METRIC

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26 October 1990
Superseding
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MILITARY SPECIFICATION

PROPELLANT, JET ENGINE, T-H DIMER, GRADE RJ-4

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

1.1 Scope. This specification covers one grade of jet engine propellant, which is a well defined chemical compound, principally composed of exo- and endo-isomers of tetrahydro-di(methylcyclopentadiene) (See 6.1).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specification 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

Military

MIL-C-4556	Coating Kit, Epoxy, For Interior of Steel Fuel Tanks
MIL-I-27686	Inhibitor, Icing, Fuel System

Federal

PPP-D-729	Drums, Metal, 55-Gallon (For Shipment of Non-corrosive Materials)

STANDARDS

Military

MIL-STD-290	Packaging, Packing, and Marking of Petroleum and Related Products

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to Naval Air Systems Command, AIR-5363, Washington, DC 20361-5360, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter

MIL-STD-1189	Standard Symbology for Marking Unit Packs

Federal

FED-STD-313	Material Safety Data Sheets Preparation and Submission of
FED-STD-791	Lubricant, Liquid Fuel and Related Products, Method of Testing

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg 4D, 700 Robins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents and publications. The following other Government documents and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

49 CFR 100-199	Department of Transportation Rules and Regulations of the Transportation of Explosives and Dangerous Explosives and Dangerous Articles
AFR 71-4	Preparing Hazardous Materials for Military Air Shipments

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

2.2 Non-Government publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the non-government documents which is current on the date of the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM D 86	Distillation of Petroleum Products
ASTM D 93	Flash Point by Pensky-Martens Closed Tester
ASTM D 130	Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test
ASTM D 156	Saybolt Color of Petroleum Products (Saybolt Chromometer Method)
ASTM D 240	Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter Test
ASTM D 381	Test for Existent Gum in Fuels by Jet Evaporation
ASTM D 445	Viscosity of Transparent and Opaque Liquids (Kinematic and Dynamic Viscosities)
ASTM D 1266	Sulfur in Petroleum Products (Lamp Method)
ASTM D 1298	Test for Density, Specific Gravity, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer
ASTM D 1655	Aviation Turbine Fuels, Specification for

ASTM D 2276	Tests for Particulate Contaminant in Aviation Turbine Fuels
ASTM D 2382	Test for Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High-Precision Method)
ASTM D 2386	Test for Freezing Point of Aviation Fuels
ASTM D 2622	Sulfur In Petroleum Products (X-Ray Spectrographic Method)
ASTM D 3120	Test for Trace Quantities of Sulfur in Light Liquid Petroleum Hydrocarbons by Oxidative Microcoulometry
ASTM D 3241	Test for Thermal Oxidation Stability of Aviation Turbine Fuels (JFTOT Procedure)
ASTM D 3828	Test Method for Flash Point by Setaflash Closed Tester
ASTM D 4057	Standard practice for Manual Sampling of Petroleum and Petroleum Products
ASTM D 4176	Free Water and Particulate Contamination in Distillate Fuels (Clear and Bright Pass/Fail Procedures)
ASTM D 5006	Standard Method for Determination of Fuel System Icing Inhibitor Content of Hydrocarbon Fuels by Hand Refractometer
ASTM E 29	Recommended Practices for Indicating Which Places of Figures Are To Be Considered Significant in Specified Limiting Values

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1137.)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z129.1	American National Standard for the Precautionary Labeling of Hazardous Industrial Chemicals.

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018.)

INTERNATIONAL TRANSPORTATION AGENCIES

IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMO	International Maritime Dangerous Goods Code

(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 specification and the references cited herein, the text of this specification takes precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Materials. Except where otherwise specified herein, RJ-4 fuel shall consist solely of a exo- and endo-isomers of tetrahydrodi(methylcyclopentadiene) devived via hydrogenation of methylcyclopentadiene dimer.

3.2 Chemical and physical requirements. The chemical and physical requirements of the fuel shall conform to those listed in Table I when tested in accordance with the applicable test methods. Requirements contained herein are absolute and are not subject to correction for tolerance of test methods. However, if multiple determinations are made, average results shall be used. For rounding off of significant figures, ASTM E 29 shall apply to all tests required by this specification.

3.3 Additives. The additives listed shall be used in combination in amounts not to exceed those specified. The type and amount of each additive used shall be reported.

