

**NOT MEASUREMENT
SENSITIVE**

MIL-M-63004C(TM)
30 MAY 1989

SUPERSEDING
MIL-M-63004B(TM)
15 JULY 1975

MILITARY SPECIFICATION

MANUALS, TECHNICAL: PREPARATION OF LUBRICATION ORDERS

This specification is approved for use by Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense

1. SCOPE

1.1 Scope. This specification contains requirements for the preparation of lubrication instructions.

1.2 Application. This specification is applicable to the following:

- a. Card-form lubrication orders (LOs).
- b. Lubrication instructions contained in a manual (when an LO is not prepared).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be used in improving this document should be addressed to: USAMC Materiel Readiness Support Activity, ATTN: AMXMD-MP, Lexington, KY 40511-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1428) appearing at the end of this document or by letter.

AMSC NO A4719

AREA TMSS

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MIL-M-63004C(TM)

2.2 Non-Government publications. The following document(s) 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 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)

ASTM D 3951 - Standard Practice for Commercial Packaging.(DOD adopted)

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

(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 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 General (card/manual). Lubrication instructions shall include all lubrication procedures and information on authorized lubricants, lubrication intervals, man-hour requirements, and the Army Oil Analysis Program (AOAP).

3.1.1 Reliability Centered Maintenance (RCM) (card/manual). Unless otherwise specified by the contracting activity, lubrication instructions shall be based upon the principles of RCM logic.

3.2 Security classification (manual). Lubrication instructions that are classified as confidential or higher shall be published as a part of the associated technical manual (TM) of the same or higher security classification.

3.3 Distribution restriction statement, export warning, and destruction notice (card). A distribution restriction statement, export warning, and destruction notice shall be placed on the first card in accordance with MIL-M-38784 (see figure 1).

3.4 Lubrication card. Lubrication card shall be either single-fold or flat.

a. Single-fold card. LO(s) requiring no more than a single card shall be printed in single-fold card style and shall be folded at the

MIL-M-63004C(TM)

center. Single-fold LO(s) shall have no lettering, leader lines, or critical portions of illustrations closer than 1/4 inch from either side of the fold.

b. Flat card. Flat card LO(s) shall not be folded.

3.5 Format.

3.5.1 Card numbering. Unless otherwise specified by the contracting activity, the card number shall be centered at the bottom of the card. Each printed side of a card shall be numbered sequentially. Each side shall reflect the relationship of that side to the total number of printed sides. For example, 1 of 4; 2 of 4; 3 of 4; and 4 of 4. If only one side of a card is printed, it shall be numbered 1 of 1.

3.5.2 Grouped sequence (hardtime, on condition) (card/manual). Unless otherwise specified by the contracting activity, the lubrication instructions shall be presented in grouped sequence by interval.

3.5.3 Style and dimensions (card). Unless otherwise specified by the contracting activity, the style and dimensions, in inches, shall be as shown below.

<u>LO Card</u>	<u>Size of LO Flat)</u>	<u>LO Image Size</u>	<u>Size of LO (Single-fold)</u>
A	4 1/4 x 8 1/2	3 1/4 x 7 1/2	N/A
B	8 1/2 x 8 1/2	7 1/2 x 7 1/2	4 1/4 x 8 1/2
C <u>1/</u>	6 1/2 x 9 1/2	5 5/16 x 8 3/4	N/A
D	8 1/2 x 11	7 1/4 x 9 3/4	N/A
E	17 x 11	14 x 9 1/2	8 1/2 x 11

1/ Use in conjunction with operators log book manual.

3.6 Content.

3.6.1 Heading (card). The heading shall consist of the words "LUBRICATION ORDER," date printed, the LO number, and a supersession notice (if applicable), formatted as shown on figure 1. For odd numbered cards, the LO number shall appear on the top right margin; for even numbered cards, it shall appear on the top left margin.

MIL-M-63004C(TM)

3.6.2 Title (card). The title shall appear below the heading and read the same as the title on the related technical manual (TM). The title(s) shall appear on the first card only (see figure 1). When more than one piece of equipment is covered by the LO, the title for each shall appear separately.

