

NOTE: MIL-STD-298 has been redesignated as a Test Method Standard. The cover page has been changed for Administrative reasons. There are no other changes to this Document.

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DEPARTMENT OF DEFENSE
TEST METHOD

VISUAL INSPECTION GUIDE
FOR
RUBBER EXTRUDED GOODS



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MIL-STD-298
17 January 1957

**OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
WASHINGTON 25, D. C.**

17 January 1957

Supply and Logistics

**VISUAL INSPECTION GUIDE FOR RUBBER EXTRUDED GOODS
MIL-STD-298**

- 1 This standard has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force, effective immediately
- 2 In accordance with established procedure, the Standardization Division has designated the Ordnance Corps, the Bureau of Ships, and the Air Force, respectively, as Army-Navy-Air Force custodians of this standard
- 3 Recommended corrections, additions, or deletions should be addressed to the Standardization Division, Office of the Assistant Secretary of Defense (Supply and Logistics), Washington 25, D. C.

FOREWORD

Government material procurement specifications have been primarily concerned with detailing composition, construction, and necessary physical requirements. However, little attention has been paid to defining the limits of acceptable quality regarding manufacturing defects other than such generalizations as "the workmanship shall be first class." In such a diverse industry as that of rubber manufacturing, individual plants vary considerably in their production and quality control techniques. Defects are likely to occur from many causes, such as variation in the quality of the basic materials and variations in manufacturing processes and finishing operations. Therefore, the quality generalizations used in this document must of necessity cover a considerable range which represents the best available judgment. This document is issued as a practical yardstick which inspectors will use to appraise visually the quality of rubber extruded goods.

MIL-STD-298
17 January 1957

CONTENTS

	Page
1 SCOPE AND PURPOSE.....	1
1 1 Scope.....	1
1 2 Purpose.....	1
2 REFERENCED DOCUMENTS.....	1
2 1 Standards.....	1
3 DEFINITIONS.....	1
4 DEFECT DESCRIPTIONS AND CLASSIFICATION.....	1

TABLES

Table I—Defects Classification.....	2
-------------------------------------	---

LIST OF FIGURES

- 1 Cross sections of typical extrusions
- 2 Cross sections of typical extrusions
- 3 Cross sections of typical extrusions
- 4 Cross sections of typical extrusions
- 5 Identification marks Bottom example—single line Top example—pyramids
- 6 Stain or discoloration—not a defect
- 7 Minor deformation—not a defect
- 8 Delamination—major, all cases
- 9 Foreign material—major, all cases
- 10 Foreign material—major, all cases
- 11 Split mark—major, all cases
- 12 Hole or open blister—major, all cases
- 13 Small lump or closed blister Sealing surface—minor Nonsealing but visible surface—not a defect Nonsealing and nonvisible surface—not a defect
- 14 Lump or closed blister Sealing surface—major Nonsealing but visible surface—minor Nonsealing and nonvisible surface—not a defect
- 15 Lump or closed blister Sealing surface—major Nonsealing but visible surface—minor Nonsealing and nonvisible surface—not a defect
- 16 Large lump or closed blister Sealing surface—major Nonsealing but visible surface—major Nonsealing and nonvisible surface—minor
- 17 Rough Sealing surface—minor Nonsealing but visible surface not a defect Nonsealing and nonvisible surface—not a defect
- 18 Rough Sealing surface—major Nonsealing but visible surface—minor Nonsealing and nonvisible surface—not a defect
- 19 Rough Sealing surface—major Nonsealing but visible surface—minor Nonsealing and nonvisible surface—not a defect
- 20 Rough Sealing surface—major Nonsealing but visible surface—major Nonsealing and nonvisible surface—minor
- 21 Small multiple lumps or closed blisters. Sealing surface—minor. Nonsealing but visible surface—not a defect Nonsealing and nonvisible surface—not a defect
- 22 Small multiple lumps or closed blisters. Sealing surface—major. Nonsealing but visible surface—minor Nonsealing and nonvisible surface—not a defect
- 23 Small multiple lumps or closed blisters. Sealing surface—major Nonsealing but visible surface—minor Nonsealing and nonvisible surface—not a defect
- 24 Small multiple lumps or closed blisters. Sealing surface—major Nonsealing but visible surface—major Nonsealing and nonvisible surface—minor
- 25 Contact roughness Sealing surface—minor Nonsealing but visible surface—not a defect Nonsealing and nonvisible surface—not a defect
- 26 Contact roughness Sealing surface—major Nonsealing but visible surface—minor Nonsealing and nonvisible surface—not a defect
- 27 Contact roughness Sealing surface—major Nonsealing but visible surface—minor Nonsealing and nonvisible surface—not a defect
- 28 Contact roughness Sealing surface—major Nonsealing but visible surface—major Nonsealing and nonvisible surface—minor
- 29 Abrasion Sealing surface—minor. Nonsealing but visible surface—not a defect. Nonsealing and nonvisible surface—not a defect
- 30 Abrasion Sealing surface—major Nonsealing but visible surface—minor. Nonsealing and nonvisible surface—not a defect
- 31 Abrasion Sealing surface—major Nonsealing but visible surface—minor Nonsealing and nonvisible surface—not a defect
- 32 Abrasion Sealing surface—major Nonsealing but visible surface—major Nonsealing and nonvisible surface—minor.

1. SCOPE AND PURPOSE

1.1 Scope.—This document covers the defects for conventional rubber extruded goods, that is, items which are made by forcing unvulcanized rubber compound through a forming die and which are subsequently cured without being confined in a mold. Cast plastisol items, coated electrical wire and items containing cellular rubber are specifically excluded.

1.2 Purpose.—The primary objective of this document is to present word descriptions and photographs of possible defects in rubber extruded goods that may be presented for inspection. In addition, it provides a training aid for inspectors.

1.2.1 In general, this document is not intended to take the place of a particular inspection procedure and which may be provided for inspectors to verify conformance with a particular specification. The quality requirements specified in the basic specification are governing.

2. REFERENCED DOCUMENTS

2.1 Standards

MILITARY

MIL-STD-105—Sampling Procedures and Tables for Inspection by Attributes

MIL-STD-177—Rubber Products. Terms for Visible Defects of

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

3. DEFINITIONS

3.1 The categories, major and minor defects, are as defined in Standard MIL-STD-105.

3.2 Word descriptions of visible defects used in this standard are in accordance with Standard MIL-STD-177.

3.3 Abrasion.—An uneven edge or feathering where two surfaces come together.

3.4 Contact roughness.—Surface unevenness where the extrusion rested on the curing pan.

3.5 Foreign material.—Extraneous material, such as paper, wood or metal, in the extrusion.

3.6 Lump.—Surface protrusion of the basic material as distinguished from foreign material.

3.7 Rough.—Surface unevenness where the compound does not extrude smoothly.

3.8 Spider mark.—A delamination, that is, a cleavage where the compound did not unite after passing the spoke of the spider in an extrusion machine.

3.9 Split mark.—A slit or cleavage in the surface.

4. DEFECT DESCRIPTIONS AND CLASSIFICATION

4.1 Since the classification of many defects depends on the service requirement of a particular surface of the extrusion, it is imperative that the end uses (see 4.3) of the various extrusion surfaces be known before inspection is started. In many cases the procurement document will contain this information. In other cases, where a common generic name, such as a refrigerator door gasket, is used in the procurement document, the functions of the various surfaces will be readily apparent. However, in case of doubt the technical bureau or agency concerned (on primes) or the endorsing inspection service (on subs) should be requested to supply this information.

4.2 For clarity, the following are listed.

4.2.1 Identification marks.—These are raised lines in the shape of pyramids or flats which are most commonly used to identify the manufacturer. Correctly used they are not defects. However, when used where the procurement document proscribes their use or when used to misidentify the item, they are major defects (See fig. 5).

4.2.2 Stains, discoloration, bloom and surface dirt.—Generally these are not considered defects (See fig. 6).

4.2.3 Deformation.—Minor irregularity in shape, such as shown in figure 7, is not considered a defect. Where the dimensional tolerances specified in the procurement document are exceeded, this condition is a major defect.

MIL-STD-298

17 January 1957

4.2.4 Tear, cut, hole, and slit.—Where these extend through the extrusion, they are major defects in all cases

4.2.5 Delamination, split, and spider mark.—These are major defects in all cases

4.2.6 Foreign material.—This is a major defect in all cases whether ingrained on the surface or imbedded

4.2.7 Lump, blister, abrasion, and surface roughness.—Generally these are classified as to degree depending on the function (sealing, visual or nonsealing and nonvisible) of the surface on which they occur

4.3 The classification of defects for extruded items is more complex than that of a single shape, single application item such as V-belts. Extruded goods are produced in a practically infinite variety of sizes and shapes so that there is no common or typical shape or cross section for this class of item. A few examples of this variation are shown on figures 1 through 4. Also, extruded goods have three principal end uses or service requirements which are quite dissimilar in their tolerances for surface variation. These are

Sealing—This is the most severe application where the extrusion is used for an airtight or watertight closure such as a gasket

Visible—This is an intermediate applica-

tion where the extrusion serves as a covering, space filler, bumper, or similar use

Nonsealing and nonvisible—This is a subordinate application where the extrusion serves merely as an internal space filler

An extrusion may (in many cases does) have two or three of these uses when all of its surfaces are considered

4.4 It is recognized that the rejection of an inspection lot of extruded goods for defects which are not commensurate with the surface tolerances required by the user can result in an appreciable increase in the cost of production. Also, in some instances the enforcement of high standards for all surfaces of an extrusion could result in the acceptance of no material made by the extruding method. Accordingly, some of the visual defects in this standard are classified under three categories (major, minor, or acceptable) depending on the type of surface on which the defect occurs

4.5 Illustrations.—Figures 1 through 4 show cross sections of typical extrusion. Identification marks are shown on figure 5

Note that these may be in the shape of pyramids or flats. One to several of these shapes or combinations of them may be used. Figures 6 through 32 illustrate the defects described in table I

TABLE I—Defects classification

Figure No	Defect	Major	Minor
6.....	Stain or discoloration.....	Not a defect	
7.....	Minor deformation.....	Not a defect	
8.....	Delamination, split or spider mark, all cases.....	X	
9 and 10.....	Foreign material, all cases.....	X	
11.....	Split mark, all cases.....	X	
	NOTE—These are usually cleavages running the length of the extrusion and occurring directly opposite one another on both sides of the extruded wall. As shown in the illustration, a complete split through the wall can result		
12.....	Hole or open blister, all cases.....	X	
13.....	Small lump or closed blister		
	Sealing surface.....		X
	Nonsealing but visible surface.....	Not a defect	
	Nonsealing and nonvisible surface.....	Not a defect	
14 and 15.....	Lump or closed blister		
	Sealing surface.....	X	
	Nonsealing but visible surface.....		X
	Nonsealing and nonvisible surface.....	Not a defect	

