

INCH-POUND

MIL-STD-1623E(SH)

20 June 2006

SUPERSEDING

MIL-STD-1623D(SH)

07 December 1981

**DEPARTMENT OF DEFENSE
DESIGN CRITERIA STANDARD
FIRE PERFORMANCE REQUIREMENTS AND
APPROVED SPECIFICATIONS FOR INTERIOR
FINISH MATERIALS AND FURNISHINGS
(NAVAL SHIPBOARD USE)**



MIL-STD-1623E(SH)

FOREWORD

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.

2. Comments, suggestions, or questions on this document should be addressed to Commander, Naval Sea Systems Command, ATTN: SEA 05Q, 1333 Isaac Hull Avenue, SE, Stop 5160, Washington Navy Yard DC 20376-5160 or emailed to commandstandards@navsea.navy.mil, with the subject line "Document Comment". Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <http://assist.daps.dla.mil>.

MIL-STD-1623E(SH)

CONTENTS

| <u>PARAGRAPH</u> | <u>PAGE</u> |
|---|-------------|
| <u>FOREWORD</u> | ii |
| 1. <u>SCOPE</u> | 1 |
| 1.1 <u>Scope</u> | 1 |
| 1.2 <u>Applicability</u> | 1 |
| 1.3 <u>Limitations</u> | 1 |
| 2. <u>APPLICABLE DOCUMENTS</u> | 1 |
| 2.1 <u>General</u> | 1 |
| 2.2 <u>Government documents</u> | 1 |
| 2.2.1 <u>Specifications, standards, and handbooks</u> | 1 |
| 2.2.2 <u>Other Government documents, drawings, and publications</u> | 3 |
| 2.3 <u>Non-Government publications</u> | 3 |
| 2.4 <u>Order of precedence</u> | 4 |
| 3. <u>DEFINITIONS</u> | 4 |
| 4. <u>GENERAL REQUIREMENTS</u> | 4 |
| 5. <u>DETAILED REQUIREMENTS</u> | 4 |
| 5.1 <u>Materials</u> | 4 |
| 5.2 <u>Fire test provisions</u> | 13 |
| 5.2.1 <u>Responsibility for testing</u> | 13 |
| 5.2.2 <u>Methods of testing</u> | 13 |
| 6. <u>NOTES</u> | 14 |
| 6.1 <u>Intended use</u> | 14 |
| 6.2 <u>Acquisition requirements</u> | 14 |
| 6.3 <u>Subject term (key word) listing</u> | 14 |
| 6.4 <u>Changes from previous issue</u> | 14 |
| TABLES | |
| TABLE I. Material requirements..... | 5 |
| TABLE II. Fire tests | 13 |

MIL-STD-1623E(SH)

1. SCOPE

1.1 Scope. This design criteria standard provides fire performance requirements and approved specifications for various categories of interior finish materials and furnishings for use on Naval surface ships and submarines.

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

1.3 Limitations. 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. Components and materials not previously approved by the Navy will be evaluated for fire gas toxicity, off-gassing, health hazards, dermal irritation/sensitization, and other pertinent factors as determined by the Naval Technical Authority.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this standard. This section does not include documents cited in other sections of this standard or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this standard, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

FEDERAL SPECIFICATIONS

| | | |
|-----------|---|--|
| CCC-C-436 | - | Cloth, Ticking Twill, Cotton |
| L-P-1040 | - | Plastic Sheets and Strips (Polyvinyl Fluoride) |

FEDERAL STANDARDS

| | | |
|-------------|---|--|
| FED-STD-191 | - | Textile Test Methods |
| FED-STD-501 | - | Floor Coverings, Resilient, Nontextile: Sampling and Testing |

COMMERCIAL ITEM DESCRIPTIONS

| | | |
|-----------|---|--|
| A-A-52085 | - | Cloth, Drill, Cotton |
| A-A-55188 | - | Blankets, Bed, Wool, Shrink Resistant and Mothproofed |
| A-A-59502 | - | Plastic Sheet, Polycarbonate |
| A-A-59517 | - | Cloth, Coated or Laminated, Polyvinylchloride (Artificial Leather) |

