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 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
Each Section is further divided into numbered Subsections and paragraphs.

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<td>1st Table</td>
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<td>(3.3A)</td>
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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
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)/Description
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.

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

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**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.

<table>
<thead>
<tr>
<th>Aspects of transport of dangerous goods by air with which they should be familiar, as a minimum</th>
<th>Shippers and packers</th>
<th>Freight forwarders</th>
<th>Operators and ground handling agents</th>
<th>Security screeners</th>
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**CATEGORY**

1. Shippers and persons undertaking the responsibilities of shippers, including operators staff acting as shippers, operators 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. Operators and ground handling agents staff accepting cargo or mail
7. Operators and ground handling agents staff involved in the handling, storage and loading of cargo or mail and baggage
8. Operators and ground handling agents staff involved in the handling, storage and loading of cargo or mail and baggage
9. Cargo handling staff
10. Flight crew members, cabin crew, ground crew and flight operations office 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 processes.

**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