



DEPARTMENT OF TRANSPORTATION
HAZARDOUS MATERIALS REGULATIONS BOARD
WASHINGTON, D. C. 20590

45238

Docket No. HM-111; Amdt. Nos. 171-28,
173-90, 174-25, 175-12, 177-32, 178-35]

RADIOACTIVE MATERIALS
Miscellaneous Amendments

On October 25, 1973, the Hazardous Materials Regulations Board ("the Board") published extensive proposals to amend the Department's Hazardous Materials regulations relating to radioactive materials (38 FR 29483). The reasons for the various miscellaneous proposals were explained in detail in the preamble to that notice. Interested persons were invited to participate in this rule-making proceeding and all comments received have been given full consideration by the Board before it decided on the amendments made herein.

As was pointed out in the notice, the Board wishes to reiterate that the substantial matters covered by these amendments are not based on the 1973 revisions by the International Atomic Energy Agency (IAEA) to its Safety Series No. 6, "Regulations for the Safe Transport of Radioactive Materials." The Board intends to propose such changes in the very near future as the subject of a separate rule making action.

Comments were received by the Board on this notice from many organizations including government agencies, members of the Nuclear Industry, and the Air Transport Association of America. The U.S. Atomic Energy Commission submitted several comments. On the basis of the information submitted by these commenters, a number of modifications to the regulations proposed in the notice were made which are reflected in these amendments. These changes are explained as follows:

1. Section 173.206(a) (10) and (11)

A commenter suggested that the 25-pound material limit that was proposed to be specified in § 173.206(a) (11) was not necessary in view of the technical evaluation which is performed on each individual Type B package. He further questioned the reason for the limited applicability of § 173.206(a) (10) as proposed to combinations of such alkali materials with radioactive materials, in view of the authority included in § 173.206(a) (11) for such materials. The Board agrees with these comments and has modified these two paragraphs accordingly.

2. Section 173.389 (o). One commenter stated that the proposed "full load" definition was contrary to the present meaning of that term as it is used in transportation practice in the United States. It was suggested that the term "exclusive use" be used for the definition, in place of "full load," since "exclusive use" of a vehicle as it is presently defined in several carrier freight tariffs means in part "A service offered to shippers who require segregation of their freight from the freight of other shippers for protection against scrutiny, pilferage, or any other reason." The Board agrees with this comment and has adopted the term

"exclusive use." However, a parenthetical reference has been added to the definition to clarify that "exclusive use" is also referred to as "sole use" and may be identified with the term "full load" as it is used in the IAEA regulations.

3. Section 173.389 (p). One commenter suggested that a definition of the term "radioactive device" be included in the regulations, since it is one of the proper shipping names listed in § 172.5. The Board agrees with this suggestion and has therefore included a new definition as an editorial addition based on the existing requirements of § 173.391(b).

4. Section 173.392. Several comments were received on this paragraph covering low specific activity material. An editorial change has been made to clarify the relationship of the various changes which were proposed in this paragraph, as well as to correct an inadvertency in the notice which would have permitted low specific activity materials in less than exclusive use shipments to be in nonspecification containers.

5. Section 173.393 (g). A number of comments were received on the proposal to strengthen the requirements for packaging of radioactive liquids. Several of the commenters suggested that the specific requirements not be applicable to Type B and fissile material packages, in view of the fact that such packages, including their containment systems, are subject to individual governmental review and approval. The Board agrees with this comment and has modified the regulation accordingly, since the original intent of the proposal was that it be applicable only to Type A packages and not to Type B and fissile packages. Several commenters stated that, although they supported the basic proposal to strengthen the liquid packaging requirements, the proposal should be modified to provide another option to the absorbent material provision. They requested that use of a secondary containment vessel be permitted, enclosing the primary inner liquid-containing vessel so as to provide overall containment of the liquid, assuming the failure of the innermost vessel. The Board also agrees with these suggestions and has added § 173.393 (g) (3) permitting this additional option.

6. Section 173.393(k). Several commenters suggested certain changes in the wording of the proposed requirement for closure of certain inner containment systems by positive fastening devices independent of the other packaging. In view of the fact that this proposed regulation is contained, with other related provisions, in the 1973 Revised IAEA regulations, the proposal to add this requirement is deleted from this docket. It will be included in another notice of proposed rule making to be published in the near future that will propose revisions specifically based on the 1973 Revised IAEA regulations.

7. Section 173.393(o). One commenter suggested that each shipper, prior to the

first use of a package, be required to subject the package to an appropriate thermal test to demonstrate the thermal performance of the package under normal conditions of transport with its design decay heat load. Although this comment has merit, it is only one of several acceptable methods of confirming compliance with the performance criteria specified in the amendment. For this reason the Board believes that the regulations should not specify one method to be used.

8. Sections 173.394 and 173.395. The proposals to eliminate the various "hardware oriented" DOT specifications for Type A packages received several comments. Several of the commenters questioned whether a need for such a proposal is justified on the basis of adverse shipping experience. The Board continues to believe that the proposal is justified, particularly on the basis of observations of packaging compliance in field surveillance activities, and the reasons stated in the preamble to the notice. The Board recognizes that the elimination of listed packaging specifications will require that some existing packages be modified and that some be tested against the performance standards. In view of the manpower and effort that may be involved and in order to not cause any unreasonable hardship, a transition period of one year has been provided before compliance with this requirement becomes mandatory. Further, the U.S. Atomic Energy Commission who supported the proposal, has informed this Department that it intends to provide a consolidated testing program in support of AEC contractor operations to develop and certify packaging designs against the DOT 7A Specification. This program is expected to yield data and results which, when appropriate, will be useful to others in establishing their supporting package safety evaluation and certification. It is expected to reduce the duplicative effort that might otherwise be required by persons in the nuclear industry who use the same or similar packaging. Further questions on this program should be directed to the USAEC, Division of Waste Management and Transportation, Washington, D.C. 20545.

The Board emphasizes that this amendment is not intended to preclude the use of certain existing DOT specification packagings as a component of the Specification 7A package.

In response to several comments, the introductory headings of §§ 173.394 (a) and 173.395 (a) have been editorially revised to call the attention of the shipper to the need for proper consideration of the other applicable general packaging requirements.

9. Section 137.396. In response to technical recommendations from the USAEC, a number of substantive revisions have been made to this section, as follows:

a. Section 173.396(b) (6). A note has been added to the table specifying that the maximum H/U ratio of 0.088 applies only to 30-inch cylinders and not to the other sizes of cylinders.

b. Section 173.396(b)(7). This paragraph has been changed to specify clearly that the inner package must meet the Type A, Spec. 7A package requirements, including the liquid packaging provisions.

c. Section 173.396(c)(1). Requirements have been added to specify a 5-watt limit on decay energy of contents and also to specify that large quantity radioactive material in normal form in the DOT-6L must be packaged in one or more sealed and leak tight cans or polyethylene bottles within the Spec. 2R containment vessel, a requirement which is consistent with a similar requirement of the DOT-6M (§ 178.104). In addition, the proposal to add fissile Class I authorized loadings in the Spec. 6L has been deleted because the USAEC has not completed its detailed nuclear safety analysis of the proposed loadings. An appropriate proposal will be the subject of future rule making. In the table of authorized contents, a footnote has been added specifying that plutonium solutions are not authorized in the Spec. 6L.

d. Section 173.396(c)(2). The footnote limiting the maximum U-235 enrichment for contents in the Spec. 6M has been retained. The available data indicates that removal of the 93 weight percent limitation would increase the reactivity by about two percent. Persons shipping enriched uranium exceeding 93 weight percent will be required to petition the USAEC for specific approvals of such shipments with lowered material quantities.

e. Section 173.396(c)(2)(iii). An inadvertency has been corrected to specify that each Fissile Class III rather than Class II shipment is subject to § 173.396(g). Also in the table of authorized contents the column headings "H/X equals 3" have been changed to read "HX=3".

f. Section 173.396(f)(1) and (2). The requirements in these two paragraphs have been modified to reflect more appropriately the nuclear safety philosophy and criteria used in limiting Fissile Class II and III shipments. Upon the effective date of these amendments, DOT Special Permit 5908 presently authorizing shipments under similar provisions will be canceled with individual notification of the cancellation to be sent to each permit registrant.

10. Section 173.397. Several editorial changes have been made to clarify the requirements of this paragraph. One commenter noted that the allowable contamination levels of § 173.397(a) are significantly higher than those which would be recommended in a forthcoming ANSI standard which is being prepared for contamination on equipment and facilities to be released for uncontrolled use. The Board emphasizes that the allowable contamination levels in § 173.397(a) are not being changed in this rule making, only those applicable to "exclusive use" shipments pursuant to § 173.397(a), which have been raised by a factor of 10. In § 173.397(a)(1), the discussion on methodology for assessment of removable surface contamination has been modified to incorporate one commenter's suggestion that other measurement methods of equal or greater efficiency than the cited "wipe test" method may be utilized.

11. Section 173.398(a)(4). A statement delaying the effective date of this para-

graph for one year from the publication of these amendments has been added to Note 1 in the paragraph. This is necessary to permit a reasonable transition period for compliance with the new requirement for the certification and supporting safety analysis to be maintained on file by shippers of special form radioactive material.

12. Section 173.416. In § 173.416(d)(1), a change has been made to clarify that when symbols are used on label entries, such symbols must conform to established radiation protection terminology which utilizes a superscript designating the atomic mass on the left side of the chemical symbol for the radionuclide.

In § 173.416(d)(2), a clarification has been added to provide that for fissile radioactive materials, the insertion of the weight in grams or kilograms of the fissile radionuclide in the "number of curies" entry on the label is optional.

13. Sections 174.586(h)(2), 175.655(f)(2), and 177.842(b). In each of these paragraphs a clarification has been added to the effect that when groups of packages are stored in a single location, the required separation of 20 feet between adjacent groups is measured from edge to edge between the groups. One commenter noted that the provisions being added to these paragraphs would have the effect of allowing an increase in radiation dose rate to transport workers, and that such an increase is not justified under the recent concepts of limiting radiation to "as low as practicable" levels. The Board wishes to emphasize that these amendments are not intended to increase radiation levels to transport workers. The required segregation distances of packages from areas occupied by persons are not being changed. The provision for situations where there are more than one group of packages with 50 transport indexes is intended solely to cover an inadvertent gap in the surface regulations (Highway and Rail) for carriers, which does not exist in either vessel (46 CFR Part 146) regulations or the IAEA standards. The Board also wishes to point out that the broad area of radiation exposure to transport workers as a result of handling radioactive packages is currently under study by this Department, in cooperation with the USAEC and several States. It is possible that changes to the carrier requirements for handling and stowing radioactive packages may be proposed later as a result of the findings in these studies.

14. Section 178.34. A change in the required temperature rating of the luting compounds from 250°F. to 300°F. has been made to make this requirement compatible with the limitation on decomposition characteristics of the authorized contents of the Spec. DOT 6L (§ 173.396(c)(1)), as well as to achieve compatibility with the operational requirements of the DOT-6L (§ 178.103) and DOT-6M (§ 178.104) specifications.

15. Section 178.103. In § 178.103-4, a clause has been added to specify that the requirement for increased fire resistance of welded joints applies only to the added spacer rods as prescribed for compliance with § 178.103-3(c)(1). Further, a statement has been added to § 178.103-3(c)(1) providing that compliance with the new requirement for four additional welded spacer rods is not mandatory for existing packagings until one year after

the date of publication of these amendments.

