

**INCH-POUND**

MIL-E-52649B  
18 November 1992  
SUPERSEDING  
MIL-E-52649A  
25 November 1975

MILITARY SPECIFICATION  
ENGINE COLD STARTING AIDS, ETHER FUEL PRIMERS

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

1. SCOPE

1.1 Scope. This specification covers primer equipment for adding controlled quantities of engine priming fuel to internal combustion engines of commercial equipment as an aid in starting at low temperatures.

1.2 Classification. The primer equipment shall be one of the following types and sizes, as specified (see 6.2 and 6.6):

Type 111 - Gas propellant primer equipment system, 18 ounce (oz) cylinder.

Size 2 - 2-1/2 cubic centimeters (cc) discharge.

Size 4 - 4 cc discharge.

Size 5 - 5 cc discharge.

Size 6 - 6 cc discharge.

Size 12 - 12 cc discharge.

Type V - Gas propellant fully automatic primer equipment system, 18 oz or 21 oz cylinder.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: USA Belvoir Research, Development, and Engineering Center, ATTN: SATBE-TSE, Fort Belvoir, VA 22060-5606 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

DISTRIBUTION STATEMENT A.  
unlimited.

Approved for public release; distribution is

FSC 2910

## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 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 listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

## SPECIFICATIONS

## FEDERAL

- |           |                                                                                     |
|-----------|-------------------------------------------------------------------------------------|
| O-F-1044  | - Fuel, Engine Primer: Cold Starting, in Pressurized and Nonpressurized Containers. |
| PPP-B-601 | - Boxes, Wood, Cleated-Plywood.                                                     |
| PPP-B-636 | - Boxes, Shipping, Fiberboard.                                                      |

## MILITARY

- |           |                                       |
|-----------|---------------------------------------|
| MIL-P-116 | - Preservation, Methods of.           |
| MIL-E-199 | - Ether, Diethyl, Technical.          |
| MIL-T-704 | - Treatment and Painting of Material. |

## STANDARDS

## FEDERAL

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

## MILITARY

- |             |                                                                |
|-------------|----------------------------------------------------------------|
| MIL-STD-105 | - Sampling Procedures and Tables for Inspection by Attributes. |
| MIL-STD-129 | - Marking for Shipment and Storage.                            |
| MIL-STD-130 | - Identification Markings of U.S. Military Property.           |
| MIL-STD-147 | - Palletized Unit Loads.                                       |
| MIL-STD-889 | - Dissimilar Metals.                                           |
| MS39254     | - Cylinder, Engine Starting (Engine Cold-Starting Aid).        |

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 40, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Non-Government Publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues

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of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- B 633 - Electrodeposited Coatings of Zinc on Iron and Steel.
- D 2000 - Standard Classification System for Rubber Products in Automotive Applications.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION INC. (NMFTA)

National Motor Freight Classification Rules.

(Application for copies should be addressed to the American Trucking Association, Inc., ATTN: Traffic Order Section, 2200 Mill Road, Alexandria, VA 22314.)

UNIFORM CLASSIFICATION COMMITTEE (UCC)

Uniform Freight Classification Rules.

(Application for copies should be addressed to the Uniform Classification Committee, ATTN: Tariff Publishing Officer, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards), 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 Description. The primer equipment shall consist of a permanently mounted frame accepting one of the engine primer fuel containers utilizing bulk primer fuel as specified in O-F-1044, a controlled device for metering the discharge through safety accessories, a discharge tube, and intake manifold dispensing nozzles.

3.2 First article. Unless otherwise specified (see 6.2), a sample shall be subjected to first article inspection (see 6.4) in accordance with 4.3.

3.3 Materials. Materials shall be as specified herein. Materials not specified shall be selected by the contractor, and shall be subject to all provisions of this specification. Mounting frames and metering devices shall be made from corrosion-resisting metals, nylon, or steel, zinc-coated in accordance with ASTM B 633, Fe/Zn 25 SC 4, type IV. The remote control cables, when applicable, shall be of austenitic stainless steel or lubricated and encased in plastic sleeves.

3.3.1 Material deterioration prevention and control. The primer equipment shall be fabricated from compatible materials, inherently corrosion resistant or treated to provide protection against the various forms of corrosion and deterioration that may be encountered in any of the applicable operating and storage environments to which the primer equipment may be exposed.

3.3.1.1 Dissimilar metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion. Dissimilar metals and methods of protection are defined and detailed in MIL-STD-889.

