

INCH-POUND

MIL-DTL-24151B(SH)

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SUPERSEDING

MIL-D-24151A(SH)

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# **DETAIL SPECIFICATION**

## **DOORS, ROLLER CURTAIN AND HINGED SLAT, AND ASSOCIATED OPERATING EQUIPMENT**



Comments, suggestions, or questions on this document should be addressed to Commander, Naval Sea Systems Command, ATTN: SEA 05S, 1333 Isaac Hull Avenue, SE, Stop 5160, Washington Navy Yard, DC 20376-5160 or emailed to [CommandStandards@navy.mil](mailto:CommandStandards@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 <https://assist.dla.mil>.

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This specification is approved for use by the Naval Sea Systems Command and is available for use by all Departments and Agencies of the Department of Defense.

## 1. SCOPE

1.1 Scope. This specification covers roller curtain doors, hinged slatted doors, and associated operating equipment used for a wide variety of applications on naval ships.

1.2 Classification. The doors and their operating equipment are of the following types and classes, as specified (see 6.2):

1.2.1 Types. The types of doors are as follows:

- a. Type I – External door
- b. Type II – Internal door

1.2.2 Classes. The classes of doors are as follows:

- a. Class 1 – Located in an area subject to fuel spills
- b. Class 2 – Not located in an area subject to fuel spills

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification 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 and 4 of this specification, 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

- FF-S-85 - Screw, Cap, Slotted and Hexagon Head
- FF-S-86 - Screw, Cap, Socket-Head
- FF-S-92 - Screw, Machine, Slotted, Cross-Recessed or Hexagon Head
- FF-S-200 - Setscrews: Hexagon Socket and Spline Socket, Headless
- OO-K-220 - Key, Machine

## FEDERAL STANDARDS

- FED-STD-H28 - Screw-Thread Standards for Federal Services

## COMMERCIAL ITEM DESCRIPTIONS

- A-A-52414 - Bearing, Roller, Thrust
- A-A-59588 - Rubber, Silicone

## DEPARTMENT OF DEFENSE SPECIFICATIONS

- MIL-S-901 - Shock Tests, H.I. (High-Impact) Shipboard Machinery, Equipment, and Systems, Requirements for

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- MIL-DTL-1222 - Studs, Bolts, Screws and Nuts for Applications Where a High Degree of Reliability is Required; General Specification for
- MIL-DTL-2212 - Contactors and Controllers, Electric Motor AC or DC, and Associated Switching Devices
- MIL-PRF-2765 - Rubber Sheet, Strip, Extruded, and Molded Shapes, Synthetic, Oil Resistant
- MIL-DTL-15024 - Plates, Tags, and Bands for Identification of Equipment, General Specification for
- MIL-A-15303 - Audible Signals: Alarms, Bells, Buzzers, Horns, and Sirens, Electronic, Shipboard
- MIL-DTL-16392 - Brakes, Magnet, Naval Shipboard
- MIL-DTL-17060 - Motors, Alternating Current, Integral-Horsepower, Shipboard Use
- MIL-DTL-18240 - Fastener Element, Self-Locking, Threaded Fastener, 250 °F Maximum
- MIL-S-22698 - Steel Plate, Shapes and Bars, Weldable Ordinary Strength and Higher Strength: Structural
- MIL-S-24093 - Steel Forgings, Carbon and Alloy Heat Treated
- MIL-F-24385 - Fire Extinguishing Agent, Aqueous Film Forming Foam (AFFF) Liquid Concentrate, for Fresh and Seawater
- MIL-C-24707 - Castings, Ferrous, General Specification for
- MIL-C-24707/1 - Castings, Ferrous, for Machinery and Structural Applications
- MIL-PRF-32006 - Programmable Controller, Naval Shipboard
- MIL-PRF-32168 - Variable Speed Drive System for Induction and Synchronous Machines

## DEPARTMENT OF DEFENSE STANDARDS

- MIL-STD-167-1 - Mechanical Vibrations of Shipboard Equipment (Type I – Environmental and Type II – Internally Excited)
- MIL-STD-461 - Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
- MIL-STD-740-2 - Structureborne Vibratory Acceleration Measurements and Acceptance Criteria of Shipboard Equipment
- MIL-STD-1472 - Human Engineering
- MIL-STD-1474 - Noise Limits
- MIL-STD-3020 - Fire Resistance of U.S. Naval Surface Ships

## DEPARTMENT OF DEFENSE HANDBOOKS

- MIL-HDBK-267 - Guide for Selection of Lubricants and Hydraulic Fluids for Use in Shipboard Equipment
- MIL-HDBK-781 - Reliability Test Methods, Plans, and Environments for Engineering Development, Qualification, and Production

(Copies of these documents are available online at <http://quicksearch.dla.mil/>.)

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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.

## GENERAL SERVICES ADMINISTRATION (GSA)

## GSA Global Supply Catalog

(Copies of this document are available online at [www.gsa.gov/ggscatalog](http://www.gsa.gov/ggscatalog).)

## NAVAL SEA SYSTEMS COMMAND (NAVSEA) PUBLICATIONS

- S0986-CJ-STM-010/075 - Naval Ships' Technical Manual, Chapter 075, Fasteners
- S9074-AR-GIB-010/278 - Requirements for Fabrication, Welding, and Inspection and Casting and Inspection Repair for Machinery, Piping, and Pressure Vessels
- T9070-AK-DPC-010/078-1 Composite Materials, Surface Ships, Topside Structural and Other Topside Applications – Fire Performance Requirements
- T9074-BD-GIB-010/0300 - Base Materials for Critical Applications: Requirements for Low Allow Steel Plate, Forgings, Castings, Shapes, Bars, and Heads of HY-80/100/130 and HSLA-80/100

(Copies of these documents are available online via Technical Data Management Information System (TDMIS) at <https://mercury.tdmis.navy.mil/> by searching for the TMIN without the suffix. Refer questions, inquiries, or problems to: DSN 296-0669, Commercial (805) 228-0669. These documents are available for ordering (hard copy) via the Naval Logistics Library <https://nll.ahf.nmci.navy.mil>. For questions regarding the NLL, contact the NLL Customer Service at [nllhelpdesk@navy.mil](mailto:nllhelpdesk@navy.mil), (866) 817-3130, or (215) 697-2626/DSN 442-2626.)