16. Section 178.104. Section 178.104(a) has been changed to provide welding together of different drums. Also, in § 178.104-3(a)(2) provision has been made for the option of a layer of porous refractory fiber beneath the pressure-relief holes. Several commenters suggested such an option be added to the specification. The intended purpose of the refractory layer is to preclude smoldering of the insulation media after exposure to the accidental fire test condition. The presence of the refractory fiber has not been demonstrated to be necessary for the package to meet the damage test sequence. Its utilization has been made optional. In § 178.104-3(b) limitations on the material of construction of the Spec. 2R have been added. Editorial reorganization of § 178.104 has also been made.

17. Section 178.195. An illustration showing typical assembly for this specification has been added as well as several editorial clarifications.

18. Metric/English Units. These amendments, units have been stated in metric units with equivalent English units in parentheses.

In accordance with section 102 of the National Environmental Policy Act (L. 91-90, 42 U.S.C. 4231 et seq.) the Board has considered the environmental impact of these amendments. It is determined that the changes made in these amendments would not have a significant impact on the environment. Accordingly,

it considers that an Environmental Impact Statement is not necessary and has not issued such a statement with respect to these amendments.

In consideration of the foregoing, CFR Parts 171, 173, 174, 175, 177 are amended as follows:

PART 171—GENERAL INFORMATION AND REGULATIONS

1. In § 171.7, paragraphs (c)(20) and (22), (d)(5)(iii), (d)(14), (16) are added; paragraph (d)(4) revised to read as follows:

§ 171.7 Matter incorporated by reference.

(c) * * *

(20) AWWA: American Water Association, 2 Park Avenue, New York 10016.

(21) AWS: American Welding Institute, 345 East 47th Street, New York 10016.

(22) USDC: U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22151.

(d) * * *

(4) American National Standards Institute, 11 West 47th Street, New York 10036.

(i) American National Standard is titled, "Safety Code for Mechanical Refrigeration," 1964 edition.

(ii) American National Standard is titled, "Steel Pipe Flanges and Flange Connections," 1968 edition.

(iii) American National Standard is titled, "Packaging of Uranium Hexafluoride for Transport," 1970 edition.

(5) * * *

(ii) ASTM D1056 is titled, "Standard Specification for Expanded Cellular Rubber Products," 1968 edition.

Sec. and Tests for," 1968 edition.

(4) American Water Works Association (AWWA) Standard C207-55 is titled, "AWWA Standard for Steel Pipe Flanges," 1955 edition.

(15) American Welding Society (AWS):

(i) AWS Code B-3.0 is titled, "Standard Qualification Procedure," 1973 edition.

(ii) AWS Code D-1.0 is titled, "Code for Welding in Building Construction," 1966 edition.

(16) USDC, CAPE-1662, one of the series of "Civilian Applications Program Engineering Drawings" which is a package of information including drawings and bills of material, describing phenolic-foam insulated, protective over-packs.

(i) USDC, USAEC Material and Equipment Specification No. SP-9, is titled, "Fire Resistant Phenolic Foam."

(ii) USDC, ORO-651 is titled, "Uranium Hexafluoride Handling Procedures and Container Criteria," Revision 3, 1972 edition.

PART 173—SHIPPERS

2. In Part 173 Table of Contents, § 173.393 is revised to read as follows:

Sec.

173.393 General packaging and shipment requirements.

73.23 [Amended]

In § 173.23, paragraph (c) is deleted.

4. In § 173.69, Note 1 following paragraph (a) is revised to read as follows:

§ 173.69 Detonating fuzes, class A, with or without radioactive components, detonating fuze parts containing an explosive, boosters, bursters, or supplementary charges.

(a) * * *

Note 1: A fuze with any radioactive component is also subject to the applicable provisions of §§ 173.389 through 173.399 for the radioactive material.

5. In § 173.202, paragraph (b) is added to read as follows:

§ 173.202 Sodium and potassium, metallic liquid alloy.

(b) Packaging of metallic liquid alloys of sodium or potassium in combination with fissile or large quantities of radioactive material, is authorized as provided in § 173.206(a)(10) and (11).

6. In § 173.206, paragraph (a)(10) is revised, paragraph (a)(12) is added to read as follows:

§ 173.206 Sodium or potassium, metallic, sodium amide, sodium potassium alloys, sodium aluminum hydride, lithium metal, lithium silicon, lithium ferro silicon, lithium hydride, and lithium aluminum hydride.

(a) * * *

(10) Tubes of stainless steel, or other metals of equipment strength and non-toxicity, having sealed, welded ends, and containing not more than 50 grams of metal. Authorized only for metallic sodium, metallic lithium, metallic potassium, and sodium potassium alloy. Each tube must be enclosed within a secondary sealed metallic tube and further enclosed within strong tight outer packaging.

secondary sealed metallic tube and further enclosed within strong tight outer packaging.

(12) Any packaging as prescribed in §§ 173.394(b) or (c), 173.395(b) or (c), or 173.396(b) or (c).

7. In § 173.226, a note is added following the heading and preceding paragraph (a) to read as follows:

§ 173.226 Thorium metal, powdered.

Note: Thorium metal, a low specific activity radioactive material, is also subject to the applicable provisions of § 173.389 through 173.399.

In § 173.389, paragraphs (o), (p), and (q) are added to read as follows:

§ 173.389 Radioactive materials; definitions.

(o) "Exclusive Use" (also referred to as "sole use" or "Full Load" as used in IAEA regulations) means any shipment:

(1) From a single consignor having the exclusive use of a transport vehicle or of an aircraft, or of a hold or compartment of an inland watercraft, or of a hold, compartment, or defined deck area of a seagoing vessel; and

(2) For which all initial, intermediate, and final loading and unloading is carried out by or under the direction of the consignor, consignee, or his designated agent.

(p) "Radioactive Device" means any manufactured article such as an instrument, clock, electronic tube or apparatus, or similar device having radioactive material (other than liquid) in a nondispersible form as a component part.

(q) "Closed transport vehicle" means a vehicle equipped with a securely attached exterior enclosure, which during normal transport, restricts the access of unauthorized persons to the cargo space containing the radioactive materials. The enclosure may be either temporary or permanent, may be of the "see-through" type, and must limit access from top, sides, and ends.

9. In § 173.391, the introductory text of paragraph (c), paragraphs (b)(3), (c)(2), and (c)(4) are revised to read as follows:

§ 173.391 Small quantities of radioactive materials and radioactive devices.

(b) * * *

(3) The radiation dose rate at any point on the external surface of the outside of the package may not exceed 0.5 millirem per hour. However, for exclusive use shipments only, the radiation at the external surface of the package or the item may exceed 0.5 millirem per hour, but must not exceed 2 millirem per hour.

(c) A manufactured article, other than reactor fuel elements, in which the only radioactive material is metallic natural or depleted uranium or natural thorium or alloys thereof, is exempt from specification packaging, marking, and labeling, and is exempt from the provisions of § 173.393, if the following conditions are met:

(2) There must be no significant radioactive surface contamination on the exterior of the package. To determine whether "significant," the standard in § 173.397 must be used.

(4) The outer surface of the uranium or thorium is enclosed in a non-radioactive, sealed, metallic sheath.

10. In § 173.392, paragraphs (a) and (b) are revised; paragraphs (c)(9) and (d)(7) are added to read as follows:

§ 173.392 Low specific activity radioactive material.

(a) Low specific activity (LSA) radioactive materials, other than materials consigned as exclusive use, are exempt from the provisions of § 173.393(a) through (e) and (g). However, they must be packaged in accordance with the requirements of § 173.395 and must be marked and labeled as required in §§ 173.401 and 173.402.

(b) LSA radioactive materials which are transported in a transport vehicle (except aircraft) and consigned as exclusive use are exempt from specification packaging, marking, and labeling, provided the shipment meets the requirements of paragraph (c) or (d) of this section.

(c) * * *

(9) Specific instructions for maintenance of exclusive use (sole use) shipment controls must be provided by the shipper to the carrier. Such instructions must be included with the shipping paper information.

(d) * * *

(7) Specific instructions for maintenance of exclusive use (sole use) shipment controls must be provided by the shipper to the carrier. Such instructions must be included with the shipping paper information.

11. In § 173.393, the heading and the introductory texts of paragraphs (d), (e), and (j) are revised; paragraphs (g), (j)(3), and (l) are revised; paragraph (o) is added to read as follows:

§ 173.393 General packaging and shipment requirements.

(d) Each radioactive material must be packaged in a packaging which has been designed to maintain shielding efficiency and leak tightness, so that, under conditions normally incident to transportation, there will be no release of radioactive material. If necessary, additional suitable inside packaging must be used. Each package must be capable of meeting the standards in §§ 173.398(b) and 173.24.

(e) The packaging must be designed, constructed, and loaded so that during transport:

(g) Liquid radioactive material in Type A quantities must be packaged in or within a leak-resistant and corrosion-resistant inner containment vessel. In addition:

(1) The packaging must be adequate to prevent loss or dispersal of the radioactive contents from the inner containment vessel if the package were sub-

jected to the 9 meter (30-foot) drop test prescribed in § 173.398(c) (2) (i); and either

(2) Enough absorbent material must be provided to absorb at least twice the volume of radioactive liquid contents. The absorbent material may be located outside the radiation shield only if it can be shown that if the radioactive liquid contents were taken up by the absorbent material the resultant dose rate at the surface of the package would not exceed 1,000 millirem per hour; or

(3) A secondary leak-resistant and corrosion-resistant containment vessel must be provided to retain the radioactive contents under the normal conditions of transport as prescribed in § 173.398(b), assuming the failure of the inner primary containment vessel.

(j) Packages for which the radiation dose rate exceeds the limits specified in paragraph (i) of this section, but does not exceed at any time during transportation any of the limits specified in paragraphs (j) (1) through (4) of this section may be transported in a transport vehicle which has been consigned as exclusive use (except aircraft). Specific instructions for maintenance of the exclusive use (sole use) shipment controls must be provided by the shipper to the carrier. Such instructions must be included with the shipping paper information:

(3) Ten millirem per hour at any point 2 meters (six feet) from the vertical planes projected by the outer lateral surface of the car or vehicle; or if the load is transported in an open transport vehicle, at any point 2 meters (six feet) from the vertical planes projected from the outer edges of the vehicle.

(i) Packages consigned for export are also subject to the regulations of the foreign governments involved in the shipment. See §§ 173.8, 173.9, and 173.393b. (The regulations of the International Atomic Energy Agency (IAEA) are used by most foreign governments.)

(o) No person may offer for transportation a package of radioactive materials until the temperature of the packaging system has reached equilibrium (see also paragraph (e) of this section) unless, for the specific contents, he has ascertained that the maximum applicable surface temperature limits cannot be exceeded.

12. In § 173.394, paragraphs (a), (b) (1), and (b) (2) are revised, paragraphs (b) (5), (b) (6), and (c) (4) are added to read as follows:

§ 173.394 Radioactive material in special form.

(a) In addition to the applicable requirements of §§ 173.24 and 173.393, a Type A quantity of special form radioactive material must be packaged as follows:

(1) Specification 7A (§ 178.350 of this subchapter) Type A general packaging. Each shipper of a Specification 7A packaging must maintain on file for at least one year after the latest shipment, and be prepared to provide the Department,

a complete certification and supporting safety analysis demonstrating that the construction methods, packaging design, and materials of construction are in compliance with the specification. This requirement is effective:

December 31, 1975.

(2) Specification 55 (§ 178.250 of this subchapter) metal encased shielded container. Use of existing container authorized; construction not authorized after March 31, 1975.

(3) Any Type B packaging pursuant to paragraph (b) of this section.

