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Part V

**Department of
Transportation**

Federal Transit Administration

**Recommended Fire Safety Practices for
Transit Bus and Van Materials; Notice**

DEPARTMENT OF TRANSPORTATION

Federal Transit Administration

[Docket 90-A]

Recommended Fire Safety Practices for Transit Bus and Van Materials Selection**AGENCY:** Federal Transit Administration, DOT.**ACTION:** Notice, request for comments.

SUMMARY: The Federal Transit Administration (FTA) after receiving public comments from a published notice, is recommending practices for testing flammability and smoke emission characteristics of materials used in the construction of transit buses and vans. These recommendations are based on the Volpe National Transportation Systems Center's "Proposed Guidelines for Flammability and Smoke Emission Specifications", a version of which the rapid rail transit and light rail transit industry uses on a voluntary basis. The guidelines have been prepared to enable the transit industry to select materials for buses and vans that minimize the effect of fires. In addition, FTA is requesting additional comment on testing for fire retardants in foam materials under certain conditions since established tests are intended for textile materials.

DATES: Effective date: January 13, 1992. Comments relating to the suitability of test methods for evaluating retention of fire retardant chemicals in foam materials must be submitted on or before March 13, 1992.

ADDRESSES: Comments should be sent to Docket 90-A, Room 9316, Office of Chief Counsel, Federal Transit Administration, 400 7th St., SW., Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: Franz K. Gimmler, Deputy Associate Administrator for Safety, or Roy Field, Office of Safety, (202) 366-2896.

SUPPLEMENTARY INFORMATION:**A. Overview**

This notice provides recommendations for testing flammability and smoke emission characteristics of materials used in the construction of transit buses and vans. The recommendations are set forth in a table, printed below. Before that table, however, is a "Background" section explaining the genesis of this notice and discussing the comments to the docket; a "Scope" section indicating that the recommendations are designed to affect the selection practices for materials procured; and an "Application" section

indicating the types of vehicles covered by the notice. The next section deals with the recommended procedures, and is followed by the table. Following the table is a list of notes referenced in the table, and following that are the sources of test procedures listed in the table. The final section includes definitions of terms used in the notes and the table.

B. Background

On July 2, 1990 the Federal Transit Administration (FTA) published a notice and request for public comment on "Recommended Fire Safety Practices for Transit Bus and Van Materials Selection," (55 FR 27402). That notice proposed recommendations for testing the flammability and smoke emission characteristics of materials used in the construction of transit buses and vans. Like the "Recommended Fire Safety Practices for Heavy Rail and Light Rail Transit Materials Selection," on which they are based, these Recommended Practices are not regulatory in nature. Rather, these are voluntary Recommended Practices that are intended to be used to assess the fire risk of materials used in transit buses and vans. They are small scale laboratory tests intended for use in screening materials and, as such, do not duplicate actual fire conditions. However, their use will result in the selection of more fire resistant materials, which will minimize the fire threat in transit buses and vans and thereby reduce the injuries and property damage resulting from transit vehicle fires. Moreover, issuance of the notice at this time is consistent with the Department of Transportation's position on promoting safety in transportation.

Similar guidelines have been published by the Federal Railroad Administration for railroad passenger cars and in the National Fire Protection Association NFPA 130 Standard for Fixed Guideway Transit Systems. FTA plans in the future, if necessary, to update these Recommended Fire Safety Practices to respond to the National Highway Traffic Safety Administration research and rulemaking relative to Federal Motor Vehicle Safety Standard No. 302. In response to comments, FTA has made three major substantive changes to the Recommended Practices. These changes delete the requirement for vehicle windows to be included in the Recommended Practices; revise the floor covering requirement to meet only one test, namely, the E-648; and incorporate an aging test for seat cushions. These changes, and two minor editorial changes, are discussed more fully below.

Twelve organizations responded to the July 2, 1990 Notice. Responding organizations included seven materials suppliers, two transit authorities, one seating manufacturer, a state Department of Transportation and a consulting firm. All but one of the commenting organizations fully supported the adoption of the Recommended Practices. After careful review of the responses, FTA has chosen not to adopt some comments. For the most part, the comments that were not adopted concerned the following: Inclusion of toxicity requirements for vehicle materials, expanding the scope of the Recommended Practices and modifying certain aspects of the performance criteria. FTA's goal in issuing the Recommended Practices is to suggest a means for providing the traveling public and transit employees with the highest practical degree of safety. It is FTA's opinion that the comments not adopted would not further this goal.

