METRIC

MIL-STD-40006(AT)
1 October 1991
SUPERSEDING
(see 6.3)

# MILITARY STANDARD

# CHROMIUM PLATE; VISUAL INSPECTION OF (METRIC)

AMSC N/A AREA NDTI

# FOREWORD

1. This military standard is approval for use by the U.S. Army Tank-Automotive Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

2. Beneficial Comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Tank-Automotive Command, ATTN: AMSTA-GDS, Warren, MI 48397-5000, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

3. This military standard provides the acceptance and rejection criteria using the visual inspection method for hard chromium plated items. The procedures covered by this standard are intended to insure that the chromium plate meets engineering requirements. The requirements of this standard are in addition to the requirements of AMS 2406.

# CONTENTS

# 1. SCOPE

1.1 Scope. Hard-deposited, chromium plated items, when made and finished to the requirements of the applicable drawing, are required to be inspected in accordance with the quality assurance provisions of AMS 2406. This standard provides the visual inspection method as a supplement to AMS 2406 to establish additional acceptance and rejection criteria.

1.2 Purpose. The purpose of this standard is to supplement the quality assurance provisions of AMS 2406 for visual inspection of parts finished by chromium electrodeposition.

## 2. APPLICABLE DOCUMENTS

2.1 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).

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

AMS 2406 - Chromium Plating Hard Deposit.

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.)

(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.)

2.2 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. DEFINITIONS

3.1 Flaked plate. Plating having short, discontinuous fissures as defects.

3.2 Blister. A raised area, often dome shaped, resulting from loss of adhesion between the deposit and base metal.

3.3 Pits. Small, sharp cavities in plated surfaces by nonuniform electrodeposition.

3.4 Pin holes. Porosity consisting of numerous small gas holes distributed in plated surfaces.

3.5 Pin hole. A small discreet gas hole.

## 4. GENERAL REQUIREMENTS

(This section is not applicable to this standard.)

## 5. DETAILED REQUIREMENTS

5.1 General. The following visual inspection procedures establish uniform quality acceptance/rejection criteria for chromium plated parts.

5.2 Test methods.

5.2.1 Visual inspection. Visual inspection shall be performed after all chromium plated areas have been finished to the engineering drawing requirements. Inspection shall be performed at a magnification of four diameters (see 5.3.1 and 5.3.2).

5.2.2 Check test. The following check test shall be used when it is not clear whether a crack or pit has penetrated to the base metal:

a. Vapor degrease part for 10 minutes or more until all traces of grease have been removed.

b. Mask around area to be tested to prevent test solution from coming in contact with any area not requiring chromium plating.

c. Brush on the test solution using a clean cotton swab. The test solution shall be as follows:

(1) Copper Sulfate ($CuSO_4$) - 4 grams.

(2) Sulphuric acid (reagent, concentrated) - 8 milliliters.

(3) Distilled water - 88 milliliters.

d. Additional drops as necessary to keep surface wet for at least 6 minutes.

e. Dry the test area using a clean, noncontaminating, absorbant material.

f. Check for the presence of copper in the cracks or pits using 10 power magnification. The presence of plated copper indicates the crack or pit has penetrated to the base metal.

g. Upon completion of the test, thoroughly flush acceptable parts in running water, air-dry, and slush in a suitable protective fluid.

5.3 Inspection criteria.

5.3.1 Rejection. The areas required to be chromium plated and exhibit one or more of the following conditions shall be rejected:

a. Lack of surface smoothness.

b. Nonuniform appearance.

c. Flaked plate.

d. Frosty areas.

e. Blisters.

f. Lack of adhesion.

g. Lack of chromium plating.

5.3.2 Acceptance. The areas required to be chromium-plated and do not exhibit imperfections in excess of the following shall be acceptable:

a. Cracking. Cracking which does not penetrate to the base metal.

b. Pits. Pits which do not penetrate to the base metal and meet the following:

(1) A pit shall have rounded edges at the perimeter.

(2) The bottom of the pit shall have a smaller area than the top.

(3) A pit's maximum dimension shall be 1.3 millimeters (mm).

(4) The distance of closest approach between pits shall be 6.4 mm or greater.

(5) There shall not be more than an average of one acceptable pit for each 25.4 linear mm of surface for a given chromium plated area.

c. Clusters of pin holes. Clusters of pin holes which do not exceed the following:

(1) Individual pin holes in cluster with a maximum dimension of .08 mm or less.

(2) Clusters with a maximum dimension of 6.4 mm or less.

(3) There shall not be more than an average of one acceptable cluster for each 152.4 linear mm of surface for a given chromium plated area.

5.4 Rework. Parts may be reworked in accordance with the requirements of AMS 2406 with prior Government approval.

## 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 procedures covered by this standard are intended to insure that chromium plated parts used on the AGT 1500 gas turbine engine of the M1 tank meet the visual inspection requirements of this standard, in addition to the requirements of AMS 2406.

6.2 Issue of DODISS. When this standard is used in acquisition, the applicable issue of the DODISS must be cited in the solicitation (see 2.1).

6.3 Supersession data. This document supersedes Textron Lycoming Division Specification No. P6810D, dated 26 April 1982.

6.4 Subject term (key word) listing.

Blisters
Check test
Copper plate solution
Cracking
Flaked plate
Pin holes
Pits
Rework
Surface smoothness
Test solution
Vapor degrease

Custodian:
Army - AT

Preparing activity:
Army - AT

(Project NDTI-A072)

FOLD

U.S. ARMY TANK - AUTOMOTIVE COMMAND
ATTN: AMSTA-GDS
WARREN, MICHIGAN 48397-5000

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

POSTAGE AND FEES PAID

U.S. ARMY TANK - AUTOMOTIVE COMMAND
ATTN: AMSTA-GDS
WARREN, MICHIGAN 48397-5000

FOLD

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS: This form is provided to solicit beneficial comments which may improve this document and enhance its use. DoD contractors, government activities, manufacturers, vendors, or other prospective users of the document are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity. A response will be provided to the submitter, when name and address is provided, within 30 days indicating that the 1426 was received and when any appropriate action on it will be completed.
NOTE: This form shall not be used to submit requests for waivers, deviations or clarification of specification 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. AREA-NDTI

DOCUMENT IDENTIFIER (Number) AND TITLE
MIL-STD-40006(AT); Chromium Plate; Visual Inspection of (METRIC)

NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER

☐ VENDOR ☐ USER ☐ MANUFACTURER

1. ☐ HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? ☐ IS ANY PART OF IT TOO RIGID, RESTRICTIVE, LOOSE OR AMBIGUOUS? PLEASE EXPLAIN BELOW.

A. GIVE PARAGRAPH NUMBER AND WORDING

B. RECOMMENDED WORDING CHANGE

C. REASON FOR RECOMMENDED CHANGE(S)

2. REMARKS

SUBMITTED BY (Printed or typed name and address — Optional)

TELEPHONE NO.

DATE

DD FORM 1 OCT 76 1426 EDITION OF 1 JAN 72 WILL BE USED UNTIL EXHAUSTED.