

MIL-STD-1258(WC)
30 June 1972

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27 April 1962

MILITARY STANDARD
COMPARISON STANDARDS
FOR
CHROMIUM PLATED 5.56MM, 7.62MM, AND CALIBER .30
SMALL ARMS BARREL BORES



FSC 1005

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30 June 1972

DEPARTMENT OF THE ARMY
U.S. ARMY MATERIEL COMMAND
WASHINGTON, D.C.

Comparison Standards For Chromium Plated 5.56MM, 7.62MM, and Cal. 30
Small Arms Barrel Bores

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1. This standard has been approved by the Department of the Army and is published to provide standards for comparison standards of chromium plated barrel bores on 5.56MM, 7.62MM, and Cal. 30 small arms.
2. Recommended corrections, additions, or deletions should be addressed to the Commanding General, U.S. Army Weapons Command, Attn: SWERR-E-SE, Rock Island, Illinois 61201.

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1. SCOPE

1.1 This document establishes visual comparison standards for workmanship type defects in chromium plated 5.56MM, 7.62MM, and Cal .30 barrel bores.

1.1.1 The type of defects covered herein are nonmetallic inclusion defects, machining defects and chromium plating defects.

1.2 Application. This document is intended for use in determining the acceptability of the interior surfaces of 5.56MM, 7.62MM, and Cal .30 barrels after chromium plating and high pressure proof testing.

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2. REFERENCED DOCUMENTS

(NONAPPLICABLE)

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3. DEFINITIONS

3.1 For the purpose of this standard the following definitions shall apply.

3.1.1 Borescope. A precision optical instrument with self-contained illuminator used for the visual examination of the internal surfaces of barrel bores.

3.1.2 Blister. An enclosed raised spot on the surface of chromium plate where the chromium has failed to adhere to the base metal because of entrapped gases or inadequate surface preparation.

3.1.3 Electrode Burn. A rough or otherwise unsatisfactory area on one side of the barrel bore produced by the application of an excessive current density to that area. This excessive current density area is caused by an off center electrode.

3.1.4 Flaking or Peeling. Chiplike pieces of chromium plate that have separated partially or wholly from the base metal.

3.1.5 Frost. A multitude of small, closely-packed nodules on the surface of the chromium plate giving it a mild rough appearance which resembles frost.

3.1.6 Inclusion. Particles of impurities that occur in the steel as intermittent or joined globules or streaks along the longitudinal axis of the barrel.

3.1.7 Nodule. A small, somewhat rounded mass of chromium deposit of irregular shape.

3.1.8 Pit. A small cavity in the surface of the chromium plate.

3.1.9 Normal Visual Inspection. Visual examination of the interior surfaces of a barrel bore without the aid of optical instruments.

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4. GENERAL REQUIREMENTS

4.1 The standard comparison gage (fig. 1) established in this standard is in the form of a photograph depicting the acceptable interior surface of 5.56mm, 7.62mm and Cal .30 barrels after chromium plating, high pressure proof firing and cleaning.

4.1.1 The other photographs contained herein (fig. 2 thru 20) show examples of unacceptable interior surface conditions. These are provided only as an aid in identifying the type of defect which caused rejection of the barrel during normal visual inspection (see 5.1) so that appropriate corrective action may be taken. These photographs do not establish and are not intended to be used as borderline acceptance standards for workmanship type defects.

4.2 Visual examination of the barrel for workmanship type defects should be accomplished without the aid of optical instruments. Barrels rejected by normal visual inspection may be examined with a borescope to determine the nature and severity of the unidentified defects and the corrective action to be taken.

4.3 Appearance of chromium deposits. The chromium deposit shall be smooth and homogeneous and shall be free from visible defects such as unplated areas, blisters, nodules, pits, flaking, peeling and cracks. A dull or milky appearing deposit shall not be cause for rejection. "Burnt" and "frosty" deposits are unacceptable.

