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Part III

Department of  
Transportation

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Research and Special Programs  
Administration

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49 CFR Parts 172 and 173  
Elevated Temperature Materials;  
Revisions and Response to Petitions for  
Reconsideration; Final Rule

**Section 172.203**

Paragraph (g)(3) is revised to correct a section reference.

**Section 172.325**

The requirement for each bulk package containing an elevated temperature material (ETM) to be marked "HOT" (or "MOLTEN ALUMINUM" or "MOLTEN SULFUR") on each side and each end is revised to require the marking only on two opposing sides. This revision is consistent with additional marking requirements for other materials, such as materials poisonous by inhalation.

A final rule issued October 1, 1992 under Dockets HM-181 and HM-189 added a domestic exception from the Class 9 placarding requirements. Under this exception, placards are not required on bulk packagings containing elevated temperature materials in Class 9 if the package is marked on each side and each end with the appropriate identification number on an orange panel or a white-square-on-point display configuration. The adoption of this domestic exception from Class 9 placarding requirements provides economic and regulatory relief.

In this document, a new paragraph (c) is added to allow the word "HOT" to be displayed in the upper corner of the same white-square-on-point display configuration used for the identification number. The 50 mm (2 inches) minimum height prescribed for the letters in the word "HOT" applies to all bulk packagings, including rail cars, under this provision. However, the 100 mm (3.9 inches) minimum height for rail car markings, as specified in § 172.302, still applies if the word "HOT" is marked on the rail car itself or on a plain white-square-on-point display configuration.

**Section 173.247**

The format of this section is restructured for consistency with the bulk packaging sections adopted in a final rule issued December 20, 1991 under Docket HM-181. The introductory text clarifies that, on or after October 1, 1993, bulk packagings must meet all requirements in paragraph (g) unless otherwise excepted.

The packaging authorizations in paragraphs (a) and (c) remain unchanged, but the paragraphs are restructured. In paragraph (b), RSPA is providing an exception to permit the use of hat shaped or open channel stiffening rings on carbon steel tanks used to transport ETMs because the elevated temperatures prevent accumulation of moisture which can

cause corrosion under the hat shaped or open channel stiffening rings.

Several petitioners requested clarification whether cargo tanks must conform to the current MC 300 series specifications and then, after September 30, 1993, DOT 400 series specifications. Until September 30, 1993, non-specification cargo tanks intended for ETM service may be built either to the accident damage resistance and structural integrity levels of the MC 306, MC 307 or MC 312 series tanks or the DOT 400 series tanks. Tanks built after that date must meet both accident damage resistance and structural integrity requirements specified for DOT 400 series cargo tank motor vehicles. Specification packagings that are being manufactured for the transport of ETMs must be authorized for current construction.

Petitioners also asked RSPA to confirm that self-closing stop valves and gauging devices on packages containing viscous materials such as asphalt and molten sulfur do not have to conform to requirements for MC 300 or DOT 400 series cargo tanks. This is correct for a non-specification packaging built with structural design and accident damage resistance equivalent to specification packaging.

Petitioners stated that most asphalt and bitumen kettles have a capacity between 400 and 600 gallons (2086 and 3129 L). According to petitioners, imposing current closure requirements on these packagings would cause great expense. Petitioners stated that kettles carry smaller quantities of asphalt and bitumen and thus do not pose a significant transportation hazard. RSPA agrees that smaller quantities of asphalt and bitumen pose a lesser potential hazard and, due to a wide usage of this type of packaging in transportation, it is important to recognize the unique characteristics of asphalt and bitumen kettles. Therefore, RSPA is providing specific packaging exceptions for kettles. These exceptions may be broadly categorized as imposing certain minimal requirements on existing kettles and providing incentives for future construction of kettles with high overturn stability.

Paragraph (e) contains new packaging requirements for asphalt and bitumen kettles and provides exceptions for kettles manufactured to certain stability and capacity requirements. A kettle, as defined by the National Roofing Contractors Association (NRCA), is a portable heating apparatus used for melting various bituminous products, such as asphalt, used in the roofing and paving industries. It is designed to be loaded through an opening on its top,

which is covered by a metal lid. Burner units are typically fueled by LP gas, kerosene, or diesel fuel. Kettles typically range in capacity for 132 to 5678 L (35 to 1500 gallons) and, depending on the size of the kettle, can have up to three axles. Kettles may be trailer or skid mounted for truck transport to job sites or for use during road and highway construction and repair.