(4) Foreign-made packagings which bear the marking "TYPE A."

(b)

(1) Specification 55 metal encased shielded container. Authorized only for domestic shipments of not more than 300 curies per package. Use of existing container authorized; construction not authorized after March 31, 1975.

(2) Specification 6M (§ 178.104 of this subchapter) metal packaging.

(5) Specification 20WC (§ 178.194 of this subchapter) wooden outer protective jacket, with a single snug-fitting inner Type A packaging which has a metal outer wall and conforms to § 178.350 of this subchapter or Specification 55. Only use of existing specification 55 container authorized; construction not authorized after March 31, 1975.

(6) Specification 21WC (§ 178.195 of this subchapter) wooden-steel protective overpack, with a single inner specification 2R (§ 178.34 of this subchapter) or specification 55, inner packaging. Only use of existing specification 55 container authorized; construction not authorized after March 31, 1975. Contents must be loaded within the inner packaging to preclude loose movement during transportation. The inner packaging must be securely positioned and centered within the overpack by solid cushioning materials so that there would be no significant displacement of the inner packaging if the packaging were subjected to the 9 meter (30-foot) drop test described in § 173.398(c) (1).

(c)

(4) Specifications 20WC (§ 178.194 of this subchapter) wooden outer protective jacket, with a single, snug-fitting specification 55 inner packaging. Only use of existing specification 55 container authorized; construction not authorized after March 31, 1975. Radioactive thermal decay energy must not exceed 100 watts.

13. In § 173.395, the introductory text of paragraph (a) and paragraphs (a) (1) through (4) are revised; paragraphs (a) (5) through (8) are deleted; paragraph (b) (4) is added to read as follows:

§ 173.395 Radioactive material in normal form.

(a) In addition to the applicable requirements of §§ 173.24 and 173.393, a Type A quantity of normal form radioactive material must be packaged as follows:

(1) Specification 7A (§ 178.350 of this subchapter) Type A general packaging. Each shipper of a specification 7A

packaging must maintain on file for at least one year after the latest shipment, and be prepared to provide the Department, a complete certification and supporting safety analysis demonstrating that the construction methods, packaging design, and material construction are in compliance with the specification. This requirement is effective December 31, 1975.

(2) Specification 55 metal encased shielded container. Use of existing container authorized; construction not authorized after March 31, 1975. For liquid contents the provisions of § 173.398 must also be met.

(3) Any Type B packaging pursuant to paragraph (b) of this section.

(4) Foreign-made packagings which bear the marking "TYPE A."

(b)

(4) Specification 20WC (§ 178.194 of this subchapter) wooden outer protective jacket, when used with a single snug-fitting inner specification 55 (§ 178.34 of this subchapter) or specification 55 inner packaging. Only use of existing specification 55 container authorized; construction not authorized after March 31, 1975. For liquid contents the provisions of § 173.398 must also be met, with respect to inner packaging.

14. In § 173.396, paragraphs (b) (c) (1), and (c) (2) (ii) are revised; paragraphs (b) (6), (b) (7), (b) (c) (5), (f) (1), and (f) (2), are added to read as follows:

§ 173.396 Fissile radioactive material

(b)

(1) Specification 6L (§ 178.106 of this subchapter) metal packaging. paragraph (c) (1) of this section for authorized contents.

(6) Specification 20PF-1, 20PF-2, 20PF-3 (§ 178.120 of this subchapter) or specification 21PF-1 or 2 (§ 17 of this subchapter) phenolic-foam insulated protective overpacks, with snug fitting inner metal cylinders meet all of the applicable requirements §§ 173.24, 173.393, and 173.394. Handling procedures and packaging criteria must be in accordance with USAEC Report No. ORO-651 or A Standard N-14.1-1971. Quantities of uranium hexafluoride are authorized to be shipped as fissile Class II, and assigned a minimum transport index as indicated:

Protective overpack specification No.	Maximum inner cylinder diameter		Maximum weight of UF ₆ contents		Maximum U ₂₃₅ enrichment (w/o)	Fissile class II transport index
	Inches	Centimeter	Pounds	Kilograms		
20PF-1	5	12.7	55	25	100	0.1
20PF-2	8	20.3	255	116	12.5	1.4
20PF-3	12	30.5	400	209	6.0	1.1
21PF-1	30	76	4,950	2,247	6.0	5.0
21PF-2	30	76	5,020	2,279	6.0	6.0

¹ For 30-in cylinders, the maximum H/U atomic ratio is 0.068.

(7) A DOT Specification 6J (§ 178.100 of this subchapter) or 17H (§ 178.118 of this subchapter) 55-gallon steel drum, for transport of not more than 350 grams of uranium-235 in any non-pyrophoric form, enriched to any degree in the U-235 isotope. Each drum must have a minimum 18-gauge body and bottom head and 16-gauge removable top head, with one or more corrugations in the cover near the periphery. Closure must conform to § 178.103-5(a) of this subchapter. At least four 1.2 centimeter (0.5 inch) diameter vent holes must be provided, equally spaced on the sides of the drum near the top, each covered with weatherproof tape, or equivalent device. Appropriate primary inner containment of the contents and any necessary packing material must be provided, such as plastic or metal jars or cans or plastic wrapping, such that Spec. 7A (§ 178.350 of this subchapter) provisions are satisfied. Each inner containment vessel must be capable of venting in the event the package was exposed to the thermal test described in (§ 173.398(c) (2) (iii)). Additionally, liquid contents must be pack-

aged in accordance with § 173.393(g). The maximum weight of contents, including internal packing must not exceed 91 kilograms (200 pounds) with fissile material content limited as follows:

Maximum U ₂₃₅ per package (grams)	Minimum transport index per package as fissile class II	Maximum packages per transport vehicle as fissile class II
350	1.8	73
200	1.0	128
250	0.5	256
200	0.3	500
150	0.1	500
100	0.1	500
50	(¹)	(¹)

¹ Fissile class I.

(8) Any metal cylinder which meets the performance requirements for a specification 7A Type A packaging (see §§ 173.395(a)(1) and 178.350 of this subchapter) for the transport of residual "heels" of enriched solid uranium hexafluoride without a protective overpack, are authorized as Fissile Class I packages, in accordance with the following:

cylinder diameter		Cylinder volume		Maximum U ₂₃₅ enrichment (weight percent)	Maximum "heel" weight per cylinder (U ₂₃₅)		
Inches	Centimeters	Cubic feet	Liters		Pounds UF ₆	Kilograms	Kilograms
5	12.7	0.311	8.8	100.0	0.1	0.045	0.031
8	20.3	1.359	39	12.5	.5	.227	.019
12	30.5	2.419	68	5.0	1.0	.454	.015
30	76	26.64	725	5.0	26.0	11.25	.323

(c) * * *

(1) Specification 6L (§ 178.103 of this subchapter) metal packaging. Authorized only for uranium-233, uranium-235, plutonium-239 or 241, as metal, oxide, or compounds which will not decompose at temperatures up to 149°C (300° F.) Radioactive thermal decay energy output shall not exceed 5 watts. Large quantity

radioactive materials in normal form must be packaged in one or more sealed and leak tight metal cans or polyethylene bottles within the Spec. 2R containment vessel.

(1) *Fissile Class II and III packages.* The following quantities of fissile radioactive materials are authorized under the Fissile Class II and III conditions listed:

TABLE OF AUTHORIZED CONTENTS ¹

Uranium-235 ²	Plutonium ³		Fissile class II transport index	Fissile class III maximum number of packages per transport vehicle
	H/X ≤ 3	3 < H/X ≤ 20		
14	2.6	2.5	1.2 1.5	80 55

¹ Quantity in kilograms.

² All sources of hydrogen within the inner containment vessel must be considered in determining the H/X ratio of inner containment vessel.

³ Volume not to exceed 3.6 l.

⁴ Plutonium solutions are not authorized.

(2) * * *

(ii) *Fissile Class II and III packages.* Quantities of fissile radioactive material as shown in the following table are authorized for a Fissile Class II and Fissile Class III package. Where a maximum ratio of hydrogen to fissile material is specified in the table, only the hydrogen dispersed with the fissile material is to be considered. For a Fissile Class II package, the minimum transport index to be assigned is shown in the following table. For a Fissile Class III package, the

maximum number of similar packages per transport vehicle is shown. Each Fissile Class III shipment is also subject to paragraph (g) of this section. For a uranium-233 shipment, the maximum inside diameter of the inner containment vessel must not exceed 12 centimeters (4.75 inches). Where necessary, a tight fitting steel insert must be used to reduce a larger diameter inner containment vessel specified in § 178.104-3(b) of this subchapter to the 12 centimeters (4.75 inches) limit.

Table of authorized contents ¹

Fissile class III maximum number of packages per transport vehicle	Fissile class II transport index	Plutonium ^{1, 4}		Uranium-235 ²		Uranium-233 ³	
		Compounds	Metal or alloy	Compounds	Metal or alloy	Compounds	Metal or alloy
		H/X ≤ 0	H/X ≤ 3	H/X = 0	H/X ≤ 3	H/X = 0	H/X ≤ 3
1,250	0.1	4.1	2.4	7.6	7.2	4.4	2.9
550	0.1	4.5	4.5	4.6	8.7	3.2	2.5
250	0.1	4.5	4.5	16.0	13.5	6.8	4.3
125	1.0	.....	.....	26.0	16.1	.....	.....
25	6.0	.....	.....	32.0	19.5	.....	.....
12	10.0	.....	.....	.....	.....	.....	.....

¹ Quantity in kilograms.

² Minimum percentage of plutonium-239 is 5 weight percent.

³ Is 1g limited to 100 mg U₂₃₅ by design limitation.

⁴ Is 1g limited to 100 mg U₂₃₅ by design limitation.

⁵ Maximum inside diameter not to exceed 12 cm (4.75 in) (see par. (c)(2)(ii) of this section).

⁶ Maximum number of packages per transport vehicle.

⁷ Granulated or powdered metal with any particle less than 8 mm (0.25 in) in the smallest dimension is not authorized.

⁸ Maximum uranium-235 enrichment is 98 percent.

(5) Specification 20PF-1 through 3 (§ 178.120 of this subchapter) or Specification 21PF-1 or 2 (§ 178.121 of this subchapter) phenolic-foam insulated protective overpacks. (See paragraph (b)(6) of this section for authorized use.)

(f) * * *

(1) Fissile Class II packages may be shipped with a transport index greater than 10, and combined with other packages of the same or different designs in a Fissile Class III shipment, under the conditions prescribed in paragraph (g) of this section. *Provided:*

(i) The transport index which has been assigned in the package approval for nuclear criticality control purposes does not exceed 10 for any single package;

(ii) The total transport index for nuclear criticality control purposes for all packages in the shipment does not exceed 100;

(iii) The shipment satisfies the provisions of § 173.393(j) if any package has radiation dose rates exceeding 10 millirem per hour at 1 meter (three feet) from any accessible external surface of the package; and

(iv) The shipment will not be transported by water.

(2) Fissile Class II packages, which have been assigned a transport index for nuclear criticality control purposes in accordance with Fissile Class II criteria, may be combined with Class II criteria, may be combined with other Fissile Class III packages of the

same or different design for which a transport index has been so assigned for nuclear criticality control purposes, and may be combined with Fissile Class II packages, in a Fissile Class III shipment under the conditions prescribed in paragraph (g) of this section, *Provided*:

- (i) The transport index which has been assigned in the package approval for nuclear criticality control purposes does not exceed 50 for any single package;
- (ii) The total transport index for nuclear criticality control purposes for all packages in the shipment does not exceed 100;
- (iii) The shipment satisfies the provisions of § 173.393(j) if any package has radiation dose rates exceeding 10 millirem per hour at 1 meter (three feet) from any accessible external surface of the package; and
- (iv) The shipment will not be transported by water.