The only response which did not fully support the adoption of the Recommended Practices was provided by a seating manufacturer. The comments provided by this responder were concerned with the availability of suitable materials. This included product performance, reliability, and cost. Similar concerns were also raised and addressed in the development of the Recommended Practices for rail vehicles. As evidenced by their adoption into rail transit authorities, there are suitable materials available at no major increase in cost.

Two commentors suggested the inclusion of toxicity requirements. FTA recognizes the need to address this issue, but because of its complexity, is not able to do so in the Recommended Practices. Instead, in an effort to respond to transit industry needs FTA initiated a program to develop guidelines for assessing the combustion toxicity of materials. Recognizing the scope and extreme complexity of this issue, FTA has requested the National Research Council's (NRC) Transportation Research Board and Materials Advisory Board of the Commission on Engineering and Technical Systems to assist in addressing this issue. In response to this request, the NRC has established a Committee on Toxicity Hazards of Materials Used in Rail Transit Vehicles. This committee, consisting of representatives of industry and academia, is reviewing the present state of knowledge of combustion toxicity, identifying specific toxicity hazards related to the use of polymeric materials

in transit vehicles, and recommending a plan of action for developing guidelines for testing materials.

In regard to expanding the scope of the Recommended Practices, a transit system recommended that the Recommended Practices include buses and vans that are remanufactured or rehabilitated. FTA stated in the July 2, 1990 Federal Register notice that the Recommended Practices will apply to the retrofit of existing vehicles. This term is meant to include remanufactured or rehabilitated vehicles.

Several commenters (3) suggested changes to the performance criteria. In one instance, the proposed change would make the seat cushion smoke emission criteria more restrictive. This change is not significant from a safety perspective but could possibly limit the availability of seat cushion materials. A second suggestion concerned providing more restrictive standards for wall panels. The flammability and smoke emission characteristics of phenolic resins for fiberglass reinforced plastics were cited as results that are achievable. However, specifying the use of one particular family of materials, such as a phenolic, will result in a requirement that is too restrictive. Finally, a third commenter suggested that the specific optical smoke density criteria cited for use with the ASTM E-662 test for tile floor covering is too restrictive and tile floor covering should meet the same criteria as carpet. This is reasonable, and the Recommended Practices have been modified accordingly.

Two commenters addressed the issue of the retention of fire retardant characteristics of foam materials after the materials have been in service for some time. One commenter suggested that an endurance test be required to evaluate the retention of the fire safety characteristics after the seat cushion has been subjected to 100,000 compression-release cycles. In response to this comment, the Recommended Practices have been modified to incorporate testing according to the ASTM D-3574 Dynamic Fatigue Test, Is,

for cellular foams. Upon completion of this test, the foam materials will then be tested for surface flammability and smoke emission. A new Footnote 2 has been created for this purpose, and the other Footnotes renumbered. Another commenter suggested that to address the issue of the retention of fire retardant chemicals after the exposure of the seating materials to moisture, Footnote 3 be modified to delete the words "if appropriate". For upholstery materials this is reasonable, and the words "if appropriate" have been deleted. The test specified in Footnote 3, FED-STD-191A Textile Test Methods 5830, is intended for textile materials and not foams, therefore the existing footnote is not applicable to foams.

We are not aware of tests in this area and are therefore requesting comments on the existence and availability of suitable test methods for evaluating the retention of fire retardant chemicals in foams after exposure to moisture. Any such comments should be sent to Docket 90-A, room 9316, UCC-10, 400 7th Street, SW., Washington, DC 20590.

Another commenter suggested that covering a seat cushion with its fire block fabric "is the more effective combination from both a cost and safety standpoint." A major concern and cost to transit systems is the vandalism/slashing of vehicle seats. The slashing of seats and the exposure of the seat cushion to fire, totally negates the value of a fire blocking fabric and makes it necessary to test each component of the seat.

In regard to the flammability and smoke emission requirements for windows, three commenters requested that windows not be included in the Recommended Practices. They noted that not only were windows addressed previously in the FTA document "Baseline Advanced Design Transit Coach Specifications" (White Book), but windows in buses are not a major fire contributor. Plastic vehicle windows have not been reported to be the initiating or first vehicle material ignited. Furthermore, plastic windows melt and fall out of the vehicle during the fire. This melt and fall out

characteristic has been noted in the FTA Fire Life Safety Exercises. Finally, the environment in which buses operate require that the windows be durable in that they be resistant to both weather, vandalism, etc. In light of the above, the requirement for windows has been deleted.