The NRCA also provided an analysis of the center of gravity of a half-filled "typical kettle model" having high overturn stability. Overturn stability can be analytically represented by calculating the ratio of kettle track-width to loaded center of gravity (CG) height. Track-width is the distance measured between the outer edge of the kettle tires. CG height is measured perpendicularly from the road surface. For this model the ratio was 3:4.

Because this ratio is simple to calculate and provides an objective way to compare overturn stability of various kettle designs, RSPA is adopting this ratio as a guide for determining exceptions from the packaging requirements of paragraph (g) for kettles. The NRCA petition also stated that "larger kettles" of similar design are even more stable. RSPA agrees that kettles with a high overturn stability have a reduced probability of single vehicle accidents due to overturn and should be excepted from the overturn requirements. In view of this, RSPA encourages future construction of kettles having a ratio of track-width to fully loaded CG height greater than 2:5 and is providing certain exceptions from the requirements in paragraphs (g)(2) and (g)(6).

In paragraph (e)(1), low stability kettles with a ratio of track-width to fully loaded CG height of less than 2:5 must meet all packaging requirements of paragraph (g). This insures that kettles manufactured on or after October 1, 1993 having a higher probability of overturn must meet the overturn protection requirements. Paragraph (e)(1) also explains the method to be used to measure track-width and center of gravity height in order to calculate the roll stability ratio.

In paragraph (e)(2)(i), high stability kettles of less than 2650 L (700 gallons) which have a ratio of track-width to fully loaded CG height of 2:5 or more are excepted from all requirements of paragraph (g)(2), and rollover protection requirements of paragraph (g)(6), provided closures are securely closed during transport and designed to prevent opening and expulsion of the lading in a rollover accident. RSPA is granting this exception to encourage future manufacture of kettles which

have a lower probability of overturn and, therefore, less need for overturn protection and closure requirements. Paragraph (e)(2)(ii) provides larger kettles having a capacity of 2650 L (700 gallons) or more and a ratio of track-width to fully loaded CG height of greater than 2:5 an exception from the requirements for leak tightness in paragraph (g)(2) and the rollover protection requirements of paragraph (g)(6).

Paragraph (f) requires that any bulk packaging intended for ETM service, which is not authorized in paragraphs (a) through (e), meet the packaging requirements of paragraph (g) on or after October 1, 1993. The revised packaging standards for ETMs are contained in paragraph (g).

Petitioners expressed concern over whether pressure or vacuum control devices or vents are required on all ETM packagings. Such devices are required only under certain conditions, as clarified in paragraph (g)(1). When such devices are required, they must be of a self-reclosing nature.

One petitioner asked RSPA to allow tanks with no vents if they are constructed to withstand any vacuum or pressure which might occur under extreme circumstances. The provisions in the final rule for pressure and vacuum control equipment do not require venting if the pressure within the tank increases or decreases less than 10% or if the tank was built to withstand a full vacuum (i.e. 100 kPa, 14.5 psig external pressure). RSPA is reducing the pressure of 14.7 psig to 14.5 psig to conform to the accepted values for an atmosphere of pressure as found in § 171.10.

Paragraphs (g)(1)(i) and (g)(1)(ii) prescribe general requirements and exceptions for pressure and vacuum control equipment. Absolute pressures should be used to calculate changes in order to obtain meaningful differences.

Paragraph (g)(1)(i) is revised to clarify what temperature range must be used to determine eligibility for an exception from installing pressure control equipment on packagings transporting ETMs. The final rule requires that such equipment must "prevent rupture . . . from heating, including fire engulfment"; however, because no specific temperature range would apply in all situations, a specific pressure rise cannot be calculated. Under this exception, packagings containing elevated temperature materials having low vapor pressure at high temperatures (including temperatures encountered in a fire engulfment scenario) may be exempted from pressure control equipment because of the low risk of

packaging rupture due to vapor pressure rise of the lading in a fire engulfment scenario. Therefore, a specific temperature range, extending from the lowest designed operating temperature to the temperature encountered in a fire engulfment scenario, is provided to calculate if an exception from pressure control equipment is authorized.

