

INCH-POUND

MIL-DTL-32238(AS)
15 March 2007

DETAIL SPECIFICATION

EXTINGUISHER, FIRE, HALOCARBON (HFC-236fa), PORTABLE,
WITH MOUNTING BRACKET, FOR AVIATION USE

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

1. SCOPE

1.1 Scope. This specification covers the requirements and test methods for a hand-held rechargeable fire extinguisher containing 2.5 pounds of halocarbon HFC-236fa and a mounting bracket.

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 and standards. The following specifications and standards 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.

Comments, suggestions, or questions on this document should be addressed to: Commander, Naval Air Warfare Center Aircraft Division, Code 491000B120-3, Highway 547, Lakehurst, NJ 08733-5100 or emailed to thomas.omara@navy.mil. 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>.

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FEDERAL STANDARD

- FED-STD-595 - Colors Used in Government Procurement: color 11105

DEPARTMENT OF DEFENSE SPECIFICATION

- MIL-L-85762 - Lighting, Aircraft, Interior, Night Vision Imaging System (NVIS) Compatible

(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, Bldg 4D, Philadelphia, PA 19111-5094.)

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 SOCIETY FOR QUALITY (ASQ)

- ANSI/ASQ-Z1.4 - Sampling Procedures and Tables for Inspection by Attributes

(Copies of the above publication are available from the American Society for Quality, P.O. Box 3005, Milwaukee, WI 53201-4606 or <http://www.asq.org>.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) INTERNATIONAL

- ASTM-B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus. (DoD Adopted)
- ASTM-D6541 - Standard Specification for HFC-236fa, 1,1,1,3,3,3-Hexafluoropropane (CF₃CH₂CF₃)

(Copies of the above publications are available from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or <http://www.astm.org>.)

UNDERWRITERS LABORATORY

- UL711 - Fire Extinguisher, Rating and Fire Testing of. (DoD Adopted)
- UL2129 - Standard for Halocarbon Clean Agent Fire Extinguishers. (DoD Adopted)

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(Copies of the above standards are available from Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096 or 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, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

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

3.2 Materials. Unless otherwise specified, the extinguisher shall meet the requirements of UL2129.

3.2.1 Extinguishant. Each extinguisher shall be charged with 2.5 pounds (lb), +2 ounces, -0 ounces of halocarbon (HFC-236fa) as specified in UL2129 or ASTM-D6541 and pressurized to 125 pounds per square inch (psi) by adding the nitrogen gas specified in UL2129.

3.2.2 Cylinder. The cylinder shall be constructed from an aluminum, steel, or stainless steel alloy that meets all the requirements of this specification.

3.2.2.1 Cylinder age. Fire extinguisher cylinders delivered to the Government shall be not older than one year from the date of manufacture to the date received by the procuring activity.

3.2.3 Mounting bracket. The mounting bracket shall be constructed of materials that meet the applicable requirements of this specification.

3.3 Design and construction.

3.3.1 Extinguisher. Unless otherwise specified herein, the fire extinguisher assembly design and construction shall conform to UL2129. The weight of fire extinguisher assembly shall be not greater than 9 lb.

3.3.1.1 Pressure gauge. The fire extinguisher shall be equipped with a pressure gauge to indicate the pressure in the cylinder. The gauge face shall be divided into 3 zones by color (red/green/red) and shall be in accordance with UL2129. The acceptable operating pressure range shall be indicated when the gauge needle is in the green zone. Low or high pressure shall be indicated when the needle is in that respective red zone.

3.3.1.2 Locking pin and seal. The operating mechanism of the extinguisher shall be supplied with a corrosion resistant locking pin that is attached to the valve handle with a chain or

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similar device to prevent loss of the pin. A plastic locking pin retainer shall be included that prevents tampering with the extinguisher and breaks off upon removal of the locking pin prior to operating the extinguisher.

