircraft on which they are carried.

Most such articles and substances could be carried safely provided that they were properly packed and the quantities in each package were properly limited.

1.2 Development of IATA DGR

The first version was published in 1956 as the IATA Restricted Articles Regulations, A Manual of Industry Carrier Regulations to be followed by all IATA member airlines. The latest edition is 55th Edition with effective 1st January – 31st December 2014 published by the IATA Dangerous Goods Boards.



Figure 4-2-1: IATA Dangerous Goods Regulations, 55 Edition (2014)

1.3 Principles of IATA DGR

The IATA DGR is an easy-to-use manual based on the International Civil Aviation Organization (ICAO) Technical Instructions for the Safe Transport of Dangerous Goods by Air. It incorporates additional operational requirements, which provide a harmonized system for operators to accept and transport dangerous goods safely and efficiently. It also includes a detailed list of individual articles and substances specifying the United Nations classification of each article or substance and their acceptability as well as the conditions for air transport.

1.4 Identification of Dangerous Goods by Air

Basically Dangerous Goods when shipped by aircrafts can be mainly classified into 4 types as below:-

1. Forbidden under any circumstances
2. Forbidden under normal circumstances but may be carried with specific approvals from the States concerned.
3. Restricted to carriage on all cargo aircraft (CAO)
4. Can be carried on passenger aircraft provided certain requirements are met.

1.5 Packaging as Essential Component of DG Transport

Packing Instructions (PI) are provided with a wide range of options (inner, outer, single packagings). Normally requires the use of UN performance-tested specification packagings except when shipped in Limited Quantity ("Y" Packing Instructions). The quantity of dangerous goods permitted within these packaging is strictly limited as to minimize the risk should an accident occur.

1.6 Sections in IATA DGR

Like other Dangerous Goods recommendations and regulations, The IATA Dangerous Goods Regulations have been structured and designed to be an easy-to-use manual. It contains various sections as listed below:-

Section 1: Applicability

Section 2: Limitations

Section 3: Classification

Section 4: Identification (Blue pages)

Section 5: Packing

Section 6: Packing Specifications and Performance Tests

Section 7: Marking and Labelling

Section 8: Documentation

Section 9: Handling

Section 10: Radioactive Materials

Appendices A: Glossary

Appendices B: Nomenclature (symbols, units & conversion tables)

Appendices C: Currently assigned Substances (Div 4.1& 5.2)

Appendices D: IATA Members, Associate Members and other Airlines

Appendices E: Competent Authorities

Appendices G: Related Services
 Appendices H: IATA Safety Standard Programmes
 Index

Each Section is further divided into numbered Subsections and paragraphs.

1.3.3.2.1 =	Section	1	(1)
	Subsection	3	(1.3)
	Paragraph	3	(1.3.3)
	Subparagraph	2	(1.3.3.2)
	Sub-subparagraph	1	(1.3.3.2.1)
Table 3.3A	Section	3	(3)
	Subsection	3	(3.3)
	1st Table	A	(3.3A)

1.7 Dangerous Goods Classification under IATA DGR

Classification of Dangerous Goods in IATA DGR is purely based on the UN Model Regulations and keeps being updated in every new edition. The Dangerous Goods are classified into 9 Classes. Some classes are also sub-classified into Divisions with Packing Groups.

In order to give a quick review of 9 Classes of Dangerous Goods, following details once again summarize all the 9 Classes and relevant division as below:-

Class 1: Explosives

- Division 1.1: substances and articles which have a mass explosion hazard
- Division 1.2: substances and articles which have a projection hazard but not a mass explosion hazard
- Division 1.3: substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard
- Division 1.4: substances and articles which present no significant hazard
- Division 1.5: very insensitive substances which have a mass explosion hazard
- Division 1.6: extremely insensitive articles which do not have a mass explosion hazard

Class 2: Gases

- Class 2.1: flammable gases
- Class 2.2: non-flammable, non-toxic gases
- Class 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

Class 4.1: flammable solids, self-reactive substances and solid desensitized explosives

Class 4.2: substances liable to spontaneous combustion

Class 4.3: substances which, in contact with water, emit flammable gases

Class 5: Oxidizing substances and organic peroxides

Class 5.1: oxidizing substances

Class 5.2: organic peroxides

Class 6: Toxic and infectious substances

Class 6.1: toxic substances

Class 6.2: infectious substances

Class 7: Radioactive material

Class 8: Corrosive substances

Class 9: Miscellaneous dangerous substances and articles

The numerical order of the classes and divisions is not that of the degree of danger.