A corresponding revision in paragraph (g)(1)(ii) clarifies the temperature range to be used in determining any exception from installing vacuum control equipment. Again, because no specific temperature range for cooling is required in the final rule, a specific pressure decrease cannot be calculated. Revised paragraph (g)(1)(ii) clarifies that if pressure in a packaging decreases less than 10 percent due to a lading temperature drop from the highest designed operating temperature to the lowest temperature expected during transport, no vacuum control equipment is required. Therefore, the largest pressure change expected during a shipment must be considered before an exception from vacuum control equipment is authorized.

In paragraph (g)(1)(iii), RSPA is authorizing the use of permanent openings and frangible safety vents for transport by highway and safety vents for transport by rail if viscous lading will cause fouling of the reclosing valves. The maximum size allowed for a permanent opening on pressure and vacuum control devices is increased from a diameter of 38 mm (1.5 inches) to a maximum effective area of 22 cm<sup>2</sup> (3.4 in<sup>2</sup>). This change is the equivalent of increasing the maximum diameter allowed for a circular permanent opening to 53 mm (2.08 inches) and permits greater flexibility to use opening shapes other than circular openings. This increase is based on the merit of petitions citing the current industry practice of using two-inch nominal pipe (two-inch nominal pipe has a 2.0625-inch diameter) as a means of venting ETM vapors during transport. Further, for bulk packagings transporting asphalt and bitumen, RSPA is authorizing an opening with a maximum effective area of 46 cm<sup>2</sup> (7.4 in<sup>2</sup>), which is the equivalent of increasing the maximum diameter allowed for a circular permanent opening to 7.8 cm (3.07 inches), allows an opening with a three-inch nominal pipe diameter (three-inch nominal pipe has a 3.068-inch diameter). This accommodates certain tanks having three-inch nominal pipe vents and provides consistency with the National Fire Protection Association (NFPA) 385 recommendation that "at least 2 inch nominal pipe" be used for

venting asphalt and bitumen tanks. A three-inch diameter opening will allow sufficient venting of vapors during transport and will prevent large amounts of ETM from being released suddenly in an overturn. However, RSPA is not adopting the NFPA's open-ended minimum of "at least two inches." If no maximum opening size is specified, potentially large permanent openings would be authorized, conflicting with RSPA's intent to prevent significant release of lading in an overturn.

The provision for installing frangible safety vents instead of permanent openings is based on the merit of a petition from the Sulphur Institute. All pressure and vacuum control devices must prevent release of lading during normal transport conditions due to splashing or surging of the lading.

The final rule required marking the manufacturer's name, date of manufacture, design temperature range, and maximum product weight on each packaging used to transport ETMs and specified the size of the markings to be at least 9.5 mm (0.375 inches). RSPA received several petitions requesting a reduction in the minimum size of the characters to 4.8 mm (3/16 inch) for consistency with the size of characters required on manufacturer identification plates for certain DOT specification packagings. RSPA agrees and is reducing the minimum size requirement to 4.8 mm (3/16 inch).

The requirement to mark "nominal capacity" is removed, and a provision to mark "volumetric capacity" as an alternative to maximum product weight is added. In response to a petition from the Sulphur Institute, paragraph (g)(5) also is revised to provide an alternative marking "load limit" instead of "maximum product weight" for tank cars. "Load limit" means the maximum allowable weight on rail minus the tare weight of the tank car. For example, if the maximum allowable weight on rail is 263,000 pounds and if the tank weighs 63,000 pounds, the load limit is 200,000 pounds.

The exception in paragraph (g)(1)(iii) allowing permanent openings is repeated in paragraph (g)(2). Paragraph (g)(3) is revised for clarification, and paragraph (g)(4) is unchanged. One petitioner questioned whether bottom-fired kettles having a spray wand and similar road oil application equipment used to seal cracks would be considered as sprayers. RSPA considers this equipment to be spraying equipment; therefore, such equipment is exempted from accident damage protection requirements. Paragraph (g)(6) is revised to clarify that spraying equipment and

road oil application equipment are not required to be protected; however, other applicable parts of the packaging must be appropriately protected.

New paragraph (g)(7) is added to clarify that the continued manufacture of packagings listed in paragraphs (a) through (c) is not authorized if construction of those packagings is prohibited elsewhere in the HMR.

Many of the petitioners asked RSPA to extend its grandfathering provisions for continued use of existing equipment from 20 years to up to 40 years, while others asked for unlimited life.

Petitioners representing the asphalt industry claimed that, because asphalt is transported short distances only three to six months of the year, the usable life of an asphalt packaging is greater than 20 years.