3.3.1 Antioxidant. The fuel shall contain at least 0.5 gram per liter, and not more than 1.0 gram per liter of 2,6-ditertiary-butyl-4-methylphenol of which at least two-thirds of the amount present shall have been added to the finished fuel.

3.3.2 Fuel system icing inhibitor. The fuel system icing inhibitor shall conform to MIL-I-27686.

3.4 Material safety data sheets. Material safety data sheets shall be prepared and submitted in accordance with FED-STD-313. Material safety data sheets shall also be forwarded as specified in 4.7. The propellant shall have no adverse effect on the health of personnel when used for its intended purpose. Questions pertinent to this effect shall be referred by the contracting activity to the appropriate departmental medical service who will act as an advisor to the contracting agency (see 4.7 and 6.2e).

3.5 Workmanship. The finished fuel shall be visually free from undissolved water, sediment or suspended matter and shall be clear and bright when examined according to ASTM 4176.

4. QUALITY ASSURANCE PROVISIONS

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

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the fuel supplier's overall inspection system or quality program. The absence of any inspection

TABLE I
CHEMICAL AND PHYSICAL REQUIREMENTS AND TEST METHODS

Property	Limit	ASTM Method
Color, Saybolt min	+25	D 156
Distillation: Initial Boiling Point, min °C Fuel Evaporated, 5% °C Fuel Evaporated, 50% °C Fuel Evaporated, 90% °C End Point, max °C Residue, vol percent, max Distillation loss, vol percent, max	 1/ 1/ 1/ 1/ 232 1.5 1.0	D 86
Specific gravity, 60/60°F, min-max	0.915-0.930	D 1298
Existent gum, mg/100 mL, max	5.0	D 381
Thermal stability: Change in pressure drop, mm Hg, max Heater tube deposit visual rating, max	 10	D 3241
Sulfur, total, percent wt., max	0.005	D 2622 or D 3120
Freezing Point, max °C	-47	D 2386
Heat of combustion (net), BTU/gal min at 15°C	139,500	D 2382 or D 240
Viscosity, centistokes at -18°C (0°F) max	20.0	D 445
Copper Strip Corrosion classification, max	No. 1b	D 130
Flash point min °C (°F) max °C (°F)	 60 (140) 79 (175)	D 93
Visual Appearance, clear and bright	Pass	D 4176
Particulates, mg/L, max 2/	1.0	D 2276
Antioxidant, concentration, g/L, min-max	0.5-1.0	3/
Fuel system icing inhibitor, % vol, min-max	0.10-0.15	D 5006 4/

Notes: 1/ To be reported, not limited.
2/ Use O.80-micron membrane filter
3/ See paragraph 4.8.
4/ Use the EGME scale Method 5327 of FED-STD-791 is also acceptable

requirements in the specification shall not relieve the contractor of the responsibility of assuring 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.

4.2 Quality conformance inspection. The quality conformance inspection of the propellant shall consist of tests of samples from 4.4.1 in accordance with Table I and an examination of samples from 4.4.2 for conformance with 4.5.3. Samples shall be labeled completely with the information identifying the purpose of the sample, name of product, specification number, lot and batch number, date of sampling and contract number.

4.3 Inspection lot.

4.3.1 Bulk lot. A bulk lot shall consist of an indefinite quantity of a homogeneous mixture of material offered for acceptance in a single isolated container.

4.3.2 Packaged lot. A packaged lot shall consist of an indefinite number of 55-gallon drums or smaller unit packages of identical size and shape offered for acceptance and filled from one isolated tank containing a homogenous mixture of material.

4.4 Sampling.

4.4.1 Sampling for verification of product quality. Each bulk or packaged lot of material shall be sampled for verification of product quality in accordance with ASTM method D 4057.

4.4.2 Sampling for examination of filled containers. A random sample of filled containers shall be selected from each lot. The samples shall be examined in accordance with 4.5.3.

4.5 Methods of examinations.

4.5.1 Examination of product. Samples selected in accordance with 4.4.1 shall be visually examined for compliance with 3.5.

4.5.2 Examination of empty containers. Prior to filling, each empty unit container shall be visually inspected for cleanliness and suitability.

