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AUTHORITY

usnwc ltr, 30 aug 1974

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IDEP FORM 12-11-62



SPECIFICATION

1 of 1

1. COMPONENT/PART NAME PER GENERIC CODE Ignition Parts & Explosives, Illumination, Pyrotechnics	2. PROGRAM OR WEAPON SYSTEM BRITEYE	3. DATE OF: DAY MO YR 24 24		
	5. ORIGINATOR'S SPEC. NO. XAS 1146(R)	ISSUE	28	3 68
4. ORIGINATOR'S SPECIFICATION TITLE Candle, Illuminating, for Aircraft Flare MLU-32/B99	6. SPECIFICATION IS: <input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> PRELIMINARY <input type="checkbox"/> FINAL			

7. THIS SPECIFICATION COMPLEMENTS REPORT NO:

8. TYPE OF SPECIFICATION

<input checked="" type="checkbox"/> (A) GENERAL PRODUCT REQUIREMENTS FOR A FAMILY OF PARTS - PROCUREMENT DOCUMENT	<input type="checkbox"/> (E) SPEC. FOR PERFORMANCE, RELIABILITY, AND/OR ENVIRONMENT FOR ASSEMBLIES, EQUIPMENTS, SUBSYSTEMS AND SYSTEMS
<input type="checkbox"/> (B) INDIVIDUAL DETAIL PARTS DOCUMENT; STDS BOOK PAGES - FOR PROCUREMENT	<input type="checkbox"/> (F) PERFORMANCE AND APPLICATION DATA FOR DESIGN ENG. USE ON PARTS - NOT FOR PROCUREMENT
<input type="checkbox"/> (C) DETAIL INSPECTION, PROCESS CONTROL, AND/OR TEST PROCEDURES FOR SPECIFIC PARTS	<input type="checkbox"/> (G) OTHER (DETAIL IN 10.)
<input type="checkbox"/> (D) PROCESS (PAINTING, WELDING, FINISHING, HEAT TREATING ETC.) APPLICABLE TO MANY PARTS	

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Officer-in-Charge (Code E-6)
U. S. Naval Fleet Missile Systems
Analysis & Evaluation Group
Corona, California 91720
Attn: IDEP Office

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11. SIGNED M. H. Sloan	12. CONTRACTOR NWC/CL	SUBCONTRACTOR
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Code Ident
30003

XAS 1146(R)

NAVAL AIR SYSTEMS COMMAND

DEPARTMENT OF THE NAVY

PURCHASE DESCRIPTION

CANDLE, ILLUMINATING

FOR AIRCRAFT FLARE, MLU-32/B99

Approved: 28 March 1968



By direction

RECORD OF REVISIONS		
Revision Letter	Date	Changes

This document consists of pages 1 to 11
and 1 to 15 inclusive.

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FSC 1370

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Code Ident
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XAS 1146(R)

NAVAL AIR SYSTEMS COMMAND

DEPARTMENT OF THE NAVY

PURCHASE DESCRIPTION

CANDLE, ILLUMINATING

FOR AIRCRAFT FLARE, MLU-32/B99

1. SCOPE.

1.1 Scope. This purchase description covers the minimum requirements for one type of illuminating candle referred to herein as the "candle".

2. APPLICABLE DOCUMENTS.

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this document to the extent specified herein.

SPECIFICATIONS

Military

ML-T-18303

Test Procedures, Preproduction, Acceptance, and Life for Aircraft Electronic Equipment, Format for.

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MIL-I-45607

Inspection Equipment, Supply and Maintenance, for Ordnance.

MIL-C-45662

Calibration System Requirements.

STANDARDS

Military

MIL-STD-129

Marking for Shipment and Storage.

MIL-STD-414

Sampling Procedures and Tables for Inspection by Variables for Percent Defective.

MIL-STD-453

Inspection, Radiographic.

MIL-STD-810

Environmental Test Methods.

