UNITED STATES GOVERNMENT

Memorandum

U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, D.C. 20207

17 MAR 1986

TO : The Commission
Through: Sadye E. Dunn, Secretary
Through: Leonard DeFiore, Executive Director

FROM : Daniel R. Levinson, General Counsel
Stephen Lemberg, Assistant General Counsel
Allen F. Brauninger, Attorney, OGC

SUBJECT: Final Amendments of FHSA Flammability Classification and Testing Regulations

VOTE SHEET

A briefing package from the Office of the General Counsel recommends issuance of final amendments of regulations implementing the Federal Hazardous Substances Act which (1) define the terms "extremely flammable," "flammable," and "combustible" substances which release ignitable vapors; and (2) prescribe the test method and apparatus for determining flashpoint temperatures of such substances. The briefing package discusses events which led to the proposal of amendments of the FHSA regulations for classification and testing of flammable materials and comments received in response to the proposal. The briefing package recommends issuance of final amendments based on the proposal, and includes a draft FEDERAL REGISTER notice to carry out this recommendation.

Please indicate your vote:

I. Issue final amendments of the FHSA regulations for classification and testing of flammable hazardous substances and

A. Approve the draft FEDERAL REGISTER notice at TAB B of the the briefing package without change.

_____ _____
(Signature) (Date)

B. Approve the draft FEDERAL REGISTER notice at TAB B of the briefing package with the following changes (please specify):

_____

_____

_____

_____ _____
(Signature) (Date)

CPSA 6.(b)(i) Cleared

No Mfrs/Prvtlblrs or Products Identified

X Exempted by Agency 3/14/86

Issues Identified,

II. Withdraw the proposed amendments; direct the staff to seek other means to implement the Congressional directive to define the terms "extremely flammable," "flammable," and "combustible" hazardous substance and to specify a test method for determining flashpoint temperatures which is compatible with procedures used by other Federal agencies.

_____ _____

(Signature) (Date)

III. Take other action (please specify):

_____

_____

_____

_____ _____

(Signature) (Date)

IV. Abstain.

_____ _____

(Signature) (Date)

EXECUTIVE SUMMARY

A memorandum from the Office of the General Counsel recommends issuance of final amendments of regulations implementing the Federal Hazardous Substances Act which (1) define the terms "extremely flammable," "flammable," and "combustible" hazardous substances; and (2) specify the apparatus and procedure used by the Commission for testing to determine flashpoint temperatures of volatile materials. The memorandum transmits a draft FEDERAL REGISTER notice to carry out this recommendation. If issued by the Commission, the recommended amendments would bring the regulations for flammability classification and testing which implement the Federal Hazardous Substances Act into closer conformity with flammability requirements enforced by other Federal agencies.

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DATE: 17 MAR 1986

FROM : Daniel R. Levinson, General Counsel
Stephen Lemberg, Assistant General Counsel
Allen F. Brauninger, Attorney, OGC

SUBJECT: Final Amendments of FHSA Flammability Classification and Testing Regulations

The purpose of this memorandum is to recommend issuance on a final basis of amendments of regulations implementing the Federal Hazardous Substances Act which (1) define the terms "extremely flammable," "flammable," and "combustible" for purposes of classifying hazardous substances which release ignitable vapors; and (2) prescribe the test method and apparatus for determining flashpoint temperatures of volatile substances.

Background

The Federal Hazardous Substances Act (FHSA) (15 U.S.C. § 1261 et seq.) requires, among other things, cautionary labeling for household products that are hazardous substances because of their flammability or combustibility. Examples of such products include kerosene, lighter fluids, solvents, paints, and paint thinners.

As originally enacted in 1960 (Pub. L. 86-613, 74 Stat. 372) and amended in 1969 (Pub. L. 91-113, 83 Stat. 187), the FHSA defined the terms "extremely flammable," "flammable," and "combustible" for purposes of labeling and other requirements applicable to volatile household products on the basis of flashpoint temperature. That legislation also specified that determination of flashpoint temperature shall be made by one particular test identified as the "Tagliabue Open-Cup Method."

Classification of the flammability of household products is necessary to inform consumers of the relative fire hazards presented by materials that can burn. One property usually considered in flammability classification is the lowest temperature at which a material will release vapors that can be ignited by an external source of ignition. This temperature, called the flashpoint temperature, can be determined by laboratory tests for liquids, viscous liquids (pastes, gels, and semi-solids) and some solid materials. Although several different methods utilizing specific items of equipment exist for determining flashpoint temperature, they all involve slowly heating the material to be tested in either an open or a closed container, and periodically introducing an ignition source into the vapor space above the material being tested. The lowest

CPSA 6 (b)(1) Cleared
No Mfrs/PrvtLblrs or Products Identified
Excepted By 3/6/86

NOTE: This document has not been reviewed or accepted by the Commission.
Initial _____ Date 3/17/86

temperature at which the vapors emitted by the material will ignite is the flashpoint temperature.

After enactment of the 1969 amendments, section 2(1) of the FHSA (15 U.S.C. § 1261(1)) provided that the term "extremely flammable" shall apply to any substance having a flashpoint at or below 20° F as determined by the Tagliabue open-cup method; the term "flammable" shall apply to any substance having a flashpoint above 20° F to and including 80° F; and the term "combustible" shall apply to any substance having a flashpoint above 80° F to and including 150° F.

During the past several years, other test methods for determining flashpoint temperatures have come into widespread use. Each of these methods prescribes the use of a particular apparatus such as the Setaflash closed-cup tester, the Setaflash open-cup tester, the Pensky-Martens closed-cup tester, or the Tagliabue closed-cup tester. The different methods and their prescribed apparatus often do not yield the same flashpoint temperature when used to test the same material. Moreover, a constant relationship often does not exist for results obtained from these various methods when used to test different materials. The difference in results obtained from the various methods and apparatus now available for determining flashpoint temperature has resulted in a lack of uniformity of requirements issued by various Federal regulatory agencies.

In 1974, the Department of Transportation (DOT) revised its regulations applicable to storage, shipment, and marking of hazardous materials by specifying the use of closed-cup methods for determining flashpoint temperatures of flammable and combustible materials. The DOT regulations are codified at 49 C.F.R. Parts 100 through 189, and are generally consistent with regulations issued by the Department of Labor in 1974, which are codified at 29 C.F.R. § 1910.106(a), and with model flammability standards published by the National Fire Protection Association.

After DOT amended its regulations, the Consumer Product Safety Commission became one of a few Federal agencies required by law to use the Tagliabue open-cup method for determining flashpoint temperatures.

Amendment of FHSA

In 1978, Congress amended section 2(1) of the FHSA to remove the requirement that flashpoint temperatures must be determined by use of the Tagliabue open-cup method and test apparatus (Pub. L. 95-631, 92 Stat. 3742, November 10, 1978). The 1978 amendment directed the Commission to issue regulations to define the terms "extremely flammable," "flammable," and "combustible," and to specify test methods which are "generally applicable" for defining flammability characteristics of

substances. The 1978 amendments provided further that in establishing definitions and test methods, the Commission must consider existing definitions and test methods of other Federal agencies, and to the extent possible, establish compatible definitions and test methods.

Until the Commission issues the regulations contemplated by the 1978 amendment, provisions of the FHSA and existing rules codified at 16 C.F.R. § 1500.3(c)(6) and § 1500.43 continue to define the terms "extremely flammable," "flammable," and "combustible" with reference to flashpoint temperatures determined by the Tagliabue open-cup method.

Proposal to Amend FHSA Flammability Regulations

In the Federal Register of April 26, 1984 (49 F.R. 17956), the Commission published a proposal for amendment of regulations implementing the FHSA which establish requirements for flammability classification and specify the apparatus and procedure for determination of flashpoint temperature.

The Commission proposed to amend 16 C.F.R. § 1500.43 to prescribe a closed-cup apparatus and procedure for determining flashpoint temperatures of volatile household substances. The proposal specified use of a Setaflash closed tester, and a procedure which closely parallels the test method designated ASTM D 3828-81 "Standard Methods for Flash Point by Setaflash Closed Tester," published by the American Society for Testing and Materials.

The Commission also proposed to amend 16 C.F.R. § 1500.3(b)(10) and § 1500.3(c)(6) to prescribe new definitions of the terms "extremely flammable," "flammable," and "combustible" hazardous substances. In addition to providing for determination of flashpoint temperatures by use of the closed-cup apparatus and procedure specified by proposed section 1500.43, the proposed amendment of section 1500.3(c)(6) specified that the term "extremely flammable" would apply to substances having a flashpoint of 20° F or lower; that the term "flammable" would apply to substances having a flashpoint temperature above 20° F to and including 100° F; and that the term "combustible" would apply to substances having a flashpoint temperature above 100° F to and including 150° F.

The proposal contained provisions which would allow product manufacturers and labelers to continue to rely on results of open-cup flashpoint testing for purposes of compliance with FHSA requirements as long as no change is made to the formulation or labeling of the product. These provisions were included to minimize any adverse economic effect which the proposed amendments might have on firms subject to regulation under the FHSA, particularly those which were small businesses.

In response to the notice of proposal, the Commission received comments from four firms which are manufacturers or labelers of products subject to regulation under the FHSA; four trade associations whose member firms manufacture or distribute such products; and one supplier of laboratory equipment. These firms and associations represent a broad cross-section of the regulated industry, including small businesses. Copies of the proposed amendments and comments on the proposal are attached at TAB A.

Although the Office of the General Counsel called representatives of consumer groups to notify them of the proposal and their opportunity to submit written comments, no consumers or consumer groups commented on the proposed amendments.

None of the comments opposed amendment of the regulations to specify a closed-cup apparatus and procedure for determination of flashpoint temperature for purposes of compliance with labeling and other requirements of the FHSA and implementing rules. However, all commenters requested specific changes or additions to the proposed amendments.

Analysis of Comments

After consideration of all comments and consultation with the technical staff, this office has drafted a notice to issue the amendments of the FHSA regulations for flammability classification and testing on a final basis. A copy of the draft notice is attached at TAB B.

In response to comments on the proposal, the following modifications have been included in the draft notice to issue the amendments on a final basis:

1. The range of flashpoint temperatures specified by section 1500.3(c)(6)(ii) for classification of a material as a "flammable" hazardous substance has been changed from "above 20° F. to and including 100° F" to "above 20° F and below 100° F." This change makes the Commission's requirements for classification of flammable substances compatible with regulations administered by DOT and the Occupational Safety and Health Administration.

2. Language of sections 1500.3(c)(6)(ii) and (iii) exempting products containing 24 percent or less of alcohol in solution as "flammable" or "combustible" hazardous substances has been modified to express more clearly the intent to limit this exemption to mixtures which do not present "a significant flammability hazard when used by consumers."

3. Language has been added to section 1500.3(c)(6) to state that a product manufacturer or labeler may rely on "reliable experience or other relevant data" in addition to flashpoint temperature as a basis for compliance with applicable

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requirements of the FHSA in the absence of a specific rule issued by the Commission to assign a flammability classification on a basis other than that of flashpoint temperature determined by the method specified in section 1500.43.

4. Language of section 1500.43(d) and Table 3 has been revised to describe the test apparatus without reference to any particular manufacturer.

The staff considered but did not incorporate in the draft notice other suggestions made by comments on the proposal. These suggestions include:

Specification of alternate test apparatus and procedures for determination of flashpoint temperature.

Modification of the range of flashpoint temperatures for classification of a product as a "combustible" hazardous substance.

Elimination of provisions to allow continued reliance on test results obtained by use of the Tagliabue open-cup methods as long as no change is made to the formulation or labeling of a product.

Revision or modification of the procedures for classification of aerosolized products as "extremely flammable" or "flammable" hazardous substances.

The draft notice at TAB B contains a detailed analysis of issues raised by the comments at pages 9 through 29.

The draft Federal Register notice has been circulated to the directors of the Regional Offices for their review and comment. Comments from the Regional Office directors are at TAB C.

Alternatives

Alternatives available to the Commission are:

I. Publish the attached draft notice in the Federal Register to issue the final amendments of the FHSA flammability classification rules to specify a closed-cup apparatus and procedure for determining flashpoint temperatures and to define the terms "extremely flammable," "flammable," and "combustible" hazardous substance.

or

II. Withdraw the proposal of April 26, 1984; direct the staff to explore alternative means for carrying out the Congressional directive to define the terms "extremely

flammable," "flammable," and "combustible" hazardous substances and to specify a test method compatible with the procedures used by other Federal agencies.

Recommendation

The Office of the General Counsel recommends publication of the draft Federal Register attached at TAB B to issue final amendments of regulations implementing the FHSA.

Attachments:

TAB A - Comments on proposed amendments of FHSA flammability rules

TAB B - Draft Federal Register notice to issue final amendments

TAB C - Comments on draft Federal Register notice from Regional Office directors

CH3-84-1

June 4, 1984

Ms. Sadye Dunn, Secretary
United States Consumer Product
Safety Commission
1111 Eighteenth Street, Northwest
Washington, DC 20207

Dear Ms. Dunn:

SUBJECT: FHSA Flammability Regulations-Amendments

The purpose of this communication is to provide comments on the Proposed Rules 16 CFR Part 1500, Hazardous Substances and Articles Amendments to Flammability Regulations published in the Federal Register, April 26, 1984, Volume 49, Number 82.

The agency is to be commended for its efforts of bringing the Commission's procedures rleative to flammability into general conformity with practices of other Federal agencies, and voluntary standards setting organizations, and for its sensitivity in minimizing the economic factors during the transition period of moving into new definitions and methodology in this area.

My basic concern with the proposal is its failure to specify the Pensky-Martens Closed Cup (ASTM-D-93) as an acceptable procedure with the Setaflash Closed Cup (ASTM-D-3828). In this regard, I would like to present the following arguments:

1. Lacking specific reference in proposed 1500.43(a)(1) where it states both "Setaflash low-range closed tester, or an apparatus producing equivalent results" and "May use other apparatus and/or test methods which produce equivalent results," it is my opinion that the burden of proving equivalency would be placed upon the testing party in any enforcing procedure that may develop should any procedure other than Setaflash be used.

2. In its desire to bring its "procedures into general conformity with practices of other Federal agencies and voluntary standards setting organizations," the Commission has apparently not become aware that the Pensky-Martens (ASTM-D-93) procedure is a more commonly specified method than Setaflash (ASTM-D-3828) by Federal agencies, international transportation organizations, and voluntary standards setting organizations.

a. DOT 49 CFR 173.115(d) specifies Tag Closed Cup (ASTM-D-56), Setaflash Closed Tester (ASTM-D-3278), and Pensky-Martens (ASTM-D-93).

b. OSHA 29 CFR 1910.106a(14) calls for Tag Closed Cup (ASTM-D-56) and Pensky-Martens (ASTM-D-93). Setaflash by any method is not an authorized procedure. Please note at this point that most facilities manufacturing flammable/combustible materials for the consumer market would also come under the authority of the Occupational Safety and Health Agency as well as need to comply with CPSC regulations relative to its products.

c. The International Maritime Organization (IMO), International Civil Aviation Organization (ICAO), and International Air Transport Association (IATA) all specify Pensky-Martens (ASTM-D-93) as one of the methods for determining flash point. Setaflash by ASTM-D-3243 and D-3278 are referenced but not D-3828 in ICAO and IATA, and no Setaflash procedure is contained in IMO.

d. The National Fire Prevention Association, ANSI/NFPA 30, Flammable and Combustible Liquids Code 1981 lists acceptable methods to be Tag Closed (ASTM-D-56), Pensky-Martens Closed (ASTM-D-93), and Setaflash Closed by ASTM-D-3243 and D-3278, but not D-3828.

3. Our own company experience shows that Setaflash is the best "Go-No-Go" procedure currently available, but probably the most costly and time-consuming method for determining a specific flash point. In the latter case, the Pensky-Martens is much more perferable.

In conclusion, we request that the Commission specifically add the Pensky-Martens Closed Cup flash point method (ASTM-D-93) as an acceptable procedure in addition to the Setaflash Cup method. The Pensky-Martens procedure is more frequently called out in both United States standards and regulations as well as in international regulations that may apply also to domestically produced commodities.

The Pensky-Martens is the better method when compared to the Setaflash for determining a specific flash point, a procedure frequently necessary when a commodity and/or producing facility comes under several different regulations. By adding Pensky-Martens to the rule, testing parties would not bear the burden of proving equivalency between these two methods.

Thank you for your consideration.

Very truly yours,

R. F. Getty
Manager, Regulatory Services

fj

enclosures: Four (4) copies of this letter

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

CH3-84-2

CONTROL DATA

8100 34th Avenue South
Mailing Address/Box O
Minneapolis, Minnesota 55440

"FHSA Flammability Regulations - Amendments" June 11, 1984
Secretary, U S Consumer Product Safety Commission
1111 18th St. NW
Washington, DC 20207

Control Data Corporation applauds your effort to make CPSC regulations more consistent with the regulations of other government agencies. While Control Data Corporation produces no products which would be covered by these regulations, it uses hundreds of adhesives, solvents and other materials which are purchased in containers covered by your regulations. The warehousing and transportation of these products is complicated by the current inconsistency which often result in inner receptacles not being marked in the same manner as outer shipping packages. Control Data Corporation would like to make the following specific comments.

1) Your proposed amendment uses the terms "at or below", or "to and including" to describe the upper flash point limit of each category. The DOT uses the term "below". This will result in a product having a flash point of exactly 100°F to be considered a flammable under your definitions but a combustible under DOT definitions. We would recommend that you modify your terminology or petition the DOT to change theirs.

2) We would strongly recommend that your proposed upper threshold of 150°F for the combustible range be changed to 141°F (60.5°C) for the following reasons. The United Nations Committee of Experts on the transport of dangerous goods has recommended a worldwide standard of 60.5°C as the upper threshold for "inflammable liquids". This recommendation has been accepted in the form of mandatory regulations by the International Civil Aviation Organization (ICAO) and, with a slight modification to 61°C, the International Maritime Organization (IMO). The US DOT has incorporated these regulations at 49 CFR §171.11 and §171.12. As the US DOT exempts from its regulations combustible liquids in less than 110 gallon containers (49 CFR §173.118a), the international regulations have a much greater economic impact. The US government has also committed itself through several international agreements to reduce nontariff trade barriers. Passing up the opportunity to harmonize a variance to a recognized international safety standard would be inconsistent with stated US policy. Furthermore, the Canadian government has published proposed regulations which incorporate 61°C as an upper threshold for flammability. (See CANADA GAZETTE Part I, June 19, 1982) As the United States' largest trading partner, variations between the two countries result in significant economic costs to multinational companies.
[It is an interesting side note that the 141°F value had its origin in 19th century US Coast Guard regulations.]

3) While we appreciate the reduction in testing which the Commission sought by the inclusion of a grandfather clause for items previously tested using a Tag open tester, in reality it will have no beneficial effect. It may even lead producers to violate other federal and state regulations. The DOT still requires the manufactures to classify their products using closed cup tests. Any manufacturer which has relied upon open cup tests has been in violation of DOT test procedures for some time. Although products labeled under CPSC regulations are technically exempt from OSHA labeling and MSDS regulations by 29 CFR §1910.1200 (b)(iv), Control Data Corporation requires, as a condition of purchase, a MSDS meeting OSHA hazard communication standards. This is to insure that all work place chemicals are identified and that we do not inadvertently violate one of the 15 or more state right-to-know laws. The overall effect is that closed cup test results are required in order to correctly transport and sell this type of product.

4) The final area where we wish to comment is on your test method for extremely flammable self-pressurized containers (aerosols). We believe that puncturing an aerosol to get at the formulation is unnecessary and dangerous. The mixture should simply be tested before it is ever placed in the aerosol. We also feel that the propellant may have an effect on the overall flammability of the aerosol. Gases in ASHRAE Group 1 may inhibit combustion whereas gases in ASHRAE Group 3 will contribute to combustion. [ANSI/ASHRAE Standard 15-1978] In fact we would recommend that any aerosol charged with a ASHRAE group 3 gas be labeled as extremely flammable.

FOR CONTROL DATA CORPORATION

Albert V. Hartl
Administrator, Hazardous
Materials Transportation

4150d

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Chapter 3
CLASS 3 - FLAMMABLE LIQUIDS

3.1 DEFINITION OF CLASS 3

Liquids or mixtures of liquids or liquids containing solids in solution or in suspension which give off a flammable vapour at temperatures of not more than 60.5°C closed-cup test or not more than 65.6°C open-cup test.

3.2 PACKING GROUP CRITERIA

3.2.1 Table 2-2 should be used for the determination of the packing group of a liquid that presents a risk due to flammability. For liquids whose only hazard is flammability, the packing group for the material is the packing group shown in the table below. For a liquid possessing an additional hazard(s), the packing group determined from Table 2-2 and the packing group based on the severity of the additional hazard(s) should be considered. In such cases, the table of precedence of hazard characteristics appearing in Table 2-12 should be used to determine the correct classification of the liquid. However, the most stringent packing group based on the different hazards of the liquid must then be the packing group for the liquid.

Table 2-2.- Packing group based on flammability

Packing group	*Flash-point (closed-cup)*	*Initial boiling point*
I	≤60.5°C	≤35°C
II	< 23°C	> 35°C
III	≥23°C, ≤ 60.5°C	> 35°C

Viscous substances having a flash point below 23°C may be placed in Packing Group III in conformity with 3.2.2.

3.2.2 Grouping of flammable viscous substances with a flash point of less than 23°C

3.2.2.1 The hazard group of paints, varnishes, enamels, lacquers, adhesives, polishes and other viscous flammable substances of Class 3 with a flash point of less than 23°C is determined by reference to:

a) the viscosity expressed as the flow time in seconds;

b) the closed-cup flash point;

c) a solvent separation test; and

d) the size of the receptacle.

3.2.2.2 *Criteria for inclusion in Group III*

Viscous flammable liquids such as paints, enamels, varnishes, adhesives and polishes with a flash point less than 23°C are grouped in Group III provided that:

a) less than 3 per cent of the clear solvent layer separates in the solvent separation test;

b) the mixture contains not more than 5 per cent of substances in Group I or Group II of Division 6.1 or Class 8, or not more than 5 per cent of substances in Group I, Class 3 requiring a Division 6.1 or Class 8 subsidiary label;

5.1.2 *Class 2 – Gases: compressed, liquefied or dissolved under pressure*

Because of the difficulty in reconciling the various main systems of regulation, definitions in this Class are of a general nature to cover all such systems. Moreover, since it has not been found possible to reconcile two main systems of regulation in respect of the differentiation between a liquefied gas exerting a low pressure at a certain temperature and an inflammable liquid, this criterion has been omitted; both methods of differentiation are recognized.

This Class comprises:

(a) *Permanent gases*
Gases which cannot be liquefied at ambient temperatures;

(b) *Liquefied gases*
Gases which can become liquid under pressure at ambient temperatures;

(c) *Dissolved gases*
Gases dissolved under pressure in a solvent, which may be absorbed in a porous material;

(d) *Deeply refrigerated permanent gases* – e.g. liquid air, oxygen, etc.

In the cases (a), (b) and (c) above, the gases are normally under pressure.

For stowage and segregation purposes Class 2 is subdivided further, namely:

Class 2.1 – Inflammable gases*

Class 2.2 – Non-inflammable gases

*Class 2.3 – Poisonous gases***

5.1.3 *Class 3 – Inflammable* liquids*

These are liquids, or mixtures of liquids, or liquids containing solids in solution or suspension (e.g. paints, varnishes, lacquers, etc., but not including substances which, on account of their other dangerous characteristics, have been included in other classes) which give off an inflammable vapour at or below 61°C (141°F) closed cup test (corresponding to 65.6°C (150°F) open cup test).

In this Code, Class 3 is subdivided further, namely:

Class 3.1. Low flashpoint group of liquids having a flashpoint below –18°C (0°F), closed cup test;

Class 3.2. Intermediate flashpoint group of liquids having a flashpoint of –18°C (0°F) up to, but not including 23°C (73°F), closed cup test;

Class 3.3. High flashpoint group of liquids having a flashpoint of 23°C (73°F) up to, and including, 61°C (141°F), closed cup test.

Substances which have a flashpoint above 61°C (141°F), closed cup test, are not considered to be dangerous by virtue of their fire hazard. Where the flashpoint is indicated for a volatile liquid it may be followed by the symbol "c.c.", representing determination by a closed cup test, or by the symbol "o.c.", representing an open cup test. A reference to these tests is given in section 6 of this General Introduction.

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* "Inflammable" has the same meaning as flammable.

** Poisonous gases which are also inflammable should be segregated as Class 2.1 gases.

Divisions — Class 2
Dangerous Goods

14. The following divisions are established for dangerous goods that fall into Class 2, namely, Divisions 1, 2 and 3.

15. Dangerous goods described in column I of an item of Table II of Schedule II that fall into Class 2 fall into the division indicated by the figure that follows the point in the first set of numbers set out in column III of that item.

16. Dangerous goods that fall into Class 2 pursuant to section 13(2) fall into:

(*a*) Division 1, if the dangerous goods

(i) are flammable when in a mixture of 13 per cent or less by volume with air at normal atmospheric temperature and pressure, or

(ii) have a flammability range of at least 12;

(*b*) Division 3, if the dangerous goods have an LC_{50} less than 200 parts per million (ppm); or

(*c*) Division 2, if the dangerous goods do not fall into Division 1 or 3.

Class 3 Dangerous Goods

17. (1) Each product or substance that,

(*a*) is described in column I of an item of Table II of Schedule II, and

(*b*) has the figure "3" preceding the point in the first set of numbers set out in column III of that item

falls into Class 3.

(2) A product or substance, other than dangerous goods described in column II of an item of Table I or column I of an item of Table II of Schedule II, that is a liquid, a mixture of liquids or a liquid containing solids in solution or suspension and that has a flash point

(*a*) where the product or substance is in a consignment that is to be, is being or has been transported by ship on a voyage, other than a domestic voyage, not greater than 61°C, or

(*b*) in any other case, less than 93.3°C,

falls into Class 3.

Divisions — Class 3
Dangerous Goods

18. The following divisions are established for dangerous goods that fall into Class 3, namely, Divisions 1, 2 and 3.

19. (1) Subject to subsection (2), dangerous goods described in column I of an item of Table II of Schedule II that fall into Class 3 fall into the division indicated by the figure that follows the point in the first set of numbers set out in column III of that item.

(2) Dangerous goods described in column I of an item of Table II of Schedule II that are in a consignment that is to be, is being or has been transported by ship on a voyage, other

Divisions des marchandises dangereuses de classe 2

14. Les divisions 1, 2 et 3 sont instaurées pour les marchandises dangereuses de classe 2.

15. Une marchandise dangereuse visée à l'article 13 tombe dans la division indiquée par le chiffre placé après le point dans le premier nombre porté à la colonne III de l'article approprié.

16. Les divisions, pour les marchandises dangereuses de classe 2 non portées aux tableaux I ou II de l'annexe II sont définies comme suit:

a) division 1, pour ces marchandises dangereuses qui:

(i) soit, sont inflammables lorsque mélangées dans une proportion égale ou inférieure à 13 pour cent en volume avec de l'air à la température et à la pression atmosphériques normales,

(ii) soit, possèdent un intervalle d'inflammabilité minimale de 12;

b) division 3, pour ces marchandises dangereuses dont la valeur LC_{50} est inférieure à 200 parties par million (ppm);

c) division 2, pour ces marchandises dangereuses qui ne tombent dans aucune autre division de la classe 2.

Marchandises dangereuses de classe 3

17. (1) Chaque produit ou matière

a) porté à la colonne I d'un article du tableau II de l'annexe II; et

b) où le chiffre «3» est placé avant le point dans le nombre porté à la colonne III de cet article

est affecté à la classe 3.

(2) Tout produit ou matière qui est

a) soit, un liquide ou un mélange de liquides,

b) soit, un liquide contenant des solides en solution ou en suspension,

tombe dans la classe 3 si son point d'éclair

c) soit, n'est pas supérieur à 61°C lorsque ce produit ou cette matière doit être, est, ou a été transporté par navire en voyage autre qu'un voyage domestique,

d) soit, dans les autres cas, est inférieur à 93,3°C,

à l'exception des marchandises dangereuses visées au paragraphe (1) ou portées à la colonne II d'un article du tableau I de l'annexe II.

Divisions des marchandises dangereuses de classe 3

18. Les divisions 1, 2 et 3 sont instaurées pour les marchandises dangereuses de classe 3.

19. (1) Sous réserve du paragraphe (2), une marchandise dangereuse visée au paragraphe 17(1) tombe dans la division indiquée par le chiffre placé après le point dans le premier nombre porté à la colonne III de l'article approprié.

(2) Une marchandise dangereuse mentionnée au paragraphe 17(1) qui doit être, est, ou a été transportée par navire en voyage qui n'est pas un voyage domestique tombe dans la

than a domestic voyage, fall into the division indicated by the figure that follows the point in the first set of numbers set out in column IV of the item of Table II of Schedule II in which those goods are described.

20. (1) Dangerous goods that fall into Class 3 pursuant to paragraph 17(2)(*a*) fall into:

(*a*) Division 1, if the dangerous goods have a flash point less than -18°C;

(*b*) Division 2, if the dangerous goods have a flash point not less than -18°C but less than 23°C; or

(*c*) Division 3, if the dangerous goods have a flash point not less than 23°C but not greater than 61°C.

(2) Dangerous goods that fall into Class 3 pursuant to paragraph 17(2)(*b*) fall into:

(*a*) Division 1, if the dangerous goods have a flash point less than 37.8°C; or

(*b*) Division 2, if the dangerous goods have a flash point of not less than 37.8°C but less than 93.3°C.

Packing Groups — Class 3 Dangerous Goods

21. The following packing groups are established for dangerous goods that fall into Class 3, namely, Packing Groups I, II and III.

22. (1) Dangerous goods described in column I of an item of Table II of Schedule II that fall into Class 3 fall into the packing group indicated by the figure set out in column V of that item.

(2) Subject to subsection (3), dangerous goods that fall into Class 3 pursuant to subsection 17(2) fall into:

(*a*) Packing Group I, if the dangerous goods have an initial boiling point not greater than 35°C;

(*b*) Packing Group II, if the dangerous goods have an initial boiling point greater than 35°C and a flash point less than 23°C; or

(*c*) Packing Group III, if the dangerous goods have an initial boiling point greater than 35°C and a flash point

(i) in the case of dangerous goods that fall into Class 3 pursuant to paragraph 17(2)(*a*), not greater than 61°C but not less than 23°C, and

(ii) in the case of dangerous goods that fall into Class 3 pursuant to paragraph 17(2)(*b*), less than 37.8°C but not less than 23°C.

(3) Dangerous goods that fall into Class 3 pursuant to subsection 17(2), other than dangerous goods that are a nitrocellulose-based paint that have a flash point less than 23°C, fall into Packing Group III if

(*a*) after those dangerous goods have been tested in accordance with the solvent separation test described in Part II of Schedule VI the upper separated layer of clear solvent represents less than 3 per cent of the quantity being tested;

(*b*) the dangerous goods have a flow time at 23°C during the viscosity test described in ISO 2431-72

(i) greater than 40 seconds using the ISO standard cup fitted with an 8 mm jet,

division indiquée par le chiffre placé après le point dans le premier nombre porté à la colonne IV de l'article approprié.

20. (1) Les divisions, pour les marchandises dangereuses visées à l'alinéa 17(2)*c*) sont définies comme suit:

a) division 1, pour ces marchandises dangereuses dont le point d'éclair est inférieur à -18°C;

b) division 2, pour ces marchandises dangereuses dont le point d'éclair n'est pas inférieur à -18°C mais inférieur à 23°C;

c) division 3, pour ces marchandises dangereuses dont le point d'éclair est situé entre 23°C et 61°C.

(2) Les divisions pour les marchandises dangereuses visées à l'alinéa 17(2)*d*) sont définies comme suit:

a) division 1, pour ces marchandises dangereuses dont le point d'éclair est inférieur à 37,8°C;

b) division 2, pour ces marchandises dangereuses dont le point d'éclair est 37,8°C ou plus mais inférieur à 93,3°C.

Groupes d'emballage des marchandises dangereuses de classe 3

21. Les groupes d'emballage I, II et III sont instaurés pour les marchandises dangereuses de classe 3.

22. (1) Une marchandise dangereuse visée au paragraphe 17(1) tombe dans le groupe d'emballage précisé par le chiffre romain porté à la colonne V de l'article approprié.

(2) Sous réserve du paragraphe (3), une marchandise dangereuse visée au paragaphe 17(2) tombe:

a) dans le groupe d'emballage I si son point d'ébullition initial ne dépasse pas 35°C;

b) dans le groupe d'emballage II si son point d'ébullition initial est supérieur à 35°C et son point d'éclair est inférieur à 23°C;

c) dans le groupe d'emballage III si son point d'ébullition initial est supérieur à 35°C et son point d'éclair est

(i) soit, compris entre 23°C et 61°C pour une marchandise dangereuse visée à l'alinéa 17(2)*c*),

(ii) soit, au moins 23°C mais inférieur à 37,8°C pour une marchandise dangereuse visée à l'alinéa 17(2)*d*).

