Research and Special Programs Administration

49 CFR Parts 173 and 178

[Docket No. HM-182, Advance Notice]

Specifications for and Use of Specification 17E Steel Drums

AGENCY: Materials Transportation Bureau, Research and Special Programs Administration.

ACTION: Advance notice of proposed rulemaking (ANPRM).

SUMMARY: This ANPRM provides information and the opportunity to comment on the merits of amending the specification requirements for the 17E steel drum to allow certain reductions in head and body thickness provided the drum is manufactured with triple-seamed chimes. Minimum thicknesses under consideration would be either head sheets of 18 gauge steel and body sheets of 20 gauge steel or both head sheets and body sheets of 20 gauge steel depending on the degree of hazard of the material to be transported in the drum.

DATE: Comments must be received on or before September 2, 1982.

ADDRESS COMMENTS TO: Dockets Branch, Materials Transportation Bureau, U.S. Department of Transportation, Washington, D.C. 20590 (202)–426–3148. Comments should identify the docket and be submitted, if possible, in five copies. The Dockets Branch is located in Room 8426 of the Nassif Building, 400 Seventh Street, SW., Washington, D.C. 20590. Office hours are 8:30 a.m. to 5:00, Monday through Friday.

FOR FURTHER INFORMATION CONTACT: Thomas J. Charlton, Office of Hazardous Materials Regulation, Materials Transportation Bureau, Department of Transportation, 400 Seventh Street, S.W., Washington, D.C. 20590 (202–426–2075).

SUPPLEMENTARY INFORMATION: On April 19, 1979, PPG Industries, Incorporated, filed an application for an exemption from 49 CFR 173.119(a)(3) to allow the shipment of certain flammable liquids having a flashpoint of 20°F or less in 55 gallon DOT 17E steel drums with a triple-seamed chime construction and having a body thickness of 20 gauge in place of the minimum body thickness of 18 gauge required by the regulations. PPG supported this request by citing test results which, the applicant held, proved that the drum could pass all current DOT test requirements for an all 18 gauge DOT 17E steel drum. The request was assigned application number 8187–N and published for comment in the **Federal Register** on May 21, 1979 (44 FR 29551).

After a thorough study of the application and the supporting information provided, as well as consideration of all public comments submitted relative to the application, the Associate Director for Hazardous Materials Regulation advised PPG Industries that the request was denied. An appeal of this denial was filed in accordance with 49 CFR 107.121 and was subsequently denied by the Director, Materials Transportation Bureau. The basis for denial of the appeal as well as the original request, was *inter alia*, that the subject raised in the application was of such general applicability and future effect that it could not appropriately be considered as an exemption and could only be adequately evaluated through a rulemaking proceeding (49 CFR 107.109(e)).

On January 1982, a petition for rulemaking was filed by Inland Steel Container Company (Inland) which requested amendment of the DOT Hazardous Materials Regulations to allow the use of a triple-seamed steel drum meeting all requirements of DOT Specification 17E except that the minimum thickness of body and head sheets would be reduced from that currently prescribed. The Inland petition is similar in many respects to the PPG petition; however, it is much broader in scope in that it applies to all hazardous materials for which a Specification 17E drum is currently authorized. The Inland petition is supported by a number of letters submitted by major shippers of hazardous materials.

Because of the increasing general interest on the part of shippers and steel drum manufacturers in the use of triple-seamed drums complying with DOT Specification 17E with the exception of reduced body and/or head thicknesses, MTB believes it is now appropriate to solicit views on this subject from all segments of the public, looking towards a possible amendment of the Hazardous Materials Regulations authorizing the use of such drums. In order to afford the public ample opportunity to consider the merits of such action, MTB is providing in this publication a reproduction of the salient points of the Inland petition. The Inland petition proposes specific amendments and provides supporting information as follows:

Substance of the Petition

It is proposed that existing regulations be revised to authorize the shipment of certain commodities in steel drums which conform in all respects except steel thickness to Specification 17E (§ 178.116), and which are manufactured with triple-seamed chimes. Specifically it is proposed that:

(1) Commodities that are presently authorized in Part 173 to be shipped in drums of 55 gallon capacity or less, constructed with head sheets of 18 gage steel and body sheets of 20 gage steel, be authorized in triple seamed drums constructed of 20 gage steel throughout, and

(2) Commodities that are presently authorized through § 173.119(a) to be shipped in drums of 55 gallon capacity or less constructed of 18 gage steel throughout, be authorized in triple-seamed drums constructed with head sheets of 18 gauge steel and body sheets of 20 gauge steel.

To accomplish this purpose, the following revisions are proposed:

§ 178.116–6

This paragraph to be modified by appending footnote 3 to the 18 gauge minimum shown in the "Head sheet" column of the table for 55 gallons maximum capacity drums. The footnote to read as follows: "20 gage authorized, provided heads are seamed to bodies by a process which results in chimes with seven overlapping layers formed from the parent and body steel."

§ 173.119(a)(3)

This paragraph to be modified by revising the third sentence to read as follows: "Drums with a marked capacity in excess of 30 gallons must be constructed of 18 gage body and head sheets, except that 20 gage is authorized for the body sheets if heads are seamed to bodies by a process which results in chimes with seven overlapping layers formed from the parent head and body steel."

Background of the Proposal

The Specification 17E drum in the 55 gallon size, which is the subject of this petition is well-known as the most widely used packaging for hazardous liquid substances, where the degree of hazard falls within a range from relatively low to moderately severe. Because it has become highly standardized in dimension and construction, it is also the accepted packaging for non-hazardous liquids. It is, in fact, a world standard packaging for the transport of a vast variety of liquid substances in industrial and commercial trade.

U.S. production of new drums that conform to the requirements of this specification was approximately 22.5 million units in 1980. Of these, 9.0 million were 18 gage throughout and 11.5 million were made with 20 gage bodies and 18 gage heads (20/18). In addition, approximately 2.0 million drums of the same type of construction, but made of 20 gage steel throughout were produced.

Because of the considerable market for this type of packaging, the design of the drum and the processes for its manufacture have become highly developed. Drums are produced today

on automated lines operating under controlled conditions at rates up to 900 drums per hour. Product uniformity and quality is not only a requirement for shipper satisfaction, it is essential to the efficient operation of these facilities.

From a product design standpoint, there have been two significant developments in recent years that have led to the improved drum performance. The first of these, the drop panel bottom, significantly reduced the incidence of vibration induced botton failures. The second, and the one which is the basis for this petition, is the triple seam.

Initial development of what has come to be known as triple seam chime construction, was done in Europe in the late 1960's in response to a perceived need to improve drum performance under the conditions which are simulated in a drop test. Several designs were produced and in fact still available, but all designs have tended to approach a standard in which a tight chime with seven overlapping layers is produced. This construction is attainable uniformly under well-controlled, high speed production conditions.

Triple seamed drums were introduced in the U.S. in 1978 by means of license agreements with European manufacturers. Since that time, the drum, in a wide variety of gage combinations, has become standard in Europe, and is being produced broadly in the U.S. by some 14 manufacturers.

In Europe, triple seam chime construction has resulted in a dramatic shift in the mix of drum types. Prior to 1970, the standard drum was 1.25mm, with some production of 1.0mm drums and .625mm chime reinforced Monostress. Since that time, the 1.0mm drum, along with a .9/1.0 version, has become the most common. Additionally, drums are being produced in greater quantity in .825mm and .75mm versions, and a triple seamed Monostress drum is being used in a combination .6/.825mm version.

In the U.S. triple seamed drums are being produced in 18, 20/18 and 20 gage versions in quantity, and in 16 gage on a more limited basis.

