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

§ 178.358–1 General requirements.

(a) Each overpack must meet all of the applicable requirements of §§173.24, 173.411, and 173.412 of this subchapter.

(1) Specification 21PF–1 overpacks includes the series of 21PF–1, 21PF–1A, and 21PF–1B models. Details of the three models are included in DOE CAPE–1662, Rev. 1 and Supplement 1 (IBR, see §171.7 of this subchapter).

(2) Drawings in CAPE–1662, Rev. 1 and Supplement 1, that include bills of materials, and KSS–471 (IBR, see §171.7 of this subchapter), are a part of this specification.

(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 kg (8200 pounds), (horizontally-loaded specification 21PF–1 unit), or 3900 kg (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 16-gauge) and steel outer shell (at least 14-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 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 cm (0.75-inch) and gaps between mating surfaces may not exceed 5 mm (0.2-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 framework must be attached to the shell to facilitate normal handling.


§ 178.358–2 Materials of construction and other requirements.

(a) Phenolic foam insulation must be fire resistant and fabricated in accordance with USDOE Material and Equipment Specification SP–9, Rev. 1 and Supplement (IBR, see §171.7 of this subchapter), which is a part of this specification. (Note: Packagings manufactured under USAEC Specification SP–9, and Rev. 1 thereto are authorized for continued manufacture and use.) A 14 cm (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 a combination of these is 10 cm (4 inches).

(3) Solid wood or laminated wood solidly glued may be used to replace the foam between liner and shell (i.e., in ends of overpack). In this case, minimum wood thickness is 10 cm (4 inches). Average density of insulation must be 0.1g/cc (6.75 pounds per cubic foot (pcf)) minimum, except that 0.13 g/cc (8 pcf) is required in the removable end cap of the specification 21PF–2, which must have a minimum foam thickness of 12.7 cm (5 inches).

(b) Gaskets for inner liner, outer shell, or where otherwise specified in DOE CAPE–1662, Rev. 1 (IBR, see §171.7 of this subchapter), must be as specified in DOE CAPE–1662, Rev. 1.

(c) Support and pressure pads for the inner liner must be of neoprene, sponge rubber, or equivalent.
§ 178.358–3 Modification of Specifica-

49 CFR Ch. I (10–1–10 Edition)

§ 178.358–3 Modification of Speciﬁcation

121PF–1 overpacks.

(a) Each Speciﬁcation 121PF–1 over-

pack for which construction began or

was completed before April 1, 1989, in

conformance with drawing E–S–31536–J,

Rev. 1 of DOE CAPE–1662 (IBR, see §

171.7 of this subchapter), must be modiﬁed

in conformance with drawing S1E–31536–J 1–D of DOE CAPE–1662,

Rev. 1, Supplement 1, before April 1,


(b) Each such existing Speciﬁcation

121PF–1 overpack must be dried and

weighed in accordance with the fol-

lowing procedures:

(1) Drill out or otherwise clean the

plug material from the vent holes

originally provided for foam expansion.

See drawing S1E–31536–J 1–D of CAPE–

1662, Revision 1, Supplement 1, for loca-

tions.

(2) Weigh each packaging element

(top and bottom halves) separately to

an accuracy of ±2.3 kg (±5 pounds) and

record the weights. If this measured

weight exceeds the initially measured

weight at the time of fabrication by 11.3 kg (25 pounds) (indicating a signiﬁ-

cant retained water content), the pack-

aging element must be dried.

(3) Place overpack element in drying

oven; maintain temperature between

87.8–98.9 °C (190° and 210 °F) for a mini-

mum of 72 hours. The oven should

have a provision for air exchange or

other means of removing moisture

driven from the foam structure.

(4) Drying may be discontinued after

72 hours if the weight of the packaging

element does not exceed the initially

measured tare weight of that element

at the time of fabrication by more than

11.3 kg (25 pounds). If the weight of the

packaging element exceeds the initial

fabricated weight (indicating a signiﬁ-

cant remaining water content) by more

than 11.3 kg (25 pounds), drying must

be continued until the weight differen-

tial is not higher than 11.3 kg (25

pounds), or until the rate of weight loss

is less than 1.1 kg (2.5 pounds) per day.

(5) As an alternate moisture meas-

urement, a calibrated moisture meter

reading for 20 percent maximum water

content may be used to indicate an end

point in the drying cycle, which is de-

tailed in report “Renovation of DOT

Speciﬁcation 21PF–1 Protective Ship-

ping Packages,” Report No. K–2057, Re-

vision 1, November 21, 1986, available

from the USDOE and part of USDOE

Report No. KSS–471 (IBR, see §171.7 of

this subchapter).

(6) Following drying, each overpack

element (top and bottom halves) must

be weighed and the weight in both

pounds and kilograms must be en-

graved on the identiﬁcation plate re-

quired by § 178.358–5(c).

(c) After modiﬁcation as provided for

herein, each Speciﬁcation 121PF–1 over-

pack must be marked “USA–DOT–21P