4.4 Appearance of the chromium plated surface. The chromium plated surface shall be free from visible machining defects such as drill, 'namer, and broach marks, tears and gouges exceeding the surface finish requirements of applicable detail drawings. Visible evidence of copper deposits after proof firing that prevent or interfere with conduct of normal visual inspection shall be cause for rejection.

4.5 The application of the visual comparison standards to acceptance inspection of the interior surfaces of 5.56mm, 7.62mm, and Cal .30 barrels, is contained in Section 5 herein.

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5. DETAIL REQUIREMENTS

5.1 Normal visual inspection. The interior surfaces of the barrel shall be examined by normal visual inspection to determine the presence of workmanship type defects. An acceptable chromium plated barrel will show no evidence of darkened areas on the top of the lands or on the grooves which are indicative of workmanship type defects on the interior surfaces.

5.2 Visual comparison standards. The visual comparison standards contained in figure .1 represents bore surface conditions for an acceptable 5.56mm, 7.62mm, and Cal .30 barrel (see 4.3, 4.4 and 5.1).

5.2.1 Figures 2 through 20 represent unacceptable types of bore surface conditions in 5.56mm, 7.62mm, and Cal .30 barrels.

5.2.1.1 Figures 2 and 3 represent a nonmetallic inclusion discerned by normal visual inspection as a darkened line on the surface of the chromium plate. In these illustrations, a void caused by removal of some nonmetallic material by electropolishing remains evident after chromium plating. The direction of an inclusion type of defect is parallel to the centerline of the barrel and does not follow the twist of the rifling. This directional pattern is not clearly evident in the illuminations because of the limited field of view obtained through the borescope.

5.2.1.2 Figure 4 represents a nonmetallic inclusion over which a series of small nodules of chromium has formed.

5.2.1.3 Figures 5 and 6 represent plated over tool marks.

5.2.1.4 Figure 7 represents a severe gouge caused by a broken tool.

5.2.1.5 Figures 8 and 9 represent torn land and groove.

5.2.1.6 Figure 10 represents a rough land and rough groove adjacent to the land. Nodules have formed on the rough surfaces. The smeared metal effect is the result of material being removed from the projectile by the rough deposits during proof firing test.

5.2.1.7 Figures 11, 12 and 13 represent various degrees of rough deposit. The darkened areas in figures 12 and 13 are copper deposits caused by the projectile during proof firing.

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5.2.1.8 Figure 14 represents pitting and nodular build-up on the land.

5.2.1.9 Figures 15 and 16 represent severe flaking of the chrome plate. A multitude of cracks in the chrome plate and areas of peeling are evident in the illustrations.

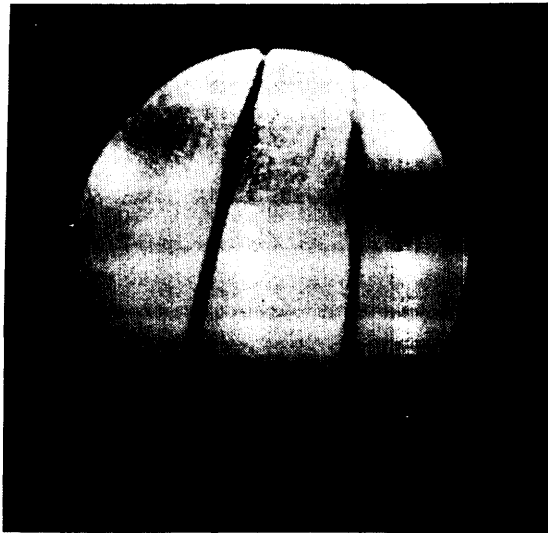
5.2.1.10 Figures 17 and 18 represent typical electrode burns. This condition results when the electrode is not centrally positioned in the barrel bore or the electrode is bowed or bent.

5.2.1.11 Figure 19 represents a rough surface condition in the chamber of the barrel. A replica of the basic metal surface roughness is evident on the chrome surface. This roughness in the chamber was the result of a mild acid etch prior to the application of the chrome plate and was caused by an inadequate alkali rinse after electropolishing. The surface roughness of the example illustrated by this figure measures up to 45 root-mean-square (rms).

