



**WORKING PAPER**

**DANGEROUS GOODS PANEL (DGP)  
MEETING OF THE WORKING GROUP OF THE WHOLE**

**Memphis, 30 April to 4 May 2007**

- Agenda Item 5: Resolution, where possible, of the non-recurrent work items identified by the Air Navigation Commission or the panel**  
**5.1: Principles governing the transport of dangerous goods on cargo only aircraft**

**ACCESSIBILITY REQUIREMENTS FOR CARGO AIRCRAFT ONLY  
DANGEROUS GOODS**

(Presented by G. A. Leach)

**SUMMARY**

This paper proposes changes to the accessibility requirements for dangerous goods permitted only on cargo aircraft

Action by the DGP-WG is in paragraph 2.

**1. INTRODUCTION**

1.1 At the ad-hoc working group held in Beijing on 27 October 2006, which looked at the current requirements in the Technical Instructions as they relate to accessibility of dangerous goods permitted only on cargo aircraft (CAO), it was agreed that there was scope for consideration of three specific aspects:

*1.1.1 Permitting loading in a Class C hold as an alternative to accessibility*

1.1.1.1 It was generally accepted that loading CAO dangerous goods in an inaccessible cargo compartment, fitted with fire detection and remotely activated fire suppressant systems (i.e. a Class C hold), was at least as safe as loading them on the main deck of a cargo aircraft, where access by flight crew could be achieved. Indeed, some felt that this provided an enhancement in safety and could be required instead of accessibility, however it has since been determined that there is no requirement for cargo aircraft to have fire detection/suppressant systems fitted to inaccessible holds and consequently to require loading in Class C holds would preclude the carriage of CAO dangerous goods by many aircraft

currently carrying them. It is therefore proposed to allow loading CAO dangerous goods in a Class C hold as an alternative to having them accessible to the flight crew.

1.1.1.2 Text was suggested at the ad hoc working group which would require CAO dangerous goods to be “made available to the crew for inspection prior to departure.” Whilst the intent of this text is understood, it is queried whether it would be appropriate for the Technical Instructions to require packages to be made available for an inspection which itself is not required. It is suggested that this instead be a recommended practice which could be mandated by operators and their handling agents if they so wish.

### *1.1.2 What “accessible” actually means*

1.1.2.1 Part 7;2.4.1 currently requires crew to be able to “see, handle and, where size and mass permit, separate (CAO) packages or overpacks from other cargo in flight.” With regard to “see”, an opinion was expressed that rather than being able to see such packages it was more important for them to be loaded such that they could be reached by a fire extinguisher (despite there being no requirement for carriage of such on a cargo aircraft), which does not necessarily require them to be visible e.g. packages within a closed unit load device (ULD) could not be seen but extinguishant could reach them if inserted through a suitable opening. As for the ability to “handle” and “separate”, it is suggested that in the confines of fully loaded cargo aircraft, this requirement is not realistic. It is therefore proposed that new text be inserted, giving greater emphasis on being able to reach a package with a fire extinguisher and also reflect the reality of a loaded main deck cargo hold.

### *1.1.3 Whether the requirement for hazard warning labels and the “cargo aircraft only” label to be visible is justified*

1.1.3.1 The ad-hoc working group considered the current requirement for hazard warning labels and the CAO label to be visible. This effectively meant that CAO dangerous goods could not all be loaded in one place and had to be spread around the aircraft, which one operator commented was problematic and potentially exposed the packages to even greater risk of damage or even through exposure to undeclared dangerous goods.