DEPARTMENT OF DEFENSE SPECIFICATIONS

| | | |
|--------------|---|--|
| MIL-I-742 | - | Insulation Board, Thermal, Fibrous Glass |
| MIL-I-2781 | - | Insulation, Pipe, Thermal |
| MIL-PRF-2818 | - | Insulation Blanket, Thermal |
| MIL-PRF-2819 | - | Insulation Block, Thermal |
| MIL-D-3134 | - | Deck Covering Materials |
| MIL-PRF-3135 | - | Deck Covering Underlay Materials |

MIL-STD-1623E(SH)

| | | |
|---------------|---|--|
| MIL-DTL-15562 | - | Matting or Sheet, Floor Covering Insulating for High Voltage Application |
| MIL-I-16411 | - | Insulation Felt, Thermal, Glass Fiber |
| MIL-P-17171 | - | Plastic, Laminate, Decorative, High Pressure |
| MIL-PRF-17951 | - | Deck Covering, Lightweight, Nonslip, Abrasive Particle Coated Fabric, Film, or Composite, and Sealing Compound |
| MIL-D-18873 | - | Deck Covering Magnesia Aggregate Mixture |
| MIL-C-20079 | - | Cloth, Glass; Tape, Textile Glass; and Thread, Glass |
| MIL-PRF-20092 | - | Rubber or Plastic Sheets and Assembled and Molded Shapes, Synthetic, Foam or Sponge Open Cell |
| 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-PRF-22344 | - | Insulation, Pipe, Thermal |
| MIL-C-22395 | - | Compound, End Sealing, Thermal Insulation Pipe Covering -Fire-, Water-, and Weather-Resistant |
| MIL-P-22581 | - | Plastic Tiles, Vibration Damping, Type III |
| MIL-A-23054 | - | Acoustical Absorptive Board, Fibrous Glass Perforated Fibrous Glass Cloth Faced |
| MIL-PRF-23653 | - | Plastic Tiles, Vibration Damping |
| MIL-PRF-24172 | - | Insulation, Plastic, Cellular Foam, Rigid, Preformed and Foam-in-Place |
| MIL-DTL-24191 | - | Plastic Sheet, Cell or Continuous Cast, Acrylic, Shipboard Application (Illumination and Signal Lighting) |
| MIL-C-24500 | - | Cloth, Drapery, Bunk Curtain, Slipcovers, and Labels, Fire Retardant |
| MIL-L-24518 | - | Laminate, Vinyl Film-Aluminum, Decorative |
| MIL-PRF-24613 | - | Deck Covering Materials, Interior, Cosmetic Polymeric |
| MIL-PRF-24667 | - | Coating System, Non-Skid, for Roll or Spray Application |
| DOD-I-24688 | - | Insulation Panel, Thermal and Acoustic Absorptive, Open-Cell Polyimide Foam |
| MIL-T-24708 | - | Thermal/Acoustic Insulation Barrier Material: Polyimide Foam |
| MIL-PRF-24712 | - | Coatings, Powder (Metric) |
| MIL-PRF-32161 | - | Insulation, High Temperature Fire Protection, Thermal and Acoustic |
| MIL-PRF-32170 | - | Deck Tiles, Wear-Resistant |
| MIL-PRF-32171 | - | Deck Coatings, High Durability |

MIL-STD-1623E(SH)

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or <http://assist.daps.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

NAVAL SEA SYSTEMS COMMAND

NAVSEA 05Z6 PD 5-04A - Mattress, Innerspring, Flame-Resistant, Shipboard

(Copies of this document are available from the Commander, Naval Sea Systems Command, ATTN: SEA 05Z, 1333 Isaac Hull Avenue, SE, Stop 5160, Washington Navy Yard DC 20376-5160).

CODE OF FEDERAL REGULATIONS (CFR)

46 CFR 164.009 - Noncombustible Materials for Merchant Vessels

(Copies of this document are available from the Superintendent of Documents, U.S. Government Printing Office, Washington DC 20401 or online at www.gpoaccess.gov/index.html.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC-135 - Dimensional Changes of Fabrics After Home Laundering

(Copies of this document are available from the American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709.)