## NAVAL SEA SYSTEMS COMMAND (NAVSEA) STANDARD ITEMS

- SI 009-32 - Cleaning and Painting Requirements

(Copies of this document are available online at <http://www.navsea.navy.mil/CNRM/C/SERMC/SSRAC1/ansi/13ansi/13.htm>.)

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.

## AEROSPACE INDUSTRIES ASSOCIATION (AIA)

- NASM 25027 - Nut, Self-Locking, 250 °F, 450 °F, and 800 °F

(Copies of this document are available online at [www.aia-aerospace.org](http://www.aia-aerospace.org).)

## AMERICAN BEARING MANUFACTURERS ASSOCIATION (ABMA)

- ABMA 19.2 - Tapered Roller Bearings, Radial Inch Design
- ABMA 20 - Radial Bearings of Ball, Cylindrical Roller and Spherical Roller Types – Metric Design

(Copies of these documents are available online at <http://www.americanbearings.org>.)

## ASME

- ASME B1.1 - Unified Inch Screw Threads, (UN and UNR Thread Form)

(Copies of this document are available online at [www.asme.org](http://www.asme.org).)

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## ASTM INTERNATIONAL

- ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
- ASTM A380/A380M - Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems
- ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip
- ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings
- ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- ASTM B247 - Standard Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and Rolled Ring Forgings
- ASTM D709 - Standard Specification for Laminated Thermosetting Materials
- ASTM D5363 - Standard Specification for Anaerobic Single-Component Adhesives (AN)
- ASTM F1166 - Standard Practice for Human Engineering Design for Marine Systems, Equipment, and Facilities

(Copies of these documents are available online at [www.astm.org](http://www.astm.org).)

## INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

- ISO/IEC 17025 - General Requirements for the Competence of Testing and Calibration Laboratories

(Copies of this document are available online at [www.iso.org](http://www.iso.org).)

## SAE INTERNATIONAL

- SAE-AS15000 - Fitting End, Lubrication, Hydraulic – Design Standard
- SAE-AS15004 - Fitting, Lubrication, Hydraulic, Surface Check, .250-28 Taper Threads, Nickel-Copper Alloy, Type IV
- SAE-AS15005 - Fitting, Lubrication, Hydraulic, Throat or Surface Check, 1/8 Pipe Threads, Nickel-Copper Alloy, Type V
- SAE-AS15720 - Fitting, Lubrication, Hydraulic, Throat or Surface Check, .250-28 Taper Threads, Corrosion Resistant Steel, Type VII
- SAE-AS15721 - Fitting, Lubrication, Hydraulic, Throat or Surface Check, 1/8 Pipe Threads, Corrosion Resistant Steel, Type VIII
- SAE-AS81820 - Bearings, Plain, Self-Aligning, Self-Lubricating, Low Speed Oscillation
- SAE-AS81934 - Bearings, Sleeve, Plain and Flanged, Self-Lubricating
- SAE-CMH-17-2G - Composite Materials Handbook, Volume 2 – Polymer Matrix Composites: Materials Properties

(Copies of these documents are available online at [www.sae.org](http://www.sae.org).)

## UNDERWRITERS LABORATORIES, INC. (UL)

- UL 33 - Standard for Heat Responsive Links for Fire-Protection Service

(Copies of this document are available online at <http://ulstandards.ul.com/>.)



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2.4 Order of precedence. Unless otherwise noted herein or in the contract, 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, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.2.

3.2 General. The door assembly shall consist of the doors, the door frame assembly, the drum, the drive system including the motors and controls, and all other components required to meet service needs as specified herein. The door and door frame shall be adequate in strength and rigidity and shall be independent of the flexure of the enclosure in which it is installed so that door alignment sealing ability is maintained at all times. The door shall be able to operate without any deformation or misalignment and be able to travel in its guides under ship motion conditions and temperature extremes as specified herein. [Table I](#) lists the types of doors and the applicable requirements for each (see 6.2).

TABLE I. Requirements for roller curtain door applications.

Roller curtain door types	Requirements
Type I – External door	3.1 – 4.6
Type II – Internal door	3.1 – 3.2, 3.3.1 – 3.3.2, 3.3.3.2, 3.4.1, 3.4.2.1, 3.4.2.3 – 3.4.2.13, 3.5.1 – 3.5.3, 3.5.5 – 3.5.6, 3.6 – 3.8, 4.1 – 4.4, 4.5.1 – 4.5.2, 4.5.3.1, 4.5.6 – 4.5.9, 4.6

### 3.3 Materials and processes.

3.3.1 Materials. The door shall be constructed of steel, stainless steel, aluminum, or composite/non-metallic materials to meet the service conditions specified herein (see [table II](#) and 6.2). Composites, when used, shall also meet the fire performance requirements of T9070-AK-DPC-010/078-1. Components that are stocked or supported by the National Stock System shall be used to the fullest extent possible. Special emphasis shall be placed on producing equipment that will have minimum weight and require minimum space in accordance with MIL-STD-1472. The material shall meet the fire resistance requirements specified herein (see 3.4.2.4 and 6.2).

TABLE II. Materials.

Component	Material	Specification
Slats, drums, guides, and frames	Steel plate, HY-80, HY-100	T9074-BD-GIB-010/0300
	Steel plate, carbon structural	MIL-S-22698
	Cast steel	MIL-C-24707, MIL-C-24707/1
	Forged steel	MIL-S-24093 Class H, Type V
	CRES 316L	ASTM A240/A240M, ASTM A480/A480M
	Aluminum alloy plate and sheet	ASTM B209
	Aluminum alloy castings	ASTM B26/B26M
	Aluminum alloy forgings	ASTM B247
	Composite	SAE-CMH-17-2G

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3.3.1.1 Mercury. Mercury in any form shall not be used in shipboard equipment, including materials and parts thereof. Mercury may be used in manufacturing and test processes for materials and parts, provided it is used in such a way that the materials and parts themselves cannot be contaminated. No instruments containing mercury shall be used in the manufacture or testing of any equipment destined for installation on a nuclear powered ship.

3.3.1.2 Material defects. Materials shall be free from any defects that might affect the serviceability or appearance of the finished product.