1.1.3.2 It was agreed that before a decision would be taken, the origin of the requirement would be researched; at Appendix A are the relevant papers, including the original proposal, from Horst Busacker of Germany. This was made on the assumption that the wording which existed at that time (“Each package *or overpack* containing dangerous goods (must be accessible)”), required both packages and overpacks (containing a single CAO package) to be accessible. A number of members were of the opinion that the original wording was intentional so as to require access to either the package or overpack. However, the proposal was accepted. Subsequently, it was pointed out (DGP/17-WP/16 and flimsy 40) that the revised wording precluded shippers from offering a single CAO package in an overpack (as provided for by Part 5;1.1e) and this was overcome by reversion to the original text but with the introduction of the requirement for CAO and hazard warning labels to be visible. However, at that time, it is believed the consequence of this change (requiring CAO packages to be spread around the aircraft) had not been appreciated.

1.1.3.3 It is suggested that any perceived benefit from having the labels visible is far outweighed by the benefit of having all CAO packages in a common loading location and consequently it is proposed that this requirement is removed.

2. **ACTION BY THE DGP-WG**

2.1 The DGP-WG is invited to amend Part 7;2.4 as follows:

**2.4.1 Loading on cargo aircraft**

2.4.1.1 Packages or overpacks of dangerous goods bearing the “Cargo aircraft only” label must be loaded on a cargo aircraft in such a manner that a crew member or other authorized person can see, handle and, where size and mass permit, separate such packages or overpacks from other cargo in flight. Hazard warning labels and the “Cargo aircraft only” label must be visible. ~~;~~

- a) a Class C aircraft cargo compartment; or
- b) a unit load device meeting the certification requirements of a Class C aircraft cargo compartment; or
- c) such a manner that in the event of an emergency involving such packages or overpacks, a crew member or other authorized person can use any appropriate emergency response equipment carried on the aircraft to respond to that incident.

2.4.1.2 When requested, packages or overpacks bearing the “Cargo aircraft only” label should be made available to the crew prior to departure.

2.4.1.3 ~~This provision~~ The requirements of 2.4.1.1 and 2.4.1.2 does not apply to:

- a) substances of Class 3, Packing Group III, without a subsidiary risk;
- b) toxic and infectious substances (Class 6);
- c) radioactive material (Class 7);
- d) miscellaneous dangerous goods (Class 9).

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*Editorial Note.—* If accepted, this would result in consequential changes to the *Emergency Response Guidance for Aircraft Incidents involving Dangerous Goods*.

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**APPENDIX A**  
**DGP EXTRACTS**



INTERNATIONAL CIVIL AVIATION ORGANIZATION

DGP/WG99-WP/51  
18/3/99

**DANGEROUS GOODS PANEL (DGP)**

**MEETING OF THE WORKING GROUP OF THE WHOLE**

(Montreal, 22 to 26 March 1999)

**CLARIFICATION OF TEXT IN THE TECHNICAL INSTRUCTIONS  
PART 5; 2.4.1 "LOADING ON CARGO AIRCRAFT",  
IN CONJUNCTION WITH PART 4; 1.1.1 d) (OVERPACK RULES)**

(Presented by the H. Busacker)

**Background**

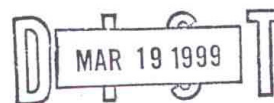
An overpack is offered for transport in full compliance with 4, 1.1 d). There is only one CAO-package in the overpack, all marking/labelling details clearly visible under a shrink foil. So, there is no reason to reject the overpack in an acceptance check.

After loading the overpack into a cargo container, the overpack as such is also in compliance with Part 5; 2.4.1 (being fully accessible), but the CAO-package within the overpack is neither visible nor accessible, turned to the backside or overstowed (exceptions from the accessibility rule under a) through d) not taken into account).

**Proposal**

Align text of Part 5; 2.4.1 to match 49 CFR/§175.85: "b) Each package containing a hazardous material acceptable only for cargo aircraft must be loaded in such a manner that a crew member or other authorized person can see, handle and when size and weight permit, separate such packages from other cargo during flight."

— END —



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**24. FUEL CONTROL UNITS (DGP/WG-WP/47)**

24.1 It was suggested that **Dangerous goods in machinery or apparatus** may not be the most appropriate entry for **Fuel control units** and that, in the long term, a separate proper shipping name and provisions should be developed. In the meantime, the proposal was agreed.