3.3.1.2 Identification of materials and finishes. The contractor shall identify the specific material, material finish or treatment for use with component and subcomponent, and shall make information available upon request to the contracting officer or designated representative.

3.3.2 Recovered materials. For the purpose of this requirement, recovered materials are those materials which have been collected from solid waste and reprocessed to become a source of raw materials, as distinguished from virgin raw materials. The components, pieces, and parts incorporated in the primer equipment may be newly fabricated from recovered materials to the maximum extent practicable, provided the primer equipment produced meets all other requirements of this specification. Used, rebuilt, or remanufactured components, pieces, and parts shall not be incorporated in the primer equipment.

3.4 Performance. The primer equipment shall operate to discharge a repeatable volume of fuel within 0.5 cc of the specified volume, without leakage, in temperatures ranging from -65 to +100 °F for 1,000 cycles. Plastics, rubbers, and fibers utilized in the fabrication of primer equipment shall remain functional after immersion in diethyl ether at 73 ±2.5 °F for 14 days.

3.5 Type III. gas propellant priming equipment. Type III primer equipment shall utilize an 18-ounce cylinder conforming to MS39254 charged with engine primer fuel with propellant as specified in O-F-1044, type III. The primer equipment shall be attached to the primer fuel container by screw threads conforming to FED-STD-H28 and a rubber gasket conforming to ASTM D 2000, class M3BG614C12E034F19, shall be provided for a leak-free connection. The primer equipment mounting shall fix and support the fuel container vertically and shall prohibit movement horizontally. The mount shall hold the container by a friction, over-center type, or screw-type clamping device. The clamping

device shall permit changing of the fuel container by an operator wearing arctic mittens. Control shall be by mechanical or electro-mechanical linkage. The metering device shall be double acting. The primary action shall open the container valve to allow the fuel and propellant gas to flow into an isolated chamber in the volume specified by the applicable size. The secondary action of the metering valve shall allow the container valve to close to prevent continued flow, and at the same time, the chamber outlet valve shall open, allowing the accumulated gas to propel the charge of primer fuel through flexible copper or nylon tubing to the atomizer.

3.5.1 Size 3. Size 3 primer shall deliver  $2\text{-}1/2 \pm 0.5$  cc of primer fuel at the atomizer during one operating cycle.

3.5.2 Size 4. Size 4 primer shall deliver  $4 \pm 0.5$  cc of primer fuel at the atomizer during one operating cycle.

3.5.3 Size 5. Size 5 primer shall deliver  $5 \pm 0.5$  cc of primer fuel at the atomizer during one operating cycle.

3.5.4 Size 6. Size 6 primer shall deliver  $6 \pm 0.5$  cc of primer fuel at the atomizer during one operating cycle.

3.5.5 Size 12. Size 12 primer shall deliver  $12 \pm 1.0$  cc of primer fuel at the atomizer during one operating cycle.

3.6 Type V. gas propellant fully automatic priming equipment. Type V primer equipment shall utilize an 18-ounce or 21-ounce cylinder, conforming to MS39254, charged with engine primer fuel with propellant as specified in O-F-1044, type III. The primer equipment shall be attached to the primer fuel container by screw threads conforming to FED-STD-H28 and a rubber gasket conforming to ASTM D 2000, class M3BG614C12E034F19 shall be provided for a leak-free connection. The primer equipment mounting shall fix and support the fuel container vertically and shall prohibit movement horizontally. The mount shall hold either size container by a friction, over-center type, or screw-type clamping device. The clamping device shall permit changing of the fuel container by an operator wearing arctic mittens. The primer equipment engine temperature sensor switch shall determine when the system shall function. When needed, the solenoid valve shall be activated automatically during engine cranking, then primer fuel shall be released from the pressurized cylinder, flows through the valve, through the metering orifice at full cylinder pressure, through the flexible copper or nylon tubing, and out of an injector nozzle located in the engine's air intake system. The valve shall have a reservoir that maintains flow of primer fuel after cranking to prevent the just-started engine from faltering or dying. The primer equipment shall deliver not more than 0.25-cc of primer fuel per 100 cubic inches of engine displacement per second. The primer fuel flow shall be continuous throughout the cranking operation.

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3.7 Type III safety accessories. When specified (see 6.2), thermal controls to protect an engine against ether injection after warmup, and cranking controls to protect against hydraulic block by excessive ether injection prior to cranking shall be furnished.