TABLE I — Defects classification—Continued

Figure No	Defect	Major	Minor
16.....	Large lump or closed blister		
	Sealing surface.....	X	
	Nonsealing but visible surface.....	X	
	Nonsealing and nonvisible surface.....		X
17.....	Rough sealing surface.....		X
	Nonsealing but visible surface.....	Not a defect	
	Nonsealing and nonvisible surface.....	Not a defect	
18 and 19.....	Rough sealing surface.....	X	
	Nonsealing but visible surface.....		X
	Nonsealing and nonvisible surface.....	Not a defect	
20.....	Rough sealing surface.....	X	
	Nonsealing but visible surface.....	X	
	Nonsealing and nonvisible surface.....		X
21.....	Small multiple lumps or closed blisters		
	Sealing surface.....		X
	Nonsealing but visible surface.....	Not a defect	
	Nonsealing and nonvisible surface.....	Not a defect	
22 and 23.....	Small multiple lumps or closed blisters		
	Sealing surface.....	X	
	Nonsealing but visible surface.....		X
	Nonsealing and nonvisible surface.....	Not a defect	
24.....	Small multiple lumps or closed blisters		
	Sealing surface.....	X	
	Nonsealing but visible surface.....	X	
	Nonsealing and nonvisible surface.....		X
25.....	Contact roughness, sealing surface.....		X
	Nonsealing but visible surface.....	Not a defect	
	Nonsealing and nonvisible.....	Not a defect	
26 and 27.....	Contact roughness, sealing surface.....	X	
	Nonsealing but visible surface.....		X
	Nonsealing and nonvisible surface.....	Not a defect	
28.....	Contact roughness, sealing surface.....	X	
	Nonsealing but visible surface.....	X	
	Nonsealing and nonvisible surface.....		X
29.....	Abrasion, sealing surface.....		X
	Nonsealing but visible surface.....	Not a defect	
	Nonsealing and nonvisible surface.....	Not a defect	
30 and 31.....	Abrasion, sealing surface.....	X	
	Nonsealing but visible surface.....		X
	Nonsealing and nonvisible surface.....	Not a defect	
32.....	Abrasion, sealing surface.....	X	
	Nonsealing but visible surface.....	X	
	Nonsealing and nonvisible surface.....		X

MIL-STD-298

17 January 1957

Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.

Copies of this Standard for military use may be obtained as indicated in the foreword to the Index of Military Specifications and Standards.

Copies of this Standard may be obtained for other than official use by individuals, firms, and contractors from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Both the title and the identifying symbol number should be stipulated when requesting copies of Military Standards.

Notice.—When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever, and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