**25. CLARIFICATION OF TEXT IN THE TECHNICAL INSTRUCTIONS PART 5; 2.4.1 "LOADING ON CARGO AIRCRAFT", IN CONJUNCTION WITH PART 4; 1.1.1 d) (OVERPACK RULES) (DGP/WG99-WP/51)**

25.1 The proposal sought to remove the term "overpacks" from Part 5; 2.4.1 so that each package would be required to be accessible. It was put forward that it was not possible to load overpacks in compliance with the regulations.

25.2 Comments were made that the problem was one of handling. Also, an overpack could consist of just one small package which was afforded protection. In this respect, it was noted that changes had been made to the Instructions recommending the use of overpacks. It was also pointed out that the proposed wording was restrictive. However, it was decided to accept the proposal.

**26. TECHNICAL NAMES FOR MIXTURES OR SOLUTIONS (DGP/WG99-WP/26)**

26.1 It was pointed out that the proposed change was to a part of the Technical Instructions that had not yet been subject to the alignment exercise (i.e. Part 2; 11). This applied equally to Part 2; 10. It was decided to await the completion of the alignment exercise.

**27. DANGEROUS GOODS IN APPARATUS OR MACHINERY (DGP/WG99-WP/28)**

27.1 The UN will be considering proposals for introducing these proper shipping names into the recommendations and, if agreed, they will be treated in a similar manner to chemical kits, i.e. Class 9 and no individual hazard labels. It was agreed to await the decision of the UNSCOE meeting.

**28. PACKING GROUP I IN DIVISION 4.1 (DGP/WG99-WP/52)**

28.1 It was decided not to pursue the proposal to request the UNCOE to develop criteria for Division 4.1, Packing Group I substances as the matter was considered to be a UN matter. It was noted that not all desensitized explosives belonged to Packing Group I and that in the 11th edition of the UN Recommendations, desensitized explosives are assigned to Classes 3 and 4.

**29. EVIDENCE OF PRESSURE TEST ON MARKINGS (DGP/WG99-WP/53)**

29.1 There was no support for the concept for a new packaging marking indicating that the inner packaging had passed the pressure differential test for air transport.



INTERNATIONAL CIVIL AVIATION ORGANIZATION

DGP/17-WP/16  
23/8/99**DANGEROUS GOODS PANEL (DGP)****SEVENTEENTH MEETING****(Montreal, 1 to 10 November 1999)**

**Agenda Item 1:           Development of recommendations for amendments to the Technical Instructions for incorporation in the 2001/2002 edition**

**LOADING ON CARGO AIRCRAFT****(Presented by K.R. Warner)**

1.           At WG99 a proposal was agreed to remove the term "overpack" from Part 5; 2.4.1, so that it would now read:

"Each package containing dangerous goods acceptable only for cargo aircraft must be loaded in such a manner that a crew member or other authorized person can see, handle and, where size and mass permit, separate such packages from other cargo in flight. This provision . . . "

2.           The proposal was contained in working paper DGP/WG99-WP/51; the explanation stated that it was to deal with a single cargo aircraft only package in an overpack which could be loaded so that whilst the overpack was visible the package was not. During discussion of the proposal at WG99 it was pointed out that the problem outlined in the paper was one of handling and overpacks afforded additional protection. However, it was decided to accept the proposal. (See paragraph 25 of the WG99 report)