These 9 hazard classes have been established internationally by a United Nations (UN) committee to ensure that all modes of transport (road, rail, air and sea) classify dangerous goods in the same way.

1.8 Hazard Communication under IATA DGR

Basically the hazard communication for all 9 classes tends to be the same as other regulations. However there are some special labels which are mainly used for international air transport of Dangerous Goods only.

To clearly understand the strict consignment procedure, it is highly recommended that readers refer to the full text of IATA Dangerous Goods regulations whereas assuring that the proper IATA DGR training has been conducted and certified. This chapter aims at giving a quick snapshot of comprehensive understanding and does not cover all detailed procedures in full compliance with IATA DGR requirements.

The other additional handling labels in addition to hazard class labels are:-

- Magnetized Materials
- Lithium Batteries
- Limited and Excepted Quantities
- Cargo Aircraft Only
- Environmentally Hazardous Substances
- Cryogenic Liquid
- Keep Away from Heat
- Time & Temperature Sensitive
- Orientation

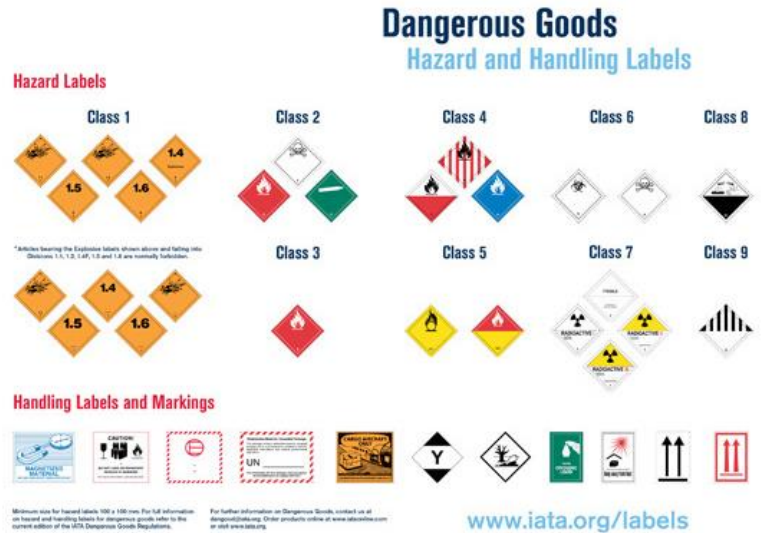


Figure 4-2-2: IATA Dangerous Goods Hazard and Handling Labels

1.9 Understanding the Blue Pages (4.2 Dangerous Goods List)

This section of the IATA Dangerous Goods Regulations is commonly called “Blue Pages” due to the fact that its color is in blue. It can be easily identified by looking at the side the text book. The actual part of this book is in fact called Dangerous Goods List which is similar to all other regulations which is a core section in identifying the substances and mixtures and relevant information in the regulations.

Structure of Dangerous Goods List (DGL)

The DGL is divided into 14 columns for each individual dangerous good listed. Much of the information contained in the DGL is coded to make it easier to present in a table. The DGL is arranged in UN Number order; column 1. To look up an entry, the readers just need to have the UN Number.

Column A – UN Number

Contains the serial number assigned to the article or substance under United Nations Classification System. When this number is used, it must be prefixed by the letters “UN”.

Column B – Proper Shipping Names (PSN)/Descriptor

Contains alphabetical listing of dangerous goods articles and substances identified by their proper shipping names together with qualifying descriptive text. The proper shipping name is shown in bold (dark) type whereas the descriptive text is shown in light type.

Column C – Class or division

Contains the class or division number assigned to the article or substance according to the classification system described in Section 3. In the case of Class 1 Explosives, the compatibility group is also shown.

Column D – Subsidiary Risks

Contains the class or division number of any important subsidiary risks. All subsidiary risks are listed in numerical order.