MIL-STD-831

Test Reports, Preparation of.

MIL-STD-1167

Ammunition Data Card.

MIL-STD-1168

Lot Numbering of Ammunition.

DRAWINGS

Naval Air Systems Command
(Code Ident 30003)

X67A82D812

Candle, Illuminating.

SA 2762101

Aircraft Vibration Fixture for Candle and Suspension Assembly, Aircraft Flare MLU-32/B99.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

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2.2 Other publications. The following documents form a part of this document to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

Code of Federal Regulations

14 CFR Part 49

Civil Aviation: Transportation of Explosives and Other Dangerous Articles.

46 CFR Part 146

Shipping: Transportation or Storage of Explosives and Other Dangerous Articles or Substances, and Combustible Liquids on Board Vessels.

49 CFR Parts 71-78

Transportation: Interstate Commerce Commission Rules and Regulations for the Transportation of Explosives and Other Dangerous Articles.

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.)

NAD Crane Research Development
Technical Report

RDTR No. 38

General Description of MAPI Data Acquisition Systems.

(Application for copies should be addressed to Commanding Officer, U.S. Naval Ammunition Depot (Code RD), Crane, Indiana 47522.)

3. REQUIREMENTS.

3.1 Preproduction sample. Unless otherwise specified in the contract or purchase order, a preproduction sample of 30 candles shall be delivered to the activity designated for preproduction testing. The preproduction sample shall be manufactured using the same methods, processes, materials, and procedures proposed for production. Any production prior to acceptance of the preproduction sample shall be at the risk of the supplier.

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3.1.1 Retest. At the discretion of the procuring activity, preproduction tests or any portion thereof shall be repeated for any of the following conditions:

- (a) The supplier has modified his product through a change of raw materials, processes, production procedures, or methods. It shall be the responsibility of the supplier to notify the procuring activity prior to the incorporation of any such changes, and to provide quantitative evidence of the effect of such changes on the performance or characteristics of the product. Requirement for such tests will be based on an evaluation of the evidence supplied (see 6.2).
- (b) Where there is evidence that the quality of the product has not been maintained. This evidence may be in the form of accumulated failure reports of the product (see 6.3.1), system failures attributable to the product, or failure of the product to pass any of the tests for quality conformance that may be conducted by or for the procuring activity (see 6.2).
- (c) Any change in design or documentation by the procuring activity (see 6.2).

3.2 Conformance to documents. Unless otherwise specified in the contract or purchase order (see 6.2), the candle shall conform to all requirements of this document and to the drawings listed on X67A82D812.

3.3 Performance characteristics.

3.3.1 The candles shall meet the following requirements:

- (a) Attain a minimum candlepower of 4.0 million within a maximum of 15 seconds (sec) after ignition.
- (b) Produce a minimum average candlepower of 4.5 million for the time period commencing when the candle first attains 4.0 million candlepower and ending when the candlepower decreases to and remains less than 4.0 million. This time period shall be a minimum of 255 sec. During this time the candlepower shall not be less than 3.5 million for longer than 10 consecutive sec.
- (c) Produce a red warning signal immediately prior to burnout for a minimum of 15 sec.

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3.4 Visual and dimensional. When tested in accordance with 4.6, the candle shall show no evidence of increment separation, cracking, or unraveling of the candle tube, and shall meet the dimensions on Drawing Xb7A52D812.

3.5 Environmental. The candle shall meet the requirements of 3.3 and 3.6 when subjected to the following environmental conditions.

- (a) Temperature shock (see 4.7.1).
- (b) Transportation vibration (see 4.7.2).
- (c) Aircraft vibration (see 4.7.3).
- (d) Handling shock (see 4.7.4).

3.6 Radiographic. When tested in accordance with 4.8, the candle shall be free from internal voids, cracks, and separations of the pyrotechnic material from the candle tube as follows:

- (a) Voids and cracks in excess of 2 inches long.
- (b) Case separations in excess of 2 square inches.
- (c) Voids and cracks in excess of 0.25 inches deep.