Custodians

Army—Ordnance Corps

Navy—Bureau of Ships

Air Force

Other interest

Army—CEM QSig

Navy—AMCORV

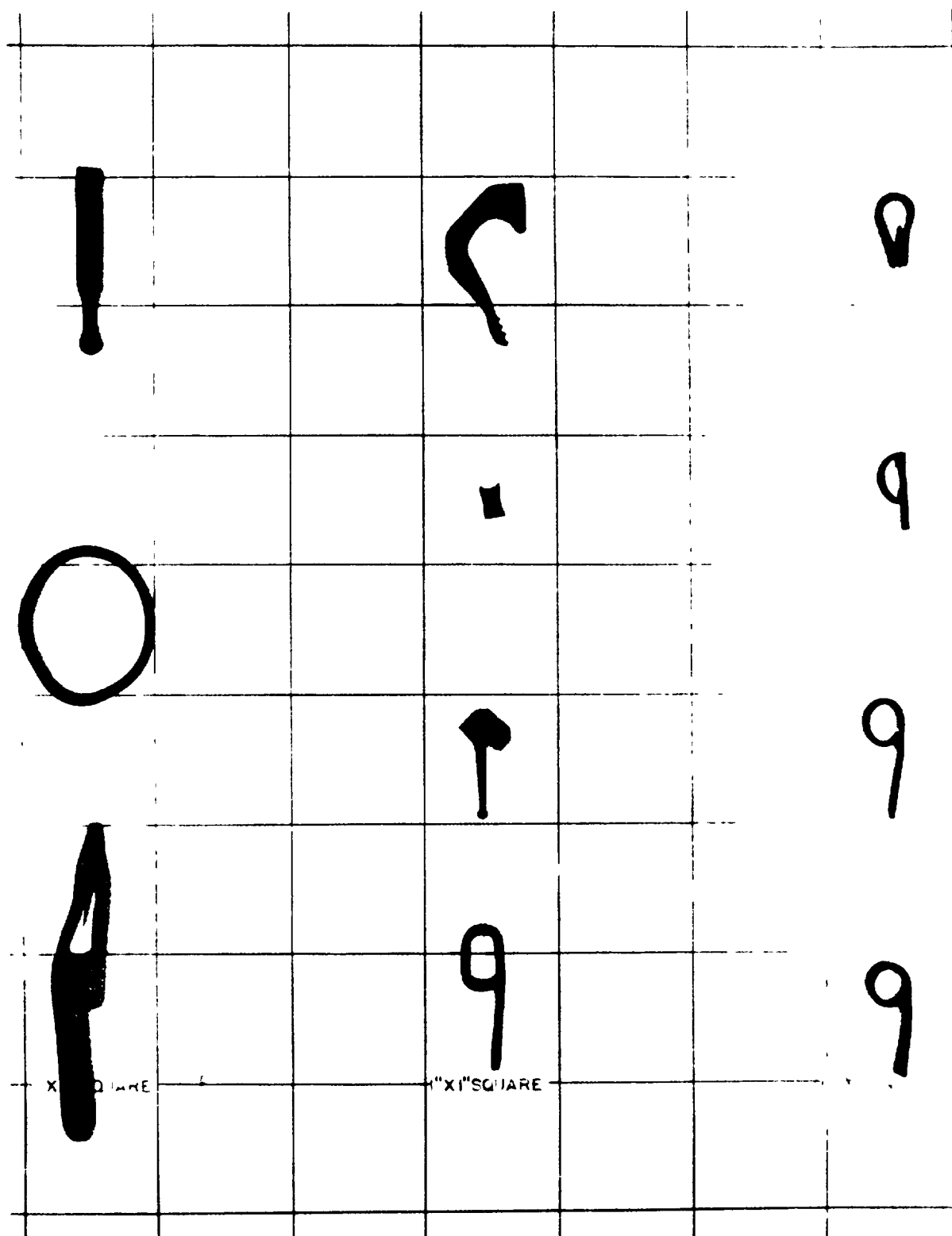


FIGURE 1—Cross sections of typical extrusions

MIL-STD-298
17 January 1957

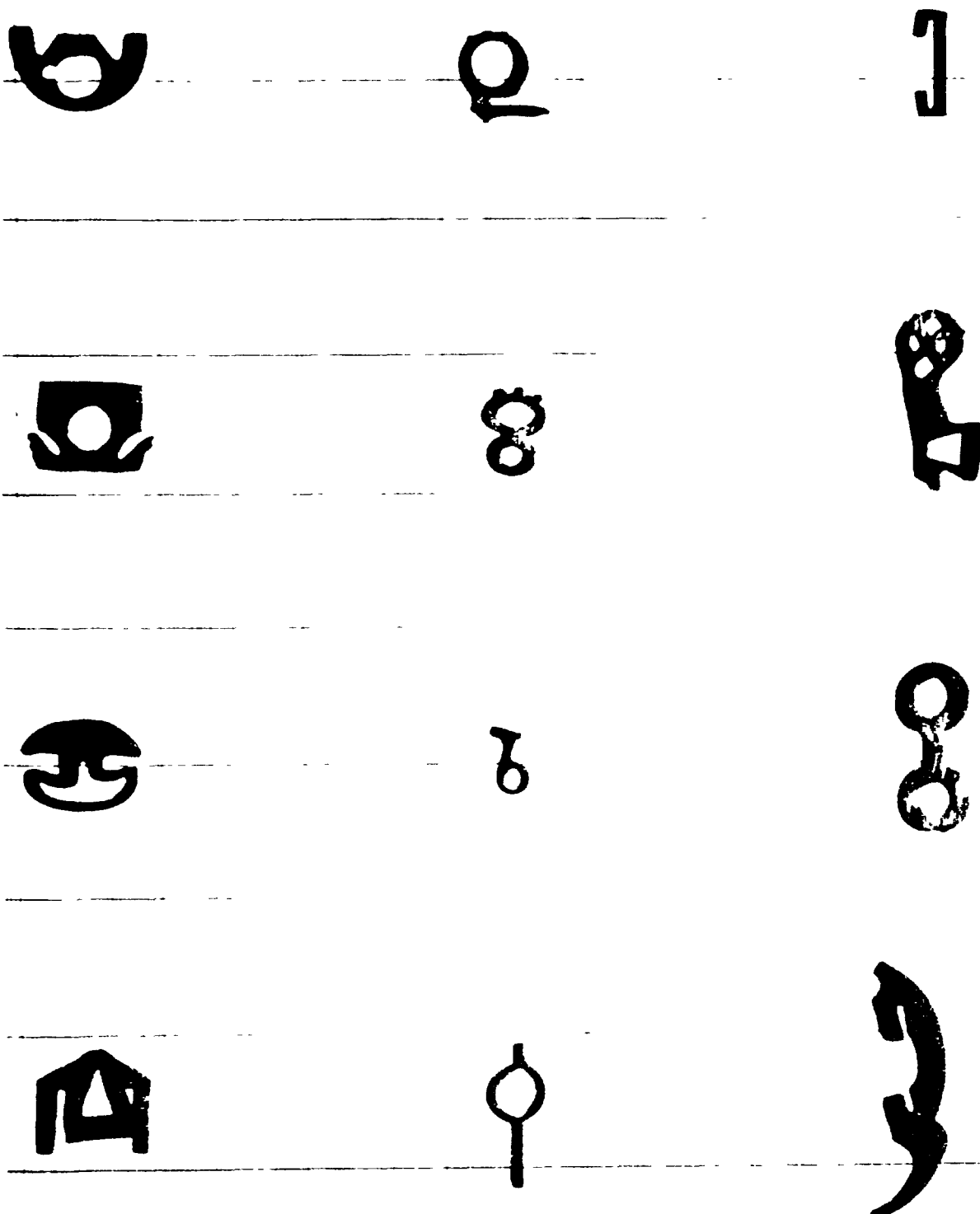


FIGURE 2—Cross sections of typical extrusions

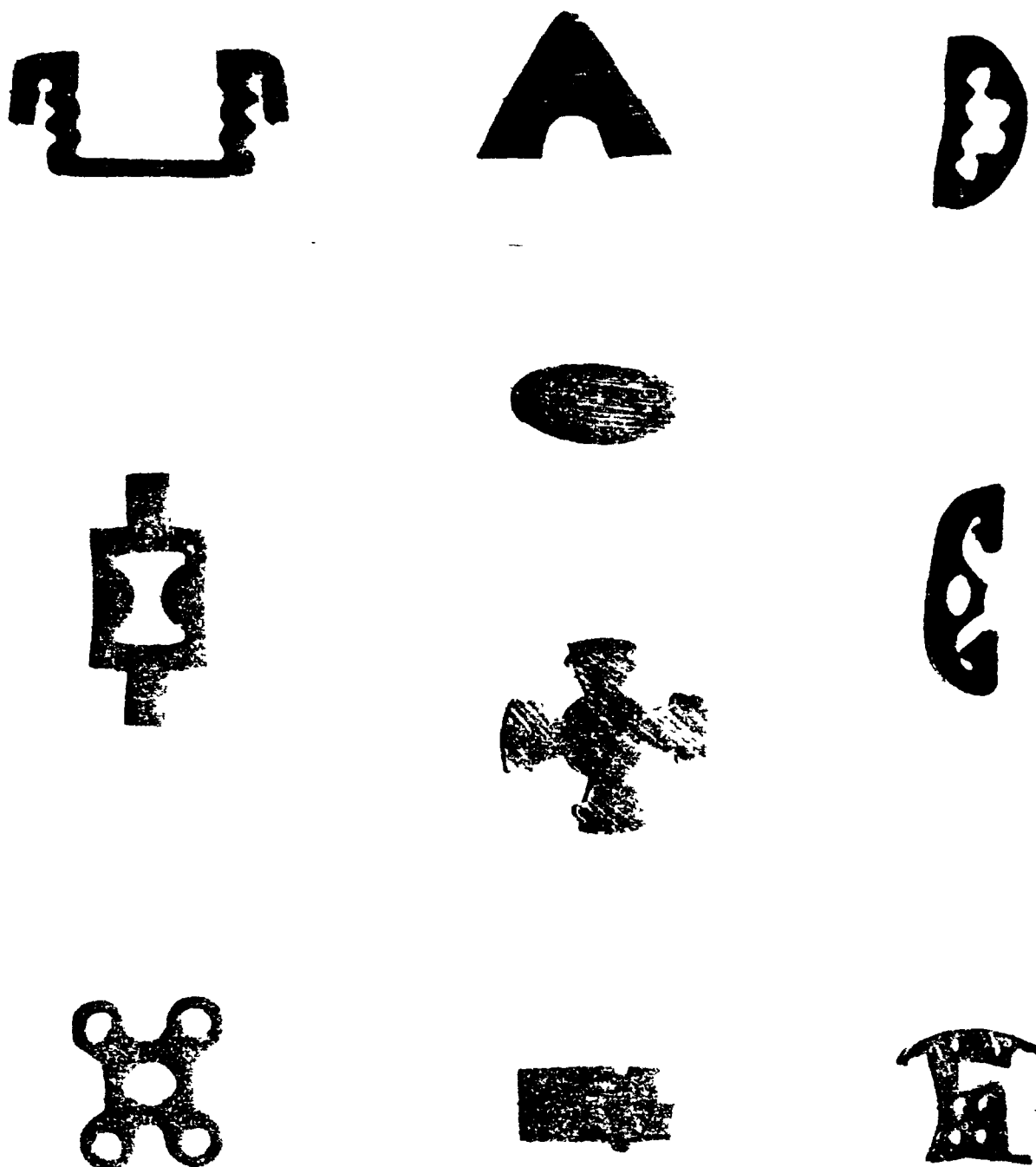


FIGURE 3—Cross sections of typical extrusions

MIL-STD-298
17 January 1957

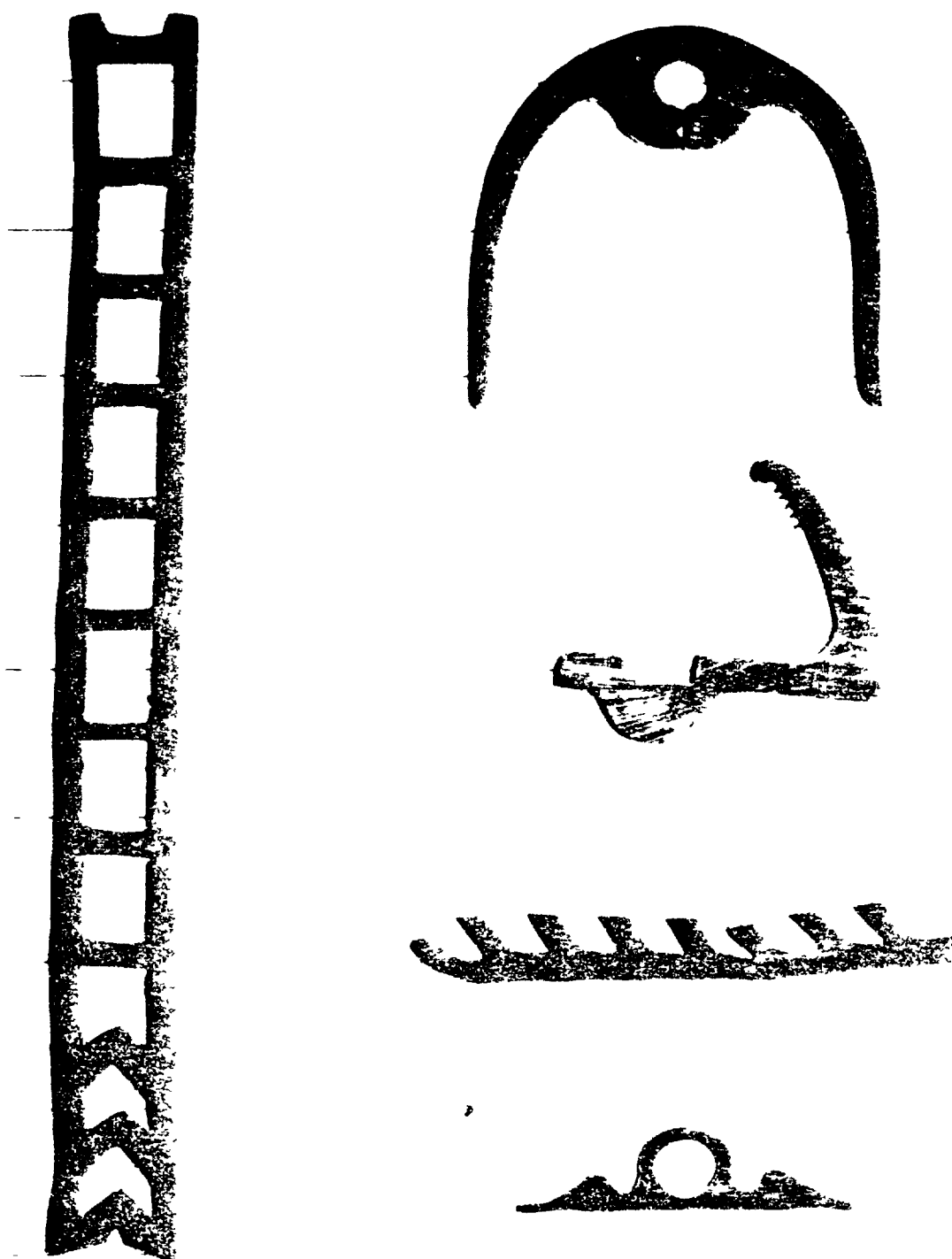
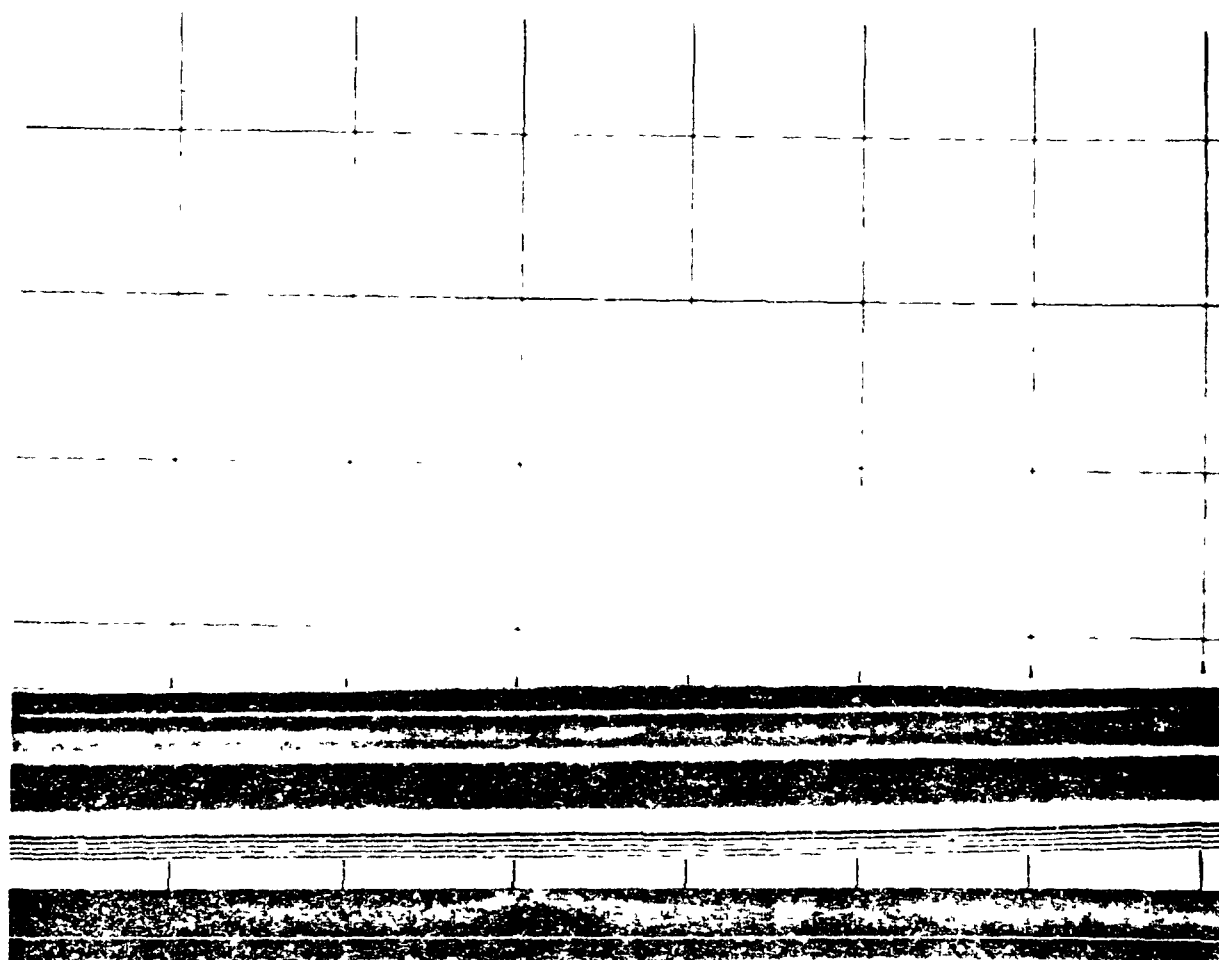