3.6.3 Reference line (card). A reference line consisting of the publication number(s) of the related TMs shall be placed below the title within the applicable area (see figure 1).

3.6.4 Reporting errors (card). LO cards shall contain a Reporting Errors and Recommending Improvement statement (see figure 1).

3.6.5 Location of LO statement (card). The following statement shall appear in the lower right-hand corner of the last card of the LO.

"Copy of this lubrication order will remain with the equipment at all times; instructions contained herein are mandatory."

3.6.6 Authentication line (card). The LO location statement shall be followed by a Department of the Army authentication, consisting of the authority line "By Order of the Secretary of the Army," and the printed name of the Chief of Staff, United States Army.

3.6.7 Distribution (card). Sufficient blank space shall be left below the authentication line to permit insertion of distribution information.

3.6.8 General statement(s) (card/manual). General statement(s) shall be placed on the first card of the LO that is applicable to the overall understanding of requirements of the LO procedures. The statement(s) shall include such information as adherence to lubrication intervals, explanation of interval symbols, maintenance levels, exceptional operational requirements, abbreviations, fittings and parts cleaning. A statement concerning corrosion control shall be used as applicable. The statement shall provide instructions or reference corrosion control requirements provided in the applicable narrative TM.

3.6.9 Oil filter statement (card/manual). As applicable, a statement similar to the following shall be included:

"Oil filters shall be serviced/cleaned/changed as applicable, when:

- a. They are known to be contaminated, or clogged;
- b. Service is recommended by AOAP laboratory analysis, or
- c. At prescribed hardtime intervals."

3.6.10 AOAP sampling interval statement (card/manual). A statement similar to the following shall be included:

" Engine oil/transmission oil/hydraulic fluids must be sampled at (insert applicable hour/mileage timeframe) as prescribed by (insert TB 43-0106 or DA Pam 738-750)."

MIL-M-63004C(TM)

3.6.11 AOAP not available/non-enrolled statement (card/manual). When a component/equipment is not enrolled in the AOAP, or oil analysis support is not available, a statement similar to the following shall be used:

"This (enter name of component/equipment) is not enrolled in the Army Oil Analysis Program. HARDTIME INTERVALS APPLY."

3.6.12 Warranty hardtime statement (card/manual). When applicable, the following statement shall be used "For equipment under manufacturer's warranty, hardtime oil service intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (such as longer - than usual operating hours, extended idling periods, extreme dust)."

3.6.13 Warnings, cautions, and notes (card/manual). Warnings, cautions, and notes shall be applied in accordance with MIL-M-38784.

3.7 Illustrations. Illustrations shall be used to show the location of grease fittings and, when applicable, shall indicate the number of grease points. A minimum number of views shall be used.

3.7.1 Multiple illustrations (card/manual). When it is necessary to provide a multiple number of illustrations to show separate component parts each illustration shall have an individual title.

3.7.2 Maintenance level (card/manual). The lowest level of maintenance authorized to perform the task shown shall be identified. The applicable maintenance level symbol shall be shown in parenthesis after the task. Maintenance symbols to be used, as applicable, are as follows: "C" (crew), "O" (unit), "F" (direct support), "H" (general support), "L" (special repair activity), "D" (depot).

3.7.3 Grouped lubrication points (card/manual). When grouped lubrication points require the same lubricant at the same interval, the type and number of points shall be identified and described by one of the following methods:

a. Multi-headed arrows. Multi-headed, solid-shafted arrows shall point to each of the lubrication points (see figure 2).

b. Lubrication point notes. Lubrication point notes shall provide instructions for applying lubricants, taking into account the following factors: type, grade, availability, and properties of the prescribed lubricant; expected temperature; lubrication guns and tools available to authorized maintenance level; types of lubrication fittings; and possible ill effects excessive or insufficient lubrication. Caution shall be stressed where over-or-under lubrication of a part will damage that part or closely associated parts. Such cautionary notes shall be included either as a portion of the point note, or as a special note (see 3.10).