15. § 173.397 is revised to read as follows:

§ 173.397 Contamination control.

(a) Removable (non-fixed) radioactive contamination is considered significant if the level of contamination, when averaged over any area of 300 square centimeters of any part of the package surface, exceeds any of the following:

Contaminant	Maximum permissible level	
	uCi/Cm ²	dis/min/Cm ²
Natural or depleted uranium and natural thorium:		
Beta-gamma.....	10 ⁻⁴	200
Alpha.....	10 ⁻⁴	20
All other beta-gamma emitting radionuclides.....	10 ⁻⁴	20
All other alpha emitting radionuclides.....	10 ⁻⁴	20

(1) In assessing the surface contamination of a package, a sufficient number of measurements must be taken in the most appropriate locations so as to yield a representative assessment of the contamination situation. The average amount of removable (non-fixed) radioactive contamination may be determined by wiping the external surface of the package with an absorbent material, using moderate pressure, and then measuring the activity on the wiping material. If the measured activity per square centimeter does not exceed 10 percent of the levels prescribed above, it may be assumed that those levels have not been exceeded. Other measurement methods of equal or greater efficiency may also be utilized.

(b) When radioactive materials packages are consigned as exclusive use, as defined in § 173.389(e), removable non-fixed radioactive contamination may not exceed 10 times that as specified in paragraph (a)(1) of this section.

(c) Each transport vehicle used for transporting radioactive materials as exclusive use, as defined in § 173.389(e), must be surveyed with appropriate radiation detection instruments after each use. A vehicle may not be returned to service until the radiation dose rate at any accessible surface is 0.5 millirem per hour or less, and there is no significant

removable radioactive surface contamination, as defined in paragraph (a) of this section.

16. In § 173.398, Notes 1 and 2 are added following paragraph (a)(4) to read as follows:

§ 173.398 Special tests.

- (a) * * *
- (4) * * *

NOTE 1: Each shipper of special form radioactive material shall maintain on file for at least one year after the last shipment, and be prepared to provide the Department, a complete certification and supporting safety analysis (see Note 2) demonstrating that the special form material meets the requirements of paragraph (a) of this section. This requirement is effective December 31, 1975.

NOTE 2: Prior to the first shipment of a special form radioactive material outside of the United States, each shipper shall obtain a Certificate of Competent Authority for the specific material. Each petition must be submitted in accordance with § 173.393b (b) and (c), and must additionally include the following information:

- 1. A detailed description of the material, or if a capsule, the contents. Particular reference must be made to both physical and chemical states;
- 2. A detailed statement of the design of any capsule to be used, including complete engineering drawings and schedules of material, and methods of construction;
- 3. A statement of the tests which have been done and their results, or evidence based on calculative methods to show that the material is capable of meeting the tests, or other evidence that the special form radioactive material meets the requirements of paragraphs (a)(1) thru (4) of this section.

17. In § 173.399, paragraph (a)(3)(ii) is revised; paragraph (a)(3)(iii) is deleted as follows:

§ 173.399 Labeling of packages of radioactive materials.

- (a) * * *
- (3) * * *

(ii) Each package containing a large quantity of radioactive material as defined in § 173.389(b).

18. In § 173.401, paragraph (f) is added to read as follows:

§ 173.401 Hazardous materials.

(f) Additional markings on packages containing radioactive materials are required as follows:

(1) Each package of radioactive materials in excess of 50 kilograms (110 pounds) must have its gross weight plainly and durably marked on the outside of the package.

(2) Each package of radioactive materials which conforms to the requirements for Type A or Type B packaging (§§ 173.389 (j) and (k) and 173.398 (b) and (c)) must be plainly and durably marked on the outside of the package in letters at least 13 millimeters (1/2-inch) high, with the words "TYPE A" or "TYPE B" as appropriate. A packaging which is not in compliance with these requirements must not be so marked. Each package of hazardous materials destined for export shipment must also be marked "USA" in conjunction with the specification marking, special permit, or other package certificate identification. (See §§ 173.393a and 173.393b.)

19. In § 173.404, paragraph (a) is revised to read as follows:

§ 173.404 Labels.

(a) A person who offers for portation a package containing hazardous material shall conspicuously label in compliance with the requirements of this Part. The applicable information required in any blank spaces on the must be inserted by legible printing using a durable, waterproof marking. Labels should be applied to part of the package bearing the signee's name and address.

20. In § 173.416, paragraph (c) is added to read as follows:

§ 173.416 Radioactive materials labels.

(d) The following requirements to completion of the items of information in the blank spaces of the labels specified in this section:

(1) "Contents". The name of radionuclide, as taken from the list of radionuclides in § 173.390 (sy which conform to established radiation protection terminology are authorized, i.e., "Mo," "Co," etc.). For mixtures of radionuclides, the most restrictive radionuclide on the basis of radiotoxicity must be listed as space on the label allows.

(2) "Number of curies". Units shall be expressed in appropriate curie unit (curies (Ci), millicuries (mCi) or microcuries (µCi) (abbreviations are authorized). For a fissile material, the weight in grams or kilograms of the radionuclide may also be inserted.

(3) "Transport index". (See § 173.401.)

PART 174—CARRIERS BY RAIL FREIGHT

21. In § 174.584, paragraph (c) is added to read as follows:

§ 174.584 Waybills, switching orders and other billing.

(1) For shipments of radioactive materials, the waybill, manifest, or other billing, as prepared from the shipper's papers, must additionally contain all information provided pursuant to § 173.427(a)(5) of this subchapter.

22. In § 174.586, paragraph (h) is revised; Note 2 is added following paragraph (h)(2) Note 1 to read as follows:

§ 174.586 Handling hazardous materials.

- (h) * * *

(1) The number of packages of radioactive materials authorized in any car or storage location must be limited so that the total transport index number as defined in § 173.389(i) of this chapter and determined by adding together the transport index number of the labels of the individual packages does not exceed 50. This provision does not apply to exclusive use shipments described in § 173.393(j), 173.396(f) or 173.392 of this subchapter.

- (2) * * *

NOTE 2: Where more than one gross package is present in any storage location a single group may not have a total transport index greater than 50. Each group of packages must be handled and stowed not more than 6 meters (20 feet) (measured edge) to any other group.

ART 175—CARRIERS BY RAIL EXPRESS

23. In § 175.652a, paragraph (c) is revised to read as follows:

§ 175.652a Shipping papers.

(c) Waybills or delivery sheets used as waybills, or other billing issued in place thereof, prepared from the shipping papers, and the transfer sheet or interchange record used for transferring such shipments to a connecting carrier, must contain the information required in paragraphs (a) and (b) of this section. Additionally, in the case of radioactive materials, each such waybill, delivery sheet, or other billing and such transfer sheet or interchange record must also contain all the information provided pursuant to § 173.427(a) (5) of this subchapter.

24. In § 175.655, paragraph (j) (1) is revised; Note 2 is added following paragraph (j) (2) Note 1 to read as follows:

§ 175.655 Protection of packages.

(j)

(1) The number of packages of radioactive materials in any rail car or storage location must be limited so that the total transport index number, as defined in § 173.389(i) of this subchapter and determined by adding together the transport index numbers on the labels of the individual packages, does not exceed 50.

This provision does not apply to exclusive use shipments described in § 173.393(j), 173.396(f), or 173.392 of this subchapter.

(2)

Note 2: Where more than one group of packages is present in any storage location, a single group may not have a total transport index greater than 50. Each group of packages must be handled and stowed not closer than 6 meters (20 feet) (measured edge to edge) to any other group.

PART 177—SHIPMENTS MADE BY WAY OF COMMON, CONTRACT, OR PRIVATE CARRIERS BY PUBLIC HIGHWAY

25. In § 177.817, the introductory text of paragraph (a) is revised to read as follows:

§ 177.817 Shipping papers.

(a) A carrier may not accept for transportation nor transport any hazardous material subject to the regulations in this subchapter unless that material is described on the shipping paper by the shipping name prescribed in § 172.5 of this subchapter and by the classification prescribed in § 172.4 of this subchapter. A further description consistent therewith may be included. Abbreviations may not be used. The total quantity by weight, volume, or as otherwise appropriate, must be shown. Additionally, in the case of a radioactive material shipment, each shipping paper must include all the information provided pursuant to § 173.427(a) (5) of this subchapter.

26. In § 177.834, paragraph (a) is amended to read as follows:

§ 177.834 General requirements.

(a) *Packages secured in a vehicle.* Any tank, barrel, drum, cylinder, or other packaging, not permanently attached to a motor vehicle, which contains any flammable liquid, compressed gas, corrosive material, poisonous material, or radioactive material must be secured against movement within the vehicle on which it is being transported, under conditions normally incident to transportation.

27. In § 177.842, paragraphs (a) and (b) are revised to read as follows:

§ 177.842 Radioactive material.

(a) The number of packages of radioactive materials in any motor vehicle, trailer, or storage location must be limited so that the total transport index number, as defined in § 173.389(i) of this subchapter and determined by adding together the transport index numbers on the labels of the individual packages, does not exceed 50. This provision does not apply to exclusive use shipments described in § 173.393(j), 173.396(f), or 173.392 of this subchapter.

(b) Packages of radioactive material bearing "radioactive yellow-II" or "radioactive yellow-III" labels must not be placed in a motor vehicle or in any other place closer than the distances shown in the following table to any area which may be continuously occupied by passengers, employees, or shipments of animals, nor closer than the distances shown in the table below to any package containing undeveloped film (if so marked). If more than one of these packages is present, the distance shall be computed from the following table on the basis of the total transport index number (determined by adding together the transport index numbers on the labels of the individual packages) or packages in the vehicle or storeroom. Where more than one group of packages is present in any single storage location,

a single group may not have a total transport index greater than 50. Each group of packages must be handled and stowed not closer than 6 meters (20 feet) (measured edge to edge) to any other group.

PART 178—SHIPPING CONTAINER SPECIFICATIONS

28. In Part 178 Table of Contents, § 178.259 is deleted; § 178.34 is revised; §§ 178.120, 178.121, 178.194, and 178.195 are added to read as follows:

- Sec.
- 178.34 Specification 2R; inside containment vessel.
 - 178.120 Specification 20PF phenolic-foam insulated, metal overpack.
 - 178.121 Specification 21PF fire and shock resistant, phenolic-foam insulated, metal overpack.
 - 178.194 Specification 20WC wooden protective jacket.
 - 178.195 Specification 21WC wooden-steel protective overpack.

29. § 178.34 is amended to read as follows:

§ 178.34 Specification 2R; inside containment vessel.

§ 178.34-1 General requirements.

(a) Each vessel must be made of stainless steel, malleable iron, or brass, or other material having equivalent physical strength and fire resistance.

(b) Each vessel must meet all of the applicable requirements of § 173.24 (c) and (d) of this subchapter. Letters and numerals at least 6 millimeters (¼-inch) in height are authorized for the marking of a vessel not exceeding 5 centimeters (2 inches) inside diameter.

§ 178.34-2 Manufacture.

The ends of the vessel must be fitted with screw-type closures or flanges (see § 178.34-4), except that one or both ends of the vessel may be permanently closed by a welded or brazed plate. Welded or brazed side seams are authorized.

§ 178.34-3 Dimensions.