ASTM INTERNATIONAL

| | | |
|------------|---|--|
| ASTM D635 | - | Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position, Standard Test Method for (DoD adopted) |
| ASTM D6413 | - | Flame Resistance of Textiles (Vertical Test), Standard Test Method for |
| ASTM E84 | - | Surface Burning Characteristics of Building Materials (DoD adopted) |
| ASTM E162 | - | Surface Flammability of Materials Using a Radiant Heat Energy Source, Standard Test Method for (DoD adopted) |
| ASTM E648 | - | Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source, Standard Test Method for (DoD adopted) |
| ASTM E662 | - | Specific Optical Density of Smoke Generated by Solid Materials, Standard Test Method for (DoD adopted) |
| ASTM E1264 | - | Acoustical Ceiling Products, Standard Classification for (DoD adopted) |
| ASTM F1066 | - | Tile, Floor, Vinyl Composition, Standard Specification for (DoD adopted) |
| ASTM F1700 | - | Solid Vinyl Floor Tile, Standard Specification for (DoD adopted) |

(Copies of these documents are available from ASTM International, 100 Barr Harbor Avenue, PO Box C700, West Conshohocken, PA, USA 19428-2959 or online at www.astm.org.)

MIL-STD-1623E(SH)

ELECTRIC BOAT CORPORATION

EB Corp. Spec 4013 - Anti-Sweat and Refrigerant Insulation Systems (Sheets and Tubes)

(Copies of this document are available from Electric Boat Corporation, a General Dynamics Company, Department 447, Material Services, 75 Eastern Point Road, Groton, CT 06340-4899.)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 267 - Fire Characteristics of Mattresses and Bedding Assemblies Exposed to Flaming Ignition Source

(Copies of this document are available from NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471 or online at www.nfpa.org.)

UNDERWRITERS LABORATORIES, INC. (UL)

UL 94 - Tests for Flammability of Plastic Materials

UL 723 - Test for Surface Burning Characteristics of Building Materials

(Copies of these documents are available from COMM 2000, 1414 Brook Drive, Downers Grove, IL 60515 or online at www.ul.com.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supercedes applicable laws and regulations unless a specific exemption has been obtained.

3. DEFINITIONS

This section is not applicable to this standard.

4. GENERAL REQUIREMENTS

This section is not applicable to this standard.

5. DETAILED REQUIREMENTS

5.1 Materials. Interior finish materials and furnishings shall meet the requirements set forth in Table I. Thickness for bulkhead sheathing, overhead sheathing, and furniture indicate maximum limits in both application and fire tests.

MIL-STD-1623E(SH)

TABLE I. Material requirements.

| Category | Material | Specification | Fire test | Maximum test limits | |
|----------------------------------|---|-------------------------------------|--------------------------|---------------------|-------------------------------|
| Bulkhead sheathing ^{1/} | High pressure laminate | MIL-P-17171, Type IV | ASTM E84 or UL 723 | Flame spread | 25 |
| | | | | Smoke developed | 15 |
| | Fabric-backed vinyl | Commercial | ASTM E84 | Flame spread | 25 |
| | | | | Smoke developed | 75 |
| | | | | Thickness | 0.035 inch |
| | PVC film-aluminum laminate | MIL-L-24518 | ASTM E84 or UL 723 | Flame spread | 25 |
| | | | | Smoke developed | 75 |
| | | | | Thickness film | 0.011 inch |
| | | | | Thickness aluminum | 0.063 inch |
| | High pressure laminate pre-bonded to aluminum | MIL-P-17171 | ASTM E84 or UL 723 | Flame spread | 25 |
| | | | | Smoke developed | 15 |
| | | | | Thickness aluminum | 0.050 inch |
| | PVF film-aluminum laminate | L-P-1040, Type II, Grade A, Class 1 | ASTM E84 or UL 723 | Flame spread | 25 |
| | | | | Smoke developed | 75 |
| | | | | Thickness film | 0.004 inch max |
| | | | | Thickness aluminum | 0.063 inch |
| | Plastic tile | MIL-PRF-23653 | ASTM D635 | | 9/, 10/ |
| | Plastic sheet | MIL-P-22581 | ASTM D635 | | 9/, 10/ |
| Overhead sheathing ^{2/} | Acoustical ceiling products | ASTM E1264 Class A (all surfaces) | ASTM E84 | Flame spread | 25 |
| | | | | Smoke developed | 50 |
| | | Class B (face side) | ASTM E84 | Flame spread | 75 |
| | Acrylic light-diffusing panel/windows (lighting fixture only) | MIL-DTL-24191 | ASTM D635 | Flame rate | 1.35 in/min |
| | | | ASTM E662 ^{20/} | Smoke density | 50 max @ 0.250 inch thickness |
| | Fibrous glass opaque suspended ceiling panel | Commercial | ASTM E84 | Flame spread | 25 |
| | | | | Smoke developed | 35 |
| | | | | Thickness | 0.750 inch |
| | PVC film-aluminum laminate | MIL-L-24518 | ASTM E84 or UL 723 | Flame spread | 25 |
| | | | | Smoke developed | 75 |
| | | | | Thickness film | 0.011 inch |
| | | | | Thickness aluminum | 0.063 inch |

