

**Title 14—Aeronautics and Space**  
**CHAPTER I—FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION**

[Docket No. 12574; Amdt. No. 103-17]

**PART 103—TRANSPORTATION OF DANGEROUS ARTICLES AND MAGNETIZED MATERIALS**

**Carriage of Radioactive and Other Hazardous Materials**

The purpose of these amendments to Part 103 of the Federal Aviation Regulations is to specifically set forth the manner in which the distribution of packages of radioactive materials being transported in aircraft may be considered in determining the distance the packages must be kept from a space that is occupied by a person or an animal, to ensure that articles subject to Part 103 are adequately safeguarded to prevent their becoming a hazard by shifting and to assure their inaccessibility to anyone but crewmembers.

These amendments are based on a notice of proposed rulemaking (Notice 73-7) published in the FEDERAL REGISTER on March 12, 1973 (38 FR 6690). Interested persons have been afforded an opportunity to participate in the making of these amendments, and due consideration has been given to all comments received in response to that Notice. Except as specifically discussed hereinafter, these amendments and the reasons therefor are the same as those contained in Notice 73-7. Fourteen public comments were received in response to the Notice. Comments were also received from the United States Atomic Energy Commission (USAEC), the Department of Transportation's Office of Hazardous Materials (OHM) and the National Transportation Safety Board. Representatives of the USAEC and OHM have met with FAA personnel and furnished extensive advice and technical guidance with respect to the regulation adopted herein.

The regulation as adopted differs from what was proposed in the Notice in regard to the distance required between packages in cases where the procedure for controlled distribution as described in § 103.23(b) is being employed. This change came about as the result of further study of levels of radiation that result from one package being placed in close proximity to another. The FAA realizes that there is a modest increase in the level of radiation when two packages are so placed; however, it has been advised by the USAEC that the increase in the level of radiation that occurs as a result of placement of packages the dis-

tance from each other that was required by the proposed rule can be virtually eliminated by separating the packages a distance calculated by increasing the basic distance by a factor of three. Accordingly, the regulation adopted herein is different from that proposed in Notice 73-7 with respect to the distance required between packages in cases where the distance between a package and a space occupied by persons is adjusted on the basis of the fact that the packages are separated from each other. Table II has been added to § 103.23(a) containing minimum distances in feet suitable for separation between one package and another; however, each distance is three times greater than the distance proposed in the Notice. In this way, the increase in the level of radiation caused by the mere proximity of two or more packages to each other is virtually eliminated.

Four of the public comments received in response to the Notice indicated that studies have shown that there are increases in levels of radiation when packages are separated from each other by the minimum distance proposed in the Notice. Since the regulation adopted herein requires increased spacing between packages equal to three times that proposed, and since the USAEC has assured the FAA that this increased separation distance between packages will eliminate any increase in the level of radiation caused by packages being too close to each other, these comments have been answered satisfactorily.

The Air Line Pilots Association's Hazardous Materials Subcommittee opposed the change proposed in the Notice, since it believes that there will be an increase in the level of exposure to both passengers and crewmembers. In this regard, the USAEC has assured the FAA that the one factor discussed above in some detail, that is, the cumulative effect of spacing packages in too close proximity to each other, can be virtually eliminated by the tripling of the horizontal distances required between packages by the Notice. Accordingly, with this additional safety factor the FAA believes that the level of radiation that will be created by the placement of packages in accordance with the regulation as adopted herein will eliminate any significant increase in the level now believed reasonably conservative.

With respect to the recommendation of one commentator that increased shielding of individual packages be employed to reduce external radiation, it is to be noted that, since the transport index on any package of radioactive materials is

based on the radiation dose rate in terms of millirem per hour, a reduction in the transport index of any package by increased shielding would merely result in an increase in the number of packages that could be carried. Since the FAA believes that the regulations adopted herein provide an adequate level of safety and, since it also believes that the regulations of the Hazardous Materials Regulations Board (49 CFR Part 170 et seq.) provide shielding sufficient to confine radioactive materials at the levels indicated when properly marked, it does not believe that increased shielding is necessary.

One commentator, the Society of Nuclear Medicine, represents more than 4,000 physicians in research, clinical practice and medical education; scientists in the fields of physics, electronics, engineering, chemistry and pharmacy, as well as technical personnel. That commentator urged the adoption of the amendment and stated that the uninterrupted flow of short-lived radioactive drugs is absolutely essential to effective medical practice throughout the United States. Comment from the Society pointed out that about five million patients received radioactive materials for diagnostic purposes in 1972. To keep the radiation dose to the patient as low as possible, short-lived isotopes must be used. If these short-lived substances were shipped exclusively on cargo-only aircraft, only 100 airport communities across the United States would be served. Of these airports, only 22 have freight service over the weekend. Because these radioactive pharmaceuticals are presently carried on passenger-carrying aircraft, a total of 550 airports are now being used in their delivery.

The Air Transportation Association of America suggested a number of clarifying changes to the wording of the regulation. One suggestion, that the minimum distance column of the table of distances in § 103.23(a) be relabeled to add "and to other packages" is no longer necessary, since the distance between packages will now be determined by using Table II. A second suggestion, that the term "radioactive materials" in § 103.31 be further delineated to read "radioactive yellow II and radioactive yellow III" has been incorporated into the section, since those are the only two classes of radioactive materials affected by § 103.23. A third clarification, that it be made clear that the transport index of any group of packages is the sum of the individual transport index numbers, has also been incorporated in the regulation adopted herein. A final suggestion, that the word "secured" in § 103.31(e) be replaced since it connotes physical tiedown, has resulted

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in a substitution of the words "safeguarded" and "safeguards", since these terms are consistent with those used in Part 121 of the Federal Aviation Regulations concerning cargo control.