(3) Une marchandise dangereuse visée au paragraphe 17(2) qui n'est pas une peinture à base de nitrocellulose, et dont le point d'éclair est inférieur à 23°C, tombe dans le groupe d'emballage III si:

a) la hauteur de la couche séparée de solvant est inférieure à 3% de la hauteur totale de l'échantillon lorsque cette marchandise dangereuse a été soumise à l'épreuve de séparation du solvant décrite à la partie II de l'annexe VI,

b) sa durée d'écoulement à 23°C, déterminée par l'épreuve de viscosité ISO 2431-72 est:

(i) supérieure à 40 secondes, mesurée à l'aide du vase normalisé ISO muni d'un ajutage de 8 mm,

to groups as follows:

Refrigerant*	Name	Chemical Formula
5.1.1		
Group 1		
R-11	Trichlorofluoromethane	CCl_3F
R-12	Dichlorodifluoromethane	CCl_2F_2
R-13	Chlorotrifluoromethane	$CClF_3$
R-13B1	Bromotrifluoromethane	$CBrF_3$
R-14	Tetrafluoromethane	CF_4
R-21	Dichlorofluoromethane	$CHCl_2F$
R-22	Chlorodifluoromethane	$CHClF_2$
R-30	Dichloromethane (Methylene chloride)	CH_2Cl_2
R-113	Trichlorotrifluoroethane	CCl_2FCClF_2
R-114	Dichlorotetrafluoroethane	$CClF_2CClF_2$
R-115	Chloropentafluoroethane	$CClF_2CF_3$
R-C318	Octafluorocyclobutane	C_4F_8
R-500	Dichlorodifluoromethane, 73.8% and Ethylidene Difluoride, 26.2%	CCl_2F_2/CH_3CHF_2
R-502	Chlorodifluoromethane, 48.8% and Chloropentafluoroethane, 51.2%	$CHClF_2/CClF_2CF_3$
R-503	Trifluoromethane 40.1%, and Chlorotrifluoromethane 59.9%	$CHF_3/CClF_3$
R-744	Carbon dioxide	CO_2
5.1.2		
Group 2		
R-40	Methyl chloride	CH_3Cl
R-611	Methyl formate	$HCOOCH_3$
R-717	Ammonia	NH_3
R-764	Sulphur dioxide	SO_2
5.1.3		
Group 3		
R-170	Ethane	C_2H_6
R-290	Propane	C_3H_8
R-600	Butane	C_4H_{10}
R-600a	Isobutane	$CH(CH_3)_3$
R-1150	Ethylene	C_2H_4
R-1270	Propylene	C_3H_6

*Group Classification-See 14.19

6. REQUIREMENTS FOR INSTITUTIONAL, PUBLIC ASSEMBLY, RESIDENTIAL, AND COMMERCIAL OCCUPANCIES

6.1 General

6.1.1 Public stairway, stair landing, *entrance* or *exit*. No portion of a *refrigerating system shall* be installed in or on a public stairway, stair landing, *entrance*, or *exit*.

6.1.2 Public *hallway* or *lobby*. No portion of a *refrigerating system shall* interfere with free passage through these areas. No portion of a *refrigerating system* containing a Group 2 *refrigerant shall* be permitted in public *hallways* or *lobbies* of Institutional or Public Assembly Occupancies. *Refrigerating systems* installed in a public *hallway* or *lobby shall* be limited to:

a) *Unit Systems* containing not more than the quantities of a Group 1 *refrigerant* specified in Table 1, or

b) *Sealed absortion systems* containing not more than 3 lbs (1.36 kg.) of a Group 2 *refrigerant* when in Residential and Commercial Occupancies.

6.1.3 When the refrigerant-containing parts of a system are located in one or more enclosed spaces, the cubical content of the smallest enclosed *humanly occupied space* other than the *machinery room, shall* be used to determine the permissible quantity of *refrigerant* in the system. Where a *refrigerating system* has *evaporator* coils serving individual stories of a building, the story having the smallest volume *shall* be used to determine the maximum quantity of *refrigerant* in the entire system.

6.1.4 When the *evaporator* is located in an *air duct* system, the cubical content of the smallest *humanly occupied* enclosed space served by the *air duct* system *shall* be used to determine the permissible quantity of *refrigerant* in the system. If the air flow to any enclosed space served by the *air duct* system cannot be shut off or reduced below one-quarter of its maximum, the cubical contents of the entire space served by the *air duct* system may be used to determine the permissible quantity of *refrigerant* in the system.

6.1.5 Where the return air space above a suspended ceiling is one continuous space and not an enclosed *air duct* in which the return air is confined, this space may be included in calculating the cubical content of the *humanly occupied space.*

6.1.6 In Institutional and Public Assembly Occupancies, direct *expansion coils* or *evaporators* used for air conditioning and located downstream from, and in proximity to, a heating coil, or located upstream within 18 in. (0.46m) of a heating coil, *shall* be fitted with a *pressure relief device* discharging to the outside of the building in an *approved* manner; except that such a relief device *shall not* be required on *unit* or *self-contained systems* if the internal volume of the *low side* of the system which may be shut off by valves, divided by the total weight of *refrigerant* in the system less the weight of *refrigerant* vapor contained in the other parts of the system at 110F (43.5 °C) exceeds the specific volume of the *refrigerant* at critical conditions of temperature and pressure.

NOTE: The above exemption is also stated in formula form below.

$V_1/W_1 - W_2$ *shall* be more than V_{gc}

where V_1 = low side volume, cu ft (cu m)

V_{gc} = specific volume at critical conditions of temperature and pressure, cu ft per lb (cu m per kg)

W_1 = total weight of refrigerant in system, lb (kg)

V_2 = total volume of system less V_1 cu ft (cu m.)

V_{gt} = specific volume of refrigerant vapor at 110F (43.5 °C), ft^3/lb (cu m/kg)

$W_2 = V_2/V_{gt}$ = weight of refrigerant vapor in V_2 at 110F (43.5°C)

6.2 Group 1 Refrigerants

6.2.1 *Direct Systems.* The maximum permissible quantity of a Group 1 *refrigerant* in a *direct system shall* be as specified in Table 1 except for additional limitations specified in 6.2.1.1 for Institutional Occupancies.

6.2.1.1 *Direct Systems* in Institutional Occupancies *shall* be limited to systems each containing not more

CHS-84-3

ADHESIVES MANUFACTURERS ASSOCIATION

One Illinois Center
111 East Wacker Drive
Chicago, Illinois 60601
312/644-6610

August 7, 1984

Secretary
U.S. Consumer Product Safety Commission
1111 18th Street, N.W.
Washington, DC 20207

RE: FHSA Flammability Regulation Amendments

Dear Ms. Dunn:

The Adhesives Manufacturers Association (AMA) appreciates the opportunity to comment on the proposed rule (Federal Register April 26, 1984, Volume 49, No. 82, p. 17956) concerning amendments to flammability regulations. AMA supports the Commission's efforts to standardize CPSC requirements relative to flammability. This will bring CPSC procedures into conformity with the practices of other Federal agencies and voluntary standard setting organizations.

AMA does urge that CPSC specificially reference the Pensky-Martin Closed Cup (ASTM-D-93) test as an acceptable test procedure along with the Setaflash Closed Cup (ASTM-D-3828) test which is cited in the proposed rule. While the proposed regulations do not prohibit the use of the Pensky-Martin Closed Cup method, it would appear that the burden of demonstrating equivalency rests with the testing party. This problem would be alleviated if CPSC would specifically reference the Pensky-Martin testing method as an option.

Such a reference would help further the CPSC goal of standardization since the Pensky-Martin Closed Cup test is more commonly specified by the other agencies such as the

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Department of Transportation, Occupational Safety and Health Administration, and several international organizations. In view of this widely accepted use of Pensky-Martin, we respectfully request that CPSC list this as an acceptable testing method.

We appreciate your consideration of this request.

Sincerely yours,

Michael Payne
Director - Government Relations

MP/sb

Koppers Company, Inc.
Occupational Health and Product Safety
440 College Park Drive, Monroeville, PA 6
Telephone 412-327-3000

CH3-07-7

Charles W. Flickinger
Manager
Industrial Hygiene

August 15, 1984

Sadye E. Dunn, Secretary
U.S. Consumer Product Safety Commission
Washington, D. C. 20207

Dear Madam:

This correspondence is in reference to: "FHSA Flammability Regulations - Amendments" as proposed in the Federal Register of April 26, 1984, and contains the comments relative to problems foreseen not only by Koppers Company, Inc., but by the entire industrial sector that manufacturers and/or formulates "combustibles" for the consumer marketplace. This major problem is in the differences between DOT definitions of "combustible" and the Proposed CPSC definition of "combustible."

Currently the DOT specifies flammable liquids as those materials having a flashpoint below 100° F, 49 CFR 173.115(a). Subsequently, the DOT has a classification for "combustible" liquids that includes those with flashpoints at or above 100°F and up to and including 199°F. Several problems could arise for Koppers Company especially in the area of our coatings with flashpoints near 100°F. CPSC would rule these materials as flammable, however, for shipment purposes, the DOT would not require flammable labeling and would permit shipments under an exception for combustible liquids per 49 CFR 173.118a. There may be considerable confusion when these products are stored or warehoused.

Another consideration should be shipments for export under the IMDG Code. The current criteria for flammable liquids under this code specifies flashpoints at or below 141°F as "flammable." We are already experiencing difficulty with many products that fall within the range of 100-141°F since shipments within the U.S. would only require a "combustible" classification. For export, however, these containers must be re-marked as "flammable" to comply with international regulations. There has been a general movement, although very slow in coming, to amend U.S. shipping regulations, bringing them more in line with international standards already established. It would be impossible to speculate when the amendments would be effective but the consensus of regulatory agencies indicates this is the direction the current shipping regulations are progressing. Resultingly, we may find that the DOT combustible classification may be totally eliminated and only materials at or below 141°F will be considered flammable.

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Koppers recommendation to the CPSC is to align both the testing methods and definitions with current practices established by the U.S. Department of Transportation. Thus, Koppers Company, Inc. is stating that the CPSC's Flashpoint Ranges and Test Methods must correspond to DOT's Ranges and Test Methods. This should be specifically cited in 16 CFR 1500.3(c)(6)(ii) for the term "flammable" as follows: "flammable" 21°F through and including 99°F and in 16 CFR 1500.3(c)(6)(iii) for the term "combustible" as follows: "combustible" 100°F through and including 200°F.

The CPSA's thorough consideration of the Koppers Company, Inc. comments toward these Proposed Rules will be greatly appreciated.

Very truly yours,

C. W. Flickinger
Manager
Industrial Hygiene

CWF:em

cc: Building Products Sector
Occupational Health & Products Safety Department
Traffic & Transportation Department

CH 3-84-5

THE ADHESIVE AND SEALANT COUNCIL
Suite 910 • 1600 Wilson Boulevard • Arlington, VA 22209 • Phone: (703) 841-1112

August 22, 1984

Secretary
U. S. Consumer Products
Safety Commission
Washington, DC 20207

Re: FHSA Flammability Regulations - Amendments

Dear Ms. Dunn:

The Adhesive and Sealant Council (ASC) respectfully responds to the Commission's request for comments on the captioned proposal as published in the April 26, 1984, Federal Register. ASC is the trade association of the nation's leading manufacturers of consumer and industrial adhesives and sealants.

INTEREST OF ASC

ASC has long worked with the Commission on the issue of flammability regulations and the flammability characteristics of different products manufactured by our industry. During the mid-1970's ASC was an active participant in Commission proceedings regarding extremely flammable contact adhesives and, at that time, recommended that the Commission adopt the Setaflash Closed Cup test method for determining flammability.

ASC COMMENTS

ASC commends the Commission for its proposal to, in fact, adopt the Setaflash Closed Cup test method for determining flammability. In advocating this amendment in the past, ASC pointed out that the Setaflash method is more easily reproduced; it generally is more accurate; and, it already is specified by other Federal agencies including the Department of Transportation and the Occupational Safety and Health Administration.

ASC also commends the Commission's recognition of the burdens and costs associated with retesting products and possible reformulation should the proposed amendment be adopted. Clearly, it would be inequitable to force retesting, and in some cases, reformulation, merely because the Commission would specify a different test method that could lead to slightly different results.

Similarly, ASC commends the Commission for its provision to permit classification exemptions where flash point testing may give a false indication of hazard,as well as the provision to exempt mixtures that contain less than 1 percent of a contaminant with a lower flashpoint. Certain products such as extremely viscous substances, or mixtures of substances, may, in actual conditions of use, pose a far lower hazard than indicated by the raw flashpoint test results. The Commission appears to have recognized these facts in the proposed amendments.

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While ASC has long advocated the adoption of the Setaflash Closed Cup test method, we recognize that other flashpoint test methods may, at times, be superior for certain substances. In proposed Section 1500.43(a), which specifies the Setaflash test method, the Commission also appears to recognize this fact when it permits "test methods which produce equivalent results". We would propose that the Commission specifically recognize the Pensky-Martens test procedure (ASTM-D93) in this section.

The Pensky-Martens test procedure often is specified both by Federal agencies, international organizations and voluntary standards-setting organizations. For example, both the Department of Transportation and the Occupational Safety and Health Administration recognize the Pensky-Martens test in certain regulations. See CFR §173.115(d) and 29 CFR §1910.106a(14). In addition, the International Maritime Organization, the International Civil Aviation Organization, and the International Air Transport Association, as well as the National Fire Prevention Association, all reference the Pensky-Martens test. Specific reference to this test in the CPSC regulations would better assist the agency in achieving the flexibility provided in §1500.43.

CONCLUSION

In conclusion, ASC strongly supports the Commission's proposed amendments as examples of cost effective regulation that, where possible, avoids needless burdens on industry. With the minor suggested revisions, we believe that the proposal will fully achieve the results intended by Congress in its 1978 amendments to the Federal Hazardous Substances Act.

Respectfully,

Jules Rapp

Jules Rapp
Executive Vice President

JR kj

CH 3-84-6

Union Oil Company of California KLM-196
Union Oil Center, Box 7600, Los Angeles, California 90051
Telephone (213) 977-7044

Kenneth L. McGinnis
Manager, Loss Prevention

August 20, 1984

Secretary
U. S. Consumer Product Safety
Commission
Washington, D.C. 20207

"FHSA Flammability Regulations
- Amendments"

Dear Madam:

The purpose of this letter is to comment on the Amendments proposed in the Federal Register on Thursday, April 26, 1984, (49 Fed. Reg. 17956).

On Page 17957, Paragraph C, "Reasons for the Proposed Amendments", begins, "The proposed amendments would bring the Commission's regulations into general conformity with the provisions of most other Federal agencies with respect to the flammability testing of hazardous substances." We believe the proposed flashpoint limits are not consistent with other governmental agencies.

For example, the Department of Transportation defines "combustible" as any substance having a flashpoint at or above 100°F but below 200°F. The Occupational Safety and Health Administration defines a "combustible liquid" as any liquid having a flashpoint at or above 100°F.

In order to be consistent with other governmental agencies and to simplify compliance by manufacturers, Union Oil Company recommends that the Amendment be modified as shown:

- Section 1500.3(c) (6).
  "(iii) The term "combustible" shall apply to any substance having a flashpoint at or above 100°F but below 200°F. . .

  A) Any mixture having one component or more with a flashpoint at 200°F or higher . . ."

Thank you for the opportunity to comment on these proposed Amendments.

Sincerely,

Kenneth L. McGinnis

ejs
cc: B. M. Dixon
A. A. Totten

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CH5-84-7

Founded 1914

Suite 1120
1001 Connecticut Avenue, NW
Washington, DC 20036
202/872-8110

CHEMICAL SPECIALTIES MANUFACTURERS ASSOCIATION

August 23, 1984

Office of the Secretary
U.S. Consumer Product Safety Commission
Washington, DC 20207

Re: FHSA Flammability Regulations - Amendments (49 FR 17956, April 26, 1984)

Dear Sir or Madam:

The Chemical Specialties Manufacturers Association (CSMA) is a voluntary, nonprofit trade association composed of some 400 companies engaged in the manufacture, distribution, and marketing of chemical specialty products such as: automotive chemicals; home, lawn, and garden pesticides including disinfectants and sanitizers; detergents and cleaning compounds; waxes, polishes, and floor finishes; and aerosol products. Many of these products are subject to the labeling and other requirements of the Federal Hazardous Substances Act (FHSA). CSMA is therefore vitally interested in the Commission's proposed amendments to the regulations for classifying extremely flammable, flammable, and combustible substances and the labeling of consumer products subject to the FHSA.

CSMA supports the goal of these proposed amendments to bring FHSA flammability procedures into general conformity with the requirements of other federal agencies such as the Department of Transportation. We would, however, like to express some concerns regarding specific aspects of these amendments, and offer modifications which we believe would improve the present regulatory requirements. Our comments are organized according to the specific subsections of Code of Federal Regulations Section 1500 to which they pertain.

Sections 1500.3(c)(6)(ii)(A) and 1500.3(c)(6)(iii)(A)

These sections would change the flashpoint criteria for distinguishing between "flammable" and "combustible" products from 80°F to 100°F, i.e., "flammable" is redefined to include substances with a flashpoint between 20°F and 100°F (instead of

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20°F to 80°F) and "combustible" is defined to include substances with a flashpoint between 100°F and 150°F (instead of 80°F to 150°F). In addition, the Commission admits in the introduction to this proposal that most products with open-cup flashpoints around 100°F will have closed-cup flashpoints about 5°F to 10°F lower. The combined effect of these two changes is, therefore, to change the criteria for distinguishing between "flammable" and "combustible" products by 25°F to 30°F.

CSMA does not believe that CPSC has adequately justified the need for this major change in criteria, which will result in a number of products considered as only "combustible" under present requirements being redefined as "flammable" under the requirements of this amendment. In lieu of justifying the need for this change, the Commission simply states, "Few if any new costs are likely to be incurred by manufacturers as a result of this proposed amendment."

If CPSC has data or experience regarding products with flashpoints between 80°F and 100°F indicating a need to reclassify those products as "flammable" instead of "combustible", this information should be made available for public review. If this change in criteria is simply an arbitrary change, we urge the Commission to reconsider this aspect of the regulatory amendments.

Sections 1500.3(c)(6)(ii)(B) and 1500.3(c)(6)(iii)(B)

In the definitions of "flammable" and "combustible" liquid mixtures, exemptions are given for certain aqueous mixtures containing 24 percent or less alcohol. Section 1500.3(c)(6)(ii)(B) states, "Any aqueous mixture containing 24 percent or less alcohol by volume is not considered to be flammable if the remainder of the mixture does not otherwise present any flammability hazard". Section 1500.3(c)(6)(iii)(B) states, "Any aqueous mixture containing 24 percent or less alcohol by volume is not considered to be combustible if the remainder of the mixture does not present any flammability hazard." It is not clear whether the remainder of the mixture (meaning the individual components other than alcohol) should be tested by the method described in Section 1500.43. There are several ways in which these definitions could be interpreted. We recommend that Section 1500.3(c)(6)(ii)(B) be clarified as follows: "Any aqueous mixture containing 24 percent or less alcohol by volume is not considered to be flammable if the remainder of the mixture does not otherwise present any flammability hazard when tested in accordance with the test methods outlined in Section 1500.43." Section 1500.3(c)(6)(iii)(B) should read: "Any aqueous mixture containing 24 percent or less alcohol by volume is not considered to be combustible if the remainder of the mixture does not present any flammability hazard when tested in accordance with the test method outlined in Section 1500.43."

Section 1500.3(c)(6)(vii)

This section of the amendment retains the present regulatory definition of "extremely flammable" for aerosol products, which states, "'Extremely flammable contents of self-pressurized container' means contents of a self-pressurized container that, when tested by the method described in Section 1500.45, a flashback (a flame extending back to the dispenser) is obtained at any degree of valve opening and the flashpoint, when tested by the method described in Section 1500.43, is less than 20° (6-6.7°C)." This definition requires that the flashpoint of an aerosol concentrate, isolated by means of the procedure given in Section 1500.46 and determined by the procedures in Section 1500.43, be used in establishing whether a product in a self-pressurized container is "extremely flammable". This flashpoint, therefore, is used in addition to the flame-extension test described in Section 1500.45 in defining the "extremely flammable" category. (It is not used in the definitions of "flammable" and "combustible" for aerosol products.)

CSMA's Aerosol Scientific Committee has adopted a position, based on its members' extensive expertise in aerosol technology and consumer safety, that flashpoints of aerosol product concentrates have insufficient correlation with aerosol consumer product safety to be used in this definition. This position applies regardless of whether the flashpoint or firepoint is determined by an open-cup or closed-cup procedure. We believe that the present criteria for flame-extension and flashback as determined by the procedures in Section 1500.45 are adequate in defining an "extremely flammable" aerosol product. We therefore strongly urge CPSC to eliminate the reference to flashpoint in Section 1500.3(c)(6)(vii) and eliminate Section 1500.46 which gives the procedures for isolating the aerosol concentrate for flashpoint determination.

There are a number of factors which make self-pressurized aerosol products fundamentally different from liquids and solids regarding their potential flammability hazards. The flammable constituents of aerosol products are potentially ignitable only when the aerosol valve is activated, and the contents emitted through the valve. The flame extension test currently required under FHSA for evaluating aerosol product flammability closely represents actual use conditions, and evaluates the total aerosol formulation, including propellant. The flashpoint methodology in the current regulations, and in these proposed amendments, bears little resemblance to actual use conditions, and is intended to evaluate only the aerosol concentrate, giving no consideration to the aerosol propellant.

There are also some additional technical problems with the use of the procedure in Section 1500.46 of the FHSA regulations to isolate the aerosol concentrate for use in flashpoint testing. Many aerosol products with hydrocarbon propellants (i.e., propane, butane and/or isobutane) will retain some hydrocarbon gas dissolved in the concentrate. These residual dissolved flammable gases often cause earlier, lower temperature flashes,

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and may make it difficult to determine which flash represents the true flashpoint of the aerosol concentrate. This difficulty with the present procedure, using an open cup flashpoint method, would be further exacerbated in changing to a closed cup procedure, where the propellant gas can more easily attain an ignitable concentration.

If the Commission believes that the flame extension test in Section 1500.45 is not adequate as the sole test in defining "extremely flammable" aerosol products, we urge CPSC to substitute a procedure which has a greater relevance to consumer safety than the present flashpoint procedures. In any case, CSMA believes that it is totally unjustifiable to require aerosol products to be retested by a closed-cup flashpoint procedure when such new data would have no reasonable relationship to consumer product safety evaluation.

At present, only the FHSA requires flashpoint testing for aerosol products. CSMA believes that eliminating this requirement would be a valuable step toward the general conformity with other federal requirements which CPSC states as the primary goal of these amendments.

Section 1500.43(a)(1)

This section specifies the use of a Setaflash low-range closed tester, or "an apparatus producing equivalent results." For certain types of products, an alternative closed-cup procedure may be warranted. For instance, very viscous or film-forming products require a stirring apparatus to determine accurate flashpoints. These types of products, therefore, may be better tested by the equipment and procedures of ASTM D-93, Standard Test Methods for Flash Point by Pensky-Martens Closed Tester.*

We believe the Commission should specify more than one type of approved tester to eliminate confusion regarding what the Commission considers to be an equivalent apparatus, especially since the preamble mentions several other testers, but goes on to say that, "the different test apparatus do not normally give the same test results and do not provide a constant relationship among all of the results obtained."

CSMA recommends that the first sentence of Section 1500.43(a)(1) be followed by the sentence, "Examples of other testers would be the Pensky-Martens apparatus or the Cleveland Closed Cup apparatus."

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* ASTM D-93 is this test's designation by the American Society for Testing and Materials and the American National Standards Institute; the method is also recognized by the Institute of Petroleum as Designation: 34/71.

Section 1500.43(a)(4)

With regard to the classification of a product as to potential flammability hazard, this section states, "If experience or other data indicate that the flammability hazard of a substance is greater or less than that indicated by the method specified here, the Commission may by regulation classify the substance in a different category than that indicated by the results of this test method."

We interpret this section to mean that only the Commission can use experience or other data to classify a substance in a different category. It is unclear how the Commission will perform this classification, especially if the history of the product indicates a lesser hazard. Is the intention that a company must petition CPSC, or will CPSC independently look at substances to make the determination?

Section 1500.4 of the present regulations gives the manufacturer/distributor of a substance the flexibility to determine if human experience takes precedence over animal data for purposes of toxicity labeling. In order for the policies in the proposed amendment to be consistent with the labeling policies presently reflected in Section 1500.4 of the present regulations, we recommend that Section 1500.43(a)(4) be revised as follows:

> If experience or other reliable data indicate that the flammability hazard of a substance is greater than or lesser than that indicated by the method specified here, the manufacturer or other party responsible for the labeling may use such experience or other data in determining the classification of the substance. Further, the Commission may by regulation classify the substance in a different category than that indicated by the results of this test method.

Section 1500.43(d)

This section states that the essential dimensions and requirements of the Setaflash apparatus are shown in figure 1 and table 3. The only "figure 1" in the proposal, however, is that showing the Tagliabue open-cup apparatus on page 17961. We trust that the deletion of the "figure 1" refered to in Section 1500.43(d) was an editorial oversight, and will be added in any final regulation.

Summary and Conclusions

CSMA appreciates the opportunity to comment on these proposed amendments to the FHSA flammability regulations. The Association urges CPSC to make the additional modifications recommended in these comments. CSMA believes that if these

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changes are made, this proposed amendment could succeed in bringing FHSA regulations into closer conformity with those of other federal agencies, while minimizing the burdens to those who must comply, and assuring that consumer products under CPSC jurisdiction are accurately and properly labeled with regard to potential flammability hazards.

Sincerely,

Ralph Engel
President

cmw

CH2-84-8

American Petroleum Institute
1220 L Street, Northwest
Washington, D.C. 20005
202-682-8300

William F. O'Keefe
Vice President

August 22, 1984

The Honorable Sadye E. Dunn
Secretary
U. S. Consumer Product Safety Commission
Washington, D.C. 20207

Re: "FHSA Flammability Regulations - Amendments"

Dear Madam:

The American Petroleum Institute (API) is a non-profit trade organization representing approximately 240 companies engaged in all aspects of the petroleum industry. API, in general, supports the amendment of Chapter II, Subchapter C, Part 1500 of Title 16 of the Code of Federal Regulations, proposed in the Federal Register on Thursday, April 26, 1984 (49 Fed. Reg. 17956). However, we offer the following comments on this proposal.

The stated purpose of the proposed rule is to bring the flammability classifications of hazardous substances into general conformity with the practices of other federal agencies and voluntary standards; yet, the proposed limits are inconsistent with flashpoint limit values of the other agencies. For example, the Department of Transportation (DOT) regulations define "combustible" as any substance "having a flashpoint at or above 100°F but below 200°F" (49 C.F.R. 172:101). In addition, the Occupational Safety and Health Administration defines a combustible liquid as having, "... a flashpoint at or above 100°F" (29 C.F.R. 1910.106, Subpart H-Hazardous Materials). The CPSC proposal is therefore clearly inconsistent with existing DOT and OSHA regulations.

The preamble states that the Commission discourages overlabeling of products having a flashpoint ranging from 150°F to 200°F. Products having flashpoints to 200° must be labeled under the final OSHA Hazard Communication Standard (48 Fed. Reg. 53280 - November 25, 1983) as combustible. If some of these products were to become consumer products, the manufacturer would also be required to label under the CPSC regulatory standard. This would result in inconsistent product labeling.

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Therefore, to conform to and be compatible with DOT Hazardous Materials Regulations (49 CFR 173.115), the OSHA Hazard Communications Standard (29 CFR 1910.1200) and ANSI Z129.1, API recommends that the following definitions in the proposed rule be amended to read in part:

1. Section 1500.3(c)(6).

   "(i) The term "extremely flammable" shall apply to any substance which has a flashpoint below 20°F..."

2. Section 1500.3(c)(6).

   "(ii) The term "flammable" shall apply to any substance having a flashpoint at or above 20°F but below 100°F..."

   (A) Any mixture having one component or more with a flashpoint at 100°F or higher..."

3. Section 1500.3(c)(6).

   "(iii) The term "combustible" shall apply to any substance having a flashpoint at or above 100°F but below 200°F..."

   (A) Any mixture having one component or more with a flashpoint at 200°F or higher..."

API recommends that the Commission uphold its purpose, conforming with other regulations, and adopt these definitions.

We thank you for this opportunity to comment on this proposal.

Sincerely,

William F. O'Keefe
Vice President

CA 3-84-9

ERDCO® Engineering Corporation

August 21, 1984

Secretary
U.S. Consumer Products Safety Commission
Washington, D.C. 20207

Subject: "FHSA Flammability Regulations - amendments"

Dear Sir:

Please consider the following recommendations to change the proposed Amendments to Flammability Regulations:

Federal Register/Vol. 49, No. 82/Thursday, April 26, 1984/Proposed Rules

Paragraph	Comment(s) and suggested corrections
1500.3 (c)(6)(ii) (B)	Delete the exemption for materials containing up to 24 percent alcohol if the remainder of the mixture does not present a flammability hazard. There is no assurance that the alcohol will remain in solution.
1500.3 (c)(6)(iii) B	Delete the exemption for materials containing up to 24 percent alcohol if the remainder of the mixture does not present a flammability hazard. There is no assurance that the alcohol will remain in solution.
1500.3 (c)(6)(iv) 2nd sentence	Substitute "ASTM Test Method D 1310" for "the Tagliabue." This allows continuous reference to a standard test method and emphasizes reference to a single source of information, ASTM. Please note that ASTM Thermometers are referenced in subsequent paragraphs. It also reduces the use of Trademarks.
Appendix I to 1500.3 (1.)	Substitute "ASTM Test Method D 1310" for "the Tagliabue" in 3 locations of the sentence.

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12b

Paragraph	Comment(s) and suggested corrections
Appendix I to 1500.3 (3.)	Substitute "ASTM Test Method D 1310" for "the Tagliabue."
1500.43	Substitute "ASTM Test Method D 1310" for "the Tagliabue" in title of paragraph.
1500.43 (2.) and (3.)	Substitute "ASTM Test Method D 1310" for "the Tagliabue."
1500.43 (3.)(g)	Substitute "ASTM Test Method D 92 Open-Cup" for "Cleveland Open Cup." [ASTM designation: D 92]. This allows continuous reference to a standard test method and emphasizes reference to a single source of information, ASTM. It also reduces the use of Trademarks.
1500.43 (4.)(c)	Substitute the word "superceded" for "old Tagliabue."
1500.43 (a)(1)	Substitute "an equilibrium closed-cup tester" for "a Setaflash low-range closed tester." In the second sentence substitute "an" for "a Setaflash." In the same sentence delete "Standard Test Methods" for "Flash Point by Setaflash Closed Tester." NOTE: An alternate equilibrium method for Flash, No-Flash is ASTM Test Method D 3934-82 and for finite flash point is ASTM Test Method D 3941-82. Reference that Setaflash is a registered trademark of Stanhope-Seta Limited, Surrey, England is no longer needed.

Paragraph	Comment(s) and suggested corrections
1500.43 (d)	Substitute "as described in ASTM Test Method D 3828, D 3934 or D 3941" for "a Setaflash tester." In second sentence, substitute "closed cup flash point tester" for "Setaflash apparatus." In the third sentence substitute "flash point tester" for "Setaflash." In fifth sentence substitute "distributors supplying laboratories and alternately from ERDCO Engineering Corporation, Post Office Box 1310, Evanston, Illinois 60204" for "ERDCO Engineering Corp., 136 Official Road, Addison, Illinois 60101 or Stanhope-Seta Ltd., Egham, Surrey England." This helps to direct users to the normal channel of supply which are the distributors and deletes reference to a foreign source in a United States enforcement document. This also follows the policy of not listing foreign sources when United States sources are available. Renumber the notes on page 17963.
1500.43 Table 2	Revise Note B to read "When in position, the thermometer bulb should be surrounded with heat-conducting thermoplastic compound (such as a past comprised of zinc oxide and minerial oil)."

As clarification or additional information is desired, please advise.

Sincerely,

E.M. Nesvig
- ERDCO -

EMN/bw

ERDCO® Engineering Corporation

August 27, 1984

Secretary
U.S. Consumer Products Safety Commission
Washington, D.C. 20207

Subject: "FHSA Flammability Regulations - amendments"
Reference: ERDCO letter dated August 21, 1984

Dear Sir:

Please accept the following correction to the last item on page two (2) of the August 21, 1984 ERDCO letter by substituting the following:

Paragraph	Comment(s) and suggested corrections
1500.43 (a)(1)	Substitute "an equilibrium closed-cup tester with range up to 100°C (212°F)" for "a Seta-flash low-range closed tester." In the second sentence substitute "an" for "a Setaflash." In the same sentence delete "Standard Test Methods for Flash Point by Setaflash Closed Tester." NOTE: There is an alternate equilibrium method for Flash, No-Flash which is ASTM Test Method D 3934-82 and for finite flash point is ASTM Test Method D 3941-82. Reference 1 that Seta-flash is a registered trademark of Stanhope-Seta Limited, Surrey England is no longer needed.

Also, please correct the last item on page three (3) of the August 21, 1984 ERDCO letter by substituting the following:

1500.43 Table 2	Revise note B to read "When in position, the thermoneter bulb should be surrounded with heat-conducting thermoplastic compound (such as a paste comprised of zinc oxide and mineral oil)."

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ERDCO® Engineering Corporation

Your acceptance of these changes is appreciated.

Sincerely,

E. M. Nesvig
-ERDCO-

EMN/at

CONSUMER PRODUCT SAFETY COMMISSION

16 CFR Part 1500

Hazardous Substances and Articles; Amendment of Flammability Regulations

AGENCY: Consumer Product Safety Commission.

ACTION: Final rule.

SUMMARY: The Commission issues final amendments to regulations for classification of extremely flammable, flammable, and combustible hazardous substances which release ignitable vapors. These amendments change the definitions of these classes of hazardous substances for purposes of labeling and other requirements imposed by the Federal Hazardous Substances Act. The amendments also prescribe a different apparatus and procedure than those currently used for testing to determine flammability classification. The Commission is issuing these amendments to bring its regulations for classification of flammable hazardous substances into closer conformity with those of other Federal agencies and test methods used by voluntary standards setting organizations.

EFFECTIVE DATE: The amendments become effective [insert date which is one year after publication of this notice.]

FOR FURTHER INFORMATION CONTACT: Charles M. Jacobson, Division of Regulatory Management, Consumer Product Safety Commission, Washington, D.C. 20207; telephone (301) 492-6400. Technical inquiries concerning the test apparatus and procedure specified in this rule should be directed to Donald F. McCaulley, Health Sciences Laboratory, Consumer Product Safety Commission, Washington, D.C. 20207; telephone (202) 245-1445.

