NOTE: MIL-STD-1623 has been redesignated as a Design Criteria Standard. The cover page has been changed for Administrative reasons. There are no other changes to this Document.

MIL-STD-1623D(SH) 07 DECEMBER 1981 SUPERSEDING MIL-STD-1623C(SH) 21 APRIL 1978

DEPARTMENT OF DEFENSE DESIGN CRITERIA STANDARD

FIRE PERFORMANCE REQUIREMENTS AND APPROVED SPECIFICATIONS FOR INTERIOR FINISH MATERIALS AND FURNISHINGS (NAVAL SHIPBOARD USE)



AMSC N/A AREA 19GP

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DEPARTMENT OF THE NAVY

NAVAL SEA SYSTEMS COMMAND

WASHINGTON, DC 20362

Fire Performance Requirements and Approved Specifications for Interior Finish Materials and Furnishings (Naval Shipboard Use)

MIL-STD-1623D(SH)

- 1. This Military Standard is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.
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MIL-STD-1623D(SH)
7 December 1981

FOREWORD

The purpose of this standard is to establish fire performance criteria and provide a list of approved specifications for interior finish materials and furnishings to be used on Naval surface ships and submarines.

Although the development of limits for toxic products of combustion is of major concern, the information generally available is not refined to the degree to allow inclusion of finite limits in this standard at this time.

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SCOPE AND APPLICATION

- $1.1 \ \underline{\text{Scope}}$. This standard provides fire performance requirements and approved specifications for seven categories of interior finish materials and furnishings for use on Naval surface ships and submarines.
- 1.2 Application. This standard applies to materials for bulkhead sheathing, overhead sheathing, furniture, draperies and curtains, deck coverings, thermal insulation and acoustic materials applications. fire performance requirements of this standard supersede those contained in the applicable specifications.

REFERENCED DOCUMENTS 2.

2.1 <u>Issues of documents.</u> The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this standard to the extent specified herein.

GOVERNMENTAL

SPECIFICATIONS

FEDERAL

L-F-450 - Flooring, Vinyl Plastic.

L-F-475 - Floor Covering Vinyl, Surface (Tile and Roll) With Backing.

L-P-1040 - Plastic Sheets and Strips (Polyvinyl Fluoride).

HH-I-551 - Insulation" Block and Boards, Thermal (Cell-

ular Glass). SS-S-118 - Sound Controlling Blocks and Boards (Acous-

tical Tiles and Panels, Prefabricated).

SS-T-312 - Tile, Floor: Asphalt, Rubber, Vinyl, Vinyl-Asbestos.

ZZ-M-42 - Mats, Floor, T)ental-Chair, Rubber.

CCC-A-680 - Artificial Leather (Cloth Coated), Vinyl Resin, Expanded Layer, (Upholstery).

CCC-C-419 - Cloth, Duck, Cotton, Unbleached, Pliedyarns, Army and Numbered.

CCC-C-426 - Cloth, Cotton, Drill.

CCC-C-436 - Cloth, Ticking Twill, Cotton. CCC-C-700 - Cloth, Coated, Vinyl Coated (Artificial Leather).

CCC-C-1703 - Cloth, Drapery, Glass Fiber.

CCC-W-408 - Wall Covering, Vinyl-Coated.

DDD-C-95 - Carpet and Rugs, Wool, Nylon, Acrylic, Modacrylic Polyester, Polypropylene.

MILITARY

MIL-F-243 - Furniture, Shipboard, Steel, General Specification For.

MIL-I-742 - Insulation Board, Thermal, Fibrous Glass.

MIL-F-902 - Furniture, Shipboard, Aluminum, General Specification For.

MIL-M-910 - Mats, Floor, Standing.

MIL-I-2781 - Insulation, Pipe, Thermal.

MILITARY - Continued

MIL-I-2818 - Insulation Blanket, Thermal, Fibrous Mineral.

MIL-I-2819 - Insulation Block, Thermal.

MIL-D-3134 - Deck Covering Materials.

MIL-D-3135 - Deck Covering Underlay Materials.

MIL-P-15280 - Plastic Material, Unicellular (Sheets and Tubes).