Recommended Practices

A. Scope

The recommended Fire Safety Practices for Transit Bus and Van Materials Selection are directed at improving the selection practices for interior materials procured for new vehicles and the retrofit of existing vehicles. Adoption of these recommended fire safety practices will help to minimize the fire threat in these vehicles and, thereby, reduce the injuries and damage resulting from fires.

B. Application

This document provides recommended fire safety practices for testing the flammability and smoke emission characteristics of materials used in the construction of transit buses and vans. Vehicles considered as transit buses and vans are those used for urban, suburban, rural and specialized transit services. Types covered by these recommended practices are revenue (passenger carrying) vehicles that are placed in mass transit service by a recipient of Federal funds from the Federal Transit Administration. Some of the functions in the recommendations may not apply to all vehicles (e.g., not all vehicles have windscreens).

C. Recommended Test Procedures and Performance Criteria

(a) The materials used in transit buses and vans should be tested according to the procedures and performance criteria set forth in Table 1.

(b) Transit agencies should require certification that combustible materials to be used in the construction of vehicles have been tested by a recognized testing laboratory, and that the results are within the recommended limits.

TABLE 1.—RECOMMENDATIONS FOR TESTING THE FLAMMABILITY AND SMOKE EMISSION CHARACTERISTICS OF TRANSIT BUS AND VAN MATERIALS

Category and function of material	Test procedure	Performance criteria
Seating:		
Cushion ^{1,2,3,4}	ASTM D-3675	$I_b < 25$.
	ASTM E-662	$D_s (1.5) < 100$; $D_s (4.0) < 200$.
Frame ^{1,2,3}	ASTM E-162	$I_b < 35$.
	ASTM E-662	$D_s (1.5) < 100$; $D_s (4.0) < 200$.
Shroud ^{1,2}	ASTM E-162	$I_b < 35$.
	ASTM E-662	$D_s (1.5) < 100$; $D_s (4.0) < 200$.

TABLE 1.—RECOMMENDATIONS FOR TESTING THE FLAMMABILITY AND SMOKE EMISSION CHARACTERISTICS OF TRANSIT BUS AND VAN MATERIALS—Continued

Category and function of material	Test procedure	Performance criteria
Upholstery ^{1,2,4,5}	FAR 25.853 (Vertical) ASTM E-662	Flame Time ≤ 10 sec; burn length ≤ 6 inch. D _s (4.0) < 250 coated. D _s (4.0) < 100 uncoated.
Panels:		
Wall ^{1,5}	ASTM E-162	I _s < 35.
Ceiling ^{1,5}	ASTM E-662	D _s (1.5) < 100; D _s (4.0) < 200.
Partition ^{1,5}	ASTM E-162	I _s < 35.
Windscreen ^{1,5}	ASTM E-662	D _s (1.5) < 100; D _s (4.0) < 200.
HVAC Ducting ^{1,5}	ASTM E-162	I _s < 35.
Light Diffuser ⁵	ASTM E-662	D _s (4.0) < 100.
Flooring:		
Wheel Well and Structural ⁶	ASTM E-119	Pass.
Carpeting ⁷	ASTM E-648	C.R.F. ≤ 0.5w/cm ² .
Insulation:		
Thermal ^{1,2,5}	ASTM E-162	I _s < 25.
Acoustic ^{1,2,5}	ASTM E-662	D _s (4.0) < 100.
Miscellaneous:		
Fire Wall ⁶	ASTM E-119	Pass.
Exterior Shell ^{1,5}	ASTM E-162	I _s < 35.
	ASTM E-662	D _s (1.5) < 100; D _s (4.0) < 200.

* Refers to Notes on Table 1.

Notes

1. Materials tested for surface flammability should not exhibit any flaming running or flaming dripping.

2. The surface flammability and smoke emission characteristics of seat cushion materials, should be demonstrated to be permanent after testing according to ASTM D-3574 Dynamic Fatigue Tests I_s (Procedure B).

3. The surface flammability and smoke emission characteristics of a material should be demonstrated to be permanent by washing according to FED-STD-191A Textile Test Method 5830.

4. The surface flammability and smoke emission characteristics of a material should be demonstrated to be permanent by dry-cleaning, if appropriate, according to ASTM D-2724. Materials that cannot be washed or dry cleaned should be so labeled and should meet the applicable performance criteria after being cleaned as recommended by the manufacturer.