FIGURE 4—Cross sections of typical extrusions



1

FIGURE 5—Identification marks Bottom example—single line Top example—pyramids

MIL-STD-298
17 January 1957

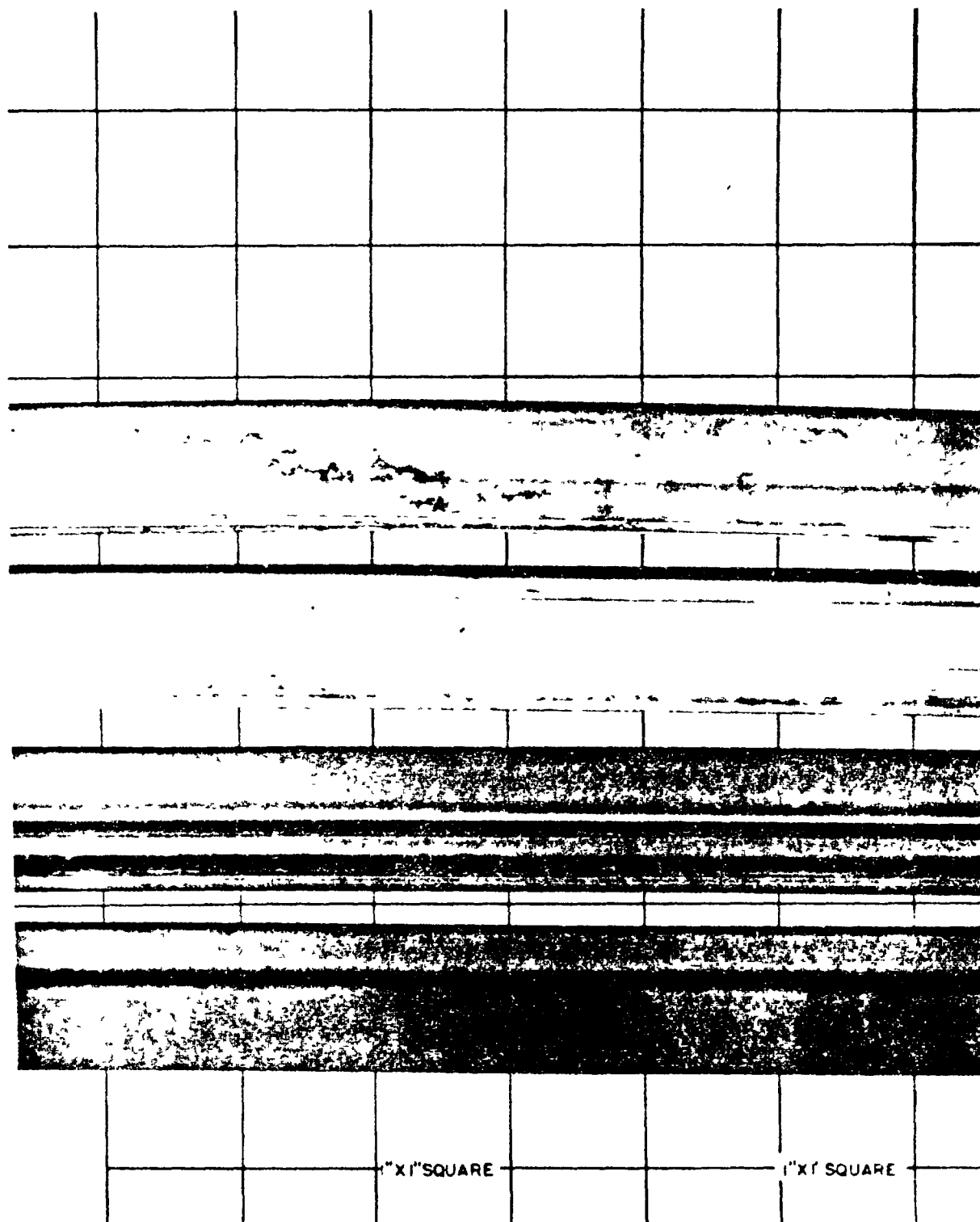


FIGURE 6—Stain or discoloration—not a defect

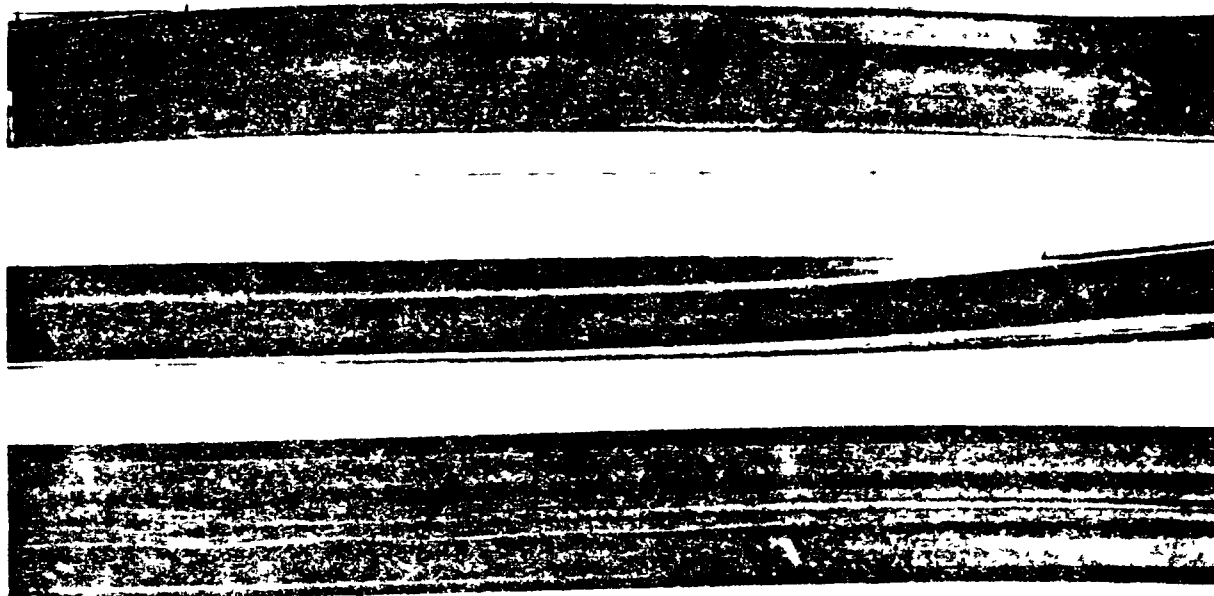


FIGURE 7—*Minor deformation—not a defect*

MIL-STD-298
17 January 1957



FIGURE 8—Delamination—minor all cases

MIL-STD-298
17 January 1957

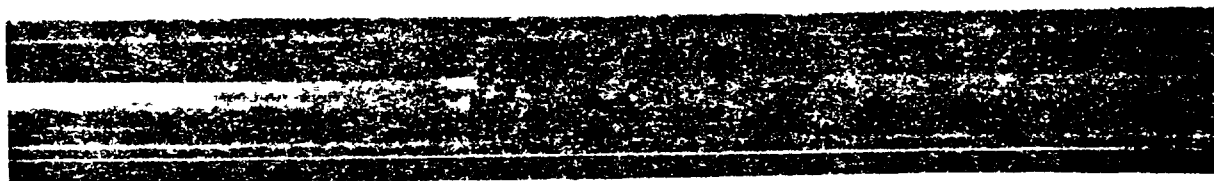
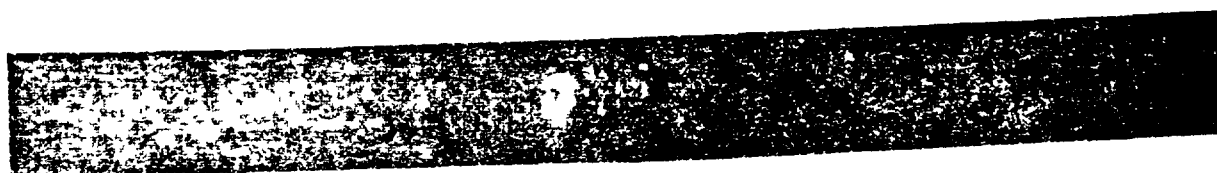