MIL-I-15475 - Insulation Felt, Thermal, Fibrous Glass Semirigid.

MIL-M-15562 - Hatting or Sheet, Floor Covering, Insulating for High Voltage Application.

MIL-I-16411 - Insulation Felt, Thermal, Glass Fiber.

MIL-D-16680 - Deck Covering Magnesia Aggregate Mixture.

MIL-P-17171 - Plastic Laminate, Decorative, High Pressure.

MIL-D-17951 - Deck Covering, Lightweight, Nonslip, Silicon Carbide Particle Coated Fabric, Film, or Composite, and Sealing Compound.

MIL-T-18830 - Tile, Plastic, Fire-Retardant.

MIL-D-18873 - Deck Covering Magnesia Aggregate Mixture.

MIL-C-19565 - Coating Compounds, Thermal Insulation Pipe Covering - Fire- and Water-Resiatant, Vapor-Barrier and Weather-Resistant.

MIL-C-19993 - Coating Compound, Fibrous Glass Thermal Insulation Board, Water Vapor Barrier.

MIL-C-20079 - Cloth, Glass: Tape, Textile, Glass; and Thread, Glass.

MIL-R-20092 - Rubber Sheets and Molded Shapes, Cellular, Synthetic, Open Cell (Foamed Latex).

MIL-G-20241 - Gasket Material, Wool Felt, Impregnated. Adhesive, Pressure-Sensitive.

MIL-A-21016 - Adhesive, Resilient Deck Covering.

MIL-D-21631 - Deck Covering, Latex Concrete.

MIL-I-22023 - Insulation Felt, Thermal and Sound Absorbing Felt, Fibrous Glass, Flexible.

MIL-I-22344 - Insulation, Pipe, Thermal, Fibrous Glass.

MIL-C-22395 - Compound, End Sealing, Thermal Insulation Pipe Covering - Fire-, Water-, and Weather-Resistant.

MIL-P-22581 - Plastic Sheet, Vibration Damping.

MIL-D-23003 - Deck Covering Compound, Nonslip, Roll-able.

MIL-A-23054 - Acoustical Absorptive Board, Fibrous Glass, Perforated Fibrous Glass Cloth Faced.

MIL-I-23128 - Insulation Blanket, Thermal, Refractory Fiber, Flexible.

MIL-P-23653 - Plastic Tiles, Vibration Damping.

MIL-S-24062 - Sprayable Vibration Damping Material for Light Steel Plate.

MILITARY - Continued

MIL-I-24172 - Insulation, Plastic, Cellular Polyurethane, Rigid, Preformed and Foam-in-Place.

MIL-P-24191 - Plastic Sheet, Cast, Acrylic, shipboard Application (Illumination and Signal Lighting).

MIL-D-24483 - Deck Covering, Spray-On, Nonslip.

MIL-C-24500 - Cloth, Drapery, Bunk Curtain, Slipcovers, and Label, Polyaramid and Polyaramid Novoloid Fiber Blends, Shipboard Use.

MIL-L-24518 - Laminate, Vinyl Film-Aluminum, Decorative.

STANDARDS

FEDERAL

FED-STD-191 - Textile Teat Methods.

FED-STD-372 - Test for Critical Radiant Flux of Carpet Flooring Systems (Flooring Radiant Panel Test).

FED-STD-406 - Plastics: Methods of Testing.

FED-STD-501 - Floor Coverings, Resilient, Nontextile: Sampling and Testing.

PUBLICATIONS

UNITED STATES COAST GUARD
U.S.C.G. 164.009 - Test for Incombustibility.

(Application for copies should be addressed to the U.S. Coast Guard Headquarters, 400 Seventh Street, S.W., Washington, DC 20591.)

(Copies of specifications, standards, drawings, and publications required by contractor in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

NONGOVERNMENTAL

AMERICAN IRON AND STEEL INSTITUTE (AISI)
Steel Products Manual.

(Application for copies should be addressed to the American Iron and Steel Institute, 1000 - 16th Street, N.W., Washington, DC 20036.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 635 - Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.

D 2843 - Density of Smoke from the Burning or Decomposition of Plastics.