3.3.1.3 Preferred material reference. Where materials of identical or equal quality can be identified by more than one specification or standard, the drawings shall reference only one such specification or standard. In selecting the specification or standard to be referenced for material not specified (see [table I](#)), the following shall be the order of preference:

- a. Military specification
- b. Federal specification
- c. Industry and technical society specification or standard
- d. Manufacturer's specification or standard

3.3.1.4 Material substitutions. Where materials other than those covered by 3.3.1 are to be used, the drawings shall show the complete chemical and physical properties of the material.

3.3.2 Fabrication, welding, and inspection. Fabrication, welding, and inspection shall be in accordance with S9074-AR-GIB-010/278, Class M. Construction shall incorporate bolted interfaces to assure access for maintenance. There shall not be any pockets where water can collect.

### 3.3.3 Corrosion control.

3.3.3.1 Metal spray coatings (type I doors only). Steel doors shall be coated with aluminum or zinc spray for corrosion control in accordance with SI 009-32.

3.3.3.2 Painting. If component specifications do not specify painting, then painting shall be as follows:

- a. Type I doors: ferrous or steel surfaces shall be coated in accordance with SI 009-32, line item for steel surfaces, surface ships, exterior surfaces above boottop with exception of areas receiving nonskid and well deck overhead areas.
- b. Type II doors: ferrous or steel surfaces shall be coated in accordance with SI 009-32, line item for steel surfaces, surface ships, interior steel surfaces.
- c. Type I doors: aluminum surfaces shall be coated in accordance with SI 009-32, line item for aluminum surfaces, surface ships, exterior surfaces above boottop with exception of areas receiving nonskid.
- d. Type II doors: aluminum surfaces shall be coated in accordance with SI 009-32, line item for aluminum surfaces, surface ships, interior aluminum surfaces.
- e. Corrosion resistant materials shall not be painted for the purpose of preservation. Corrosion resistant materials shall be treated in accordance with ASTM A380/A380M, as appropriate. Type I doors servicing a flight deck, if not painted, shall be treated to a dull finish.
- f. Touch-up of damaged paint shall be in accordance with 3.3.3.2(a) or 3.3.3.2(b), as appropriate.
- g. Bearing and machined surfaced or interior "oil wetted" surfaces shall not be painted.
- h. Surfaces to be painted shall be completely free of rust, mill scale, dirt, oil, grease, moisture, deteriorated paint, and other surface contaminants.
- i. When painting in the area of switches, safety devices, labels, and warning or operating plates, they shall be protected from paint and overspray.

### 3.4 Performance.

3.4.1 Door operation. Door operation shall be accomplished in one of four ways, as specified (see 6.2):

- a. Electrically operated with a manual back-up capability

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- b. Electrically operated with a manual back-up capability and automatic closure by means of a fusible link
- c. Manually operated only
- d. Manually operated and automatic closure by means of a fusible link

3.4.1.1 Rate of operation. Unless otherwise specified (see 6.2), in the electric mode, the door shall be capable of opening within 1 minute and closing within 1 minute under the most adverse conditions specified herein. The door shall be capable of operating at a duty cycle of 20 cycles per hour, indefinitely. In the manual mode, the door shall be capable of opening within 10 minutes and closing within 10 minutes under the most adverse conditions specified herein. When closing the door upon activation of a fusible link, the door shall have an average closing speed of not less than 6 inches per second and not more than 24 inches per second.

3.4.2 Environment. Unless otherwise specified (see 6.2), the equipment shall operate at designed operating levels without deterioration due to the following environmental factors:

3.4.2.1 Ship motion.

3.4.2.1.1 Storm sea conditions. During storm conditions (Sea State 8), the door will be considered stowed and dogged. Doors shall be able to withstand storm conditions without loss of fluids or post storm operability. Storm conditions include the roll, pitch, trim, and list angles and longitudinal, transverse, and vertical accelerations according to the applicable ship sea keeping data for the worst case door location(s) at Sea State 8, as specified (see 6.2).

3.4.2.1.2 Moderate sea conditions. All door systems shall be capable of operating with rated live load under moderate sea conditions (Sea State 5). Moderate sea conditions include the roll, pitch, trim, and list angles and longitudinal, transverse, and vertical accelerations according to the applicable ship sea keeping data for the worst case door location(s) at Sea State 5, as specified (see 6.2).

3.4.2.2 Ice and wind loading (type I doors only). The door shall operate in normal and back-up operation under a 0.25-inch thick layer of ice on the door and its operating surface. In the closed and dogged position, the door shall withstand a wind load of 40 pounds per square foot (lbs/ft<sup>2</sup>) over its entire surface without damage.

3.4.2.3 Stress limitations. Under normal equipment operating conditions, calculated combined stresses acting both individually and concurrently for machine and structural components shall not exceed 35 percent of the yield point of the material in any part. Allowable stress at the maximum level of operation or when the door is dogged and exposed to maximum load shall be not greater than 75 percent of the door material elastic limit.

3.4.2.4 Fire resistance. Unless otherwise specified (see 6.2), the door shall have the same fire resistance rating as the boundary in which it is located.

3.4.2.5 Shock. Unless otherwise specified (see 6.2), the door shall meet Grade A shock requirements in accordance with MIL-S-901 in the closed and dogged position.

3.4.2.6 Vibration. The equipment shall meet the vibration requirements of MIL-STD-167-1.

3.4.2.7 Humidity. The equipment shall operate satisfactorily in an atmosphere of relative humidity between 5 and 95 percent.

3.4.2.8 Temperature. For Type I doors, all equipment shall operate satisfactorily without any adjustment throughout an ambient temperature range of -20 to 120 °F. For Type II doors, all equipment shall operate satisfactorily without any adjustment throughout an ambient temperature range of 32 to 120 °F.

3.4.2.9 Operational lighting levels. The system shall be designed to be safely operated under all possible operational lighting levels (e.g., darken ship, Night Vision Device [NVD]) in accordance with MIL-STD-1472, as specified (see 6.2).

3.4.2.10 Contaminants. All door components shall function as specified herein after exposure to, and in the presence of, the following: lubricants, hydraulic fluids, solvents, JP-4 and JP-5 aviation fuels, and aqueous film-forming foam (AFFF) fire extinguishing agent (in accordance with MIL-F-24385) with no sign of corrosion or other deterioration that could affect performance or predicted design life.

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3.4.2.11 Electromagnetic interference. The system shall meet the surface ship below deck requirements of MIL-STD-461.