3.3.2 Mounting bracket. The bracket design shall permit flush mounting to the bulkhead (see figure 1). Each bracket shall be interchangeable with any extinguishers approved under this specification without causing any visible damage. When properly installed on the mounting bracket, the cylinder shall not contact the mounting fasteners. Additionally, the cylinder shall not be in contact with raised areas or edges on the bracket that cause gouging or wear on the cylinder wall.

3.3.2.1 Mounting bracket fastening mechanism. The mechanism shall represent the simplest design consistent with the easy removal of the extinguisher from any mounted position. The unfastening process shall not require more than two motions and the use of one hand to release the extinguisher whether or not the user is wearing heavy gloves or arctic mittens. All moveable parts shall remain attached to the bracket to prevent foreign object damage. Once unfastened, the bracket parts shall not interfere with quick removal of the extinguisher from any position. The overall assembly design shall permit the operator to remove the extinguisher by lifting the cylinder not greater than 0.50 inch away from the bracket base and then away from the bracket.

3.3.3 Dimensions. Dimensions shall be as specified on figure 1.

3.4 Exterior surface treatments. All exterior metal surfaces shall be treated to resist atmospheric corrosion. Coatings containing cadmium, lead, or chromium shall not be used. The fire extinguisher cylinder, handle, lever and bracket shall conform to FED-STD-595, color number 11105, or other red color approved by the Naval Air Systems Command. The valve body and nozzle shall be black. Color samples shall be approved the Naval Air Systems Command.

3.4.1 Night vision imaging system (NVIS) compatibility. When finish materials are illuminated with NVIS compatible lighting as specified in 4.5.13, the resulting emissions shall be not greater than the NVIS radiance limits of MIL-L-85762 before or after environmental tests.

3.5 Performance characteristics. Unless otherwise specified, the fire extinguisher shall meet the requirements of UL2129 and the following performance characteristics.

3.5.1 Performance rating. The fire extinguisher shall have an extinguishing performance rating equal to 2B:C in accordance with UL711.

3.5.1.1 Extinguishments. Conditioning and testing shall be in accordance with UL711 and 4.5.3. No greater than five extinguishing attempts for each condition shall be allowed to demonstrate the two successive extinguishments.

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3.5.2 Fragmentation resistance. The fire extinguisher cylinder shall remain unshattered and in one piece, when tested in accordance with 4.5.4.

3.5.3 Crash retention. The bracket shall retain the extinguisher under the loading conditions specified in 4.5.5.

3.5.4 Operation and angle of discharge. The fire extinguisher, when operated at an angle of 70 degrees from the vertical, shall discharge at least 90 percent (by weight) of the rated capacity of the clean agent, when tested as specified in 4.5.6.