3.7.1 Temperature control. When a thermal control is specified, either of the following types may be furnished.

3.7.1.1 Engine coolant temperature control. The temperature control device shall receive thermal energy from the cooling system. The device shall prevent the flow of ether when the coolant temperature rises above 100 °F. Upon cooling, the device shall open to allow ether flow at 50°F or below engine coolant temperature.

3.7.1.2 Engine manifold temperature control. The temperature control device shall receive thermal energy from the exhaust manifold. The device shall prevent the flow of ether when the exhaust manifold temperature rises above 140 °F. Upon cooling, the device shall allow ether flow at 50 °F or below exhaust manifold temperature.

3.7.2 Cranking control. The cranking control shall be a pressure-sensitive valve. The valve shall be normally closed, inhibiting the flow of primer fuel between the metering equipment and the air induction system. The valve shall open at an oil pressure of 5 pounds per square inch (psi) and above, and will close when oil pressure falls below 3 psi. The control design shall be such that primer fuel can only be injected into the manifold when oil pressure due to cranking reaches 5 psi and above. The pressure sensor shall have 1/8-inch pipe threads in accordance with FED-STD-H28.

3.7.3 Temperature and pressure control combination. When applicable, safety controls may be furnished separately or in combination. For combination use, utilizing the pressure-sensitive valve (see 3.7.2), the thermal valve (see 3.7.1) shall be placed in the primer line between the metering device and the oil-pressure sensor plug. This combination will inhibit injection of primer fuel when the oil pressure of the engine is below 3 psi, and when the block temperature of the engine rises above 50°F.

3.8 Type V safety accessory. The type V primer equipment shall be with a factory-preset interlock engine temperature sensor which shall prevent the primer equipment from supplying primer fuel to a warm engine.

3.9 Treatment and Painting. Unless otherwise specified (see 6.2), the painting of the primer equipment shall be the supplier's standard. When specified (see 6.2), painting shall be in accordance with MIL-T-704, type F or G as applicable, topcoat color as specified.

3.10 Identification markings. Identification markings shall be in accordance with MIL-STD-130, method optional, and shall include as a minimum the following:

- a. The capacity of the metered primer fuel output as specified by given size.
- b. Contractor's name and model as applicable.

3.11 Workmanship. Components and assemblies of the primer equipment including seals, stampings, and moldings shall be clean and free from fins, sharp edges, pits, or scratches. Each primer shall be complete and function smoothly and to its specified capacity.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor 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 specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Component and material inspection. The contractor is responsible for ensuring that components and materials used are manufactured, examined, and tested in accordance with referenced specifications and standards, as applicable.

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

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).
- c. Inspection of packaging (see 4.6).

4.3 First article inspection. A first article inspection shall be performed on one primer equipment (see 3.2 and 6.4).

4.3.1 Examinations The first article shall be examined as specified in 4.5.1. Presence of one or more defects shall be cause for rejection.

4.3.2 Tests. The first article shall be tested as specified in 4.5.2. Failure of any test shall be cause for rejection.

4.4 Quality conformance inspection.

4.4.1 Sampling. Sampling for inspection shall be in accordance with MIL-STD-105. Sample size shall be determined by using MIL-STD-105, table I and table IIa. A lot shall be accepted when 0 defects are found and rejected when one or more defects are found.

4.4.2 Examination. Sample selected in accordance with 4.4.1 shall be examined for the defects specified in 4.5.1. Presence of one or more defects shall be cause for rejection.

4.4.3 Tests. Samples selected in accordance with 4.4.1 shall be tested as specified in 4.5.2. Failure of any test shall be cause for rejection.

4.5 Inspection procedure.

4.5.1 Examination. The primer equipment shall be examined as specified herein for the following defects:

101. Materials not as specified (see 3.3).
102. Materials not resistant to corrosion and deterioration, or treated to be resistant to corrosion or deterioration of the applicable operating and storage environments (see 3.3.1).
103. Dissimilar metals as defined in MIL-STD-889 are not effectively insulated from each other (see 3.3.1.1).
104. Contractor does not have documentation available for identification of materials, material finishes, or treatment (see 3.3.1.2).
105. Used, rebuilt, or remanufactured components, pieces, and parts incorporated in the primer equipment (see 3.3.2).
106. Type and size of primer equipment not as specified (see 3.5 and 3.6).
107. Safety accessories not as specified (see 3.7 and 3.8).
108. Treatment and painting not as specified (see 3.9).
109. Identification markings not as specified (see 3.10).
110. Workmanship not as specified (see 3.11).