E 84 - Surface Burning Characteristics of Building Materials.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) - Continued E 162 - Surface Flammability of Materials Using a Radiant Heat Energy Source.

E 662 - Specific Optical Density of Smoke Generated by Solid Materials.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

3. REQUIREMENTS

3.1 <u>Materials.</u> Interior finish materials and furnishings shall meet the requirements set forth in table 1. Thicknesses for bulkhead sheathing, overhead sheathing, and furniture indicate maximum limits in both application and fire tests.

TABLE I. <u>Material requirements.</u>

Category	Material	Specification	Fire test	Maximum test limits	
	High pressure laminate	MIL-P-17171, type IV	ASTM E 84	Flame spread Smoke developed	25 15
	Frabric-backed vinyl	CCC-W-408, type II	ASTM E 84	Flame spread Smoke developed Thickness	25 75 0.035 inch
Bulkhead 1/sheathing—	PVC film- aluminum laminate	MIL-L-24518	ASTM E 84	Flame spread Smoke developed Thickness film Thickness aluminum	25 75 0.011 inch 0.063 inch
	CRES panel	ANSI type 304, finish 4	Not required	Not required	
	High pressure laminate pre- bonded to aluminum	MIL-P-17171	ASTM E 84	Flame spread Smoke developed Thickness aluminum	25 15 0.050 inch
	PVF film- aluminum laminate	L-P-1040, type II, grade A, class 1	ASTM E 84	FLame spread Smoke developed Thickness film Thickness aluminum	25 75 0.004 inch max 0.063 inch

TABLE I. Material requirements. - Continued

Category	Material	Specification	Fire test	Maximum test limits	
	Fibrous glass opaque sus- pended ceil- ing panel	SS-S-118, type III	ASTM E 84	Flame spread Smoke developed Thickness	25 35 0.750 inch
Overhead sheathing 2/	Acrylic light-diffusing panel/windows (lighting fixture only)3/	MIL-P-24191	ASTM D 635 ASTM D 2843	1.35 in/min. Optical smoke density Thickness	50 0.250 inch
	PVC film-alum- inum laminate	MIL-L-24518	ASTM E 84	Flame spread Smoke developed Thickness film Thickness aluminum	25 75 0.011 inch 0.063 inch
	CRES panel	ANSI type 304, finish 4	Not required	Not required	
	Aluminum exposed grid suspension framework	Commercial	Not required	Not required	
	PVC film-alum- inum-laminate	L-P-1040, type II, grade A, class 1	ASTM E 84	Flame spread Smoke developed Film thickness Thickness aluminum	25 75 0.004 inch 0.05 inch
	Vinyl uphols- tery	CCC-A-680, class 2, treat- ment (a) 1	FED-STD-191, method 5903		3 inch 2 sec
Furniture	Vinyl uphols- tery	CCC-C-700, class 4, treat- ment a	FED-STD-191, method 5903		3 inch 2 sec

See footnotes at end of table.

)

TABLE I. Material requirements. - Continued

		Fire		Maximum	
Catetory	Material	Specification	test	test limits	
Furniture - continued	Aromatic poly- amide uphols- tery	Commercial	FED-STD-191, method 5903	=	5 inch 1 sec
	Treated 3/ cotton 3/ mattress ticking (non-launder- able)	CCC-C-436, type II, class 2	FED-STD-191, method 5903		5 inch 2 sec
	Cotton duck— berth-spring unit mattress cover, treated (launderable)	CCC-C-419, type I, No. 10	FED-STD-191, method 5903		5 inch 2 sec
	Cotton drill mattress cover (launderable)	CCC-C-426 type I class 2	FED-STD-191 method 5903	Char length After flame	5 inch 2 sec
	Aluminum	MIL-F-902	Not required	Not required	
	Steel	MIL-F-243	Not required	Not required	
	Polychloroprene cushioning and mattresses	MIL-R-20092, type II, class 5	ASTM E 162 ASTM E 662	Flame spread D corrected	10 200
	High pressure laminate for table tops 5/	MIL-P-17171, type I	ASTM E 84	Flame spread Smoke developed Thickness	75 50 0.062 incl
Draperies and 6/ curtains	Fibrous glass	CCC-C-1703	FED-STD-191, method 5903 ASTM E 662	Cnar length After flame After glow D corrected	1.5 inch 1 sec 2 sec 20