(a) The inside diameter of the vessel may not exceed 30 centimeters (12 inches) exclusive of flanges for handling or fastening devices and must have wall thickness and length in accordance with the following:

Inside diameter maximum Inches	Centimeters	Wall thickness minimum		Length minimum	
		Inches	Millimeters	Inches	Centimeters
2 1/2	63.5	1/8	3.2	16	41
3	76.2	1/8	3.2	16	41
3 1/2	88.9	1/8	3.2	16	41
4	101.6	1/8	3.2	16	41
4 1/2	114.3	1/8	3.2	16	41
5	127.0	1/8	3.2	16	41
5 1/2	139.7	1/8	3.2	16	41
6	152.4	1/8	3.2	16	41
6 1/2	165.1	1/8	3.2	16	41
7	177.8	1/8	3.2	16	41
7 1/2	190.5	1/8	3.2	16	41
8	203.2	1/8	3.2	16	41
8 1/2	215.9	1/8	3.2	16	41
9	228.6	1/8	3.2	16	41
9 1/2	241.3	1/8	3.2	16	41
10	254.0	1/8	3.2	16	41
10 1/2	266.7	1/8	3.2	16	41
11	279.4	1/8	3.2	16	41
11 1/2	292.1	1/8	3.2	16	41
12	304.8	1/8	3.2	16	41
12 1/2	317.5	1/8	3.2	16	41
13	330.2	1/8	3.2	16	41
13 1/2	342.9	1/8	3.2	16	41
14	355.6	1/8	3.2	16	41
14 1/2	368.3	1/8	3.2	16	41
15	381.0	1/8	3.2	16	41
15 1/2	393.7	1/8	3.2	16	41
16	406.4	1/8	3.2	16	41
16 1/2	419.1	1/8	3.2	16	41
17	431.8	1/8	3.2	16	41
17 1/2	444.5	1/8	3.2	16	41
18	457.2	1/8	3.2	16	41
18 1/2	469.9	1/8	3.2	16	41
19	482.6	1/8	3.2	16	41
19 1/2	495.3	1/8	3.2	16	41
20	508.0	1/8	3.2	16	41
20 1/2	520.7	1/8	3.2	16	41
21	533.4	1/8	3.2	16	41
21 1/2	546.1	1/8	3.2	16	41
22	558.8	1/8	3.2	16	41
22 1/2	571.5	1/8	3.2	16	41
23	584.2	1/8	3.2	16	41
23 1/2	596.9	1/8	3.2	16	41
24	609.6	1/8	3.2	16	41
24 1/2	622.3	1/8	3.2	16	41
25	635.0	1/8	3.2	16	41
25 1/2	647.7	1/8	3.2	16	41
26	660.4	1/8	3.2	16	41
26 1/2	673.1	1/8	3.2	16	41
27	685.8	1/8	3.2	16	41
27 1/2	698.5	1/8	3.2	16	41
28	711.2	1/8	3.2	16	41
28 1/2	723.9	1/8	3.2	16	41
29	736.6	1/8	3.2	16	41
29 1/2	749.3	1/8	3.2	16	41
30	762.0	1/8	3.2	16	41

Not less than that prescribed for schedule 40 pipe.

§ 178.34-4 Closure devices.

(a) Each closure device must be as follows:

(1) Screw-type cap or plug; number of threads per inch must not be less than United States standard pipe threads and must have sufficient length of thread to engage at least 5 threads when securely tightened. Pipe threads must be luted with an appropriate non-hardening compound which must be capable of withstanding up to 149°C. (300°F.) without loss of efficiency. Tightening torque must be adequate to maintain leak tightness with the specific luting compound.

(2) An opening may be closed by a securely bolted flange and leak-tight gasket. Each flange must be welded or brazed to the body of the 2R vessel per (ANSI) Standard B16.5 or (AWWA) Standard C207-55, section 10. A torque wrench must be used in securing the flange with a corresponding torque of no

more than twice the force necessary to seal the selected gasket. Gasket material must be capable of withstanding up to 149°C (300°F) without loss of efficiency. The flange, whether of ferrous or non-ferrous metal, must be constructed from the same metal as the vessel and must meet the dimensional and fabrication specifications for welded construction as follows:

(i) Pipe flanges described in Tables 13, 14, 16, 17, 19, 20, 22, 23, 25, and 26 of ANSI B16.5.

(ii) For nominal pipe sizes 6, 8, 10, and 12 inches, AWWA Standard C207-55 Table 1, class B, may be used in place of the tables prescribed by paragraph (a) (2) (i) of this section.

(iii) Sizes under 6 inches, nominal pipe size, the following table with the same configuration as illustrated in AWWA C207-55, Table 1, class B, may be used in place of paragraph (a) (2) (i) of this section.

Nominal pipe size		Flange O.D.		Number of bolts	Bolt circle diameter		Diameter of bolts		Flange thickness	
Inches	Centimeters	bolts	Inches		Inches	Centimeters	Inches	Centimeters	Inches	Centimeters
2	5	6	15	4	4 1/2	11.8	1/2	1.9	1/2	1.6
2 1/2	6.2	7	17.5	4	5 1/2	13.8	1/2	1.9	1/2	1.6
3	7.5	7 1/2	18.8	4	6 1/2	15	1/2	1.9	1/2	1.6
3 1/2	8.8	8 1/2	21.3	8	7 1/2	17.5	1/2	1.9	1/2	1.6
4	10	9	22.5	8	7 1/2	18.8	1/2	1.9	1/2	1.6
4 1/2	11.2	10	25.4	8	8 1/2	21.3	1/2	1.9	1/2	1.6

(iv) Cast iron flanges prohibited. 30. In § 178.103, §§ 178.103-1, and 178.103-3 are amended; paragraph (a) in §§ 178.103-4, and 178.103-5 is revised; in § 178.103-2 paragraph (b) is added to read as follows:

§ 178.103 Specification 6L; metal packaging.

§ 178.103-1 General requirements.

Each packaging must meet the applicable requirements of § 173.24 of this subchapter.

§ 178.103-2 Rated capacity.

(b) The authorized maximum gross weight of the package is 160 kilograms (350 pounds) for sizes not over 210L (55 gallons) or 220 kilograms (480 pounds) for sizes over 210L (55 gallons) but not over 420L (110 gallons).

§ 178.103-3 General construction requirements.

(a) The outer shell must be of straight sided steel, with welded body seams and at least 18-gauge body and bottom head sheets, and 14-gauge removable head sheets (unless there are one or more corrugations in the cover near the periphery, in which case 16-gauge is authorized). The shell may be either a single sheet of steel or may be fabricated by welding together two appropriate lengths of 210L (55-gallon) drums, such as a DOT Specification 6J or 17H, with rolled or swedged in hoops as prescribed for either of those specifications. The head must be convex (crowned), not extending beyond the level of the chime, with a minimum convexity of 1 centimeter (3/8-inch). The inside diameter of the shell must be at least 57 centimeters (22.5 inches).

(b) Inner containment vessel must conform to specification 2R (except that cast iron is not authorized), with a maxi-

mum usable inside dimension of 13.3 centimeters (5.25 inches) maximum height of 127 centimeters (50 inches) (with caps in place) and minimum wall thickness of 6 millimeters (0.25 inch).

(c) Inner containment vessel must be fixed within the outer shell by one of the following types of centering devices:

(1) At least 8 steel rod spacers, of at least 6 millimeters (0.25-inch) diameter (for packages of 210 liters (55-gallon) capacity) or 1 centimeter (0.375-inch) diameter (for packages with greater than 210 liters (55-gallon) capacity) cold rolled steel, welded to the vessel at each end by minimum 5 centimeter (2-inch) continuous weld. Each rod must be welded to the vessel at radial positions not exceeding 45 degrees as not to interfere with closure of the inner vessel. Each spacer rod must extend at least 5.6 centimeters (2.25 inches) beyond the inner vessel at each end, then radially to the wall of the outer drum (to provide a springlike snug fit) and along the entire length of the wall of the outer drum. For a packaging of more than 210 liters (55-gallon) capacity, each spacer rod must be braced by welding a 6 millimeter (0.25-inch) by 5 centimeter (2-inch) steel plate to the spacer rod and the pipe with a continuous weld at each joint, the joints being located approximately half way along the length of the drum. For containers manufactured prior to March 31, 1975, this requirement is effective December 31, 1975.

(2) . . .

(i) 2.5 centimeters (1 inch) by 2.5 centimeters (1 inch) by 6 millimeters (1/4-inch) steel angle iron.

(ii) 3 centimeters (1 1/4 inches) by 3 centimeters (1 1/4 inches) by 5 millimeters (3/16-inch) steel angle iron.

(iii) 2.5 centimeters (1 inch) schedule 40 steel pipe.

(3) There must not be less than 3 spacer mechanisms for a package 210 liters (55-gallon) capacity or more than 3 spacer mechanisms for a package greater than 210 liters (55-gallon) capacity. Each spacer mechanism consist of not less than 6 steel pipe, or rod radial supports of at least 1 square centimeters (0.42 square inch) cross-section. Each radial support be welded at one end to the containment vessel by a continuous weld or inner steel band of at least 6 millimeter (1/4-inch) by 2.5 centimeters (1 inch) a continuous weld at radial position exceeding 60 degrees from the center of the package. The inner band, when must be welded to the inner containment vessel by at least 6 equally spaced 2-inch (2-inch) welds on each end of the band. The opposite end of the support must be welded by a continuous weld to an outer steel band of at least 1 millimeter (1/4-inch) by 2.5 centimeter (1 inch). The outer steel band must be welded to the outer shell by at least 6 equally spaced welds on each end of the top band, such that the inner is fixed at least 5.7 centimeters (inches) from the top and bottom of the drum. The spacer mechanism must be welded as specified near each end of the containment vessel so as not to interfere with the vessel closure. For a package greater than 210L (55-gallon) capacity, the additional spacer mechanism must be located at approximately point along the length of the inner shell.

(d) The void between the inner containment vessel and the outer shell be completely filled with bagged tamped vermiculite (expanded) with a density of at least 0.072 g/cc (pounds per cubic foot). Loose, untreated vermiculite is not authorized.

§ 178.103-4 Welding.

Welding must be of material having melting point in excess of 80 (1475°F.) (except that for packages constructed prior to March 31, 1975 temperature may be 540°C. (1000°F.) with a joint efficiency of at least 75%. This requirement applies to be used in adding spacer rods to a vessel with 178.103(3)(c)(1).

§ 178.103-5 Closure.

(a) The outer drum closure must be at least a 12-gauge bolted ring with forged lugs, one of which is threaded and having at least a 1.6 centimeter (5/8-inch) diameter steel bolt and nut, or equivalent device.

31. In § 178.104-3, paragraphs (b), and (c) are revised; paragraph (d) would be added to read as follows:

§ 178.104-3 General construction requirements.

(a) The outer shell must be of straight sided steel, with welded body seams may be either a single sheet of steel or may be fabricated by welding together two appropriate lengths of drums, such as a DOT Specification 6C or 17C each length to contain 3 swedged rolled rolling hoops as prescribed either of these specifications. A removable head for a packaging of 210

55 gallons) or larger volume must have one or more corrugations in the cover near the periphery. For a packaging exceeding 51 liters (15 gallons) volume, the head must be crowned (convexed), not extending beyond the level of the chime,

with a minimum convexity of 1 centimeter ($\frac{3}{8}$ -inch).