3.7 Temperature conditioning. When tested in accordance with 4.9 and 4.10, the 30 samples shall be temperature conditioned as follows:

- (a) Preproduction tests:
 - (1) 12 candles: - 65 degrees Fahrenheit (°F).
 - (2) 11 candles: 70°F.
 - (3) 7 candles: 160°F.
- (b) Quality conformance tests:
 - (1) 10 candles: 70°F.

3.8 MAPI. When tested in accordance with 4.10, the candle shall meet the requirements of 3.3.

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3.8.1 Chamber. When tested in accordance with 4.10.1, the candle shall not burn up the side of the tube, shall have an effective burn time of 255 sec, and shall produce a red warning signal immediately prior to burn-out for a minimum of 15 sec.

3.9 Marking. Each candle shall be legibly serialized and marked with a lot number in accordance with MIL-STD-1168.

3.10 Workmanship. The candle shall be a uniform product manufactured using good workmanship. The external finish and coatings shall be continuous, adherent, and free from all traces of pyrotechnic compounds.

4. QUALITY ASSURANCE PROVISIONS.

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this document where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Classification of tests. Inspection and testing of the candle shall be classified as follows:

- (a) Preproduction tests (see 4.3).
- (b) Quality conformance tests (see 4.4).

4.3 Preproduction tests. The preproduction tests shall be performed in accordance with Table I in the sequence shown. All candles of the preproduction sample shall be subjected to the inspections of Groups I, II, and III. The sample lot shall then be subdivided in accordance with Table I, Group IV, and subjected to the tests of Group IV.

4.3.1 Lot acceptance. All samples shall meet the tests specified in Table I, Groups I, II, III, and the performance tests of Group IV. The 25 samples subjected to the MAPI tests shall meet Single Limit Plan (Example B-2) of MIL-STD-414, Code Letter I, the Acceptable Quality Level (AQL) of 0.65 percent defective for both illumination and burn time with the following values for the lower limit (L):

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Table I. Preproduction Tests

Examination or test	Sample size	Requirement paragraph	Method paragraph	
<u>Group I</u>				
Visual and dimensional	30	3.4, 3.6, 3.9, 3.10	4.6, 4.8, 4.11	
<u>Group II</u>				
Environmental tests	30	3.5	4.7	
Temperature shock	30	3.5(a)	4.7.1	
Transportation vibration	30	3.5(b)	4.7.2	
Aircraft vibration	30	3.5(c)	4.7.3	
Handling shock	30	3.5(d)	4.7.4	
<u>Group III</u>				
Radiographic inspection	30	3.6	4.8	
<u>Group IV</u>				
Performance tests	30	3.3	4.6	
Temperature conditioning	30	3.7	4.9	
<u>MAPI</u>	<u>Temperature</u>	3.8	4.10	
Burn test	- 65°F	10	3.7(a)(1)	4.10
Burn test	70°F	10	3.7(a)(2)	4.10
Burn test	160°F	5	3.7(a)(3)	4.10
<u>Chamber</u>	<u>Temperature</u>	3.8.1	4.10.1	
Burn test	- 65°F	2	3.7(a)(1)	4.10.1
Burn test	70°F	1	3.7(a)(2)	4.10.1
Burn test	160°F	2	3.7(a)(3)	4.10.1

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- (a) Illumination: $L = 4.5 \times 10^6$ candlepower.
- (b) Burn time: $L = 255$ sec.

The five samples subjected to the chamber tests shall meet the requirements of 3.8.1. Failure of the candles to pass any of the preproduction tests shall be cause for rejection of the preproduction sample.

4.4 Quality conformance tests. The quality conformance tests shall be performed in accordance with Table II in the sequence shown in each group.

4.4.1 Production lot. Each lot shall consist of candles of a single grade and composition manufactured under essentially the same conditions and shall not exceed 300 candles.