MIL-M-63004C(TM)

3.9 Measurements (card/manual). Unless otherwise specified by the contracting activity, all measurements expressed in text, in tables, or on illustrations shall be expressed in both U.S. standard units and metric units. The order of precedence shall be in accordance with equipment markings.

3.9.1 Lubricant table (card/manual). As applicable, a table(s) shall be prepared to provide information needed to select the proper lubricant for various temperature ranges and uses. The size and location of the table(s) shall be tailored to meet the layout requirements and shall include as applicable, information on temperature range, lubricant, military symbol, NATO code, specification, national stock number, capacity, interval between service, and man-hours required to complete all services by type shall be stated to the nearest tenth for all lubrications prescribed by the lubricant order (see figure 3).

3.9.2 Notes to tables (card/manual). As necessary, when specific restrictions, preferred grades, and other conditions exist, notes shall be annotated on table(s) in accordance with MIL-M-38784. For example: 1/"When MIL-L-2104 lubricant is authorized, use 15W-40 (OE/HDO-15/40) when available and applicable temperature range exists," or 2/"15W-40 oil is not authorized in this particular (enter component name)." Where applicable, the statement "For Arctic Operation, refer to FM 9-207" shall be included as a note.

3.10 Special notes.

3.10.1 Pertinent lubrication point information (card/manual). As applicable, additional pertinent lubrication point information shall be incorporated into a section of the lubrication order titled "Notes" in either single or double column, at the bottom of the lubrication order. When applicable, the lubrication order shall contain a special note referencing, but not repeating, instructions in technical manuals. Special notes may be divided between the lower portions of both sides or placed entirely on one side (see figure 1).

3.10.2 Effect of extreme humidity (card/manual). If applicable, pertinent instructions relevant to the effect of extreme humidity on lubrication requirements for the equipment shall be included as a note.

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

MIL-M-63004C(TM)

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 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 acceptance of defective material.

4.2. Application of quality assurance. The contractor shall be responsible for performance of quality assurance provisions in accordance with MIL-M-85337 to the extent specified by the contracting activity.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with ASTM D 3951.

5.2 Marking. Exterior of cartons containing lubrication orders shall be marked to conform to MIL-STD-129 and shall include the appropriate lubrication order number and publication date.

6. NOTES

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

6.1 Intended use. Lubrication orders provide information used by operator/crew and unit maintenance personnel to perform lubrication services on equipment.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the lubrication order.
- b. Style and dimensions of card LO (see 3.5.3).
- c. Issue of DODISS to be cited in the solicitation, and if required,

MIL-M-63004C(TM)

the specific issue of individual documents referenced (see 2.1.1 and 2.2).

- d. Reference line (see 3.6.3).
- e. Lubrication interval symbols to be used (see 3.8.1).
- f. Whether part of technical manual or card LO is desired.
- g. Type of reproducible copy desired.

6.3 Technical manual acquisition. This specification must be listed on the Contract Data Requirements List (DD Form 1423) in order to acquire the technical manuals described by this specification, except where DOD FAR 27.475-1 exempts the requirement for a DD Form 1423.

6.4 Definitions.

6.4.1 Caution (card/manual). A caution is a statement about a maintenance procedure, practice, condition, that if not strictly observed, could result in damage to or destruction of equipment or loss of mission effectiveness or long term health hazards to personnel.

6.4.2 Hardtime scheduled maintenance. Hardtime maintenance is scheduled maintenance conducted at predetermined fixed intervals because of age, calendar, or usage such as operating time, flying hours, miles driven or rounds fired.

6.4.3 Note (card/manual). Note is an attention getter used to highlight an essential operating or maintenance procedure, practice, or condition.

6.4.4 On-condition scheduled maintenance. On-condition scheduled maintenance is maintenance or item replacement action performed based upon condition of the item as determined by an evaluation of each item on a scheduled basis.

6.4.5 Warning (card/manual). A warning is a statement about an operating or maintenance procedure, practice, or condition, that if not strictly observed, could result in injury or death to personnel performing the task.