3.           In the working paper DGP/WG99-WP/51 the reason for the change was put forward as the inability to stow the overpack so the package was visible and accessible. However, for a single package in an overpack it is believed that Part 5; 2.4.1 intends to allow only the overpack to be visible/accessible, on the basis that there is only one package in it. Whilst the revised wording may clarify that packages must be stowed so they are visible and accessible, excluding reference to overpacks means it is now unclear as to whether or not overpacks are permissible for cargo aircraft only packages of dangerous goods. In Part 4; 1.1 (d) the shipper is told the circumstances when it is acceptable for overpacks to contain cargo aircraft only dangerous goods. Also, in the note under Part 3; 1.1.1 the shipper is encouraged to overpack small single packagings to facilitate handling and securing on aircraft. The change which has now been agreed for Part 5; 2.4.1 leaves a confusing situation in that it would seem to be acceptable for a shipper to offer an overpack containing cargo aircraft only packages of dangerous goods and be encouraged to do so, but the operator would be unable to accept it since it could not be stowed legally on the aircraft.

(2 pages)



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4. The intent of both Part 4; 1.1 (d) and existing Part 5; 2.4.1 is, of course, the same; which is to ensure that if a package (or the overpack) appears to be leaking it can be seen and action taken. From the shipper's perspective acceptable overpacks would be: (a) a single package inside another container or wrapping (since the package does not need to be visible or accessible); or (b) several packages shrink-wrapped together so they can be seen through the wrapping. The proposed change now agreed appears to mean that a shipper could no longer offer an overpack containing a single package of dangerous goods which is for cargo aircraft; and the situation would be unclear in regard to several packages shrink-wrapped together, since whilst this would be an acceptable overpack under Part 4; 1.1.(d), whether or not it could be loaded in accordance with the revised wording of Part 5; 2.4.1 would depend on the operator and the intended method of stowage.

5. It is suggested that changing Part 5; 2.4.1 will have an affect on shippers and there also needs to be a change to, at least, Part 4; 1.1 (d)(3) in order to make it clear what a shipper is permitted to offer; but none has been proposed.

6. At the last panel meeting, the note under Part 3; 1.1.1 was agreed as one of the means of addressing the problem of damage to drums caused during handling; among other things, it recommends that small packages be overpacked to facilitate handling and securing. The proposed change to Part 5; 2.4.1 would now appear to counter this recommendation and preclude overpacking as a means of providing additional protection for packages containing cargo aircraft only dangerous goods, with a consequent increase in the handling required and the difficulty of ensuring that small packages are adequately secured.

7. As far as is known, there has never been a major problem with operators interpreting and implementing the requirements of Part 5; 2.4.1 such that they have been found to be impossible to meet. The working paper produced for WG99 only identified a problem that should be regarded as a non-compliance with these requirements and, therefore, dealt with as an enforcement matter.

8. It is believed there is no justification yet provided for amending the Technical Instructions, particularly since the text agreed could mean shippers will be faced with no longer being able to consign cargo aircraft only dangerous goods in overpacks. It is suggested that the panel reconsider the decision to amend Part 5; 2.4.1 and that no change be made to the existing requirements.

— END —



DGP/17  
Flimsy No. 40  
8/11/99**DANGEROUS GOODS PANEL (DGP)****SEVENTEENTH MEETING****(Montreal, 1 to 10 November 1999)****Agenda Item 1:      Development of recommendations for amendments to the Technical Instructions for incorporation in the 2001/2002 edition****LOADING ON CARGO AIRCRAFT - COMMENT ON WP/16****(Presented by F. Wybenga)****FLIMSY NO. 40**

1.      The change to Part 5; 2.4 1 agreed at WG99 and the present text pose conflicting problems. While the change agreed by WG99 ensures that a package bearing a CAO label is clearly visible it eliminates the possible use of certain overpacks (e.g., steel drums) from being used in the case of the CAO package since the package itself will no longer be visible. On the otherhand, the current text would permit an overpack containing a CAO package to be turned so that the hazard warning labels are no longer visible even though the overpack is visible.

2.      A solution is to revert to the original text and add an additional sentence to ensure that whether the CAO package is in an overpack or is stowed as an individual package the hazard warning labels and the CAO label are visible. A new second sentence is proposed to read as follows:

“Hazards warning labels and the CAO label must be visible.”