4.5.3 Examination of filled containers. Samples taken as specified in 4.4.2 shall be examined for conformance to MIL-STD-290 with regard to fill, closure, sealing, leakage, packaging, packing, and markings. Any container having one or more defects under the required fill shall be rejected.

4.6 Test methods.

4.6.1 Chemical and physical properties. Tests to determine conformance to chemical and physical requirements shall be conducted in accordance with FED-STD-791, ASTM standards, or in the case of unique requirements, the test procedures as outlined in Table I and described in the attached Appendices, with the following exceptions:

4.6.1.1 Corrosion. The corrosion test shall be performed in accordance with ASTM method D 130 for "Test at 100°C for Volatile Materials."

4.6.1.2 Thermal stability.

4.6.1.2.1 ASTM D 3241. The thermal stability test shall be conducted using ASTM D 3241 (JFTOT). The heater tube shall be rated visually.

4.6.1.2.2 ASTM D 3241 test conditions.

a. Heater tube temperature at maximum point: 300°C (572°F).

b. Fuel system pressure: 3.43 MPa (500 psig).

c. Fuel flow rate: 3.0 ml/minute.

d. Test duration: 150 minutes.

4.6.1.2.3 Results. The fuel sample is acceptable if all the following criteria are met:

a. The maximum differential pressure across the test filter does not exceed 10 millimeters of mercury.

b. The maximum visual rating of the heater tube deposits is a Code 2, and the visual rating of the heater tube shows neither peacock type deposits (code P) nor abnormal type deposits (code A).

4.6.1.2.4 ASTM D 3241 reported data. The following data shall be reported:

a. Differential pressure in millimeters of mercury at 150 minutes, or time to differential pressure of 10 millimeters of mercury, whichever comes first.

b. Heater tube deposit Visual Rating Code at the end of the test.

4.6.1.3 Distillation. The distillation test shall be performed in accordance with ASTM D 86 except for the following:

a. There shall be no adjustment in heat after the 95% recovery point.

b. The time interval from the 5 ml residue to end point shall be less than five minutes.

c. When observed, the decomposition point shall be considered the endpoint.

4.6.1.4 Freeze Point. The freeze point test will be performed in accordance with ASTM D2386 except that the restriction limiting the difference in temperature between the point at which hydrocarbon crystals first appear and later disappear to 3°C shall not be applied.

4.7 Test report. Test data required by 4.6 shall be reported in the same order as listed in Table I. The Inspection data on Aviation Turbine Fuels form published in ASTM D 1655 shall be used as a guide. Also the types and concentration of additives used shall be reported (6.2.1). Material Safety Data sheets prepared as specified in 3.4 shall be submitted to the contracting activity.

4.8 Antioxidant content. Proof of compliance with 3.3.1 shall be satisfied by a report of total amount of antioxidant added, the stage or stages of the process at which the antioxidant addition took place, and test results from Appendix A. Alternate methods to Appendix A may be approved for use by contacting: Naval Air Propulsion Center, Attn: PE-33, P.O. Box 7176, Trenton N.J., 08628.

4.9 Rejection. Samples of material not conforming to the requirements of this specification shall cause the lot represented by the sample to be rejected. Rejected material shall not be resubmitted until corrective action, subject to procuring activity approval, has been taken by the supplier.

5. PREPARATION FOR DELIVERY

5.1 Packaging and packing. The fuel shall be delivered in bulk or packaged in 200 liter (55-gallon) drums as specified by the procuring activity. When drums are used they shall conform to PPP-D-729, type I or II, except they shall have the interior coated with baked epoxy-phenolic resin in accordance with MIL-C-4556 which is inert to the fuel defined in this specification. Bulk shipments shall be made in vessels having an interior of stainless steel or aluminum, or be epoxy-phenolic resin coated in accordance with MIL-C-4556.

5.2 Marking. All unit, intermediate and shipping containers shall be marked in accordance with MIL-STD-290, MIL-STD-1189 and Title 49 of the Code of Federal Regulations and any other additional special markings specified by the acquiring activity (see 6.2e). All unit and intermediate packs of toxic and hazardous chemicals and materials shall also be labeled in accordance with the applicable laws, statutes, regulations or ordinances, including Federal, State, and Municipal requirements. In addition unit and intermediate containers, including unit containers that serve as shipping containers, such as pails and drums, shall be marked with the applicable precautionary information detailed in ANSI Z129.1. Drums and exterior shipping containers shall be marked in accordance with MIL-STD-290. The nomenclature shall include this specification number and title.