Asphalt industry petitioners cited an exemplary safety record as the basis for requesting relief from the retrofit and limited grandfathering provisions of the final rule. One petitioner claimed that retrofitting existing asphalt and bitumen packagings to meet accident damage protection requirements would cost as much as \$10,000 per unit. Another petitioner stated that of the approximately 10,000 asphalt cargo tanks in service, only a small fraction are built to MC 306 specifications. The majority of these cargo tanks are used to transport previously unregulated

asphalt. One petitioner estimated that 9,000 tanks would require a partial retrofit to serve out their 20-year lives, presenting serious difficulties for the road construction industry and resulting in higher roadway construction and maintenance costs. Asphalt industry petitioners asked RSPA to allow cargo tanks built prior to March 1993 to be used without retrofit for the duration of their 20-year service lives and, further, to consider extending the service lives for these tanks to up to 40 years.

RSPA believes the petitions are of sufficient merit to allow the continued use of packagings in elevated temperature material service which were manufactured before October 1, 1993, if the packagings meet the general packaging requirements of subparts A and B of part 173. In addition, RSPA is removing the marking and accident damage retrofit requirements for asphalt and bitumen packagings. However, to promote safety, RSPA encourages the cargo tank owners to add accident damage protection whenever practicable, such as when a packaging is undergoing major repair or reconditioning.

Paragraph (h) provides exceptions to certain packaging requirements.

The Truck Trailer Manufacturers Association asked whether existing cargo tanks designed for the transportation of molten sulphur, dimethyl-terephthalate and phthalic anhydride may continue in service if in compliance only with the closure requirement by March 30, 1995. This is correct. RSPA realizes that many packagings currently in ETM service will not be authorized for new construction on or after October 1, 1993. However, paragraph (h)(1) is revised to clarify that such packagings may continue in ETM service if the closure requirements of paragraph (g)(2) are met by March 30, 1995, and if the packaging conforms to the general packaging requirements in subparts A and B of part 173.

As mentioned earlier, petitioners stated that most asphalt and bitumen kettles have a capacity between 400 and 600 gallons (1515 and 2270 L). RSPA believes that smaller quantities of asphalt and bitumen pose a lesser potential hazard and, due to a wide usage of this type of packaging in transportation, it is important to recognize the unique characteristics of asphalt and bitumen kettles. Therefore, in this document, RSPA is providing specific packaging exceptions for kettles which will result in economic relief to industry. These exceptions may be broadly categorized as imposing certain minimal requirements on existing kettles and, as discussed earlier, providing incentives for future construction of kettles with high overturn stability.

Paragraph (h)(2) provides exceptions for asphalt or bitumen kettles manufactured before October 1, 1993. Kettles transporting asphalt and bitumen and having less than 2650 L (700 gallons) total capacity are excepted in paragraph (h)(2)(i) from general packaging requirements of this section except for securing closures during transport. Lids, closures, and covers on these packagings must be secured by March 30, 1995 in such a way as to resist opening in the event of overturn. By this date, all other ETM packagings in service before October 1, 1993 must be retrofitted with closures which fully meet the requirements of paragraph (g)(2).

Under paragraph (h)(2)(ii), kettles having a capacity of 2650 L (700 gallons) or greater and in service before October 1, 1993 must meet certain closure requirements in paragraph (g)(2) by October 1, 1995. These packagings may continue in service for as long as they conform to the general packaging requirements in subparts A and B of part 173.

The exceptions in paragraphs (h)(3) and (h)(4) for molten metals and molten glass by rail, and solid elevated temperature materials remain unchanged from the final rule.

#### 49 App. U.S.C. 1804(a)(4) (A) and (B)

In February 28, 1991 final rule (56 FR 8616), RSPA added this new preemption standard to § 107.202 to mirror the statute. Section 105(a)(5) of the HMTA, as amended by the HMTUSA, provides that if DOT issues a regulation concerning any of the covered subjects after the date of enactment of the HMTUSA (November 16, 1990), DOT must determine and publish in the Federal Register the effective date of the Federal preemption. That effective date may not be earlier than the 90th day following the date of issuance and not later than two years after the date of issuance.

To the extent that the requirements of Docket HM-198A involve covered subjects, States, political subdivisions, or Indian tribes may only establish, maintain, and enforce laws, regulations, or other requirements concerning such subjects if they are substantively the same as the requirements in Docket HM-198A. In a May 13, 1992 final rule (57 FR 20424), RSPA defined the phrase "substantively the same". RSPA has determined that the effective date of Federal preemption for these requirements will be October 1, 1993.