5.2.1.12 Figure 20 represents a "frost" deposit of chromium plate. This condition is most apt to result when one of the principal variables in the plating process, such as high current density area, tends to accelerate chromium plate build-up.



Acceptable 5.56MM Barrel Bore
(Magnification 10X approx.)



Acceptable 7.62MM and Caliber .30 Barrel Bore
(Magnification 10X approx.)

Figure 1.

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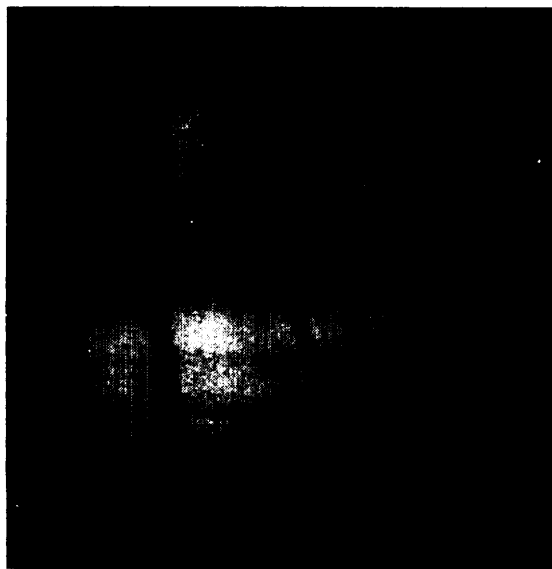


Figure 2. Unacceptable Inclusion
(Magnification 10X approx.)

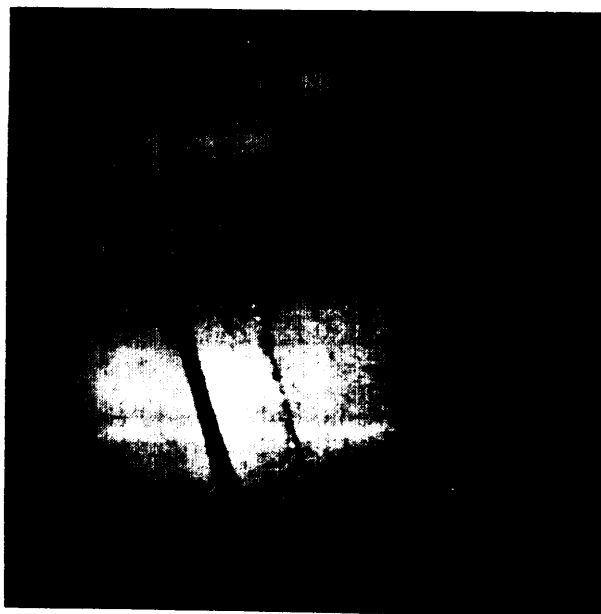


Figure 3. Unacceptable Inclusion
(Magnification 10X approx.)

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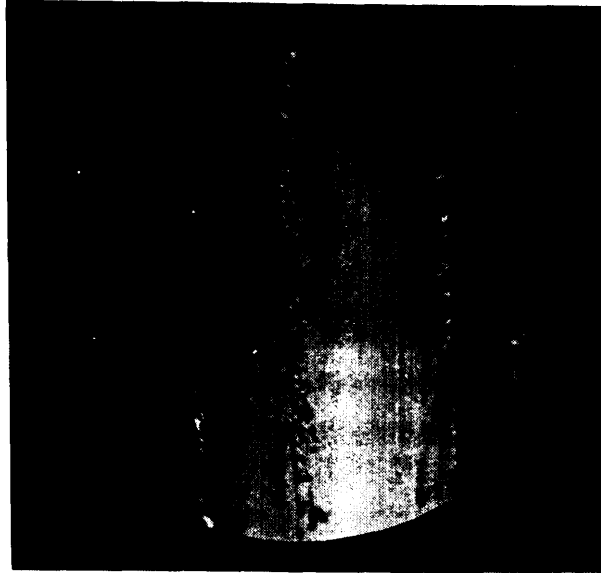


Figure 4. Unacceptable Inclusion, Nodule Build-up
(Magnification 10X approx.)