Noting the requirement in § 103.31(f) that hazardous materials must be inaccessible to persons other than crewmembers, one commentator observed that this requirement would in effect ban their carriage on single-level passenger-carrying aircraft such as the FH-227, F-27 and the YH-11. The FAA recognizes that the regulation as adopted will have such an effect. Nevertheless, in the interest of safety, the FAA believes that hazardous materials should not be carried in areas in passenger-carrying aircraft that are accessible to persons other than crewmembers during flight.

The FAA will continue its surveillance of the transportation of radioactive materials by air and, as in other areas relating to safety in air commerce, will initiate additional rule-making action at any time available information indicates such action is necessary in the interest of safety.

Accordingly, since the FAA has established that an adequate level of safety is provided by the regulations adopted herein, and, since the carriage of radioactive pharmaceuticals on passenger-carrying aircraft supports the needs of effective medical treatment throughout the United States, it has concluded that the regulations adopted herein are in the public interest and will not adversely affect the safety of persons aboard aircraft.

The U.S. District Court for the District of Columbia stayed for a period of 30 days the effective date of its Order dated June 12, 1973, concerning § 103.23(a) to permit the agency to complete this rule making action and adopt a final rule. Therefore, I find that good cause exists for making this amendment effective on less than 30 days' notice.

(Secs. 313(a), 601, 604, 902, Federal Aviation Act of 1958, 49 U.S.C. 1354(a), 1421, 1424, and 1472; sec. 6(c), Department of Transportation Act, 49 U.S.C. 1655(c))

In consideration of the foregoing, Part 103 of the Federal Aviation Regulations is amended, effective July 11, 1973, as follows:

1. By amending § 103.23 to read as follows:

**§ 103.23 Special requirements for radioactive materials.**

(a) No person may place a package labeled "radioactive yellow II" or "radioactive yellow III" in an aircraft closer to a space that is occupied by a person or by an animal or a package containing undeveloped film (if so marked), than the minimum distance prescribed in table I of this paragraph. The distance is measured from the package surface nearest the compartment occupied by a person or an animal to the inside limiting surface of the compartment, that is, the surface nearest the space occupied by a person or an animal. If more

than one package of radioactive materials is aboard an aircraft, the minimum separation distance for each individual package may be determined either from the following table on the

basis of the sum of the transport index numbers shown on the labels of each of the individual packages in the aircraft or in accordance with paragraph (b) of this section.

TABLE I

Total transport index	Minimum distance in feet to area of persons or animals	Minimum separation distances in feet to nearest undeveloped film for various times of transit				
		Up to 2 hours	2-4 hours	4-8 hours	8-12 hours	Over 12 hours
None.....	0	0	0	0	0	0
0.1 to 1.0.....	1	1	2	3	4	5
1.1 to 5.0.....	2	3	4	6	8	11
5.1 to 10.0.....	3	4	6	9	11	16
10.1 to 20.0.....	4	5	8	12	16	22
20.1 to 30.0.....	5	7	10	15	20	29
30.1 to 40.0.....	6	8	11	17	22	33
40.1 to 50.0.....	7	9	12	19	24	36

Table II

Total transport index	Minimum distance in feet between packages or groups of packages if the procedure for controlled distribution is used
None.....	0
0.1 to 1.0.....	3
1.1 to 5.0.....	6
5.1 to 10.0.....	9
10.1 to 20.0.....	12
20.1 to 30.0.....	15
30.1 to 40.0.....	18
40.1 to 50.0.....	21

(b) When an individual package of radioactive material is separated from each other such package by at least the minimum distance prescribed in Table II in paragraph (a) of this section for the package having the largest transport index, the minimum distance to a space occupied by persons or animals may be determined from Table I in paragraph (a) of this section solely on the basis of the transport index shown on the label of that package. When individual packages of radioactive materials are grouped together, the transport index of the group (the sum of the transport index numbers shown on the labels of each of the individual packages), and the appropriate separation distance of each group may be determined as for an individual package.

(c) In addition to the reporting requirements of § 103.28, the carrier shall also notify the shipper at the earliest practicable moment following any incident in which there has been breakage, spillage, or suspected radioactive contamination involving radioactive materials shipments. Aircraft in which radioactive materials have been spilled may not be again placed in service or routinely occupied until the radiation dose-rate at any accessible surface is less than 0.5 millirem per hour and there is no significant removable radioactive surface contamination (see 49 CFR 173.397). In these instances, the package or materials should be segregated as far as practicable from personnel contact. If radiological advice or assistance is needed, the U.S. Atomic Energy Commission should also be notified. In case of obvious leakage,

or if it appears likely that the inside container may have been damaged, care should be taken to avoid inhalation, ingestion, or contact with the radioactive materials. Any loose radioactive materials should be left in a segregated area pending disposal instructions from qualified persons.

2. By adding new paragraphs (e) and (f) to § 103.31 to read as follows:

**§ 103.31 Cargo location.**

(e) No person may carry articles subject to the requirements of this part in an aircraft unless they are suitably safeguarded to prevent their becoming a hazard by shifting. For packages labeled "radioactive yellow II" or "radioactive yellow III", such safeguards must prevent movement that would permit the package to be closer to a space that is occupied by a person or an animal, or to other packages or groups of packages than is permitted by § 103.23.

(f) No person may carry an article subject to the requirements of this part that is acceptable for carriage in a passenger-carrying aircraft unless it is located in the aircraft in a place that is inaccessible to persons other than crewmembers.

Issued in Washington, D.C., on June 28, 1973.

ALEXANDER P. BUTTERFIELD,  
Administrator.