MIL-STD-1623E(SH)

TABLE I. Material requirements – continued.

| Category | Material | Specification | Fire test | Maximum test limits | |
|---|---|-------------------------------------|--------------------------|--|------------------------------|
| Overhead sheathing ^{2/} continued | PVF film-aluminum laminate | L-P-1040, Type II, Grade A, Class 1 | ASTM E84 or UL 723 | Flame spread | 25 |
| | | | | Smoke developed | 75 |
| | | | | Film thickness | 0.004 inch |
| | | | | Thickness aluminum | 0.05 inch |
| Furniture | Vinyl upholstery | A-A-59517, Class 4, Condition a | ASTM D6413 | Char length | 3 inch |
| | | | | After flame | 2 sec |
| | | | | No flaming droplets | |
| | Upholstery fabric | Commercial | ASTM D6413 | Char length | 3 inch |
| | | | | After flame | 2 sec |
| | | | | No flaming droplets | |
| | Polychloroprene cushioning ^{15/} | MIL-PRF-20092, Type II, Class 5 | ASTM E162 | Flame spread | 10 |
| | | | ASTM E662 ^{20/} | Smoke density | 200 |
| | | | MIL-PRF-20092 Appendix A | Net peak HRR | 150 kW (max) |
| | | | | Avg specific extinction area | 300 m ² /kg (max) |
| | High pressure laminate for table tops ^{4/} | MIL-P-17171, Type I | ASTM E84 | No burning droplets or flaming material ^{19/} | |
| | | | | Flame spread | 75 |
| | | | | Smoke developed | 50 |
| | Polycarbonate | A-A-59502, Type II | UL 94 | Thickness | 0.062 inch |
| | | | | Flammability | V-0 |
| Draperies and curtains ^{5/} | Polyaramid/novoloid | MIL-C-24500, Type II ^{13/} | ASTM D6413 | Char length | 3 inch |
| | | | | After flame | 1 sec |
| | | | | After glow | 25 sec |
| | | | ASTM E662 ^{20/} | Smoke density | 20 max |
| | Polyaramid | MIL-C-24500, Type I ^{13/} | ASTM D6413 | Char length | 5 inch |
| | | | | After flame | 1 sec |
| | | | | After glow | 25 sec |
| | | | ASTM E662 ^{20/} | Smoke density | 20 max |
| | Fibrous glass | Commercial | ASTM D6413 | Char length | 1.5 inch |
| | | | | After flame | 1 sec |
| | | | | After glow | 2 sec |
| | | | ASTM E662 ^{20/} | Smoke density | 20 |

MIL-STD-1623E(SH)

TABLE I. Material requirements – continued.

