

INCH-POUND

MIL-PRF-32478

22 October 2013

PERFORMANCE SPECIFICATION
FIRE ZONE DOOR, SHIPBOARD USE

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers fire zone doors for use in internal shipboard fire zone boundaries where ingress and egress are required in interior, non-structural bulkheads. The door assembly includes the panel (door), frame, hinges, latch or lock assembly, light assembly, insulating material (if any), structural supports, sealing assembly, and all related mounting hardware.

1.2 Classification. Fire zone doors are of the following configurations (operation) and styles.

1.2.1 Configuration (operation). Door-swing (i.e., left-hand or right-hand) designations are opposite that of standard commercial practice. Door-swing determination is made by standing on the side of the door opening in which the panel swings towards an individual from the closed position; if the door hinges are located on the left side, it is considered a left-hand door; if the door hinges are on the right side, it is considered a right-hand door. Fire zone doors are of the following configurations as classified by operator orientation:

- a. Operation I – Left-hand operation.
- b. Operation II – Right-hand operation.

1.2.2 Styles. Fire zone doors are of the following styles:

- a. Style 1 – With latch assembly.
- b. Style 2 – With latch assembly and fixed light assembly.
- c. Style 3 – With lock assembly.
- d. Style 4 – With lock assembly and fixed light assembly.

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, 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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1.3 Part or identifying number (PIN). PINs to be used for fire zone doors acquired to this specification are created (see 6.2) as follows:

<u>M</u>	<u>32478</u>	:	<u>X</u>	<u>X</u>	<u>X</u>
Prefix for Military Specification	Specification Number		Dimension A – CO 26" × 66" B – CO 26" × 69" C – CO 30" × 66" D – CO 30" × 69" (see 3.4)	Configuration (Operation) 1 – Left-hand 2 – Right-hand (see 1.2.1)	Style A – Latch B – Latch & Light C – Lock D – Lock & Light (see 1.2.2)

Examples:

M32478- <u>D1B</u>	Clear opening (CO) 30W × 69H; assembly footprint 34¼ × 73¼; Left-hand operation; latch assembly and fixed light
M32478- <u>A2C</u>	CO 26W × 66H; assembly footprint 30¼ × 70¼; Right-hand operation; lock assembly only
M32478- <u>C1D</u>	CO 30W × 66H; assembly footprint 34¼ × 70¼; Left-hand operation; lock assembly and fixed light

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 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, 4, or 5 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.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-S-901	-	Shock Tests, H.I. (High-Impact) Shipboard Machinery, Equipment, and Systems, Requirements for
MIL-DTL-15024	-	Plates, Tags, and Bands for Identification of Equipment, General Specification for

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-167-1	-	Mechanical Vibrations of Shipboard Equipment (Type I-Environmental and Type II-Internally Excited)
MIL-STD-3020	-	Fire Resistance of U.S. Naval Surface Ships

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

NAVAL SEA SYSTEMS COMMAND (NAVSEA) INSTRUCTIONS

NAVSEAINST 9491.1 - Location of Approved Class HI Shock Testing Facilities

(Copies of this document are available online at www.navsea.navy.mil.)

NAVAL SEA SYSTEMS COMMAND (NAVSEA) DESIGN DATA SHEETS

DDS 078-1 - Composite Materials, Surface Ships, Topside Structural and Other Topside Applications – Fire Performance Requirements

(Copies of this document are available from Commander, Naval Sea Systems Command, ATTN: SEA05S, 1333 Isaac Hull Avenue, SE, Stop 5160, Washington Navy Yard DC 20376-5160, or by email at CommandStandards@navy.mil with the subject line “DDS request”.)

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 NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A156.2 - Bored and Preassembled Locks and Latches

ANSI A156.4 - Door Controls – Closers

(Copies of these documents are available from the American National Standards Institute, 25 W. 43rd St, 4th Floor, New York, NY 10036 or online at <http://webstore.ansi.org/>.)

ASTM INTERNATIONAL

ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials

ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

ASTM E800 - Standard Guide for Measurement of Gases Present or Generated During Fires

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

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 in accordance with 4.2.

3.2 Materials. Material selected shall meet the requirements specified herein. Materials specified herein are recommended, not mandatory. The use of carcinogenic materials is prohibited.