(1) The maximum authorized gross weight, metal thickness, and minimum end insulation thickness for the marked volume is as follows:

Marked capacity		Maximum authorized gross weight		Minimum thickness of uncoated sheets and heads (gage)	Minimum thickness of end insulation	
Gallons not over	Liters	Pounds	Kilograms		Inches	Centimeters
15	57	100	73	20	1.88	4.7
30	114	480	219	18	3.75	9.5
55	210	640	292	16	3.75	9.5
110	420	640	292	16	3.75	9.5

(2) Each drum must have at least four 1.2 centimeter (0.5-inch) diameter vent holes, located on the sides of the drum, near the top, each covered with a weatherproof tape, fusible plug, or equivalent device. A layer of porous refractory fiber may be placed behind the pressure-relief vent holes.

(b) Inner containment vessel must conform to specification 2R or equivalent (except that only carbon steel or stainless steel is authorized), with maximum usable inside diameter of 13.3 centimeters (5.25 inches), minimum usable inside diameter of 10 centimeters (4 inches), and minimum height of 15 centimeters (6 inches).

(c) Inner containment vessel must be fixed within the outer shell by one of the following types of solid centering media,

with the sides of the inner vessel protected by at least 9.5 centimeters (3.75 inches) of insulation media, and the ends with at least the thickness as prescribed in § 178.104-3(a) (1).

(1) Machined discs and rings made of solid industrial cane fiberboard having a density of at least 0.24 g/cc (15 pounds per cubic foot) fitted such that the radial clearances between the fiberboard, inner vessel, and shell do not exceed 6 millimeters ($\frac{1}{4}$ -inch); or

(2) Hardwood or plywood at least 1.2 centimeter ($\frac{1}{2}$ -inch) thick, having a density of at least 0.45 g/cc (28 pounds per cubic foot). There must be no gap or direct heat path from the shell to the inner vessel.

(e) For a packaging having an authorized gross weight in excess of 219kg (480 pounds), a steel bearing plate, at least 6 millimeters (0.25-inch) thick or a plywood disc, at least 2.5 centimeters (1 inch) thick, and at least 25 centimeters (10 inches) in diameter must be provided at both ends and adjacent to the specification 2R inner containment vessel, to provide additional load-bearing surface against the insulation-centering medium.

32. § 178.120 is added to read as follows:

§ 178.120 Specification 20PF phenolic-foam insulated, metal overpack.

§ 178.120-1 General requirements.

(a) Each overpack must meet all of the applicable requirements of § 173.24 of this subchapter.

(b) The maximum gross weight of the package, including the inner cylinder and its contents, must not exceed the following:

(1) Specification 20PF-1—138 kilograms (300 pounds).

(2) Specification 20PF-2—320 kilograms (700 pounds).

(3) Specification 20PF-3—455 kilograms (1000 pounds).

(c) The general configuration of the overpack must be a right cylinder, consisting of an insulated base section, a steel liner lid, and an insulated top section. The inner liner and outer shell must be at least 16-gauge and 18-gauge steel, respectively, with the intervening cavity filled with a molded-in-place, fire-resistant, phenolic-foam insulation interspersed with wooden members for bracing and support. Wood pieces must be securely attached to both the liner and shell. No hole is permitted in the liner. Each joint between sections must be stepped a minimum of 5 centimeters (2 inches) and gaps between mating surfaces must not exceed 5 millimeters (0.2-inch). Gaps between foam surface of top section and liner lid must not exceed 1 centimeter (0.4-inch) or 5 centimeters (2 inches) where taper is required for mold stripping. For the specification 20PF-1, the top section may consist of a plug of foam insulation and a steel cover. The liner and shell closures must each be gasketed against moisture penetration. The liner must have a bolted flange closure. Shell closure must conform to § 178.118-8(b).

(d) Drawings in CAPE-1662, which include bills of material are a part of this specification.

§ 178.120-2 Materials of construction and other requirements.

(a) Phenolic foam—Insulation must be fire-resistant, phenolic foam which has been fabricated in accordance with USAEC Material and Equipment Specification SP-9, which is a part of this specification. A 13.7 centimeter (5-inch) minimum thickness of foam must be provided over the entire liner except:

(1) Where wood spacers replace the foam; or

(2) At protrusions of liner or shell, such as, flanges, baffles, etc., where minimum insulation thickness is 9 centimeters (3.5 inches); or

(3) Where alternate top section (specification 20PF-1) is used. Foam must not interfere with proper seating of screws in inner liner flange assembly. Average density of insulation must be 0.13 g/cc (8 pounds per cubic foot (pcf)) minimum for bottom section and 0.16 g/cc (10 pcf) minimum for top section, except 0.1 g/cc (6.5 pcf) for the specification 20PF-1 top section.

(b) Gaskets must be as follows:

(1) Inner liner flange—Neoprene rubber of 30 to 60 type A durometer hardness or other equivalent gasket material which is compatible with the specific

contents.

(2) Outer shell—Synthetic rubber conforming to MIL-R-6855 (available from the Naval Publications Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120) class 2, grade 60.

(3) Support and pressure pads for inner liner top and bottom must be sponge rubber or equivalent.

(c) Alternate top section (specification 20PF-1 only). Average insulation density must be 0.16 g/cc (10 pcf minimum). Thickness of plug must be 11 centimeters (4.3 inches) minimum, except thickness may be reduced to 10 centimeters (4 inches) to clear bolt heads. A flush mounted top lifting device must be securely fastened to a wood block encapsulated by the foam.

(d) Vent holes 5 millimeters (0.2-inch) diameter must be drilled in the outer shell to provide pressure relief during the insulation foaming and in the event of a fire. These holes, which must be drilled in all areas of the shell which mate with the foam insulation, must be spaced in accordance with CAPE-1662.

(e) Welding must be by a fusion welding process in accordance with American Welding Society Codes B-3.0 and D-1.0. Body seams and joints for the liner or shell must be continuous welds.

(f) Waterproofing—Each screw hole in the outer shell must be sealed with appropriate resin-type or equivalent sealing material during installation of the screw. All exposed foam surfaces, including any vent hole, must be sealed with water-proofing material as prescribed in USAEC Specification SP-9, Rev. 1, or equivalent.

§ 178.120-3 Tests.

(a) Leakage test—Each inner liner assembly must be tested for leakage prior to installation. Seam welds of the liner must be covered for a distance of at least 15 centimeters (6 inches) on either side of the seam, with soapsuds, heavy oil, or equivalent material, and interior air pressure applied to at least 776mm Hg (15 p.s.i.g.) above atmospheric pressure must be held for at least 30 seconds. Liners failing to pass this test may not be used until repairs are made, and retests successfully passed.

§ 178.120-4 Required markings.

(a) Marking must be as prescribed in § 173.24 of this subchapter.

(b) Marking on the outside of each overpack must be as follows:

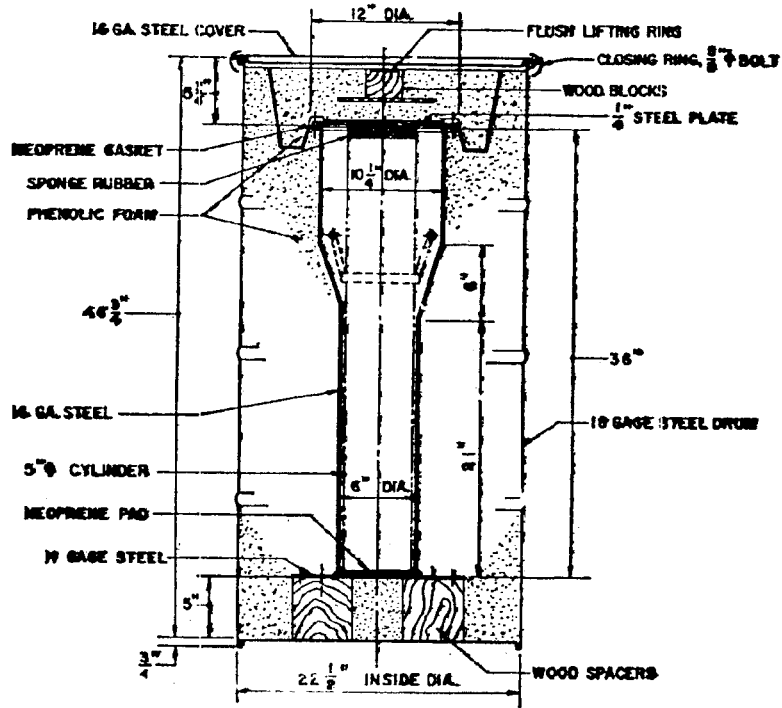
(1) "USA-DOT-20PF-1" or "-2," as appropriate, and if the entire liner is made of stainless steel, additional marking such as "3041-SS" to indicate the type of stainless steel used.

(2) "TARE WT: xxx lbs." where xxx is the tare weight of the assembled overpack without the inner container.

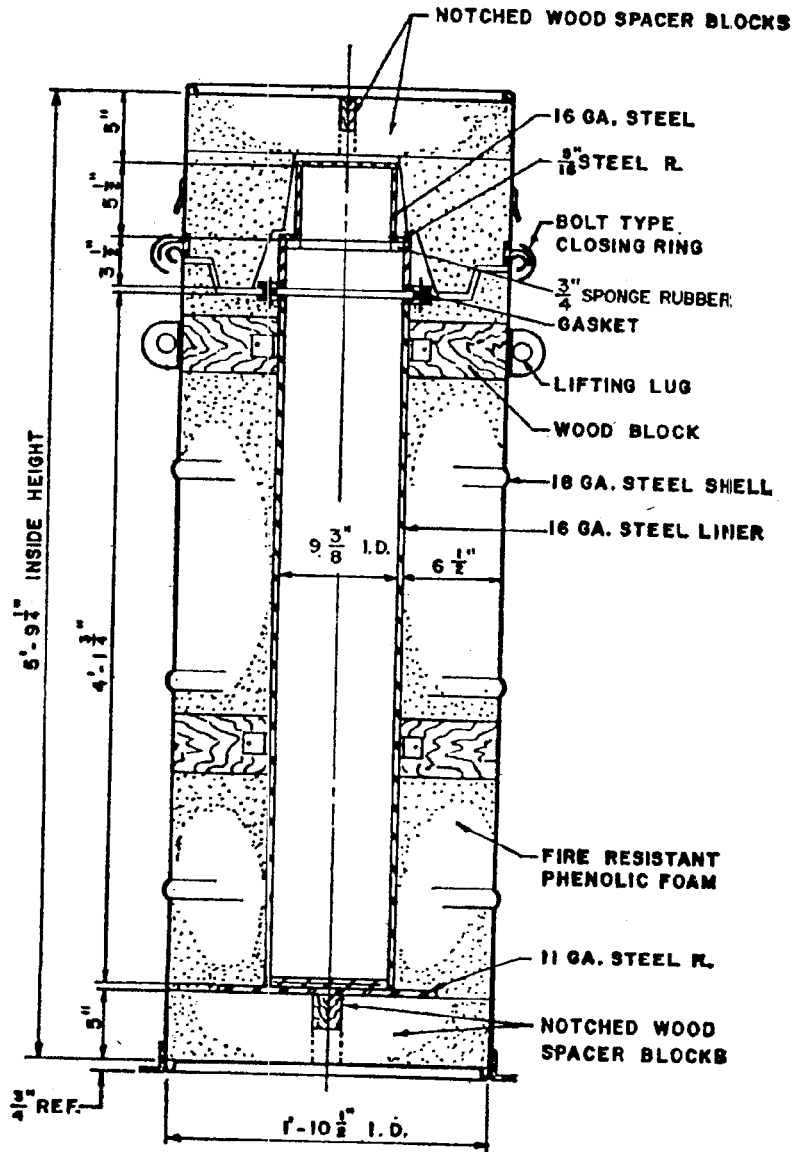
(3) Year of manufacture.