#### IV. Regulatory Analyses

##### A. Executive Order 12291 and DOT Regulatory Policies and Procedures

This final rule has been reviewed under the criteria specified in § 1(b) of Executive Order 12291 and (1) is determined not to be a major rule under Executive Order 12291; (2) does not require a Regulatory Impact Analysis; and (3) is not "significant" under DOT's regulatory policies and procedures (44 FR 11034). This final rule does not impose additional requirements and, in fact, provides regulatory and economic relief in some areas. The net result is that costs imposed under the final rule published in the Federal Register on October 2, 1991 (56 FR 49980) are reduced, but without a reduction in safety. The original regulatory evaluation of the final rule has been reexamined but not modified. The changes made under this rule provide relief and will not result in an adverse economic impact on industry.

##### B. Executive Order 12612

This action has been analyzed in accordance with Executive Order 12612 ("Federalism"). The HMTA contains an

express preemption provisions which RSPA is implementing at the minimum level necessary to achieve the objectives of the statute. Therefore, preparation of a Federalism Assessment is not warranted.

#### C. Impact on Small Entities

Based on limited information concerning size and nature of entities likely to be affected by this rule, I certify that this rule will not have a significant economic impact on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

#### D. Paperwork Reduction Act

This amendment imposes no changes to the information collection and recordkeeping requirements contained in the October 2, 1991 final rule for §§ 172.201 and 172.203, which were approved by the Office of Management and Budget (OMB) under the provisions of 44 U.S.C. chapter 35.

#### E. Regulation Identifier Number (RIN)

A regulation identifier number (RIN) is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN number contained in the heading of this document can be used to cross-reference this action with the Unified Agenda.

#### F. National Environmental Policy Act

This rule has been reviewed under the National Environmental Policy Act (42

U.S.C. 4321 *et seq.*) and does not require an environmental impact statement.

#### List of Subjects

##### 49 CFR Part 172

Hazardous materials transportation, Hazardous waste, Labeling, Packaging and containers, Reporting and recordkeeping requirements.

##### 49 CFR Part 173

Hazardous materials transportation, Packaging and containers, Radioactive materials, Reporting and recordkeeping requirements, Uranium.

In consideration of the foregoing, 49 CFR parts 172 and 173 are amended as follows:

#### PART 172—HAZARDOUS MATERIALS TABLE, SPECIAL PROVISIONS, HAZARDOUS MATERIALS COMMUNICATIONS, EMERGENCY RESPONSE INFORMATION, AND TRAINING REQUIREMENTS

1. The authority citation for part 172 continues to read as follows:

Authority: 49 App. U.S.C. 1803, 1804, 1805, and 1808; 49 CFR part 1, unless otherwise noted.

##### § 172.101 [Amended]

2. In § 172.101, the Hazardous Materials Table is amended as follows:

a. For the entry, "*Elevated temperature material, solid, n.o.s.* (see § 173.247(d)(2))", in column (2), the reference "*§ 173.247(d)(2)*" is revised to read "*§ 173.247(h)(4)*".

b. For the entry "*Flammable liquid, elevated temperature material, n.o.s.*",

in column (4), the identification number "NA9275" is revised to read "NA9276"