Column E – Labels

Contains the hazard label(s) to be applied to the outside of each package and overpack for the commodity shown in Column B. The primary hazard label is listed first followed by any subsidiary risk label(s).

Column F – Packing Group - contains the UN Packing Group (I, II, III) where assigned to the article or substance.

Column G – Passenger and Cargo Aircraft Limited Quantity – Packing Instructions

Refers to the relevant Limited Quantity (Y) Packing Instructions listed in Section 5 for transport of the article or substance on a passenger or on a cargo aircraft. If no packing instruction is shown, the article or substance cannot be carried under Limited Quantity provisions.

Column H – Passenger and Cargo Aircraft Limited Quantity – Maximum Net Quantity per Package

Shows the maximum net quantity (weight or volume) of the article or substance allowed in each package for transport on a passenger or cargo aircraft. The weight quoted is net weight, unless otherwise indicated by a letter G which refers to the gross weight of the package.

Column I – Passenger and Cargo– Packing Instructions

Refers to the relevant Packing Instructions listed in Section 5 for transport of the article or substance on a passenger or on a cargo aircraft.

Column J – Passenger and Cargo Aircraft – Maximum Net Quantity per Package

– shows the maximum net quantity (weight or volume) of the article or substance allowed in each package for transport on a passenger or cargo aircraft. The weight quoted is net weight, unless otherwise indicated by a letter G which refers to the gross weight of the package.

If the word “Forbidden” is shown, the article cannot be carried on a passenger aircraft.

Column K – Cargo Aircraft Only– Packing Instructions

Refers to the relevant Packing Instructions listed in Section 5 for transport of the article or substance on a cargo aircraft ONLY.

Column L – Cargo Aircraft Only – Maximum Net Quantity per Package

– shows the maximum net quantity (weight or volume) of the article or substance allowed in each package for transport on a cargo aircraft ONLY. The weight quoted

is net weight, unless otherwise indicated by a letter G which refers to the gross weight of the package.

If the word “Forbidden” is shown, the article cannot be carried on any aircraft unless exempted by States under the provisions of 2.6.1.

Column M – Special Provisions – may show a single, double or triple digit number preceded by the letter “A”, against appropriate entries in the List of Dangerous Goods. This alpha-numeric indicator relates to Subsection 4.4 and applies to all the packing groups permitted for the entry concerned, unless the wording of the special provision makes it otherwise apparent.

Column N – ERG Code – Emergency Response Drill Code as found in the International Civil Aviation Organization (ICAO) document “The Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods”. The code consists of a combination of letters and numbers, which represents suggested responses to incidents involving the specific dangerous good entry to which the drill code is assigned.

States and Operators Variation

In the IATA Dangerous Goods Regulations, there is certain limitation which must meet the strict compliance in two additional terms. The first one is country limitation which is so called States variation. The second one is airline limitation which is called Operators variation.

States and Operators Variations entries in the List of Dangerous Goods are subject to State and/or operator variations which must always be consulted. Variations are indicated in the appropriate locations in these Regulations and described in Subsection 2.9.

1.10 How to use IATA DGR

The following table illustrates the step-wise approach how to easily use the IATA Dangerous Goods Regulations.

Step	Description	Section
Step 1	Determine the correct technical names and check if forbidden.	2.1 and 4.2
Step 2	Check if it is listed in Blue Pages (4.2) and identify PSN	4.2
Step 3	If not listed, determine class or division by its known properties	3
Step 4	If properties are not known, test should be carried out	
Step 5	If it has multiple hazards, refer to Subsection 3.10 and check if forbidden.	3.10, 2.1, 4.2
Step 6	Determine the most appropriate PSN of N.O.S. entries	4.1
Step 7	If small quantities, check DG in excepted quantities	2.7
Step 8	Desire to ship on passenger or cargo aircraft	