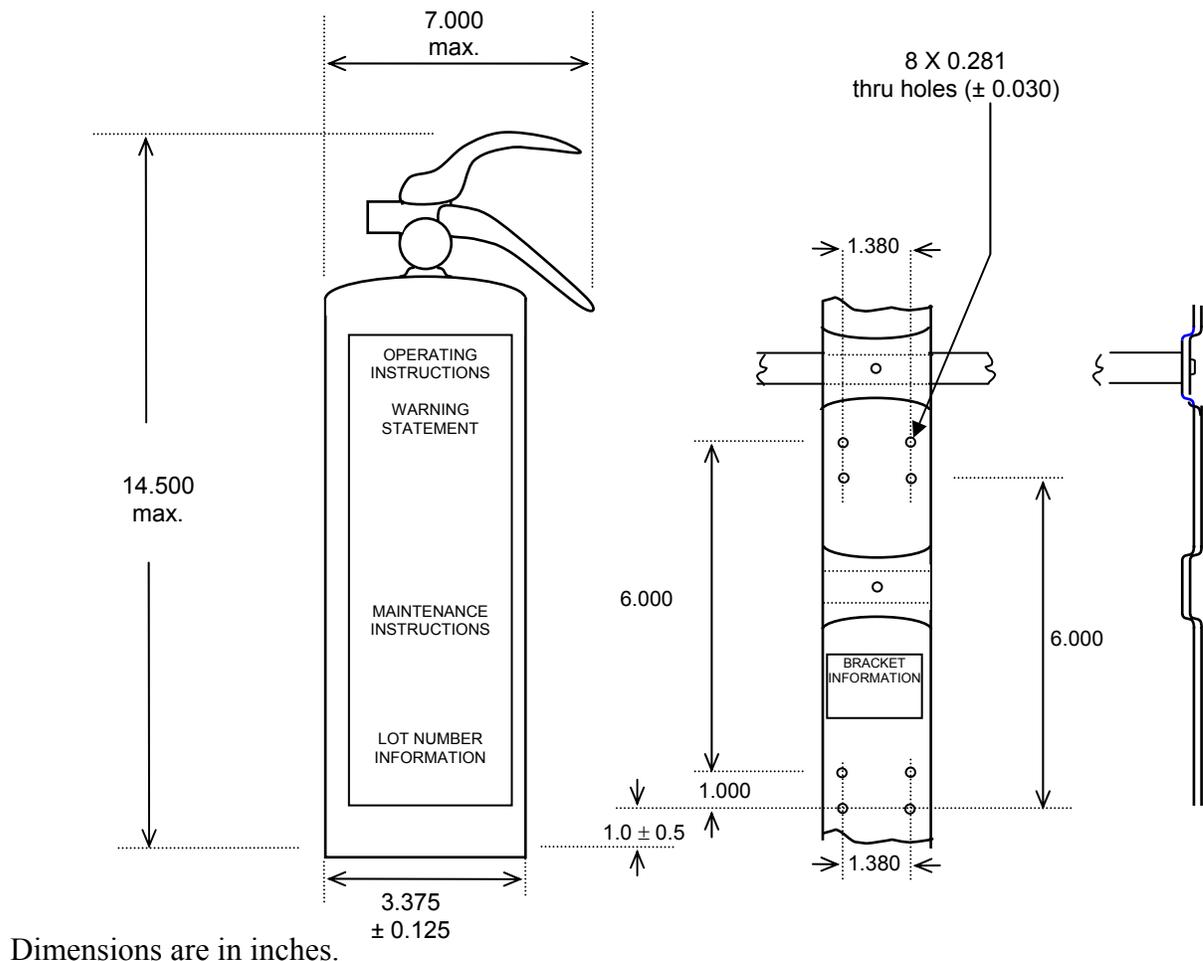


FIGURE 1. Fire extinguisher and mounting bracket.

3.5.5 Discharge duration. The duration of effective discharge, as specified by UL2129, shall be not less than 8 seconds at 70 °F (21 °C) and not less than 6 seconds at -40 °F (-40 °C), when tested as specified in 4.5.7.

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3.5.6 Operating temperature limit and discharge range. There shall be no leakage from the fire extinguisher during the conditioning cycles, when tested in accordance with 4.5.8. The fire extinguisher shall discharge not less than 90 percent (by weight) of the rated capacity of the clean agent with a discharge range of not less than 4 feet, when tested immediately after each conditioning cycle specified in 4.5.8.

3.5.7 Temperature cycling. After testing as specified in 4.5.9, the extinguisher shall not show any leakage and shall discharge not less than 90 percent by weight of the halocarbon.

3.6 Salt fog. The fire extinguisher assembly (fire extinguisher and bracket) finish shall provide substrate corrosion resistance. All parts of the assembly, including the finish shall demonstrate compliance with UL2129 subsequent to the testing in accordance with 4.5.10.

3.7 Rough usage. The fire extinguisher shall meet the rough usage requirements of UL2129, when tested in accordance with 4.5.11.

3.8 Vibration. The fire extinguisher and bracket shall meet the vibration requirements of UL2129, when tested in accordance with 4.5.12.

3.9 Identification and instructions. A permanent label shall be affixed to the cylinder as shown on figure 1 in accordance with UL2129 and 3.9.1 through 3.9.4, herein. The bracket shall be labeled as specified in 3.9.4.