FIGURE 9—Foreign material—major all cases

MIL-STD-298
17 January 1957

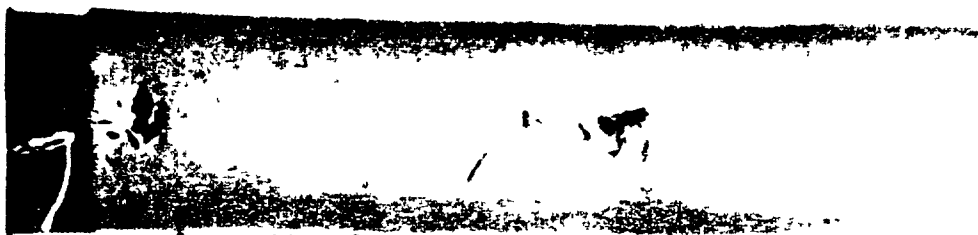


FIGURE 10—*Foreign material—major, all cases*

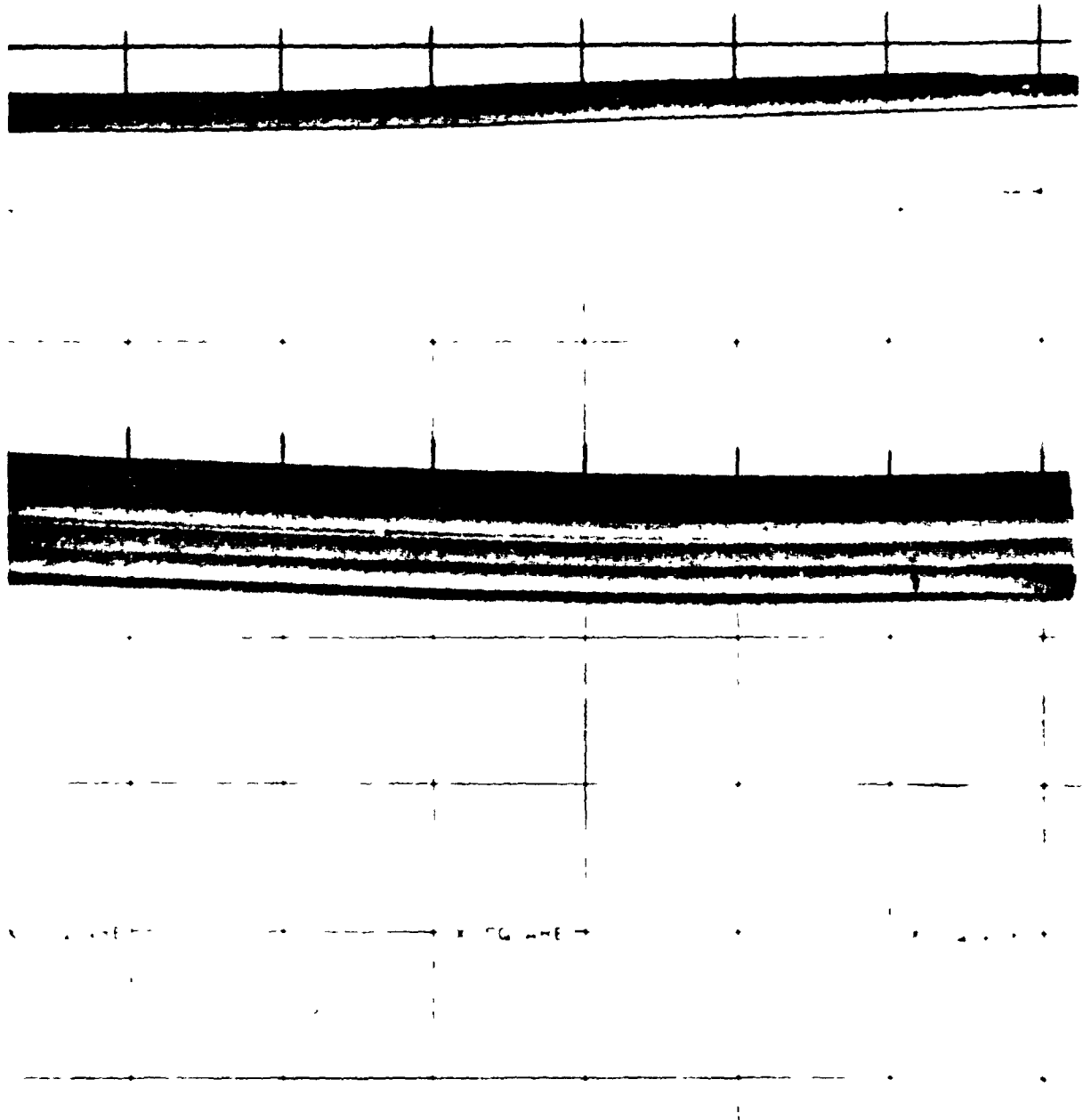


FIGURE 11—Split mark—major, all cases

MIL-STD-298
17 January 1957

4" X 1" SQUARE		1" X 1" SQUARE		1" X 1" SQUARE		

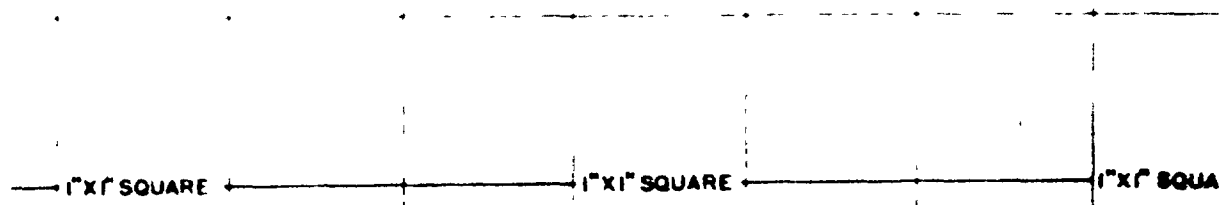
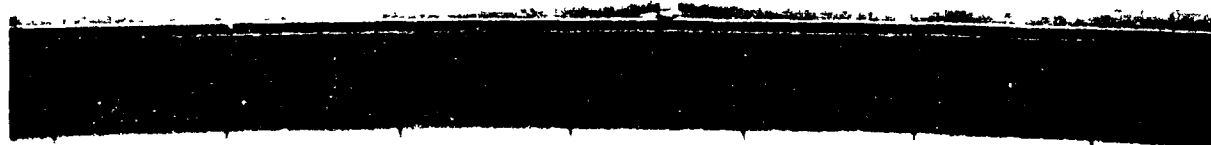


FIGURE 13—Small lump or closed blister
Sealing surface—minor
Nonsealing but visible surface—not a defect
Nonsealing and nonvisible surface—not a defect



18

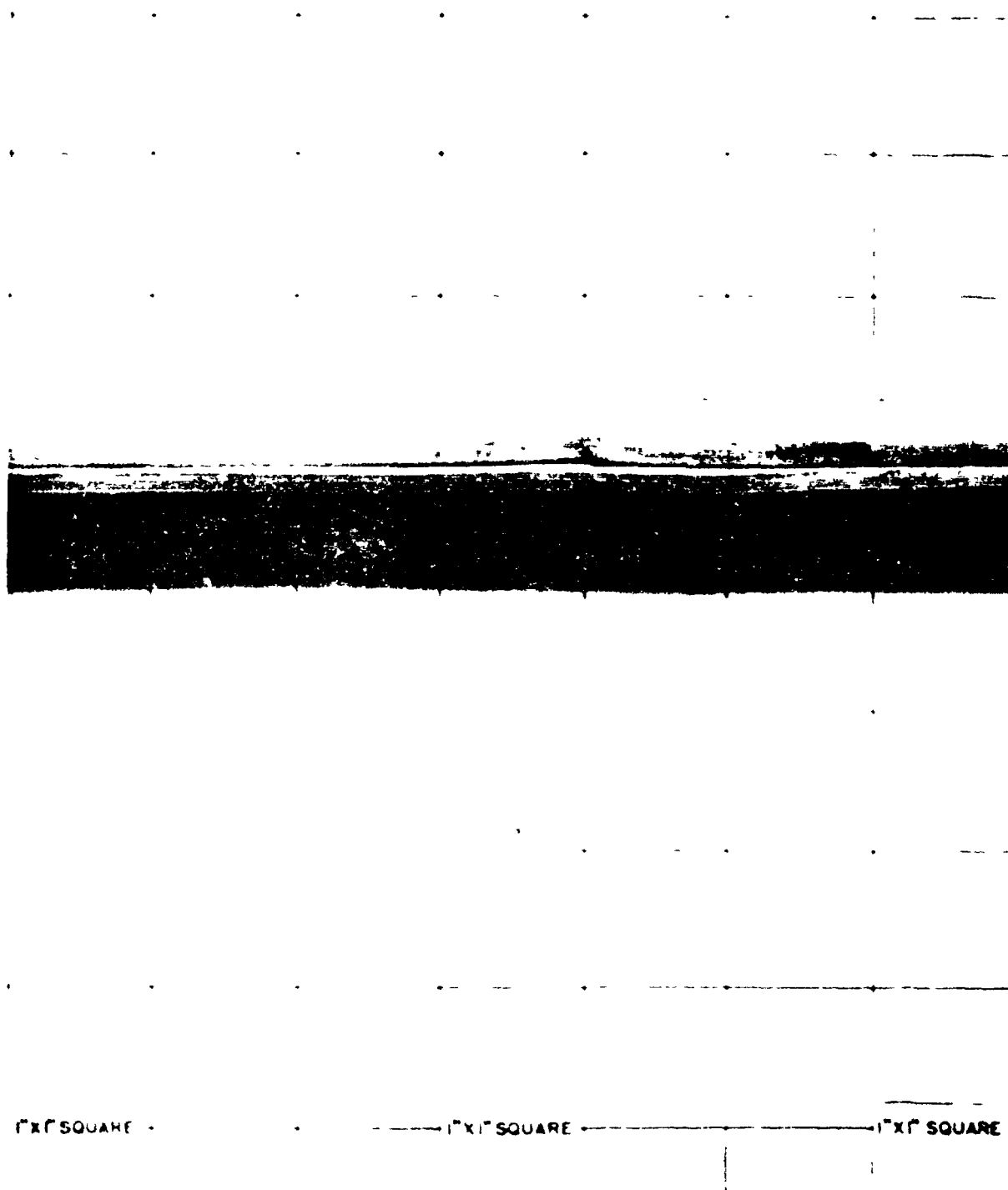
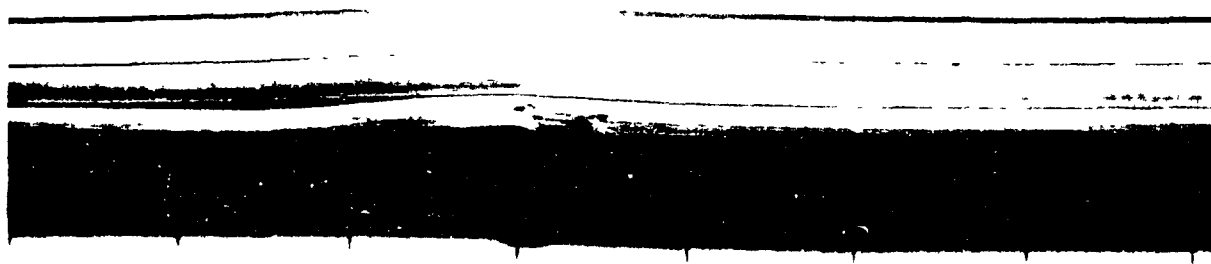


FIGURE 15—Lump or closed blister
Sealing surface—major
Nonsealing end surface—minor
Nonsealing and nonend surface—minor, etc.

MIL-STD-298
17 January 1957



1"X1" SQUARE ————— 1"X1" SQUARE ————— 1"X1" SQUARE

FIGURE 16—*Large lump or closed blister*
Sealing surface—major
Nonsealing but visible surface—major
Nonsealing and nonvisible surface—minor

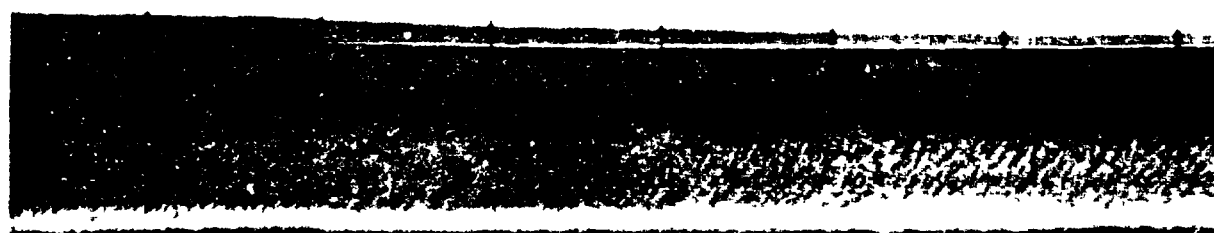


FIGURE 17—Rough
sealing surface—minimum
exposed surface—minimum
exposed surface—minimum

MIL-STD-298
17 January 1957

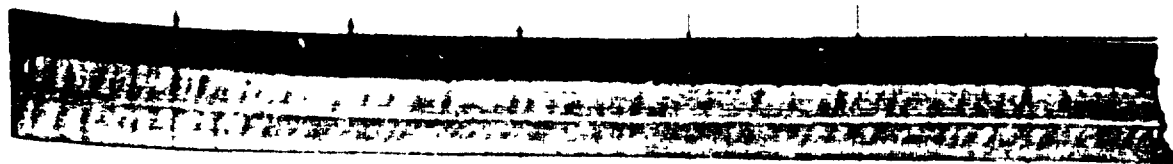


FIGURE 18—Rough
Sealing surface—major
Nonsealing but visible surface—minor
Nonsealing and nonvisible surface—not a defect

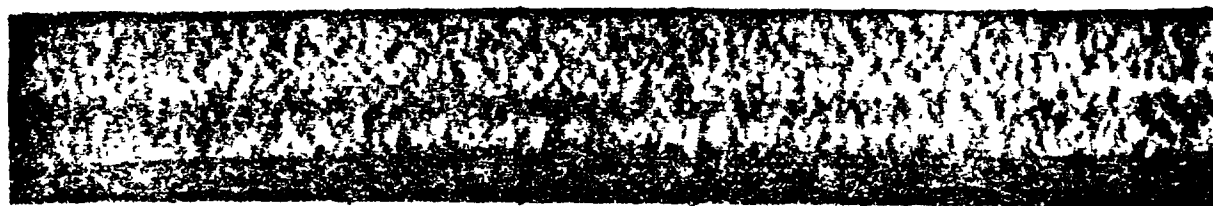


FIGURE 19—*Rough*
Sealing surface—major
Nonsealing but visible surface—minor
Nonsealing and nonvisible surface—not a defect

MIL-STD-298
17 January 1957

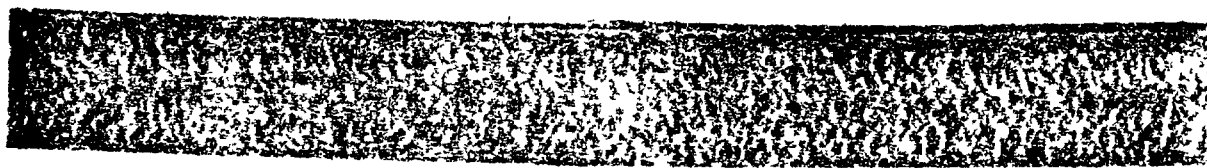


FIGURE 20—Rough
Sealing surface—major
Nonsealing but visible surface—major
Nonsealing and nonvisible surface—minor