SUPPLEMENTARY INFORMATION: The Consumer Product Safety Commission issues final amendments to regulations implementing the Federal

Hazardous Substances Act (FHSA) (15 U.S.C. § 1261 et seq.) and codified at 16 CFR Part 1500 which are applicable to classification of flammable hazardous substances. The amendments issued below change the definitions of the terms "extremely flammable," "flammable," and "combustible" hazardous substances in § 1500.3(c)(6). The amendments also revise provisions of § 1500.43 to prescribe use of a closed-cup apparatus and procedure for determining flashpoint temperature of volatile substances. The amendment of § 1500.43 issued below specifies use of the Setaflash closed tester and a procedure which closely parallels the test method designated ASTM D 3828-81 "Standard Test Methods for Flash Point by Setaflash Closed Tester," published by the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

A. Background

The Federal Hazardous Substances Act requires, among other things, cautionary labeling for household products that are hazardous substances because of their flammability or combustibility. Examples of these products include gasoline, kerosene, lighter fluids, alcohol, solvents, paint, and paint thinners. Nearly 11,000 persons seek treatment in hospital emergency rooms each year for burns associated with the use of flammable liquids. At least 100 persons die each year as a result of burn injuries associated with these products. (1)*/

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*/ References in parentheses are to the Bibliography at the end of this notice.

As originally enacted in 1960, and amended in 1969, the FHSA defined the terms "extremely flammable," "flammable," and "combustible" for purposes of labeling and other requirements applicable to volatile household products on the basis of flashpoint temperature. The FHSA further required determination of flashpoint temperature by one particular test identified as the "Tagliabue Open-Cup Method."

Classification of the flammability of household products is necessary to advise consumers of the relative fire hazards presented by materials that can burn. In the classification of the flammability of materials, one property usually considered is the lowest temperature at which the material will release vapors that can be ignited by an external source of ignition. (2) This temperature, called flashpoint temperature, can be determined experimentally for liquids, viscous liquids (pastes, gels, and semi-solids) and some solid materials by a flashpoint test. Although many test methods exist for determining flashpoint temperature, they all involve slowly heating the substance to be tested in an open or closed container, while an ignition source is periodically introduced into the vapor space of the material. The lowest temperature at which the vapors ignite is the flashpoint.

While the flashpoint temperature of a substance does not by itself provide a complete evaluation of the fire hazard of a material, flashpoint testing is generally reproducible and is relatively quick and simple to perform. Additionally, the equipment used to determine flashpoint temperature is relatively inexpensive. For these reasons, determination of flashpoint temperature forms the most commonly used

basis for classification of the flammability hazards of vapor-producing materials. (2)

Section 2(l) of the FHSA (15 U.S.C. § 1261(l)) currently prescribes use of the Tagliabue open-cup tester to determine flashpoint temperature for flammability classification of volatile household products. However, this apparatus is not the only item of laboratory equipment available for flashpoint testing. Other test equipment commonly used to determine flashpoint temperature includes the Setaflash closed-cup tester; the Setaflash open-cup tester; the Pensky-Martens closed-cup tester; the Tagliabue closed-cup tester; and the Cleveland open-cup tester. (2)

The different kinds of test equipment do not usually give exactly the same flashpoint temperature for the same material, and often do not provide a constant relationship among all of the results obtained. Additionally, different test methods using the same item of test equipment can yield different flashpoint temperatures for the same material. Because various Federal agencies, and state and local governments have issued requirements for flammable materials which specify determination of flashpoint temperature using different kinds of equipment and different test methods, a lack of uniformity exists among those requirements.

In an effort to achieve greater consistency among flammability requirements of the Federal agencies, the Department of Transportation (DOT) amended its regulations applicable to labeling and shipments of hazardous materials in 1974 to make those rules generally compatible with flammability regulations issued by the Occupational Safety and

Health Administration (OSHA) of the Department of Labor, and model flammability requirements published by the National Fire Protection Association. The amended requirements for labeling and shipment of hazardous materials issued by DOT are codified at 49 CFR Parts 100 through 189, and are similar to the OSHA rules codified at 29 CFR § 1910.106(a) in their specification of closed-cup apparatus and test procedures for determining flashpoint temperatures of volatile materials. The amended DOT regulations also include requirements for supplementary testing to prevent incorrect classification of materials resulting from contaminants or additives that raise or lower flashpoint temperatures obtained from laboratory testing without substantially affecting the fire performance of the materials.

After DOT amended its regulations for labeling and shipment of hazardous materials, the Commission remained among a few Federal agencies which continued to specify an open-cup test method for determination of flashpoint temperatures in flammability regulations. As noted above, provisions of section 2(l) of the FHSA defined the terms "extremely flammable," "flammable," and "combustible" hazardous substances by reference to flashpoint temperatures as determined by the Tagliabue open-cup method, thereby requiring the Commission to use that particular test procedure in its administration and enforcement of the FHSA. As a result, many product labelers and manufacturers were required to perform closed-cup flashpoint tests for purposes of compliance with regulations applicable to shipment and storage of hazardous materials enforced by DOT, and open-cup flashpoint tests for purposes of

product labeling and other requirements of the FHSA and implementing regulations.

In 1978, Congress amended section 2(l) of the FHSA by adding provisions which direct the Commission to issue regulations to define the terms "extremely flammable," "flammable," and "combustible" hazardous substance, and to specify the test method for defining the flammability characteristics of those categories of hazardous substances. The 1978 amendments also direct the Commission to consider definitions and test methods used by other Federal agencies in regulations governing shipments, storage, and use of flammable and combustible materials, and to the extent possible, to establish compatible definitions and test methods in the regulations implementing the FHSA. (See Pub. L. 95-631, 92 Stat. 3742, November 10, 1978.)

Until the Commission issues the regulations described in the 1978 amendments to section 2(l) of the FHSA, the definitions of the terms "extremely flammable," "flammable," and "combustible" hazardous substance as enacted in 1960 and amended in 1969 remain in effect.

B. Proposed Amendment of FHSA Flammability Regulations

In the Federal Register of April 26, 1984 (49 F.R. 17956), the Commission proposed to amend the regulations for classification of flammable hazardous substances in accordance with provisions of the 1978 amendments of the FHSA.

The Commission proposed to amend § 1500.43 of the FHSA flammability regulations to prescribe a closed-cup apparatus and procedure for determining flashpoint temperatures of volatile household substances.

The proposal specified use of a Setaflash closed tester, and a procedure which closely parallels the test method designated ASTM D 3828-81, "Standard Test Methods for Flash Point by Setaflash Closed Tester," published by the American Society for Testing and Materials. (9)

The Commission also proposed to amend §§ 1500.3(b)(10) and 1500.3(c)(6) of the FHSA regulations to prescribe new definitions of the terms "extremely flammable," "flammable," and "combustible" hazardous substances. In addition to providing for determination of flashpoint temperatures by use of the closed-cup apparatus and procedure described in proposed § 1500.43, the proposed amendment of § 1500.3(c)(6) specified that the term "extremely flammable" would apply to substances having a flashpoint temperature of 20° F or lower; that the term "flammable" would apply to substances having a flashpoint temperature above 20° F to and including 100° F; and that the term "combustible" would apply to substances having a flashpoint temperature above 100° F to and including 150° F. (9)

Existing provisions of the FHSA and §§ 1500.3(b)(10) and 1500.3(c)(6) define the term "extremely flammable" to include any substance with a flashpoint temperature of 20° F or lower, as determined by the Tagliabue open-cup method. Existing provisions of the FHSA and implementing regulations define the term "flammable" to mean any substance with a flashpoint temperature above 20° F to and including 80° F; and the term "combustible" to mean any substance with a flashpoint temperature above 80° F to and including 150° F.

In the notice of proposal, the Commission observed that the proposed change to the definition of the term "flammable" hazardous substance could affect products that are currently classified as "combustible" and have open-cup flashpoints from 80° F to about 110° F, or closed-cup flashpoints from about 75° F to 100° F. As a result of this proposed change, some products having flashpoints in the range described above which currently are labeled "combustible" would be reclassified as "flammable," and would require new labeling to comply with the amended regulations.

After consideration of a report on the anticipated economic consequences of the proposed change from an open-cup to a closed-cup test for determination of flashpoint temperatures for purposes of compliance with requirements of the FHSA (4), the Commission decided to add provisions to the proposed amendment of § 1500.3(c)(6) allowing product manufacturers and labelers to continue to rely on results of open-cup flashpoint testing for purposes of compliance with FHSA requirements as long as no change is made to the formulation or labeling of the product.

In order to minimize costs to product manufacturers and labelers which might result from the proposed amendments, the Commission also decided to retain 150° F as the upper limit for classification as a "combustible" hazardous substance, rather than to extend the range of flashpoint temperatures for the "combustible" category to 200° F to achieve closer conformity with the classification system in the DOT regulations.

In the notice of proposal, the Commission observed that changing from an open-cup to a closed-cup test for determination of flashpoint temperature will benefit many product manufacturers and labelers because they will no longer be required to perform separate open-cup tests for compliance with FHSA requirements in addition to closed-cup tests for shipping and storage requirements. The Commission estimated that a reduction in testing costs of 40 percent could result for manufacturers and labelers who perform their own testing. (9) The Commission also estimated that changing from an open-cup test to a closed-cup test could reduce total testing costs for all firms subject to FHSA flammability requirements by $1 million a year. (9)

C. Comments on Proposal

In response to the notice of April 26, 1984, the Commission received comments from H.B. Fuller Co. (10), Control Data Corporation (11), Adhesives Manufacturers Association (12), Koppers Company, Inc. (13), The Adhesive and Sealant Council (14), Union Oil Company of California (15), Chemical Specialties Manufacturers Association (16), American Petroleum Institute (17), and Erdco Engineering Corporation (18). The issues raised by these comments and the Commission's resolution of those issues are discussed below.

1. Alternate apparatus and test method. Comments from H.B. Fuller Co. (10), Adhesives Manufacturers Association (12), The Adhesive and Sealant Council (14), and Chemical Specialties Manufacturers Association (16) urge the Commission to modify provisions of proposed § 1500.43 to specify an alternate test apparatus and procedure in

addition to the Setaflash closed-cup tester and the procedure specified in the proposal. All of these comments suggested the Pensky-Martens closed-cup apparatus and ASTM test method D-93 as appropriate alternatives to the apparatus and procedure specified in the proposal. Three comments (10,12,14) state that regulations for classification of flammable materials issued by the Department of Transportation and the Occupational Safety and Health Administration of the Department of Labor prescribe more than one test apparatus and procedure for determining flashpoint, and include the Pensky-Martens apparatus and ASTM test method D-93 among the equipment and procedures specified in those regulations.

Comments concerning the test apparatus and procedure specified in the proposal observe that § 1500.43(a)(1) of the proposal states that manufacturers and labelers of products subject to the requirements of the FHSA may use other test equipment or procedures which yield results equivalent to those obtained by using the apparatus and procedure specified in the proposed amendment. However, the comments express the view that the Commission should recognize a particular alternate apparatus and test procedure as yielding equivalent results, rather than place the burden of establishing equivalence of results on regulated firms.

In the notice of proposal, the Commission observed that while a variety of test equipment, including the Pensky-Martens closed-cup apparatus, is available for determining flashpoints, the different test apparatus do not usually yield the same results from tests of the same material. Moreover, when different materials are tested using the

different kinds of equipment, a constant relationship often does not exist among the results obtained. (9)

For these reasons, the Commission cannot specify by rule an alternate apparatus and procedure which will yield results equivalent to those obtained by using the Setaflash closed-cup tester and the procedure specified below for all of the materials which may be subject to regulation under the FHSA. However, individual manufacturers or labelers of products may be able to establish that an apparatus or procedure other than the one specified in § 1500.43 will yield results which can be relied upon by firms to determine whether their products meet applicable requirements established by the FHSA and implementing regulations.

The Commission's purpose in proposing to amend § 1500.43 was to change the apparatus and procedure which the Commission will use when testing products to determine if they comply with labeling or other requirements imposed under provisions of the FHSA. If the Commission made the change requested by the comments under consideration, it would be required to test products using both the Setaflash tester and procedure and the alternate apparatus and procedure, and to consider results from both tests before initiating any enforcement action. The Commission finds that specification of more than one type of apparatus and more than one test procedure in a regulation which prescribes testing to determine compliance with requirements imposed by law or regulation is not practical.

The Commission also has considered the possibility of specifying the Pensky-Martens closed-cup tester and ASTM test method D-93 rather than the apparatus and procedure set forth in the proposed amendment. However, the Commission finds that the Setaflash tester and method set forth in the proposal are more reliable and convenient for compliance testing, and in most instances will yield more reproducible results than the Pensky-Martens apparatus and ASTM test method D-93. (19) For these reasons, the amendment issued below specifies the Setaflash closed-cup tester and a test method substantially similar to the one published in the proposal.

2. Flashpoint temperatures for classification of flammable and combustible hazardous substances. As noted above, the notice of April 26, 1984, not only proposed to change the equipment and procedure which the Commission will use to determine flashpoint temperatures of volatile materials subject to regulation under the FHSA, but also proposed to change the range of flashpoint temperatures in existing regulations for classifying "flammable" and "combustible" hazardous substances. When the Commission published its notice of proposal, provisions of section 2(l) of the FHSA (15 U.S.C. 1261(l)) and 16 CFR 1500.3(b)(10) classified any substance having a flashpoint at or below 20° F as "extremely flammable"; any substance having a flashpoint above 20° F to and including 80° F as "flammable"; and any substance having a flashpoint above 80° F to and including 150° F as "combustible." The notice of April 26, 1984, proposed to amend §§ 1500.3(b)(10) and 1500.3(c)(6) to classify any substance having a flashpoint above 20° F

to and including 100° F as "flammable," and any substance having a flashpoint above 100° F to and including 150° F as combustible."

Comments from Control Data Corporation (11), Koppers Company, Inc. (13), Union Oil Company of California (15), and American Petroleum Institute (17) urge the Commission to revise the temperature range for "flammable" hazardous substances to include temperatures above 20° F and below 100° F. These comments state that the requested change would make the temperature range for classification of "flammable" hazardous substances in the Commission's regulation compatible with the temperature range for materials classified as "flammable" by regulations issued by the Department of Transportation (DOT) at 49 CFR 173.115 and by the Occupational Safety and Health Administration (OSHA) at 29 CFR 1910.106(a). These comments state that unless such a change is made to the Commission's proposal, a substance having a flashpoint of 100° F would be classified as "flammable" by the Commission's regulations implementing the FHSA, but would be classified as "combustible" by regulations administered by DOT and OSHA. These comments observe that in the notice of April 26, 1984, the Commission stated that one of the purposes of the proposed amendments is to bring the Commission's regulations governing testing and classification of flammable materials into closer conformity with those of other Federal agencies.

A comment from Chemical Specialties Manufacturers Association (16) urges the Commission to retain existing provisions of the regulations implementing the FHSA which classify those substances as "flammable" which have a flashpoint above 20° F to and including 80° F. This

comment states that the proposed amendment of the FHSA flammability classification regulations would have the effect of requiring many products now classified as "combustible" hazardous substances to be reclassified as "flammable" hazardous substances. The comment asserts that the notice of proposal does not adequately explain the necessity for reclassification of those products. The comment also questions the basis for a statement in the notice of proposal that few if any new costs are likely to result to manufacturers from the proposed revision of the temperature range for classification of products as "flammable" hazardous substances.

In the notice of proposal, the Commission acknowledged that revisions of the range of flashpoint temperatures for classification of a substance as "flammable" could affect some products having flashpoint temperatures between 80° F and 110° F as determined by the open-cup method by causing them to be classified as "flammable" rather than "combustible." (9) In response to the comment questioning the necessity of such reclassification, the Commission observes that one of the purposes of the proposed amendments was to achieve greater consistency of product labeling required by provisions of the FHSA and implementing regulations with labeling on cartons for shipping and storage required by regulations administered by the Department of Transportation.

In response to that portion of the comment questioning the basis of the statement that few if any new costs are likely to result to manufacturers of products from the proposed amendments, the Commission observes that revision of the flashpoint temperature range for classification of

a product as a "flammable" hazardous substance will affect only those products which are already subject to combustibility or flammability labeling or other requirements of the FHSA. Manufacturers of products not previously subject to labeling or other requirements of the FHSA arising from its flammability are not affected by the proposed revision of the range of flashpoint temperatures for classification of a product as a "flammable" hazardous substance. The Commission recognizes that some costs would be associated with any change to the labeling of a product necessitated by its reclassification from a "combustible" hazardous substance to a "flammable" hazardous substance. However, the proposed amendment contained provisions to allow any firm to use the existing test procedure and classification schedule for labeling of any product subject to FHSA flammability requirements as long as no change is made in the formulation or labeling of a product. This option would minimize the potential cost of compliance with the proposed amendment.

After consideration of all of these comments, the Commission has revised § 1500.3(c)(6) of the amendments issued below to specify that substances having a flashpoint "above 20° F and below 100° F" shall be classified as "flammable." The Commission agrees with comments to the effect that this modification of the proposal will bring the Commission's regulations into closer conformity with requirements of other Federal agencies. While this modification of the proposal probably will affect a relatively small number of products, it is consistent with provisions of section 2(l) of the FHSA which require the Commission to

consider definitions used by other Federal agencies, and to the extent possible, establish compatible provisions in the FHSA regulations.

Comments from Koppers Company, Inc. (13), Union Oil Company of California (15), and American Petroleum Institute (17) also urge revision of the temperature range for classification of a material as a "combustible" hazardous substance to include flashpoints above 100° F and below 200° F, thereby making the Commission's provisions for classification of "combustible" substances consistent with those in regulations issued by the Department of Transportation.

During the development of the proposed amendments, the Commission considered the possibility of revising the upper limit of the range for classification of materials as "combustible" hazardous substances to include flashpoint temperatures of 200° F. However, a contractor's report on the economic consequences of amending the FHSA flammability regulations indicated that such a revision would cause a large number of products not currently subject to requirements under the FHSA to be labeled as "combustible" hazardous substances. (4) To avoid the costs of new labeling to manufacturers of products not currently subject to FHSA flammability requirements, the Commission decided to leave the upper flashpoint temperature for classification as a "combustible" hazardous substance at 150° F in the proposed amendments. (9).

Although consistency with labeling requirements of other Federal agencies is one of the Commission's objectives in this proceeding, the Commission concludes that complete achievement of that objective is not

warranted in view of the costs of new labeling requirements which would be imposed on products not currently subject to provisions of the FHSA.

A comment from Control Data Corporation (11) suggests revision of the proposal to establish 141° F as the upper limit of the flashpoint temperature range for classification of a product as a "combustible" hazardous substance. This comment states that such a revision would be consistent with labeling requirements established by the International Civil Aviation Organization and the International Maritime Organization, with recommendations of the United Nations Committee of Experts on Transportation of Dangerous Materials, and with proposed regulations published by the government of Canada in 1982.

Household products subject to regulation under the FHSA with flashpoint temperatures ranging from 141° F to 150° F include charcoal lighter fuels, patio torch fuels, various automotive supplies, some furniture polishes, and other household cleaning products. The Commission's experience gained from the administration and enforcement of the FHSA indicates that such products frequently present a hazard of combustibility from open-flame ignition sources when used by consumers in or around the home. (20)

As noted above, the 1978 amendments of section 2(1) of the FHSA direct the Commission to consider and seek consistency with flammability regulations established by other agencies of the United States government when issuing rules for classification and testing of flammable hazardous substances. The objective of the comment under consideration is that of obtaining consistency with flammability

labeling requirements established by international organizations.

The Commission has decided not to make the revision requested by this comment because it concludes that many of the products which would be affected by such a change present a hazard of combustibility when used in the household, and because such a change would not promote greater consistency of the Commission's regulations with flammability requirements of other agencies of the Federal government.

After consideration of all comments concerning modification of the range of flashpoint temperatures for classification of a product as a "combustible" hazardous substance, the Commission has revised § 1500.3(c)(6) of the amendments issued below to specify that substances

having a flashpoint temperature "at or above 100° F to and including 150° F" shall be classified as "combustible."

3. Exemption for products containing alcohol in solution. The proposed amendment of § 1500.3(c)(6) contained language to exempt products containing "24 per cent or less alcohol by volume" from classification as a "flammable" or "combustible" hazardous substance, provided that "the remainder of the mixture does not present any flammability hazard." In the notice of proposal, the Commission stated that these provisions were similar to exemptions in the regulations issued by the Department of Transportation, and had been added to avoid overstating the flammability hazard of certain mixtures which contain alcohol. The proposal cited some liquid dishwashing detergents containing alcohol as examples of products which may have a flashpoint temperature in the "flammable" range when tested with the Setaflash closed tester, but which can be used to extinguish fires. (9)

A comment from Erdco Engineering Company (18) objects to the exemption for products containing alcohol, and asserts that the Commission has no assurance that alcohol present in such products will remain in solution at all times.

When the Commission proposed the exemption for products containing 24 percent or less alcohol by volume, it contemplated that this exemption would be available only for products containing alcohol in solution. To express this limitation on the types of products eligible for the exemption more clearly, the amendment of § 1500.3(c)(6) issued

below describes them as "any mixture containing 24 percent or less of water miscible alcohol, by volume, in aqueous solution."

A comment from Chemical Specialties Manufacturers Association (16) states that the proposed exemption does not state clearly how the determination will be made as to whether the "remainder of the mixture" presents a "flammability hazard." This comment suggests the addition of language to state that the remainder of the mixture shall be tested using the apparatus and procedure set forth in the proposed amendment to determine if its flashpoint temperature falls within the range of a "flammable" or "combustible" hazardous substance.

When the Commission proposed the exemption for mixtures containing alcohol, the Commission did not intend to remove the alcohol from such products and then test them to determine flashpoint. Instead, the Commission intended to exempt mixtures containing alcohol in solution from labeling requirements applicable to "flammable" or "combustible" hazardous substances as long as they do not present a flammability hazard when used by consumers. To express that intent more clearly, the amendment of § 1500.3(c)(6) issued below exempts mixtures containing 24 percent or less alcohol, by volume, in solution from classification as "flammable" or "combustible" hazardous substances provided that "the mixture does not present a significant flammability hazard when used by consumers."

4. Flammability of products in self-pressurized containers. Existing provisions of §§ 1500.3(c)(6)(v) and (vi) of the rules implementing the FHSA prescribe a two-step process for classification of the

flammability of the contents of products in self-pressurized containers. The first step involves spraying the contents of the container in the direction of a lighted paraffin candle from a distance of six inches, measuring the distance that the flame projects, and observing whether the flame extends back to the container. This procedure is described at § 1500.45 of the existing rules. If a flame extends back to the container, the second step of the procedure is performed. This step involves exhausting the propellant from the container, removing a sample of the contents, and determining the flashpoint temperature of the contents. This procedure is described in the existing rules and in the proposal at § 1500.46.

The proposed amendments of the regulations prescribing procedures for testing substances to determine flashpoint temperatures and for classifying flammable hazardous substances did not contain any provision to change the procedures set forth in existing § 1500.45. The proposed amendments of §§ 1500.3(c)(6) and 1500.46 would affect testing and classification of products in self-pressurized containers only to the extent that a closed-cup apparatus and procedure would be used to determine flashpoint temperatures of the contents of such containers.

A comment from Control Data Corporation (11) urges the Commission to eliminate the procedures described in the proposed amendment at § 1500.46 for exhausting the propellant and removing the contents of a product from a self-pressurized container. This comment expresses the view that the procedure described in proposed § 1500.46 is unnecessary and dangerous. This comment recommends that tests to determine the flashpoint temperatures of the contents of a product in a self-

pressurized container should be conducted before the product is placed in the container. This comment also recommends classification of the flammability of products in self-pressurized containers on the basis of the type of gas used as the propellant.

A comment from Chemical Specialties Manufacturers Association (16) suggests elimination of the requirements in proposed § 1500.3(c)(6) for determination of the flashpoint temperature of a product in a self-pressurized container in the flammability classification of such a product. This comment states that the Aerosol Scientific Committee of Chemical Specialties Manufacturers Association has taken the position that flashpoint temperatures of products in self-pressurized containers have "insufficient correlation" with the safety of those products to be used in their classification as flammable hazardous substances. However, the comment does not make reference to any data or information considered by the committee, or describe the process by which the committee reached its conclusion.

The Commission recognizes that the procedure for classifying products in self-pressurized containers for flammability under the FHSA has been in existence for several years, and would be modified by the proposed amendments of §§ 1500.3(c)(6) and 1500.46 only by specifying a closed-cup apparatus and procedure for determination of flashpoint temperatures of the contents of such products. However, consideration of the various alternative procedures for flammability classification of products in self-pressurized containers recommended in the two comments under consideration would require extensive investigation and analysis

by the Commission staff. (19) At this time, the Commission lacks the resources necessary for such an undertaking. If at some future date, resources become available for evaluation of alternative procedures for flammability classification of products in self-pressurized containers, the Commission will consider the suggestions made in the comments under consideration. However, until the Commission is able to undertake a comprehensive review and evaluation of alternative procedures for flammability classification of products in self-pressurized containers, the Commission declines to make any of the changes recommended in these comments.

5. Classification of a substance on the basis of other experience or data concerning its flammability hazard. Section 1500.43(a)(4) of the proposed amendments states that if experience or other data indicate that the flammability hazard of a substance is greater or less than the classification which results from determination of its flashpoint temperature in accordance with proposed § 1500.43 and provisions of proposed § 1500.3(c)(6), the Commission may "by regulation" establish a different classification for that substance. A comment from Chemical Specialties Manufacturers Association (16) observes that the language of proposed § 1500.43(a)(4) does not clearly indicate if a product manufacturer or labeler may use other information or data to determine the appropriate classification of a substance in the absence of a rule issued by the Commission. This comment recommends the addition of language to the effect that product manufacturers and labelers may use experience or other reliable data indicating that the flammability

hazard of a substance is greater or less than the classification which results from determination of flashpoint temperature by the method set forth in § 1500.43. This comment suggests that without such a modification, proposed § 1500.43(a)(4) would require the manufacturer or labeler of a product to petition the Commission for rulemaking to change the product's flammability classification if the firm had information indicating that the classification which results from determination of flashpoint temperature does not accurately reflect the flammability hazard of the product.

The Commission included § 1500.43(a)(4) in the proposed amendments to advise regulated firms and all other interested parties that if the Commission has reason to believe that the flammability hazard of a substance is not appropriately indicated by its classification on the basis of flashpoint temperature and that the substance should be reclassified on the basis of experience or other data or information, the Commission will initiate a rulemaking proceeding to establish a different flammability classification. Such a proceeding will give all interested parties notice of the Commission's proposed change to the classification of a substance, a statement of the Commission's reasons for proposing reclassification, and an opportunity to comment on the proposal before the Commission takes final action.

The Commission did not intend to preclude product manufacturers or labelers from using experience or other data or information as a basis for compliance with applicable labeling and other requirements of the

FHSA in the absence of a Commission proceeding to reclassify a particular substance.

The Commission observes that the definition of the term "hazardous substance" in section 2(f)1(A) of the FHSA (15 U.S.C. § 1261(f)1(A)) requires that a substance must not only be "flammable," as defined by section 2(l) of the FHSA and regulations issued by the Commission, but must also present a risk of "substantial personal injury or substantial illness during or as a proximate result of any customary or reasonably foreseeable use" before the substance is subject to any requirements of the FHSA as a flammable hazardous substance. This definition requires consideration of any relevant information or data concerning experience with use of a product in addition to its flammability classification based on flashpoint temperature to determine whether the product is subject to labeling or other requirements of the FHSA.

For these reasons, the Commission has modified § 1500.43(a)(4) issued below to state that if the Commission has reason to believe from experience, information or other data that the flammability hazard of a substance is not appropriately characterized by its classification on the basis of flashpoint temperature and that the substance should be reclassified, the Commission will initiate a rulemaking proceeding for reclassification. The Commission has added language to state that product manufacturers and labelers may use reliable experience or other relevant information or data in addition to the flashpoint temperature of a substance as a basis for compliance with any applicable

requirements of the FHSA in the absence of a rule issued by the Commission to reclassify the substance.

6. Reliance on open-cup tests by product manufacturers and labelers. Section 1500.3(c)(6)(iv) of the proposed amendments states that the Commission will use the closed-cup apparatus and test procedure described in § 1500.43 of the proposal when testing for compliance with the requirements of the FHSA. However, proposed § 1500.43(c)(6)(iv) states that product manufacturers and labelers may continue to rely on properly conducted tests using the Tagliabue open-cup method and the definitions of the terms "extremely flammable," "flammable," and "combustible" which were in effect before the amendment of § 1500.3(c)(6) if all of the following conditions are met:

(1) The product was subject to FHSA requirements for "extremely flammable," "flammable," or "combustible" hazardous substances before the effective date of the amendment of § 1500.43; and

(2) No change has been made to the formulation or labeling of the product after the effective date of the amendment of § 1500.43.

The Commission included the provisions of § 1500.43(c)(6)(iv) in the proposal to minimize any adverse economic impact which the proposed amendments may have on regulated firms, particularly small businesses.

A comment from Control Data Corporation (11) objects to the provisions of proposed § 1500.3(c)(6)(iv) allowing product manufacturers and labelers to continue reliance on open-cup flashpoint tests. This comment asserts that this section of the proposal will confer no benefit on regulated firms, and may result in violation of regulations issued by

the Department of Transportation and state governments. This comment states that requirements for disclosure of flashpoint temperatures as determined by closed-cup apparatus and test procedure may also be included in commercial contracts for purchase of materials.

Although this comment asserts that provisions of proposed § 1500.3(c)(6)(iv) will confer no benefit on regulated firms, the Commission has information indicating that the costs of retesting and relabeling products in accordance with provisions of the amendments issued below could be expected to range from $5,000 to $10,000 for a typical small manufacturer or labeler of products regulated under the FHSA. (4) This information also indicates that many small manufacturers would not be required to retest their products except for provisions of the amendments issued below, and in ordinary circumstances would change labels only once every five years. (4)

Provisions of proposed § 1500.3(c)(6)(iv) confer a benefit on these firms by allowing them to avoid the costs of retesting and relabeling their products solely for compliance with the amendments issued below. Instead, they may continue to use existing labels based on open-cup testing for purposes of compliance with FHSA requirements until they decide to reformulate or relabel their products in the normal course of business.

After the effective date of the amendments issued below, firms which rely on provisions of § 1500.3(c)(6)(iv) must comply with all applicable Federal and state laws and regulations requiring determination of flashpoint temperature by closed-cup testing. However, most of

those firms are currently subject to Federal or state requirements based on closed-cup tests for determination of flashpoint temperature, as well as FHSA labeling requirements based on open-cup tests for flashpoint temperature. For this reason, the Commission has no reason to conclude that provisions of § 1500.3(c)(6)(iv) are likely to cause firms to violate other Federal or state laws or regulations.

As indicated by the comment under consideration, provisions of the amendments issued below which prescribe a closed-cup apparatus and procedure for determination of flashpoint temperature will be advantageous to many manufacturers and labelers of products subject to requirements of the FHSA. The ability of those firms to derive benefits of the amendments issued below after their effective date will not be affected by provisions of § 1500.3(c)(6)(iv).

A comment from Erdco engineering Corporation (18) suggests revision of proposed § 1500.3(c)(6)(iv) to describe the open-cup test procedure set forth in § 1500.43 before the amendments issued below as "ASTM Test Method D 1310" instead of "the Tagliabue open-cup method." This comment also suggests revision of proposed Appendix I to § 1500.3 to describe the test equipment as the apparatus specified by "ASTM Test Method D 1310" rather than the "Tagliabue Open-Cup Tester," and to substitute the designation "ASTM Test Method D92" in place of the designation "Cleveland Open-Cup (ASTM designation D 92)." This comment states that the recommended changes would allow continuous reference to a standard test method, and would reduce the use of trademarks in the description of test apparatus.

The Commission has not made the changes to § 1500.3(c)(6)(iv) and Appendix I to § 1500.3 suggested by this comment. The Commission included provisions of § 1500.3(c)(6)(iv) and Appendix I in the proposed amendments to allow product manufacturers and labelers to continue to rely on tests conducted in accordance with provisions of § 1500.43 before the amendments issued below for compliance with applicable requirements of the FHSA. Appendix I to § 1500.3 reprints the language of §§ 1500.3(b)(10), 1500.3(c)(6), and 1500.43 as it appeared in the Code of Federal Regulations before the amendments issued below.

Although the revisions suggested by the comment under consideration appear to be editorial and non-substantive, they could affect testing requirements if the ASTM test methods referenced in the comment were not identical in all respects to the test methods and apparatus described in § 1500.3(c)(6)(iv) and Appendix I to § 1500.3. To assure that manufacturers and labelers may continue to rely on tests conducted in accordance with § 1500.43 before its amendment, the Commission is reprinting the text of former § 1500.43 without change in Appendix I to § 1500.3 issued below.

7. Other changes. A comment from Erdco Engineering Corporation (18) suggests revision of proposed § 1500.43(a)(1) to describe the apparatus which the Commission will use for determining flashpoint temperatures of products subject to FHSA requirements as "an equilibrium closed-cup tester with a range up to 100° C (212° F)" rather than a "Setaflash low-range closed tester." The Commission has not included this change in the amendments issued below because the Commission will

use the particular item of equipment specified in proposed § 1500.43(a)(1), and no other, for purposes of compliance testing. As noted in the discussion of comments concerned with alternate test apparatus, § 1500.43(a)(1) of the amendments issued below states that manufacturers and labelers may use any item of equipment which yields equivalent results when testing to determine if their products meet applicable requirements of the FHSA and implementing regulations.