5.3 Transportation of fuels. The transportation of RJ-4 fuel shall be in accordance with 49 CFR 100-199, AFR 71-4, International Maritime Dangerous Goods Code (IMO); International Air Transport Association (IATA), and the International Civil Aviation Organization (ICAO) as applicable for mode of transportation and destination.

6. NOTES

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

6.1 Intended use. The fuel covered by this specification is intended for, but not limited to, use in jet engines.

6.2 Ordering data. Requisitions, contracts, or orders should specify the following:

a. Title, number, and date of this specification.

b. Quantity required.

c. Size and type of container (see 5.1).

d. Suppliers responsibility if other than 4.1.

e. Specify DAR clauses 7-104.98 and 1-323.2.

f. Applicable levels of packaging and packing and other options (see 5.1).

g. Any special markings required (see 5.2).

h. The current, applicable issue of the DODISS and supplement thereto.

6.2.1 When the material is purchased by volume, the unit will be a US gallon at 15°C.

6.3 Certificate of analysis. When the procuring activity requires, a copy of a certificate of analysis containing those items in table I, together with the report required by 4.5, shall be forwarded to the procuring activity with each lot of fuel delivered to this specification as specified in 6.4.

6.4 Contract data requirements. Data as required by 4.5 and 6.3 shall be submitted as stated on DD Form 1423 and incorporated into the contract.

6.5 Subject term (key word) listing.

RJ-4
Propellant
Synthetic hydrocarbon fuel
Turbine fuel

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

APPENDIX A

METHOD OF TEST FOR ANTIOXIDANT ADDITIVE IN RJ-4 FUEL BY GAS CHROMATOGRAPHY

10. Scope

10.1 This test method provides for the quantitative determination of antioxidant additive concentration in RJ-4 fuel. The method is only applicable to the 2,6-ditertiary-butyl-4-methylphenol (DBMP) antioxidant additive over a range of 10 to 1000 ppm.

10.2 This method may involve hazardous materials, operations, and equipment. This method does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this method to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

20. Summary of Method

20.1 The RJ-4 fuel sample with an internal standard is introduced into a gas chromatographic column. The column temperature is raised at a reproducible rate to separate the DBMP additive from the RJ-4 fuel. The area under the chromatogram is recorded throughout the run for quantitative determination of the additive concentration.

30. Apparatus

30.1 Chromatograph - Any gas chromatograph may be used that has the following performance characteristics.

30.2 Detector - Either a thermal conductivity (TCD) or flame ionization (FID) detector may be used. A FID was used in the development of this method. Unless otherwise stated, the following conditions and procedures apply to this method using an FID. The detector shall be operated in such a manner that its linear dynamic range is not exceeded, and its linearity should be checked periodically. The detector shall be capable of continuous operation at 300°C or higher, and must be connected to the column in a manner that eliminates cold spots.

30.3 Column Temperature Programmer - The instrument must be capable of reproducible temperature programming over the range of 50 to 300°C. The programming rate must be sufficiently reproducible that individual retention times do not vary by more than 2 percent.

30.4 Sample Inlet System - The sample inlet system must be capable of operating continuously at a temperature equivalent to the maximum column temperature employed, or provide on-column injection with some means of programming the entire column, including point of sample introduction up to the maximum temperature required. The sample inlet system must be connected to the chromatographic column so as to avoid any

cold spots. An injector temperature of 250°C, and a split ratio of 100 to 1 was determined to be acceptable.

30.5 Recorder - Any potentiometric recorder compatible with the chromatograph may be used. The full-scale response time should be two seconds or less, and the gain and damping controls should be adjusted to provide optimum response and minimum noise.

30.6 Column - The following column was determined to be acceptable for this method: a Hewlett Packard fused silica capillary column with cross-linked methyl silicone stationary phase, film thickness of 0.33 micron, 0.2 mm ID, length of 12 meter (HP part no. 991-61-03-A). Other capillary columns which can provide equivalent efficiency of separating DBMP and the internal standard in RJ-4 fuel also may be adapted to the method.

30.7 Integrator - Means must be provided for determining the accumulated area under the chromatogram. This can be done by means of a computer, or electronic integrator. A timing device is used to record the area at set time intervals. The same basis for measuring time must be used to determine retention times in the calibration, the blank, and the sample. The maximum area measured must be within the linear range of the measuring system used.