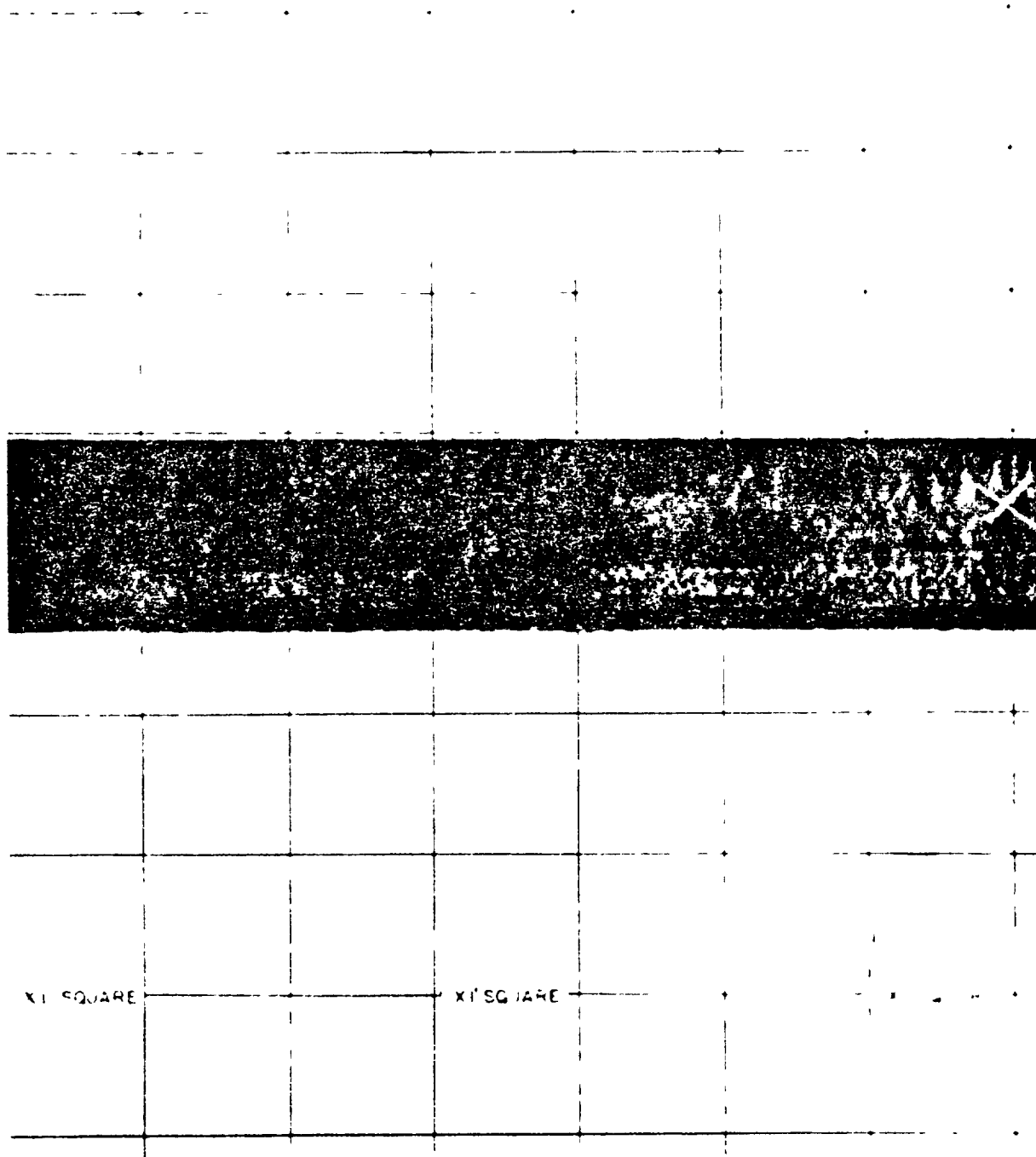


FIGURE 21—Small multiple lumps or closed blisters
Sealing surface—minor
Nonsealing but visible surface—not a defect
Nonsealing and nonvisible surface—not a defect

MIL-STD-298
17 January 1957

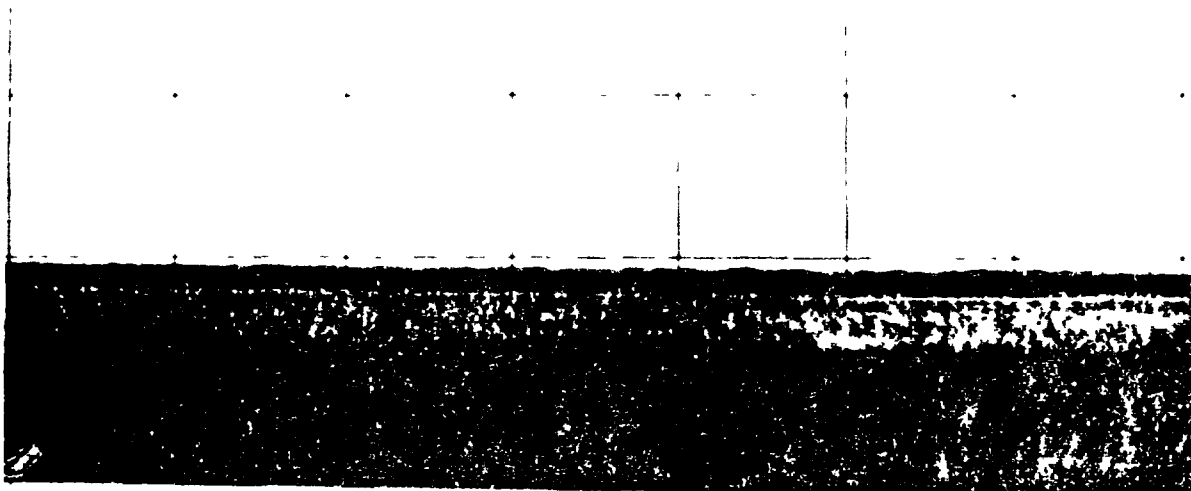


FIGURE 22—*Small multiple lumps or closed blisters*
Sealing surface—major
Nonsealing but visible surface—minor
Nonsealing and nonvisible surface—not a defect

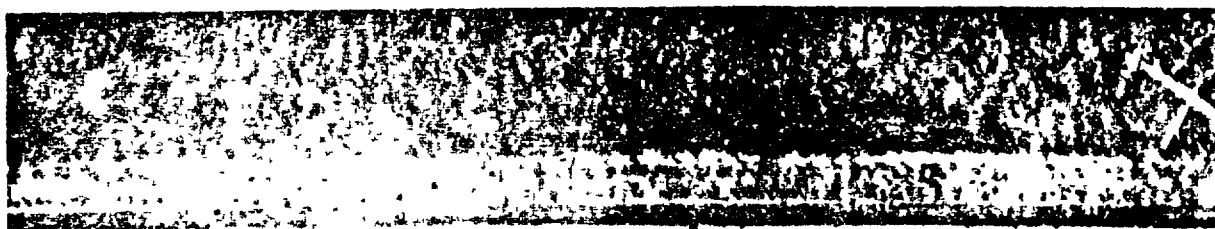


FIGURE 23—Small multiple lumps or closed blisters
Scaling surface—major
Nonscaling but visible surface—minor
Nonscaling and nonvisible surface—not a defect

MIL-STD-298
7 January 1957



FIGURE 24—Small multiple lumps or closed blisters
Sealing surface—major
Nonsealing but visible surface—major
Nonsealing and nonvisible surface—minor

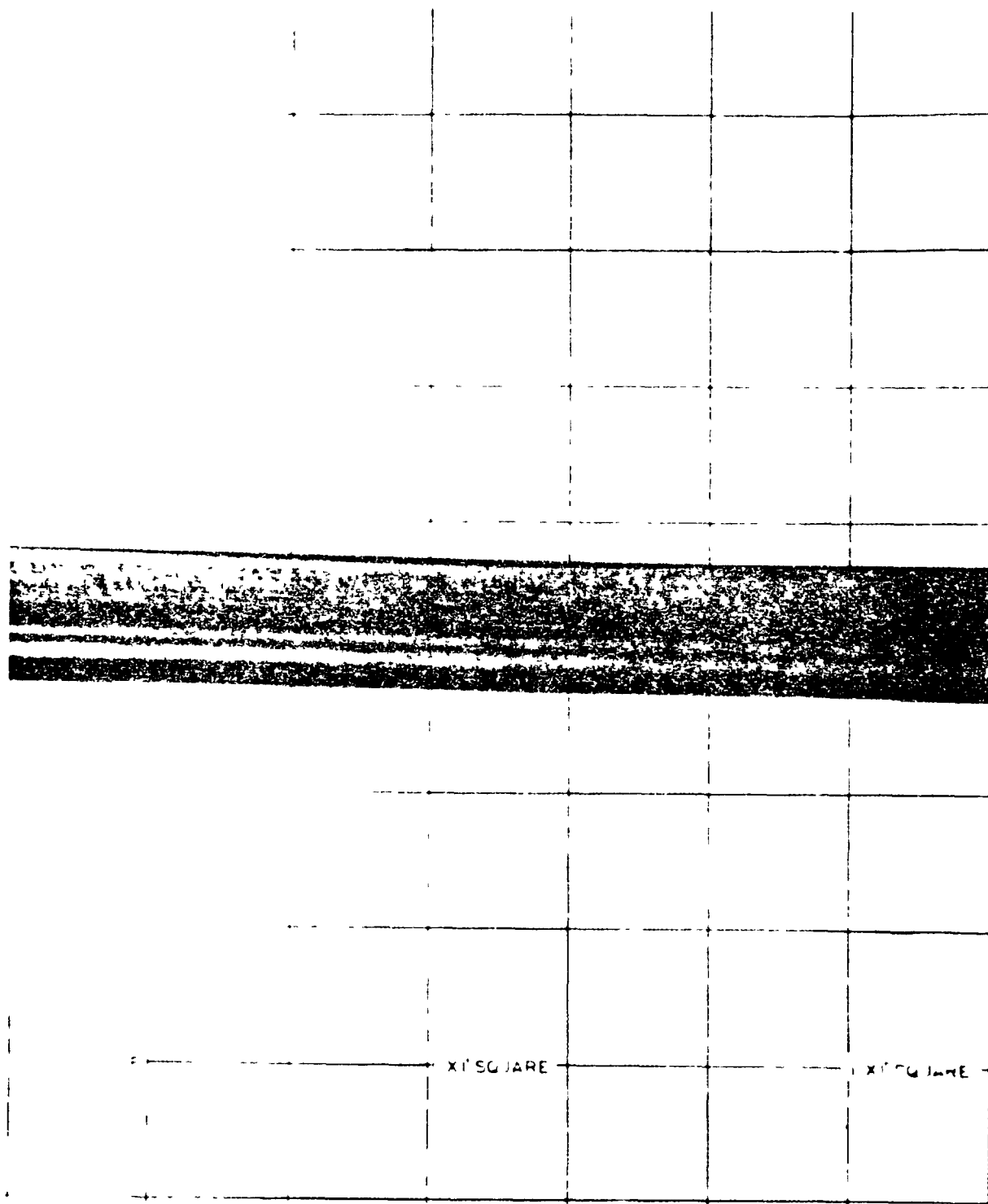


FIGURE 25—Contact roughness
Sealing surface—minor
Nonsealing but visible surface—not a defect
Nonsealing and nonvisible surface—not a defect