3.9.1 Operating instructions and warning statement. Operating instructions and a warning statement shall contain the information below in the sizes indicated. The text shall be permanent and legible.

<u>Letter size (inch)</u>	<u>Label information</u>
3/16	EXTINGUISHER, FIRE, HALOCARBON (HFC-236fa) 2.5 LB, 2B:C (Insert use code symbol pictographs for Class B, Class C rating. See UL2129)
3/16	TO OPERATE:
5/32	1. Pull locking pin. (Insert pictograph)
5/32	2. Point extinguisher to base of fire. (Insert pictograph)
5/32	3. Depress push lever for discharge and sweep side to side. (Insert pictograph)
	WARNING:
3/16	1. The concentrated agent when applied to fire can produce toxic by-products.
5/32	Avoid inhalation of these materials by evacuating and ventilating the area. Do not use in confined spaces less than 38.5 cubic feet per extinguisher.

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- 5/32 2. Avoid contact with skin or clothing.
 5/32 3. Do not direct discharge toward face.

3.9.2 Maintenance instructions and logistics information. Maintenance instructions and logistics information shall be placed below the operating instructions and shall contain the following information:

<u>Letter size (inch)</u>	<u>Label information</u>
3/16	FOR MAINTENANCE
3/16	CYLINDER (Material: aluminum, steel or stainless steel)
3/32	NATIONAL STOCK NUMBER (NSN)
3/16	MANUFACTURER'S PART NUMBER _____
7/64	Replace with a charged extinguisher, manufacturer's part number _____, immediately after use or 12 years after date of manufacture.
5/64	Visually inspect extinguisher every six months. Replace if mechanical damage is found or if indicated pressure is not in the proper range.
3/32	MANUFACTURER'S NAME AND CAGE CODE
3/32	EXTINGUISHER GROSS WEIGHT _____ LB _____ OZ
3/32	Intended expellant gas pressure: 125 PSI
7/64	Property of the U.S. Government

3.9.3 Lot number information. A permanent label containing the lot number and contract number information shall be affixed to the cylinder in the sizes indicated below:

<u>Letter size (inch)</u>	<u>Label information</u>
3/32	CONTRACT NUMBER
3/32	LOT NUMBER
3/32	DATE OF MANUFACTURE MONTH____ YEAR____

3.9.4 Mounting bracket label. The mounting bracket shall have a permanently affixed label with the following information in the indicated size:

<u>Letter size (inch)</u>	<u>Label information</u>
3/32	FIRE EXTINGUISHER BRACKET
3/32	Component of PART NUMBER _____ extinguisher assembly.

3.10 Workmanship. The fire extinguisher and bracket assembly shall be uniform in quality and shall be free from irregularities, defects, or foreign matter that could affect safety, performance, reliability, or durability.

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4. VERIFICATION

4.1 Classification of inspection. The examination and testing of the fire extinguisher assembly shall be 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 consist of examinations and tests specified in this specification, and shall be performed on samples from the same production lot, when specified (see 6.2). Failure of any examination or test shall result in first article disapproval.

4.3 Conformance inspection. Conformance inspection shall consist of the tests and examinations specified in tables I and II. Unless otherwise specified, testing shall be done at the test conditions specified in 4.4.

4.3.1 Sampling for conformance tests. Sampling for tests shall be four extinguishers selected at random from the lot offered for inspection.

4.3.2 Sampling for conformance examinations. Unless otherwise specified in table II, the sampling and inspection levels shall conform to ANSI/ASQ-Z1.4, inspection level S-1. There shall be no defects.

TABLE I. Conformance tests.

Requirement	Requirement Paragraph	Inspection Paragraph	Applicable Test Method
Operation and angle of discharge	3.5.4	4.5.6	UL2129
Discharge duration	3.5.5	4.5.7	UL2129

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TABLE II. Visual conformance examinations.