4.4.2 Lot acceptance. All samples shall meet the requirements of Table II. The five samples subjected to the MAPI tests shall meet Single Limit Plan (Example B-2) of MIL-STD-414, Code Letter D, the AQL of 0.65 percent defective for both illumination and burn with the L values specified in 4.3.1. The five samples subjected to the chamber tests shall meet the requirements of 3.8.1.

4.5 Test provisions and conditions. Detailed test plans conforming to the requirements of MIL-T-18303 shall be submitted to the procuring activity for approval prior to commencement of testing (see 6.2). Changes in the specified provisions shall be approved by the procuring activity prior to the performance of the tests.

4.5.1 Test reports. Test reports conforming to MIL-STD-831 shall be prepared for all preproduction acceptance and quality conformance tests required by this document. Distribution of such reports shall be as specified in the contract or purchase order (see 6.2). Unless otherwise specified, test reports on lot acceptance testing shall accompany the delivered candles.

4.5.2 Test equipment. All test equipment and gages shall be supplied and maintained by the contractor as specified by MIL-I-45607. The contractor shall maintain a calibration system in accordance with MIL-C-45662.

4.6 Visual and dimensional examinations. The candles shall be examined for conformance to this document, the drawings, correct marking (see 3.9), and workmanship (see 3.10).

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Table II. Quality Conformance Tests

Examination or test	Sample size	Requirement paragraph	Method paragraph
<u>Group I</u>			
Visual and dimensional	10	3.4, 3.6, 3.9, 3.10	4.6, 4.8, 4.11
<u>Group II</u>			
Environmental	10	3.5	4.7
Temperature shock	10	3.5(a)	4.7.1
Aircraft vibration	10	3.5(c)	4.7.3
Handling shock	10	3.5(d)	4.7.4
<u>Group III</u>			
Radiographic inspection	10	3.6	4.8
<u>Group IV</u>			
Performance tests	10	3.3	4.6
Temperature conditioning	10	3.7	4.9
<u>MAPI</u> <u>Temperature</u>		3.8	4.10
Burn test 70°F	5	3.7(a)(2)	4.10
<u>Chamber</u> <u>Temperature</u>		3.8.1	4.10.1
Burn test 70°F	5	3.7(a)(2)	4.10.1

4.7 Environmental.

4.7.1 Temperature shock. When temperature-cycled three times in accordance with MIL-STD-810, Method 503, the sample, when visually inspected, shall meet the requirements of 3.5(a).

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4.7.2 Transportation vibration. The candles shall be subjected to the transportation vibration test in accordance with MIL-STD-810, Method 514, Procedure I, Curve AB, time schedule IV, and shall meet the requirements of 3.5(b).

4.7.3 Aircraft vibration. The candles shall be subjected to the aircraft vibration test in accordance with MIL-STD-810, Method 514, Class 1, Mounting B, Curve B, using test fixture, Drawing SA 2762101, and shall meet the requirements of 3.5(c).

4.7.4 Handling shock. The candles shall be subjected to the handling shock test in accordance with MIL-STD-810, Method 516, Procedure II for material under 36 inches and shall meet the requirements of 3.5(d).

4.8 Radiographic. The candles shall be radiographically inspected in accordance with MIL-STD-453 and shall meet the criteria specified in 3.6.

4.9 Temperature conditioning.

4.9.1 Low temperature test. The candles shall be conditioned in an approved chamber at -65°F for a minimum of 24 hours. The candles shall be tested within 20 minutes after removal from the conditioning chamber and shall meet the performance requirements of 3.3.

4.9.2 High temperature test. The candles shall be conditioned in an approved chamber at $+160^{\circ}\text{F}$ for a minimum of 24 hours. The candles shall be tested within 20 minutes after removal from the conditioning chamber and shall meet the performance requirements of 3.3.