4.5.2 Tests. Tests shall be conducted in the following order.

4.5.2.1 Diethyl ether stability. Gaskets, O-rings, moldings, and all non-metallic material utilized in any sample primer equipment shall be tested for stability in ether as follows:

- a. Place nonmetallic parts of a sample in a 400 milliliter glass beaker and immerse with diethyl ether conforming to MIL-E-199. Cover with a watchglass and place in a ventilated space maintained at  $73 \pm 2.5^\circ\text{F}$  for 14 days.
- b. Remove parts from ether and allow to air-dry for 1 hour.
- c. Reassemble the primer equipment sample and proceed with the endurance test.

Any swelling, hardening, or softening rendering a nonmetallic part as unfit for the endurance test (see 4.5.2.2), shall constitute failure of this test.

4.5.2.2 Endurance. Cold soak the primer equipment at a temperature of not higher than  $-65^\circ\text{F}$  for a minimum of 4 hours. Using primer fuel conforming to O-F-1044, subject the cold soaked primer equipment to 1,000 cycles of simulated use at an ambient temperature not higher than  $-65^\circ\text{F}$ . Nonconformance to 3.4, binding of components, breakage, or inability to complete the test shall constitute failure of this test.

4.5.2.3 Thermal stability and discharge volume. Establish the discharge volume for the type and size of primer equipment to be tested as follows:

- a. Weigh cylinder and complete primer device.
- b. Discharge 10 shots (pausing 6 seconds after pulling lever to allow chamber to fill and 6 seconds to allow it to empty).
- c. Reweigh cylinder and primer device. The difference in weight is the total discharge of primer (or primer and propellant) as appropriate.
- d. Taking the average weight of the 10 shots, convert to primer volume as follows:

Primer Volume =  $\frac{\text{(Average shot weight)} (91.3\%)}{\text{Specify gravity ether at discharge temperature}}$

Average shot weight = From (c) above.

91.3% = Empirically arrived at percent of ether in total discharge.

Specific gravity ether = Supplied from data published by ether supplier.

Any breakage, leaking, sticking, or binding of components, or a deviation in the specified discharge of volume of primer fuel as specified in 3.5 shall constitute failure of this test.

#### 4.6 Inspection of packaging.

##### 4.6.1 Quality conformance inspection of pack.

4.6.1.1 Unit of product. For the purpose of inspection, a completed pack prepared for shipment shall be considered a unit of product.

4.6.1.2 Sampling. Sampling for examination shall be in accordance with MIL-STD-105.

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4.6.1.3 Examination. Samples selected in accordance with 4.6.1.2 shall be examined for the following defects.

111. Preservation not as specified for Level A or B (see 5.1.1 and 5.1.2).
112. Containers not waterproof sealed for Level A preservation and Level B packing (see 5.1.1 and 5.2.2).
113. Strapping not zinc coated for Level A (see 5.2.1).
114. Packing not as specified for Level A or B (see 5.2.1 and 5.2.2).
115. Level C packing not as specified (see 5.2.3).
116. Marking illegible, incomplete, incorrect or missing (see 5.3).

5. PACKAGING

5.1 Preservation. Preservation shall be Level A, B, or C as specified (see 6.2).

5.1.1 Level A. Each primer equipment shall be preserved in accordance with MIL-P-116, method III. The container shall be a box conforming to PPP-B-636, grade W6c, and waterproof sealed with tape in accordance with the appendix to the box specification.

5.1.2 Level B. Each primer equipment shall be preserved as specified in 5.1.1 except the box shall be domestic class, variety SW, grade 125, and waterproof sealing shall not be required.

5.1.3 Level C. The primer equipment shall be packaged in containers in a manner to afford protection against damage from the contractor to the initial destination. The contractor's standard practice shall be acceptable provided it fulfills these requirements.

5.2 Packing. Packing shall be Level A, B, or C as specified (see 6.2).

5.2.1 Level A. The prime equipment preserved as specified in 5.1.1, shall be packed in close-fitting wood cleated-plywood boxes conforming to PPP-B-601, overseas type, style A or B. The boxes shall be closed and strapped in accordance with the appendix to the box specification. Strapping shall be zinc coated.