3.3 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.

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3.3.1 U.S. Environmental Protection Agency. The use of these materials on the list should be minimized or eliminated unless needed to meet the requirements specified herein. The list of chemicals and additional information is available on their website: <http://www.epa.gov/osw/hazard/wastemin/priority.htm>.

3.4 Design. The door assembly shall be a swing type, flush-mounted, radius cornered panel that is manually operated. Door assemblies shall be constructed in the types and sizes listed in [table I](#). The dimensions shown in [table I](#) are the required clear openings of the door and the maximum footprint of the entire door assembly. Components of the door assembly shall be contained within the footprint of the door frame. Specific configurations and styles are identified in 1.2.1 and 1.2.2. The door frame shall be of the bolt-mounted variety. Door frames shall be provided with no mounting holes drilled to accommodate retrofitting door assemblies onto legacy ships. Corners of $8\frac{7}{16}$ -inch radius shall be incorporated into the door panel. Doors sizes that are not specified in [table I](#) and are required for back-fit shall meet all requirements stated herein.

TABLE I. Fire zone door sizes and footprints.

Type	Clear opening width (inches)	Clear opening height (inches)	Door assembly footprint (W) (inches)	Door assembly footprint (H) (inches)
1	26	66	30 $\frac{1}{4}$	70 $\frac{1}{4}$
2	26	69	30 $\frac{1}{4}$	73 $\frac{1}{4}$
3	30	66	34 $\frac{1}{4}$	70 $\frac{1}{4}$
4	30	69	34 $\frac{1}{4}$	73 $\frac{1}{4}$

3.4.1 Latch or lock assemblies. Latch or lock assemblies shall be provided in accordance with ANSI A156.2. Both the latch and lock assembly shall include a commercial standard size doorknob on both sides of the panel.

3.4.2 Automatic closing devices. Door assemblies shall be supplied with an automatic closing device (closer) in accordance with ANSI A156.4. The closer shall provide a force to close and latch the door automatically after the door panel has been pulled or pushed open. The closer shall include a dampening mechanism with a two-stage closing speed arrangement to prevent the door from slamming. The closer shall be provided with four adjustable controls; back-check, sweep, latch, and spring force. The back-check feature acts as a dampening device to prevent uncontrolled opening of the door panel, reducing the possibility of slamming the panel against the door bumper, bulkhead, or another piece of equipment. The closing speed is to be controlled by the sweep and the latch mechanisms. Routine adjustments to the closer shall be capable without requiring the closer to be removed from the door assembly.

3.4.3 Light assembly. When specified (see 6.2), the door assembly shall be provided with a clear glass light assembly with the following characteristics:

- Minimum viewing area of the glass shall be 12.56 square inches.
- The light assembly design shall allow for easy replacement of the light.
- The center of the light assembly shall be located vertically 55 inches above the bottom of the door panel and horizontally centered on the door panel.

3.4.4 Sealing mechanism. The door assembly shall be supplied with a means of sealing the door panel/frame interface with the door panel in the closed position. The fire zone door assembly shall not allow for passage of flame, air, or smoke with the door panel in the closed and latched position. The sealing mechanism shall be adjustable ± 0.5 inch (normal to the clear opening) to accommodate variations in local bulkheads. If an intumescent material is used to provide sealing performance when subjected to high temperature fire, that material shall be in a recess or channel to prevent damage caused by hard objects being carried through the door by shipboard personnel.

3.4.5 Special tools. Fire zone doors shall be designed so that special tools are not required for installation and maintenance. Special tools are defined as those tools not listed in the Federal Supply Catalog.

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3.5 Physical requirements.

3.5.1 Edges. Exposed burrs and raw or sharp edges on doors and frames which might be injurious to personnel shall be removed.

3.5.2 Finish. The finish (including color) of the fire zone door panels and frames shall be as specified in the contract or order (see 6.2).