MIL-M-63004C(TM)

6.5 Subject term (key word) listing.

AOAP

Card LO

Hardtime

Lubricant table

Lubricants

Military lubrication symbols

On-condition

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.

MIL-M-63004C (TM)

LUBRICATION ORDER
31 JULY 1987

LO 9-1005-286-12

(Supersedes LO 9-1005-286-12, 25 March 1982)

**GUN, AIR DEFENSE ARTILLERY,
 TOWED: 20-MM, M167A1
 (1005-01-014-0837)**

References: TM 9-1005-286-10, TM 9-1005-286-20-1, LO 5-2805-257-12, and FM 9-207

REPORTING OF ERRORS

You can improve this publication by calling attention to errors and by recommending improvements and by stating your reasons for the recommendations. Your letter or DA Form 2028, Recommended Changes to Publications and Forms, should be mailed directly to Commander, US Army Armament, Munitions and Chemical Command, ATTN: AMSMC-MAS, Rock Island, IL 61299-6000. A reply will be furnished directly to you.

NOTES

This LO is for crew (C) or unit (O) maintenance. Lube intervals (on-condition or hard time) are based on normal operation. Lube more during constant use, and less during inactive periods. Use correct grade of lubricant for seasonal temperature expected.

On the pictures a dash line (—) means lube points on both sides.

Clean parts with dry cleaning solvent (SD), type II, or equivalent. Use cleaning compound solvent (RBC) on powder-fouled parts. Dry before lubricating. DO NOT use fluid or semi-fluid lubricant on SFD lubricated surface. Wipe surface dry.

Before you start your lube service.

ALWAYS

- a. Clean grease fittings before lubrication.
- b. Use the lubrication order as your guide.

NEVER

- a. Use wrong type/grade grease.
- b. Use too much lubricant.

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Card 1 of 16

FIGURE 1. Example of first card.

MIL-M-63004C(TM)