5. ASTM E-662 maximum test limits for smoke emission (specific optical density) should be measured in either the flaming or non-flaming mode, depending on which mode generates the most smoke.

6. Flooring and fire wall assemblies should meet the performance criteria during a nominal test period determined by the transit property. The nominal test period should be twice the maximum

expected period of time, under normal circumstances, for a vehicle to come to a complete, safe stop from maximum speed, plus the time necessary to evacuate all passengers from a vehicle to safe area. The nominal test period should not be less than 15 minutes. Only one specimen need be tested. A proportional reduction may be made in dimensions of the specimen provided that it represents a true test of its ability to perform as a barrier against vehicle fires. Penetrations (ducts, piping, etc.) should be designed against acting as conduits for fire and smoke.

7. Carpeting should be tested in accordance with ASTM E-648 with its padding, if the padding is used in actual installation.

8. Arm rests, if foamed plastic, are tested as cushions.

9. Testing is performed without upholstery.

D. Referenced Fire Standards

The source of test procedures listed in Table 1 are as follows:

(1) Leaching Resistance of Cloth, FED-STD-191A Textile Test Method 5830.

Available from: General Services Administration Specifications Division, Building 197, Washington Navy Yard, Washington, DC 20407.

(2) Federal Aviation Administration Vertical Burn Test, FAR-25-853.

Available from: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

(3) American Society for Testing Materials (ASTM)

(a) Surface Flammability of Materials Using a Radiant Heat Energy Source, ASTM E-162;

(b) Surface Flammability for Flexible Cellular Materials Using a Radiant Heat Energy Source, ASTM D-3675;

(c) Fire Tests of Building Construction and Materials, ASTM E-119;

(d) Specific Optical Density of Smoke Generated by Solid Materials, ASTM E-662;

(e) Bonded and Laminated Apparel Fabrics, ASTM D-2724;

(f) Flexible Cellular Materials-Slab, Bonded, and Molded Urethane Foams, ASTM D-3574.

Available from: American Society for Testing and Materials; 1916 Race Street, Philadelphia, PA 19103.

In all instances, the most recent issue of the document or the revision in effect at the time of request should be used in the evaluation of the material specified herein.

Definition of Terms

1. Flame spread index (I_s) as defined in ASTM E-162 is a factor derived from the rate of progress of the flame front (F_s) and the rate of heat liberation by the material under test (Q), such that I_s = F_s × Q.

2. Specific optical density (D_s) is the optical density measured over unit path length within a chamber of unit volume produced from a specimen of unit surface area, that is irradiated by a heat flux of 2.5 watts/cm² for a specified period of time.

3. Surface flammability denotes the rate at which flames will travel along surfaces.

4. Flaming running denotes continuous flaming material leaving the site of the burning material as its installed location.

5. Flaming dripping denotes periodic dripping of flaming material from the site of burning material at its installed location.

Issued on: January 7, 1992.

Brian W. Clymer,

Administrator.

[FR Doc. 92-729 Filed 1-10-92; 8:45 am]

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LIST OF PUBLIC LAWS

Note: The List of Public Laws for the first session of the 102d Congress has been completed and will be resumed when bills are enacted into public law during the second session of the 102d Congress, which convenes on January 3, 1992. A cumulative list of Public Laws for the first session was published in Part II of the **Federal Register** on January 2, 1992.

CFR CHECKLIST

This checklist, prepared by the Office of the Federal Register, is published weekly. It is arranged in the order of CFR titles, stock numbers, prices, and revision dates.

An asterisk (*) precedes each entry that has been issued since last week and which is now available for sale at the Government Printing Office.

A checklist of current CFR volumes comprising a complete CFR set, also appears in the latest issue of the LSA (List of CFR Sections Affected), which is revised monthly.

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Title	Stock Number	Price	Revision Date
1, 2 (2 Reserved)	(869-013-00001-3)	\$12.00	Jan. 1, 1991
3 (1990 Compilation and Parts 100 and 101)	(869-013-00002-1)	14.00	¹ Jan. 1, 1991
4	(869-013-00003-0)	15.00	Jan. 1, 1991
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700-1199	(869-013-00005-6)	13.00	Jan. 1, 1991
1200-End, 6 (6 Reserved)	(869-013-00006-4)	18.00	Jan. 1, 1991
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27-45	(869-013-00008-1)	12.00	Jan. 1, 1991
46-51	(869-013-00009-9)	17.00	Jan. 1, 1991
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200-219	(869-013-00036-6)	12.00	Jan. 1, 1991
220-299	(869-013-00037-4)	21.00	Jan. 1, 1991
300-499	(869-013-00038-2)	17.00	Jan. 1, 1991
500-599	(869-013-00039-1)	17.00	Jan. 1, 1991
600-End	(869-013-00040-4)	19.00	Jan. 1, 1991
13	(869-013-00041-2)	24.00	Jan. 1, 1991