3.4.2.12 Particulates. All system components shall resist damage or degradation of performance due to exposure to wind-blown sand, dust, and other abrasives. Where the threat of exposure exists, provisions shall be made for cleaning or flushing all rotating and pivoting points.

3.4.2.13 Paint overspray. All system components shall withstand indiscriminate spraying of Navy grade primers and paints in accordance with SI 009-32 and remain operational.

3.4.2.14 Weather proofing (type I doors only). All equipment shall withstand continuous exposure to weather without deterioration throughout the life cycle. All equipment shall operate as specified herein when subjected to continuous salt fog and saltwater spray exposure and shall show no signs of corrosion or other deterioration that could degrade performance or predicted design life.

### 3.5 Design and construction.

3.5.1 Door construction. Both roller curtain type door construction and hinged slat type door construction are permissible. The requirements for each are listed in 3.5.1.1 and 3.5.1.2, respectively.

3.5.1.1 Curtains. Roller curtain type doors shall be built of interlocking steel, stainless steel, aluminum, or composite horizontal slats secured together in such a manner that the curtain rolls on a drum or tube. For Type I doors, the curtain shall be built of interlocking stainless steel (316 series or better), aluminum (5000 series or better), or composite horizontal slats, and the curtain drum shall be mounted on the interior of the ship. Spool pieces shall be provided at the ends of the curtain drum to preserve the vertical alignment of the door while in operation. The bracket carrying the curtain drum shall be bolted on the end columns of the door frame to allow accurate alignment of the curtain drum after installation. At each end, the curtain shall be fitted with roller guides, wind locks, and end locks with bearing pads, as required, to guide the curtain into the vertical guides of the door frame and to provide a continuous seal under all operating conditions. The width of the slats shall be sufficiently narrow in relation to the circumference of the drum to allow the slats to be rolled up without excessive rattling. However, for Class 1 doors, the bottom slat may be 12 inches or wider, with appropriate radii corners, to facilitate sealing the bottom 12 inches of the closed door against any leakage.

3.5.1.2 Hinged slats. Hinged slat type doors shall be built of steel, stainless steel, aluminum, or composite horizontal slats secured together with hinges in such a manner that the slats will roll up into a spiral track assembly, vice roller curtain drum. For Type I doors, the door assembly shall be built of stainless steel (316 series or better) or aluminum (5000 series or better) hinged slats, and the spiral track shall be mounted on the interior of the ship. Each end of the door slats shall be fitted with roller guides, wind locks, and end locks with bearing pads, as required, to guide the hinged slats into the vertical guides of the door frame and to provide continuous seal under all operating conditions. For Class 1 doors, the bottom 12 inches of the door assembly shall be a single piece hinged slat assembly capable of sealing against the deck to completely prevent fuel penetration through the bottom 12 inches of the door.

3.5.2 Dogging mechanism. Roller curtain type doors (see 3.5.1.1) shall have provisions to be dogged to the deck. The dogs shall be permanently attached to the bottom slat to eliminate the risk of the dogs being misplaced or lost. The dogs shall be operable from both sides of the enclosure. Means shall be provided for the dogs to take up the slack as they become worn with use. The door drive system shall allow, either by electrical or manual backup drive means, to put upward tension on the door so that when the bottom door edge is dogged, a slight tension (not to exceed 10 percent of the door normal operational lifting force) can be set up in the slats to make the curtain door more rigid and minimize weather from being blown through the slat joints. The number and spacing of dogs for the curtain door shall be adequate to meet the design requirements specified herein. The dogging mechanism shall be designed and constructed so that it will not be released by ship vibration. The dogs shall be located so as to prevent injury to operating personnel and shall cause no obstruction of the passage opening when the door is open. Dogging mechanisms for hinged slat type doors (see 3.5.1.2) shall be optional, provided all sealing and structural requirements specified herein are met.

3.5.3 Sealing requirements. The following paragraphs outline the requirements for sealing the door to exclude the ingress of weather and fuel.

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3.5.3.1 Watertight sealing requirements (class 1 doors only). In the fully closed and locked position, the door shall be watertight on the bottom 12 inches of the door to the extent specified in 4.5.3.1. Provisions shall be made to interface the deck configuration with the sealing arrangement so that the sealing remains effective over the entire width of the door. The door's bottom edge shall provide a smooth radius transition from the horizontal deck to the vertical sides of the door opening. Intumescent seals may also be used to prevent burning fuel leakage through the bottom 12 inches of the door. Intumescent seals, where used, shall be easily replaceable without removing any curtains or slats from their tracks.

3.5.3.2 Weathertight sealing requirements (type I doors only). In the fully closed and locked position, the door shall be weathertight to the extent specified in 4.5.3.2. Doors shall be fitted with seals to exclude the ingress of weather (e.g., rain, sea water, snow, ice). The seal material shall be in accordance with A-A-59588 and shall provide a minimum service life of 3 years in a marine environment. Seals shall be mechanically fastened and shall be easily replaced when required. Where it is not possible to mechanically fasten the seals, the contractor may propose an alternative method to attach the seals that will be within the capability of the ship's personnel to remove and replace at sea.

3.5.4 Light tight requirements (type I doors only). In the fully closed and locked position, the door shall provide an effective light trap and prevent interior illumination (white, red, or blue), which would violate light security, from escaping outside the enclosure. The control stations shall have a darken ship feature to dim the indicator lights. Interior lighting shall be controlled by door switches such that the interior lighting shall be turned off should the door be opened during a darken ship condition. Switches shall be supplied by the manufacturer of the door.

### 3.5.5 Door drive system.

3.5.5.1 Drive shaft system. Door drive shall be accomplished through the output shaft of a self-braking worm or other suitable gear. This shall prevent the door from overwhelming the drive train and falling shut due to its own weight when the door motor is de-energized or the force on the hand crank is removed. The operating gear for raising and lowering the door shall be such that either manual or electric power operation can be selected without the door falling shut regardless of the position (open, closed, or intermediate) of the door when the shift is made. A safety device shall be provided to prevent the free-fall of the door in the case of any supporting component failure. For doors that are electrically operated, an interlock (electrical or mechanical) shall be provided to prevent accidental operation of the door with the locks, dogs, or manual backup drive engaged. A torque sensing overload trip device or feature shall be provided to prevent damage to the door if the door is jammed or locked. An automatically engaged or disengaged up latch shall be provided to retain the door in the open position for hinged slat type doors to secure the door in the event of drive system component failure.