##### § 172.203 [Amended]

3. In § 172.203, in paragraph (g)(3), the reference "*§ 173.247(d)*" is revised to read "*§ 173.247(h)(3)*".

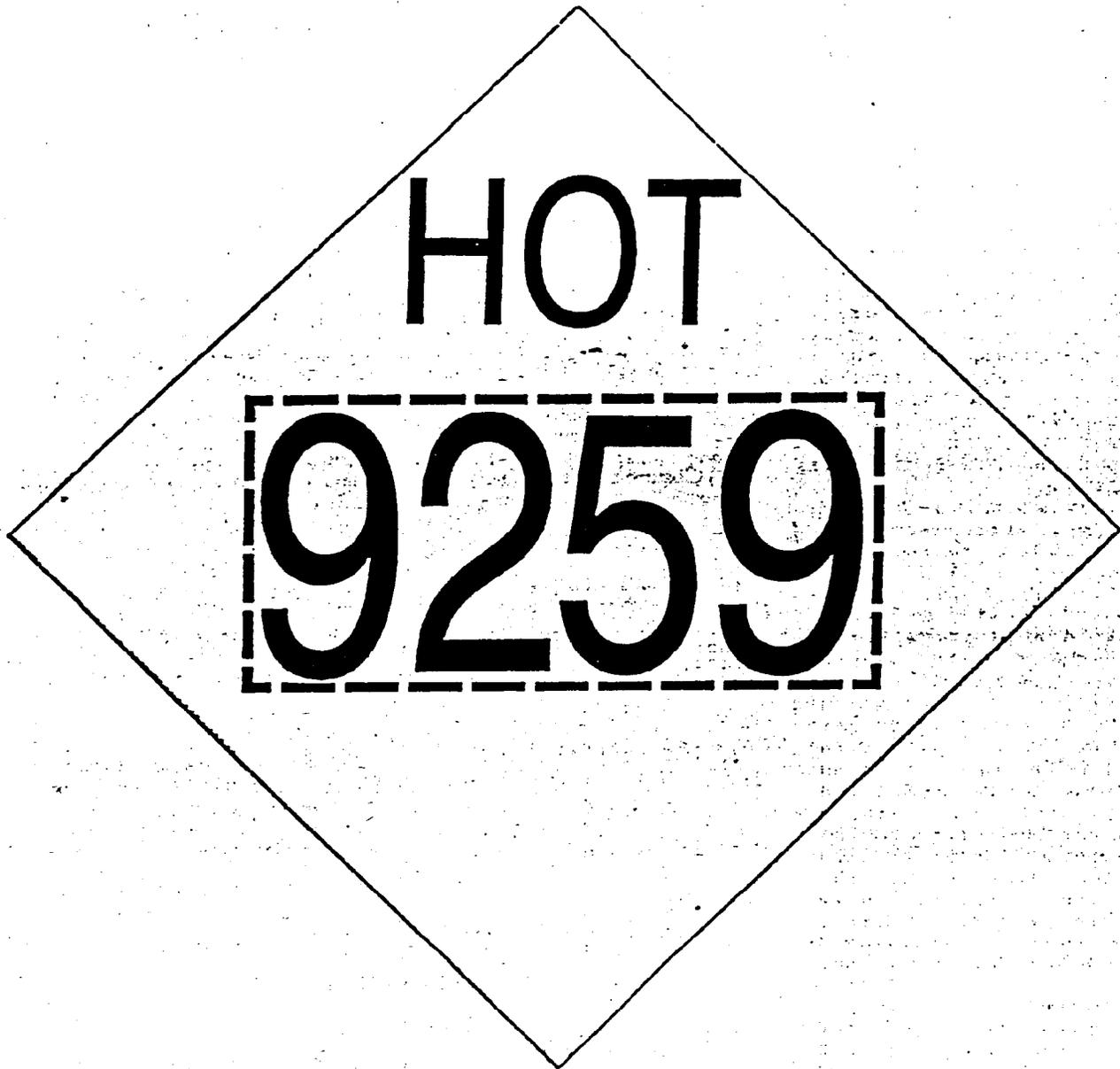
4. Section 172.325 is revised to read as follows:

##### § 172.325 Elevated temperature materials.

(a) Except as provided in paragraph (b) of this section, a bulk packaging containing an elevated temperature material must be marked on two opposing sides with the word "HOT" in black or white Gothic lettering on a contrasting background. The marking must be displayed on the packaging itself or in black lettering on a plain white square-on-point configuration having the same outside dimensions as a placard. (See § 172.302(b) for size of markings on bulk packagings.)

(b) Bulk packagings containing molten aluminum or molten sulfur must be marked "MOLTEN ALUMINUM" or "MOLTEN SULFUR", respectively, in the same manner as prescribed in paragraph (a) of this section.

(c) If the identification number is displayed on a white-square-on-point display configuration, as prescribed in § 172.336(b), the word "HOT" may be displayed in the upper corner of the same white-square-on-point display configuration. The word "HOT" must be in black letters having a height of at least 50 mm (2.0 inches). Except for size, these markings shall be as illustrated for an Elevated temperature material, liquid, n.o.s.:



**PART 173—SHIPPERS—GENERAL  
REQUIREMENTS FOR SHIPMENTS  
AND PACKAGINGS**

5. The authority citation for part 173 continues to read as follows:

Authority: 49 App. U.S.C. 1803, 1804, 1805, 1806, 1807, 1808, 1817; 49 CFR part 1, unless otherwise noted.