§ 178.120-5 Typical assembly detail.

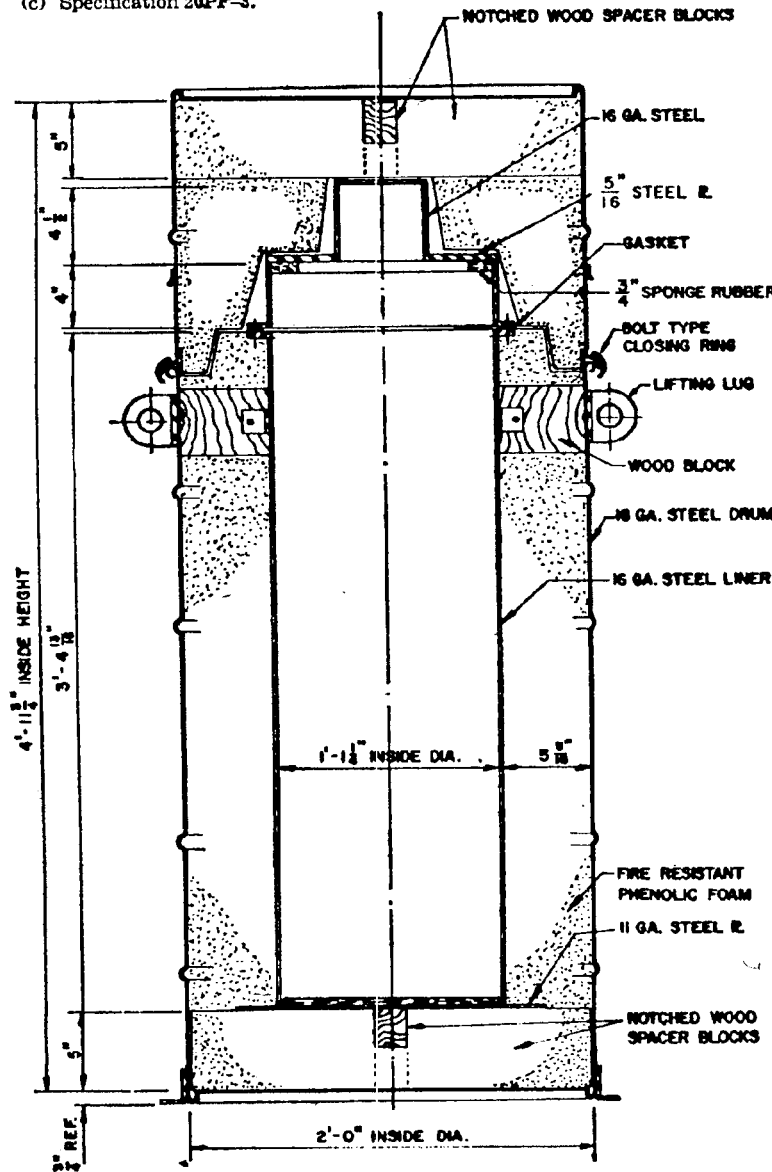
(a) Specification 20PF-1.



(b) Specification 20FP-2.



(c) Specification 20PF-3.



33. § 178.121 is added to read as follows:

§ 178.121 Specification 21PF fire and shock resistant, phenolic-foam insulated, metal overpack.

§ 178.121-1 General requirements.

(a) Each overpack must meet all of the applicable requirements of § 173.24 of this subchapter.

(b) Each overpack is authorized for use in applications where the maximum gross weight of the package, including the inner container and contents does not exceed 3725 kilograms (8200 pounds)

(horizontally-loaded specification 21PF-1 unit), or 3900 kilograms (8600 pounds) (end-loaded specification 21PF-2 unit).

(c) The general configuration of the overpack must be a right cylinder, consisting of a steel inner liner (at least 14-gauge) and steel outer shell (at least 16-gauge) with the intervening cavity filled with a molded-in-place, fire-resistant, phenolic foam insulation and interspersed wooden members for bracing and support. Two specific configurations are authorized; a horizontal loading unit (specification 21PF-1) consisting of insulated base and top sections

jointed in a longitudinal peripheral closure joint; or an end-loading unit (specification 21PF-2), consisting of an insulated main section, a steel plate liner lid, and an insulated end cap. For either type each joint between sections must be stepped at least 1.8 centimeters (0.75-inch) and gaps between mating surfaces may not exceed 5 millimeters (0.1-inch). Bolted closures which must each be gasketed against moisture penetration, must be in accordance with CAPE-1662. Each bolt must be equipped with a locking device to prevent loosening from vibration. Outer steel bracing and support frame work must be attached to the shell to facilitate normal handling.

(d) Drawings in CAPE-1662, which include bills of materials, are a part of this specification.

§ 178.121-2 Materials of construction and other requirements.

(a) Phenolic foam. Insulation must be fire resistant, phenolic foam which has been fabricated in accordance with USAEC material specification SP-9, Re 1, which is a part of this specification. 14 centimeters (5.5-inch) minimum thickness of foam must be provided over the entire liner, except where:

(1) Wood spacers replace the foam material; or

(2) At protrusions of liner or shell such as flanges, baffles, etc., where the minimum thickness of foam, wood, or combination of these is 10 centimeters (4 inches).

(3) Solid wood or laminated wood solidly glued may be used to replace the foam between liner and shell (i.e., ends of overpack). In this case, minimum wood thickness is 10 centimeters (inches). Average density of insulation must be 0.1g/cc (6.75 pounds per cubic foot (pcf) minimum, except that 0.08 g/cc (8 pcf) is required in the removable end cap of the specification 21PF-1 which must have a minimum foam thickness of 12.7 centimeters (5 inches).

(b) Gaskets for inner liner, outer shell or where otherwise specified in CAPE 1662, must be of vinyl foam tape, single coated, or 6 millimeters (1/4-inch) thick expanded rubber, per ASTM D1056, type R or S, grades 41 to 43, with adhesive backing, or equivalent.

(c) Support and pressure pads for the inner liner must be of neoprene, sponge rubber, or equivalent.

(d) Fire retardant (intumescent paint) must be applied to any wood blocking which is located at any joint in the shell.

(e) Vent holes 5 millimeters (0.19 inch) diameter must be drilled in the outer shell to provide pressure relief during the insulation foaming and in the event of a fire. These holes, which must be drilled in all areas of the shell which mate with the foam insulation, must be spaced in accordance with CAPE-1662.

(f) Welding must be by a fusion process in accordance with the American Welding Society Code. Body seams at joints for the liner and shell must be continuous welds.

(g) Waterproofing. Each screw hole in the outer shell must be sealed with appropriate resin-type or equivalent sealing material during installation of the screw. All exposed foam surfaces including any vent hole, must be sealed with waterproofing material as prescribed in USAEC Material and Equipment Specification SP-9, or equivalent.

§ 178.121-3 Required markings.

(a) Markings must be as prescribed in § 173.24 of this subchapter.

(b) Marking on the outside of each overpack must be as follows:

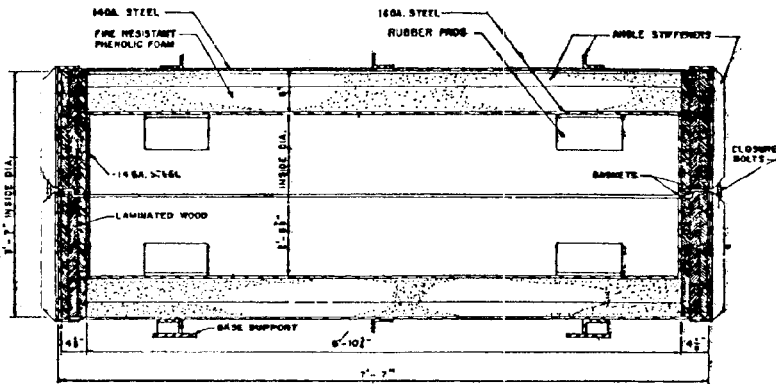
(1) "USA-DOT-21PF-1" or "2", as appropriate, and, if the inner shell is of stainless steel, additional marking such as "304L-SS" to indicate the type of stainless steel used.

(2) "TARE WT: xxx lbs. (or kg.)" where xxx is the tare weight of the assembled overpack without the inner container.

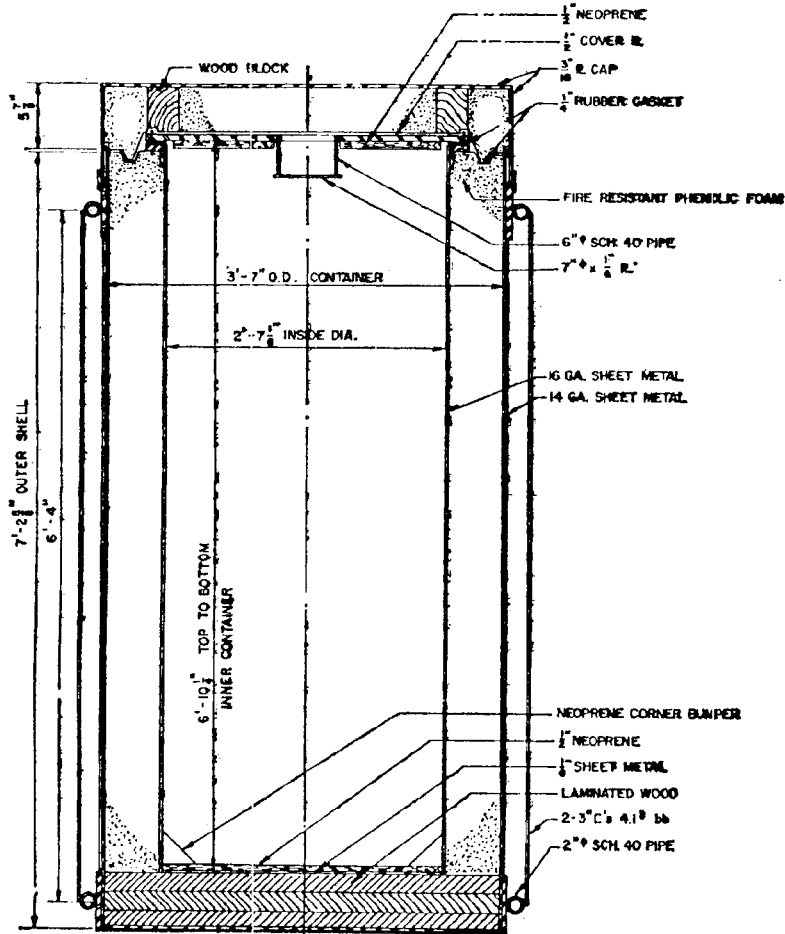
(3) Year of manufacture.

§ 178.121-4 Typical assembly detail.

(a) Specification 21PF-1 (horizontal loading overpack).



(b) Specification 21PF-2 (end loading overpack).



34. § 178.194 is added to read as follows:

§ 178.194 Specification 20WC wooden protective jacket.

§ 178.194-1 General requirements.

(a) Each jacket must meet the applicable requirements of § 173.24 of this subchapter.

(b) Maximum gross weight of the jacket plus the contents may not exceed the following:

- (1) Specification 20WC-1: 225 kilograms (500 pounds).
- (2) Specification 20WC-2: 225 kilograms (500 pounds).
- (3) Specification 20WC-3: 455 kilograms (1000 pounds).
- (4) Specification 20WC-4: 910 kilograms (2000 pounds).
- (5) Specification 20WC-5: 1820 kilograms (4000 pounds).
- (6) Specification 20WC-6: 2230 kilograms (6000 pounds).