3.5.5.2 Speed gear reducer. The gearing shall be totally enclosed in an oil-tight case and shall be lubricated by oil bath. The housing shall permit the ready examination, removal, and replacement of gear elements. Gaskets shall be in accordance with MIL-PRF-2765. Oil fill, drain, and vent fittings shall be provided. An oil level measuring device or indicator shall be provided. The device or indicator shall indicate the "full" and the "add oil" levels. Seals shall be provided to prevent leakage of oil where shafts penetrate the gear housing. The reducer shall be oil-tight for non-operating inclinations up to 45 degrees roll. The reducer lubrication shall be unimpaired while operating under moderate sea conditions (see 3.4.2.1.2). Use of lubricating oil should follow the guidelines provided in MIL-HDBK-267. The service factor shall be 1.5 times calculated worst load condition.

3.5.5.3 Electric motor. For electrically operated doors, the electric motor shall be in accordance with MIL-DTL-17060 and the following requirements:

- a. Service: A
- b. Ambient temperature: See 3.4.2.8
- c. Ambient humidity: See 3.4.2.7
- d. Voltage: 440 Volts Alternating Current (VAC)
- e. Phase: 3
- f. Frequency: 60 Hertz
- g. Duty: As required to meet the requirements specified herein

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- h. Connected inertia at start: As required to meet the requirements specified herein
- i. Torque: As required to meet the requirements specified herein
- j. Thermal protection: Stator windings shall be provided thermal sensors
- k. Enclosure: Totally enclosed (TE)
- l. Speed: Single-speed, two-speed, or variable speed
- m. Horsepower: As required to meet the requirements specified herein
- n. Type: Squirrel cage induction
- o. Design: C
- p. Mounting: Horizontal (preferred) or vertical
- q. Bearing type: Ball
- r. Insulation: Class F sealed (vacuum pressure impregnated)
- s. Degree of balance: Precision
- t. Structureborne and airborne noise levels: In accordance with MIL-STD-740-2, Type II, and MIL-STD-1474, Category D
- u. Locked rotor torque: As required to meet the requirements specified herein
- v. Shock test: See 3.4.2.5

3.5.5.3.1 Overload protection. Overload protection shall be provided for the motor during both starting and running conditions.

3.5.5.3.2 Reset button. Resetting shall be accomplished by a button external to the motor enclosure and situated on the door control panel.

3.5.5.3.3 Motor drive assembly. The motor drive assembly shall be mounted on a common bedplate to the maximum extent possible and shall be arranged in the most compact manner consistent with maintenance requirements.

3.5.5.3.4 Bedplate. The bedplate shall be rigid enough to maintain alignment of equipment mounted thereon, without aid from the foundation.

3.5.5.4 Motor controls. For electrically operated doors, the motor controller shall be an across-the-line motor controller or a variable speed drive controller. Across-the-line motor controllers and associated switching devices, as well as control circuits, shall be in accordance with MIL-DTL-2212. Variable speed drive controllers and associated control circuits shall be in accordance with MIL-PRF-32168, except that the size requirements of the enclosure found in MIL-PRF-32168 shall be used as guidance only. When power is removed from the door motor, the door travel shall stop within 6 inches. This shall be achieved by utilization of a solid-state electronic brake unit or a fail-safe electric brake in accordance with MIL-DTL-16392.

3.5.5.5 Logic controller. For electrically operated doors, the logic controller shall be relay type or a programmable logic controller (PLC). The relay controller shall be in accordance with MIL-DTL-2212. The PLC shall be in accordance with MIL-PRF-32006. In addition, the following PLC physical security and cybersecurity requirements shall be followed:

- a. The user developed PLC system software shall be capable of being protected by password, certificate, or other means to authenticate users to prevent unauthorized access. If password protection is utilized, password login failure lockout shall be provided.

- (1) Any password login failure lockout mechanism shall be protected as to prevent an attacker to use it to bypass the password.

- (2) If passwords are utilized, passwords of up 50 characters shall be supported

- b. The PLC system firmware shall be digitally signed to ensure authenticity.

- c. The PLC processor shall contain non-volatile memory for the storage of the user developed software. An energy storage device shall not be required to retain the software in memory.



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d. The PLC enclosure shall be capable of being padlocked to prevent unauthorized physical access into the enclosure.

e. The PLC enclosure shall include an RJ45 Ethernet port accessible through a separate hinged cover. The Ethernet port hinged cover shall be capable of being padlocked to prevent unauthorized opening of the cover. The Ethernet Port shall provide for communication with the PLC processor for software upload, download, and online monitoring via a portable computer utilizing PLC development software.

f. All accessible PLC system communication ports that are not used for PLC system operation, software programming, or monitoring shall be capable of being disabled.

g. The human machine interface, if utilized, shall be capable of being password protected.

h. A copy of all user developed software products and supporting documentation shall be provided via electronic media.

i. A warning placard shall be posted on the PLC enclosure indicating "Unauthorized Access to this Software Based System is Prohibited".

j. The PLC software shall be developed in a secure environment.

k. The PLC software shall be tested under all system operating conditions to verify proper functionality.

**3.5.5.6 Control station.** For electrically operated doors, momentary selector switches or momentary pushbutton switches, suitable for mounting in a control station, shall be provided for Open and Close functions. A control station suitable for bulkhead mounting shall be provided for controlling the operation of the door. A full set of controls shall be in the control station located on both sides of the door. The door control stations shall be positioned to allow the operator full view of the door during operation. Dead-man operation of the Open and Close control switches shall be incorporated to ensure positive operator control of machinery. When human input is discontinued, the switch shall return to its default state and the commanded motion shall stop. A "Power Available" indicator light shall be provided at each control station to illuminate when electric power is available to operate the door. A push-pull type Emergency Stop pushbutton shall be provided at each control station to disable door operation. The Emergency Stop pushbutton shall be hard wired to disable the motor contactors when depressed.

**3.5.5.7 Travel switches.** For electrically operated doors, proximity switches shall be provided to sense and stop the door in the fully open or fully closed positions prior to the door reaching the end of travel. Continuous actuation of the lever switch shall be required until the "DOWN STOP" or "UP STOP" limit switch is activated. A spare set of output contacts shall be provided with each proximity switch for use in monitoring the position of each switch.