6. Section 173.247 is revised to read as follows:

**§ 173.247 Bulk packaging for certain elevated temperature materials (Class 9) and certain flammable elevated temperature materials (Class 3).**

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the

following bulk packagings are authorized, subject to the requirements of subparts A and B of part 173 of this subchapter and the special provisions in Column 7 of the § 172.101 Table. On or after October 1, 1993, authorized packagings must meet all requirements in paragraph (g) of this section, unless otherwise excepted.

(a) *Rail cars*: Class DOT 103, 104, 105, 109, 111, 112, 114, 115 tank car tanks; Class DOT 106, 110 multi-unit tank car tanks; AAR Class 203W, 206W, 211W tank car tanks; and non-DOT specification tank car tanks equivalent in structural design and accident damage resistance to specification packagings.

(b) *Cargo tanks*: Specification MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, MC 312, MC 330, MC 331 cargo tank motor vehicles; DOT 406, DOT 407, DOT 412 cargo tank motor vehicles; and non-DOT specification cargo tank motor vehicles equivalent in structural design and accident damage resistance to specification packagings. A non-DOT specification cargo tank motor vehicle constructed of carbon steel which is in elevated temperature material service is excepted from § 178.345-7(d)(5) of this subchapter.

(c) *Portable tanks*: Specification 51, 52, 53, 56, 57, 60 portable tanks; IM 101, 102 portable tanks; marine portable tanks conforming to 46 CFR Part 64; and non-specification portable tanks equivalent in structural design and accident damage resistance to specification packagings.

(d) *Crucibles*: Nonspecification crucibles designed and constructed such that the stress in the packaging does not exceed one fourth (0.25) of the ultimate strength of the packaging material at any temperature within the design temperature range. Stress is determined under a load equal to the sum of the static or working pressure in combination with the loads developed from accelerations and decelerations incident to normal transportation. For highway transportation, these forces are assumed to be "1.7g" vertical, "0.75g" longitudinal, and "0.4g" transverse, in reference to the axes of the transport vehicle. Each accelerative or decelerative load may be considered separately.

(e) *Kettles*: A kettle, for the purpose of this section, is a bulk packaging (portable tank or cargo tank) having a capacity not greater than 5678 L (1500 gallons) with an integral heating apparatus used for melting various bituminous products such as asphalt. Kettles used for the transport of asphalt or bitumen are subject to the following requirements:

(1) *Low stability kettles*. Kettles with a ratio of track-width to fully loaded center of gravity (CG) height less than 2.5 must meet all requirements of paragraph (b) of this section (track-width is the distance measured between the outer edge of the kettle tires; CG

height is measured perpendicular from the road surface).

(2) *High stability kettles*. (i) Kettles with a total capacity of less than 2650 L (700 gallons) and a ratio of track-width to fully loaded CG height of 2.5 or more are excepted from all requirements of paragraph (g)(2) of this section and the rollover protection requirements of paragraph (g)(6) of this section, if closures meet the requirements of paragraph (e)(2)(iii) of this section.

(ii) Kettles with a total capacity of 2650 L (700 gallons) or more and a ratio of track-width to fully loaded CG height of 2.5 or more are excepted from the "substantially leak tight" requirements of paragraph (g)(2) of this section and the rollover protection requirements of paragraph (g)(6) of this section if closures meet the requirements of paragraph (e)(2)(iii) of this section.

(iii) Closures must be securely closed during transportation. Closures also must be designed to prevent opening and the expulsion of lading in a rollover accident.

(f) *Other bulk packagings*: Bulk packagings, other than those specified in paragraphs (a) through (e) of this section, which are used for the transport of elevated temperature materials, must conform to all requirements of paragraph (g) of this section on or after October 1, 1993.

(g) *General requirements*. Bulk packagings authorized or used for transport of elevated temperature materials must conform to the following requirements:

(1) *Pressure and vacuum control equipment*. When pressure or vacuum control equipment is required on a packaging authorized in this section, such equipment must be of a self-reclosing design, must prevent package rupture or collapse due to pressure, must prevent significant release of lading due to packaging overturn or splashing or surging during normal transport conditions, and may be external to the packaging.

