MIL-STD-1623(SHIPS)
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MILITARY STANDARD

FIRE PERFORMANCE REQUIREMENTS AND APPROVED SPECIFICATIONS FOR INTERIOR FINISH MATERIALS AND FURNISHINGS

(NAVAL SHIPBOARD USE)

FSC MISC

DEPARTMENT OF THE NAVY

NAVAL SHIP SYSTEMS COMMAND

WASHINGTON, D.C.

Fire Performance Requirements and Approved Specifications for
Interior Finish Materials and Furnishings (Naval Shipboard Use)
MIL-STD-1623(SHIPS)

1. This Military Standard is approved and is mandatory for use by the Naval Ship Systems Command.

2. Recommended corrections, additions, or deletions should be addressed to Commander, Naval Ship Engineering Center, Department of the Navy, Center Building, Prince George's Center, Hyattsville, Maryland 20782.

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 new and existing Naval 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.

Where no fire test limits appear, technical data was not available as of the date of this standard.

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1. SCOPE AND APPLICATION

1.1 Scope. This standard provides fire performance requirements and approved specifications for eight categories of interior finish materials and furnishings for use on new and existing surface ships and submarines.

1.2 Application. This standard applies to materials for bulkhead sheathing, overhead sheathing, furniture, draperies and curtains, adhesives, deck coverings, thermal insulation, and acoustic materials applications. The fire performance requirements of this standard supersede those contained in the applicable specifications.

2. REFERENCED DOCUMENTS

2.1 The issues of the following documents in effect on the date of invitation for bids form a part of this standard to the extent specified herein.

GOVERNMENTAL

SPECIFICATIONS

FEDERAL

L-F-450 - Flooring, Vinyl Plastic.
HH-I-551 - Insulation Block, Pipe Covering and Boards, Thermal (Cellular Glass).
QQ-A-250/19 - Aluminum Alloy 5086, Plate and Sheet for Sea Water Application.
SS-C-160 - Cements, Insulation, Thermal.
SS-S-118 - Sound Controlling Blocks and Boards (Acoustical Tiles and Panels, Prefabricated).
SS-T-312 - Tile, Floor, Asphalt, Rubber, Vinyl, Vinyl-Asbestos.
ZZ-M-42 - Mats, Floor, Dental-Chair, Rubber.
CCC-A-680 - Artificial Leather (Cloth Coated), Vinyl Resin, Expanded Layer, (Upholstery).
CCC-C-436 - Cloth, Ticking Twill, Cotton.
CCC-C-700 - Cloth, Coated, Vinyl Coated (Artificial Leather).
CCC-W-408 - Wall Covering, Vinyl-Coated.
MMM-A-130 - Adhesive, Contact.

MILITARY

MIL-I-742 - Insulation Board, Thermal, Fibrous Glass.
MIL-M-910 - Mats, Floor, Standing.
MIL-I-2781 - Insulation, Pipe, Thermal.
MIL-I-2818 - Insulation Blanket, Thermal, Fibrous Mineral.
MIL-I-2819 - Insulation Block, Thermal.
MIL-C-2861 - Cement, Insulation, High Temperature.
MIL-C-2908 - Cements, Finishing, Insulation.
MIL-D-3134 - Deck Covering Materials.
MIL-D-3135 - Deck Covering Underlay Materials.
MIL-A-3316 - Adhesives, Fire-Resistant, Thermal Insulation.
MIL-P-15280 - Plastic Material, Unicellular (Sheets and Tubes).
MIL-I-15475 - Insulation Felt, Thermal, Fibrous Glass Semirigid.
MIL-M-15562 - Matting, Floor, Rubber.
MIL-I-16411 - Insulation Felt, Thermal, Glass Fiber.
MIL-D-16680 - Deck Covering Magnesia Aggregate Mixture.
MIL-T-17171 - Table Top, Plastic; Thermosetting Resin.
MIL-D-17951 - Deck Covering, Lightweight, Nonslip, Silicon Carbide Particle Coated Fabric and Sealing Compound.
MIL-T-18830 - Tile, Plastic, Fire Retardant.
MIL-M-19018 - Mats, Floor, Rubber or Plastic, Light Gray; for Shipboard Shower Stalls.
MIL-C-19565 - Coating Compounds, Thermal Insulation Pipe Covering -- Fire- and Water-Resistant, 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-A-21016 - Adhesive, Resilient Deck Covering.

MILITARY (Cont'd)

MIL-D-21631 - Deck Covering, Latex Concrete (For Ammunition Ships).
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, Lightweight.
MIL-A-23054 - Acoustical Absorptive Board, Fibrous Glass, Perforated Fibrous Glass Cloth Faced.
MIL-I-23128 - Insulation Blanket, Thermal, Refractory Fiber, Flexible.
MIL-P-24062 - Sprayable Vibration Damping Material for Light Steel Plate.
MIL-I-24172 - Insulation, Plastic, Cellular Polyurethane, Rigid, Preformed and Foam-in-Place.
MIL-A-24179 - Adhesive, Flexible Unicellular-Plastic Thermal Insulation.
MIL-P-24191 - Plastic Sheet, Cast, Acrylic, Shipboard Application (Illumination and Signal Lighting).
MIL-A-24456 - Adhesive for Plastic Vibration-Damping Tiles.
MIL-D-24483 - Deck Covering, Spray-On, Nonslip.