| Category | Material | Specification | Fire test | Maximum test limits | |
|------------------------------|----------------------------------|--|--------------------------|-----------------------------|------------------------------|
| Deck coverings ^{7/} | Vinyl tile | ASTM F1066 and ASTM F1700 | ASTM E648 | Critical radiant flux | 0.45 w/cm ² (min) |
| | | | ASTM E662 ^{20/} | Smoke density | 450 max |
| | Fire-retardant plastic | Commercial | ASTM E648 | Critical radiant flux | 0.45 w/cm ² (min) |
| | | | ASTM E662 ^{20/} | Smoke density | 450 max |
| | Vinyl sheet | Commercial | ASTM E648 | Critical radiant flux | 0.45 w/cm ² (min) |
| | | | ASTM E662 ^{20/} | Smoke density | 450 max |
| | Rubber tile | Commercial | ASTM E648 | Critical radiant flux | 0.45 w/cm ² (min) |
| | | | ASTM E662 ^{20/} | Smoke density | 450 max |
| | Vinyl tile or sheet with backing | Commercial | ASTM E648 | Critical radiant flux | 0.45 w/cm ² (min) |
| | | | ASTM E662 ^{20/} | Smoke density | 450 max |
| | Treads non-skid | MIL-PRF-17951 | ASTM E648 | Critical radiant flux | 0.45 w/cm ² (min) |
| | | | ASTM E662 ^{20/} | Smoke density | 450 max |
| | Epoxy non-skid | MIL-PRF-24667 | ASTM E648 | Critical radiant flux | 0.45 w/cm ² (min) |
| | | | ASTM E662 ^{20/} | Smoke density | 450 max |
| | Underlay | MIL-PRF-3135 | FED-STD-501, method 6411 | Char length | 10 inch |
| | | | | Combustion time | 4.0 min |
| | | | | Ignition time ^{7/} | 20 sec min |
| | Terrazzo | MIL-D-3134, Type I, Class 1, Type I, Class 2 | FED-STD-501, method 6411 | Char length | 10 inch |
| | | | | Combustion time | 4.0 min |
| | | | | Ignition time ^{7/} | 20 sec min |
| | Latex mastic | MIL-D-3134, Type II | FED-STD-501, method 6411 | Char length | 10 inch |
| | | | | Combustion time | 4.0 min |
| | | | | Ignition time ^{7/} | 20 sec min |
| | Latex concrete | MIL-D-21631 | FED-STD-501, method 6411 | Char length | 3 inch |
| | | | | Combustion time | 4.0 min |
| | | | | Ignition time ^{7/} | 20 sec min |

MIL-STD-1623E(SH)

TABLE I. Material requirements – continued.

| Category | Material | Specification | Fire test | Maximum test limits | |
|---|-------------------------------|-----------------------------|--------------------------|-----------------------------|------------------------------|
| Deck coverings ^{7/} continued | Magnesium aggregate | MIL-D-18873 | FED-STD-501, method 6411 | Char length | 3 inch |
| | | | | Combustion time | 4.0 min |
| | | | | Ignition time ^{7/} | 20 sec min |
| | Electrical grade mat or sheet | MIL-DTL-15562 ^{6/} | ASTM E648 | Critical radiant flux | 0.45 w/cm ² (min) |
| | | | ASTM E662 ^{20/} | Smoke density | 450 max |
| | Carpet | Commercial | ASTM E648 | Critical radiant flux | 0.45 w/cm ² (min) |
| | | | ASTM E662 ^{20/} | Smoke density | 450 max |
| | Spray-on non-skid | MIL-PRF-24667 | ASTM E648 | Critical radiant flux | 0.45 w/cm ² (min) |
| | | | ASTM E662 ^{20/} | Smoke density | 450 max |
| | Powder coating | MIL-PRF-24712 | ASTM E162 | Flame spread | 20 |
| | | | | No dripping | |
| | Interior cosmetic polymeric | MIL-PRF-24613 | ASTM E648 | Critical radiant flux | 0.45 w/cm ² (min) |
| | | | ASTM E662 ^{20/} | Smoke density | 450 max |
| | Deck tiles, wear resistant | MIL-PRF-32170 | ASTM E648 | Critical radiant flux | 0.45 w/cm ² (min) |
| | | | ASTM E662 ^{20/} | Smoke density | 450 max |
| Insulation | Insulating board | MIL-I-742, Type I core only | ASTM E84 | Flame spread | 25 |
| | | | | Smoke developed | 15 |
| | | | | Thickness | 14/ |
| | | Type II | 46 CFR 164.009 | Pass ^{8/} | |
| | Pipe insulation | MIL-I-2781 | ASTM E84 | Flame spread | 0 |
| | | | | Smoke developed | 0 |
| | Pipe insulation | MIL-PRF-22344 | ASTM E84 | Flame spread | 25 |
| | | | | Smoke developed | 50 |