TABLE I. Material requirements. - Continued

Category	Material	Specification	Fire test	Maximum test limits	
Draperies and curtains— continued	Polyaramid	MIL-C-24500, type I	FED-STD-191, method 5903 ASTM E 662	Char length After flame After glow D corrected	5 inch 1 sec 25 sec 20
	Polyaramid/ Novoloid	MIL-C-24500, type II	FED-STD-191, method 5903 ASTM E 662	Char length After flame After glow D corrected	3 inch 1 sec 25 sec 20
	Fire-retardant plastic	MIL-T-18830 ⁷ /	FED-STD-501, method 6411	Char length Combustion time	10 inch 4.0 min
	Vinyl tile	SS-T-312. ^{7/} type III	FED-STD-501, method 6411	Char length Combustion time	10 inch 4.0 min
Deck coverings	Vinyl sheet	L-F-450 ⁷ /	FED-STD-501, method 6411	Char length Combustion time	10 inch 4.0 min
	Rubber tile	SS-T-312, ^{7/} type II	FED-STD-501. method 6411	Char length Combustion time	10 inch 4.0 min
	Vinyl tile or sheet with backing	L-F-475 ^{7/}	FED-STD-501, metnod 6411	Char length Combustion time	10 inch 4.0 min
	Threads non-skid	MIL-D-17951	FED-STD-501, method 6411	Char length Combustion time	10 inch 4.0 min
	Epoxy non-skid	MIL-D-23003	FED-STD-501, method 6411	Char length Combustion time	10 inch 4.0 min
	Latex underlay	MIL-D-3135	FED-STD-501, method 6411	Char length Combustion time	10 inch 4.0 min
	Terrazzo	MIL-D-3134, type I, class 1, type I, class 2	FED-STD-501, method 6411	Char length Combustion time	10 inch 4.0 min

TABLE I. Material requirements. - Continued

Category	Material	Specification	Fire test	Maximum test limits	
Deck coverings /- continued	Latex mastic	MIL-D-3134,	FED-STD-501,	Char length	10 inch
	Lacex mascre	type II	method 6411	Combustion time	4.0 min
	Latex concrete	MIL-D-21631	FED-STD-501, method 6411	Char length Combustion time	3 inch 4.0 min
	Magnesium aggregate	MIL-D-16680 and MIL-D-18873	FED-STD-501, method 6411	Char length Combustion time	3 inch 4.0 min
	Standing rubber mat	MIL-M-910	Not required	Not required	
	Electrical grade mat or sheet	MIL-M-15562 ⁷ /	FED-STD-501, method 6411	Char length Combustion time	10 inch 4.0 min
	Carpet	DDD-C-95, type II, class 1, 2, or 4	FED-STD-372	Incident radient en 0.5 watts/cm² (mini	ergy mum)
			ASTM E 662	D corrected 450	
	Spray-on non-skid	MIL-D-24483	FED-STD-501, method 6411	Char length Combustion time	10 inch 4.0 min
	Barber shop mat	ZZ-M-42	Not required	Not required	
	Monolithic resin seam- less ør "Terrazzo" substitute systems	Commercial	FED-STD-501, method 6411	Char length Combustion time	10 inch 4.0 min

TABLE I. Material requirements. - Continued

Category	Material	Specification	Fire test	Maximum test limits
			0050	
hermal nsula-	Insulating board	MIL-I-742 type I	ASTM E 84	Flame spread 25 Smoke developed 10
tiøn ⁹ /		Core only	U.S.C.G. 164.009 U.S.C.G. 164.009	Thickness 1 inch Pass Pass
	Pipe insulation	MIL-I-2781	ASTM E 84	Flame spread 0 Smoke developed 0
	Bløck insula- tion	MIL-I-2819	ASTM E 84	Flame spread 0 Smoke developed 0
	Insulating blanket	MIL-I-23128	U.S.C.G. 164.009	Pass
	Insulating felt	MIL-I-16411	U.S.C.G. 164.009	Pass
	Insulating block	HH-I-551	U.S.C.G. 164.009	Pass
	Insulating blanket	MIL-I-2818	U.S.C.G. 164.009	Pass
	Insulating felt	MIL-I-15475	U.S.C.G. 164.009	Pass .
	Weather resistant ant coating compound 10/	MIL-C-19565		
	Fibrous glass coating com-	MIL-C-19993		