**3.5.5.8 Audible alarm.** For electrically operated doors, an automatic audible alarm signal shall be provided to warn personnel of a moving door. The alarm shall be in accordance with MIL-A-15303, Type IC/B1S4. The alarm shall sound for at least 5 seconds prior to the start of the electrically operated door motion and continue until the door stops. A cutout switch shall be provided to permit silencing of the alarm.

**3.5.5.9 Manual operation.** Manual operation of the door shall be accomplished by means of a hand crank assembly or other suitable device accessible for operation at the deck level. Hanging loops of link chain shall not be used for the manual drive system. The manual drive assembly shall include a mechanical stop arrangement positioned so as to define the upper and lower limits of door travel. Means shall be provided to secure the manual drive in all positions to prevent door movement or slippage under all ship motion and environmental conditions as specified herein. An electrical interlock shall be provided to disable powered operation when the manual drive assembly is engaged. The manual drive device shall not be removable and shall not rotate in powered operation. If a hand crank is used, the force on the hand crank shall not exceed 35 pounds, and the hand crank shall be in accordance with ASTM F1166. Where the power required to lift or lower the door is too great for a single manual drive unit, a second unit may be used to meet the rate of operation and manual force requirements specified herein.

**3.5.5.10 Fail-safe operations.** The door shall be designed for "fail-safe" operation. An operation shall be deemed fail-safe if it has the ability to maintain the safety of the equipment and personnel at all times. Failure of the power source or manual or power-operated drive mechanism shall not result in damage to equipment, jeopardize the safety of personnel, or result in uncontrolled movement of the equipment. In the event of a power failure, the door shall be immobilized. Fail-safe shall not be applied to static components or to structural members or other static parts or mechanisms. Fail-safe operations design shall be based on a safety study and shall be in accordance with 3.6.3.

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3.5.5.11 Lubrication. Lubrication fittings in accordance with SAE-AS15000 and SAE-AS15004, SAE-AS15005, SAE-AS15720, or SAE-AS15721 shall be provided for bearing elements not equipped with special lubrication means. Fittings shall be accessible for the use of a hand lubrication gun and shall utilize the same type and grade of lubricant. Use of the lubricant should follow the guidelines provided in MIL-HDBK-267. Where practicable, points requiring lubrication may be permanently lubricated for the life of the equipment. The motor operator unit shall maintain satisfactory lubrication with no loss of lubricant under the pitch, roll, and list conditions in accordance with 3.4.2.1.2. Operating parts for the door system shall be easily accessible. No special technical skills or tools shall be required to perform routine maintenance.

3.5.5.12 Fusible links. When required (see 6.2), fusible links for automatic door closure shall be provided as listed in and in accordance with UL 33 and shall meet the following requirements:

- a. The particular type of fusible link used shall depend on the temperature (see 6.2) and load requirements of the application.
- b. Fusible links shall be located at the top plane of the door and at the overhead on both sides of the door. The fusible link installed at the top plane of the door shall be located at the centerline of the door. The fusible links installed at the overhead shall be located on the bulkhead within 4 to 12 inches of the overhead.
- c. The fusible links shall be interconnected such that the operation of any fusible link shall trigger the other fusible links, causing the door to close.
- d. Where fusible links are installed on both sides of the bulkhead, the design shall provide for free movement of the cable or chain upon fusing of the links, while ensuring compartment integrity requirements (airtightness, watertightness, etc.) are maintained.

#### 3.5.6 Other parts and components.

3.5.6.1 Keys, keyways. Where used, straight cut keyways shall be closed end to prevent loss of keys. Keys and keyways shall be in accordance with OO-K-220.

3.5.6.2 Bearings. Bearings capable of meeting the physical, functional, environmental, and service life requirements of the application shall be in accordance with SAE-AS81820 for spherical bearings and SAE-AS81934 for journal bearings. Where these types of bearings do not meet design requirements, bearings in accordance with one or more of the following specifications shall be used: ABMA 19.2, ABMA 20, and A-A-52414. Rolling element bearings shall be selected to result in an L-10 life of not less than 10,000 hours. Design shall permit the replacement of all bearings without use of special tools. Special tools are defined as those tools not listed in the GSA Global Supply Catalog. Copies of this catalog may be consulted in the office of the Defense Contract Management Agency (DCMA).

3.5.6.3 Bolting. Screw threads, except as noted below, shall be unified 2A/2B fit in accordance with ASME B1.1. Nuts shall be of the plastic insert, self-locking type. The use of sintered metal fasteners is prohibited.

3.5.6.4 Fasteners. Cap screws, machine screws, setscrews, bolts, and nuts shall comply with MIL-DTL-1222 and FF-S-85, FF-S-86, FF-S-92, or FF-S-200.

3.5.6.5 Fastener practice. For a threaded fastener, not less than one thread but not more than four threads shall protrude beyond the crown of the nut. With plastic insert self-locking nuts, the end of the thread run-out shall be at least one thread above the top of the plastic insert. Washers shall not be used under the nut for the sole purpose of lessening thread protrusion.

3.5.6.6 Studs. Class 3 fit, as specified by FED-STD-H28, shall be used for the setting end of studs, and the studs shall be secured with thread-locking compound in accordance with ASTM D5363, Grade AN0142 (blue), or equivalent to commercially available Loctite 242 (blue).



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3.5.6.7 Stud engagement. Thread engagement for the setting end of a stud shall be such that the shear load strength of the engaged threads is more than the tensile load strength of the stud. For materials having similar mechanical properties, the full thread engagement of studs shall be not less than 1 major diameter (ID). For materials having dissimilar mechanical properties, the minimum engagement of stud setting threads shall be computed in accordance with S0986-CJ-STM-010/075, using the maximum tensile strength of the stud material and minimum specified tensile strength of the body material, plus one thread, but in no instance less than the root diameter.

3.5.6.8 Bottom tapping. Bottom tapping is permissible only where metal thickness is too thin for full thread engagement plus thread run-out and beveled end. Bottom-tapped holes shall have full threads for the entire depth.