Figure 5. Unacceptable Tool Marks
(Magnification 15X approx.)

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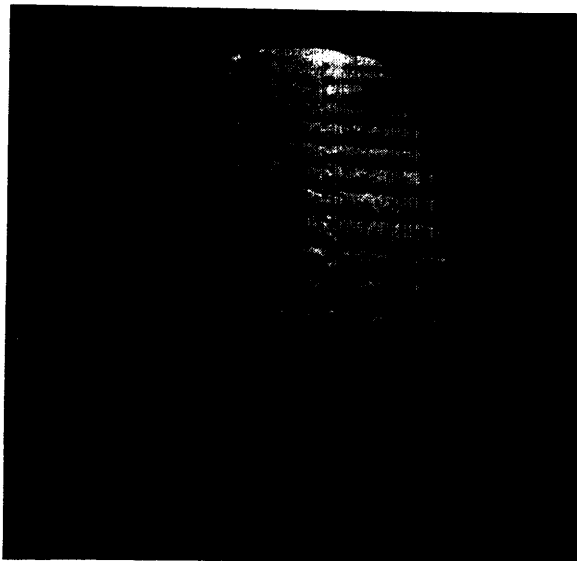


Figure 6. Unacceptable Tool Marks
(Magnification 18x approx.)

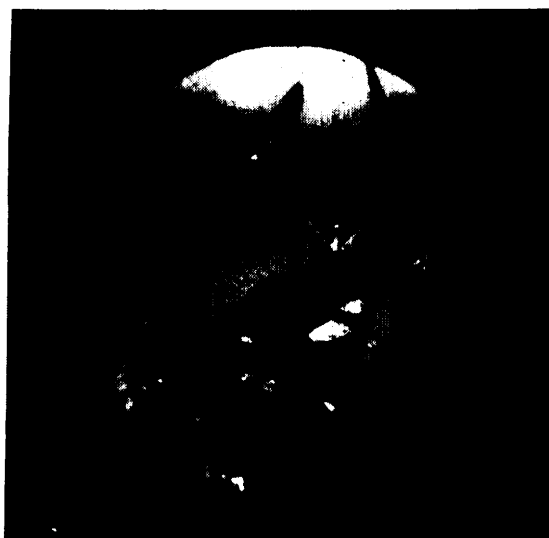


Figure 7. Unacceptable Broken Tool Mark (Severe Broken Tool Gouge)
(Magnification 15X approx.)

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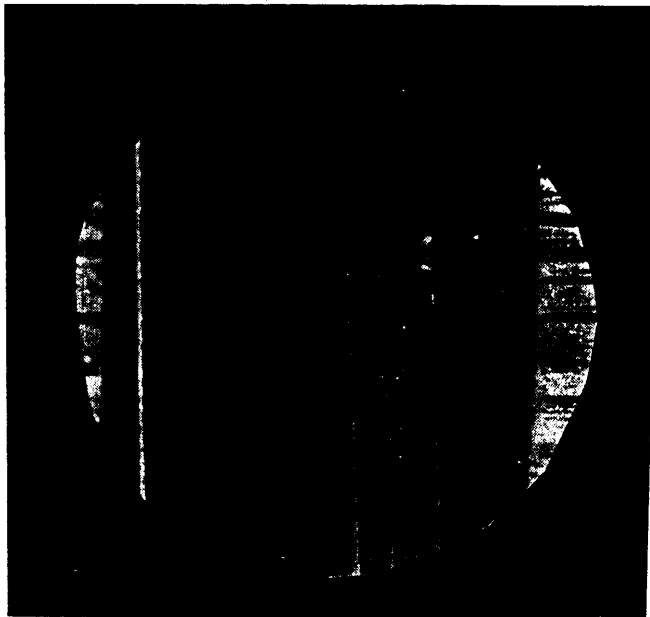


Figure 8. Unacceptable Tears, Land
(Magnification 10X approx.)