However, in response to the same comment, the Commission has revised § 1500.43(d), issued below, to set forth the dimensions and requirements of the test equipment without reference to any particular brand or manufacturer. The Commission has also eliminated the reference to a particular brand of material from footnote B of Table 3, and has described the material in generic terms, as suggested by this comment.

D. Effective Date

In the notice of proposal, the Commission stated that it was considering establishment of an effective date for the proposed amendments one year after issuance on a final basis. The Commission stated that delaying the effective date of the amendments by one year should provide sufficient time for manufacturers and labelers to perform any additional testing relabeling of products which may be required by the amended flammability regulations. The Commission expressed its desire to minimize any adverse economic consequences which the amended regulations may have for manufacturers and labelers of products which would be reclassified from "combustible" to "flammable" hazardous substances, and for small businesses.

The notice of proposal specifically solicited comment on the issue of an appropriate effective date for the amendments; however, none was received.

All information currently available to the Commission indicates that an effective date one year after issuance of the final amendments will minimize any adverse economic consequences which they may have on regulated firms, including manufacturers and labelers whose products are reclassified by the amended regulations, and small businesses. Therefore, the amendments issued below shall become effective on [insert date which is one year after date of publication].

E. Impact on Small Businesses

Section 603 of the Regulatory Flexibility Act (5 U.S.C. § 601 et seq.) requires agencies to prepare an initial regulatory flexibility analysis of the impact of a proposal on small businesses, unless the agency certifies in accordance with section 605 of that act that the proposed rule will not have a significant economic impact on a substantial number of small entities, including small businesses, if issued on a final basis. The notice of proposal included the Commission's certification that the proposed amendments would not have a significant economic impact on a substantial number of small businesses.

In that notice, the Commission observed that provisions of proposed § 1500.3(c)(6)(iv) allow continued reliance on Tagliabue open-cup flashpoint tests by manufacturers and labelers as long as no change is made to the formulation or labeling of a product, thereby minimizing any potentially adverse economic impact of the amendments on small

businesses. The notice of proposal also stated that while the amendments would in some cases decrease costs for small businesses by eliminating the need for separate open-cup testing for compliance with FHSA requirements, the potential economic benefit for most small businesses was not expected to be significant.

None of the comments on the proposal addressed the economic impact of the amendments on small businesses. The Commission has not received any other information concerning the economic impact of the amendments on small businesses. For these reasons, the Commission affirms the certification made in the notice of proposal that the amendments issued below will not have a significant economic impact on a substantial number of small entities, including small businesses.

F. Statutory Requirements

Section 2(l) of the FHSA, as amended, provides that in establishing definitions and test methods related to flammability and combustibility, the Commission must consider existing definitions and test methods of other Federal agencies involved with regulation of flammable and combustible substances, and to the extent possible, establish compatible definitions and test methods.

As explained in this notice and in the proposal, the Commission has considered the definitions and test methods for the flammability of hazardous substances issued by other Federal agencies, including the Department of Transportation and the Department of Labor. Based on all information currently available, the Commission concludes that the definitions and test method established by the amendments issued below

are compatible to the extent possible with those of other Federal agencies.

G. Conclusion and Promulgation

After consideration of the proposal of April 26, 1984, comments received in response to that proposal, information provided by the Commission staff, and other relevant information, the Commission hereby amends the definitions of the terms "extremely flammable," "flammable," and "combustible" hazardous substances, and regulations implementing the FHSA which prescribe the apparatus and procedure for determining flash-point temperatures of volatile substances.

List of Subjects in 16 CFR Part 1500

Consumer protection, Hazardous substances, Labeling

PART 1500-[AMENDED]

Therefore, in accordance with provisions of the Federal Hazardous Substances Act (secs. 2(1), 10(a); 15 U.S.C. § 1261(1), 1269(a)) and under the authority of the Consumer Product Safety Act (sec. 30(a); 15 U.S.C. § 2079(a)), the Commission hereby amends Chapter II, Subchapter C, Part 1500 of Title 16 of the Code of Federal Regulations, as follows:

1. Section 1500.3(b)(10) is revised to read as follows:

§ 1500.3 Definitions.

* * * * *

(b) * * *

(10) The terms "extremely flammable," "flammable," and

"combustible" as they apply to any substance, liquid, solid, or the contents of any self-pressurized container, are defined by regulations issued by the Commission and published at § 1500.3(c)(6).

* * * * *

2. Section 1500.3(c)(6) is revised to read as follows:

* * * * *

(c) * * *

(6) The Consumer Product Safety Commission, by the regulations published in this section, defines the terms "extremely flammable," "flammable," and "combustible," appearing in section 2(l) of the Federal Hazardous Substances Act, as follows:

(i) The term "extremely flammable" shall apply to any substance which has a flashpoint at or below 20° F (-6.7°C) as determined by the test method described at § 1500.43, except that, any mixture having one component or more with a flashpoint higher than 20° F (-6.7° C) which comprises at least 99 percent of the total volume of the mixture is not considered to be an extremely flammable substance.

(ii) The term "flammable" shall apply to any substance having a flashpoint above 20° F (-6.7° C) and below 100° F (37.8° C), as determined by the method described at § 1500.43, except that:

(A) Any mixture having one component or more with a flashpoint at or above 100° F (37.8° C) which comprises at least 99 percent of the total volume of the mixture is not considered to be a flammable substance; and

(B) Any mixture containing 24 percent or less of water miscible alcohols, by volume, in aqueous solution is not considered to be flammable if the mixture does not present a significant flammability hazard when used by consumers.

(iii) The term "combustible" shall apply to any substance having a flashpoint at or above 100° F (37.8° C) to and including 150° F (65.6° C) as determined by the test method described at 1500.43, except that:

(A) Any mixture having one component or more with a flashpoint higher than 150° F (65.6° C) which comprises at least 99 percent of the total volume of the mixture is not considered to be a combustible hazardous substance; and

(B) Any mixture containing 24 percent or less of water miscible alcohols, by volume, in aqueous solution is not considered to be combustible if the mixture does not present a significant flammability hazard when used by consumers.

(iv) To determine flashpoint temperatures for purposes of enforcing and administering requirements of the Federal Hazardous Substances Act applicable to "extremely flammable," "flammable," and "combustible" hazardous substances, the Commission will follow the procedures set forth in § 1500.43, as amended. However, the Commission will allow manufacturers and labelers of substances and products subject to those requirements to rely on properly conducted tests using the Tagliabue open-cup method which was in effect prior to the amendment of § 1500.43 (as published at 38 FR 27012, September 27, 1973; reprinted at

Appendix I of this section) and the definitions of the terms "extremely flammable," "flammable," and "combustible" in this section before its amendments (as published at 38 FR 27012, September 27, 1983, and amended 38 FR 30105, November 1, 1973; reprinted at Appendix I of this section) if all of the following conditions are met;

(A) The substance or product was subject to and complied with the requirements of the Federal Hazardous Substances Act for "extremely flammable," "flammable," or "combustible" hazardous substances before the effective date of the amendment of § 1500.43; and

(B) No change has been made to the formulation or labeling of such substance or product after the effective date of the amendment of § 1500.43 to prescribe a closed-cup test apparatus and procedure.

(v) "Extremely flammable solid" means a solid substance that ignites and burns at an ambient temperature of 80° F or less when subjected to friction, percussion, or electrical spark.

(vi) "Flammable solid" means a solid substance that, when tested by the method described in § 1500.44, ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.

(vii) "Extremely flammable contents of self-pressurized container" means contents of a self-pressurized container that, when tested by the method described in § 1500.45, a flashback (a flame extending back to the dispenser) is obtained at any degree of valve opening and the flashpoint, when tested by the method described in § 1500.43 is less than 20° F (-6.7° C).

(viii) "Flammable contents of self-pressurized container" means contents of a self-pressurized container that, when tested by the method described in § 1500.45, a flame projection exceeding 18 inches is obtained at full valve opening, or flashback (a flame extending back to the dispenser) is obtained at any degree of valve opening.

3. Section 1500.3 is amended by adding an Appendix I, as follows:

Appendix I

1. Definitions of "extremely flammable," "flammable, and "combustible" hazardous substances in 16 CFR 1500.3(b)(10), as published in 38 F.R. 27012, September 27, 1973, and amended by 38 F.R. 30105, November 1, 1973:

> "Extremely flammable" shall apply to any substance which has a flashpoint at or below 20° F. as determined by the Tagliabue Open Cup Tester; "flammable" shall apply to any substance which has a flashpoint of above 20° F., to and including 80° F., as determined by the Tagliabue Open Cup Tester; and "combustible" shall apply to any substance which has a flashpoint above 80° F. to and including 150° F., as determined by the Tagliabue Open Cup Tester; except that the flammability or combustibility of solids and of the contents of self-pressurized containers shall be determined by methods found by the Commission to be generally applicable to such materials or containers, respectively, and established by regulations issued by the Commission, which regulations shall also define the terms "flammable," "combustible," and "extremely flammable" in accord with such methods.

2. Definitions of "extremely flammable" and "flammable" hazardous substances in 16 CFR 1500.3(c)(6) as published at 38 F.R. 27012, September 27, 1973:

> (i) "Extremely flammable" means any substance that has a flashpoint at or below 20° F. as determined by the method described in § 1500.43.
> (ii) "Flammable" means any substance that has a flashpoint of above 20° F., to and including 80° F., as determined by the method described in § 1500.43.

3. Method for test for flashpoint of volatile flammable materials by Tagliabue open-cup apparatus in 16 CFR 1500.43, as published at 38 F.R. 27012, September 27, 1973:

§ 1500.43 Method of test for flashpoint of volatile flammable materials by Tagliabue open-cup apparatus.

SCOPE

1. (a) This method describes a test procedure for the determination of open-cup flashpoints of volatile flammable materials having flashpoints below 175° F.

(b) This method, when applied to paints and resin solutions which tend to skin over or which are very viscous, gives less reproducible results than when applied to solvents.

OUTLINE OF METHOD

2. The sample is placed in the cup of a Tag Open Tester, and heated at a slow but constant rate. A small test flame is passed at a uniform rate across the cup at specified intervals. The flashpoint is taken as the lowest temperature at which application of the test flame causes the vapor at the surface of the liquid to flash, that is, ignite but not continue to burn.

APPARATUS

3. The Tag open-cup tester is illustrated in Fig. 1. It consists of the following parts, which must conform to the dimensions shown, and have the additional characteristics as noted:

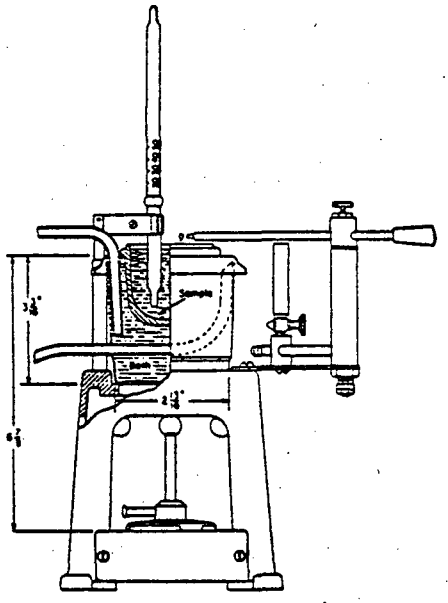

FIGURE 1—*Tag open-cup flash tester.*

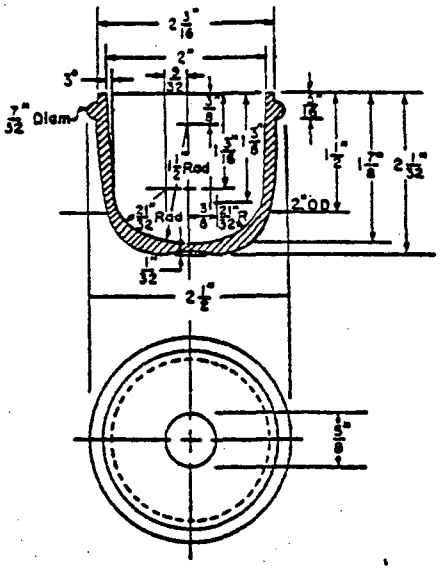

FIGURE 2—*Glass test cup.*

(a) *Copper bath*, preferably equipped with a constant level overflow so placed as to maintain the bath liquid level ¼ inch below the rim of the glass cup.

(b) *Thermometer holder.* Support firmly with ringstand and clamp.

(c) *Thermometer.* For flashpoints above 40° F., use the ASTM Tag Closed Tester Thermometer, range of +20 to +230° F., in 1° F. divisions, and conforming to thermometer 9F. of ASTM Standard E 1. For flashpoints from 20° F. to 40° F., use ASTM Tag Closed Tester, Low Range, Thermometer 57F. For flashpoints below 20° F., use ASTM Thermometer 33F. The original Tag Open-Cup (Paper Scale) Thermometer will be a permissible alternate until January 1, 1962. It is calibrated to −20° F.

(d) *Glass test cup.* Glass test cup (Fig. 2), of molded clear glass, annealed, heat-resistant, and free from surface defects.

(e) *Leveling device.* Leveling device or guide, for proper adjustment of the liquid level in the cup (Fig. 3). This shall be made of No. 18-gage polished aluminum, with a projection for adjusting the liquid level when the sample is added to exactly ¼-inch below the level of the edge or rim of the cup.

FIGURE 3—*Leveling device for adjusting liquid level in test cup*

(f) "Micro," or small gas burner of suitable dimensions for heating the bath. A screw clamp may be used to help regulate the gas. A small electric heater may be used.

(g) Ignition taper, which is a small straight, blow-pipe type gas burner. The test flame torch prescribed in the method of test for flash and fire points by Cleveland Open Cup (ASTM designation: D 92) is satisfactory.

(h) Alternative methods for maintaining the ignition taper in a fixed horizontal

plane above the liquid may be used, as follows:

(1) Guide wire, $\frac{1}{32}$-inch in diameter and 3¼ inches in length, with a right-angle bend ¼-inch from each end. This wire is palced snugly in holes drilled in the rim of the bath, so that the guide wire is ⅛-inch from the center of the cup and resting on the rim of the cup.

(2) Swivel-type taper holder, such as is used in ASTM METHOD D 92. The height and position of the taper are fixed by adjusting the holder on a suitable ringstand support adjacent to the flash cup.

(i) Draft shield, consisting of two rectangular sheets of noncombustible material, 24 inches x 28 inches, are fastened together along the 28-inch side, preferably by hinges. A triangular sheet, 24 inches x 24 inches x 34 inches is fastened by hinges to one of the lateral sheets (to form a top when shield is open). The interior of the draft shield shall be painted a flat black.

PROCEDURE

4. (a) Place the tester on a solid table free of vibration, in a location free of perceptible draft, and in a dim light.

(b) Run water, brine, or water-glycol solution into the bath to a predetermined level, which will fill the bath to ¼-inch below the top when the cup is in place. An overflow is permissible for water-level control.

(c) Firmly support the thermometer vertically halfway between the center and edge of the cup on a diameter at right angles to the guide wire, or on a diameter passing through the center of the cup and the pivot of the taper. Place so that the bottom of the bulb is ¼-inch from the inner bottom surface of the cup. If the old Tagliabue thermometer is used, immerse to well cover the mercury bulb, but not the wide body of the thermometer.

(d) Fill the glass cup with the sample liquid to a depth just ¼-inch below the edge, as determined by the leveling device.

(e) Place the guide wire or swivel device in position, and set the draft shield around the tester so that the sides form right angles with each other and the tester is well toward the back of the shield.

(f) If a guide wire is used, the taper, when passed, should rest lightly on the wire, with the end of the jet burner just clear of the edge of the guide wire. If the swivel-type holder is used, the horizontal and vertical positions of the jet are so adjusted that the jet passes on the circumference of a circle, having a radius of at least 6 inches, across the center of the cup at right angles to the diameter passing through the thermometer, and in a plane ¼-inch above the upper edge of the cup. The taper should be kept in the "off" position, at one end or the other of the swing, except when the flame is applied.

(g) Light the ignition flame and adjust it to form a flame of spherical form matching in size the $\frac{1}{32}$-inch sphere on the apparatus.

(h) Adjust heater source under bath so that the temperature of the sample increases at a rate of 2 ±0.5° F. per minute. With viscous materials this rate of heating cannot always be obtained.

INITIAL TEST

5. Determine an approximate flashpoint by passing the taper flame across the sample at intervals of 2° F. Each pass must be in one direction only. The time required to pass the ignition flame across the surface of the sample should be 1 second. Remove bubbles from the surface of the sample liquid before starting a determination. Meticulous attention to all details relating to the taper, size of taper flame, and rate of passing the taper is necessary for good results. When determining the flashpoint of viscous liquids and those liquids that tend to form a film of polymer, etc., on the surface, the surface film should be disturbed mechanically each time before the taper flame is passed.

RECORDED TESTS

6. Repeat the procedure by cooling a fresh portion of the sample, the glass cup, the bath solution, and the thermometer at least 20° F. below the approximate flashpoint. Resume heating, and pass the taper flame across the sample at two intervals of 5° F. and then at intervals of 2° F. until the flashpoint occurs.

REPORTING DATA

7. The average of not less than three recorded tests, other than the initial test, shall be used in determining the flashpoint and flammability of the substance.

STANDARDIZATION

8. (a) Make determinations in triplicate on the flashpoint of standard paraxylene and of standard isopropyl alcohol which meet the following specifications:

(1) *Specifications for p-xylene, flashpoint check grade.* p-xylene shall conform to the following requirements:

Specific gravity: 15.56° C./15.56° C., 0.860 minimum, 0.866 maximum

Boiling range: 2° C. maximum from start to dry point when tested in accordance with the method of test for distillation of industrial aromatic hydrocarbons (ASTM designation: D 850), or the method of test for distillation range of lacquer solvents and diluents (ASTM designation: D 1078). The range shall include the boiling point of pure p-xylene, which is 138.35° C. (281.03° F.).

Purity: 95 percent minimum, calculated in accordance with the method of test for de-

termination of purity from freezing points of high-purity compounds (ASTM designation: D 1016), from the experimentally determined freezing point, measured by the method of test for measurement of freezing points of high-purity compounds for evaluation of purity (ASTM designation: D 1015).

(ii) *Specifications for isopropanol, flashpoint check grade.* Isopropanol shall conform to the following requirements:

Specific gravity: 0.8175 to 0.8185 at 20° C./20° C. as determined by means of a calibrated pycnometer.

Distillation range: Shall entirely distill within a 1.0° C. range which shall include the temperature 80.4° C. as determined by ASTM method D 1078.

Average these values for each compound. If the difference between the values for these two compounds is less than 15° F. (8.5° C.) or more than 27° F. (16° C.), repeat the determinations or obtain fresh standards.

(b) Calculate a correction factor as follows:

$$X = 92 - A$$
$$Y = 71 - B$$

$$\text{Correction} = (X + Y)/2.$$

Where:

A = Observed flash of *p*-xylene, and
B = Observed flash of isopropyl alcohol.

Apply this correction of all determinations. Half units in correction shall be discarded.

PRECISION

9. (a) For hydrocarbon solvents having flashpoints between 60° F. and 110° F., repeatability is ±2° F. and the reproducibility is ±5° F.

(b) If results from two tests differ by more than 10° F., they shall be considered uncertain and should be checked. The calibration procedure provided in this method will cancel out the effect of barometric pressure if calibration and tests are run at the same pressure. Data supporting the precision are given in Appendix III of the 1956 Report of Committee D-1 on Paint, Varnish, Lacquers and Related Products, Proceedings, Am. Soc. Testing Mats., Vol. 56 (1956).

4. Section 1500.43 is revised to read as follows:

§ 1500.43 Method of test for flashpoint of volatile flammable materials.

(a) *Scope.* (1) This method describes the test procedure which the Commission will use for the determination of the flashpoint of volatile flammable materials, using a Setaflash [1] low-range closed tester, or an apparatus producing equivalent results. The method described in this section is essentially a Setaflash equilibrium procedure which closely parallels the test method designated ASTM D 3828-81, "Standard Test Methods for Flash Point by Setaflash Closed Tester," published by the American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, Pennsylvania 19103. Manufacturers and labelers of products subject to labeling and other requirements under the Federal Hazardous Substances Act may use other apparatus and/or test methods which produce equivalent results.

(2) At the option of the user, the procedures described in this section may be used to determine the actual flashpoint temperature of a sample or to determine whether a product will or will not flash at a specified temperature (flash/no flash).

(3) If the substance to be tested has a viscosity greater than 150 Stokes at 77°F (25°C), see paragraph (n) of this section for modifications to the testing procedure.

(4) If the Commission has reason to believe on the basis of reliable experience or other relevant information or data that the flammability hazard of a substance is greater or less than its flammability classification based on flashpoint temperature determined in accordance with this § 1500.43 and that the substance should be reclassified, the Commission will initiate a rulemaking proceeding for reclassification of the substance. Product manufacturers and labelers may use reliable experience or other relevant information or data in addition to the flashpoint temperature of a substance as a basis for compliance with any applicable requirements of the Federal Hazardous Substances Act in the absence of a rule issued by the Commission to reclassify the substance.

1/ Setaflash is a registered trademark of Stanhope-Seta Limited, Surrey, England.

(b) *Summary of test methods.* (1) Method A—Flash/No Flash Test. A specified volume of sample is introduced by a syringe into the cup of the apparatus that is set and maintained at the specified temperature. After a specific time a test flame is applied and an observation made as to whether or not a flash occurred. Test procedures are set forth in detail in § 1500.43(i).

(2) Method B—Finite (or Actual) Flashpoint. (i) A specified volume of sample is introduced into the cup of the apparatus that is maintained at the expected flashpoint. After a specified time a test flame is applied and the observation made whether or not a flash occured.

(ii) The specimen is removed from the cup, the cup cleaned, and the cup temperature adjusted 5°C (9°F), lower or higher depending on whether or not a flash occurred [redacted] A fresh specimen is introduced and tested. This procedure is repeated until the flashpoint is established within 5°C (9°F).

previously

(iii) The procedure is then repeated at 1°C (2°F) intervals until the flashpoint is determined to the nearest 1°C (2°F).

(iv) If improved accuracy is desired the procedure is repeated at 0.5°C (1°F). Test procedures are set forth in detail at § 1500.43(j).

(3) The test procedures will be modified, where necessary, to ensure that the results obtained reflect the hazard of the substance under [redacted] foreseeable conditions of use. Thus, for example, the material, if a mixture, will normally be tested as it comes from the container, and/or after a period of evaporation. The period of evaporation for a material which is a mixture will normally be the time required for the mixture to evaporate in an open beaker under ambient conditions to 90 percent of its original volume, or a period of four hours, whichever occurs first. However, this period of evaporation will be changed if the results obtained do not represent the hazard of the substance under [redacted] foreseeable conditions of use.

reasonably

reasonably

(c) *Definition of flashpoint.* The lowest temperature of the sample, corrected to a barometric pressure of 101.3 kPa (760 mm Hg), at which application of a test flame causes the

vapor of the sample to ignite under specified conditions of test. The sample is deemed to have flashed when a large flame appears and instantaneously propagates itself over the surface of the sample. Occasionally, particularly near actual flashpoint, the application of the test flame will cause a halo or an enlarged flame; this is not a flash and should be ignored.

(d) The test apparatus is an equilibrium closed-cup tester with a range up to 100° C (212° F). The essential dimensions and requirements are shown in figure 1 and table 3, and are described in § 1500.43(m). Closed-cup flashpoint testers and accessories meeting these requirements are available from commercial suppliers and distributors of laboratory equipment.

(e) *Safety precautions.* The operator must exercise and take appropriate safety precautions during the initial application of the test flame to the sample. Samples containing low-flash material may give an abnormally strong flash when the test flame is first applied.

(f) *Preparation of samples.* (1) Erroneously high flashpoints may be obtained if precautions are not taken to avoid the loss of volatile material. In preliminary tests of materials taken directly from the container, do not open containers unnecessarily and make a transfer unless the sample temperature is at least 10°C (18°F) below the expected flashpoint. Do not use samples in leaky containers for this test.

(2) Do not store samples in plastic (polyethylene, polypropylene, etc.) bottles since volatile material may diffuse through the walls of the bottle.

(3) A 2-ml specimen is required for each test. If possible, obtain at least a 50-ml sample from the bulk test site and store in a clean, tightly closed container.

(g) *Preparation of apparatus.* (1) Place the tester on a level, stable surface. Unless tests are made in a draft-free area, surround the tester on three sides with a shield for protection. Do not rely on tests made in a laboratory draft hood or near ventilators.

(2) Read the manufacturer's instructions on the care and servicing of the instrument and for correct operation of its controls.

(h) *Calibration and standardization.* (1) Before initial use determine and plot the relationship between the temperature control dial and the thermometer readings at each major (numbered) dial division as follows:

Turn the temperature control knob[2] fully counterclockwise ("O" reading). Advance the temperature control knob clockwise until the indicator light is illuminated[3]. Advance the knob clockwise to the next numbered line. After the thermometer mercury column ceases to advance, record the dial reading and the temperature. Advance the knob clockwise to the next numbered line. After the thermometer mercury column ceases to advance, read the dial reading and the temperature. Repeat this procedure through the full range of the instrument. Plot the dial readings versus the respective temperatures.

(2) Standardize the instrument using sample of material meeting the specifications in table 1. If the average of two determinations falls within the acceptable limits the instrument is assumed to be operating properly. If the average of the two determinations does not fall within this range, check the manufacturer's operating and maintenance instructions and determine that they are being followed. In particular, be sure that the cup lid assembly makes a vapor-tight seal with the cup, the shutter provides a light-tight seal, and that adequate heat transfer paste surrounds the thermometer bulb and the immersed portion of the barrel.

(i) *Test Method A—for determining Flash/No Flash.*

(1) Determine the target flashpoint as follows:

(i) Target flashpoint, °C = $S_c - 0.25$ (101.3—A)

(ii) Target flashpoint, °C = $S_c - 0.03$ (760—B)

(iii) Target flashpoint, °F = $S_f - 0.06$ (760—B)

where:

S_c = specification, or uncorrected target, flashpoint, °C,

S_f = specification, or uncorrected target, flashpoint, °F,

B = ambient barometric pressure, mm Hg,[4] and

A = ambient barometer pressure, kPa.[4]

2/ If the instrument has two temperature control knobs, set the fine control (center, small knob) at its mid-position and allow it to remain there throughout the calibration. The calibration is determined by adjusting the coarse control (large, outer knob) only.

3/ When using the tester, it will be found that the indicator light may not illuminate and the temperature may not rise until a temperature control dial setting between one and two is reached.

4/ The barometric pressure used in this calculation must be the ambient pressure for the laboratory at the time of test. Many aneroid barometers, such as those used at weather stations and airports, are pre-corrected to give sea-level readings; these must not be used.

(2) Inspect the inside of the sample cup, lid, and shutter mechanism for cleanliness and freedom from contamination. Use an absorbent paper tissue to wipe clean, if necessary. Put cover in place and lock securely. The filling orifice may be conveniently cleaned with a pipe cleaner.

(3) Set the instrument at the target temperature.

(i) For target temperature below ambient. The instrument power switch is to be in the off position. Fill the refrigerant-charged cooling block with a suitable material. [5] Raise the lid and shutter assembly, and position the base of the block in the sample cup, being careful not to injure or mar the cup. When the thermometer reads approximately 6 to 10° C (10 to 20°F) below the target temperature, remove the cooling block and quickly dry the cup with a paper tissue to remove any moisture. Immediately close the lid and shutter assembly and secure. Prepare to introduce the sample using the syringe, both of which have been precooled to a temperature 5 to 10°C (10 to 20°F) below the target temperature.

(A) Caution: Do not cool the sample block below −38°C, the freezing point of mercury.

(B) Caution: Acetone is extremely flammable. Keep away from heat, sparks, and flames and keep container closed when not actually pouring acetone. Use only in a well-ventilated area. Avoid inhalation and contact with the eyes or skin. Use cloth or leather gloves, goggles or safety shield, and keep dry ice in a canvas bag, especially when cracking.

(ii) For target temperature above ambient. Switch the instrument on and turn the coarse termperature control knob fully clockwise (full on) causing the indicator light to illuminate. [6] When the thermometer indicates a temperature about 3°C (5°F) below the target (or specification) temperature, reduce the heat input to the sample cup by turning the coarse temperature control knob counter-clockwise to the desired control point (see § 1500.43(i)(1)). When the

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5/ If the target or specification temperature is not less than 5° C (40° F) crushed ice and water may be used as charging (cooling) fluid. If below 5° C (40° F), a suitable charging (cooling) fluid is solid carbon dioxide (dry ice) and acetone. If the refrigerant charged cooling module is unavailable, refer to the manufacturer's instruction manual for alternative methods of cooling.

6/ The target temperature may be attained by originally turning the coarse temperature control knob to the proper setting (see § 1500.43(h)(1)) for the temperature desired rather than the maximum setting (full on). The elapsed time to reach the temperature will be greater, except for maximum temperature. However, less attention will be required during the intervening period.

indicator light slowly cycles on and off read the temperature on the thermometer. If necessary, adjust the fine (center) temperature control knob to obtain the desired test (target) temperature. When the test temperature is reached and the indicator lamp slowly cycles on and off, prepare to introduce the sample.

(4) Charge the syringe with a 2-ml specimen of the sample [7] to be tested; transfer the syringe to the filling orifice, taking care not to lose any sample; discharge the test specimen into the cup by full depressing the syringe plunger, remove the syringe.

(5)(i) Set the timer 8/ by rotating its knob clockwise to its stop. Open the gas control valve and light the pilot and test flames. Adjust the test flame with the pinch valve to conform to the size of the 4-mm (5/32-in.) gage.

(ii) After the time signal indicates the specimen is at test temperature [8], apply the test flame by slowly and uniformly opening the shutter and closing it completely over a period of approximately 2½ s. [9] Watch closely for a flash at the cup openings.

(iii) The sample is deemed to have flashed when a large flame appears and instantaneously propagates itself over the surface of the sample (see § 1500.43(c)).

(6) Record the test results as "flash" or "no flash" and the test temperature.

(7) Turn off the pilot and test flames using the gas control valve. Remove the sample and clean the instrument. It may be necessary to allow the cup temperature to decline to a safe level before cleaning.

7/ For target or expected temperatures below ambient, both syringe and sample must be precooled to cup temperature (see § 1500.43(i)(3)(i)) before the specimen is taken.

8/ For target temperatures below ambient, do not set the timer. Adjust the test flame and allow the temperature to rise under ambient conditions until the target temperature is reached. Immediately apply the test flame as detailed.

9/ Never apply the test flame to the specimen more than once. Fresh portions of the sample must be used for each test.

10/ For expected flashpoints below ambient, do not set the timing device. Adjust the test flame. Allow the temperature to rise under ambient conditions until the temperature reaches 5° C (9° F) below the expected flashpoint. Immediately apply the test flame.

(j) *Test Method B—for determining Finite or Actual Flashpoint.* (1) Inspect the inside of the sample cup, lid, and shutter mechanism for cleanlines and freedom from contamination. Use an absorbent paper tissue to wipe clean, if necessary. Put cover in place and lock securely. The filling orifice may be conveniently cleaned with a pipe cleaner.

(2) For expected flashpoints below ambient. (i) The instrument power switch is to be in off position. Fill the refrigerant-charged cooling block with a suitable material.[5] Raise the lid and shutter assembly, and position the base of the block in the sample cup, being careful not to injure or mar the cup. When the thermometer reaches a temperature 5 to 10°C (10 to 20°F) below the expected flashpoint, remove the cooling block and quickly dry the cup with a paper tissue to remove any moisture. Immediately close the lid and shutter assembly and secure. Prepare to introduce the sample using the syringe, both of which have been precooled to a temperature 5 to 10°C (10 to 20°F) below the expected temperature (See § 1500.43(j)(5)).

(ii) Caution: Do not cool the sample block below −38°C, the freezing point of mercury.

(3) For tests where the expected flashpoint is above ambient. Turn the coarse temperature control knob fully clockwise (full on) causing the indicator light to illuminate. When the thermometer reaches a temperature 3°C (5°F) below the estimated flashpoint, turn the coarse temperature knob counter-clockwise to the dial reading representing the estimated flashpoint temperture as shown on the calibration curve (See § 1500.43(h)(l)). When the indicator light slowly cycles on and off, read the temperature on the thermometer. If necessary, adjust the fine temperature control knob to obtain the exact desired temperture.

(4)(i) Charge the syringe[7] with a 2 ml specimen of the sample[7] to be tested; transfer the syringe to the filling orifice, taking care not to lose any sample; discharge the test specimen into the cup by fully depressing the syringe plunger; remove the syringe.

(ii) Set the timer[10] by rotating its knob clockswise to its stop. Open the gas control valve and ignite the pilot and test flames. Adjust the test flame with the pinch valve to conform to the size of the 4-mm (5/32-in.) gage.

(iii) After the audible time signal indicates the specimen is at test temperature[10], apply the test flame by slowly and uniformly opening the shutter and then closing it completely over a period of approximately 2½ s. Watch closely for a flash at the cup opening.

(iv) The sample is deemed to have flashed only if a large flame appears and instaneously propagates itself over the surface of the sample. (See § 1500.43(c).)

(v) Turn off the pilot and test flames using the gas control valve. When the cup temperature declines to a safe level, remove the sample and clean the instrument.

(5)(i) If a flash was observed in § 1500.43(j)(4)(iii) repeat the procedure given in section 1500.43(j)(2) or (3), and in section 1500.43(j)(4), testing a new specimen at a temperature 5°C (9°F) below that at which the flash was observed.

(ii) If necessary, repeat the procedure in § 1500.43(j)(5)(i), lowering the temperature 5°C (9°F) each time, until no flash is observed.[9]

(iii) Proceed to § 1500.43(j)(7)

(6)(i) If no flash was observed in § 1500.43(j)(4)(iii) repeat the procedure given in § 1500.43(j)(2) or (3), and in § 1500.43(j)(4), testing a fresh specimen at a temperature 5°C (9°F) above that at which the specimen was tested in § 1500.43(j)(4)(iii).