Step 9	Determine the Packing Instructions Number (PI) and check applicable States & Operators Variations Passenger aircraft (Column G & I) Cargo aircraft (Column K & L)	4.2 and 2.9
Step 10	Determine the packing details in Section 5 and special requirements in Section 1 & 4.	4.1
Step 11	Select method of packing from PI. Ascertain all criteria are met.	5.0 and 6
Step 12	Ascertain all States and Operators Variations are fully complied.	2.9
Step 13	Ensure all appropriate markings and labellings are affixed on the packages	7
Step 14	Complete and sign Shipper's Declaration for Dangerous Goods (DGD) and prepare Air Waybill	8
Step 15	Use checklist to recheck	
Step 16	Offer the complete consignment for transport by air	

1.11 Documentation

The shipper is responsible for providing information applicable to a consignment of dangerous goods to the airline (operator) as described in section 8 of the IATA DGR. The information may be provided by the completion of a Shipper's Declaration for Dangerous Goods in the IATA format of shipments containing dangerous goods as defined or classified in the IATA DGR, or, where an agreement exists with the airline, the information may be sent electronically by the use of electronic data processing (EDP) or electronic data interchange (EDI) techniques.

The formats reproduced on the following pages are also shown in DGR Section 8 and must be used for all shipments of dangerous goods. The form may be printed in black and red on white paper, or in red only. The diagonal hatchings printed vertically in the left and right margins must be printed in red.

The Shipper's Declaration for Dangerous Goods (DGD)

The explanation of each detail in the DGD is as below:-

1. Shipper : Full name and address of the shipper

2. Consignee : Full name and address of the consignee

Note:

There is no requirement that the names and addresses on the Air Waybill correspond with those on the Shipper's Declaration

3. Air Waybill Number: The appropriate Air Waybill number for the shipment. This information may also be entered or amended by the shipper, his agent or by the airline or its handling agent.

4. Page ... of ... Pages: The appropriate page number of the total number of pages of the Shipper's Declaration for Dangerous Goods.

5. Aircraft Limitations: Delete the box that does not apply to indicate whether the shipment is packed to comply with the limitations for passenger and cargo aircraft or cargo aircraft only. Where the Shipper's Declaration is generated from a computer system it is sufficient if just the applicable aircraft type is shown, i.e. only print "Passenger and Cargo Aircraft" or "Cargo Aircraft Only".

6. Airport of Departure: Enter the full name of the airport or city of departure. This information may also be entered or amended by the shipper, his agent or by the airline or its handling agent.

Note:

This information is optional and may be left blank.

7. Airport of Destination: Enter the full name of the airport or city of destination. This information may also be entered or amended by the shipper, his agent or by the airline or its handling agent.

Note:

This information is optional and may be left blank.

8. Shipment Type (non-radioactive/radioactive): Where the Shipper's Declaration is generated from a computer system it is sufficient if just the applicable shipment type is shown, i.e. only print "Non-radioactive" or "Radioactive".

9. Nature and Quantity of Dangerous Goods: Enter the identification of each dangerous goods in the following order:

- UN number, proper shipping name, class/division, plus any subsidiary class or division which must be in brackets, packing group. e.g. UN 1738, Benzyl chloride, 6.1 (8), II
 - Followed by:
 - The total number of packages of the same type and content:
 - The type of packaging; and
 - The net quantity of dangerous goods in each package, or the gross weight of the completed package when applicable. For example: 5 Fibreboard boxes x 10 kg, 1 Steel drum 20 L, 1 Wooden box 15 kgG.
 - The words "Overpack used" immediately after any entries relating to the packages within the (each) overpack.
- Note:*
The units of measurement must be shown and must be SI (metric) units.
- Followed by:
 - The packing instruction number.
 - Followed by:

- The Special Provision number when required (A1, A2, A4, A5, A51, A81, A88, A99, A130, A190 and A191); and/or
- Details of any government approvals or authorizations.

10. Additional Handling Information: Enter any special handling information relevant to the consignments.

11. Certification Statement: The Shipper’s Declaration must include the certification statement and the air transport statement.