MIL-STD-1623E(SH)

TABLE I. Material requirements – continued.

| Category | Material | Specification | Fire test | Maximum test limits | |
|----------------------|---|--|---|---|--|
| Insulation continued | Anti-sweat pipe insulation ^{15/} | EB Corp Spec 4013 | Room/corner test (see applicable specification, Appendix A) | Flame spread | 1 ft. on horizontal pipe runs, no melting or dripping, no ignition of target array |
| | | | | Heat release rate (material only) | 11,384 Btu/min (200 kW) |
| | Block insulation | MIL-PRF-2819 | ASTM E84 | Flame spread | 0 |
| | | | | Smoke developed | 0 |
| | Insulating felt | MIL-I-16411 | 46 CFR 164.009 | Pass ^{8/} | |
| | Insulating blanket | MIL-PRF-2818 (blanket only without supporting members) | 46 CFR 164.009 | Pass ^{8/} | |
| | Glass cloth | MIL-C-20079 (All tests before and after treatment) | | | |
| | | Type I, Classes 1, 3, 5, 7, 9 | 46 CFR 164.009 | Pass ^{8/} | |
| | | Type I, Class 2 | ASTM E84 | Flame spread | 20 |
| | | | | Smoke developed | 10 |
| | | Type I, Classes 4, 6, 8, 10 | ASTM D6413 or FED-STD-191 Method 5903.2 | After flame and afterglow | 0 sec |
| | | | | Char length | 0 inch |
| | | | | Flame travel | 1.5 inch |
| | | Type II, Classes 1, 3, 4 | 46 CFR 164.009 | Pass ^{8/} | |
| | | Type II, Class 2 | ASTM E84 | Flame spread | 20 |
| | | | | Smoke developed | 10 |
| | Cellular foam (Reefer spaces only) | MIL-PRF-24172 | ASTM E84 (before and after humid aging) | Flame spread | 25 |
| | | | | Smoke developed | 250 |
| | | | | Thickness | 1.0 inch |
| | | | | No melting, dripping, or flaming droplets | |

MIL-STD-1623E(SH)

TABLE I. Material requirements – continued.

| Category | Material | Specification | Fire test | Maximum test limits | |
|----------------------|--|------------------------------------|--|--|----------------|
| Insulation continued | End sealer | MIL-C-22395 | MIL-C-22395, fire resistance | Shall not burn for more than 30 seconds after removal of a test flame. | |
| | Thermal/sound absorbing felt ^{15/} | MIL-I-22023 Type I and Type II | ASTM E84 | Flame spread | 25 |
| | | | | Smoke developed | 50 |
| | Thermal/acoustic panel ^{15/} | Type III | MIL-I-22023 Appendix A | Flash-over time | > 10 min |
| | | DOD-I-24688, Type I | ASTM E662 | Smoke density | 5 max |
| | | | DOD-I-24688 Appendix A | Flash-over time | > 10 min |
| | High temperature fire/thermal/acoustic insulation ^{15/} | MIL-PRF-32161, Type I, II, and III | ASTM E84 | Flame spread | 25 |
| | | | | Smoke developed | 50 |
| | | Type I | MIL-PRF-32161 Appendix A | Full-scale fire resistance test | ^{11/} |
| | Thermal/acoustic barrier ^{15/} | MIL-T-24708, Type I | ASTM E162 | Flame spread ^{12/} | 25 |
| | | | ASTM E662 ^{20/} | Smoke density | 150 |
| | | Type I, Class 3 | MIL-T-24708 Appendix | Flash-over time | > 10 min |
| | Acoustic board | MIL-A-23054 | ASTM E84 or UL 723 | Flame spread | 30 |
| | | | | Smoke developed | 100 |
| Bedding | Mattress, innerspring | NAVSEA 05Z6 PD 5-04A: | Component testing: | | |
| | | | <i>Upholstery Ticking, Border Ticking, Flange, Tape^{16/} and Pocketing Material^{16/}</i> | | |
| | | | ASTM D6413 | Initial flammability: | |
| | | | | Char length | 5 in max |
| | | | | After flame | 2 sec max |
| | | | | Molten and/or flaming drops | None |