It should be noted that while steel is purchased in the U.S. to a given decimal with no negative tolerance, the practice in Europe is different. Steel is purchased there with both plus and minus tolerances. Therefore, steel stated as 1.0mm can be expected to vary both above and below that thickness by 2 to 4%; whereas, steel purchased in the U.S. to a .0324" minimum decimal (20 gage) can be expectd to average from 2 to 4% heavier. Appendix I illustrates the relationship between European metric steel thicknesses and U.S. gages.

In summary, triple seam chime construction is now a highly developed production technique; it is the accepted method for a very significant segment of word drum production; and it has enabled manufacturers to produce lighter, less costly drums. The reasons for this transition are presented in the following section on performance.

Performance Capability of Triple Seamed Drums

Triple seaming is a process by which a drum head is joined to drum body by mechanically rolling up circumferential flanges on the two pieces into seven layer chime. This construction contrasts with previous double seaming practice which results in a five layer chime. Appendix II pictorially compares the two types of chimes in cross-section.

A triple seamed chime as a result of the additional thickness and interlocking of the layers has superior performance characteristics when compared to a double seamed chime. It is more resistant to denting and other concentrated impact damage; it performs in vastly superior manner when subjected to the more dispersed crushing force of a fall from a height; it has better resistance to the unrolling force exerted by severe internal pressure; and its tight construction is inherently more leakproof.

As a result of this performance capability, drums manufactured with triple seamed chimes in a given steel gage meet and exceed the performance standards set for heavier gage drums. This is clearly demonstrated in the tests conducted for Inland by Gaynes Laboratories.

In the tests three drum styles were subjected to the series stipulated in the *United Nations Recommendations on the Transportation of Dangerous Goods* for packagings suitable for the carriage of Packing Group I substances with a specific gravity 1.2 or less. This level exceeds in severity that specified in DOT specification 17E and includes all of the tests required for that specification.

The three styles tested were 55 gallon 18 gage, 55 gallon 20/18 gage and 55 gallon gage. The drums were manufactured with triple seamed chimes, and except for the nonspecification gage of the 20 gage drums, were made in accordance with the construction requirements in DOT specification 17E.

The U.N. tests conducted were the 1.8 meter (6') diagonal and flat drop tests, 250 kpa (36.2 psi) internal hydrostatic pressure test, 8 meter (26') stacking test and 30 kpa (4.3 psi) air pressure leak test. Supplemental tests included the DOT specified 7 psi air pressure leak test, a 40 psi internal hydrostatic pressure test and a one hour, 285 rpm vibration test on a table having a 1" displacement. There were no failures in any of the tests conducted.

Copies of the test reports prepared by Gaynes Laboratories are included in Appendices III, IV and V.

Statement of Shipper Interest

Accompanying this petition are several letters from shippers, addressed to the Office of Hazardous Materials, which set forth an interest in the adoption of our proposed regulation change. The interest stated is based on the following reasons:

1. Shippers have had successful experience with the use of 20 gage and 20/18 gage triple seamed drums for several years and in numerous shipments. Some of this experience is described in the shippers' letters.

2. Triple seamed drums in test experience perform in superior fashion when compared with double seamed drums.

3. The ability to use lighter weight drums in transport offers an opportunity to reduce costs. The following weight* comparisons are noted:

55 gallon 18 gage—43.5#
55 gallon 20/18 page—36#
55 gallon 20 gage—33#

*Based on theoretical weight at DOT minimum decimal. Actual weights will be somewhat higher.

4. The use of triple seamed drums is an enhancement to transportation safety. This construction method offers the opportunity for steel thickness reduction without compromising safety in transport.

Conclusion

Inland Steel Container believes that for the reasons which have been discussed in the body of this petition, a regulatory change is warranted. Further, it is believed that this is consistent with the position that DOT has supported in international discussions promoting performance oriented specifications for packagings.

Approval of the change would provide benefits to U.S. business in cost reduction and in improved competitive position in world trade.