— END —

#### 1.7.4 **Disposition of Part 9 of the Technical Instructions**

1.7.4.1 As a result of reformatting the Technical Instructions to align with the UN Recommendations, the existing Part 5 of the Technical Instructions (Operator's Responsibilities) will be moved to Part 7. Moreover, the UN Recommendations have no equivalent part to Part 9 of the Technical Instructions (Provisions Concerning Passengers and Crew). The latter part contains provisions which are the responsibility of the operator as well as those addressed to passengers. A possible way of dealing with this situation could be to incorporate Part 9 into the new Part 7. This would result in the list of items (now in 9;2.2.2) which passengers might present as baggage, but which might contain dangerous goods, appearing in the same part as the very similar list at present appearing in 5;1.4 for cargo (which would also be transferred to the new Part 7). It was therefore suggested that the two lists might be amalgamated, with the necessary editorial changes. A structure for the new Part 7 was consequently proposed, showing the disposition of relevant parts of the existing Part 5 and Part 9.

1.7.4.2 It was suggested that an editorially simpler solution would be to retain the existing Part 9 but renumber it as Part 8. It was pointed out that there was a danger in this if the UNCOE should ever introduce its own Part 8, the Technical Instructions Part 8 would have to be moved again. After some discussion, a compromise solution was reached, wherein the provisions relating directly to passengers and crew from the existing Part 9 would be transferred to a new Part 8 and the provisions from Part 9 which dealt with operator's responsibilities would be moved to the new Part 7. Under this arrangement, the lists at present in 5;1.4 and 9;2.2.2 would be amalgamated as originally proposed.

#### 1.7.5 **Loading on cargo aircraft (DGP/17-WP/16)**

1.7.5.1 It was recalled that at the Meeting of the Working Group of the Whole held in Montreal in March 1999, it had been agreed to amend 5;2.4.1 of the Technical Instructions, which deals with loading on cargo aircraft, such that it applied only to individual packages of cargo aircraft only (CAO) dangerous goods and not to overpacks containing such packages. There was some confusion as to whether the intention was to cover the case where an overpack contained a single package and this package was a CAO package or whether it was intended to cover overpacks containing several packages, one of which might be a CAO package. In the first case it might be the case that the single CAO package might not be visible (e.g. if the overpack were a steel drum). In the second case, the overpack might be loaded in such a way that the CAO package was not visible and/or accessible. It was clarified that the original intention had been to deal with the latter case to ensure that overpacks were loaded so that any CAO package they contained would be visible and accessible.

1.7.5.2 It was considered that the difficulties would be largely overcome if the original (i.e. referring to both packages and overpacks) text were maintained but with a statement added that "Hazard warning labels and the CAO label must be visible." It was considered that this would take care of the case of a single CAO package in an overpack — it might require the labels to be repeated on the outside of the overpack — and also the visibility requirements when a CAO package was packed with other packages in an overpack. There was general agreement with this solution. An amendment to 5;3.2.1 was consequently developed. It was noted that there was at present no provision in the Technical Instructions requiring labels to be on the same surface of a package or overpack and amendments to 5;3.2.1 and 3.2.11 were developed to rectify this omission.

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Report on Agenda Item 1

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1.7.5.3 One member expressed strong reservations with this proposal. In his opinion it did not ensure accessibility to the CAO package which he pointed out was one of the essential elements in allowing less restriction on CAO packages. Other members pointed out that the accessibility requirements were very difficult to implement in practice and could result in operators not being willing to accept CAO packages.

**1.8 TRAINING****1.8.1 Provisions concerning passengers (DGP/17-WP/8)**

It was noted that Table 6-1 of the Technical Instructions does not require certain categories of persons to be familiar with the provisions of the Technical Instructions concerning the dangerous goods which a passenger is permitted to carry on board an aircraft or pack in their checked baggage. However, in view of the number of incidents which arise from dangerous goods carried by passengers and the difficulties associated with promoting passenger awareness, it was suggested that the opportunity of ensuring that the message is delivered to as many persons as possible should not be missed. The meeting consequently agreed to amend Table 6-1 to require all categories of personnel to receive training on the provisions for passengers and crew.