3.5.3 Identification plate. Each fire zone door assembly shall be supplied with an identification plate affixed to the door panel by double-back tape. The identification plate shall be 3¼ inches high by 5 inches wide. The identification plate shall be in accordance with the requirements of MIL-DTL-15024, Type H. Lettering shall be 5/32 inch high. Spacing between text lines shall be 7/16 inch. Double-back tape shall cover the entire face of the identification plate. Each identification plate shall list the following information:

- a. Specification number.
- b. Part or identifying number (PIN).
- c. Manufacturer name.
- d. Date manufactured.

3.6 Performance requirements.

3.6.1 Endurance. The fire zone door assembly, with the lock or latch assembly removed, shall be capable of withstanding a minimum of 1,000,000 closed-to-open-to-closed cycles with the automatic closing device set at its highest resistance level and with no adjustments allowed.

3.6.2 Closure speed. The sweep shall control the initial 70 to 75 degrees of the door's closing and shall be adjusted to reach this location within 3 seconds. The latch shall control the final 15 to 20 degrees of the door panels' closing and latching. The panel shall reach the closed and latched position in 1 to 2 seconds once the latch control engages. The transition from fully open to the closed and latched position shall be smooth with no perceivable bounce at the point of speed change.

3.6.3 Force to open. The force perpendicular to the door panel required to open the door shall not exceed 17 pounds.

3.6.4 Closure force. The closer shall not prevent the door from traveling from fully closed to open (90 degrees) within 2 seconds. The closer shall provide a force sufficient to close and latch the fire zone door when the door assembly is positioned to a list angle of 3.5 degrees opposing the closer direction within 5 to 7 seconds.

3.6.5 Shock resistance. The entire fire zone door assembly shall be capable of withstanding Grade A shock in accordance with MIL-S-901, medium weight shock test, Class I, hull mounted, front or face mounting plane requirements.

3.6.6 Vibration resistance. The entire fire zone door assembly shall be capable of withstanding shipboard vibration in accordance with MIL-STD-167-1, Type I vibration.

3.6.7 Moisture and water resistance. Neither the door material nor the insulating material (if any) will degrade when exposed to water or moisture. The materials will continue to be able to provide the same level of fire protection after exposure to water or moisture. Absorbent materials which encourage the growth of mold shall not be used.

3.6.8 Fire resistance. When tested in accordance with 4.6.6.2, the entire fire zone door assembly shall be capable of preventing passage of hot gases, smoke, and flames on the unexposed surface for 30 minutes. The fire resistance performance rating for a fire zone door is N-30, as defined in MIL-STD-3020. The door shall be capable of preventing an average unexposed surface temperature rise of 250 °F (139 °C) and the temperature rise at any point on the unexposed surface not exceeding 325 °F (181 °C) above the initial temperature for the 30 minute test period. The specimen is considered to have satisfied the criteria of the hose stream test if no openings develop during the application of the stream which allows water to pass to the unexposed face.

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3.6.9 Surface flammability. The door assembly shall have a flame spread index less than or equal to 25, and a smoke developed index less than or equal to 50 when tested for surface flammability in accordance with ASTM E84.

3.6.10 Smoke toxicity. The door assembly shall meet all of the smoke toxicity requirements below. Tests shall be conducted in accordance with ASTM E662 and ASTM E800 in both flaming and non-flaming modes.

- a. Carbon monoxide (CO): 600 parts per million (ppm) (max)
- b. Hydrogen chloride (HCl): 30 ppm (max)
- c. Hydrogen cyanide (HCN): 30 ppm (max)
- d. Fire Gas IDLH (Immediately Dangerous to Life or Health) Index, IDLH < (less than) 1
- e. When candidate materials have a potential for significant concentrations of other toxic fire gases, those gases shall be included in the Fire Gas IDLH Index.

IDLH index calculation shall be in accordance with guidance provided in DDS-078-1.

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).

TABLE II. Examinations and inspections.

Test requirement	Requirement paragraph	Verification paragraph	First article	Conformance
Examination	3.1 through 3.5.3	4.4	X	X
Operational test	3.1, 3.6.2 through 3.6.4	4.6.1	X	X
Inclined operation test	3.1 and 3.6.3	4.6.3	X	
Cycle test	3.1 and 3.6.1	4.6.2	X	
Shock test	3.1 and 3.6.5	4.6.4	X	
Vibration test	3.1 and 3.6.6	4.6.5	X	
Fire test	3.1 and 3.6.	4.6.6.2	X	
Surface flammability test	3.1 and 3.6.	4.6.6.3	X	
Smoke toxicity test	3.1 and 3.6.	4.6.6.4	X	

4.2 First article inspection. When specified (see 6.2), first article tests and inspection shall be performed on a complete fire zone door assembly. The inspection shall include the examination of 4.4 and the tests of 4.6.1 through 4.6.6.4.