STANDARDS

FEDERAL

FED-STD-191 - Textile Test Methods.
FED-STD-406 - Plastics: Methods of Testing.
FED-STD-501 - Floor Coverings, Resilient, Nontextile: Sampling and Testing.

PUBLICATION

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, D.C. 20591.)

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring 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, 150 East Forty Second Street, New York, New York 10017.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

E84-70 - Surface Burning Characteristics of Building Materials, Test for.
E162-67 - Surface Flammability of Materials Using a Radiant Heat Energy Source, Test for.
STP 422 - Special Technical Publication. Method for Measuring Smoke from Burning Materials.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 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 Materials. Interior finish materials and furnishings shall meet the requirements set forth in table I.

Table I - Material requirements.

Category	Material	Specification	Fire test	Maximum Test limits
Bulkhead sheathing 1/	High pressure laminate for vertical surfaces	MIL-T-17171, type IV	ASTM E84-70	Flame spread 25 Smoke developed 15 Thickness .032"
	Fabric-backed vinyl	CCC-W-408, type II	ASTM E84-70	Flame spread 25 Smoke developed 15 Thickness .025"
	Unsupported vinyl film-aluminum lamination	QQ-A-250/19, Temper H-116 (for aluminum only)	ASTM E84-70	Flame spread 25 Smoke developed 15 Thickness film .010" Thickness aluminum .063"
	Fabric-backed wood veneer	Commercial	ASTM E84-70	Flame spread 25 Smoke developed 15 Thickness .025"
	CRES panel	AISI type 304, finish 4	N/A	N/A
Overhead sheathing 2/	Fibrous glass opaque suspended ceiling panel	SS-S-118, type IX	ASTM E84-70	Flame spread 25 Smoke developed 35 Thickness .750"
	Ceramic opaque suspended ceiling panel	SS-S-118, type IX	ASTM E84-70	Flame spread 25 Smoke developed 25 Thickness .750"
	Acrylic light-diffusing panel (lighting fixture only)	MIL-P-24191, type clear-2	FED-STD-406, method 2021 STP 422	Burning rate 1.35 in/min Optical smoke density
	Vinyl clad perforated aluminum panel	QQ-A-250/19, temper H-116 (for aluminum only)	ASTM E84-70	Flame spread 25 Smoke developed 15 Thickness film .010" Thickness aluminum .063"
	CRES panel	AISI type 304, finish 4	N/A	N/A
	Steel or aluminum exposed grid suspension framework	Commercial	N/A	N/A
Furniture	Vinyl upholstery	CCC-A-680, class 2, treatment A.1	FED-STD-191, method 5903	Char length 3.0" After flame 2 sec
	Vinyl upholstery	CCC-C-700, class 4, treatment A.1	FED-STD-191, method 5903	Char length 3.0" After flame 2 sec
	Aromatic polyamide upholstery	Commercial	FED-STD-191, method 5903	Char length 5.0" After flame 1 sec
	Treated cotton ticking	CCC-C-436, type II, class 2	FED-STD-191, method 5903	Char length 5.0" After flame 2 sec

See footnotes at end of table.

Table I - Material requirements (cont'd).

Category	Material	Specification	Fire test	Maximum Test limits
Furniture (cont'd)	Neoprene cushioning	MIL-R-20092, type II, class 3	ASTM E162-67	Flame spread index 10
	Neoprene mattresses	MIL-R-20092, type II, class 4	ASTM E162-67	Flame spread index 10
	High pressure laminate for table tops	MIL-T-17171, Type I	ASTM E84-70 (bonded)	Flame spread 75 Smoke developed 50 Thickness .062"
Draperies and curtains	Beta fibrous glass	Proposed	FED-STD-191, method 5903	Char length 1.5" After flame 1 sec After glow 2 sec
	Aromatic polyamide	Proposed	FED-STD-191, method 5903	Char length 1.5" After flame 1 sec After glow 10 sec
	Phenolic aromatic Polyamide	Proposed	FED-STD-191, method 5903	Char length 2.5" After flame 1 sec After glow 6 sec
Adhesives	Contact adhesive (sheathing on surface ships)	MMM-A-130		
	Contact adhesive (sheathing on on submarines)	MIL-A-24179, type I		
	Deck tile adhesive	MIL-A-21016		
	Carpet cement	Commercial		
	Bead sealer	MIL-D-17951		
	Thermal insulation	MIL-A-3316, class 1		
	Finishing insulating cement	MIL-C-2908		
	High temperature insulation cement	MIL-C-2861		
	Thermal insulation cement	SS-C-160		
	Damping tile cement	MIL-A-24456		
Deck coverings	Vinyl asbestos tile	MIL-T-18830	FED-STD-501, method 6411	Char length 10 Combustion + ignition 4.0 min
	Vinyl tile	SS-T-312, type III	FED-STD-501, method 6411	Char length Combustion + ignition
	Vinyl sheet	L-F-450	FED-STD-501, method 6411	Char Length Combustion + ignition

See footnotes at end of table

Table I - Material requirements (cont'd).