MIL-STD-298
17 January 1957

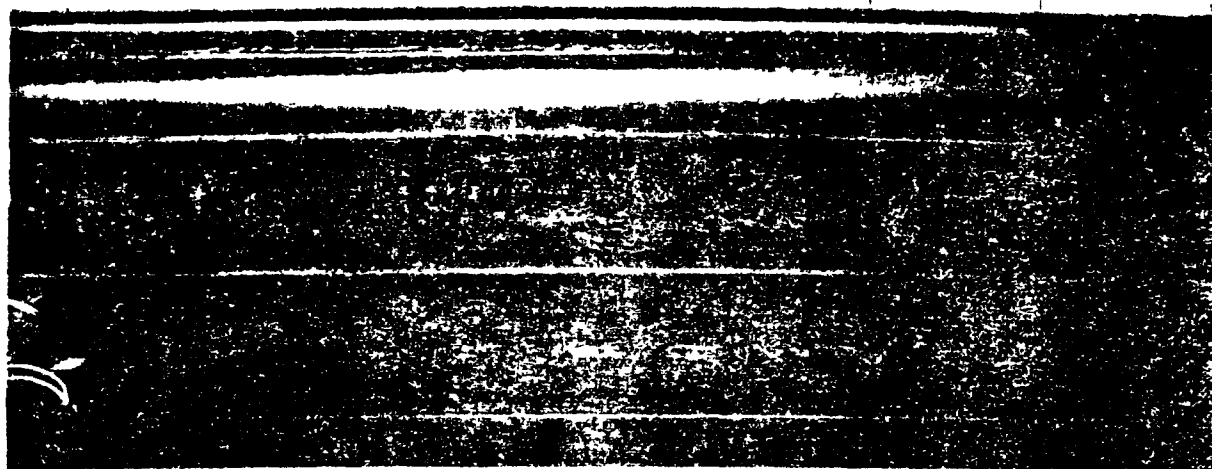


FIGURE 26—Contact roughness
Sealing surface—major
Nonsealing but visible surface—minor
Nonsealing and nonvisible surface—not a defect

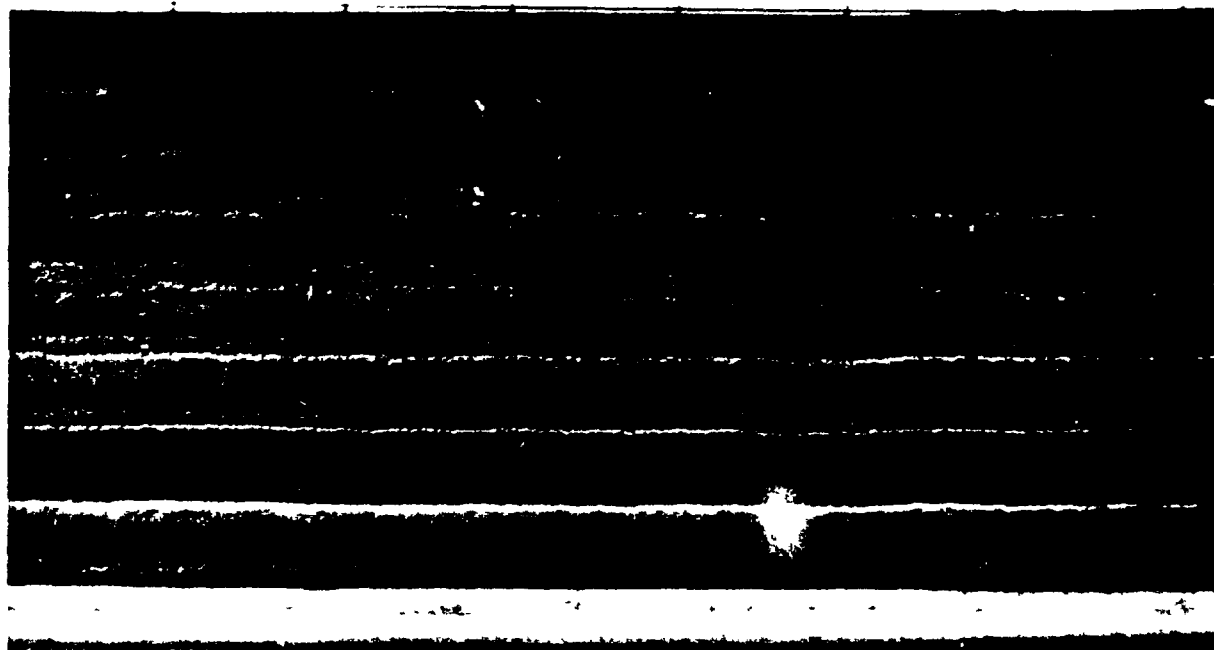


FIGURE 27—Contact roughness
Sealing surface—major
Nonsealing but visible surface—minor
Nonsealing and nonvisible surface—not a defect

MIL-STD-298
17 January 1957

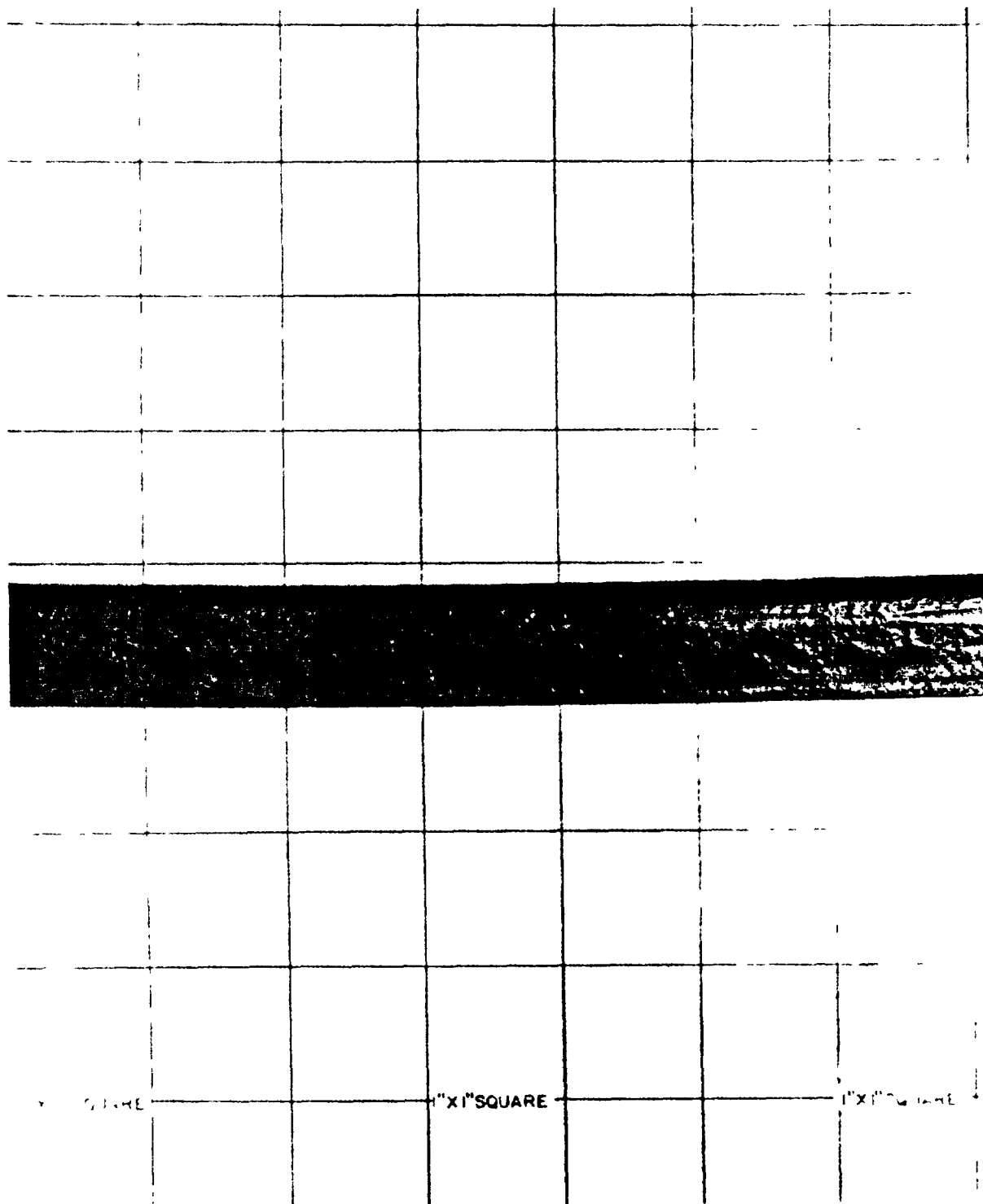
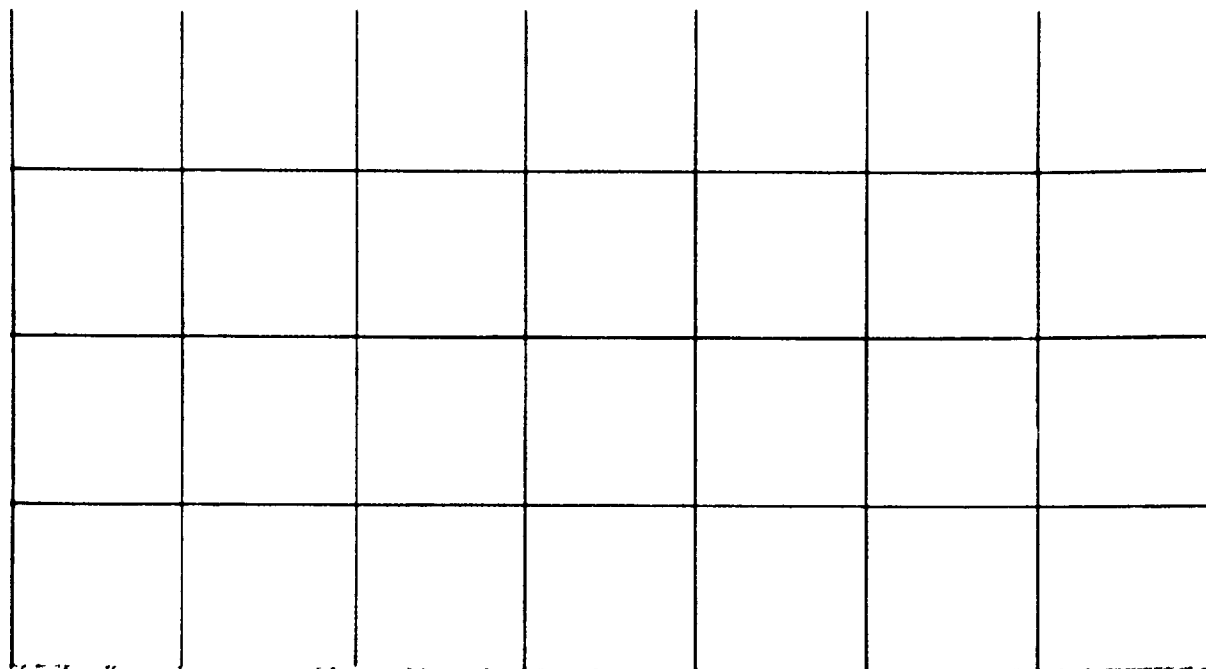


FIGURE 28—Contact roughness
Sealing surface—major
Nonsealing but visible surface—major
Nonsealing and nonvisible surface—minor



1/2"