Requirement	Requirement Paragraph	Inspection Paragraph	Applicable Test Method
Dimensions	Figure 1	4.5.1	
Extinguisher charged weight	<u>1</u> /	<u>1</u> /	
Visual examination	3.3.1 through 3.3.2	4.5.2	UL2129
Extinguisher label	3.9.1 3.9.2 3.9.3	4.5.2	
Mounting bracket label	3.9.4	4.5.2	
Workmanship	3.10	4.5.2	

1/ 100 percent inspection. Charged weight of each extinguisher shall be compared to that recorded on the label. The mounting bracket is not to be included in this weight. Any underweight/overweight cylinder may be resubmitted after weight adjustment.

4.4 Test conditions. Unless otherwise specified in the test method, tests shall be conducted at room temperature (70 \pm 4 °F [21.1 \pm 2 °C]) and relative humidity of 50 \pm 10 percent.

4.5 Test methods.

4.5.1 Assembly. The fire extinguisher assembly shall be inspected for conformance to the dimensions on figure 1.

4.5.2 Visual examination. The fire extinguisher shall be examined visually to determine conformance to 3.3.1.1, 3.3.1.2, 3.3.2, and 3.3.2.1.

4.5.3 Extinguishment. Fire extinguishers shall be tested for conformance to 3.5.1.1 as specified for B:C fires in UL711 immediately after each conditioning cycle and in the pan size indicated below:

- a. -65 °F (-55 °C) for 16 hours, then warmed to -40 °F (-40 °C). Pan size 2 square feet (sq. ft.).
- b. 70 °F (21.1 °C) for 24 hours. Pan size 5 sq. ft.
- c. 175 °F (79.5 °C) for 4 hours and cooled to 120 °F (49 °C). Pan size 2 sq. ft.

4.5.4 Fragmentation resistance. Fully charged extinguishers in their brackets shall be struck in the center of the cylinder with a .30 caliber armor piercing cartridge M2 at a projectile muzzle velocity of 2,765 feet/second. Unless otherwise specified by the test facility, the cylinder shall be mounted in its bracket, which shall be securely mounted using its mounting hardware, at

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a distance of 20 ± 5 feet from the gun muzzle (firing mechanism), and then impacted with fully tumbled projectiles. The test shall be conducted at ambient temperature. A separate cylinder and mounting bracket shall be used for each test, as follows:

- a. With a longitudinal axis of the cylinder normal to the line of fire. Point of entry not through the bracket.
- b. With the longitudinal axis of the cylinder 45 degrees from the normal toward the gun (firing mechanism) position and the outlet port (neck) of the cylinder facing away from the weapon.
- c. With the longitudinal axis of the cylinder parallel to the line of fire with outlet port (neck) facing away from the gun (firing mechanism).
- d. With the longitudinal axis of the cylinder normal to the line of fire. The fully tumbled projectile shall penetrate (enter) through the back of the bracket.

4.5.5 Crash retention. Using a different bracket for each direction, the extinguisher shall be subjected to a static loading of 20 times its weight in the downward, upward, lateral, and forward directions to determine conformance to 3.5.3.

4.5.6 Operation and angle of discharge. The fire extinguisher shall be tested for proper operation after it is charged with the rated capacity and conditioned at 70 ± 4 °F (21.1 ± 2 °C) for at least 16 hours. The fire extinguisher shall be tested in accordance with UL2129, except that the extinguisher shall be operated at an angle of 70 degrees from the vertical, in the forward, back, and side orientations. In addition, the fire extinguisher shall be operable by personnel wearing arctic gloves.

4.5.7 Discharge duration. Discharge duration shall be performed on 2 extinguishers in accordance with UL2129. One extinguisher shall be conditioned at -65 ± 4 °F (-55 ± 2 °C) for not less than 16 hours, then warmed to -40 °F (-40 °C) and immediately discharged. The second cylinder shall be conditioned at 70 ± 4 °F (21.1 ± 2 °C) for not less than 16 hours prior to immediate discharge. The duration of effective discharge shall meet the requirements of 3.5.5.

4.5.8 Operating temperature limit test and discharge range. One fire extinguisher, charged to its rated capacity, shall be used for each of the conditioning cycles below. Prior to conditioning, each extinguisher shall be weighed.