MIL-STD-1623E(SH)

TABLE I. Material requirements – continued.

| Category | Material | Specification | Fire test | Maximum test limits | |
|----------------------|---|---|---|---|--|
| Bedding continued | Mattress, innerspring continued | NAVSEA 05Z6 PD 5- 04A: continued | FED-STD-191 Method 5556 and ASTM D6413 | Flammability after 15 launderings: | |
| | | | | Char length | 5 in max |
| | | | | After flame | 2 sec max |
| | | | | Molten and/or flaming drops | None |
| | | | <i>Cushioning and insulator pad</i> | | |
| | | | ASTM D6413 | Char length | 5 in max |
| | | | | After flame | 2 sec max |
| | | | | Molten and/or flaming drops | None |
| | | | ASTM E162 | Flame spread ^{18/} | 10 |
| | | | ASTM E662 ^{20/} | Smoke density ^{18/} | 200 and no molten and/or flaming drops |
| | | | Finished mattress testing: | | |
| | | | NFPA 267 (with Navy exceptions) | Net peak HRR | 150 kW (max) |
| | | | | Avg specific extinction area | 300 m ² /kg (max) |
| | | | | No burning droplets or flaming material ^{19/} | |
| | Mattress, polychloroprene ^{15/} | MIL-PRF- 20092, Type II, Class 5 | ASTM E162 | Flame spread | 10 |
| | | | ASTM E662 ^{20/} | Smoke density | 200 |
| | | | MIL-PRF- 20092 Appendix A | Net peak HRR | 150 kW (max) |
| | | | | Avg specific extinction area | 300 m ² /kg (max) |
| | | | | No burning droplets or flaming material ^{19/} | |
| | Treated cotton mattress ticking (non-launderable) ^{3/} | CCC-C-436, Type II, Class 2 | ASTM D6413 | Char length | 5 inch |
| | | | | After flame | 2 sec |
| | | | | No flaming droplets | |
| | Mattress cover, cotton drill (launderable) ^{3/} | A-A-52085, Type I, Class 2 | ASTM D6413 | Char length | 5 inch |
| | | | | After flame | 2 sec |

MIL-STD-1623E(SH)

TABLE I. Material requirements – continued.

| Category | Material | Specification | Fire test | Maximum test limits | |
|-------------------|------------------------|---------------|---|---|-----------|
| Bedding continued | Blanket ^{17/} | A-A-55188 | Aircraft Material Fire Test Handbook , Chapter 18, Recommended Procedure for the 4-Ply Horizontal Flammability Test for Aircraft Blankets | Flame time | 5 sec max |
| | | | | Drip flame time | 5 sec max |
| | | | | No holing, flame penetration, or burn-through permitted | |

NOTES:

- ^{1/} Maximum test limits are based upon material bonded to a non-combustible substrate.
- ^{2/} Maximum test limits are based upon material attached to, or supported by, a non-combustible substrate.
- ^{3/} Use with polychloroprene mattress only.
- ^{4/} 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.
- ^{5/} An 8-ounce weight shall be used for materials tested in accordance with ASTM D6413.
- ^{6/} Cement test specimen with MIL-A-21016. Permit cement to dry a minimum of 72 hours before conducting fire test.
- ^{7/} 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.
- ^{8/} Materials tested in accordance with 46 CFR 164.009 shall pass all requirements for noncombustibility.
- ^{9/} Specimen shall not burn to the 4-inch mark after the first or second ignition.
- ^{10/} No wire gauze shall be mounted beneath the specimen and only three (3) specimens cut from the same tile shall be tested. Each of the three (3) specimens shall pass. If any do not pass, the procedure in ASTM D635 which specifies tests in groups of ten (10) specimens (cut from the same tile) shall be followed.
- ^{11/} (a) The fire-containment assembly, with attached insulation, shall have withstood the fire endurance test without passage of flame for a time period equal to that for which the classification is desired, and (b) Transmission of heat through the assembly during the fire endurance test period shall not have raised the average temperature on its unexposed surface more than 250 °F (139 °C) above its initial temperature, nor the temperature of any one point on the surface, more than 325 °F (181 °C) above its initial temperature. The test shall be performed in both vertical and horizontal configurations.
- ^{12/} Type I shall be tested twice. One with the glass cloth cover facing the heat source, and one with the flexible polyimide foam facing the heat source.
- ^{13/} Material shall be tested as received and after five (5) launderings as per AATCC 135 Procedure IIIB in both warp and fill directions.
- ^{14/} Test at maximum thickness contemplated for use.
- ^{15/} Where test methods are non-standard, but are called out from within the specification or an Appendix to that specification, the test methods will be referenced as such.
- ^{16/} Only molten and/or flaming drops requirement applies to tape. Only initial flammability requirements apply to pocketing material.
- ^{17/} The A-A-55188 limits the use of blankets to wool material only. The fire performance requirements apply to alternative materials which are subject to approval by Naval Technical Authority.
- ^{18/} When materials are not identical on both sides, each side shall be tested as a different specimen (does not apply to cushioning).
- ^{19/} This means no flaming droplets or flaming material which fall from the test mattress during the fire test, shall continue flaming after reaching the test platform or floor.
- ^{20/} Where test method ASTM E662 is invoked, tests shall be conducted in both non-flaming and flaming modes.

MIL-STD-1623E(SH)

5.2 Fire test provisions.

5.2.1 Responsibility for testing. Unless otherwise required in the applicable material specification, the manufacturer is responsible for conducting fire tests as specified herein. All tests specified in this document shall be conducted by an independent testing laboratory that is accredited to ISO/IEC 17025 or equivalent procedure. Accreditation shall be obtained from a recognized accreditation body such as American Association for Laboratory Accreditation (A2LA) or International Code Council's International Accreditation Services (IAS). The scope of accreditation shall include specific flammability and fire tests required for qualification. The Government reserves the right to witness the tests, and/or perform any of the tests set forth herein where such testing is deemed necessary to assure compliance to prescribed requirements.

5.2.2 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). Tests as listed in Table II shall apply.

TABLE II. Fire tests.

| Specification | Description |
|----------------------------------|-------------------------------------|
| <i>Surface flammability</i> | |
| ASTM D635 | Burn rate test |
| ASTM E84 | Tunnel test |
| ASTM E162 | Radiant panel |
| ASTM E648 | Flooring radiant panel |
| FED-STD-501, Method 6411 | Floor covering, fire resistance |
| UL 94 | Flammability of plastics |
| <i>Vertical flame resistance</i> | |
| ASTM D6413* | Flame resistance of textiles |
| <i>Smoke generation</i> | |
| ASTM E84 | Tunnel test |
| ASTM E662 | Specific optical density of smoke |
| <i>Test for incombustibility</i> | |
| 46 CFR 164.009 | Heated tube test |
| <i>Fire endurance</i> | |
| NFPA 267** | Fire characteristics of mattresses |
| UL 1709** | Hydrocarbon pool fire exposure test |

* A minimum of five specimens from each of the warp and fill directions on materials of the same lot shall be tested and their results averaged (arithmetic mean).

** Only one specimen.

MIL-STD-1623E(SH)

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. This standard contains requirements necessary to establish fire performance criteria and to provide a list of approved specifications for interior finish materials and furnishings to be used on Naval surface ships and submarines.

6.2 Acquisition requirements. Acquisition documents should specify the title, number, and date of this standard.

6.3 Subject term (key word) listing.

Ceiling products, acoustical

Char

Combustion

Curtains

Deck coverings

Draperies

Fire resistance

Flame

Flame spread

Flashover

Furniture

Heat release

Ignition

Insulation, thermal

Sheathing, bulkhead

Sheathing, overhead

Smoke

6.4 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodian:
Navy – SH

Preparing activity:
Navy – SH
(Project 19GP-2005-001)

Review activity:
Navy – YD

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <http://assist.daps.dla.mil>.