**1.8.2 Training for load planners (DGP/17-WP/9)**

1.8.2.1 It was noted that Table 6-1 makes no specific mention of load planners. Load planners may be given different titles in different States and in different airlines but generally speaking, the load planner, as the title implies, has responsibilities for planning an aircraft load. That planning includes making decisions on where dangerous goods must be stowed on the aircraft, preparing a Load Instruction Report for aircraft loaders and preparing the notification to captain. Depending on the size of the operation, the load planner may also have responsibility for loading the aircraft. Because of these duties the load planner must have a sound knowledge of dangerous goods matters such as stowage, segregation, advice to pilot-in-command and emergency response. Accordingly, it was proposed that load planners be mentioned by name in Table 6-1 as persons who must undertake dangerous goods training. As the training should be similar to that undertaken of flight crew, the title should be added to Key 7 of the table.

1.8.2.2 Some members suggested that load planners could be included under column 4, but others considered this column to cover personnel physically involved in cargo handling. The majority of members agreed to include load planners with flight crew in column 7 of Table 6-1.

**1.8.3 Safety training (DGP/17-WP/49)**

1.8.3.1 It was noted that 6;1.2.1 c) of the Technical Instructions requires that personnel must receive safety training which includes training in emergency response procedures. However, Table 6-1 does not require several categories of personnel (i.e. columns 1, 2, 5 and 6) to undergo such training. It was therefore proposed that Table 6-1 be amended to require all categories of staff to receive emergency procedures training.

## Chapter 2 STORAGE AND LOADING

*Parts of this Chapter are affected by State Variations IT 3, JP 10, JP 11, JP 12, JP 22, NZ 5, US 10, US 13, US 15; see Table A-1*

### 2.1 LOADING RESTRICTIONS ON THE FLIGHT DECK AND FOR PASSENGER AIRCRAFT

≠ Dangerous goods must not be carried in an aircraft cabin occupied by passengers or on the flight deck of an aircraft, except as permitted by Part 1; 2.2.1 and Part 8, Chapter 1 and for radioactive material, excepted packages under Part 2; 7.9. Dangerous goods may be carried in a main deck cargo compartment of a passenger aircraft provided that compartment meets all the certification requirements for a Class B or a Class C aircraft cargo compartment. Dangerous goods bearing the 'Cargo aircraft only' label must not be carried on a passenger aircraft.

### 2.2 INCOMPATIBLE DANGEROUS GOODS

#### 2.2.1 Segregation

Packages containing dangerous goods which might react dangerously one with another must not be stowed on an aircraft next to each other or in a position that would allow interaction between them in the event of leakage. As a minimum, the segregation scheme shown in Table 7-1 must be followed in order to maintain acceptable segregation between packages containing dangerous goods having different hazards. The scheme applies irrespective of whether the hazard is the primary or subsidiary risk.

#### 2.2.2 Separation of explosive substances and articles

2.2.2.1 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.

2.2.2.2 Explosives in Compatibility Groups A to K and N may be stowed in accordance with the following:

- a) packages bearing the same compatibility group letter and the same division number may be stowed together;
- b) explosives of the same compatibility group but different divisions may be stowed together providing the whole is treated as belonging to the division having the smaller number. However, when explosives of Division 1.5, Compatibility Group D, are stowed together with explosives of Division 1.2, Compatibility Group D, the total of the consignment must be treated as Division 1.1, Compatibility Group D, for the purposes of transport;

- c) packages bearing different compatibility group letters must not be stowed together, whether or not they belong to the same division, except as provided for in 2.2.2.3 and 2.2.2.4.