- a. -65 ± 4 °F (-55 ± 2 °C) for 16 hours, then warmed to -40 ± 4 °F (-40 ± 2 °C).
- b. 175 ± 4 °F (79.5 ± 2 °C) for 4 hours, then cooled to 150 °F (65.5 °C).

After the conditioning period, each extinguisher shall be immediately re-weighed then held with the nozzle in a horizontal position and tested in accordance with UL2129 for conformance to 3.5.6.

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4.5.9 Temperature cycle. A fully charged, weighed extinguisher shall be subjected to temperature cycling as follows (transfer from one temperature environment to the next shall be immediate):

- a. A minimum of 24 hours at -65 ± 4 °F (-55 ± 2 °C).
- b. A minimum of 24 hours at 150 ± 2 °F (65.5 ± 1 °C).
- c. A minimum of 24 hours at -65 ± 4 °F (-55 ± 2 °C).
- d. The extinguisher shall then be conditioned at 70 ± 4 °F (21 ± 2 °C) for 16 hours.

Immediately after the last temperature cycle, the extinguisher shall be checked for leakage by reweighing and then discharged to determine conformance to 3.5.7.

4.5.10 Salt fog. A fully charged fire extinguisher and bracket assembly shall be tested for corrosion resistance in accordance with UL2129, except the test procedure shall use a 5 percent by weight of sea salt solution for 500 hours in accordance with ASTM-B117, to determine conformance to 3.6. After the conditioning period, the extinguisher shall be discharged.

4.5.11 Rough usage. The fire extinguisher shall be tested in accordance with UL2129 for rough use.

4.5.12 Vibration. The fire extinguisher and bracket shall be tested in accordance with UL2129 for vibration.

4.5.13 NVIS radiance test. The government shall perform the radiance test in accordance with MIL-L-85762 to determine compliance with the requirement in 3.4.1.

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.)

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6.1 Intended use. The fire extinguishers covered by this specification are used to extinguish petroleum and electrical fires in crew compartments of aircraft, particularly tactical military aircraft, and for general use outside the aircraft (remote tactical landing locations). In addition, the extinguisher assembly possesses gunfire resistance, fragmentation resistance, and crash integrity. The halocarbon materials covered by this specification are considered clean agents.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. Number of extinguishers with mounting bracket required.
- c. Whether first article inspection (partial or entire) is required or waived (see 3.1 and 4.2).
- d. Name and address of the first article inspection laboratory and the name of the Government Activity responsible for conducting the first article test program.
- e. Name and address of the inspection facility designated to perform the fragmentation test (see 4.2).
- f. Packaging requirements (see 5.1).

6.3 First article. When first article is required, the item will be tested and should be a production sample. The contracting officer should include specific instructions in all acquisition instruments, regarding arrangements for examinations, tests and approval of first article.

6.3.1 First article samples. Unless otherwise specified, as soon as practicable after award of the contract or order, the manufacturer will submit first article samples as required. The samples are to be representative of the construction, workmanship, components and materials to be used during production. When a manufacturer is in continuous production of these fire extinguishers from contract to contract, submission of further first article samples may be waived at the discretion of the procuring activity (see 6.2). Approval of the first article inspection samples or the waiving of first article inspection does not exempt the extinguisher from conformance inspection. The first article inspection samples are to be furnished to the Government as directed by the contracting officer (see 6.2). The samples are to be plainly identified by securely attached tags marked with the following information:

Samples submitted by (name of manufacturer) (date) for first article inspection in accordance with the requirements of MIL-DTL-32238 under contract number _____.

Test samples and other information required must be representative of production units and must consist of the following:

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- a. Identification of material used in construction of the cylinder (see 3.2).
- b. A certified test report showing that the fire extinguisher conforms to the requirements of this specification.

6.4 Subject term (key word) listing.

Clean agent
Fire fighting equipment
Fragmentation resistance
Hand-held

Preparing activity:
Navy - AS
(Project 4210-2007-001)

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>.