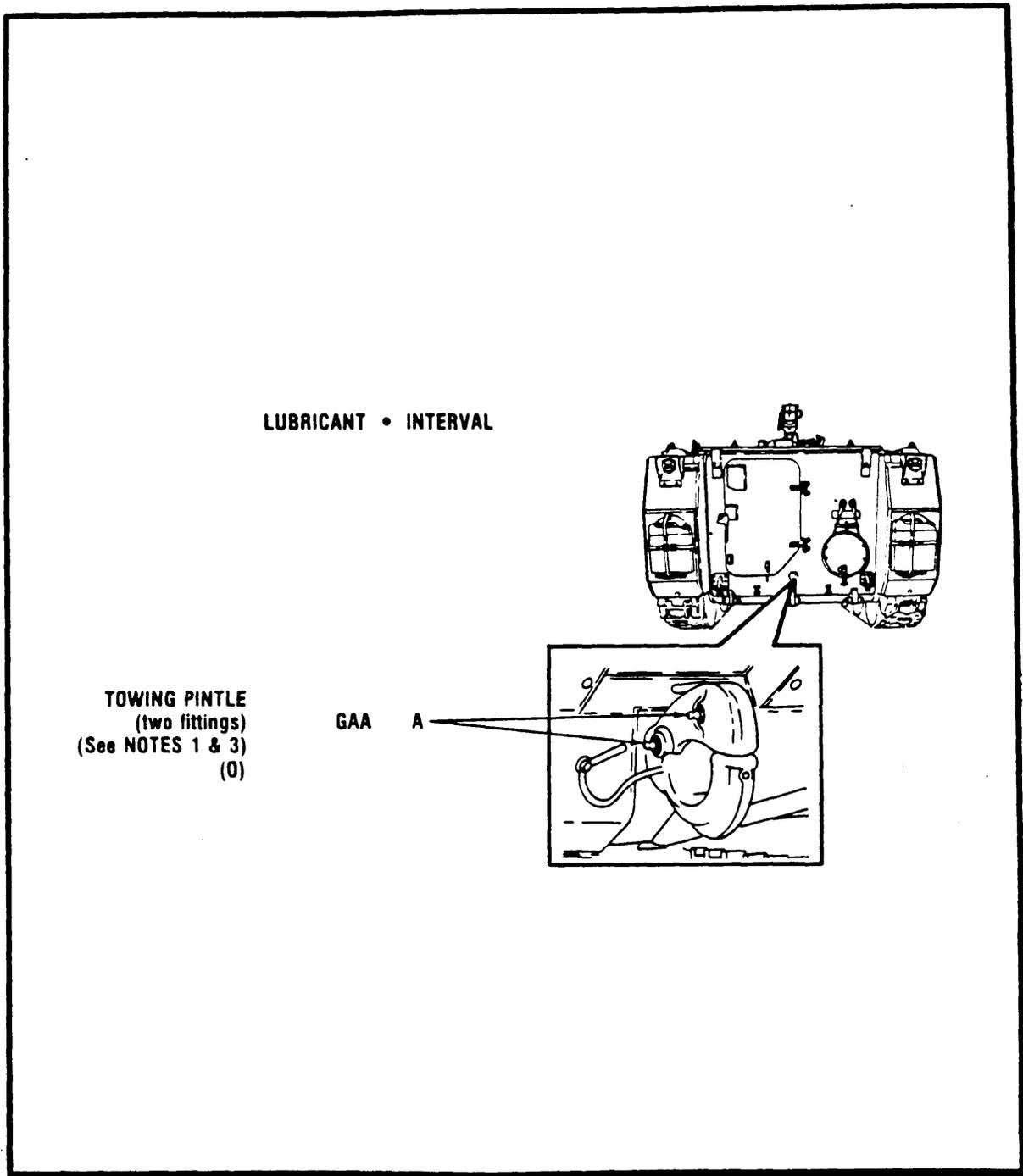


FIGURE 2. Example - identification of lubricant symbol, and lubrication points, interval and note.

TABLE I. Lubricant Table for Engine XXX

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
-18C to +49C(zero to +120F)	OE/HDO 15/40 (O-1236) MIL-L-2104	5 QTS	200 MI	.5
-25C to +04C(-15F to +40F)	OE/HDO-10 (O-237) MIL-L-2104	5 QTS	200 MI	.5
-10C to +49C(+15F to +120F)	OE/HDO-30 (O-238) MIL-L-2104	5 QTS	200 MI	.5
-05C to +49C(+25F to +120F)	OE/HDO-40 (N/A) MIL-L-2104	5 QTS	200 MI	.5
-57C to +04C(-70F to +40F)	OEA (D-183) MIL-L-46167	5 QTS	100 MI	.5

FIGURE 3. Example of lubricant table.

MIL-M-63004C(TM)

APPENDIX A

CONTENT/FORMAT SELECTION SUMMARY

FOR LUBRICATION ORDER (LO)

10. SCOPE

10.1 Scope. This appendix to be used by the contracting activity to specify which optional requirements of this specification are to be contractually imposed in the acquisition of LO(s). This Appendix is a mandatory part of this specification. The information contained herein is intended for compliance.

10.2 Application. This appendix is intended to be copied/reproduced, completed, and become a part of the Technical Manual Contract Document Summary List for solicitation/contact application.

10.3 Explanation of columns - Content/Format Selection Summary. Column (1), Item No., self-explanatory; Column (2) Optional Requirements; column (3), identifies the Applicable Paragraph in this specification; Column (4), Options Selected, subcolumn (a) "yes", should be marked with an "X" for each item/requirement applicable to the solicitation/acquisition; Column (4), subcolumn (b) "no", should be marked with an "X" for each item/requirement not applicable; Subcolumn (c) Explanation/Remarks, is used when an explanation of requirements (column 2) is needed.