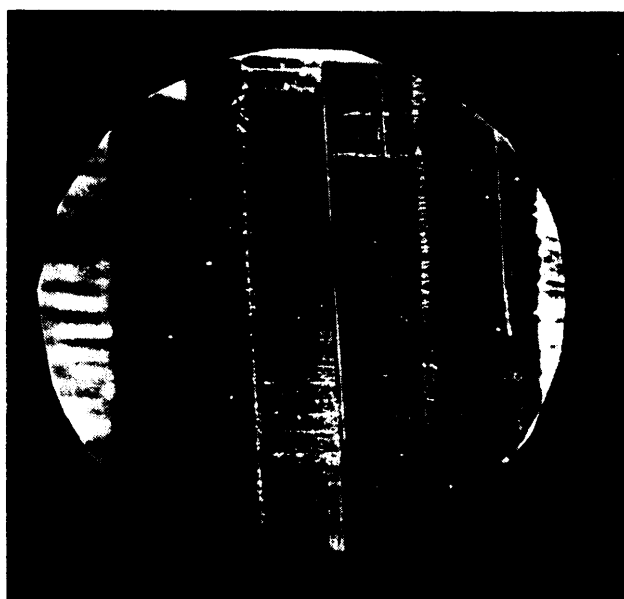


Figure 9. Unacceptable Tears, Groove
(Magnification 10X approx.)

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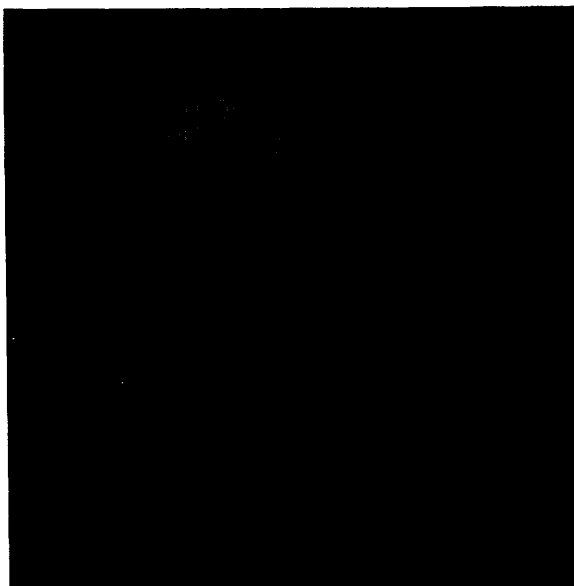


Figure 10. Unacceptable Rough Land and Groove
(Magnification 15X approx.)

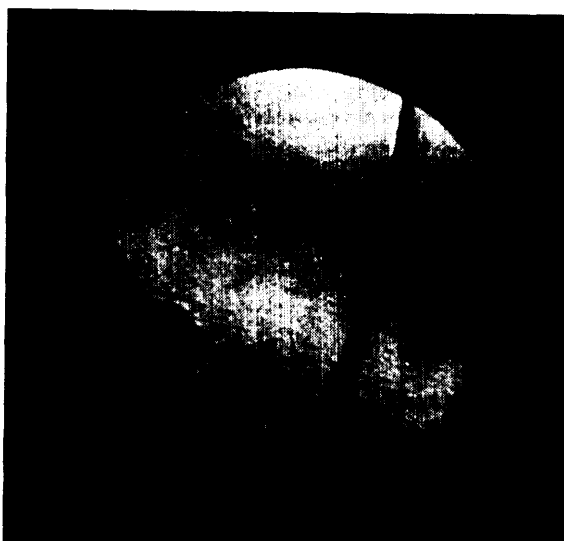


Figure 11. Unacceptable Rough Deposit
(Magnification 15X approx.)