3.5.6.9 Thread-locking features. To prevent loosening due to shock or vibration, self-locking nuts in accordance with NASM 25027 shall be used. Bolts shall have self-locking elements in accordance with MIL-DTL-18240, except for use with self-locking nuts. Where a thread-sealing or thread-locking compound is used, the material and its application shall comply with ASTM D5363 and the threads shall be unified 3A/3B fit in accordance with ASME B1.1. Fasteners, with the exception of the lower door dogging bolts, shall be locked.

3.6 Reliability and maintainability. Reliability and maintainability terms are defined in accordance with the guidelines provided in MIL-HDBK-781.

3.6.1 Failure. Any event that necessitates corrective maintenance, including failures in accordance with the guidelines provided in MIL-HDBK-781, shall be considered a system failure. Chargeable failures include any major or minor failures attributable to the internal operation of the system and system components. Failures due to external sources or operator error do not constitute chargeable failures but shall be evaluated as part of the safety program plan referred to in 3.6.3.

3.6.2 Reliability requirements. The door assembly, including the operating mechanism, shall have a Mean Time Between Failure (MTBF) of 2400 hours with a Mean Time To Repair (MTTR) of 6 hours.

3.6.3 Safety. Safety features shall be incorporated into the door configuration to prevent damage to equipment and to ensure optimal personnel protection.

3.6.4 Maintainability requirements. Replacement components and the time needed to replace them shall be identified. The maximum target replacement time shall be 6 hours while the target time to diagnose problems shall be 15 minutes.

3.7 Human engineering. Human engineering design criteria, principles, and practices in accordance with ASTM F1166 shall be followed. Particular attention shall be directed to ease of opening and closing the door, the dogging operation, and access for maintenance, lubrication, and part replacement.

3.7.1 Warning, caution, and instruction plates. Warning, caution, and instruction plates shall be installed wherever necessary to minimize the possibility of injury to personnel or damage to equipment due to:

- a. Faulty operation resulting from lack of posted instructions.
- b. Inadequate maintenance resulting from lack of posted instructions or lubrication charts.
- c. Lack of special safety precautions.

Warning and caution plates shall be fabricated from anodized-hydrated aluminum and shall comply with MIL-DTL-15024 plate, Type H. These plates shall have a red inscription on black background visible in both low level red and white illumination. A ¼-inch wide, red and black diagonally striped margin shall be provided around the border of the plate. Operating instructions shall be fabricated using plastic sheeting in accordance with ASTM D709, 0.06 inch thick with matte finish. Lettering shall be black. Size shall be 8 by 10½ inches, 8 by 5¼ inches, or 16 by 10½ inches as practicable for the proper display of the material. Plates shall be mounted in a conspicuous place on or near the control point.

3.7.2 Label plates. Assemblies, sub-assemblies, and replaceable components such as switches shall have a label plate to identify it by a functional name and assigned number. Label plates shall comply with MIL-DTL-15024 and shall be the most economical, provided they are suitable for their environment.

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3.8 Recycled, recovered, environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

#### 4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.2 First article inspection. First article inspection shall be performed on the first application of the door by the agency concerned (see 6.3). This inspection shall consist of the examination specified in 4.4 and the first unit tests specified in 4.5.

4.3 Conformance inspection. Conformance inspection of each door and drive system shall consist of the examination specified in 4.4 and the operating tests specified in 4.6.

4.4 Examination.

4.4.1 Visual and dimensional. Each door shall be subjected to a thorough visual and dimensional examination to ascertain that the material, workmanship, and construction are in conformance with the requirements of this specification.

4.4.2 Parts and components. Examination shall be conducted to determine that all parts and components conform to the specification; that the size, type, and rating are shown on the certified drawings; and that they are oriented and mounted as illustrated on the drawings. This shall include, but not be limited to, the following items:

- a. Motor
- b. Speed reducer
- c. Brake
- d. Shafts
- e. Bearings
- f. Dogging mechanisms
- g. Manual drive mechanism
- h. Controls
- i. Solenoids
- j. Switches
- k. Door frame
- l. Guides
- m. Rollers
- n. Seals

4.4.3 Completed equipment. Examination of the completed equipment shall be conducted to determine the following:

- a. Parts and assemblies are readily accessible for maintenance and repair in place; equipment that may need to be replaced during the life of the system shall lend itself to convenient and easy replacement.
- b. Fasteners are securely fastened and lockwired where required.
- c. Identification and instruction plates are furnished and attached as required.
- d. Potentially hazardous equipment and machinery is adequately grounded or insulated.

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4.5 First unit tests. Ship operating conditions shall be simulated during which the representative door shall be subjected to first article testing in accordance with 4.5.1 through 4.5.9. Throughout the test and for the purpose of the simulation, the door and door frame assemblies shall be considered to be installed athwartships. During the test, the door shall operate smoothly without binding or interference of any sort.

4.5.1 Endurance tests.

a. The electrically operated door shall be continuously operated for 1000 cycles, installed in its own frame and using its own drive system. During the test, the door shall be operated for a period of 8 hours each day. A complete cycle shall consist of fully opening the door, then immediately closing the door, then waiting no more than 1 minute before repeating the cycle. If installed, the door dogs will be engaged/disengaged for each cycle. There shall be at least 20 cycles per hour. The test shall be repeated if a component malfunction or breakdown, which causes the door to be inoperable, cannot be corrected or repaired within 2 hours of shut down, or if the same fault occurs twice during the test, irrespective of the time taken to rectify it.

b. The manually operated door shall be subjected to the same test as in (a) above, except that the door shall be operated for 20 cycles and there shall be at least 3 cycles per hour.

c. For doors with fusible links, the operation of the fusible link shall be simulated with the door fully open, and the door shall be allowed to fully close. The fusible link itself shall not be actuated via heat. Instead, the connection shall be broken at the fusible link. The door shall be restored to the open position with the fusible link connection in place, and the test shall be repeated 5 times. For all cycles, the door close time shall be demonstrated to be within the time limits specified herein.

4.5.2 Roll and pitch test. For at least 5 percent of the total endurance test cycles, the door shall be inclined at an angle simulating the worst case moderate sea conditions (see 3.4.2.1.2) for roll and list to port or starboard. For at least 5 percent of the total endurance test cycles, the door shall be inclined at an angle simulating the worst case moderate sea conditions (see 3.4.2.1.2) for pitch and trim. Roll and pitch need not occur simultaneously.