TABLE I. Material requirements. - Continued

Category	Material	Specification	Fire test	Maximum test limits
Thermal insula- tion - continued	Glass cloth	MIL-C-20079, type I (all classes) Before & after treatment type II (all classes) Before & after treatment	See appli- cable specifica- tion	Pass
	Pipe insula- tion	MIL-I-22344	ASTM E 84	Flame spread 25 Smoke developed 50
	Urethane foam (Reefer spaces only)	MIL-I-24172		
	End sealer 10/	MIL-C-22395		
	PVC - Nitrile	MIL-P-15280	ASTM E 84 ASTM E 662	Flame spread 25 D corrected 250 Thickness 0.5 inch

Maximum test limits are based upon material bonded to a non-combustible substrate.

Maximum test limits are based upon material attached to, or supported by, a non-combustible substrate.

J/ Use restricted to mattresses only. E, Use restricted to Officers' Berths.

Wherever a flame spread higher than 25 is indicated, the material is acceptable since there is no other acceptable material available with a lower flame spread.

An 8-ounce weight shall be used for materials tested in accordance with method 5903 of FED-STD-191.

Cement test specimen with MIL-A-21016. Permit cement to dry a minimum of 72 nours before conducting fire test.

- Materials tested in accordance with method 6411 of FED-STD-501 shall exhibit ignition time no less than 20 seconds. Ignition time is defined as the time in seconds from the Initial application of the burners on the sample until the first self-sustaining flame (ignition) is observed issuing from the top surface of the sample.
- 9/ Materials tested in accordance with U.S.C.G. 164.009 shall pass all re-
- quirements for incombustibility.
 Where no fire test limits appear, technical data was not available as of the date of this standard. However, the specifications listed are the only materials available.

4. FIRE TEST PROVISIONS

- 4.1 Responsibility for testing. Unless otherwise required in the applicable material specification, the manufacturer is responsible for conducting fire tests as specified herein. Except as otherwise specified, the manufacturer may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the tests set forth herein where such testing is deemed necessary to assure compliance to prescribed requirements.
- 4.2 <u>Methods of testing.</u> Fire tests shall be conducted on materials as specified in table I and the notes therein. All fire test procedures shall be in accordance with prescribed standards and test methods, and, unless otherwise specified herein, no less than three specimens shall be tested on material of the same lot with results averaged (arithmetic means). The following tests apply:
 - 4.2.1 Surface flammability.
 - 4.2.1.1 ASTM E 84 (Tunnel test).
 - 4.2.1.2 ASTM E 162 (Radiant panel).
 - 4.2.1.3 FED-STD-501, method 6411.
 - 4.2.1.4 FED-STD-372.
 - 4.2.1.5 ASTM D 635.
 - 4.2.2 Vertical flame resistance.
- 4.2.2.1 FED-STD-191, method 5903 A minimum of five specimens from each of the warp and filling directions on material of the same lot shall be tested and their results averaged (arithmetic means).
 - 4.2.3 <u>Smoke generation</u>.
 - 4.2.3.1 ASTM E 84 (Tunnel test).
 - 4.2.3.2 ASTM E 662.
 - 4.2.3.3 ASTM D 2843.

- 4,2.4 Test for incombustibility.
- 4.2.4.1 U.S.C.G. 164.009 (Heated Tube Test).
- 5. NOTES
- 5.1 This standard will be updated periodically as additional data becomes available.
- 5.2 Approved adhesives were not considered a fire hazard and the category was deleted from this standard.
- 5.3 This standard will be implemented by the requirements of the applicable material specifications.
- 5.4 The materials specified in this standard reflect the present state-of-the-art.

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