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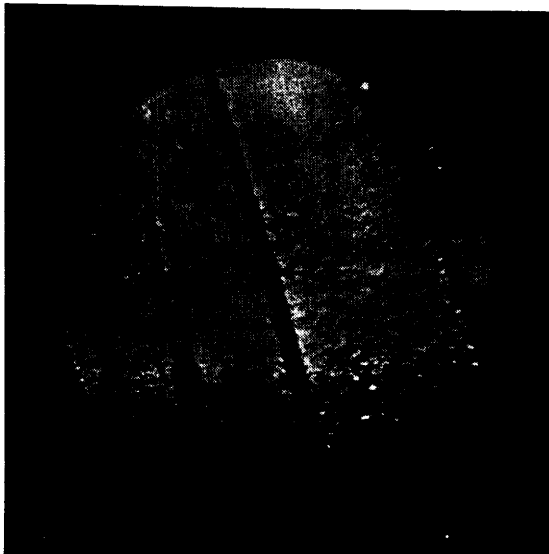


Figure 12. Unacceptable Rough Deposit
(Magnification 12X approx.)

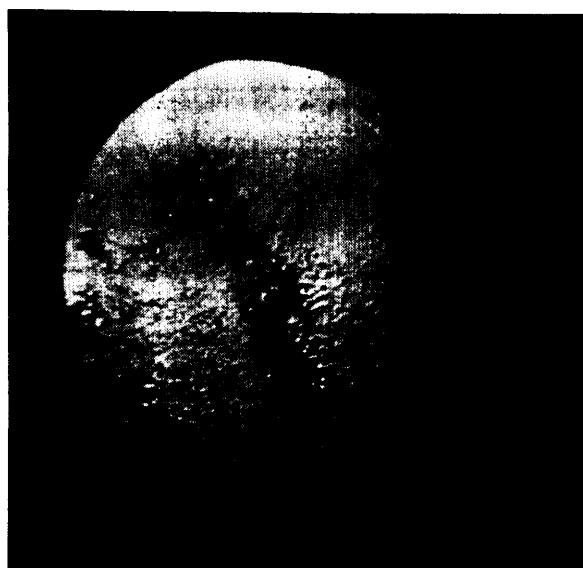


Figure 13. Unacceptable Rough Deposit
(Magnification 12X approx.)

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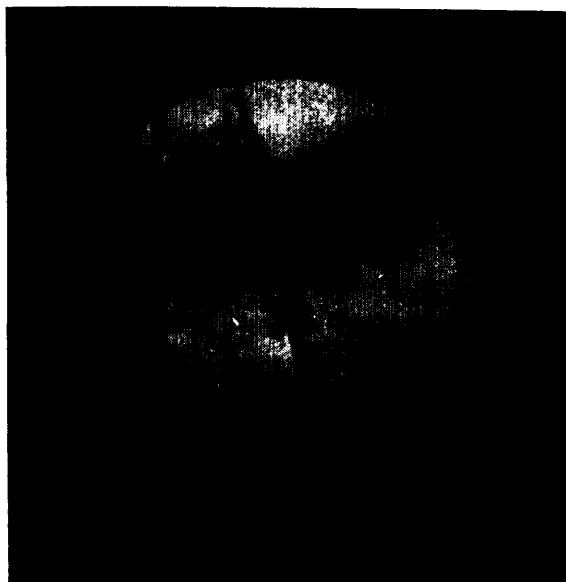


Figure 14. Unacceptable Pitting and Nodules
(Magnification 8x approx.)



Figure 15. Unacceptable Flaking (Severe)
(Magnification 10X approx.)

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Figure 16. Unacceptable Flaking
(Magnification 10X approx.)