12. Name and Title of Signatory: Enter the name and title of the person signing the declaration.

13. Place and Date: Enter the place and date of issue.

14. Signature: The declaration must be signed by the shipper.

The form is titled "SHIPPER'S DECLARATION FOR DANGEROUS GOODS" and includes the following sections:

- Shipper Information:** Shipper, Air Waybill No., Page of Pages, Shipper's Reference Number.
- Consignee:** FedEx Express logo.
- Transport Details:** This shipment is within the territory prescribed for (select one applicable): PASSENGER AND CARGO AIRCRAFT, CARGO AIRCRAFT ONLY. Airport of Departure, Airport of Destination.
- WARNING:** Failure to comply with all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties.
- NATURE AND QUANTITY OF DANGEROUS GOODS:** UN Number or identification number, proper shipping name, Class or Division (subclassify if applicable), packing group (if required), and all other required information.
- Additional Handling Information:** A section for providing special handling instructions.
- Signature and Date:** 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, Place and Date, Signature (See warning above).

Figure 4-2-3: The Shipper’s Declaration for Dangerous Goods (DGD)

1.12 Training Requirements

Training must be provided or verified upon the employment of personnel identified in the categories specified in Table 1.5A in IATA DGR.

Recurrent training must take place within 24 months of previous training to ensure knowledge is current, unless a competent authority has defined a shorter period.

A test must be undertaken following dangerous goods training to verify understanding of the regulations. Confirmation is required of successful completion of the test.

Aspects of transport of dangerous goods by air with which they should be familiar, as a minimum	Shippers and packers		Freight forwarders			Operators and ground handling agents						Security screeners
	Category											
	1	2	3	4	5	6	7	8	9	10	11	12
General philosophy	X	X	X	X	X	X	X	X	X	X	X	X
Limitations	X		X	X	X	X	X	X	X	X	X	X
General requirements for shippers	X		X			X						
Classification	X	X	X			X						X
List of dangerous goods	X	X	X			X				X		
General packing requirements	X	X	X			X						
Packing instructions	X	X	X			X						
Labelling and marking	X	X	X	X	X	X	X	X	X	X	X	X
Shipper's Declaration and other relevant documentation	X		X	X		X	X					
Acceptance procedures						X						
Recognition of undeclared dangerous goods	X	X	X	X	X	X	X	X	X	X	X	X
Storage and loading procedures					X	X		X		X		
Pilots' notification						X		X		X		
Provisions for passengers and crew	X	X	X	X	X	X	X	X	X	X	X	X
Emergency procedures	X	X	X	X	X	X	X	X	X	X	X	X

CATEGORY

1. Shippers and persons undertaking the responsibilities of shippers', including operator's staff acting as shippers, operator's staff preparing dangerous goods as Company Materials (COMAT)
2. Packers
3. Staff of freight forwarders involved in processing dangerous goods
4. Staff of freight forwarders involved in processing cargo or mail (other than dangerous goods)
5. Staff of freight forwarders involved in the handling, storage and loading of cargo or mail
6. Operator's and ground handling agent's staff accepting dangerous goods
7. Operator's and ground handling agent's staff accepting cargo or mail (other than dangerous goods)
8. Operator's and ground handling agent's staff involved in the handling, storage and loading of cargo or mail and baggage
9. Passenger handling staff
10. Flight crew members, loadmasters, load planners and flight operations officers/flight dispatchers
11. Crew members (other than flight crew members)
12. Security staff who deal with the screening of passengers and their baggage and cargo or mail, e.g. security screeners, their supervisors and staff involved in implementing security procedures.

Figure 4-2-4: Training Requirements under IATA DGR

2. Conclusion

Shipping dangerous goods by air is a highly sensitive issue since it highly concerns with the lives of the passengers on the aircraft. Therefore, it is strictly important that relevant operators, shippers and freight forwarders are fully aware of the IATA Dangerous Goods regulations in details and have been adequately certified through proper IATA DGR trainings.

By reading this guidance document, it gives a quick snapshot of what relevant information is necessary in having the right understanding in arranging the Dangerous goods shipments by air. It also gives a step-by-step approach as an easy-to-use guideline and reference for quick learners only. In order to assure that dangerous goods shipments by air are handled properly and safely in complete compliance with IATA DGR, it is a must that the IATA DGR must be completely and strictly used as a full reference document.

References

1. Dangerous Goods Regulations (2014) Effective 1 January – 31 December 2014 Produced in consultation with ICAO 56th Edition. Montreal - Geneva: International Air Transport Association
2. <http://www.iata.org/labels>