4.5.3 Sealing tightness test. This test shall be accomplished on a closed and dogged door following completion of the endurance test. Adequate sealing of the door shall be demonstrated by a water hose test. The test shall be conducted in one or two phases, depending on door type and class: the watertight test as described in 4.5.3.1 and the weathertight test as described in 4.5.3.2.

4.5.3.1 Watertight hose test (class 1 doors only). Plastic sheeting or other means shall be used to protect the door from water overspray above the 12-inch bottom test area. The door shall be tested within 20 feet using two 1½-inch fire hoses with the nozzles removed and a pressure of 125 to 150 lbs/in<sup>2</sup> at the hose connection. The entire length of the bottom seal shall be flooded, no higher than 12 inches above the sill, for 5 minutes. The door tightness shall be acceptable if there is zero water leakage through the bottom 12 inches of the door. At the conclusion of this test, remove plastic sheeting or shielding to prepare for the weathertight test of entire door, when required.

4.5.3.2 Weathertight hose test (type I doors only). The door shall be tested for overall weathertightness by spraying water over the entire door face. The hose nozzle shall be within 10 feet of the door under test and the stream shall be directed against specified portions of the door in a manner most likely to cause leaks. The nozzle diameter shall be not less than ½ inch and the pressure at the nozzle shall be not less than 50 lbs/in<sup>2</sup>. The door shall be sprayed for 3 minutes for every 100 square feet of door area. Water spray shall be evenly distributed over the entire door exterior face and door boundaries using side-to-side and up/down hose motions. The door weathertightness shall be acceptable if there are not more than 3 cups of leakage through the door per 100 square feet of door area during the entire test.

4.5.4 Light tightness test (type I doors only). This test shall be accomplished on a closed and dogged door following completion of the endurance test. With darkness on one side of the door, light shall be shone on the entire surface of the other side of the door. Visual inspection shall show that no light leakage occurs through the door, between the door and door frame, or between the door and the deck.

4.5.5 External environmental tests.

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4.5.5.1 Wind pressure test (type I doors only). This test shall be accomplished by laying the door flat on the floor with its operating mechanism fully connected and its surface loaded uniformly with ballast weight distributed to simulate a wind pressure of 40 lbs/ft<sup>2</sup>. After 10 minutes have elapsed, the weights shall be removed and the door shall be erected to operating position. The door shall then be cycled 10 times without defects or failure in order to establish conformance with the requirement specified in 3.4.2.3.

4.5.5.2 Icing test (type I doors only). Door integrity and operating performance in the primary and back-up mode of operation under the specified icing loads (see 3.4.2.2) shall be verified by analysis.

4.5.6 Shock testing. The door and all door components shall be subjected to and shall meet shock test requirements in accordance with MIL-S-901 when in the closed and dogged position to the specified shock grade (see 3.4.2.5 and 6.2).

4.5.7 Fire resistance testing. The door shall be subjected to and shall pass a standard fire test in accordance with MIL-STD-3020 at the same rating as the boundary in which the door is located or as otherwise specified (see 6.2). This test shall be accomplished on a closed and dogged door following completion of the endurance test.

4.5.7.1 Fire testing provisions. All fire tests specified in this document shall be conducted by an independent testing laboratory that is accredited to ISO-IEC 17025. 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. All other fire test provisions shall be as specified (see 6.2 and 6.5).

4.5.8 Electromagnetic interference testing. The door shall be tested in accordance with MIL-STD-461. The following emission and susceptibility requirements shall be tested: CE101, CE102, CS101, CS114, CS116, RE101, RE102, and RS103.

4.5.9 Vibration testing. All electrical equipment and associated electronics and all drive assembly equipment shall be vibration tested in accordance with MIL-STD-167-1. All door assembly components (i.e., door, door frame, drum, guide) shall be verified by analysis in accordance with MIL-STD-167-1.

4.6 Operating tests. The following tests shall be performed:

- a. Opening and closing of the door in all operating modes. The door shall be stopped and restarted at any point in its travel (except for testing of the fusible link). Movements shall be smooth and free of binding or interference.
- b. The open and close time of the door shall be demonstrated to be within the time limits specified herein (see 3.4.1.1). Each manual drive assembly shall be easy to operate by one person.
- c. Ease of dogging and un-dogging operations shall be demonstrated, and in the dogged position, no visible openings shall exist.
- d. Satisfactory operation of all control and safety features shall be verified by demonstration.
- e. For Type I and/or Class 1 doors, sealing tightness of the door shall be demonstrated by the accomplishment of the sealing tightness tests in 4.5.3.
- f. For Type I doors, light tightness of the door shall be demonstrated by the accomplishment of the light tightness test in 4.5.4.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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## 6. NOTES

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

6.1 Intended use. These doors are intended for a variety of applications for use on naval ships. Each application has its own unique set of requirements.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type and class of door (see 1.2).
- c. When first article is required (see 3.1).
- d. Material of door (see 3.2 and 3.3.1).
- e. Fire resistance requirements (see 3.3.1 and 3.4.2.4).
- f. Modes of operation (electrical, manual, fusible link) (see 3.4.1 and 3.4.1.1).
- g. Environmental factors (see 3.4.2).
- h. Storm sea conditions and loading factors (see 3.4.2.1.1).
- i. Moderate sea conditions and loading factors (see 3.4.2.1.2).
- j. Shock requirements (see 3.4.2.5 and 4.5.6).
- k. Operational lighting levels requirements (see 3.4.2.9).
- l. Fusible link temperature of actuation, if required (see 3.5.5.12).
- m. Additional fire testing provisions (see 4.5.7, 4.5.7.1 and 6.4).
- n. Packaging requirements (see 5.1).

6.3 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerors whether the item(s) should be a preproduction sample, a first article sample, a first production item, a sample selected from the first production items, or a standard production item from the contractor's current inventory (see 3.1), as well as the number of items to be tested in accordance with 4.3. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.4 Additional fire testing provisions. NAVSEA reserves the right to witness the tests and perform any of the tests set forth herein where such testing is deemed necessary to assure compliance to prescribed requirements.

6.5 Subject term (key word) listing:

Curtains  
Dogs  
External  
Fire resistance  
Frame  
Hangar  
Internal  
Slats

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6.6 Sub-contracted material and parts. The packaging requirements of referenced documents listed in section 2 do not apply when material and parts are acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

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

Preparing activity:

Navy – SH

(Project 2040-2014-002)

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 <https://assist.dla.mil>.