§ 178.194-2 Materials of construction.

(a) The general configuration of the wooden protective jacket must be a hollow cylindrical shell constructed of one-piece discs and rings of plywood or solid hardwood reinforced with steel rods.

(1) The specification 20WC-2 must be additionally completely encased, snugly fit, within an 18-gauge steel shell. The steel shell must be provided with at least four 6 millimeter (0.25-inch) diameter vent holes. Each hole must be covered with durable weatherproof tape, or equivalent device.

(2) The specification 20WC-6 jacket must be additionally completely encased, snugly-fit, within a 12-gauge steel shell. The steel shell must be provided with at least twelve 1.2 centimeters (0.5-inch) diameter vent holes, located in 3 rows of 4 holes each, spaced at 90 degree intervals near the top, middle, and bottom of the drum. Each hole must be covered with durable weatherproof tape, or equivalent device.

(b) Plywood must be exterior-grade, void-free, Douglas fir (or equivalent) not more than 2.5 centimeters (1 inch) thick. Solid hardwood is authorized for specification 20WC-2 only.

(c) Discs and rings must be glued together with a strong, shock-resistant adhesive, such as either of the following:

(1) A resorcinol-formaldehyde adhesive, which has been bonded under both heat and pressure; or

(2) A polyvinyl-acetate emulsion, which has been reinforced with cement-coated nails. The nails must be randomly spaced and must be at least 2.5 times as long as the minimum thickness of the plywood discs or rings.

(d) Full-length steel rods are required for reinforcement and lid closure.

(1) The minimum number of rods and the minimum rod diameter are as shown in the following table:

Specification	Minimum number of rods	Minimum rod diameter	
		Inches	Millimeters
20WC-1	6	0.25	6.0
20WC-2	6	.25	6.0
20WC-3	12	.375	9.5
20WC-4	16	.50	12.0
20WC-5	16	.50	12.0
20WC-6	16	.50	12.0

(2) For specifications 20WC-1 and

20WC-2, steel rods must be equally spaced around the circumference to the rings and discs, midway between the O.D. and I.D. of the rings. For specifications 20WC-3 and 20WC-4, bolts may be staggered alternately in two rows, at ±1.2 centimeters (0.5-inch) from the line midway between the O.D. and I.D. of the rings. For specifications 20WC-5 and 20WC-6, bolts may be staggered alternately in two rows at ±2.5 centimeters (1 inch) from the line midway between the O.D. and I.D. of the rings.

(3) Rod ends must be threaded and secured with lock nuts and steel washers, or equivalent device, to provide at least a 2.5 centimeters (1 inch) diameter bearing surface on each end. Ends of the rods must terminate 1.4 centimeters (0.75-inch) below the surface of the plywood for specifications 20WC-1 and 20WC-2. For specifications 20WC-3, 20WC-4, 20WC-5 and 20WC-6, the ends of the rods must terminate 3.7 centimeters (1.5 inches) below the surface of the plywood, and that portion of each end disc which extends beyond the rod ends must be further held in place with lag screws at least 10 centimeters (4 inches) long.

(e) Thickness of wooden shell:

(1) Specification 20WC-1: At least 10 centimeters (4 inches) thick.

(2) Specification 20WC-2: At least 7.5 centimeters (3 inches) thick.

(3) Specification 20WC-3: At least 13 centimeters (5 inches) thick for the jacket wall, and at least 15 centimeters (6 inches) thick for the end discs. In addition, at least 3 plywood chins, 5 centimeters (2 inches) wide and protruding 5 centimeters (2 inches) beyond the outer surfaces, must be located at each end and midway along the length of the jacket.

(4) Specification 20WC-4: At least 15 centimeters (6 inches) thick for the jacket wall, and at least 15 centimeters (6 inches) thick for the end discs. In addition, at least 3 plywood chins, 5 centimeters (2 inches) wide and protruding 5 centimeters (2 inches) beyond the outer surfaces, must be located at each end and midway along the length of the jacket.

(5) Specifications 20WC-5 and 20WC-6: At least 15 centimeters (6 inches) thick for the jacket wall, and at least 20 centimeters (8 inches) thick for the end discs. In addition, at least 5 plywood chins, 5 centimeters (2 inches) wide and protruding 5 centimeters (2 inches) beyond the outer surfaces, must be located at each end and equally spaced along the length of the jacket.

§ 178.194-3 Closure.

(a) Closure for the wooden protective jacket is provided by the steel reinforcing rods. The end cap (lid) must fit tightly to the body of the jacket to prevent a heat path to the inside of the jacket. The lid joint for specifications 20WC-3, 20WC-4, 20WC-5, and 20WC-6, may not be coplanar with the end of the inner containment vessel.

(b) Specifications 20WC-2 and 20WC-6. Locking ring closure, if used, must conform to § 178.104-4. Flanged closure, if used, must have at least 3 steel bolts (at least 6 millimeters (0.25-inch) diameter for 20WC-2 or 1.2 centimeters (0.50-inch) diameter for 20WC-6) and lock

nuts (or equivalent device), spaced more than 13 centimeters (5 inches) between centers.

§ 178.194-4 Tests.

Prior to each use, each jacket must be visually inspected for defects such as proper bonding, cracking, corrosion of steel rods, and improperly fitting lid, or other manufacturing defects. Particular attention must be given to separation of the plywood discs and which would provide a heat path to inside of the jacket.

§ 178.194-5 Painting.

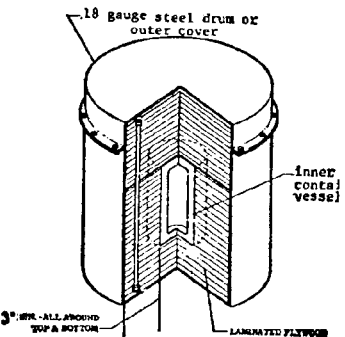
Each jacket (other than 20WC-2 20WC-6) must be completely painted with a high quality exterior weather resistant paint.

§ 178.194-6 Marking.

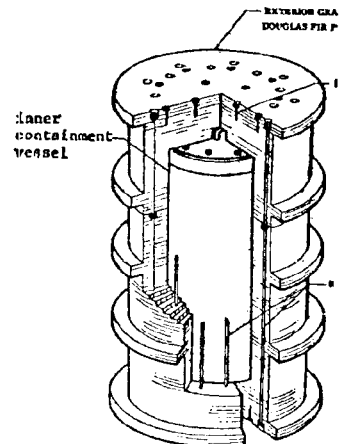
Each jacket must be marked on the external surface as follows: "USA-20WC-() TYPE B." The appropriate numeral must be inserted in the ring to indicate the appropriate specification 20WC category: e.g., "20WC-2

§ 178.194-7 Typical assembly sketch

(a) Spec. 20WC-2.



(b) Specification 20WC-5



35. § 178.195 is added to read as follows:

§ 178.195 Specification 21WC wooden steel protective overpack.

§ 178.195-1 General requirements.

(a) Each jacket must meet all the applicable requirements of § 173.24 of this subchapter.

(b) The maximum authorized gross weight of the overpack, including its inner container and contents may not exceed 1360 kilograms (3000 pounds).

§ 178.195-2 Materials of construction and other requirements.

(a) The general configuration of the protective overpack must be a combination of two nested plywood boxes, each 2.5 centimeters (1 inch) thick, nested within a third wooden box of nominal 5 centimeters (2-inch) thickness solid hardwood. The three nested boxes must be enclosed within a welded framework constructed of mild steel strap, nominally 1 centimeter (3/8-inch) thick by 8-10 centimeters (3-4 inches) wide. All outer surfaces of each box must be coated with intumescent paint.

(b) Plywood must be exterior-grade, void-free, Douglas fir, or equivalent, at least 2.5 centimeters (1-inch) thick. Solid hardwood must be maple, or equivalent.

(c) All box joints and interior surfaces must be glued with a strong, shock-resistant adhesive such as polyvinyl-acetate emulsion, or equivalent.

(d) All hardwood joints must be mitered, or equivalent, reinforced with No. 10 cement-coated nails spaced on nominal 15 centimeters (6-inch) centers.

(e) All plywood joints must be butt-type, or equivalent, reinforced with No. 10 cement-coated nails spaced on nominal 15 centimeters (6-inch) centers.

(f) The angles and strapping of the metal frame must be spaced such that separation distances do not exceed 15 centimeters (6 inches).

(g) The lid must be of the same material as the box and fabricated in such a manner that closure forms a mitered joint with the hardwood box and 2 stepped-joints with the plywood boxes.

§ 178.195-3 Closure.

Closure for the protective overpack must be provided by at least 4 mild steel hinges formed from minimum 2.5-centimeter (1-inch) x 5-millimeter (3/16-inch) bar stock. Hinge pins must be minimum 6-millimeter (1/4-inch) diameter by 13.3 centimeters (5-1/4 inches) long mild steel rod drilled at both ends for cotter pins.

§ 178.195-4 Tests.

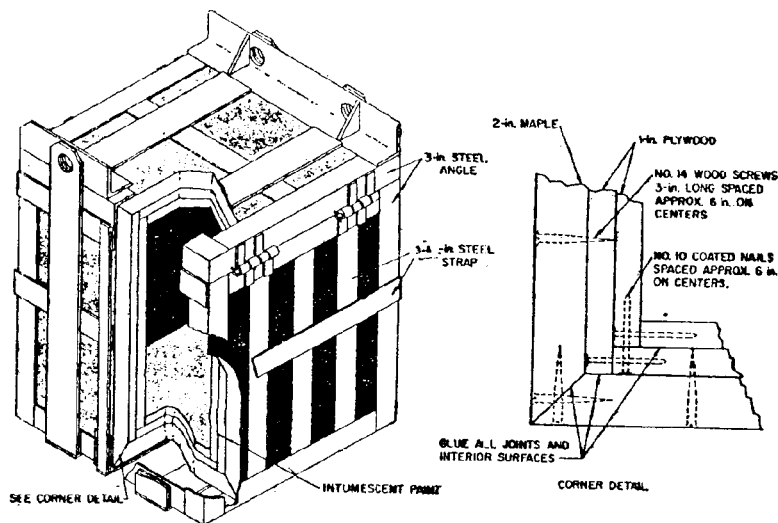
Prior to each use, each overpack must be visually inspected for defects such as wood checking or splintering, weld cracking, corrosion of steel parts, improper joint bonding, or improperly fitting closure lid.

§ 178.195-5 Required marking.

(a) Marking must be as prescribed in § 173.24 of this subchapter.

(b) Marking on the outside of each overpack must include the following:

(1) "USA-DOT 21WC" and "TYPE B" as appropriate. § 178.195-6 Typical assembly detail.



RADIOISOTOPE SHIPPING CASK FIRE AND IMPACT SHIELD.

36. § 178.250 is deleted.

This amendment is effective March 31, 1975. However, immediate compliance with the regulations, as amended herein, is authorized.

(Transportation of Explosives Act (18 U.S.C. 831-835); sec. 6, Department of Transportation Act (18 U.S.C. 1655); Title VI and sec. 902(h), Federal Aviation Act of 1958, (49 U.S.C. 1421-1430, 1472(h), and 1665(c)))

Issued in Washington, D.C. on December 20, 1974.

For the Federal Aviation Administration:

R. P. SKULLY,
Board Member.

For the Federal Highway Administration:

KENNETH L. PIERSON,
Alternate Board Member.

For the Federal Railroad Administration:

MAC E. ROGERS,
Board Member.

For the United States Coast Guard:

W. M. BENKERT,
Board Member.

[FR Doc. 74-30289 Filed 12-30-74; 9:45 am]