4.10 MAPI burn test. The temperature-conditioned candles shall be suspended approximately 80 feet in air and ignited. The burn time and candlepower shall be determined by use of NAD Crane PDTR No. 38, dated 1 August 1966. The candles shall meet the performance requirements of 3.8.

4.10.1 Chamber burn tests. The temperature-conditioned candles shall be suspended in a well exhausted, vented chamber, ignited, and visually observed for correct burn time, warning signal burn time, and that the candles do not burn out the tube side. The candles shall meet the requirements of 3.8.1.

4.11 Packaging, packing, and marking. The candles shall be visually examined for conformance to section 5.

5. PREPARATION FOR DELIVERY.

5.1 Preservation and packaging.

5.1.1 Level A. When specified in the contract or purchase order, preservation and packaging shall be Level A for Class B explosives and shall be in accordance with the Code of Federal Regulations 14 CFR Part 49, 46 CFR Part 146, 49 CFR Parts 71-78, as applicable.

5.1.2 Level B. Not applicable.

5.1.3 Level C. Not applicable.

5.2 Packing.

5.2.1 Level A. Not applicable.

5.2.2 Level B. Not applicable.

5.2.3 Level C. Not applicable.

5.3 Marking.

5.3.1 Special marking. Special markings on exterior containers shall be in accordance with the Code of Federal Regulations 14 CFR Part 49, 46 CFR Part 146, and 49 CFR Parts 71-78, as applicable, for Class B explosives.

5.3.2 Normal marking. In addition to the markings required by the contract or purchase order, the containers shall be marked in accordance with MIL-STD-129 (see 6.2).

5.4 Data card. A data card shall accompany each serially numbered candle in accordance with MIL-STD-1167 (see 3.9).

6. NOTES.

6.1 Intended use. The candle is intended for use as a component of the MLU-32/E99 Aircraft Flare (Briteye).

6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number, and date of this document.

(b) Quantity of preproduction sample, if different from 3.1.

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- (c) Testing activity designated for preproduction testing (see 3.1).
- (d) Retest required under the provisions of 3.1.1(a) and (b) will be the supplier's responsibility and will be conducted as designated by the procuring activity without additional expense to the Government. Retest required under the provisions of 3.1.1(c) will be conducted as designated by the procuring activity at Government expense.
- (e) Exceptions to documentary compliance, if applicable (see 3.2).
- (f) Marking, in addition to 5.3.2.
- (g) Detailed test plans (see 4.5).
- (h) Test reports: requirements and distribution (see 4.5.1).
- (i) Packaging, when required (see 5.1.1).

6.3 Definitions.

6.3.1 Failure report. The failure report will give detailed description, modes, causes, and consequences of the failure. The report should contain sufficient details so that subsequent reviews will not be necessary (see 3.1.1(b)).

6.3.2 Candle. The term "candle" shall mean "illuminating candle" as depicted on Drawing X67A82D812.

6.4 General safety precautions. The loading, assembly and handling of the explosive items covered by this document, and the subassemblies thereof, involve hazardous operations and therefore require suitable safety precautions. Use of this document will not be construed as to relieve the supplier or manufacturer of responsibility for the safety of his operations. Listed below are certain minimum provisions which a supplier or manufacturer (which explosively loads the item covered) should observe in order to fulfill his responsibility for safety. At all applicable Government plants, these provisions are mandatory. Such other warnings and precautions, pertinent to the operational effectiveness or safety during use or loading of the specified items are included in the detail technical requirements of the document.

6.4.1 All loading operations should be conducted in a neat and orderly manner.

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6.4.2 Safe equipment and methods should be utilized for transporting and handling explosives and loaded parts. When performing operations, such as mixing, pouring, weighing, charging, sifting, drying, pressing, casting, crimping, etc., remote control, barricaded handling equipment shall be used.