20. APPLICABLE DOCUMENTS

20.1 Applicable documents. This section is not applicable to this appendix.

MIL-M-63004C(TM)

APPENDIX A

CONTENT/FORMAT SELECTION SUMMARY - LO

Equipment name/nomenclature _____

(1)	(2)	(3)	(4)		
			(a)	(b)	(c)
Item No.	Requirement (Options)	Applicable Paragraph No.	Options Selected (yes) (no)		Explanation/Remarks
1.	Reliability Centered Maintenance (RCM)	3.1.1			
2.	Lubrication card	3.4			
	Single-fold card	3.4.a			
	Flat card	3.4.b			
3.	Card numbering	3.5.1			
4.	Grouped sequence	3.5.2			
5.	LO card	3.5.3			
	A				
	B				
	C				
	D				
6.	Lubrication interval symbols	3.8.1			
7.	Measurements	3.9			

NOTE: The above selected requirements tailoring options identified by an "X" in the Options Selected column 4, subcolumn 4(a) or 4(b), or the explanation provided in the Remarks subcolumn 4(c) are a mandatory part of this contract.

Completed by: _____
(authorized signature)

Publications Activity _____ Date _____

MIL-M-63004C(TM)

INDEX

	Paragraph	Page
Acquisition requirements	6.2	9
AOAP not available/non-enrolled statement (card/manual)	3.6.11	6
AOAP sampling interval statement (card/manual)	3.6.10	5
Appendix A		15
Applicable Documents	2.	2
Application	1.2	1
Application of quality assurance	4.2	9
Authentication line (card)	3.6.6	5
Card numbering	3.5.1	4
Caution (card/manual)	6.4.1	10
Changes from previous issue	6.6	11
Cleaning, disassembling, and reassembling (card/manual)	3.7.5	7
Content	3.6	4
Content/format selection worksheet		15
Definitions	6.4	10
Disassembling/ and handpacking (card/manual)	3.7.4	7
Distribution (card)	3.6.7	5
Distribution restriction statement, export warning, and destruction notice (card)	3.3	3
Effect of extreme humidity (card/manual)	3.10.2	8
Format	3.5	4
General (card/manual)	3.1	3
General statement(s) (card/manual)	3.6.8	5
Government documents	2.1	2
Grouped lubrication points (card/manual)	3.7.3	6
Grouped sequence (card/manual)	3.5.2	4
Hardtime scheduled maintenance	6.4.2	10
Heading (card)	3.6.1	4
Illustrations	3.7	6
Intended use	6.1	9
Location of LO statement (card)	3.6.5	5
Lubricant table (card/manual)	3.9.1	8
Lubricants and military symbols (card/manual)	3.8	7
Lubricants interval symbols (card/manual)	3.8.1	8
Lubrication card	3.4	3
Maintenance level (card/manual)	3.7.2	6
Marking	5.2	9
Measurements (card/manual)	3.9	8
Multiple illustrations (card/manual)	3.7.1	6
Non-Government publications	2.2	3
Note (card/manual)	6.4.3	10
Notes	6.	9
Notes to tables (card/manual)	3.9.2	8

MIL-M-63004C(TM)

Index

Oil filter statement (card/manual)	3.6.9	5
On-condition scheduled maintenance	6.4.4	10
Order of precedence	2.3	3
Packaging	5.	9
Packaging requirements	5.1	9
Pertinent lubrication point information (card/manual)	3.10.1	8
Preservative material (card/manual)	3.7.7	7
Quality Assurance/Provisions	4.	8
Reference line (card)	3.6.3	5
Reliability Centered Maintenance (RCM) (card/manual)	3.1.1	3
Reporting errors (card)	3.6.4	5
Requirements	3.	3
Responsibility for compliance	4.1.1	9
Responsibility for inspection	4.1	8
Scope	1.	1
Security classification (manual)	3.2	3
Special notes	3.10	8
Specification, standards, and handbooks	2.1.1	2
Style and dimensions (card)	3.5.3	4
Subject term (key word) listing	6.5	11
Technical manual acquisition	6.3	10
Title (card)	3.6.2	5
Warning (card/manual)	6.4.5	10
Warnings, cautions, and notes (card/manual)	3.6.13	6
Warranty hardtime statement (card/manual)	3.6.12	6
Washing and natural drying (card/manual)	3.7.6	7

MIL-M-63004C(TM)

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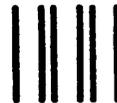
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