Title	Stock Number	Price	Revision Date
14 Parts:			
1-59	(869-013-00042-1)	25.00	Jan. 1, 1991
60-139	(869-013-00043-9)	21.00	Jan. 1, 1991
140-199	(869-013-00044-7)	10.00	Jan. 1, 1991
200-1199	(869-013-00045-5)	20.00	Jan. 1, 1991
1200-End	(869-013-00046-3)	13.00	Jan. 1, 1991
15 Parts:			
0-299	(869-013-00047-1)	12.00	Jan. 1, 1991
300-799	(869-013-00048-0)	22.00	Jan. 1, 1991
800-End	(869-013-00049-8)	15.00	Jan. 1, 1991
16 Parts:			
0-149	(869-013-00050-1)	5.50	Jan. 1, 1991
150-999	(869-013-00051-0)	14.00	Jan. 1, 1991
1000-End	(869-013-00052-8)	19.00	Jan. 1, 1991
17 Parts:			
1-199	(869-013-00054-4)	15.00	Apr. 1, 1991
200-239	(869-013-00055-2)	16.00	Apr. 1, 1991
240-End	(869-013-00056-1)	23.00	Apr. 1, 1991
18 Parts:			
1-149	(869-013-00057-9)	15.00	Apr. 1, 1991
150-279	(869-013-00058-7)	15.00	Apr. 1, 1991
280-399	(869-013-00059-5)	13.00	Apr. 1, 1991
400-End	(869-013-00060-9)	9.00	Apr. 1, 1991
19 Parts:			
1-199	(869-013-00061-7)	28.00	Apr. 1, 1991
200-End	(869-013-00062-5)	9.50	Apr. 1, 1991
20 Parts:			
1-399	(869-013-00063-3)	16.00	Apr. 1, 1991
400-499	(869-013-00064-1)	25.00	Apr. 1, 1991
500-End	(869-013-00065-0)	21.00	Apr. 1, 1991
21 Parts:			
1-99	(869-013-00066-8)	12.00	Apr. 1, 1991
100-169	(869-013-00067-6)	13.00	Apr. 1, 1991
170-199	(869-013-00068-4)	17.00	Apr. 1, 1991
200-299	(869-013-00069-2)	5.50	Apr. 1, 1991
300-499	(869-013-00070-6)	28.00	Apr. 1, 1991
500-599	(869-013-00071-4)	20.00	Apr. 1, 1991
600-799	(869-013-00072-2)	7.00	Apr. 1, 1991
800-1299	(869-013-00073-1)	18.00	Apr. 1, 1991
1300-End	(869-013-00074-9)	7.50	Apr. 1, 1991
22 Parts:			
1-299	(869-013-00075-7)	25.00	Apr. 1, 1991
300-End	(869-013-00076-5)	18.00	Apr. 1, 1991
23	(869-013-00077-3)	17.00	Apr. 1, 1991
24 Parts:			
0-199	(869-013-00078-1)	25.00	Apr. 1, 1991
200-499	(869-013-00079-0)	27.00	Apr. 1, 1991
500-699	(869-013-00080-3)	13.00	Apr. 1, 1991
700-1699	(869-013-00081-1)	26.00	Apr. 1, 1991
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26 Parts:			
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§§ 1.61-1.169	(869-013-00085-4)	28.00	Apr. 1, 1991
§§ 1.170-1.300	(869-013-00086-2)	18.00	Apr. 1, 1991
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§§ 1.501-1.640	(869-013-00089-7)	16.00	Apr. 1, 1991
§§ 1.641-1.850	(869-013-00090-1)	19.00	^a Apr. 1, 1990
§§ 1.851-1.907	(869-013-00091-9)	20.00	Apr. 1, 1991
§§ 1.908-1.1000	(869-013-00092-7)	22.00	Apr. 1, 1991
§§ 1.1001-1.1400	(869-013-00093-5)	18.00	^a Apr. 1, 1990
§§ 1.1401-End	(869-013-00094-3)	24.00	Apr. 1, 1991
2-29	(869-013-00095-1)	21.00	Apr. 1, 1991
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