Category	Material	Specification	Fire test	Maximum Test limits
Deck coverings	Treads - non skid	MIL-D-17951	FED-STD-501, method 6411	Char length 8" Combustion + ignition 4.0 min
	Epoxy non-skid	MIL-D-23003	FED-STD-501, method 6411	Char length 6" Combustion + ignition 4.25 min
	Latex underlay	MIL-D-3135	FED-STD-501, method 6411	Char length 8" Combustion +ignition 4.5 min
	Terrazzo	MIL-D-3134, type I, class 1	FED-STD-501, method 6411	Char length 7" Combustion + ignition
	Latex mastic	MIL-D-3134, type II, class 1	FED-STD-501, method 6411	Char length 7" Combustion + ignition
	Latex concrete	MIL-D-21631	FED-STD-501, method 6411	Char length 3" Combustion + ignition 4.0 min
	Magnesium aggregate	MIL-D-16680	FED-STD-501, method 6411	Char length 3" Combustion + ignition 0 min
	Standard rubber mat	MIL-M-910	FED-STD-501, method 6411	Char length Combustion + ignition
	Insulating rubber mat	MIL-M-15562	FED-STD-501 method 6411	Char length 10" Combustion + ignition
	Shower mat	MIL-M-19018	FED-STD-501, method 6411	Char length Combustion + ignition
	Beta fibrous glass carpet	Commercial	ASTM E162-67 without pad	Flame spread index 25
	Aromatic polyamide carpet	Commercial	ASTM E162-67 without pad	Flame spread index 25
	Spray-on non skid	MIL-D-24483	FED-STD-501, method 6411	Char length Combustion + ignition
	Barber shop mat	ZZ-M-42	FED-STD-501, method 6411	Char length Combustion + ignition
Thermal[3/] insulation	Insulating board	MIL-I-742	U.S.C.G. 164.009	N/A
	Pipe insulation	MIL-I-2781	U.S.C.G. 164.009	N/A
	Block insulation	MIL-I-2819	U.S.C.G. 164.009	N/A
	Insulating blanket	MIL-I-23128	U.S.C.G. 164.009	N/A
	Insulating felt	MIL-I-16411	U.S.C.G. 164.009	N/A

See footnotes at end of table.

Table I - Material requirements (cont'd).

Category	Material	Specification	Fire test	Maximum Test limits
Thermal[3/] insulation (cont'd)	Insulating block	HH-I-551	U.S.C.G. 164.009	N/A
	Insulating blanket	MIL-I-2818	U.S.C.G. 164.009	N/A
	Insulating felt	MIL-I-15475	U.S.C.G. 164.009	N/A
	Coating compound	MIL-C-19565	ASTM E84-70 (bonded)	Flame spread 25 Smoke developed
	Coating compound	MIL-C-19993	ASTM E84-70 (bonded)	Flame spread 25 Smoke developed
	Glass cloth	MIL-C-20079	FED-STD-191, method 5903	Char length After flame After glow
	Pipe insulation	MIL-I-22344	ASTM E84-70 (bonded)	Flame spread 25 Smoke developed
	Urethane foam	MIL-I-24172	ASTM E84-70 (bonded)	Flame spread 25 Smoke developed
	End sealer	MIL-C-22395	ASTM E84-70 (bonded)	Flame spread 25 Smoke developed
	PVC - Nitrile	MIL-P-15280	ASTM E84-70 STP 422	Flame spread 25 Optical smoke density 250 Thickness 1/2"
Acoustic materials	Acoustic board	MIL-I-22023	ASTM E84-70 (bonded)	Flame spread Smoke developed
	Acoustic insulation	MIL-A-23054	U.S.C.G. 164.009	Flame spread index
	PVC graphite	MIL-P-23653 class 1, 2	ASTM E162-67	Flame spread index
	Epoxy-sand (sheet)	MIL-P-22581	ASTM E162-67	Flame spread index
	Epoxy-sand (sprayable)	MIL-S-24062	ASTM E162-67	Flame spread index
	Felt-chromate	Commercial	ASTM E162-67	Flame spread index
	Vibration damping plastic tiles	MIL-P-23653, class 3	ASTM E162-67	Flame spread index

1/ Maximum test limits are based upon material bonded to a non-combustible substrate.
2/ Thickness indicates maximum limits in both application and fire tests.
3/ Maximum test limits are based upon material attached to, or supported by, a non-combustible substrate.
3/ Materials tested in accordance with U.S.C.G. 164.009 shall pass all requirements for incombustibility.

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 Methods of testing. 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 E84-70 (Tunnel test).

4.2.1.2 ASTM E162-67 (Radiant panel).

4.2.1.3 FED-STD-501, Method 6411.

4.2.1.4 FED-STD-406, Method 2021.

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 Smoke generation.

4.2.3.1 ASTM E84-70 (Tunnel test).

4.2.3.2 STP 422 (NBS Smoke Chamber).

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 This standard will be implemented by the requirements of the applicable material specifications.

Preparing activity:
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