(ii) If necessary repeat the procedure in § 1500.43(j)(6)(i), above, raising the temperature 5°C (9°F) each time until a flash is observed.[9]

(7) Having established a flash within two temperatures 5° C (9° F) apart, repeat the procedure at 1° C (2° F) intervals from the lower of the two temperatures until a flash is observed. 9/ Record the temperature of the test when this flash occurs as the flashpoint, allowing for any known thermometer correction. Record the barometric pressure. 4/

(8) The flashpoint determined in § 1500.43(j)(7) will be to the nearest 1°C (2°F). If improved accuracy is desired (that is, to the nearest 0.5°C (1°F)), test a fresh specimen at a temperature 0.5°C (1°F) below that at which the flash was observed in § 1500.43(j)(7). If no flash is observed, the temperature recorded in § 1500.43 (j)(7), is the flashpoint to the nearest 0.5°C (1°F). If a flash is observed at the lower temperature, record this latter temperature as the flashpoint.

(9) Turn off the pilot and test flames using the gas control valve. When the cup temperature declines to a safe level, remove the sample and clean the instrument.

(k) *Calculations.* If it is desired to correct the observed finite flashpoint for the effect of barometric pressure, proceed as follows: Observe and record the ambient barometric pressure at the time of the test. If the pressure differs from 101.3 kPa (760 mm Hg), correct the flashpoint as follows:

(1) Corrected flashpoint (°C) = C + 0.25 (101.3-A)

(2) Corrected flashpoint (°F) = F + 0.06 (760-B)

(3) Corrected flashpoint (°C) = C + 0.03 (760-B)

Where: F = Observed flashpoint, °F,
C = observed flashpoint, °C,

B=ambient barometric pressure, mm Hg.; and

A=ambient barometric pressure, kPa.

(l) *Precision.* The precision of the method as determined by statistical examination of interlaboratory results is as follows:

(1) Repeatability. The difference between two test results obtained by the same operator with the same apparatus under constant operating conditions on identical test material, would, in the long run, in the normal and correct operation of the test method, exceed the values shown in table 2 only in 1 case in 20.

(2) Reproducibility. The difference between two single and independent results obtained by different operators working in different laboratories on identical test material, would, in the long run, in the normal and correct operation of the test method, exceed the values shown in table 2 only in 1 case in 20.

(m) *Flash Test Apparatus.* (1)(i) Unit consisting of an aluminum alloy or non-rusting metal block of suitable conductivity with a cylindrical depression, or sample cup, over which is fitted a cover. A thermometer is embedded in the block.

(ii) The cover is fitted with an opening slide and a device capable of inserting an ignition flame (diameter 4 ± 0.5 mm) into the well when the slide device shall intersect the plane of the underside of the cover. The cover is also provided with an orifice extending into the sample well for insertion of the test sample and also a suitable clamping device for securing the cover tightly to the metal block. The three openings in the cover shall be within the diameter of the sample well. When the slide is in the open position, the two openings in the slide shall coincide exactly with the two corresponding openings in the cover.

(iii) Electrical heaters are attached to the bottom of the cup in a manner that provides efficient transfer of heat. An electronic heat control is required to hold the equilibrium temperature, in a draft-free area, within 0.1°C (0.2°F) for the low-temperature tester. A visual indicator lamp shows when energy is or is not being applied. Energy may be supplied from 120 or 240 V, 50 or 60 Hz main service.

(2)(i) Test flame and pilot flame-regulatable test flame, for dipping into the sample cup to try for flash, and a pilot flame, to maintain the test flame, are required. These flames may be fueled by piped gas service. A gage ring 4mm (5/32 in.) in diameter, engraved on the lid near the test flame, is required to

ensure uniformity in the size of the test flame.

(ii) Caution: Never recharge the self-contained gas tank at elevated temperature, or with the pilot or test flames lighted, nor in the vicinity of other flames.

(iii) Audible Signal is required. The audible signal is given after 1 min in the case of the low-temperature tester.

(iv) Syringe. 2ml capacity, equipped with a needle suitable for use with the apparatus, adjusted to deliver 2.00 ± 0.05 ml.

(3) Essential dimensions of the test apparatus are set forth in table 3.

(n) *Testing high-viscosity liquids.* (1) High-viscosity materials may be added to the cup by the following procedure:

(i) Back load a 5 or 10-ml syringe with the sample to be tested and extrude 2 ml into the cup. Spread the specimen as evenly as possible over the bottom of the cup.

(ii) If the sample cannot be loaded into a syringe and extruded, other means of adding the sample to the cup may be used such as a spoon. Add approximately 2 ml of material to the spoon and then push the material from the spoon into the cup.

(iii) If the test specimen does not close the sampling port in the cup, seal the cup externally by suitable means.

(2) Using the appropriate procedure, either Method A in § 1500.43(i) or Method B in § 1500.43(j), determine the flashpoint of the specimen which has been added to the tester in accordance with § 1500.43(n)(i), except that the time specified is increased from 1 to 5 minutes for samples at or above ambient temperature.

Table 1 - Calibration of Tester

Material	p-xylene[A] (Caution)[B]
Specific gravity. 15.6/ 15.6°C (60/60°F)	0.850 to 0.866
Boiling range	2°C maximum including 138.35°C (281.03°F)
Freezing point	11.23°C (52.2°F minimum
Flashpoint °C (acceptable range)	25.6 ± 0.5 (78 ± 1°F)

A/ Available as Flash Point Check Fluid (p-xylene) from Special Products Div., Phillips Petroleum Co., Drawer '0,' Borger, Texas 79007.

B/ Caution: Handle xylene with care. Avoid inhalation; use only in a well-ventilated area. Avoid prolonged or repeated contact with skin. Keep away from flames and heat, except as necessary for the actual flash point determination.

Table 2 - Repeatability and Reproducibility

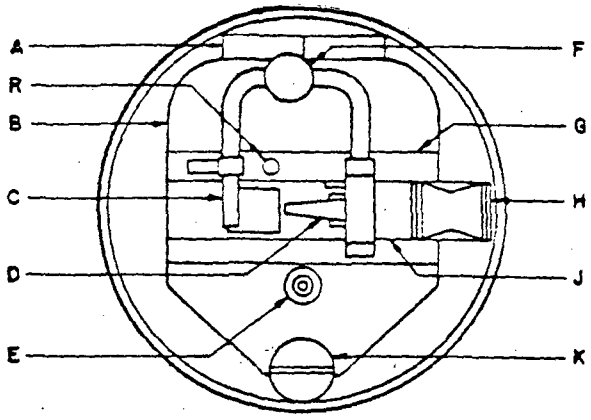
Temperature, °C (°F)	Repeatability, °C (°F)	Reproducibility, °C(°F)
20 (68)	0.5 (0.9)	1.4 (2.6)
70 (158)	0.5 (0.9)	2.9 (5.3)
93 (200)	1.3 (2.3)	4.9 (8.8)
150 (300)	2.0 (3.6)	7.5 (13.5)
200 (400)	2.6 (4.7)	9.9 (17.9)
260 (500)	3.3 (5.9)	12.4 (22.3)

Table 3 - Essential Dimensions of Flash Test Apparatus[A,B]

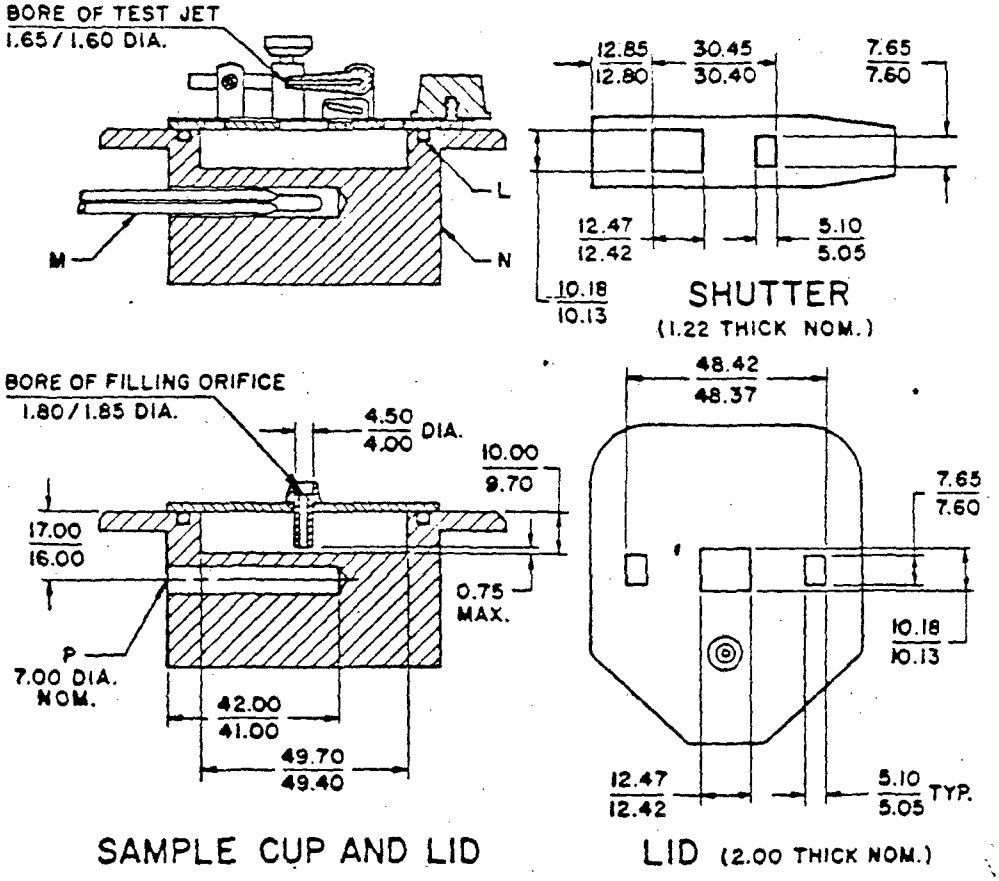
	mm
Sample Block:	
Block diameter	61.5-62.5
Sample well diameter	49.40-49.70
Sample well depth	9.70-10.00
Top of block to center of thermometer hole	16.00-17.00
Diameter of thermometer hole	7.00 approx.
Cover:	
Large opening length	12.42-12.47
Large opening width	10.13-10.18
Small opening length	5.05-5.10
Small opening width	7.60-7.65
Distance between extreme edges of small openings	48.37-48.32
Filling orifice diameter	4.00-4.50
Bore or filler tube	1.80-1.85
Maximum distance of filler tube from base of well with cover closed	0.75 max.
Slide:	
Large opening length	12.42-12.47
Large opening width	10.13-10.18
Small opening length	5.05-5.10
Small opening width	7.60-7.65
Near edge of large opening to end of slide	12.80-12.85
Extremes of large and small openings	30.40-30.45
Jet:	
Length of jet	18.30-18.40
External diameter at end of jet	2.20-2.60
Bore of jet	1.60-1.65
Height of jet center above top surface of cover	11.00-11.20
Jet pivot to center of block with cover closed	12.68-12.72

A/ The O-seal or gasket, which provides a seal when the cover is shut, should be made of a heat-resistant material capable of withstanding temperatures up to 150°C for the low-range apparatus.

B/ When in position, the thermometer bulb should be surrounded with heat-conducting thermoplastic compound, such as a paste comprised of zinc oxide and mineral oil.



A - Hinge
B - Lid
C - Pilot flame jet
D - Test flame jet
E - Filling orifice
F - Test flame gas control screw
G - Shutter guide
H - Shutter knob
J - Shutter
K - Lid lock
L - Lid sealing O-ring
M - Thermometer
N - Sample cup
P - Thermometer pocket
R - Test flame guage



(All dimensions are in millimeters)

FIGURE 1 - Closed-cup tester

5. Section 1500.46 is revised to read as follows:

§ 1500.46 Method for determining flashpoint of extremely flammable contents of self-pressurized containers.

Use the apparatus described in § 1500.43. Use some means such as dry ice in an open container to chill the pressurized container. Chill the container, the flash cup, and the bath solution of the apparatus (brine or glycol may be used) to a temperature of about 25° F below zero. Puncture the chilled container to exhaust the propellant. Transfer the chilled formulation to the test apparatus and test in accordance with the method described in § 1500.43.

(15 U.S.C. § 1261(1), 1269(a), 2079(a))

Effective date: These amendments shall be effective on [insert date which is one year after publication in the Federal Register].

Dated:

Sadye E. Dunn, Secretary
Consumer Product Safety Commission

Bibliography

1. Memorandum from Robert E. Frye, CPSC, to James Sharman, concerning injuries from flammable liquids; 1 page; September 20, 1985.

2. Memorandum from Donald F. McCaulley, CPSC, to George Anikis, CPSC, concerning briefing package for flashpoint changes in the FHSA; 9 pages; April 6, 1979.

3. Memorandum from Donald F. McCaulley, CPSC, to Stan Morrow, CPSC, concerning FHSA flammability test revisions, with attachments; 27 pages; February 22, 1980.

4. Final report "Flammability Criteria Changes: Consumer Products Affected and Related Economic Impacts," by Donald Slivka and John J. Scarry, Batelle, Columbus Division; 46 pages; February 27, 1980.

5. Memorandum from Julia Clones, CPSC, to Stan Morrow, CPSC, concerning FHSA test-method changes, with attachment; 4 pages; March 27, 1980.

6. Report on additional evidence in support of closed cup flash-point method by Joseph M. Kuchta Safety Research Center, Bureau of Mines, U.S. Department of the Interior; 10 pages; June 18, 1970.

7. Memorandum from Allen F. Brauninger, OGC to the Commission concerning amendment of regulations for classification of flammable hazardous substances and specification of test method to determine flashpoint temperatures, with attachment; 55 pages; March 2, 1984.

8. Vote sheet for approval of draft Federal Register notice to propose amendment of regulations for classification of flammable hazardous substances and specification of test method to determine flashpoint temperatures; 1 pages; March 2, 1984.

9. Federal Register notice proposing amendment of regulations for classification of flammable hazardous substances and specification of test method to determine flashpoint temperatures; 11 pages; April 26, 1984.

10. Comment from H.B. Fuller Company concerning proposed amendment of flammability regulations; 3 pages; June 4, 1984.

11. Comment from Control Data Corporation concerning proposed amendment of flammability regulations, with attachments; 7 pages; June 11, 1984.

12. Comment from Adhesives Manufacturers Association concerning proposed amendment of flammability regulations; 2 pages; August 7, 1984.

13. Comment from Koppers Company, Inc. concerning proposed amendment of flammability regulations; 2 pages; August 15, 1984.

14. Comment from the Adhesive and Sealant Council concerning proposed amendment of flammability regulations; 2 pages; August 22, 1984.

15. Comment from Union Oil Company of California concerning proposed amendment of flammability regulations; 1 page; August 20, 1984.

16. Comment from Chemical Specialties Manufacturers Association concerning proposed amendment of flammability regulations; 6 pages; August 23, 1984.

17. Comment from American Petroleum Institute concerning proposed amendment of flammability regulations; 2 pages; August 22, 1984.

18. Comment from Erdco Engineering Corporation concerning proposed amendment of flammability regulations; 5 pages; August 21 and August 27, 1984.

19. Memorandum from Donald F. McCaulley, HSHL, to Allen F. Brauninger, OGC, concerning issues raised by comments on proposed amendments of flammability regulations; 6 pages; March 15, 1985.

20. Memorandum from Charles M. Jacobson, CARM, to Allen F. Brauninger, OGC, concerning comment on proposed amendment of flammability regulations; 1 page; November 12, 1985.

UNITED STATES GOVERNMENT

Memorandum

U.S. CONSUMER PRODUCT SAFETY COMMISSION

TO : Iris Lieske - EX-P

DATE: October 1, 1985

FROM : Midwestern Regional Office

SUBJECT: Final Amendments of FHSA Flammability Rules

We agree with OGC's proposed Final Rule for revising the above FHSA Flammability Rules.

Donald L. Dovel

Donald L. Dovel
Senior Compliance Officer

UNITED STATES GOVERNMENT

Memorandum

U.S. CONSUMER PRODUCT SAFETY COMMISSION

TO : Iris Liskey, FO

DATE: 9/30/85

FROM : Les Pounds
Leslie Y. Pounds, RD/ATL

SUBJECT: Final Amendments of FHSA Flammability Rules

I have reviewed the subject package. There is certainly a need to bring the Commission's FHSA flammability testing procedures into line with what are current common procedures among other federal agencies as well as within the industry. Making these amendments final would accomplish that. I would agree with publication of the proposed Federal Register Notice, and with proceeding to making these amendments final.

c:
Other Directors
EX-P File

ATL:LYPounds:bt

UNITED STATES GOVERNMENT

Memorandum

U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, D.C. 20207

TO : Iris Liskey, Field Operations

DATE: October 3, 1985

FROM : Richard D. Swackhamer
Regional Director, NYC-RO

SUBJECT: Final Amendment of FHSA Flammability Rules

The staff of the NYC-RO has reviewed the above referenced document as you requested. We have no comments on such.

Thank you for the opportunity to review and comment.

October 4, 1985

MEMORANDUM:

TO: Iris Liskey, EX-P
thru Lee D. Baxter, Director WERO

FROM: Charles W. Demoret
Compliance Officer, WERO

SUBJECT: Final Amendments of FHSA
Flammability Rules:

I would like to offer comments on 3 areas.

1. The question of testing the liquid in an aerosol after exhausting the propellant (as someone suggested, before it is put in the can) does not relate to the flammability as experienced by the consumer, if we are considering a true aresol. In my opinion the flammability classification of an aresol should be based entirely on the flame extension and flashback.

2. The exemption of products that contain 24% alcohol does not appear [illegible]. The claim that dish washing liquids containing alcohol can be used to put out a fire is not at all impressive. There are no doubt other products with flashpoints less than 150 degrees F, that are used to put out fires. I understand that when cotton bales catch fire they are extremely difficult to extinguish. One method that has been successful is to immerse the entire bale in kerosene. I hope no one suggests exempting kerosene.

3. The reference to "reliable experience or other relevant information or data in addition to the flashpoint", should include specific examples, such as the depressing affect some chlorinated hydrocarbons have on the closed cup flashpoint, compared to the flammability experienced by the consumer in actual use.

CWD/cbs

UNITED STATES GOVERNMENT

Memorandum

U.S. CONSUMER PRODUCT SAFETY COMMISSION

TO : Iris Liskey, FO

DATE: 9/30/85

FROM : Leslie Y. Pounds, RD/ATL

SUBJECT: Final Amendments of FHSA Flammability Rules

I have reviewed the subject package. There is certainly a need to bring the Commission's FHSA flammability testing procedures into line with what are current common procedures among other federal agencies as well as within the industry. Making these amendments final would accomplish that. I would agree with publication of the proposed Federal Register Notice, and with proceeding to making these amendments final.

c:
Other Directors
[illegible]-P File

[illegible]:LYPounds:bt

105

FR NOTICE: 4/26/84
COMMENTS DUE: 8-24-84

UNITED STATES GOVERNMENT

Memorandum

U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, D.C. 20207

TO : OFFICE OF PROGRAM MANAGEMENT
OFFICE OF THE GENERAL COUNSEL

DATE: August 31, 1984

FROM : PAT CHISLEY, OS

SUBJECT: REFERRA OF OFFICIAL COMMENTS

16 CFR Part 1500
Hazardous Substances and Article
Amendments to Flammability
Regulations; Proposed Rule

ATTACHED ARE COMMENTS ON THE CH3-84

PLEASE LOG AND HANDEL AS APPROPRIATE.

COMMENTS BY DATE OF RECEIPT

COMMENT	DATE	CORRESPONDENT	SIGNED BY
CH3-84-1	6-8-84	H.B. Fuller Company 2400 Kasota Avenue St. Paul, Minnesota 55108	R. F. Getty, Manager
CH3-84-2	6-11-84	Control Data 8100 34th Avenue South Box O Minneapolis, Minnesota 55440	Albert V. Hartl
CH3-84-3	8-16-84	Adhesives Mfrs. Assoc. One Illinois Center 111 East Wacker Dr. Chicago, ILL 60601	Michael Payne Director Government Affairs
CH3-84-4	8-20-84	Koppers Company Inc. Occupational Health & Product Safety 440 College Park Dr. Monroeville, PA 15146	C.W. Flickinger
CH3-84-5	8-23-84	The Adhesive & Sealant Council Suite 910 1600 Wilson Boulevard Arlington, VA 22209	Jules Rapp, Exec. Vice President
CH3-84-6	8-23-84	Union Oil Company of CA Union Oil Center Box 7600 Los Angeles, CA 90051	Kenneth L. McGinnis
CH3-84-7	8-23-84	Chemical Specialties Mfrs. Association Suite 1120 1001 Connecticut Ave., N.W. Washington, DC 20036	Ralph Engel President

CH3-84-8	8-23-84	American Petroleum Institute 1220 L St., NW Washington, D.C. 20005	Wm F. O'Keefe Vice President
CH3-84-9	8-23-84	ERDCO P.O. Box 1310 Evanston, ILL 60204	E. M. Nesvig

CH3-84-1

H.B. Fuller Company
Corporate Headquarters

2400 Kasota Avenue
St. Paul, Minnesota 55108
(612) 645-3401

June 4, 1984

Ms. Sadye Dunn, Secretary
United States Consumer Product
Safety Commission
1111 Eighteenth Street, Northwest
Washington, DC 20207

Dear Ms. Dunn:

SUBJECT: FHSA Flammability Regulations-Amendments

The purpose of this communication is to provide comments on the Proposed Rules 16 CFR Part 1500, Hazardous Substances and Articles Amendments to Flammability Regulations published in the Federal Register, April 26, 1984, Volume 49, Number 82.

The agency is to be commended for its efforts of bringing the Commission's procedures rleative to flammability into general conformity with practices of other Federal agencies, and voluntary standards setting organizations, and for its sensitivity in minimizing the economic factors during the transition period of moving into new definitions and methodology in this area.

My basic concern with the proposal is its failure to specify the Pensky-Martens Closed Cup (ASTM-D-93) as an acceptable procedure with the Setaflash Closed Cup (ASTM-D-3828). In this regard, I would like to present the following arguments:

1. Lacking specific reference in proposed 1500.43(a)(1) where it states both "Setaflash low-range closed tester, or an apparatus producing equivalent results" and "May use other apparatus and/or test methods which produce equivalent results," it is my opinion that the burden of proving equivalency would be placed upon the testing party in any enforcing procedure that may develop should any procedure other than Setaflash be used.

2. In its desire to bring its "procedures into general conformity with practices of other Federal agencies and voluntary standards setting organizations," the Commission has apparently not become aware that the Pensky-Martens (ASTM-D-93) procedure is a more commonly specified method than Setaflash (ASTM-D-3828) by Federal agencies, international transportation organizations, and voluntary standards setting organizations.

a. DOT 49 CFR 173.115(d) specifies Tag Closed Cup (ASTM-D-56), Setaflash Closed Tester (ASTM-D-3278), and Pensky-Martens (ASTM-D-93).

b. OSHA 29 CFR 1910.106a(14) calls for Tag Closed Cup (ASTM-D-56) and Pensky-Martens (ASTM-D-93). Setaflash by any method is not an authorized procedure. Please note at this point that most facilities manufacturing flammable/combustible materials for the consumer market would also come under the authority of the Occupational Safety and Health Agency as well as need to comply with CPSC regulations relative to its products.

c. The International Maritime Organization (IMO), International Civil Aviation Organization (ICAO), and International Air Transport Association (IATA) all specify Pensky-Martens (ASTM-D-93) as one of the methods for determining flash point. Setaflash by ASTM-D-3243 and D-3278 are referenced but not D-3828 in ICAO and IATA, and no Setaflash procedure is contained in IMO.

d. The National Fire Prevention Association, ANSI/NFPA 30, Flammable and Combustible Liquids Code 1981 lists acceptable methods to be Tag Closed (ASTM-D-56), Pensky-Martens Closed (ASTM-D-93), and Setaflash Closed by ASTM-D-3243 and D-3278, but not D-3828.

3. Our own company experience shows that Setaflash is the best "Go-No-Go" procedure currently available, but probably the most costly and time-consuming method for determining a specific flash point. In the latter case, the Pensky-Martens is much more perferable.

In conclusion, we request that the Commission specifically add the Pensky-Martens Closed Cup flash point method (ASTM-D-93) as an acceptable procedure in addition to the Setaflash Cup method. The Pensky-Martens procedure is more frequently called out in both United States standards and regulations as well as in international regulations that may apply also to domestically produced commodities.

The Pensky-Martens is the better method when compared to the Setaflash for determining a specific flash point, a procedure frequently necessary when a commodity and/or producing facility comes under several different regulations. By adding Pensky-Martens to the rule, testing parties would not bear the burden of proving equivalency between these two methods.

Thank you for your consideration.

Very truly yours,

R. F. Getty
Manager, Regulatory Services

fj

enclosures: Four (4) copies of this letter

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

CH3-84-2

CONTROL DATA

8100 34th Avenue South
Mailing Address/Box O
Minneapolis, Minnesota 55440

"FHSA Flammability Regulations - Amendments" June 11, 1984
Secretary, U S Consumer Product Safety Commission
1111 18th St. NW
Washington, DC 20207

Control Data Corporation applauds your effort to make CPSC regulations more consistent with the regulations of other government agencies. While Control Data Corporation produces no products which would be covered by these regulations, it uses hundreds of adhesives, solvents and other materials which are purchased in containers covered by your regulations. The warehousing and transportation of these products is complicated by the current inconsistency which often result in inner receptacles not being marked in the same manner as outer shipping packages. Control Data Corporation would like to make the following specific comments.

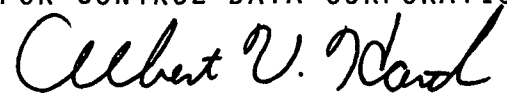
1) Your proposed amendment uses the terms "at or below", or "to and including" to describe the upper flash point limit of each category. The DOT uses the term "below". This will result in a product having a flash point of exactly 100°F to be considered a flammable under your definitions but a combustible under DOT definitions. We would recommend that you modify your terminology or petition the DOT to change theirs.

2) We would strongly recommend that your proposed upper threshold of 150°F for the combustible range be changed to 141°F (60.5°C) for the following reasons. The United Nations Committee of Experts on the transport of dangerous goods has recommended a worldwide standard of 60.5°C as the upper threshold for "inflammable liquids". This recommendation has been accepted in the form of mandatory regulations by the International Civil Aviation Organization (ICAO) and, with a slight modification to 61°C, the International Maritime Organization (IMO). The US DOT has incorporated these regulations at 49 CFR §171.11 and §171.12. As the US DOT exempts from its regulations combustible liquids in less than 110 gallon containers (49 CFR §173.118a), the international regulations have a much greater economic impact. The US government has also committed itself through several international agreements to reduce nontariff trade barriers. Passing up the opportunity to harmonize a variance to a recognized international safety standard would be inconsistent with stated US policy. Furthermore, the Canadian government has published proposed regulations which incorporate 61°C as an upper threshold for flammability. (See CANADA GAZETTE Part I, June 19, 1982) As the United States' largest trading partner, variations between the two countries result in significant economic costs to multinational companies.
[It is an interesting side note that the 141°F value had its origin in 19th century US Coast Guard regulations.]

3) While we appreciate the reduction in testing which the Commission sought by the inclusion of a grandfather clause for items previously tested using a Tag open tester, in reality it will have no beneficial effect. It may even lead producers to violate other federal and state regulations. The DOT still requires the manufactures to classify their products using closed cup tests. Any manufacturer which has relied upon open cup tests has been in violation of DOT test procedures for some time. Although products labeled under CPSC regulations are technically exempt from OSHA labeling and MSDS regulations by 29 CFR §1910.1200 (b)(iv), Control Data Corporation requires, as a condition of purchase, a MSDS meeting OSHA hazard communication standards. This is to insure that all work place chemicals are identified and that we do not inadvertently violate one of the 15 or more state right-to-know laws. The overall effect is that closed cup test results are required in order to correctly transport and sell this type of product.

4) The final area where we wish to comment is on your test method for extremely flammable self-pressurized containers (aerosols). We believe that puncturing an aerosol to get at the formulation is unnecessary and dangerous. The mixture should simply be tested before it is ever placed in the aerosol. We also feel that the propellant may have an effect on the overall flammability of the aerosol. Gases in ASHRAE Group 1 may inhibit combustion whereas gases in ASHRAE Group 3 will contribute to combustion. [ANSI/ASHRAE Standard 15-1978] In fact we would recommend that any aerosol charged with a ASHRAE group 3 gas be labeled as extremely flammable.

FOR CONTROL DATA CORPORATION



Albert V. Hartl
Administrator, Hazardous
Materials Transportation

4150d

Chapter 3
CLASS 3 - FLAMMABLE LIQUIDS

3.1 DEFINITION OF CLASS 3

Liquids or mixtures of liquids or liquids containing solids in solution or in suspension which give off a flammable vapour at temperatures of not more than 60.5°C closed-cup test or not more than 65.6°C open-cup test.

3.2 PACKING GROUP CRITERIA

3.2.1 Table 2-2 should be used for the determination of the packing group of a liquid that presents a risk due to flammability. For liquids whose only hazard is flammability, the packing group for the material is the packing group shown in the table below. For a liquid possessing an additional hazard(s), the packing group determined from Table 2-2 and the packing group based on the severity of the additional hazard(s) should be considered. In such cases, the table of precedence of hazard characteristics appearing in Table 2-12 should be used to determine the correct classification of the liquid. However, the most stringent packing group based on the different hazards of the liquid must then be the packing group for the liquid.

Table 2-2.- Packing group based on flammability

Packing group	*Flash point (closed-cup)*	*Initial boiling point*
I	≤60.5°C	≤35°C
II	< 23°C	> 35°C
III	≥23°C, ≤ 60.5°C	> 35°C

Viscous substances having a flash point below 23°C may be placed in Packing Group III in conformity with 3.2.2.

3.2.2 Grouping of flammable viscous substances with a flash point of less than 23°C

3.2.2.1 The hazard group of paints, varnishes, enamels, lacquers, adhesives, polishes and other viscous flammable substances of Class 3 with a flash point of less than 23°C is determined by reference to:

a) the viscosity expressed as the flow time in seconds;

b) the closed-cup flash point;

c) a solvent separation test; and

d) the size of the receptacle.

3.2.2.2 *Criteria for inclusion in Group III*

Viscous flammable liquids such as paints, enamels, varnishes, adhesives and polishes with a flash point less than 23°C are grouped in Group III provided that:

a) less than 3 per cent of the clear solvent layer separates in the solvent separation test;

b) the mixture contains not more than 5 per cent of substances in Group I or Group II of Division 6.1 or Class 8, or not more than 5 per cent of substances in Group I, Class 3 requiring a Division 6.1 or Class 8 subsidiary label;

5.1.2 *Class 2 — Gases: compressed, liquefied or dissolved under pressure*

Because of the difficulty in reconciling the various main systems of regulation, definitions in this Class are of a general nature to cover all such systems. Moreover, since it has not been found possible to reconcile two main systems of regulation in respect of the differentiation between a liquefied gas exerting a low pressure at a certain temperature and an inflammable liquid, this criterion has been omitted; both methods of differentiation are recognized.

This Class comprises:

(a) *Permanent gases*
Gases which cannot be liquefied at ambient temperatures;

(b) *Liquefied gases*
Gases which can become liquid under pressure at ambient temperatures;

(c) *Dissolved gases*
Gases dissolved under pressure in a solvent, which may be absorbed in a porous material;

(d) *Deeply refrigerated permanent gases* — e.g. liquid air, oxygen, etc.

In the cases (a), (b) and (c) above, the gases are normally under pressure.

For stowage and segregation purposes Class 2 is subdivided further, namely:

Class 2.1 — Inflammable gases*

Class 2.2 — Non-inflammable gases

*Class 2.3 — Poisonous gases***

5.1.3 *Class 3 — Inflammable* liquids*

These are liquids, or mixtures of liquids, or liquids containing solids in solution or suspension (e.g. paints, varnishes, lacquers, etc., but not including substances which, on account of their other dangerous characteristics, have been included in other classes) which give off an inflammable vapour at or below 61°C (141°F) closed cup test (corresponding to 65.6°C (150°F) open cup test).

In this Code, Class 3 is subdivided further, namely:

Class 3.1. Low flashpoint group of liquids having a flashpoint below −18°C (0°F), closed cup test;

Class 3.2. Intermediate flashpoint group of liquids having a flashpoint of −18°C (0°F) up to, but not including 23°C (73°F), closed cup test;

Class 3.3. High flashpoint group of liquids having a flashpoint of 23°C (73°F) up to, and including, 61°C (141°F), closed cup test.

Substances which have a flashpoint above 61°C (141°F), closed cup test, are not considered to be dangerous by virtue of their fire hazard. Where the flashpoint is indicated for a volatile liquid it may be followed by the symbol "c.c.", representing determination by a closed cup test, or by the symbol "o.c.", representing an open cup test. A reference to these tests is given in section 6 of this General Introduction.

---

* "Inflammable" has the same meaning as flammable.

** Poisonous gases which are also inflammable should be segregated as Class 2.1 gases.

Divisions — Class 2
Dangerous Goods

14. The following divisions are established for dangerous goods that fall into Class 2, namely, Divisions 1, 2 and 3.

15. Dangerous goods described in column I of an item of Table II of Schedule II that fall into Class 2 fall into the division indicated by the figure that follows the point in the first set of numbers set out in column III of that item.

16. Dangerous goods that fall into Class 2 pursuant to section 13(2) fall into:

(*a*) Division 1, if the dangerous goods

(i) are flammable when in a mixture of 13 per cent or less by volume with air at normal atmospheric temperature and pressure, or

(ii) have a flammability range of at least 12;

(*b*) Division 3, if the dangerous goods have an LC_{50} less than 200 parts per million (ppm); or

(*c*) Division 2, if the dangerous goods do not fall into Division 1 or 3.