30.8 Flow Controllers - Chromatographs must be equipped with constant-flow controllers capable of holding carrier gas flow constant to 1% over the full-operating temperature range.

30.9 Microsyringe - A microsyringe is needed for sample introduction.

40. Reagents and Materials

40.1 Carrier Gas - The purity of all gases used should be 99.995% or better. Filter-driers in the gas supply lines are used to ensure that no impurities reach the chromatograph. Helium is used as the carrier gas. Hydrogen and compressed air are combustion gases for the FID.

40.2 Internal standard - Chromatographic grade 2,4 dimethyl-6-tertiary butyl phenol (DMTP) is used as the internal standard.

40.3 Standard Solution Preparation - Prepare antioxidant free RJ-4 fuel by filtering the fuel through a column of 100-200 mesh silica gel. Prepare solutions by adding DBMP to the silica gel filtered RJ-4 fuel over a range of 10 to 1000 ppm. The standard solutions are prepared by adding an identical quantity of the DMTP internal standard to each DBMP solution.

50. Preparation of apparatus

50.1 Column preparation - New columns must be conditioned before they are used as follows: (a) heat the column at its maximum operating temperature for at least half an hour. (b) run the column temperature program (used for sample analysis) several times. When the chromatogram baseline drifts, the column needs to be reconditioned. A "used"

column can be reconditioned by the same procedure shown above for a new column.

50.2 Response Factor - One microliter of standard solution analyzed by the procedure described herein. The response factor (RF) of the DMTP is defined as 1.0. The RF of the DBMP is calculated as follows:

$$\underset{(DBMP)}{RF} = \frac{(\text{Peak Area of DMPT})}{(\text{Peak Area of DBMP})} \times \frac{(\text{Concentration of DBMP})}{(\text{Concentration of DMTP})}$$

50.3 Chromatograph - Place in service according to the manufacturer's specifications paying particular attention to flow rates through the detector.

60. Procedure

60.1 Calibrate using the standard solutions as follows:

60.1.1 Inject the sample into the chromatograph (1 microliter was determined to be acceptable with a 100 to 1 split ratio). The temperature program is as follows: hold oven temperature at 50°C for 5 minutes, increase to 135°C with a 5°C/minute ramp rate, hold at 135°C for one minute, and then increase to 225°C with a 30°C/minute ramp rate.

60.1.2 Integrate the area under the curve continuously until the final peak has been eluted.

60.2 Follow the above procedure (60.1.1 - 60.1.2) to analyze for DBMP concentration in RJ-4 fuel sample(s).

70. Calculations

70.1 The concentration of DBMP is determined from the following equation:

$$\text{Conc. DBMP} = (\text{RF OF DBMP}) \times \frac{(\text{PEAK AREA OF DBMP})}{(\text{PEAK AREA OF DMTP})} \times (\text{CONC. DMTP})$$

80. PRECISION

80.1 The following data should be used for judging the acceptability of results:

80.1.1 Repeatability - The difference between successive test results, obtained by the same apparatus under constant operating conditions on identical test material, should be within 5 % of their mean.

80.1 2 Reproducibility - Not determined.

CONCLUDING MATERIAL

Custodians:
Navy - AS
Air Force - 68

Review Activities:
Air Force - 11

Preparing activity.
Navy - AS
(Project No. 9135-0108)

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 revision letter should 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 of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYMMDD)
	MIL-L-82522C	901026

3 DOCUMENT TITLE
PROPELLANT, JET ENGINE, T-H DIMER, GRADE RJ-4

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First, Middle Initial)*	b. ORGANIZATION	
c. ADDRESS *(Include Zip Code)*	d. TELEPHONE *(Include Area Code)* (1) Commercial (2) AUTOVON *(If applicable)*	7. DATE SUBMITTED *(YYMMDD)*

8 PREPARING ACTIVITY

a. NAME	b. TELEPHONE *(Include Area Code)*	
Naval Air Systems Command AIR-53632	(1) Commercial 202-692-2653	(2) AUTOVON 222-2653
c. ADDRESS *(Include Zip Code)* Naval Air Systems Command AIR-53632 Washington, DC 20361-5360	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT. Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	