APPENDIX I.—COMPARISON OF U.S. AND EUROPEAN STEEL THICKNESSES FOR STEEL DRUMS

[DOT thicknesses]

U.S. gage	DOT nominal		DOT minimum	
	Inches	Millimeters	Inches	Millimeters
24	0.0239	0.607	0.0209	0.531
22	.0299	.759	.0269	.683
20	.0359	.912	.0324	.823
19	.0418	1.062	.0378	.960
18	.0478	1.214	.0428	1.087
16	.0598	1.519	.0533	1.354

[European Ordering Thicknesses]

Nominal		U.S. Manufacturers gage range
Inches	Millimeters	
0.0246	0.625	24
.0295	.75	22
.0354	.90	20
.0394	1.00	19
.0492	1.25	18
.0591	1.50	16

For the sake of brevity, Appendix II of the Inland petition, which presents a cross-sectional diagram of both a triple-seamed chime and a standard double-seamed chime, has not been reproduced in this ANPRM. In addition, since the tests and test results presented in Appendices III, IV and V of the Inland petition were summarized in the body of the petition, they have not been reproduced in this ANPRM. Copies of each of these appendices are available for review in the docket file.

The statement of shipper interest referred to in the Inland petition were filed by the following shippers of hazardous materials: Monsanto Company, PPG Industries, Inc., Economics Laboratory, Inc., Nalco Chemical Company.

Copies of these statments are available for review in the docket file.

In connection with this ANPRM and the Inland petition for rulemaking, it should be noted that applications for exemptions, again concerning the minimum thickness of DOT 17E drums, have been received for consideration under 49 CFR 107.103. These applications request authorizations to manufacture, mark and sell a steel drum with head sheets of a thickness below the minimum thickness prescribed but are otherwise in full compliance with Specification 17E. The following applications are being reviewed:

1. *Mauser-Werke G. m.b.H., West Germany.* Top and bottom heads will be made of 1mm (0.0366 inch minimum) steel in place of 18 gauge (0.0428 inch minimum) steel presently required. For materials authorized to be packaged in DOT-17E, 20/18 gauge drums.

2. *G. Schonung & Co., West Germany.* Top and bottom heads will be 1 mm (0.0366 inch minimum) steel in place of 18 gauge (0.0428 inch minimum) steel presently required. For materials authorized to be packaged in DOT-17E drums.

3. *Natico, Inc., USA.* Top and bottom heads would be 20 gauge (0.0324 inch minimum) steel in place of 18 gauge (0.0428 inch minimum) steel presently required. For materials authorized to be packaged in DOT-17E drums.

Comments are solicited on the amendments requested in the Inland petition and on the following questions:

1. What has been the transportation experience in the use of both all 20 gage triple-seamed drums and 20/18 gage triple-seamed drums for hazardous (when authorized) and nonhazardous materials;

2. What would be the safety implications, if any, particularly with respect to resistance to puncture, if the reduced body and head thicknesses were authorized under the conditions proposed by Inland; and,

3. What would be the economic benefits and consequences associated with adoption of the Inland petition with regard to the purchase of new and used drums.

List of Subjects in 49 CFR

Part 173

Hazardous materials transportation, Packaging and containers.

Part 178

Hazardous materials transportation, Packaging and containers.

(49 U.S.C. 1803, 1804, 1808; 49 CFR 1.53, App. A to Part 1 and paragraph (a)(4) of App. A to Part 106)

Note.—The Materials Transportation Bureau has determined, on the basis of limited information currently available, that adoption of the petition presented in this advance notice would not result in a "major rule" under the terms of Executive Order 12291 and DOT procedure (44 FR 11034) nor require an environmental impact statement under the National Environmental Policy Act (49 U.S.C. 4321, et seq.) I certify that the petition presented in this advance notice would not, if adopted, have a significant economic impact on a substantial number of small entities that purchase drums.

Issued in Washington, D.C., on June 2, 1982.

Joseph T. Horning,

Acting Associate Director for Hazardous Materials Regulation, Materials Transportation Bureau.

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