Class 3 Dangerous Goods

17. (1) Each product or substance that,

(*a*) is described in column I of an item of Table II of Schedule II, and

(*b*) has the figure "3" preceding the point in the first set of numbers set out in column III of that item

falls into Class 3.

(2) A product or substance, other than dangerous goods described in column II of an item of Table I or column I of an item of Table II of Schedule II, that is a liquid, a mixture of liquids or a liquid containing solids in solution or suspension and that has a flash point

(*a*) where the product or substance is in a consignment that is to be, is being or has been transported by ship on a voyage, other than a domestic voyage, not greater than 61°C, or

(*b*) in any other case, less than 93.3°C,

falls into Class 3.

Divisions — Class 3
Dangerous Goods

18. The following divisions are established for dangerous goods that fall into Class 3, namely, Divisions 1, 2 and 3.

19. (1) Subject to subsection (2), dangerous goods described in column I of an item of Table II of Schedule II that fall into Class 3 fall into the division indicated by the figure that follows the point in the first set of numbers set out in column III of that item.

(2) Dangerous goods described in column I of an item of Table II of Schedule II that are in a consignment that is to be, is being or has been transported by ship on a voyage, other

Divisions des marchandises dangereuses de classe 2

14. Les divisions 1, 2 et 3 sont instaurées pour les marchandises dangereuses de classe 2.

15. Une marchandise dangereuse visée à l'article 13 tombe dans la division indiquée par le chiffre placé après le point dans le premier nombre porté à la colonne III de l'article approprié.

16. Les divisions, pour les marchandises dangereuses de classe 2 non portées aux tableaux I ou II de l'annexe II sont définies comme suit:

a) division 1, pour ces marchandises dangereuses qui:

(i) soit, sont inflammables lorsque mélangées dans une proportion égale ou inférieure à 13 pour cent en volume avec de l'air à la température et à la pression atmosphériques normales,

(ii) soit, possèdent un intervalle d'inflammabilité minimale de 12;

b) division 3, pour ces marchandises dangereuses dont la valeur LC_{50} est inférieure à 200 parties par million (ppm);

c) division 2, pour ces marchandises dangereuses qui ne tombent dans aucune autre division de la classe 2.

Marchandises dangereuses de classe 3

17. (1) Chaque produit ou matière

a) porté à la colonne I d'un article du tableau II de l'annexe II; et

b) où le chiffre «3» est placé avant le point dans le nombre porté à la colonne III de cet article

est affecté à la classe 3.

(2) Tout produit ou matière qui est

a) soit, un liquide ou un mélange de liquides,

b) soit, un liquide contenant des solides en solution ou en suspension,

tombe dans la classe 3 si son point d'éclair

c) soit, n'est pas supérieur à 61°C lorsque ce produit ou cette matière doit être, est, ou a été transporté par navire en voyage autre qu'un voyage domestique,

d) soit, dans les autres cas, est inférieur à 93,3°C,

à l'exception des marchandises dangereuses visées au paragraphe (1) ou portées à la colonne II d'un article du tableau I de l'annexe II.

Divisions des marchandises dangereuses de classe 3

18. Les divisions 1, 2 et 3 sont instaurées pour les marchandises dangereuses de classe 3.

19. (1) Sous réserve du paragraphe (2), une marchandise dangereuse visée au paragraphe 17(1) tombe dans la division indiquée par le chiffre placé après le point dans le premier nombre porté à la colonne III de l'article approprié.

(2) Une marchandise dangereuse mentionnée au paragraphe 17(1) qui doit être, est, ou a été transportée par navire en voyage qui n'est pas un voyage domestique tombe dans la

than a domestic voyage, fall into the division indicated by the figure that follows the point in the first set of numbers set out in column IV of the item of Table II of Schedule II in which those goods are described.

20. (1) Dangerous goods that fall into Class 3 pursuant to paragraph 17(2)(*a*) fall into:

(*a*) Division 1, if the dangerous goods have a flash point less than -18°C;

(*b*) Division 2, if the dangerous goods have a flash point not less than -18°C but less than 23°C; or

(*c*) Division 3, if the dangerous goods have a flash point not less than 23°C but not greater than 61°C.

(2) Dangerous goods that fall into Class 3 pursuant to paragraph 17(2)(*b*) fall into:

(*a*) Division 1, if the dangerous goods have a flash point less than 37.8°C; or

(*b*) Division 2, if the dangerous goods have a flash point of not less than 37.8°C but less than 93.3°C.

Packing Groups — Class 3 Dangerous Goods

21. The following packing groups are established for dangerous goods that fall into Class 3, namely, Packing Groups I, II and III.

22. (1) Dangerous goods described in column I of an item of Table II of Schedule II that fall into Class 3 fall into the packing group indicated by the figure set out in column V of that item.

(2) Subject to subsection (3), dangerous goods that fall into Class 3 pursuant to subsection 17(2) fall into:

(*a*) Packing Group I, if the dangerous goods have an initial boiling point not greater than 35°C;

(*b*) Packing Group II, if the dangerous goods have an initial boiling point greater than 35°C and a flash point less than 23°C; or

(*c*) Packing Group III, if the dangerous goods have an initial boiling point greater than 35°C and a flash point

(i) in the case of dangerous goods that fall into Class 3 pursuant to paragraph 17(2)(*a*), not greater than 61°C but not less than 23°C, and

(ii) in the case of dangerous goods that fall into Class 3 pursuant to paragraph 17(2)(*b*), less than 37.8°C but not less than 23°C.

(3) Dangerous goods that fall into Class 3 pursuant to subsection 17(2), other than dangerous goods that are a nitrocellulose-based paint that have a flash point less than 23°C, fall into Packing Group III if

(*a*) after those dangerous goods have been tested in accordance with the solvent separation test described in Part II of Schedule VI the upper separated layer of clear solvent represents less than 3 per cent of the quantity being tested;

(*b*) the dangerous goods have a flow time at 23°C during the viscosity test described in ISO 2431-72

(i) greater than 40 seconds using the ISO standard cup fitted with an 8 mm jet,

division indiquée par le chiffre placé après le point dans le premier nombre porté à la colonne IV de l'article approprié.

20. (1) Les divisions, pour les marchandises dangereuses visées à l'alinéa 17(2)*c*) sont définies comme suit:

a) division 1, pour ces marchandises dangereuses dont le point d'éclair est inférieur à -18°C;

b) division 2, pour ces marchandises dangereuses dont le point d'éclair n'est pas inférieur à -18°C mais inférieur à 23°C;

c) division 3, pour ces marchandises dangereuses dont le point d'éclair est situé entre 23°C et 61°C.

(2) Les divisions pour les marchandises dangereuses visées à l'alinéa 17(2)*d*) sont définies comme suit:

a) division 1, pour ces marchandises dangereuses dont le point d'éclair est inférieur à 37,8°C;

b) division 2, pour ces marchandises dangereuses dont le point d'éclair est 37,8°C ou plus mais inférieur à 93,3°C.

Groupes d'emballage des marchandises dangereuses de classe 3

21. Les groupes d'emballage I, II et III sont instaurés pour les marchandises dangereuses de classe 3.

22. (1) Une marchandise dangereuse visée au paragraphe 17(1) tombe dans le groupe d'emballage précisé par le chiffre romain porté à la colonne V de l'article approprié.

(2) Sous réserve du paragraphe (3), une marchandise dangereuse visée au paragaphe 17(2) tombe:

a) dans le groupe d'emballage I si son point d'ébullition initial ne dépasse pas 35°C;

b) dans le groupe d'emballage II si son point d'ébullition initial est supérieur à 35°C et son point d'éclair est inférieur à 23°C;

c) dans le groupe d'emballage III si son point d'ébullition initial est supérieur à 35°C et son point d'éclair est

(i) soit, compris entre 23°C et 61°C pour une marchandise dangereuse visée à l'alinéa 17(2)*c*),

(ii) soit, au moins 23°C mais inférieur à 37,8°C pour une marchandise dangereuse visée à l'alinéa 17(2)*d*).

(3) Une marchandise dangereuse visée au paragraphe 17(2) qui n'est pas une peinture à base de nitrocellulose, et dont le point d'éclair est inférieur à 23°C, tombe dans le groupe d'emballage III si:

a) la hauteur de la couche séparée de solvant est inférieure à 3% de la hauteur totale de l'échantillon lorsque cette marchandise dangereuse a été soumise à l'épreuve de séparation du solvant décrite à la partie II de l'annexe VI,

b) sa durée d'écoulement à 23°C, déterminée par l'épreuve de viscosité ISO 2431-72 est:

(i) supérieure à 40 secondes, mesurée à l'aide du vase normalisé ISO muni d'un ajutage de 8 mm,

to groups as follows:

Refrigerant*	Name	Chemical Formula
5.1.1		
Group 1		
R-11	Trichlorofluoromethane	CCl_3F
R-12	Dichlorodifluoromethane	CCl_2F_2
R-13	Chlorotrifluoromethane	$CClF_3$
R-13B1	Bromotrifluoromethane	$CBrF_3$
R-14	Tetrafluoromethane	CF_4
R-21	Dichlorofluoromethane	$CHCl_2F$
R-22	Chlorodifluoromethane	$CHClF_2$
R-30	Dichloromethane (Methylene chloride)	CH_2Cl_2
R-113	Trichlorotrifluoroethane	CCl_2FCClF_2
R-114	Dichlorotetrafluoroethane	$CClF_2CClF_2$
R-115	Chloropentafluoroethane	$CClF_2CF_3$
R-C318	Octafluorocyclobutane	C_4F_8
R-500	Dichlorodifluoromethane, 73.8% and Ethylidene Difluoride, 26.2%	CCl_2F_2/CH_3CHF_2
R-502	Chlorodifluoromethane, 48.8% and Chloropentafluoroethane, 51.2%	$CHClF_2/CClF_2CF_3$
R-503	Trifluoromethane 40.1%, and Chlorotrifluoromethane 59.9%	$CHF_3/CClF_3$
R-744	Carbon dioxide	CO_2
5.1.2		
Group 2		
R-40	Methyl chloride	CH_3Cl
R-611	Methyl formate	$HCOOCH_3$
R-717	Ammonia	NH_3
R-764	Sulphur dioxide	SO_2
5.1.3		
Group 3		
R-170	Ethane	C_2H_6
R-290	Propane	C_3H_8
R-600	Butane	C_4H_{10}
R-600a	Isobutane	$CH(CH_3)_3$
R-1150	Ethylene	C_2H_4
R-1270	Propylene	C_3H_6

*Group Classification-See 14.19

6. REQUIREMENTS FOR INSTITUTIONAL, PUBLIC ASSEMBLY, RESIDENTIAL, AND COMMERCIAL OCCUPANCIES

6.1 General

6.1.1 Public stairway, stair landing, *entrance* or *exit*. No portion of a *refrigerating system shall* be installed in or on a public stairway, stair landing, *entrance*, or *exit*.

6.1.2 Public *hallway* or *lobby*. No portion of a *refrigerating system shall* interfere with free passage through these areas. No portion of a *refrigerating system* containing a Group 2 *refrigerant shall* be permitted in public *hallways* or *lobbies* of Institutional or Public Assembly Occupancies. *Refrigerating systems* installed in a public *hallway* or *lobby shall* be limited to:

a) *Unit Systems* containing not more than the quantities of a Group 1 *refrigerant* specified in Table 1, or

b) *Sealed absorption systems* containing not more than 3 lbs (1.36 kg.) of a Group 2 *refrigerant* when in Residential and Commercial Occupancies.

6.1.3 When the refrigerant-containing parts of a system are located in one or more enclosed spaces, the cubical content of the smallest enclosed *humanly occupied space* other than the *machinery room, shall* be used to determine the permissible quantity of *refrigerant* in the system. Where a *refrigerating system* has *evaporator* coils serving individual stories of a building, the story having the smallest volume *shall* be used to determine the maximum quantity of *refrigerant* in the entire system.

6.1.4 When the *evaporator* is located in an *air duct* system, the cubical content of the smallest *humanly occupied* enclosed space served by the *air duct* system *shall* be used to determine the permissible quantity of *refrigerant* in the system. If the air flow to any enclosed space served by the *air duct* system cannot be shut off or reduced below one-quarter of its maximum, the cubical contents of the entire space served by the *air duct* system may be used to determine the permissible quantity of *refrigerant* in the system.

6.1.5 Where the return air space above a suspended ceiling is one continuous space and not an enclosed *air duct* in which the return air is confined, this space may be included in calculating the cubical content of the *humanly occupied space.*

6.1.6 In Institutional and Public Assembly Occupancies, direct *expansion coils* or *evaporators* used for air conditioning and located downstream from, and in proximity to, a heating coil, or located upstream within 18 in. (0.46m) of a heating coil, *shall* be fitted with a *pressure relief device* discharging to the outside of the building in an *approved* manner; except that such a relief device *shall not* be required on *unit* or *self-contained systems* if the internal volume of the *low side* of the system which may be shut off by valves, divided by the total weight of *refrigerant* in the system less the weight of *refrigerant* vapor contained in the other parts of the system at 110F (43.5 °C) exceeds the specific volume of the *refrigerant* at critical conditions of temperature and pressure.

NOTE: The above exemption is also stated in formula form below.

$V_1/W_1 - W_2$ *shall* be more than V_{gc}

where V_1 = low side volume, cu ft (cu m)

V_{gc} = specific volume at critical conditions of temperature and pressure, cu ft per lb (cu m per kg)

W_1 = total weight of refrigerant in system, lb (kg)

V_2 = total volume of system less V_1 cu ft (cu m.)

V_{gt} = specific volume of refrigerant vapor at 110F (43.5 °C), ft^3/lb (cu m/kg)

$W_2 = V_2/V_{gt}$ = weight of refrigerant vapor in V_2 at 110F (43.5°C)

6.2 Group 1 Refrigerants

6.2.1 ***Direct Systems.*** The maximum permissible quantity of a Group 1 *refrigerant* in a *direct system shall* be as specified in Table 1 except for additional limitations specified in 6.2.1.1 for Institutional Occupancies.

6.2.1.1 ***Direct Systems*** in Institutional Occupancies *shall* be limited to systems each containing not more

CH3-84-3

ADHESIVES MANUFACTURERS ASSOCIATION

One Illinois Center
111 East Wacker Drive
Chicago, Illinois 60601
312/644-6610

August 7, 1984

Secretary
U.S. Consumer Product Safety Commission
1111 18th Street, N.W.
Washington, DC 20207

RE: FHSA Flammability Regulation Amendments

Dear Ms. Dunn:

The Adhesives Manufacturers Association (AMA) appreciates the opportunity to comment on the proposed rule (Federal Register April 26, 1984, Volume 49, No. 82, p. 17956) concerning amendments to flammability regulations. AMA supports the Commission's efforts to standardize CPSC requirements relative to flammability. This will bring CPSC procedures into conformity with the practices of other Federal agencies and voluntary standard setting organizations.

AMA does urge that CPSC specificially reference the Pensky-Martin Closed Cup (ASTM-D-93) test as an acceptable test procedure along with the Setaflash Closed Cup (ASTM-D-3828) test which is cited in the proposed rule. While the proposed regulations do not prohibit the use of the Pensky-Martin Closed Cup method, it would appear that the burden of demonstrating equivalency rests with the testing party. This problem would be alleviated if CPSC would specifically reference the Pensky-Martin testing method as an option.

Such a reference would help further the CPSC goal of standardization since the Pensky-Martin Closed Cup test is more commonly specified by the other agencies such as the

Department of Transportation, Occupational Safety and Health Administration, and several international organizations. In view of this widely accepted use of Pensky-Martin, we respectfully request that CPSC list this as an acceptable testing method.

We appreciate your consideration of this request.

Sincerely yours,

Michael Payne
Director - Government Relations

MP/sb

Koppers Company, Inc.
Occupational Health and Product Safety
440 College Park Drive, Monroeville, PA 15146
Telephone 412-327-3000

CH3-84-4

Charles W. Flickinger
Manager
Industrial Hygiene

KOPPERS

August 15, 1984

Sadye E. Dunn, Secretary
U.S. Consumer Product Safety Commission
Washington, D. C. 20207

Dear Madam:

This correspondence is in reference to: "FHSA Flammability Regulations - Amendments" as proposed in the Federal Register of April 26, 1984, and contains the comments relative to problems foreseen not only by Koppers Company, Inc., but by the entire industrial sector that manufacturers and/or formulates "combustibles" for the consumer marketplace. This major problem is in the differences between DOT definitions of "combustible" and the Proposed CPSC definition of "combustible."

Currently the DOT specifies flammable liquids as those materials having a flashpoint below 100° F, 49 CFR 173.115(a). Subsequently, the DOT has a classification for "combustible" liquids that includes those with flashpoints at or above 100°F and up to and including 199°F. Several problems could arise for Koppers Company especially in the area of our coatings with flashpoints near 100°F. CPSC would rule these materials as flammable, however, for shipment purposes, the DOT would not require flammable labeling and would permit shipments under an exception for combustible liquids per 49 CFR 173.118a. There may be considerable confusion when these products are stored or warehoused.

Another consideration should be shipments for export under the IMDG Code. The current criteria for flammable liquids under this code specifies flashpoints at or below 141°F as "flammable." We are already experiencing difficulty with many products that fall within the range of 100-141°F since shipments within the U.S. would only require a "combustible" classification. For export, however, these containers must be re-marked as "flammable" to comply with international regulations. There has been a general movement, although very slow in coming, to amend U.S. shipping regulations, bringing them more in line with international standards already established. It would be impossible to speculate when the amendments would be effective but the consensus of regulatory agencies indicates this is the direction the current shipping regulations are progressing. Resultingly, we may find that the DOT combustible classification may be totally eliminated and only materials at or below 141°F will be considered flammable.

Koppers recommendation to the CPSC is to align both the testing methods and definitions with current practices established by the U.S. Department of Transportation. Thus, Koppers Company, Inc. is stating that the CPSC's Flashpoint Ranges and Test Methods must correspond to DOT's Ranges and Test Methods. This should be specifically cited in 16 CFR 1500.3(c)(6)(ii) for the term "flammable" as follows: "flammable" 21°F through and including 99°F and in 16 CFR 1500.3(c)(6)(iii) for the term "combustible" as follows: "combustible" 100°F through and including 200°F.

The CPSA's thorough consideration of the Koppers Company, Inc. comments toward these Proposed Rules will be greatly appreciated.

Very truly yours,

C. W. Flickinger
Manager
Industrial Hygiene

CWF:em

cc: Building Products Sector
Occupational Health & Products Safety Department
Traffic & Transportation Department

CH3-84-5

THE ADHESIVE AND SEALANT COUNCIL
Suite 910 • 1600 Wilson Boulevard • Arlington, VA 22209 • Phone: (703) 841-1112

August 22, 1984

Secretary
U. S. Consumer Products
Safety Commission
Washington, DC 20207

Re: FHSA Flammability Regulations - Amendments

Dear Ms. Dunn:

The Adhesive and Sealant Council (ASC) respectfully responds to the Commission's request for comments on the captioned proposal as published in the April 26, 1984, Federal Register. ASC is the trade association of the nation's leading manufacturers of consumer and industrial adhesives and sealants.

INTEREST OF ASC

ASC has long worked with the Commission on the issue of flammability regulations and the flammability characteristics of different products manufactured by our industry. During the mid-1970's ASC was an active participant in Commission proceedings regarding extremely flammable contact adhesives and, at that time, recommended that the Commission adopt the Setaflash Closed Cup test method for determining flammability.

ASC COMMENTS

ASC commends the Commission for its proposal to, in fact, adopt the Setaflash Closed Cup test method for determining flammability. In advocating this amendment in the past, ASC pointed out that the Setaflash method is more easily reproduced; it generally is more accurate; and, it already is specified by other Federal agencies including the Department of Transportation and the Occupational Safety and Health Administration.

ASC also commends the Commission's recognition of the burdens and costs associated with retesting products and possible reformulation should the proposed amendment be adopted. Clearly, it would be inequitable to force retesting, and in some cases, reformulation, merely because the Commission would specify a different test method that could lead to slightly different results.

Similarly, ASC commends the Commission for its provision to permit classification exemptions where flash point testing may give a false indication of hazard, as well as the provision to exempt mixtures that contain less than 1 percent of a contaminant with a lower flashpoint. Certain products such as extremely viscous substances, or mixtures of substances, may, in actual conditions of use, pose a far lower hazard than indicated by the raw flashpoint test results. The Commission appears to have recognized these facts in the proposed amendments.

While ASC has long advocated the adoption of the Setaflash Closed Cup test method, we recognize that other flashpoint test methods may, at times, be superior for certain substances. In proposed Section 1500.43(a), which specifies the Setaflash test method, the Commission also appears to recognize this fact when it permits "test methods which produce equivalent results". We would propose that the Commission specifically recognize the Pensky-Martens test procedure (ASTM-D93) in this section.

The Pensky-Martens test procedure often is specified both by Federal agencies, international organizations and voluntary standards-setting organizations. For example, both the Department of Transportation and the Occupational Safety and Health Administration recognize the Pensky-Martens test in certain regulations. See CFR §173.115(d) and 29 CFR §1910.106a(14). In addition, the International Maritime Organization, the International Civil Aviation Organization, and the International Air Transport Association, as well as the National Fire Prevention Association, all reference the Pensky-Martens test. Specific reference to this test in the CPSC regulations would better assist the agency in achieving the flexibility provided in §1500.43.

CONCLUSION

In conclusion, ASC strongly supports the Commission's proposed amendments as examples of cost effective regulation that, where possible, avoids needless burdens on industry. With the minor suggested revisions, we believe that the proposal will fully achieve the results intended by Congress in its 1978 amendments to the Federal Hazardous Substances Act.

Respectfully,

Jules Rapp

Jules Rapp
Executive Vice President

JR:kj

CH3-84-6

Union Oil Company of California KLM-196
Union Oil Center, Box 7600, Los Angeles, California 90051
Telephone (213) 977-7044

Kenneth L. McGinnis
Manager, Loss Prevention

August 20, 1984

Secretary
U. S. Consumer Product Safety
Commission
Washington, D.C. 20207

"FHSA Flammability Regulations
- Amendments"

Dear Madam:

The purpose of this letter is to comment on the Amendments proposed in the Federal Register on Thursday, April 26, 1984, (49 Fed. Reg. 17956).

On Page 17957, Paragraph C, "Reasons for the Proposed Amendments", begins, "The proposed amendments would bring the Commission's regulations into general conformity with the provisions of most other Federal agencies with respect to the flammability testing of hazardous substances." We believe the proposed flashpoint limits are not consistent with other governmental agencies.

For example, the Department of Transportation defines "combustible" as any substance having a flashpoint at or above 100°F but below 200°F. The Occupational Safety and Health Administration defines a "combustible liquid" as any liquid having a flashpoint at or above 100°F.

In order to be consistent with other governmental agencies and to simplify compliance by manufacturers, Union Oil Company recommends that the Amendment be modified as shown:

- Section 1500.3(c) (6).
  "(iii) The term "combustible" shall apply to any substance having a flashpoint at or above 100°F but below 200°F. . .

  A) Any mixture having one component or more with a flashpoint at 200°F or higher . . ."

Thank you for the opportunity to comment on these proposed Amendments.

Sincerely,

Kenneth L. McGinnis

ejs
cc: B. M. Dixon
A. A. Totten

CH3-84-7

Founded 1914

Suite 1120
1001 Connecticut Avenue, NW
Washington, DC 20036
202/872-8110

CHEMICAL SPECIALTIES MANUFACTURERS ASSOCIATION

August 23, 1984

Office of the Secretary
U.S. Consumer Product Safety Commission
Washington, DC 20207

Re: FHSA Flammability Regulations - Amendments (49 FR 17956, April 26, 1984)

Dear Sir or Madam:

The Chemical Specialties Manufacturers Association (CSMA) is a voluntary, nonprofit trade association composed of some 400 companies engaged in the manufacture, distribution, and marketing of chemical specialty products such as: automotive chemicals; home, lawn, and garden pesticides including disinfectants and sanitizers; detergents and cleaning compounds; waxes, polishes, and floor finishes; and aerosol products. Many of these products are subject to the labeling and other requirements of the Federal Hazardous Substances Act (FHSA). CSMA is therefore vitally interested in the Commission's proposed amendments to the regulations for classifying extremely flammable, flammable, and combustible substances and the labeling of consumer products subject to the FHSA.

CSMA supports the goal of these proposed amendments to bring FHSA flammability procedures into general conformity with the requirements of other federal agencies such as the Department of Transportation. We would, however, like to express some concerns regarding specific aspects of these amendments, and offer modifications which we believe would improve the present regulatory requirements. Our comments are organized according to the specific subsections of Code of Federal Regulations Section 1500 to which they pertain.

Sections 1500.3(c)(6)(ii)(A) and 1500.3(c)(6)(iii)(A)

These sections would change the flashpoint criteria for distinguishing between "flammable" and "combustible" products from 80°F to 100°F, i.e., "flammable" is redefined to include substances with a flashpoint between 20°F and 100°F (instead of

20°F to 80°F) and "combustible" is defined to include substances with a flashpoint between 100°F and 150°F (instead of 80°F to 150°F). In addition, the Commission admits in the introduction to this proposal that most products with open-cup flashpoints around 100°F will have closed-cup flashpoints about 5°F to 10°F lower. The combined effect of these two changes is, therefore, to change the criteria for distinguishing between "flammable" and "combustible" products by 25°F to 30°F.

CSMA does not believe that CPSC has adequately justified the need for this major change in criteria, which will result in a number of products considered as only "combustible" under present requirements being redefined as "flammable" under the requirements of this amendment. In lieu of justifying the need for this change, the Commission simply states, "Few if any new costs are likely to be incurred by manufacturers as a result of this proposed amendment."

If CPSC has data or experience regarding products with flashpoints between 80°F and 100°F indicating a need to reclassify those products as "flammable" instead of "combustible", this information should be made available for public review. If this change in criteria is simply an arbitrary change, we urge the Commission to reconsider this aspect of the regulatory amendments.

Sections 1500.3(c)(6)(ii)(B) and 1500.3(c)(6)(iii)(B)

In the definitions of "flammable" and "combustible" liquid mixtures, exemptions are given for certain aqueous mixtures containing 24 percent or less alcohol. Section 1500.3(c)(6)(ii)(B) states, "Any aqueous mixture containing 24 percent or less alcohol by volume is not considered to be flammable if the remainder of the mixture does not otherwise present any flammability hazard". Section 1500.3(c)(6)(iii)(B) states, "Any aqueous mixture containing 24 percent or less alcohol by volume is not considered to be combustible if the remainder of the mixture does not present any flammability hazard." It is not clear whether the remainder of the mixture (meaning the individual components other than alcohol) should be tested by the method described in Section 1500.43. There are several ways in which these definitions could be interpreted. We recommend that Section 1500.3(c)(6)(ii)(B) be clarified as follows: "Any aqueous mixture containing 24 percent or less alcohol by volume is not considered to be flammable if the remainder of the mixture does not otherwise present any flammability hazard when tested in accordance with the test methods outlined in Section 1500.43." Section 1500.3(c)(6)(iii)(B) should read: "Any aqueous mixture containing 24 percent or less alcohol by volume is not considered to be combustible if the remainder of the mixture does not present any flammability hazard when tested in accordance with the test method outlined in Section 1500.43."

Section 1500.3(c)(6)(vii)

This section of the amendment retains the present regulatory definition of "extremely flammable" for aerosol products, which states, "'Extremely flammable contents of self-pressurized container' means contents of a self-pressurized container that, when tested by the method described in Section 1500.45, a flashback (a flame extending back to the dispenser) is obtained at any degree of valve opening and the flashpoint, when tested by the method described in Section 1500.43, is less than 20° (6-6.7°C)." This definition requires that the flashpoint of an aerosol concentrate, isolated by means of the procedure given in Section 1500.46 and determined by the procedures in Section 1500.43, be used in establishing whether a product in a self-pressurized container is "extremely flammable". This flashpoint, therefore, is used in addition to the flame-extension test described in Section 1500.45 in defining the "extremely flammable" category. (It is not used in the definitions of "flammable" and "combustible" for aerosol products.)

CSMA's Aerosol Scientific Committee has adopted a position, based on its members' extensive expertise in aerosol technology and consumer safety, that flashpoints of aerosol product concentrates have insufficient correlation with aerosol consumer product safety to be used in this definition. This position applies regardless of whether the flashpoint or firepoint is determined by an open-cup or closed-cup procedure. We believe that the present criteria for flame-extension and flashback as determined by the procedures in Section 1500.45 are adequate in defining an "extremely flammable" aerosol product. We therefore strongly urge CPSC to eliminate the reference to flashpoint in Section 1500.3(c)(6)(vii) and eliminate Section 1500.46 which gives the procedures for isolating the aerosol concentrate for flashpoint determination.

There are a number of factors which make self-pressurized aerosol products fundamentally different from liquids and solids regarding their potential flammability hazards. The flammable constituents of aerosol products are potentially ignitable only when the aerosol valve is activated, and the contents emitted through the valve. The flame extension test currently required under FHSA for evaluating aerosol product flammability closely represents actual use conditions, and evaluates the total aerosol formulation, including propellant. The flashpoint methodology in the current regulations, and in these proposed amendments, bears little resemblance to actual use conditions, and is intended to evaluate only the aerosol concentrate, giving no consideration to the aerosol propellant.

There are also some additional technical problems with the use of the procedure in Section 1500.46 of the FHSA regulations to isolate the aerosol concentrate for use in flashpoint testing. Many aerosol products with hydrocarbon propellants (i.e., propane, butane and/or isobutane) will retain some hydrocarbon gas dissolved in the concentrate. These residual dissolved flammable gases often cause earlier, lower temperature flashes,

and may make it difficult to determine which flash represents the true flashpoint of the aerosol concentrate. This difficulty with the present procedure, using an open cup flashpoint method, would be further exacerbated in changing to a closed cup procedure, where the propellant gas can more easily attain an ignitable concentration.

If the Commission believes that the flame extension test in Section 1500.45 is not adequate as the sole test in defining "extremely flammable" aerosol products, we urge CPSC to substitute a procedure which has a greater relevance to consumer safety than the present flashpoint procedures. In any case, CSMA believes that it is totally unjustifiable to require aerosol products to be retested by a closed-cup flashpoint procedure when such new data would have no reasonable relationship to consumer product safety evaluation.

At present, only the FHSA requires flashpoint testing for aerosol products. CSMA believes that eliminating this requirement would be a valuable step toward the general conformity with other federal requirements which CPSC states as the primary goal of these amendments.

Section 1500.43(a)(1)

This section specifies the use of a Setaflash low-range closed tester, or "an apparatus producing equivalent results." For certain types of products, an alternative closed-cup procedure may be warranted. For instance, very viscous or film-forming products require a stirring apparatus to determine accurate flashpoints. These types of products, therefore, may be better tested by the equipment and procedures of ASTM D-93, Standard Test Methods for Flash Point by Pensky-Martens Closed Tester.*

We believe the Commission should specify more than one type of approved tester to eliminate confusion regarding what the Commission considers to be an equivalent apparatus, especially since the preamble mentions several other testers, but goes on to say that, "the different test apparatus do not normally give the same test results and do not provide a constant relationship among all of the results obtained."

CSMA recommends that the first sentence of Section 1500.43(a)(1) be followed by the sentence, "Examples of other testers would be the Pensky-Martens apparatus or the Cleveland Closed Cup apparatus."

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* ASTM D-93 is this test's designation by the American Society for Testing and Materials and the American National Standards Institute; the method is also recognized by the Institute of Petroleum as Designation: 34/71.

Section 1500.43(a)(4)

With regard to the classification of a product as to potential flammability hazard, this section states, "If experience or other data indicate that the flammability hazard of a substance is greater or less than that indicated by the method specified here, the Commission may by regulation classify the substance in a different category than that indicated by the results of this test method."

We interpret this section to mean that only the Commission can use experience or other data to classify a substance in a different category. It is unclear how the Commission will perform this classification, especially if the history of the product indicates a lesser hazard. Is the intention that a company must petition CPSC, or will CPSC independently look at substances to make the determination?

Section 1500.4 of the present regulations gives the manufacturer/distributor of a substance the flexibility to determine if human experience takes precedence over animal data for purposes of toxicity labeling. In order for the policies in the proposed amendment to be consistent with the labeling policies presently reflected in Section 1500.4 of the present regulations, we recommend that Section 1500.43(a)(4) be revised as follows:

> If experience or other reliable data indicate that the flammability hazard of a substance is greater than or lesser than that indicated by the method specified here, the manufacturer or other party responsible for the labeling may use such experience or other data in determining the classification of the substance. Further, the Commission may by regulation classify the substance in a different category than that indicated by the results of this test method.

Section 1500.43(d)

This section states that the essential dimensions and requirements of the Setaflash apparatus are shown in figure 1 and table 3. The only "figure 1" in the proposal, however, is that showing the Tagliabue open-cup apparatus on page 17961. We trust that the deletion of the "figure 1" refered to in Section 1500.43(d) was an editorial oversight, and will be added in any final regulation.

Summary and Conclusions

CSMA appreciates the opportunity to comment on these proposed amendments to the FHSA flammability regulations. The Association urges CPSC to make the additional modifications recommended in these comments. CSMA believes that if these

changes are made, this proposed amendment could succeed in bringing FHSA regulations into closer conformity with those of other federal agencies, while minimizing the burdens to those who must comply, and assuring that consumer products under CPSC jurisdiction are accurately and properly labeled with regard to potential flammability hazards.