4.3 Conformance inspection. Conformance inspections shall include the examination of 4.4 and the test of 4.6.1.

4.4 Examination. Each fire zone door assembly shall be examined for compliance with the requirements specified in 3.1 through 3.6. Redesign or modification of the contractor's standard product to comply with specified requirements or any necessary redesign or modification following failure to meet the specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional requirements. Non-compliance with any specified requirement shall constitute cause for rejection.

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4.5 Inspection.

4.5.1 Methods of inspection. To complete first article test requirements, two fire zone door assemblies shall be tested, identified herein as Assembly A and Assembly B. Assembly A shall be tested in accordance with paragraphs 4.6.1, 4.6.2, and 4.6.3. Assembly B shall be tested in accordance with 4.6.4, 4.6.5, and 4.6.6.2, in that order. Representative samples of the fire zone door assembly shall be used for testing in accordance with 4.6.6.3 and 4.6.6.4. These different tests can occur simultaneously. Assemblies to be tested shall contain a light assembly, and be identical in configuration and construction. Tests identified in 4.6.4 through 4.6.6.4 shall be conducted by a certified independent test facility.

4.5.2 Materials and construction. Conformance shall be determined by examination for the defects listed in [table III](#). All doors presented for delivery at one time shall be considered a lot. The sample size of acceptable major and minor defects is shown in [table IV](#). No major defects are allowed. The number of minor defects is shown in [table IV](#). If an unacceptable amount of minor defects are found in any lot, the entire lot shall be rejected.

TABLE III. Classification of defects.

Category	Defect	Method of Examination
Major		
101	Dimensions affecting interchangeability, out of tolerance	SIE ^{1/}
102	Failure to meet any test acceptance criteria	As specified (see 4.6)
Minor		
201	Dimensions not affecting interchangeability, out of tolerance	SIE
202	Nonconformance in design or construction	Visual and SIE
203	Weight not as specified	SIE
204	Improper finish, color or application	Visual
205	Improper marking or identification plates	Visual
206	Logistics support documentation inaccurate or incomplete	Visual
NOTE: ^{1/} SIE = Standard inspection equipment.		

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TABLE IV. Conformance inspection/verification sampling.

Lot size	Sampling size
1 to 8	3
9 to 25	5
26 to 40	7
41 to 65	10
66 to 110	15
111 to 300	25
301 to 500	35
501 to 800	50

4.6 Tests.

4.6.1 Operational test. A complete door assembly shall be operationally tested to verify the requirements defined in 3.6.2 through 3.6.4. The panel shall be opened 90 degrees from a closed position in no more than 2 seconds. The force to open the door shall be measured perpendicular to the door panel. This opening force shall not exceed the specified value. The panel shall then be released by the test actuator and closed, solely due to the closer. The time to reach the initial 70 to 75 degrees of the door's closing shall be no more than 3 seconds. The additional time to reach the full closed and latched position shall be no more than 2 seconds. The transition from fully open to the closed and latched position shall be smooth with no perceivable bounce at the point of speed change.

4.6.2 Cycle test. Cycle testing shall take place in a controlled environment to verify the requirements defined in 3.6.1. Adjustments to any part of the door assembly during any part of this test are prohibited. Cycle testing will consist of a testing device that will allow the mounting of the door frame into a fabricated bulkhead equipped with mechanical devices necessary to swing open the door panel 90 degrees from a closed position and then back to the fully closed position due to the mechanical action of the closer. One cycle is defined as the panel traveling from the fully closed position to fully open position and back to the fully closed position. The door panel latch or lock set hole shall be covered up with a rigid plate during this test.

4.6.3 Inclined operation test. The closer shall be tested with the door assembly positioned to a list angle of 3.5 degrees opposing the closer direction to verify that the closer shall close and latch the fire zone door within the specified time.