6.4.3 Personnel handling detonators, primers, delay elements, lead-ins, boosters, and related parts which affect functioning, should avoid using bare fingers or improper equipment in order to prevent damage, corrosion, or deterioration from perspiration or other contaminating deposits.

6.4.4 In order to minimize the absorption of moisture from the atmosphere or other sources during loading and handling operations, the exposure of explosive materials shall be closely controlled.

6.4.5 All explosives and completely or partially loaded items should be stored in suitable storage magazines located in accordance with the American Table of Distances (ATD) or other applicable safety standards. While in process these items shall be located in accordance with intraplant distances and stored in adequate ready or service magazines if outside of loading rooms. For all Government managed explosives loading plants, the provisions of the Armed Services Explosives Safety Board covering quantity-distance relations for explosives shall apply.

6.4.6 Proper care must be exercised at all times to protect personnel, equipment and loading areas from accidents, fires or explosions. The precautionary measures in the following paragraphs should be observed.

6.4.6.1 Employ properly proportioned and properly located protective barricades, screens or shields at all required points.

6.4.6.2 Keep only minimum quantities of explosives and completed or partially loaded parts present at each stage of operation.

6.4.6.3 Keep explosives and explosive parts in approved covered receptacles. Ensure covers are in place after material is taken out of or put into the receptacles. Receptacles should be conductive to ground electrostatic charges.

6.4.6.4 Protect operations from electrostatic charges by effectively grounding all machinery, equipment, and fixtures. Employ suitable grounded conductive coverings for floors, work benches, tables, and

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workers' conductive shoes. Employ workers' clothing of a type to minimize the accumulation of static charges. Fabrics such as silk and nylon, which promote static generation should be avoided. Additional devices, such as grounded bracelets for workers, should be employed where operations are conducted with items unusually sensitive to initiation by static electricity. Such items include initiating explosives, tracer mixtures, and low-energy type electric primers, detonators and squibs. The latter types of items should have the free ends of lead wires bared and twisted together. They shall be packed in relatively small groups wrapped in bare noninsulated aluminum or other uncoated metal foil. During assembly and processing operations, such sensitive electric items should be short circuited by clips or other devices until installed with safety shunt in the final device. Additional precautions for these items should include mechanical shielding to contain or deflect fragments and blasts. Electrical shielding of these items from induced electric currents generated by sources such as lightning, static, radiations from communications apparatus, radar, or high frequency heat apparatus, etc., shall be utilized. For safety, humidity of work rooms should be appropriately increased, as required to lessen electrostatic effects without inducing excessive moisture absorption by any of the components.

6.4.6.5 Protect all explosive operations from effects of electric current originating from equipment such as soldering irons, heaters, switches, wiring, motors, lights, test instruments, etc., by suitable insulation, grounding separation or shielding. Such electric sources may initiate explosives by heat, sparks, arcs, or due to completing an electric circuit through an electric primer, detonator, or squib. Circuits may be inadvertently completed, for example, from a defective electric soldering iron through a grounded contact. Removable short circuiting clips, or other devices shall be employed during manufacturing operations involving electric primers, detonators or squibs.

6.4.6.6 Enforce the wearing of suitable safety footwear, gloves goggles, respirators and impregnated garments to protect personnel against burns, poisoning and associated industrial hazards.

6.4.6.7 Allow no fires or exposed electrical or other sparking equipment. Allow little or no flammable material to be present in loading, handling and storage spaces. Enforce proper "Match" and "No Smoking" rules.

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6.4.6.8 Enforce good housekeeping and maintain effective policing inspection and supervisory methods throughout the loading area and surroundings. Employ effective cleaning methods periodically to minimize the accumulation of explosives, explosive dust, and other contaminants. Assure its removal from floors, walls, ceilings, ledges, tables, benches, piping, equipment and items being loaded. Clean up any spilled material immediately.

Custodian:
NAVAIR AIR52021E

Preparing Activity:
NWC/China Lake, California

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THE ORIGINAL REPORT QUALITY**