Sincerely,

Ralph Engel
President

cmw

CH3-84-8

American Petroleum Institute
1220 L Street, Northwest
Washington, D.C. 20005
202-682-8300

William F. O'Keefe
Vice President

August 22, 1984

The Honorable Sadye E. Dunn
Secretary
U. S. Consumer Product Safety Commission
Washington, D.C. 20207

Re: "FHSA Flammability Regulations - Amendments"

Dear Madam:

The American Petroleum Institute (API) is a non-profit trade organization representing approximately 240 companies engaged in all aspects of the petroleum industry. API, in general, supports the amendment of Chapter II, Subchapter C, Part 1500 of Title 16 of the Code of Federal Regulations, proposed in the Federal Register on Thursday, April 26, 1984 (49 Fed. Reg. 17956). However, we offer the following comments on this proposal.

The stated purpose of the proposed rule is to bring the flammability classifications of hazardous substances into general conformity with the practices of other federal agencies and voluntary standards; yet, the proposed limits are inconsistent with flashpoint limit values of the other agencies. For example, the Department of Transportation (DOT) regulations define "combustible" as any substance "having a flashpoint at or above 100°F but below 200°F" (49 C.F.R. 172.101). In addition, the Occupational Safety and Health Administration defines a combustible liquid as having, "... a flashpoint at or above 100°F" (29 C.F.R. 1910.106, Subpart H-Hazardous Materials). The CPSC proposal is therefore clearly inconsistent with existing DOT and OSHA regulations.

The preamble states that the Commission discourages overlabeling of products having a flashpoint ranging from 150°F to 200°F. Products having flashpoints to 200° must be labeled under the final OSHA Hazard Communication Standard (48 Fed. Reg. 53280 - November 25, 1983) as combustible. If some of these products were to become consumer products, the manufacturer would also be required to label under the CPSC regulatory standard. This would result in inconsistent product labeling.

Therefore, to conform to and be compatible with DOT Hazardous Materials Regulations (49 CFR 173.115), the OSHA Hazard Communications Standard (29 CFR 1910.1200) and ANSI Z129.1, API recommends that the following definitions in the proposed rule be amended to read in part:

1. Section 1500.3(c)(6).

   "(i) The term "extremely flammable" shall apply to any substance which has a flashpoint below 20°F..."

2. Section 1500.3(c)(6).

   "(ii) The term "flammable" shall apply to any substance having a flashpoint at or above 20°F but below 100°F..."

   (A) Any mixture having one component or more with a flashpoint at 100°F or higher..."

3. Section 1500.3(c)(6).

   "(iii) The term "combustible" shall apply to any substance having a flashpoint at or above 100°F but below 200°F..."

   (A) Any mixture having one component or more with a flashpoint at 200°F or higher..."

API recommends that the Commission uphold its purpose, conforming with other regulations, and adopt these definitions.

We thank you for this opportunity to comment on this proposal.

Sincerely,

William F. O'Keefe
Vice President

CH3-84-9

ERDCO® Engineering Corporation

August 21, 1984

Secretary
U.S. Consumer Products Safety Commission
Washington, D.C. 20207

Subject: "FHSA Flammability Regulations - amendments"

Dear Sir:

Please consider the following recommendations to change the proposed Amendments to Flammability Regulations:

Federal Register/Vol. 49, No. 82/Thursday, April 26, 1984/Proposed Rules

Paragraph	Comment(s) and suggested corrections
1500.3 (c)(6)(ii) (B)	Delete the exemption for materials containing up to 24 percent alcohol if the remainder of the mixture does not present a flammability hazard. There is no assurance that the alcohol will remain in solution.
1500.3 (c)(6)(iii) B	Delete the exemption for materials containing up to 24 percent alcohol if the remainder of the mixture does not present a flammability hazard. There is no assurance that the alcohol will remain in solution.
1500.3 (c)(6)(iv) 2nd sentence	Substitute "ASTM Test Method D 1310" for "the Tagliabue." This allows continuous reference to a standard test method and emphasizes reference to a single source of information, ASTM. Please note that ASTM Thermometers are referenced in subsequent paragraphs. It also reduces the use of Trademarks.
Appendix I to 1500.3 (1.)	Substitute "ASTM Test Method D 1310" for "the Tagliabue" in 3 locations of the sentence.

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Paragraph	Comment(s) and suggested corrections
Appendix I to 1500.3 (3.)	Substitute "ASTM Test Method D 1310" for "the Tagliabue."
1500.43	Substitute "ASTM Test Method D 1310" for "the Tagliabue" in title of paragraph.
1500.43 (2.) and (3.)	Substitute "ASTM Test Method D 1310" for "the Tagliabue."
1500.43 (3.)(g)	Substitute "ASTM Test Method D 92 Open-Cup" for "Cleveland Open Cup." [ASTM designation: D 92]. This allows continuous reference to a standard test method and emphasizes reference to a single source of information, ASTM. It also reduces the use of Trademarks.
1500.43 (4.)(c)	Substitute the word "superceded" for "old Tagliabue."
1500.43 (a)(1)	Substitute "an equilibrium closed-cup tester" for "a Setaflash low-range closed tester." In the second sentence substitute "an" for "a Setaflash." In the same sentence delete "Standard Test Methods" for "Flash Point by Setaflash Closed Tester." NOTE: An alternate equilibrium method for Flash, No-Flash is ASTM Test Method D 3934-82 and for finite flash point is ASTM Test Method D 3941-82. Reference that Setaflash is a registered trademark of Stanhope-Seta Limited, Surrey, England is no longer needed.

Paragraph	Comment(s) and suggested corrections
1500.43 (d)	Substitute "as described in ASTM Test Method D 3828, D 3934 or D 3941" for "a Setaflash tester." In second sentence, substitute "closed cup flash point tester" for "Setaflash apparatus." In the third sentence substitute "flash point tester" for "Setaflash." In fifth sentence substitute "distributors supplying laboratories and alternately from ERDCO Engineering Corporation, Post Office Box 1310, Evanston, Illinois 60204" for "ERDCO Engineering Corp., 136 Official Road, Addison, Illinois 60101 or Stanhope-Seta Ltd., Egham, Surrey England." This helps to direct users to the normal channel of supply which are the distributors and deletes reference to a foreign source in a United States enforcement document. This also follows the policy of not listing foreign sources when United States sources are available. Renumber the notes on page 17963.
1500.43 Table 2	Revise Note B to read "When in position, the thermometer bulb should be surrounded with heat-conducting thermoplastic compound (such as a past comprised of zinc oxide and minerial oil)."

As clarification or additional information is desired, please advise.

Sincerely,

E.M. Nesvig
- ERDCO -

EMN/bw

ERDCO® Engineering Corporation

August 27, 1984

Secretary
U.S. Consumer Products Safety Commission
Washington, D.C. 20207

Subject: "FHSA Flammability Regulations - amendments"
Reference: ERDCO letter dated August 21, 1984

Dear Sir:

Please accept the following correction to the last item on page two (2) of the August 21, 1984 ERDCO letter by substituting the following:

Paragraph	Comment(s) and suggested corrections
1500.43 (a)(1)	Substitute "an equilibrium closed-cup tester with range up to 100°C (212°F)" for "a Seta-flash low-range closed tester." In the second sentence substitute "an" for "a Setaflash." In the same sentence delete "Standard Test Methods for Flash Point by Setaflash Closed Tester." NOTE: There is an alternate equilibrium method for Flash, No-Flash which is ASTM Test Method D 3934-82 and for finite flash point is ASTM Test Method D 3941-82. Reference 1 that Seta-flash is a registered trademark of Stanhope-Seta Limited, Surrey England is no longer needed.

Also, please correct the last item on page three (3) of the August 21, 1984 ERDCO letter by substituting the following:

1500.43 Table 2	Revise note B to read "When in position, the thermoneter bulb should be surrounded with heat-conducting thermoplastic compound (such as a paste comprised of zinc oxide and mineral oil)."

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ERDCO® Engineering Corporation

Your acceptance of these changes is appreciated.

Sincerely,

E. M. Nesvig
-ERDCO-

EMN/at

CONSUMER PRODUCT SAFETY COMMISSION

16 CFR Part 1500

Hazardous Substances and Articles Amendments to Flammability Regulations

AGENCY: Consumer Product Safety Commission.

ACTION: Proposed rule.

SUMMARY: The Commission proposes to amend its regulations for classifying extremely flammable, flammable and combustible hazardous substances which release ignitible vapors. These flammability classifications are used for regulatory purposes, including hazard labeling. The amendments change the definitions of these classifications and specify a different test method for determining the classification of these substances. The changes would bring the Commission's procedures into general conformity with the practices of other Federal agencies and voluntary standards setting organizations.

DATES: (1) *Effective date:* The Commission proposes an effective date that is one year after any final regulation is published.

(2) *Written comments:* Written comments on the proposal must be submitted to the Commission on or before August 24, 1984.

ADDRESS: Written comments, preferably in five copies, should be submitted to the Secretary, U.S. Consumer Product Safety Commission, Washington, D.C. 20207 and should be titled: "FHSA Flammability Regulations—Amendments."

All materials the Commission has that are relevant to this proceeding, including any comments that may be received on this proposal, may be seen in, or copies obtained from, the Office of the Secretary, Third Floor; 1111 18th Street, NW., Washington, D.C. 20207.

FOR FURTHER INFORMATION CONTACT: Allen F. Brauninger, Attorney, Office of General Counsel, Consumer Product Safety Commission, Washington, D.C. 20207; telephone (301) 492–6980.

SUPPLEMENTARY INFORMATION:

A. Background

The Federal Hazardous Substances Act (FHSA, 15 U.S.C. 1261), among other things, requires cautionary labeling for household substances that are hazardous substances as a result of their flammability or combustibility. (About 10,500 victims annually seek hospital emergency room treatment for burns associated with the use of flammable liquids, including gasoline, kerosene, lighter fluids, alochol, solvents, paint and paint thinners. At least 150 persons die each year as a result of burn injuries associated with these products. [1]) As originally enacted (Pub. L. 86–613, 74 Stat. 372, July 12, 1960), the FHSA included at section 2(1) definitions of the terms "extremely flammable" and "flammable." In 1969, the FHSA was amended to define the term "combustible," and to require the labling of flammable hazardous substances which fall within the definition of the term "combustible" (Pub. L 91–113, 83 Stat. 187–189). After the 1969 amendments, the FHSA provided that the term "extremely flammable" applied to any substance having a flashpoint at or below 20°F; the term "flammable applied to any substance having a flashpoint above 20°F to and including 80°F; and the term "combustible" applied to any substance having a flashpoint above 80°F to and including 150°F. The FHSA specified a certain test method for determining flashpoints, known as the "Tagliabue Open-Cup Test Method," except in the case of substances that are solids or the contents of self-pressurize containers, where the agency administering the act could specify the test method.

The classification of the Flammability properties of substances is necessary to evaluate the relative fire hazards of materials that can burn. In classifying substances, one property that is usually considered is the lowest temperature at which the material will release vapors that can be ignited by an external ignition source. This temperature can be determined experimentally for liquids, viscous liquids (pastes, gels, and semi-solids), and some solids by using a flashpoint test. Although there are various test methods for determining flashpoint, all of these methods involve slowly heating the substance to be tested in an open or closed container while an ignition source is periodically introduced into the vapor space of the material. the lowest temperature at which the vapors ignite is known as the flashpoint.

The flashpoint of a substance does not, by itself, provide a complete evaluation of the fire hazard of a material. The environment of intended use is another important consideration in any evaluation of fire hazard. However, flashpoint testing is relatively quick and simple: is generally reproducible; and involves uncomplicated and relatively inexpensive test apparatus. As a result, flashpoint test methods are generally recognized to be the most appropriate single measure of flammability hazard and are currently used as the primary method for classifying the flammability hazards of vapor-producing materials throughout most of the world (2).

Various states imposed flashpoint testing requirements around 1860, largely because of accidents due to the presence of highly volatile hydrocarbon fractions in "lamp oil." The earliest formal test method was probably an open test instrument developed by Guiseppe Tagliabue of New York. At the present time in the United States, the most commonly used flashpoint test apparatus are: Setaflash Closed-Cup; Tagliabue Closed-Cup; Pensky-Martin Closed-Cup; Tagliabue Open-Cup; Cleveland Open-Cup; and Setaflash Open-Cup (2).

Unfortunately, the different test apparatus do not normally give the same test results and do not provide a constant relationship among all of the results obtained. Moreover, different test methods using the same piece of

[1] Even non-fatal injuries are likely to be very serious. As an example, about 24 percent of the more than 8,000 persons treated in hospital emergency rooms for gasoline related burns were injured seriously enough to require admission for hospitalized care. By comparison, only 4 percent of all emergency room victims are admitted for in-patient care, and only 9 percent of all burn inujury victims are admitted for such care. (1) (References are to the Bibliography at the end of this notice.)

equipment can give different flashpoint temperatures. These differences have created a lack of uniformity and in some cases confusion involving city, state, and Federal regulatory bodies. In 1974, in an effort to achieve general uniformity, the Department of Transportation (DOT) published hazardous materials regulations that were generally consistent with flammability regulations issued by the Department of Labor at 29 CFR 1910.106(a), and model flammability requirements published by the National Fire Protection Association. DOT also consolidated air, water, and surface transportation regulations and issued changes in marking, labeling, placarding, and document action requirements for hazardous materials subject to its jurisdiction. The DOT amendments changed predominantly open-cup test methods (like the one specified by the FHSA as originally enacted) to closed-cup test methods. The DOT amendments also provided for supplementary testing to prevent the incorrect classification of materials due to contaminants or additives that raise or lower test temperatures without substantially affecting the fire behavior of the materials.[2]

The change by DOT left the CPSC as one of a few Federal agencies required by statute to use the open-cup test method.

To remedy this situation, in 1978 Congress amended section 2(1) of the FHSA to remove the requirement that flashpoints must be determined by use of the Tagliabue Open-Cup test apparatus (Pub. L. 95-631, 92 Stat. 3742, November 10, 1978). The amendments directed the Commission to issue regulations that define the terms "extremely flammable," "flammable," and "combustible," and specify test methods found to be generally applicable for defining flammability and combustibility characteristics of substances which release ignitible vapors. In establishing definitions and test methods, the Commission must consider existing definitions and test methods of other federal agencies and must, to the extent possible, establish compatible definitions and test methods. Thus, proposal of the amendments published below is necessary to comply with the 1978 amendments to the FHSA.

B. Description of the Amendments

In this notice the Commission proposes to amend the existing flammability regulations under the FHSA to implement the Congressional directive contained in the 1978 amendments to that act. The proposed amendments include new definitions for the terms "extremely flammable," "flammable," and "combustible" for substances which release ignitible vapors, as well as a different test apparatus for assessing flashpoint flammability characteristics. The Commission proposes to effect these changes by amending the definitions at 16 CFR 1500.3(c)(6) to provide that the term "flammable" would apply to any substance having a flashpoint above 20°F to and including 100°F, and in the term "combustible" would apply to any substance having a flashpoint above 100°F to and including 150°F. The present temperature limits in the definition of "extremely flammable" as any substance having a flashpoint at or below 20°F would remain unchanged. The classifications of "flammable" and "combustible," as redefined, include exemptions for mixtures of substances where only a percentage (1 percent) of the mixture has a flashpoint within the required range, and exemptions for certain mixtures of liquids with alcohol.

The proposal would also amend section 1500.43 to describe different methods and apparatus for determining flashpoint using the Setaflash[3] closed tester instead of the Tagliabue Open-Cup tester. The test method set forth in proposed § 1500.43 closely parallels the test method designated ASTM D 3828-81, "Standard Test Methods for Flash Point by Setaflash Closed Tester," published by the American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, Pennsylvania 19103. The principal differences between proposed § 1500.43 and the ASTM procedure are that proposed § 1500.43 omits reference to the high-temperature Setaflash Cup, and thus is applicable only to operation of the Setaflash low-range apparatus. Additionally, proposed § 1500.43 contains provisions for testing viscous materials.

The proposal includes provisions at § 1500.43(a)(4) that would allow the Commission to initiate a rulemaking proceeding to classify a substance in a different category if experience or other data show that the flammability hazard is greater or lesser than that indicated by the results of the test method. At § 1500.43(b)(3), the proposal also includes a provision that would allow the Commission to modify the test procedures to address special circumstances to ensure that the test results reflect the hazard under reasonable foreseeable conditions of use.

The proposal would change one part of the test method for classifying extremely flammable and flammable contents of self-pressurized containers by specifying the use of a closed-cup apparatus rather than an open-cup apparatus for determining flashpoints. See proposed § 1500.46. However, the test for determination of flashback in § 1500.45 is unaffected by the amendments proposed below. The proposal does not change the existing test method for determining extremely flammable and flammable solids specified by § 1500.44, because that test does not involve measurement of flashpoint temperatures.

C. Reasons for the Proposed Amendments

The proposed amendments would bring the Commission's regulations into general conformity with the provisions of most other Federal agencies with respect to the flammability testing of hazardous substances. At the present time, most other Federal agencies use closed-cup flashpoint test methods to determine flashpoint temperatures. These agencies include the Department of Transportation and the Occupational Safety and Health Administration of the Department of Labor. The Commission knows of only two other Federal agencies which use or require open-cup test methods to determine flashpoint temperatures. One of these agencies is the Pesticide Regulation Division of the Environmental Protection Agency, which technically requires test results using an open-cup method, but accepts results using closed-cup methods, and contemplates changing to a closed-cup test method at some future date. The other is the Coast Guard, which enforces regulations prescribing an open-cup method for determining flashpoints of hazardous materials shipped as bulk cargo.

The closed-cup test method is superior to the open-cup test method because it is more reproducible. The closed testing apparatus which collects vapors more nearly under equilibrium conditions is subject to less variation in vapor concentration caused by differences in ventilation from time to time or from one laboratory to another. (4,6). The closed-cup test method is also more precise and reliable than the open-cup method (5).

In addition to achieving uniformity, the proposed change in test method should lessen the present burden for many producers of household substances by eliminating the need to run tests using the closed-cup test

[2] The DOT requirements for labeling and shipment of hazardous materials are published in the Code of Federal Regulations at 49 CFR Parts 100 through 189.

[3] Setaflash is a registered trademark of Stanhope-Seta Limited, Surrey, England.

method for shipping, storage, and insurance purposes, and other tests using the open-cup test method for purposes of cautionary labeling for consumers.

Proposed § 1500.3(c)(6)(iv) states that the Commission will use the closed-cup apparatus and test procedure described in the proposed amendment of § 1500.43 when testing for compliance with the requirements of the FHSA. However, that section of the proposal also states that manufacturers of household products which are subject to FHSA requirements may continue to rely on properly conducted tests using the Tagliabue open-cup method and the definitions of the terms "extremely flammable," "flammable," and "combustible" contained in § 1500.3(c)(6) before amendment if all of the following conditions are met:

(1) The product was subject to FHSA requirements for "extremely flammable," "flammable," or "combustible" hazardous substances before the effective date of the amendment of § 1500.43; and

(2) No change has been made to the formulation or labeling of the product since the amendment of § 1500.43.

Consequently, the amendments proposed below, if issued on a final basis will not require any manufacturer to conduct new tests using closed-cup apparatus and procedures or to relabel any product which is now correctly labeled in accordance with provisions of existing § 1500.3(c)(6).

Proposed §§ 1500.3(c)(6)(ii) and (iii) contain exemptions for substances having trace amounts (less than one percent) of low flashpoint ingredients. These provisions are consistent with those of DOT and OSHA regulations and are intended to avoid cautionary labeling that overstates the flammability hazard, since these trace amounts do not add to the flammability hazard of the substance.

Proposed §§ 1500.3(c)(6)(ii) and (iii) also provide exemptions for materials containing up to 24 percent alcohol if the remainder of the mixture does not present a flammability hazard. These provisions are similarly consistent with DOT requirements and are proposed to avoid overstating flammability hazards. In general, these substances do not have a flashpoint when tested in the open-cup test apparatus presently used. For example, some liquid dishwashing detergents contain varying amounts of alcohol, and may have a closed-cup flashpoint in the flammable range. However, these products can also be used to extinguish fires (3).

Proposed § 1500.43(a)(4) states that the Commission may classify a substance in a different category based on experience or other data indicating a greater or lesser hazard than that indicated by the test method. This provision of the proposed amendments is also intended to avoid classifications that overstate or understate the flammability hazard. Provisions of proposed § 1500.43(a) which allow the Commission to modify the test procedures to reflect reasonably foreseeable conditions of use have been included for the same reason.

D. Economic Effects

In February of 1980, an outside contractor completed a report to the Commission on the anticipated economic consequences of an earlier draft of a proposal to amend the FHSA regulations by changing from the Tagliabue open-cup method for determining flashpoint to a closed-cup method, and by modifying the definitions of the terms "extremely flammable," "flammable," and "combustible" hazardous substances. (4)

After considering that report, the Commission staff revised the proposal. The amendments proposed below differ from the proposed changes to the FHSA regulations which were the subject of the contractor's report in two significant ways:

1. The amendments proposed below contain provisions at § 1500.3(c)(6)(iv) which allow manufacturers to continue to rely on data from testing in accordance with the open-cup method and existing definitions of flammability categories for purposes of compliance with FHSA requirements as long as no change is made to the formulation or labeling of a product; and

2. The amendments proposed below retain the 150° flashpoint as the upper limit for classification as a "combustible" hazardous substance, rather than the expanded upper limit of 200°F in the earlier of the proposed amendments.

Because of these differences between the earlier draft of the amendments and the proposal published below, much of the potential economic burden on manufacturers which may result from the proposed amendments, particularly to small manufacturers, has been eliminated.

Little change in the classification of "extremely flammable" substances would result from the proposed amendments because the temperature limit for classification in this category remains unchanged. Although the closed-cup test method generally gives results that are lower than the open-cup test method, at 20° F the temperature differential between the open- and closed-cup test methods is normally relatively small. At this temperature the change from open- to closed-cup test methods would affect at most a very small number of products, primarily because of the greater accuracy and precision of the closed-cup apparatus.

Most products with open-cup flashpoints of 100° F will have flashpoints of 90° F to 95° F when tested under the closed-cup test method. Many or most products with open-cup flashpoints of 200° F will have closed-cup flashpoints in the range of 185° to 195° F.

The change in the definition of "flammable" could affect products that are currently classified as "combustible" and have open-cup flashpoints from 80° F to about 110° F, or closed-cup flashpoints of about 75° F to 100 °. As a result of this change, some products in this range that are currently labeled as "combustible" products would require labeling as "flammable" products, if these products were reformulated or relabeled so that the provisions of proposed ¶ 1500.3(c)(6)(iv) would not be applicable. Few if any new costs are likely to be incurred by manufacturers as a result of the proposed amendment.

Since the amendment proposed below leaves the upper flashpoint limit for the combustible classification at 150° F, the proposed amendments are unlikely to result in imposing any labeling requirements are unlikely to result in imposing any labeling requirements on substances that are not currently subject to labeling under the FHSA. The Commission does not intend for this change in test methods to result in new labeling requirements for substances that are not currently subject to labeling requirements.

The Commission realizes that if the amendments proposed below are issued on a final basis, differences will continue to exist between labeling requirements for shipment and storage administered by DOT, and labeling requirements for household products administered by the Commission. The principal difference will be that some products with a flashpoint ranging from 151° F to 200° F will be subject to labeling requirements for "combustible" substances by DOT regulations, but will not be subject to any similar labeling requirement under the FHSA. While the Commission discourages the overlabeling of products—that is the use of labels which overstate the degree of hazard—it would not object to the labeling of household products having a flashpoint ranging from 151° F to 200° F with appropriate statements for "combustible hazardous substances" if

the amendments proposed below are issued on a final basis.

The Commission recognizes that products with a flashpoint temperature of 151° F or greater are outside the definition of the term "hazardous substance" for purposes of flammability labeling under the FHSA. However, the Commission considers the labeling of any such product as "nonflammable" or "noncombustible" to be inappropriate and misleading, if such products will ignite.

Changing from an open-cup to a closed-cup method for determining flashpoint will benefit many manufacturers because they will no longer be required to perform separate open-cup tests for purposes of compliance with FHSA requirements in addition to closed-cup tests for shipping and storage requirements. Additionally, many manufactures will benefit from provisions in the amendments proposed below which allow use of a flash/no flash method as an alternative to determining a finite flashpoint. A reduction in testing costs of 40 percent is estimated for manufacturers who perform their own testing.

The Commission estimates that the change from the open-cup to the closed-cup test method could reduce total testing costs for all producers by $1 million per year.

The proposed amendments would also result in greater consistency among shipping carton labels and product labels with regard to flammability hazards.

E. Effective Date

The Commission is proposing an effective date that is one year after any final amendments to the flammability regulations are issued. The Commission encourages interested persons, in submitting comments on the proposal, to specifically address the issue of the effective date.

In choosing an effective date, a major factor the Commission will consider is the impact of different dates on manufacturers, especially small manufacturers, whose products are affected by the flammability regulations. The regulations, if issued in final form as they are proposed here, would result in a "flammable," as opposed to a "combustible," classification for many products when tested under the closed-cup test method. The products most likely to be affected by this change are paint products, asphalts and sealants, and automobile care products.

However, as discussed earlier, manufacturers who are currently labeling their products as "combustible" based on valid tests under the present open-cup test method may rely on these test results and are not required to conduct additional testing or relabel their products as a result of the test method change proposed here. The Commission believes that an effective date of one year should provide sufficient time for manufacturers, including small manufacturers, to become aware of the change in test method and conduct additional testing if they choose to do so.

F. Impact on Small Businesses

Section 603 of the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires agencies to prepare and make available for public comment an initial regulatory flexibility analysis of the impact of a proposed rule on small entities, including small businesses. Section 605(b) of this act provides that an agency is not required to prepare a regulatory flexibility analysis where the agency certifies that the rule will not, if issued, have a significant economic impact on a substantial number of small entities. In accordance with section 605(b), the Commission certifies that the regulation proposed below, if issued on a final basis will not have a significant economic impact on a substantial number of small entities.

The amendments proposed below contain provisions at § 1500.3(c)(6)(iv) which allow manufacturers to continue labeling their products in accordance with existing definitions of the terms "extremely flammable," "flammable," and "combustible" hazardous substances as determined by use of the Tagliabue open-cup test method currently specified in existing regulations at 16 CFR 1500.43, as long as no change is made to the formulation or labeling of those products. Consequently, any small business which concludes that use of the definitions of "extremely flammable," "flammable," or "combustible" hazardous substance in the amendments proposed below, or that determination of flashpoint using the closed-cup method described in the proposal will have a significantly adverse economic impact, may continue to use existing definitions and test procedures as long as its products and their labels remain unchanged.

The amendments proposed below, if issued on a final basis, would change the classifications and test procedures for the flammability of household substances in order to make them generally consistent with the requirements of other Federal agencies. By promoting uniformity and consistency among the procedures of different Federal agencies, the regulation would in some cases decrease testing costs for small businesses and reduce overall compliance costs to small businesses by eliminating the need for separate labels for the shipping container and the consumer package caused by product differences between DOT regulations and CPSC regulations. However, for most small businesses, the potential beneficial economic impact of the amendments proposed below, is not significant.

G. Environmental Considerations

The proposed regulations fall within the categories of Commission actions described at 16 CFR 1021.5(c) that have little or no potential for affecting the human environment. Since the primary effect of the proposed amendments will be on the test method for determining the flammability classification of household substances, the proposed action does not have the potential for producing significant environmental effects, and neither an environmental assessment nor an environmental impact statement is required.

H. Statutory Findings

Section 2(1) of the FHSA, as amended, provides that in establishing definitions and test methods related to flammability and combustibility, the Commission must consider existing definitions and test methods for other Federal agencies, and to the extent possible, establish compatible definitions and test methods that are generally applicable.

As explained earlier in this notice, the Commission has considered the definitions and test methods for the flammability of hazardous substances established by other federal agencies, including the Department of Transportation, the Department of Labor, and the Environmental Protection Agency. Based on information available at the present time, the Commission makes the preliminary determinations that the test method proposed here is of general applicability and that the proposed changes to the definitions and test methods for flammability under the FHSA are compatible with the provisions of other Federal agencies. Accordingly, the Commission has decided to propose these regulations as amendments to its existing regulations. The Commission is particularly interested in receiving comments on the issue of the compatibility of the proposed amendments with the requirements of other agencies and welcomes any suggestions how the amendments should be refined or clarified to be further in accord with the requirements of other agencies without

placing new burdens on manufacturers of household substances.

I. Conclusion and Proposal

Based on the foregoing information, the Commission proposes to amend the existing definitions of "extremely flammable," "Flammable," and "coumbustible" under the FHSA and proposes to adopt the closed-cup test method for assessing the flammability of substances, instead of the open cup test method presently used.

List of Subjects in 16 CFR Part 1500

Consumer protection, Hazardous substances, Labeling.

PART 1500—[AMENDED]

Therefore, in accordance with provisions of the Federal Hazardous Substances Act (secs. 2(1), 10(a); 15 U.S.C. 1261(1), 1269(a)) and under the authority of the Consumer Product Safety Act (sec. 30(a); 15 U.S.C. 2079(a)), the Commission hereby proposes to amend Chapter II, Subchapter C, Part 1500 of Title 16 of the Code of Federal Regulations, as follows:

1. Section 1500.3(b)(10) is proposed to be revised as follows:

§ 1500.3 Definitions.

* * * * *

(b) * * *

(10) The terms "extremely flammable," "flammable," and "combustible" as they apply to any substance, liquid, solid, or the contents of any self-pressurized container, are defined by regulations issued by the Commission and published at § 1500.3(c)(6).

* * * * *

2. Section 1500.3(c)(6) is proposed to be revised as follows:

* * * * *

(c) * * *

(6) The Consumer Product Safety Commission, by the regulations published in this section, defines the terms "extremely flammable," "flammable," and "combustible," appearing in section 2(1) of the Federal Hazardous Substances Act, as follows:

(i) The term "extremely flammable" shall apply to any substance which has a flashpoint at or below 20°F (−6.7°C) as determined by the test method described at § 1500.43, except that, any mixture having one component or more with a flashpoint higher than 20°F (−6.7°C) making up at least 99 percent of the total volume of the mixture is not considered to be an extremely flammable substance.

(ii) The term "flammable" shall apply to any substance having a flashpoint above 20°F to and including 100°F (37.8°C), as determined by the test method described at § 1500.43, except that:

(A) Any mixture having one component or more with a flashpoint higher than 100°F (37.8°C) making up at least 99 percent of the total volume of the mixture is not considered to be a flammable substance; and

(B) Any aqueous mixture containing 24 percent or less alcohol by volume is not considered to be flammable if the remainder of the mixture does not otherwise present any flammability hazard.

(iii) The term "combustible" shall apply to any substance having a flashpoint above 100°F (37.8°C) to and including 150 F (65.6°C) as determined by the test method described at § 1500.43 except that:

(A) Any mixture having one component or more with a flashpoint higher than 150°F (65.6°C) that makes up at least 99 percent of the total volume of the mixture is not considered to be a combustible substances; and

(B) Any aqueous mixture containing 24 percent or less alcohol by volume is not considered to be combustible if the remainder of the mixture does not present any flammability hazard.

(iv) To determine flashpoint temperatures for purposes of enforcing and administering requirements of the Federal Hazardous Substances Act applicable to "extremely flammable," "flammable," and "combustible" hazardous substances, the Commission will follow the procedures set forth in § 1500.43, as amended. However, the Commission will allow manufacturers of substances and products subject to those requirements to rely on properly conducted tests using the Tagliabue open-cup method which was in effect prior to the amendment of § 1500.43 (as published at 38 FR 27012, September 27, 1973; reprinted at Appendix I of this section) and the definitions of the terms "extremely flammable," "flammable," and "combustible" in this section before its amendments (as published at 38 FR 27012, September 27, 1983, and amended 38 FR 30105, November 1, 1973; reprinted at Appendix I of this section) if all of the following conditions are met:

(A) The substance or product was subject to and complied with the requirements of the Federal Hazardous Substances Act for "extremely flammable," "flammable," or "combustible" hazardous substances before the effective date of the amendment of § 1500.43; and

(B) No change has been made to the formulation or labeling of such substance or product after the effective date of the amendment of § 1500.43 to prescribe a closed-cup test apparatus and procedure.

(v) "Extremely flammable solid" means a solid substance that ignites and burns at an ambient temperature of 80°F or less when subjected to friction, percussion, or electrical spark.

(vi) "Flammable solid" means a solid substance that, when tested by the method described in § 1500.44, ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.

(vii) "Extremely flammable contents of self-pressurized container" means contents of a self-pressurized container that, when tested by the method described in § 1500.45, a flashback (a flame extending back to the dispenser) is obtained at any degree of valve opening and the flashpoint, when tested by the method described in § 1500.43, is less than 20° (6−6.7°C).

(viii) "Flammable contents of self-pressurized container," means contents of a self-pressurized container that, when tested by the method described in § 1500.45, a flame projection exceeding 18 inches is obtained a full valve opening, or flashback (a flame extending back to the dispenser) is obtained at any degree of valve opening.

3. Section 1500.3 is amended by adding an Appendix I, as follows:

Appendix I to § 1500.3

1. Definitions of "extremely flammable," "flammable," and "combustible" hazardous substances in 16 CFR 1500.3(b)(10), as published in 38 FR 27012, September 27, 1973, and amended by 38 FR 30105, November 1, 1973:

"Extremely flammable" shall apply to any substance which has a flashpoint at or below 20° F. as determined by the Tagliabue Open Cup Tester; "flammable" shall apply to any substance which has a flashpoint of above 20° F., to and including 80° F., as determined by the Tagliabue Open Cup Tester; and "combustible" shall apply to any substance which has a flashpoint above 80° F. to and including 150° F., as determined by the Tagliabue Open Cup Tester; except that the flammability or combustibility of solids and of the contents of self-pressurized containers shall be determined by methods found by the Commission to be generally applicable to such materials or containers, respectively, and established by regulations issued by the Commission, which regulations shall also define the terms "flammable," "combustible," and "extremely flammable" in accord with such methods.