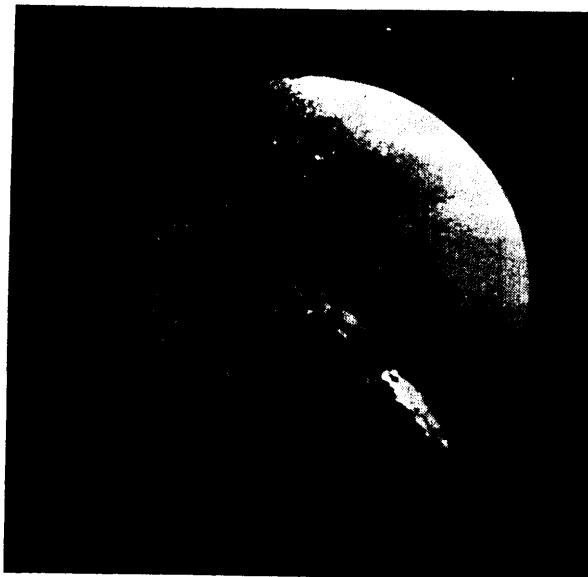


Figure 17. Unacceptable Electrode Burn
(Magnification 10X approx.)

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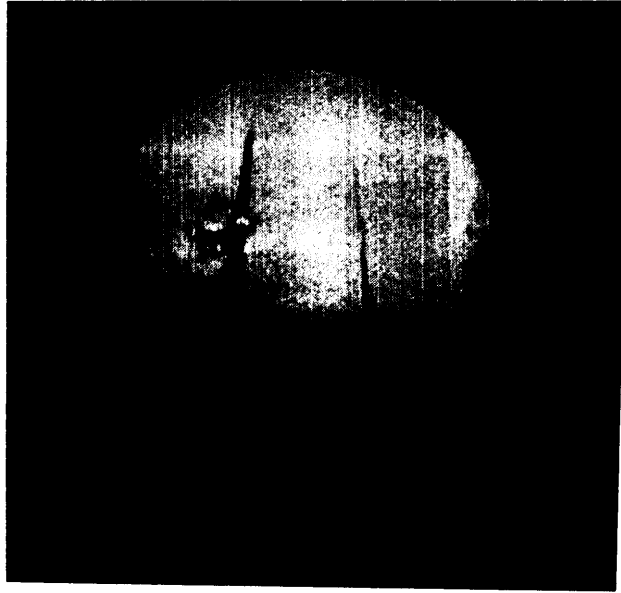


Figure 18. Unacceptable Electrode Burn
(Magnification 10X approx.)

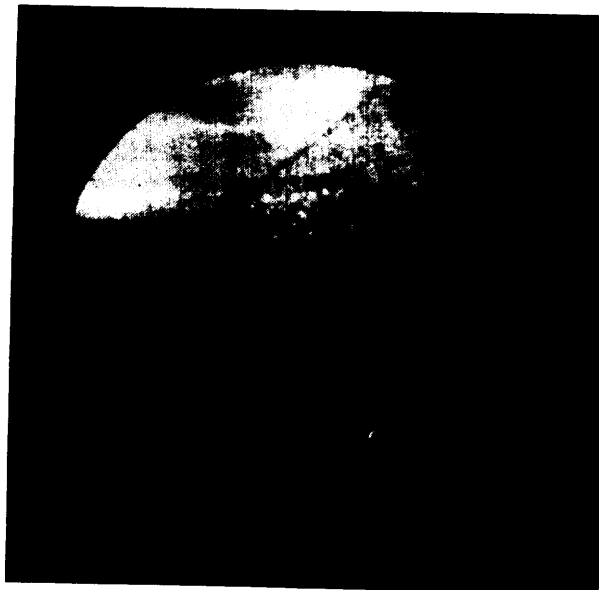


Figure 19. Unacceptable Surface Roughness
(Magnification 10X approx.)

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Figure 20. Unacceptable Frost
(Magnification 10X approx.)

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(When required for use in the contract, the applicable photographs, as depicted in figures contained herein, may be obtained from U.S. Army Weapons Command, Attn: SWERR-E-SE, Rock Island, Illinois 61201.)

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