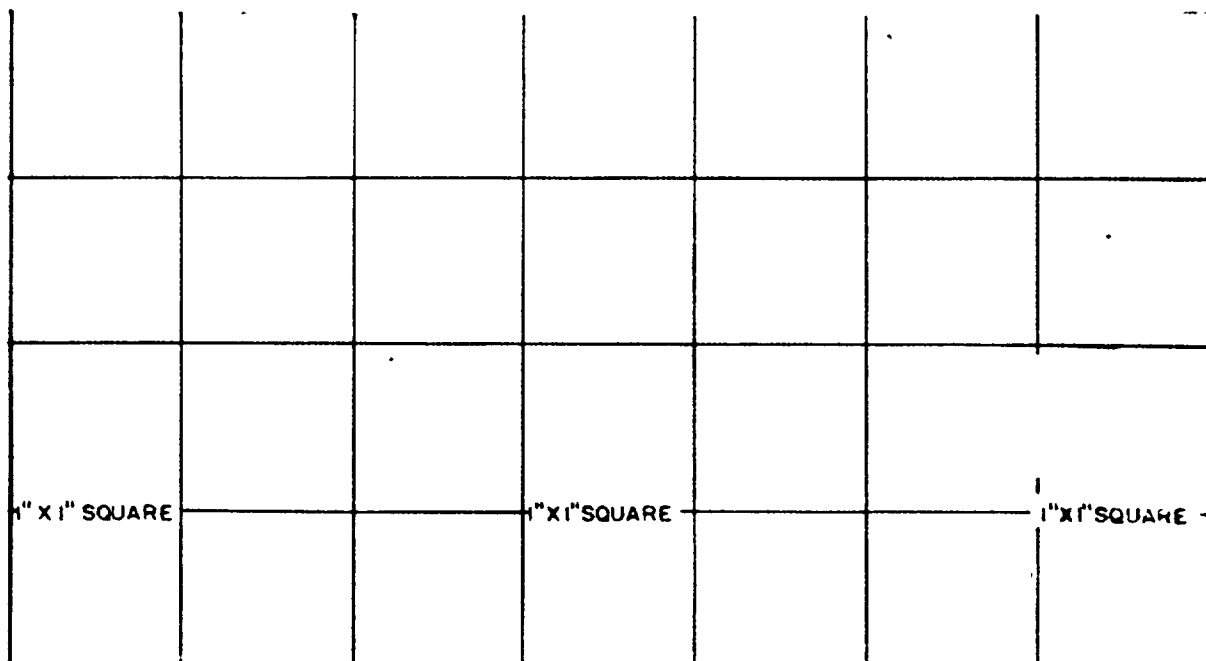


FIGURE 29 —Abrasion
Sealing surface—minor
Nonsealing but visible surface—not a defect
Nonsealing and nonvisible surface—not a defect

MIL-STD-298
17 January 1957

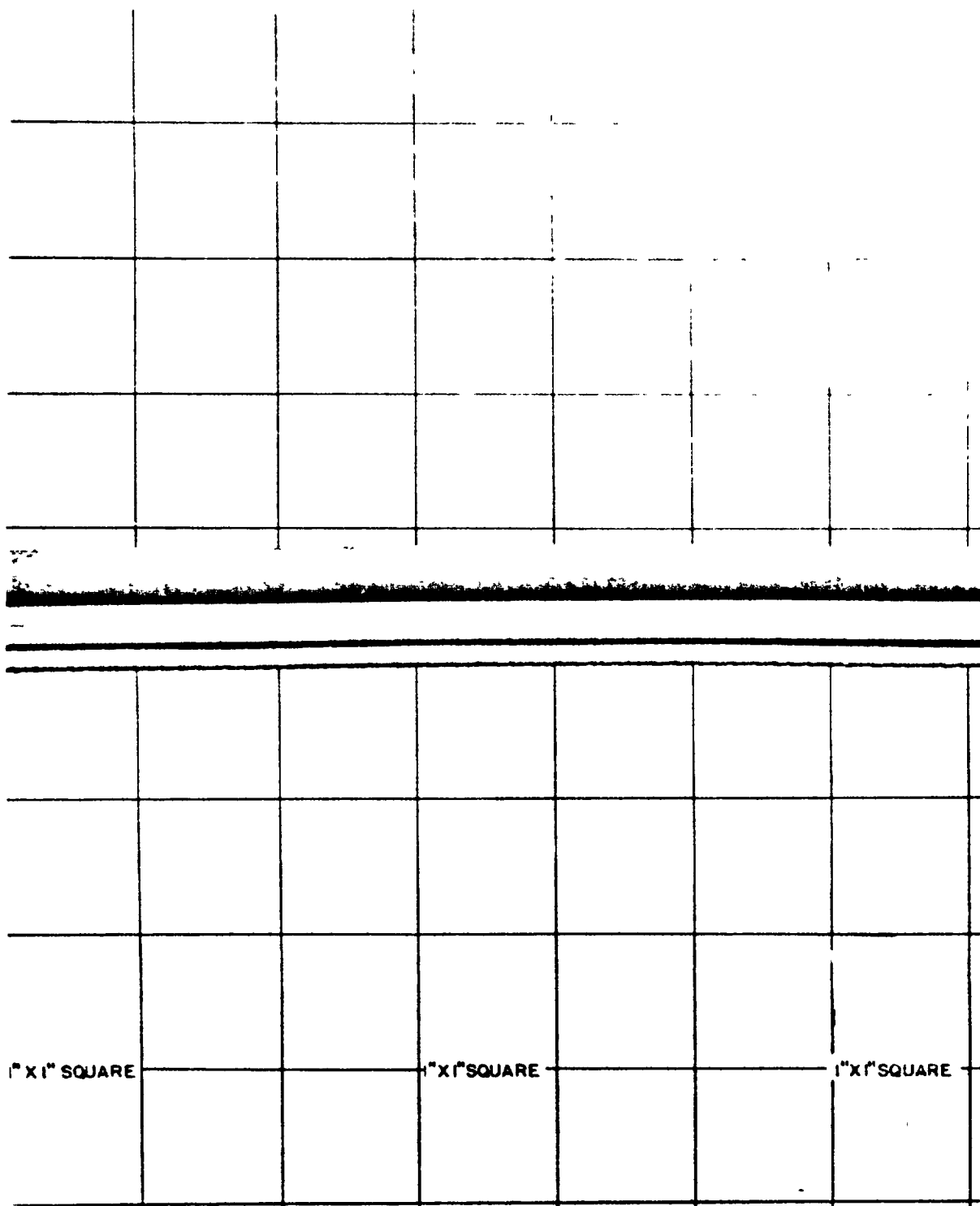


FIGURE 30—Abrasion
Sealing surface—major
Nonsealing but visible surface—minor
Nonsealing and nonvisible surface—not a defect

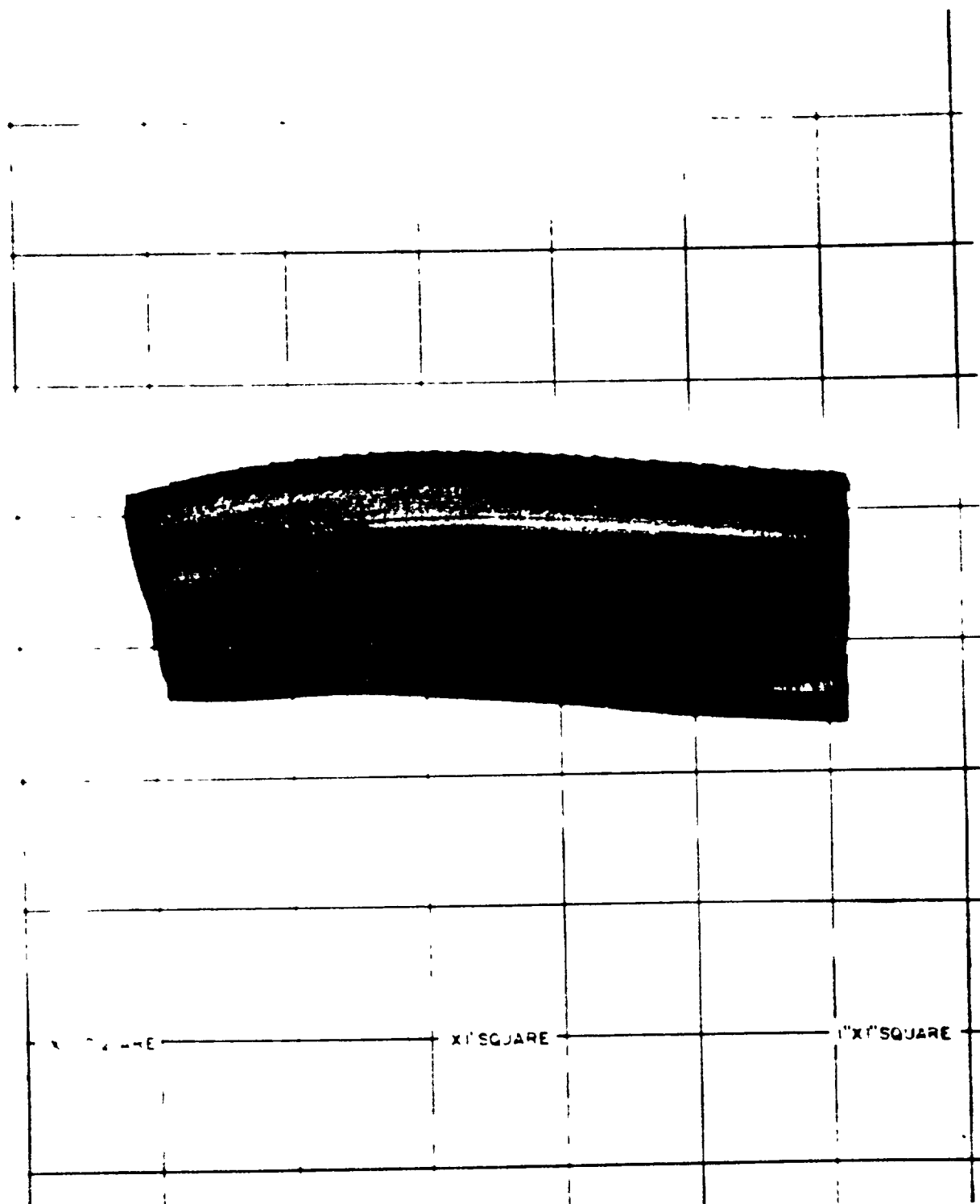


FIGURE 31—Abrasion
Sealing surface—major
Nonsealing but visible surface—minor
Nonsealing and nonvisible surface—not a defect

MIL-STD-298
17 January 1957



FIGURE 32—Abrasion
Sealing surface—major
Nonsealing but visible surface—major
Nonsealing and nonvisible surface—minor

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1 DOCUMENT NUMBER		2 DOCUMENT TITLE	
3a. NAME OF SUBMITTING ORGANIZATION		4 TYPE OF ORGANIZATION (Mark one)	
b ADDRESS (Street, City, State, ZIP Code)		<input type="checkbox"/> VENDOR	
		<input type="checkbox"/> USER	
		<input type="checkbox"/> MANUFACTURER	
		<input type="checkbox"/> OTHER (Specify) _____	
5 PROBLEM AREAS			
a. Paragraph Number and Wording			
b Recommended Wording			
c Reason/Rationale for Recommendation			
6 REMARKS			
7a NAME OF SUBMITTER (Last, First, MI) - Optional		b WORK TELEPHONE NUMBER (Include Area Code) - Optional	
c MAILING ADDRESS (Street, City, State, ZIP Code) - Optional		8 DATE OF SUBMISSION (YYMMDD)	

(TO DETACH THIS FORM, CUT ALONG THIS LINE)