2. Definitions of "extremely flammable" and "flammable" hazardous substances in 16 CFR 1500.3(c)(6) as published at 38 FR 27012, September 27, 1983:

(i) "Extremely flammable" means any substance that has a flashpoint at or below 20° F. as determined by the method described in § 1500.43.

(ii) "Flammable" means any substance that has a flashpoint of above 20° F., to and including 80° F., as determined by the method described in § 1500.43.

3. Method for test for flashpoint of volatile flammable materials by Tagliabue open-cup apparatus in 16 CFR 1500.43, as published at 38 FR 27012, September 27, 1983:

§ 1500.43 Method of test for flashpoint of volatile flammable materials by Tagliabue open-cup apparatus.

Scope

1. (A) This method describes a test procedure for the determination of open-cup flashpoints of volatile flammable materials having flashpoints below 175° F.

(b) This method, when applied to paints and resin solutions which tend to skin over or which are very viscous, gives, less reproducible results than when applied to solvents.

Outline of Method

2. The sample is placed in the cup of a Tagliabue Open Tester, and heated at a slow but constant rate. A small test flame is passed at a uniform rate across the cup at specified intervals. The flashpoint is taken as the lowest temperature at which application of the test flame causes the vapor at the surface of the liquid to flash, that is, ignite but not continue to burn.

Apparatus

3. The Tagliabue open-cup tester is illustrated in Fig. 1. It consists of the following parts, which must conform to the dimensions shown, and have the additional characteristics as noted:

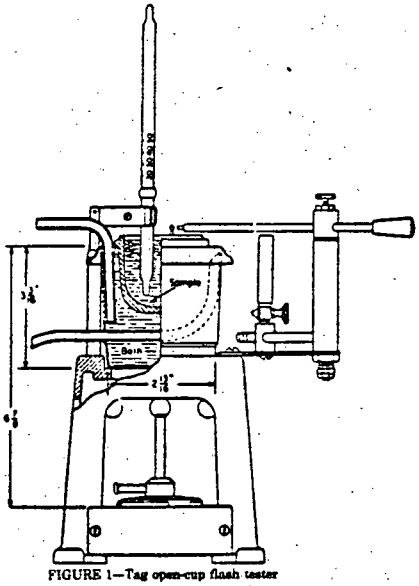

FIGURE 1—Tag open-cup flash tester

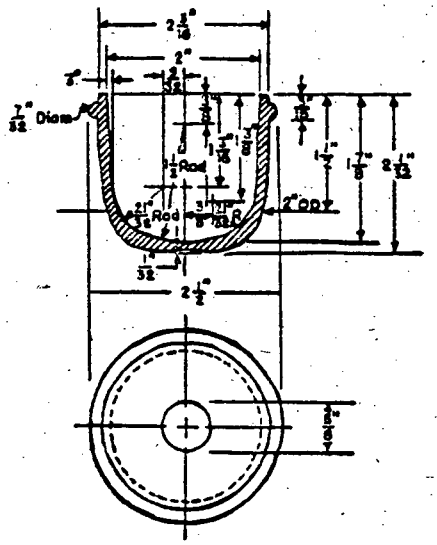

FIGURE 2—Glass test cup

(a) *Copper bath,* preferably equipped with a constant level overflow so placed as to maintain the bath liquid level ⅛ inch below the rim of the glass cup.

(b) *Thermometer holder.* Support firmly with ringstand and clamp.

(c) *Thermometer.* For flashpoints above 40° F., use the ASTM Tag Closed Tester Thermometer, range of +20 to +230° F., in 1° F. divisions, and conforming to thermometer 9F. of ASTM Standard E 1. For flashpoints from 20° F. to 40° F., use ASTM Tag Closed Tester, Low Range, Thermometer 57F. For flashpoints below 20° F., use ASTM Thermometer 33F. The original Tag Open-Cup (Paper Scale) Thermometer will be a permissible alternate until January 1, 1962. It is calibrated to −20° F.

(d) *Glass test cup.* Glass test cup (Fig. 2), of molded clear glass, annealed, heat-resistant, and free from surface defects.

(e) *Leveling device.* Leveling device or guide, for proper adjustment of the liquid level in the cup (Fig. 3). This shall be made of No. 18-gage polished aluminum, with a projection for adjusting the liquid level when the sample is added to exactly ⅛-inch below the level of the edge or rim of the cup.

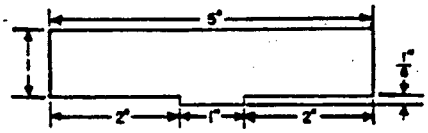

FIGURE 3—Leveling device for adjusting liquid level in test cup

(f) "Micro," or small gas burner of suitable dimensions for heating the bath. A screw clamp may be used to help regulate the gas. A small electric heater may be used.

(g) Ignition taper, which is a small straight, blow-pipe type gas burner. The test flame torch prescribed in the method of test for flash and fire points by Cleveland Open Cup (ASTM designation: D 92) is satisfactory.

(h) Alternative methods for maintaining the ignition taper in a fixed horizontal plane above the liquid may be used, as follows:

(1) Guide wire, 3/32-inch in diameter and 3½ inches in length, with a right-angle bend ½-inch from each end. This wire is placed snugly in holes drilled in the rim of the bath, so that the guide wire is 5/32-inch from the center of the cup and resting on the rim of the cup.

(2) Swivel-type taper holder, such as is used in ASTM METHOD D 92. The height and position of the taper are fixed by adjusting the holder on a suitable ringstand support adjacent to the flash cup.

(i) Draft shield, consisting of two rectangular sheets of noncombustible material, 24 inches x 28 inches, are fasteded together along the 28-inch side, preferably by hinges. A triangular sheet, 24 inches x 24 inches x 34 inches is fastened by hinges to one of the lateral sheets (to form a top when shield is open). The interior of the draft shield shall be painted a flat black.

Procedure

4. (a) Place the tester on a solid table free of vibration, in a location free of perceptible draft, and in a dim light.

(b) Run water, brine, or water-glycol solution into the bath to a predetermined level, which will fill the bath to ⅛-inch below the top when the cup is in place. An overflow is permissible for water-level control.

(c) Firmly support the thermometer vertically halfway between the center and edge of the cup on a diameter at right angles to the guide wire, or on a diameter passing through the center of the cup and the pivot of the taper. Place so that the bottom of the bulb is ¼-inch from the inner bottom surface of the cup. If the old Tagliabue thermometer is used, immerse to well cover the mercury bulb, but not the wide body of the thermometer.

(d) Fill the glass cup with the sample liquid to a depth just ⅛-inch below the edge, as determined by the leveling device.

(e) Place the guide wire or swivel device in position, and set the draft shield around the tester so that the sides form right angles with each other the tester is well toward the back of the shield.

(f) If a guide wire is used, the taper, when passed, should rest lightly on the wire, with the end of the jet burner just clear of the edge of the guide wire. If the swivel-type holder is used, the horizontal and vertical positions of the jet are so adjusted that the jet passes on the circumference of a circle, having a radius of at least 6 inches, across the center of the cup at right angles to the diameter passing through the thermometer, and in a plane ⅛-inch above the upper edge of the cup. The taper should be kept in the "off" position, at the end of the other of the swing, except when the flame is applied.

(g) Light the ingnition flame and adjust it to form a a flame of spherical form matching in size the 5/32-inch sphere on the apparatus.

(h) Adjust heater source under bath so that the temperature of the sample increases at a rate of 2 ±0.5° F. per minute. With viscous materials this rate of heating cannot always be obtained.

Initial Test

5. Determine an approximate flashpoint by passing the taper flame across the sample at intervals of 2° F. Each pass must be in one direction only. The time required to pass the ignition flame across the surface of the sample should be 1 second. Remove bubbles from the surface of the sample liquid before starting a determination. Meticulous attention to all details relating to the taper, size of taper flame, and rate of passing the taper is necessary for good results. When determining the flashpoint of viscous liquids and those liquids that tend to form a film of polymer, etc., on the surface, the surface film should be disturbed mechanically each time before the taper flame is passed.

Recorded Tests

6. Repeat the procedure by cooling a fresh portion of the sample, the glass cup, the bath solution, and the thermometer at least 20° F. below the approximate flashpoint. Resume heating, and pass the taper flame across the sample at two intervals of 5° F. and then at intervals of 2° F. until the flashpoint occurs.

Reporting Data

7. The average of not less than three recorded tests, other than the initial test, shall be used in determining the flashpoint and flammability of the substance.

Standardization

8. (a) Make determinations in triplicate on the flashpoint of standard paraxylene and of standard isopropyl alcohol which meet the following specifications:

(i) *Specifications for p-xylene, flashpoint check grade.* p-xylene shall conform to the following requirements:

Specific gravity: 15.56° C./15.56° C., 0.860 minimum, 0.866 maximum

Boiling range: 2° C. maximum from start to dry point when tested in accordance with the method of test for distillation of industrial aromatic hydrocarbons (ASTM designation: D 850), or the method of test for distillation range of lacquer solvents and diluents (ASTM designation: D 1078). The range shall include the boiling point of pure p-xylene, which is 138.35° C. (281.03° F.).

Purity: 95 percent minimum, calculated in accordance with the method of test for determination of purity from freezing points of high-purity compounds (ASTM designation: D 1016), from the experimentally determined freezing point, measured by the method of test for measurement of freezing points of high-purity compounds for evaluation of purity (ASTM designation: D 1015).

(ii) *Specifications for isopropanol, flashpoint check grade.* Isopropanol shall conform to the following requirements:

Specific gravity: 0.8175 to 0.8185 at 20° C./20° C. as determined by means of a calibrated pycnometer.

Distillation range: Shall entirely distill within a 1.0° C. range which shall include the temperature 80.4° C. as determined by ASTM method D 1078.

Average these values for each compound. If the difference between the values for these two compounds is less than 15° F. (8.5° C.) or more than 27° F. (18° C.), repeat the determinations or obtain fresh standards.

(b) Calculate a correction factor as follows:

$X = 92 - A$

$Y = 71 - B$

$\text{Correction} = (X + Y)/2.$

Where:

A = Observed flash of p-xylene, and

B = Observed flash of isopropyl alcohol.

Apply this correction of all determinations. Half units in correction shall be discarded.

Precision

9. (a) For hydrocarbon solvents having flashpoints between 60° F. and 110° F., repeatability is ±2° F. and the reproducibility is ±5° F.

(b) If results from two tests differ by more than 10° F., they shall be considered uncertain and should be checked. The calibration procedure provided in this method will cancel out the effect of barometric pressure if calibration and tests are run at the same pressure. Data supporting the precision are given Appendix III of the 1956 Report of Committee D-1 on Paint, Varnish, Lacquers and Related Products, Proceedings, Am. Soc. Testing Mats., Vol. 56 (1956).

4. Section 1500.43 is proposed to be revised as follows:

§ 1500.43 Method of test for flashpoint of volatile flammable materials.

(a) *Scope.* (1) This method describes the test procedure which the Commission will use for the determination of the flashpoint of volatile flammable materials, using a Setaflash [1] low-range closed tester, or an apparatus producing equivalent results. The method described in this section is essentially a Setaflash equilibrium procedure which closely parallels the test method designated ASTM D 3828-81, "Standard Test Methods for Flash Point by Setaflash Closed Tester," published by the American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, Pennsylvania 19103. Manufacturers and labelers of products subject to labeling and other requirements under the Federal Hazardous Substances Act may use other apparatus and/or test methods which produce equivalent results.

(2) At the option of the user, the procedures described in this section may be used to determine the actual flashpoint temperature of a sample or to determine whether a product will or will not flash at a specified temperature (flash/no flash).

(3) If the substance to be tested has a viscosity greater than 150 Stokes at 77°F (25°C), see paragraph (n) of this section modifications to the testing procedure.

[1] Setaflash is a registered trademark of Stanhope-Seta Limited, Surrey, England.

(4) If experience or other data indicate that the flammability hazard of a substance is greater or less than that indicated by the method specified here, the Commission may by regulation classify the substance in a different category than that indicated by the results of this test method.

(b) *Summary of test methods.* (1) Method A—Flash/No Flash Test. A specified volume of sample is introduced by a syringe into the cup of the apparatus that is set and maintained at the specified temperature. After a specific time a test flame is applied and an observation made as to whether or not a flash occurred. Test procedures are set forth in detail in § 1500.43(i).

(2) Method B—Finite (or Actual) Flashpoint. (i) A specified volume of sample is introduced into the cup of the apparatus that is maintained at the expected flashpoint. After a specified time a test flame is applied and the observation made whether or not a flash occured.

(ii) The specimen is removed from the cup, the cup cleaned, and the cup temperature adjusted 5°C (9°F), lower or higher depending on whether or not a flash occurred previoulsy. A fresh specimen is introduced and tested. This procedure is repeated until the flashpoint is established within 5°C (9°F).

(iii) The procedure is then repeated at 1°C (2°F) intervals until the flashpoint is determined to the nearest 1°C (2°F).

(iv) If improved accuracy is desired the procedure is repeated at 0.5°C (1°F). Test procedures are set forth in detail at § 1500.43(j).

(3) The test procedures will be modified, where necessary, to ensure that the results obtained reflect the hazard of the substance under reasonable foreseeable conditions of use. Thus, for example, the material, if a mixture, will normally be tested as it comes from the container, and/or after a period of evaporation. The period of evaporation for a material which is a mixture will normally be the time required for the mixture to evaporate in an open beaker under ambient conditions to 90 percent of its original volume, or a period of four hours, whichever occurs first. However, this period of evaporation will be changed if the results obtained do not represent the hazard of the substance under reasonable foreseeable conditions of use.

(c) *Definition of flashpoint.* The lowest temperature of the sample, corrected to a barometric pressure of 101.3 kPa (760 mm Hg), at which application of a test flame causes the

vapor of the sample to ignite under specified conditions of test. The sample is deemed to have flashed when a large flame appears and instantaneously propagates itself over the surface of the sample. Occasionally, particularly near actual flashpoint, the application of the test flame will cause a halo or an enlarged flame; this is not a flash and should be ignored.

(d) *Test apparatus.* The test apparatus shall be a Setaflash[1] tester or an apparatus producing equivalent results. The essential dimensions and requirements of the Setaflash [1] apparatus are shown in figure 1 and table 3. The Setaflash[1] and accessories are described in detail at section 1500.43(m). A commercially available unit is shown in figure 1. Closed-cup flashpoint testers and their accessories meeting these requirements are available from Erdco Engineering Corp., 136 Official Road, Addison, Illinois 60101, or Stanhope-Seta Ltd., Egham, Surrey, England.

(e) *Safety precautions.* The operator must exercise and take appropriate safety precautions during the initial application of the test flame to the sample. Samples containing low-flash material may give an abnormally strong flash when the test flame is first applied.

(f) *Preparation of samples.* (1) Erroneously high flashpoints may be obtained if precautions are not taken to avoid the loss of volatile material. In preliminary tests of materials taken directly from the container, do not open containers unnecessarily and make a transfer unless the sample temperature is at least 10°C (18°F) below the expected flashpoint. Do not use samples in leaky containers for this test.

(2) Do not store damples in plastic (polyethylene, polypropylene, etc.) bottles since volatile material may diffuse through the walls of the bottle.

(3) A 2-ml specimen is required for each test. If possible , obtain at least a 50-ml sample from the bulk test site and store in a clean, tightly closed container.

(g) *Preparation of apparatus.* (1) Place the tester on a level, stable surface. Unless tests are made in a draft-free area, surround the tester on three sides with a shield for protection. Do not rely on tests made in a laboratory draft hood or near ventilators.

(2) Read the manufacturer's instructions on the care and servicing of the instrument and for correct operation of its controls.

(h) *Calibration and standardization.* (1) Before initial use determine and plot the relationship between the temperature control dial and the thermometer readings at each major (numbered) dial division as follows: Turn the temperature control knob[2] fully counterclockwise ("O" reading). Advance the temperature control knob clockwise until the indicator light is illuminated[3]. Advance the knob clockwise to the next numbered line. After the thermometer mercury column ceases to advance, record the dial reading and the temperature. Advance the knob clockwise to the next numbered line. After the thermometer mercury column ceases to advance, read the dial reading and the termperature. Repeat this procedure through the full range of the instrument. Plot the dial readings versus the respective temperatures.

(2) Standardize the instrument using sample of material meeting the specifications in table 1. If the average of two determinations falls within the acceptable limits the instrument is assumed to be operating properly. If the average of the two determinations does not fall within this range, check the manufacturer's operating and maintenance instructions and determine that they are being followed. In particular, be sure that the cup lid assembly makes a vapor-tight seal with the cup, the shutter provides a light-tight seal, and that adequate heat transfer paste surrounds the thermometer bulb and the immersed portion of the barrel.

(i) *Test Method A—for determining Flash/No Flash.*

(1) Determine the target flashpoint as follows:

(i) Target flashpoint, $°C = S_c - 0.25$ (101.3—A)

(ii) Target flashpoint, $°C = S_c - 0.03$ (760—B)

(iii) Target flashpoint, $°F = S_f - 0.06$ (760—B)

where:

S_c = specification, or uncorrected target, flashpoint, °C,

S_f = specification, or uncorrected target, flashpoint, °F,

B = ambient barometric pressure, mm Hg,[4] and

A = ambient barometer pressure, kPa.[4]

(2) Inspect the inside of the sample cup, lid, and shutter mechanism for cleaniness and freedom from contamination. Use an absorbent paper tissue to wipe clean, if necessary. Put cover in place and lock securely. The filling orifice may be conveniently cleaned with a pipe cleaner.

(3) Set the instrument at the target temperature.

(i) For target temperature below ambient. The instrument power switch is to be in the off position. Fill the refrigerant-charged cooling block with a suitable material. [5] Raise the lid and shutter assembly, and position the base of the block in the sample cup, being careful not to injure or mar the cup. When the thermometer reads approximately 6 to 10° C (10 to 20°F) below the target temperature, remove the cooling block and quickly dry the cup with a paper tissue to remove any moisture. Immediately close the lid and shutter assembly and secure. Prepare to introduce the sample using the syringe, both of which have been precooled to a temperature 5 to 10°C (10 to 20°F) below the target temperature.

(A) Caution: Do not cool the sample block below −38°C, the freezing point of mercury.

(B) Caution: Acetone is extremely flammable. Keep away from heat, sparks, and flames and keep container closed when not actually pouring acetone. Use only in a well-ventilated area. Avoid inhalation and contact with the eyes or skin. Use cloth or leather gloves, goggles or safety shield, and keep dry ice in a canvas bag, especially when cracking.

(ii) For target temperature above ambient. Switch the instrument on and turn the coarse termperature control knob fully clockwise (full on) causing the indicator light to illuminate. [6] When the thermometer indicates a temperature about 3°C (5°F) below the target (or specification) temperature, reduce the heat input to the sample cup by turning the coarse temperature control knob counter-clockwise to the desired control point (see § 1500.43(i)(l)(i)). When the

[2] If the instrument has two temperature control knobs, set the fine control (center, small knob) at its mid-position and allow it to remain there throughout the calibration. The calibration is determined by adjusting the coarse control (large, outer knob) only.

[3] When using the tester it will be found that the indicator light may not illuminate and the temperature may not rise until a temperature control dial setting between one and two is reached.

[4] The barometric pressure used in this calculation must be the ambient pressure for the laboratory at the time of test. Many aneroid barometers, such as those used at weather stations and airports, are precorrected to give sea level readings; these must not be used.

[5] If the target or specification temperature is less than 5°C (40°F), crushed ice and water may be used as charging (cooling) fluid. If below 5°C (40°F) a suitable charging (cooling) fluid is solid carbon dioxide (dry ice) and acetone. If the refrigerant charged cooling module is unavailable, refer to the manufacturer's instruction manual for alternative methods of cooling.

[6] The target temperature may be attained by originally turning the coarse temperature control knob to the proper setting (see § 1500.43(h)(l)) for the temperature desired rather than to the maximum setting (full on). The elapsed time to reach the temperature will be greater, except for maximum temperature. However, less attention will be required during the intervening period.

indicator light slowly cycles on and off read the temperature on the thermometer. If necessary, adjust the fine (center) temperature control knob to obtain the desired test (target) temperature. When the test temperature is reached and the indicator lamp slowly cycles on and off, prepare to introduce the sample.

(4) Charge the syringe with a 2-ml specimen of the sample [7] to be tested; transfer the syringe to the filling orifice, taking care not to lose any sample; discharge the test specimen into the cup by full depressing the syringe plunger, remove the syringe.

(5)(i) Set the timer [7] by rotating its knob clockwise to its stop. Open the gas control valve and light the pilot and test flames. Admust the test flame with the pinch valve to conform to the size of the 4-mm (5/32-in.) gage.

(ii) After the time signal indicates the specimen is at test temperature [8], apply the test flame by slowly and uniformly opening the shutter and closing it completely over a period of approximately 2½ s. [9] Watch closely for a flash at the cup openings.

(iii) The sample is deemed to have flashed when a large flame appears and instantaneously propagates itself over the surface of the sample (see § 1500.43(c)).

(6) Record the test results as "flash" or "no flash" and the test temperature.

(7) Turn off the pilot and test flames using the gas control valve. Remove the sample and clean the instrument. It may be necessary to allow the cup temperature to decline to a safe level before cleaning.

(j) *Test Method B—for determining Finite or Actual Flashpoint.* (1) Inspect the inside of the sample cup, lid, and shutter mechanism for cleanlines and freedom from contamination. Use an absorbent paper tissue to wipe clean, if necessary. Put cover in place and lock securely. The filling orifice may be conveniently cleaned with a pipe cleaner.

(2) For expected flashpoints below ambient. (i) The instrument power switch is to be in off position. Fill the refrigerant-charged cooling block with a suitable material.[5] Raise the lid and shutter assembly, and position the base of the block in the sample cup, being careful not to injure or mar the cup. When the thermometer reaches a temperature 5 to 10°C (10 to 20°F) below the expected flashpoint, remove the cooling block and quickly dry the cup with a paper tissue to remove any moisture. Immediately close the lid and shutter assembly and secure. Prepare to introduce the sample using the syringe, both of which have been precooled to a temperature 5 to 10°C (10 to 20°F) below the expected temperature (See § 1500.43(j)(5)).

(ii) Caution: Do not cool the sample block below −38°C, the freezing point of mercury.

(3) For tests where the expected flashpoint is above ambient. Turn the coarse temperature control knob fully clockwise (full on) causing the indicator light to illuminate. When the thermometer reaches a temperature 3°C (5°F) below the estimated flashpoint, turn the coarse temperature knob counter-clockwise to the dial reading representing the estimated flashpoint temperture as shown on the calibration curve (See § 1500.43(h)(l)). When the indicator light slowly cycles on and off, read the temperature on the thermometer. If necessary, adjust the fine temperature control knob to obtain the exact desired temperture.

(4)(i) Charge the syringe [7] with a 2 ml specimen of the sample [7] to be tested; transfer the syringe to the filling orifice, taking care not to lose any sample; discharge the test specimen into the cup by fully depressing the syringe plunger; remove the syringe.

(ii) Set the timer [10] by rotating its knob clockswise to its stop. Open the gas control valve and ingnite the pilot and test flames. Adjust the test flame with the pinch valve to conform to the size of the 4-mm (5/32-in.) gage.

(iii) After the audible time signal indicates the specimen is at test temperature [10], apply the test flame by slowly and uniformly opening the shutter and then closing it completely over a period of approximately 2½ s. Watch closely for a flash at the cup opening.

(iv) The sample is deemed to have flashed only if a large flame appears and instaneously propagates itself over the surface of the sample. (See § 1500.43(c).)

(v) Turn off the pilot and test flames using the gas control valve. When the cup temperature declines to a safe level, remove the sample and clean the instrument.

(5)(i) If a flash was observed in § 1500.43(j)(4)(iii) repeat the procedure given in section 1500.43(j)(2) or (3), and in section 1500.43(j)(4), testing a new specimen at a temperature 5°C (9°F) below that at which the flash was observed.

(ii) If necessary, repeat the procedure in § 1500.43(j)(5)(i), lowering the temperature 5°C (9°F) each time, until no flash is observed.[9]

(iii) Proceed to § 1500.43(j)(7)

(6)(i) If no flash was observed in § 1500.43(j)(4)(iii) repeat the procedure given in § 1500.43(j)(2) or (3), and in § 1500.43(j)(4), testing a fresh specimen at a temperature 5°C (9°F) above that at which the specimen was tested in § 1500.43(j)(4)(iii).

(ii) If necessary repeat the procedure in § 1500.43(j)(6)(i), above, raising the temperature 5°C (9°F) each time until a flash is observed. [9]

(7) Having established a flash within 10 temperatures 5°C (9°F) apart, repeat the procedure at 1°C (2°F) apart, repeat the procedure at 1°C (2°F) intervals from the lower of the two temperatures until a flash is observed.[9] Record the temperature of the test when this flash occurs as the flashpoint, allowing for any known thermometer correction. Record the barometric pressure.[3]

(8) The flashpoint determined in § 1500.43(j)(7) will be to the nearest 1°C (2°F). If improved accuracy is desired (that is, to the nearest 0.5°C (1°F)), test a fresh specimen at a temperature 0.5°C (1°F) below that at which the flash was observed in § 1500.43(j)(7). If no flash is observed, the temperature recorded in § 1500.43 (j)(7), is the flashpoint to the nearest 0.5°C (1°F). If a flash is observed at the lower temperature, record this latter temperature as the flashpoint.

(9) Turn off the pilot and test flames using the gas control valve. When the cup temperature declines to a safe level, remove the sample and clean the instrument.

(k) *Calculations.* If it is desired to correct the observed finite flashpoint for the effect of barometric pressure, proceed as follows: Observe and record the ambient barometric pressure [4] at the time of the test. If the pressure differs from 101.3 kPa (760 mm Hg), correct the flashpoint as follows:

(1) Corrected flashpoint (°C) = C + 0.25 (101.3-A)

(2) Corrected flashpoint (°F) = F + 0.06 (760-B)

(3) Corrected flashpoint (°C) = C + 0.03 (760-B)

Where: F = Observed flashpoint, °F,
C = observed flashpoint, °C,

[7] For target, or expected, termperatures below ambient, both syringe and sample must be precooled to cup temperature (see § 1500.43(i)(3)(i)) before the specimen is taken.

[8] For target temperatures below ambient do not set the timer. Adjust the test flame and allow the temperature to rise under ambient conditions until the target temperature is reached. Immediately apply the test flame as detailed.

[9] Never apply the test flame to the specimen more than once. Fresh portions of the sample must be used for each test.

[10] For expected flashpoints below ambient do not set the timing device. Adjust the test flame. Allow the temperature to rise, under ambient conditions, until the temperature reaches 5°C (9°F) below the expected flashpoint. Immediately apply the test flame.

B = ambient barometric pressure, mm Hg.; and

A = ambient barometric pressure, kPa.

(l) *Precision.* The precision of the method as determined by statistical examination of interlaboratory results is as follows:

(1) Repeatability. The difference between two test results obtained by the same operator with the same apparatus under constant operating conditions on identical test material, would, in the long run, in the normal and correct operation of the test method, exceed the values shown in table 2 only in 1 case in 20.

(2) Reproducibility. The difference between two single and independent results obtained by different operators working in different laboratories on identical test material, would, in the long run, in the normal and correct operation of the test method, exceed the values shown in table 2 only in 1 case in 20.

(m) *Flash Test Apparatus.* (1)(i) Unit consisting of an aluminum alloy or non-rusting metal block of suitable conductivity with a cylindrical depression, or sample cup, over which is fitted a cover. A thermometer is embedded in the block.

(ii) The cover is fitted with an opening slide and a device capable of inserting an ignition flame (diameter 4 ± 0.5 mm) into the well when the slide device shall intersect the plane of the underside of the cover. The cover is also provided with an orifice extending into the sample well for insertion of the test sample and also a suitable clamping device for securing the cover tightly to the metal block. The three openings in the cover shall be within the diameter of the sample well. When the slide is in the open position, the two openings in the slide shall coincide exactly with the two corresponding openings in the cover.

(iii) Electrical heaters are attached to the bottom of the cup in a manner that provides efficient transfer of heat. An electronic heat control is required to hold the equilibrium temperature, in a draft-free area, within 0.1°C (0.2°F) for the low-temperature tester. A visual indicator lamp shows when energy is or is not being applied. Energy may be supplied from 120 or 240 V, 50 or 60 Hz main service.

(2)(i) Test flame and pilot flame-regulatable test flame, for dipping into the sample cup to try for flash, and a pilot flame, to maintain the test flame, are required. These flames may be fueled by piped gas service. A gage ring 4mm (5/32 in.) in diameter, engraved on the lid near the test flame, is required to ensure uniformity in the size of the test flame.

(ii) Caution: Never recharge the self-contained gas tank at elevated temperature, or with the pilot or test flames lighted, nor in the vicinity of other flames.

(iii) Audible Signal is required. The audible signal is given after 1 min in the case of the low-temperature tester.

(iv) Syringe. 2ml capacity, equipped with a needle suitable for use with the apparatus, adjusted to deliver 2.00 ± 0.05 ml.

(3) Essential dimensions of the test apparatus are set forth in table 3.

(n) *Testing high-viscosity liquids.* (1) High-viscosity materials may be added to the cup by the following procedure:

(i) Back load a 5 or 10-ml syringe with the sample to be tested and extrude 2 ml into the cup. Spread the specimen as evenly as possible over the bottom of the cup.

(ii) If the sample cannot be loaded into a syringe and extruded, other means of adding the sample to the cup may be used such as a spoon. Add approximately 2 ml of material to the spoon and then push the material from the spoon into the cup.

(iii) If the test specimen does not close the sampling port in the cup, seal the cup externally by suitable means.

(2) Using the appropriate procedure, either Method A in § 1500.43(i) or Method B in § 1500.43(j), determine the flashpoint of the specimen which has been added to the tester in accordance with § 1500.43(n)(i), except that the time specified is increased from 1 to 5 minutes for samples at or above ambient temperature.

TABLE 1—CALIBRATION OF TESTER

Material	*p*-xylene [A] (Caution)[B].
Specific gravity, 15.6/15.6°C (60/60°F).	0.850 to 0.866.
Boiling range	2 C maximum including 138.35°C (281.03°F).
Freezing point	11.23°C (52.2°F) minimum.
Flashpoint °C (acceptable range).	25.6±0.5 (78±a°F).

[A] Available as Flash Point Check Fluid (p-xylene) from Special Products Div., Phillips Petroleum Co., Drawer 'O', Borger, Texas 79007.

[B] Caution: Handle xylene with care. Avoid inhalation; use only in a well-ventilated area. Avoid prolonged or repeated contact with skin. Keep away from flames and heat, except as necessary for the actual flashpoint determination.

TABLE 2—REPEATABILITY AND REPRODUCIBILITY

Temperature, °C (°F)	Repeatability, °C (°F)	Reproducibility, °C (°F)
20 (68)	0.5 (0.9)	1.4 (2.6)
70 (158)	0.5 (0.9)	2.9 (5.3)
93 (200)	1.3 (2.3)	4.9 (8.8)
150 (300)	2.0 (3.6)	7.5 (13.5)
200 (400)	2.6 (4.7)	9.9 (17.9)
260 (500)	3.3 (5.9)	12.4 (22.3)

TABLE 3—ESSENTIAL DIMENSIONS OF FLASH TEST APPARATUS[A,B]

	mm
Sample block:	
Block diameter	61.5–62.5
Sample well diameter	49.40–49.70
Sample well depth	9.70–10.00
Top of block to center of thermometer hole	16.00–17.00
Diameter of thermometer hole (approximate)	7.00
Cover:	
Large opening length	12.42–12.47
Large opening width	10.13–10.18
Small opening length	5.05–5.10
Small opening width	7.60–7.65
Distance between extreme edges of small openings	48.37–48.32
Filling orifice diameter	4.00–4.50
Bore of filler tube	1.80–1.85
Maximum distance of filler tube from base of well with cover closed (maximum)	0.75
Slide:	
Large opening length	12.42–12.47
Large opening width	10.13–10.18
Small opening length	5.05–5.10
Small opening width	7.60–7.65
Near edge of large opening to end of slide	12.80–12.85
Extremes of Large and small openings	30.40–30.45
Jet:	
Length of jet	18.30–18.40
External diameter at end of jet	2.20–2.60
Bore of jet	1.60–1.65
Height of jet center above top surface of cover	11.00–11.20
Jet pivot to center of block with cover closed	12.68–12.72

[A] The O-seal or gasket, which provides a seal when the cover is shut, should be made of a heat-resistant material capable of withstanding temperatures up to 150°C for the low-range apparatus.

[B] When in position, the thermometer bulb should be surrounded with heat-conducting thermoplastic compound. (Heat Sink Compound Type DP 2823 supplied by Midland Silicone Ltd., and Part No. ISF-5013, Erdco Engineering Corp., Addison, Ill. 60101, are among the materials suitable for this purpose.)

5. Section 1500.46 is proposed to be revised as follows:

§ 1500.46 Method for determining flashpoint of extremely flammable contents of self-pressurized containers.

Use the apparatus described in § 1500.43. Use some means such as dry ice in an open container to chill the pressurized container. Chill the container, the flash cup, and the bath solution of the apparatus (brine or glycol may be used) to a temperature of about 25°F below zero. Puncture the chilled container to exhaust the propellant. Transfer the chilled formulation to the test apparatus and test in accordance with the method described in § 1500.43.

Interested persons are invited to submit written comments by August 24, 1984. Comments may be accompanied by written data, views, and arguments and should be addressed to the

Secretary, Consumer Product Safety Commission, Washington, D.C. 20207.

(15 U.S.C. 1261(1), 1269(a); 15 U.S.C. 2079(a))

Dated: April 16, 1984.

Sadye E. Dunn,

Secretary, Consumer Product Safety Commission.

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