4.6.4 Shock test. A complete door assembly shall be tested to the medium weight shock test, Grade A, Class I, hull mounted, front or face mounting plane requirements in accordance with MIL-S-901. The shock testing shall take place in one of the approved facilities in accordance with NAVSEAINST 9491.1. The door shall remain latched throughout the test, shall not open at any time, and no parts or piece parts shall disengage themselves from the assembled door during any part of the testing.

4.6.5 Vibration test. A complete door assembly shall be tested in accordance with MIL-STD-167-1, Type I vibration (see 3.6.6). An exploratory vibration test, variable frequency test, and endurance test shall be performed. One test shall be run to its completion before the next test begins.

4.6.6 Fire test.

4.6.6.1 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 6.6).

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4.6.6.2 Fire resistance test. The fire resistance test shall be performed on the same door that has successfully passed the shock and vibration tests of 4.6.4 and 4.6.5. The fire test shall be performed in one of the approved facilities. The fire resistance test shall be performed in accordance with fire resistance test methods of MIL-STD-3020 with the bulkhead/door assembly test configuration of MIL-STD-3020. After the fire exposure period, the door shall be subjected to a hose stream test conducted in accordance with MIL-STD-3020.

4.6.6.3 Surface flammability. A fire zone door assembly shall be tested for surface flammability in accordance with ASTM E84. Flame spread index shall be less than or equal to 25; smoke developed index shall be less than or equal to 50.

4.6.6.4 Smoke toxicity. A sample representing the thickness and cross sectional construction of the door leaf, and also meeting the size requirements of the test procedure, shall be tested for smoke toxicity in accordance with ASTM E662 and ASTM E800. CO shall be no more than 600 ppm, HCl shall be no more than 30 ppm, HCN shall be no more than 30 ppm, and IDLH Index shall be less than 1.

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.

6. NOTES

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

6.1 Intended use. The fire zone doors covered under this specification are intended for internal shipboard use where fire zone boundaries are located, ingress/egress through the bulkhead is required, and the bulkhead is considered non-structural. Doors meeting this specification may be used in fire zone boundaries designated as N-0 or N-30 in accordance with MIL-STD-3020. Fire zone door assemblies are typically operated (opened and closed) manually thousands of times a day.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Quantity required.
- c. Part or identifying number (PIN) (see 1.3).
- d. When first article is required (see 3.1).
- e. Light assembly requirements (see 3.4.3).
- f. Finish requirements (see 3.5.2).
- g. When first article inspection is required (see 4.2).
- h. Packaging requirements (see 5.1).
- i. Additional fire testing provisions (see 4.6.6.1 and 6.6).

6.3 Technical documentation. The requirement for technical documentation should be considered when this specification is applied on a contract. Technical documentation, including assembly drawings identifying parts being used with dimensions and tolerances required for dimensional examination and installation instructions of a lifeline strength member to Navy ships should be included in the contract for delivery with each order of assemblies. Drawing types should be in accordance with ASME Y14.24 and drawing practices should be in accordance with ASME Y14.100.

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6.4 First article inspection. First article testing is required on the first acquisition of an item from a given manufacturer to ensure that the item meets the requirements of section 3. The first article should consist of one unit. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitation 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.

6.5 Test reporting. A report covering data on all testing performed should be submitted for Government review if required by the contract. The test reports should accompany any proposal. The report should contain the test results for each test, required by this performance specification, forwarded as PDF files attached to the report, that were provided by the independent testing facility that actually performed the testing. The report should contain the solicitation number and a statement that identifies the purpose and applicability of this certification. It should clearly state the degrees of compliance achieved for all processes/tests required by this specification. The report should certify the completion of tests performed, and that specific qualifications have been obtained. The report should certify that the supporting documentation has been reviewed and approved by an authorized Government representative.

6.6 Additional fire testing provisions. NAVSEA 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.

6.7 Subject term (key word) listing.

Fire resistant

Flush mounted

Interior

Manually operated

Self closing

Swing type

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Custodians:

Navy – SH
Air Force – 99

Preparing Activity:

Navy – SH
(Project 2040-2010-004)

Review Activities:

Navy – AS
DLA – CC

Civil Agency:

GSA – FAS

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