(i) Pressure control equipment is not required if pressure in the packaging would increase less than 10 percent as a result of heating the lading from the lowest design operating temperature to a temperature likely to be encountered if the packaging were engulfed in a fire. When pressure control equipment is required, it must prevent rupture of the packaging from heating, including fire engulfment.

(ii) Vacuum control equipment is not required if the packaging is designed to withstand an external pressure of 100 Kpa (14.5 psig) or if pressure in the packaging would decrease less than 10

percent as a result of the lading cooling from the highest design operating temperature to the lowest temperature incurred in transport. When vacuum control equipment is required, it must prevent collapse of the packaging from a cooling-induced pressure differential.

(iii) When the regulations require a reclosing pressure relief device, the lading must not render the devices inoperable (i.e. from clogging, freezing, or fouling). If the lading affects the proper operation of the device, the packaging must have:

(A) A safety relief device incorporating a frangible disc or a permanent opening, each having a maximum effective area of 22 cm<sup>2</sup> (3.4 in.<sup>2</sup>), for transportation by highway;

(B) For transportation of asphalt by highway, a safety relief device incorporating a frangible disc or a permanent opening, each having a maximum effective area of 46 cm<sup>2</sup> (7.1 in.<sup>2</sup>); or

(C) For transportation by rail, a safety relief device incorporating a frangible disc, meeting the requirements of § 179.200-18 of this subchapter.

(iv) Reclosing pressure relief devices, frangible discs or permanent openings must not allow the release of lading during normal transportation conditions (i.e., due to splashing or surging).

(2) *Closures*. All openings, except permanent vent openings authorized in paragraph (g)(1)(iii) of this section, must be securely closed during transportation.

Packagings must be substantially leak-tight so as not to allow any more than dripping or trickling of a non-continuous flow when overturned. Closures must be designed and constructed to withstand, without exceeding the yield strength of the packaging, twice the static loading produced by the lading in any packaging orientation and at all operating temperatures.

(3) *Strength*. Each packaging must be designed and constructed to withstand, without exceeding the yield strength of the packaging, twice the static loading produced by the lading in any orientation and at all operating temperatures.

(4) *Compatibility*. The packaging and lading must be compatible over the entire operating temperature range.

(5) *Markings*. In addition to any other markings required by this subchapter, each packaging must be durably marked in a place readily accessible for inspection in characters at least 4.8 mm (3/16 inch) with the manufacturer's name, date of manufacture, design temperature range, and maximum product weight (or "load limit" for tanks) or volumetric capacity.

(6) *Accident damage protection.* For transportation by highway, external loading and unloading valves and closures must be protected from impact damage resulting from collision or overturn. Spraying equipment and the road oil application portion of a packaging are excepted from this requirement.

(7) *New construction.* Specification packagings that are being manufactured for the transport of elevated temperature materials must be authorized for current construction.

(h) *Exceptions.*

(1) *General.* Packagings manufactured for elevated temperature materials service prior to October 1, 1993, which are not in full compliance with the requirements in paragraph (g) of this section, may continue in service if they meet the applicable requirements of subparts A and B of this part and meet the closure requirements in paragraph (g)(2) of this section by March 30, 1995.

(2) *Kettles.* Kettles in service prior to October 1, 1993, which are used to

transport asphalt or bitumen, are excepted from specific provisions of this section as follows:

(i) Kettles with a total capacity of less than 2650 L (700 gallons), which are not in full compliance with the requirements of paragraph (g) of this section, may continue in elevated temperature material service if they meet the applicable requirements of subparts A and B of this part and if, after March 30, 1995, closures are secured during transport to resist opening in an overturn.

(ii) Kettles with a total capacity of 2650 L (700 gallons) or more, which are not in full compliance with the requirements of paragraph (g) of this section, may continue in elevated temperature material service if they meet the applicable requirements of subparts A and B of this part and if, after March 30, 1995, closures are secured during transport to resist opening in an overturn and no opening exceeds 46 cm<sup>2</sup> (7.1 in<sup>2</sup>).

(3) *Molten metals and molten glass.* This section does not apply to packagings used for transportation of molten metals and molten glass by rail when movement is restricted to operating speeds less than 15 miles per hour. (See § 172.203(g)(3) of this subchapter for shipping paper requirements.)

(4) *Solid elevated temperature materials.* A material which meets the definition of a solid elevated temperature material is excepted from all requirements of this subchapter except § 172.325 of this subchapter.

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Douglas B. Ham,

Acting Administrator, Research and Special Programs Administration.

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