≠ 2.2.2.3 Explosives in Compatibility Groups C, D and E may be stowed together. The appropriate division is determined in accordance with 2.2.2.2 b). Any combination of articles in Compatibility Groups C, D and E is assigned to Compatibility Group E. Any combination of substances in Compatibility Groups C and D must be assigned to the most appropriate of the compatibility groups shown in the Dangerous Goods List, taking into account the predominant characteristics of the combined load.

2.2.2.4 Explosives in Compatibility Group S may be stowed with explosives in all compatibility groups other than A and L.

2.2.2.5 Explosives in Compatibility Group L must not be stowed with explosives in other compatibility groups and they may only be stowed with the same type of explosives in Compatibility Group L.

2.2.2.6 Explosives in Compatibility Group N must not be stowed with explosives in other compatibility groups except S. However, they may also be stowed together with explosives in Compatibility Groups C, D and E, when the explosives in Compatibility Group N must be considered as having Compatibility Group D (see also 2.2.2.3).

### 2.3 HANDLING AND LOADING OF PACKAGES CONTAINING LIQUID DANGEROUS GOODS

During the course of air transport, a package of dangerous goods bearing the package orientation label prescribed in Part 5, Chapter 3 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.

### 2.4 LOADING AND SECURING OF DANGEROUS GOODS

#### 2.4.1 Loading on cargo aircraft

≠ Packages or overpacks of dangerous goods bearing the 'Cargo aircraft only' label must be loaded in such a manner that a crew

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Part 7

≠ Table 7-1. Segregation between packages

| Hazard label | Class or division |        |        |        |        |        |     |        |
|--------------|-------------------|--------|--------|--------|--------|--------|-----|--------|
|              | 1                 | 2      | 3      | 4.2    | 4.3    | 5.1    | 5.2 | 8      |
| 1            | Note 1            | Note 2 | Note 2 | Note 2 | Note 2 | Note 2 | —   | Note 2 |
| 2            | Note 2            | —      | —      | —      | —      | —      | —   | —      |
| 3            | Note 2            | —      | —      | —      | —      | x      | —   | —      |
| 4.2          | Note 2            | —      | —      | —      | —      | x      | —   | —      |
| 4.3          | Note 2            | —      | —      | —      | —      | —      | —   | x      |
| 5.1          | Note 2            | —      | x      | x      | —      | —      | —   | —      |
| 5.2          | Note 2            | —      | —      | —      | —      | —      | —   | —      |
| 8            | Note 2            | —      | —      | —      | x      | —      | —   | —      |

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 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 2.2.2.2 through 2.2.2.4.

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 Table 7-1 need not be segregated from other packages bearing the same UN number.

member or other authorized person can see, handle and, where size and mass permit, separate such packages or overpacks from other cargo in flight. Hazard warning labels and the 'Cargo Aircraft Only' label must be visible. This provision does not apply to:

- a) substances of Class 3, Packing Group III, without a subsidiary risk;
- b) toxic and infectious substances (Class 6);
- c) radioactive material (Class 7);
- d) miscellaneous dangerous goods (Class 9).

#### 2.4.2 Securing of dangerous goods

The operator must secure dangerous goods in the aircraft in a manner that will prevent any movement in flight which would change the orientation of the packages. For packages or overpacks containing radioactive materials, the securing must be adequate to ensure that the separation requirements of 2.9.3 are met at all times.

#### 2.4.3 General loading requirements

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. 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.

#### 2.5 DAMAGED PACKAGES OF DANGEROUS GOODS

Where any package of dangerous goods loaded on an aircraft appears to be damaged or leaking, the operator must remove such package from the aircraft, or arrange for its removal by an appropriate authority or organization, and thereafter arrange for its safe disposal. In the case of a package which appears to be leaking, the operator must ensure the remainder of the consignment is in a proper condition for transport by air and that no other package has been contaminated. See 3.1 and 3.2 of this Part concerning action to be taken in the event of damage to packages containing infectious substances in Class 6 and radioactive materials in Class 7.