5.2.2 Level B. The primer equipment preserved as specified in 5.1.2, shall be packed in quantities not to exceed the weight limitations of boxes, in close-fitting boxes conforming to PPP-B-636, V3C. The boxes shall be waterproof sealed with tape in accordance with the appendix to the box specification.

5.2.3 Level C. The primer equipment shall be packed for shipment in a manner to assure carrier acceptance and safe delivery to destination at lowest rating in compliance with Uniform Freight Classification Rules and National Motor Freight Classification Rules.

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5.3 Marking. In addition to any special marking specified in the contract or purchase order (see 6.2), marking shall be in accordance with MIL-STD-129.

5.4 Palletization. When required (see 6.2), unitized loads, for levels A, B, or C shall be palletized in accordance with MIL-STD-147. Palletized loads shall be uniform in size and quantities to the greatest extent possible. If the container is of a size that does not conform to any of the pallet patterns specified in MIL-STD-147, the pallet pattern shall first be approved by the contracting officer (see 6.2).

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 primer equipment is intended as permanent installation for cold starting internal combustion engines, utilizing ether engine primer fuel in accordance with O-F-1044.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type and size of primer equipment required (see 1.2).
- c. Issue of DoDISS to be cited in the solicitation and, if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- d. When a first article is required for inspection and approval, and the number of units required (see 3.2, 4.3 and 6.4).
- e. When thermal or cranking controls are required (see 3.7).
- f. When military treatment and painting is required (see 3.9).
- g. When color is other than specified (see 3.9).
- h. Preservation and packing required (see 5.1 and 5.2).
- i. Any special marking (see 5.3).
- j- When palletization is required (see 5.4), and if the pallet pattern specified does not conform to MIL-STD-147 (see 5.4).

6.3 Technical manuals. The requirement for technical manuals for such data as technical publications, instructional materials, and supplier's maintenance and operational manual should be considered when this specification is applied on a contract. If technical manuals are required, military specifications and standards that have been cleared and listed in DoD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL) must be listed on a separate Contract Data Requirements List (DD Form 1423), which is included as an exhibit to the contract. The technical manuals must be acquired under separate contract line item in the contract.

6.4 First article. When a first article inspection is required, the item(s) should be a preproduction model. The first article should consist of one unit. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of the

first article test results and disposition of the 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. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.5 Subject term (key word) listing.

Engine primer  
Fluid starting system  
Primer  
Primer equipment

6.6 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. Types I, II, and IV have been deleted and type V has been added.

6.7 Part or identifying number (PIN). The PIN to be used for engine cold starting aids acquired to this specification are created as follows:

6.7.1 Capacity designator. The capacity designator is a letter code used to designate the required cylinder capacity, as follows:

Capacity designator

A

B

Cylinder capacity

18 oz

21 oz

Custodians:

Army - ME

Air Force - 99

Preparing activity:

Army - ME

Project 2910-0206

Review activities:

Army - AT

Air Force - 82

DLA - CS

**STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL**

**INSTRUCTIONS**

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification current contracts. Comments submitted on this form do not constitute or imply authorization to waive any referenced document(s) or to amend contractual requirements.

<b>RECOMMEND A CHANGE:</b>	<b>1. DOCUMENT NUMBER</b> MIL-E-52649B	<b>2. DOCUMENT DATE (YYMMDD)</b> 921118
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**3. DOCUMENT TITLE**  
 Engine Cold Starting Aids, Ether Fuel Primers

**4. NATURE OF CHANGE** (Identify paragraph number and include proposed rewrite, if possible. Attach extra s

**5. REASON FOR RECOMMENDATION**

**6. SUBMITTER**

<b>a. NAME</b> (Last, First, Middle Initial)	<b>b. ORGANIZATION</b>	
<b>c. ADDRESS</b> (Include Zip Code)	<b>d. TELEPHONE</b> (Include Area Code) (1) Commercial (if applicable) (2) AUTOVON	<b>7.</b>

**8. PREPARING ACTIVITY**

<b>a. NAME</b>  Carolyn B. Johnson	<b>b. TELEPHONE</b> (Include Area Code) (1) Commercial (2) (703) 704-3468 65
<b>c. ADDRESS</b> (Include Zip Code)  US Army Belvoir RDE Center ATTN: SATBE-TSE Fort Belvoir, VA 22060-5606	<b>IF YOU DO NOT RECEIVE A REPLY WITHIN 45 D</b>  Defense Quality and Standardization Off 5203 Leesburg Pike, Suite 1403, Falls C Telephone (703) 756-2340 AUTOV