#### 2.6 REPLACEMENT OF LABELS

When an operator discovers that labels for packages of dangerous goods have become lost, detached or illegible he must replace them with appropriate labels in accordance with the information provided on the dangerous goods transport document.

#### 2.7 IDENTIFICATION OF UNIT LOAD DEVICES CONTAINING DANGEROUS GOODS

2.7.1 Each unit load device containing dangerous goods which require a class hazard label must clearly display on its exterior an indication that dangerous goods are contained within the unit load device, unless those hazard class labels are themselves visible.

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Table 5-1. Segregation between packages

| Class or division | Class or division |        |        |        |        |        |   |
|-------------------|-------------------|--------|--------|--------|--------|--------|---|
|                   | 1                 | 2      | 3      | 4.2    | 4.3    | 5      | 8 |
| 1                 | Note 1            | Note 2 | Note 2 | Note 2 | Note 2 | Note 2 | x |
| 2                 | Note 2            | —      | —      | —      | —      | —      | — |
| 3                 | Note 2            | —      | —      | —      | —      | x      | — |
| 4.2               | Note 2            | —      | —      | —      | —      | x      | x |
| 4.3               | Note 2            | —      | —      | —      | —      | x      | x |
| 5                 | Note 2            | —      | x      | x      | x      | —      | x |
| 8                 | x                 | —      | —      | x      | x      | x      | — |

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 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 Class 5 dangerous goods.

≠ Note 1.— See 2.2.2.2 through 2.2.2.4.

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

**2.4 LOADING AND SECURING OF DANGEROUS GOODS**

**2.4.1 Loading on cargo aircraft**

Packages or overpacks of dangerous goods bearing the 'Cargo aircraft only' label must be loaded in such a manner that a crew member or other authorized person can see, handle and, where size and mass permit, separate such packages or overpacks from other cargo in flight. This provision does not apply to:

- a) substances of Class 3, Packing Group III, without a subsidiary risk;
- b) toxic and infectious substances (Class 6);
- c) radioactive material (Class 7);
- d) miscellaneous dangerous goods (Class 9).

**2.4.2 Securing of dangerous goods**

≠ The operator must secure dangerous goods in the aircraft in a manner that will prevent any movement in flight which would change the orientation of the packages. For packages or overpacks containing radioactive materials, the securing must be adequate to ensure that the separation requirements of 2.9.3 are met at all times.

+ **2.4.3 General loading requirements**

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. 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.

**2.5 DAMAGED PACKAGES OF DANGEROUS GOODS**

Where any package of dangerous goods loaded on an aircraft appears to be damaged or leaking, the operator must remove such package from the aircraft, or arrange for its removal by an appropriate authority or organization, and thereafter arrange for its safe disposal. In the case of a package which appears to be leaking, the operator must ensure the remainder of the consignment is in a proper condition for transport by air and that no other package has been contaminated. See 3.1 and 3.2 of this Part concerning action to be taken in the event of damage to packages containing infectious substances in Class 6 and radioactive materials in Class 7.

**2.6 REPLACEMENT OF LABELS**

When an operator discovers that labels for packages of dangerous goods have become lost, detached or illegible he must replace them with appropriate labels in accordance with the information provided on the dangerous goods transport document.

**2.7 IDENTIFICATION OF UNIT LOAD DEVICES CONTAINING DANGEROUS GOODS**

2.7.1 Each unit load device containing dangerous goods which require a class hazard label must clearly display on its exterior an indication that dangerous goods are contained within the unit load device, unless those hazard class labels are themselves visible.

2.7.2 This indication must be provided by attaching to the unit load device an identification tag having a border of prominent red hatchings on both sides and the minimum dimensions of 148 mm x 210 mm. The primary hazard class or division of such dangerous goods must be visibly indicated on this tag.