

**FED. STD. NO. 162a**

**May 9, 1967**

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**SUPERSEDING**

**Int. Fed. Std. No. 00162 (NAVY-SHIPS)**

**June 14, 1965**

FEDERAL STANDARD

**HOSE, RUBBER,  
VISUAL INSPECTION GUIDE FOR**

This standard was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

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**FSC 4720**

**INFORMATION SHEET**  
**ON**  
**FEDERAL STANDARDS**

This Federal Standard is issued in loose leaf form to permit the insertion or removal of new or revised pages.

All users of Federal Standards should keep them up to date by inserting revised or new pages as issued and removing superseded and canceled pages.

New and revised pages will be issued under Change Notices which will be numbered consecutively and will bear the date of issuance. Change Notices should be retained and filed in front of the Standard until such time as they are superseded by a reissue of the entire Standard.

This Information Sheet should be filed immediately behind the cover page of the Federal Standard.

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**HOSE, RUBBER,  
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**Authority.** This standard is issued pursuant to the Federal Property and Administrative Services Act of 1949, as amended, and its application to the purchase of the commodities referred to herein is mandatory on all Federal agencies.

S1. Scope. This standard covers visible defects in natural or synthetic rubber hose.

S2. Identification. Throughout this standard, the table and figures are identified by the possible defect under study and the classification of defect. When examined and tested in accordance with the procurement document, any defect listed in this standard which permits leakage shall be reclassified "critical" when the hose and couplings are intended for any of the following uses: divers air hose, high pressure hydraulic hose, outer space application, oxygen hose, steam hose, gasoline hose, or any application where leakage can result in injury or loss of life. References to classes in table I are identified as follows :

Class A—a very high quality user-sensitive hose, primarily divers air supply hose.

Class B—high quality hose, such as high pressure hydraulic hose where failure could result in loss of life.

Class C—all other types of hose.

Where a class is not indicated, the defect is intended for all classes.

S3. Purpose. The purpose of this standard is to:

(a) Provide photographs and descriptions of the defects commonly found in rubber hose together with a statement of their usual classification: "major defect or minor defect". "Critical defects" are determined by examination and tests.

(b) Facilitate inspection of rubber hose and increase efficiency of Government inspectors.

(c) Provide a training manual for new Government inspectors.

S4. Changes. When a Federal agency considers that this standard does not provide for its essential needs, written request for changing or adding to the standard, supported by adequate justification, shall be sent to the Administration. This justification shall explain wherein the standard does not provide for essential needs. The request shall be sent in duplicate to the General Services Administration, Federal Supply Service, Standardization Division, Washington, D. C., 20406. The Administration will determine the appropriate action to be taken and will notify the agency.

S5. Applicable document. The following standard, of the issue in effect on date of invitation for bids or request for proposal, forms a part of this standard to the extent specified herein.

Military Standard:

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

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

S6. Quality assurance provisions. The sample lot, inspection level, and acceptable quality level (AQL) shall be as stated in the procurement specification and be processed in accordance with MIL-STD-105.

S7. Notes.

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S7.1 Incorporated data. This standard incorporates the requirement of MIL-STD-166, dated June 22, 1954.

S7.2 Grouping of defects. The defects in table I are grouped as follows:

- (a) Fibre jacket.
- (b) Wrap cured.
- (c) Press cured.
- (d) Miscellaneous.

S7.3 Definitions. The definitions listed in MIL-STD-105 for "critical defects", "major defects", and "minor defects" are applicable herein.

S8. Index.

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TABLE I. Classification of defects, cont'd.

Defect	Fibre jacket		Wrap cured		Press cured		Miscellaneous	
	Major	Minor	Major	Minor	Major	Minor	Major	Minor
Cover: cont'd. Bulge, large: Dynamic use (Air Force procurement only), and class A Classes B and C	----	----	X	----	X	----	X	----
	----	----	----	X	----	X	----	X
Bulge, small: Dynamic use—service abrasion (Air Force procurement only) Other use	----	----	X	----	X	----	----	----
	----	----	Not a defect.	Similar to figure 20.	Not a defect.	20	Not a defect.	Similar to figure 20.
Bump: In contour In nipple area	----	----	----	----	----	----	----	X
	----	----	----	----	----	----	----	X
Crack	----	----	X	----	X	----	X	----
	----	----	X	----	X	----	X	----
Dent	----	----	X	----	X	----	X	----
	----	----	Not shown. Similar to figures 23 and 24.	Similar to figures 23 and 24.	Not shown. Similar to figures 25 and 26.	22	Not shown. Similar to figures 25 and 26.	24
Depressions: Large area	----	----	X	----	X	----	X	----
	----	----	X	----	X	----	X	----
Deep	----	----	X	----	X	----	X	----
	----	----	Not shown. Similar to figures 27 and 28.	Similar to figures 27 and 28.	Not shown. Similar to figures 25 and 26.	25 and 26	Not shown. Similar to figures 25 and 26.	27 and 28
Small and light, Class A	----	----	X	----	X	----	X	----
	----	----	X	----	X	----	X	----
Classes B and C	----	----	----	X	----	X	----	X
	----	----	----	X	----	X	----	X
Small and light	----	----	----	X	----	X	----	X
	----	----	Not shown. Similar to figures 33 and 34.	Similar to figures 33 and 34.	Not shown. Similar to figures 29, 30, 31, and 32.	29, 30, 31, and 32	Not shown. Similar to figures 29, 30, 31, and 32.	33 and 34
Discolored	----	----	Not a defect.	35	Not a defect.	35	Not a defect.	35
	----	----	----	----	Not a defect.	36	Not a defect.	36
Dog leg	----	----	X	----	X	----	X	----
	----	----	Not shown. Similar to figure 37.	Similar to figure 37.	Not shown. Similar to figure 37.	37	Not shown. Similar to figure 37.	37
Groove, deep	----	----	X	----	X	----	X	----
	----	----	Not shown. Similar to figure 38.	Similar to figure 38.	Not shown. Similar to figure 38.	38	Not shown. Similar to figure 38.	38
Rupture, large	----	----	X	----	X	----	X	----
	----	----	Not shown. Similar to figure 38.	Similar to figure 38.	Not shown. Similar to figure 38.	38	Not shown. Similar to figure 38.	38

Hole: reinforcement exposed	X	Not shown. Similar to figures 39, 40, and 41.	X	39, 40, and 41	X	39, 40, and 41
Hole, small, reinforcement not exposed						
Lap: Foldover, opening	X	Not shown. Similar to figure 41.	X	41	X	41
	X	42 and 43	X	43	X	Not shown. Similar to figures 42 and 43.
Open lap in fabric.	X	44	X	Not shown. Similar to figure 44.	X	Not shown. Similar to figure 44.
	X	Not shown. Similar to figure 45.	X	Not shown. Similar to figure 45.	X	45
No opening and no lack of adhesion (similar to fig. 43 but no delamination)	Not a defect.		Not a defect.		Not a defect.	
Lead:						
Burst	X		X	46	X	
Charge mark (dent) (see also dog leg)	X		X	47	X	
Charge mark	X		X	48	X	
	X		X	48	X	
	Not a defect.		Not a defect.	48	Not a defect.	
Charge mark (also see machine stop):						
Class A	X		X	49	X	
Classes B and C	Not a defect.		Not a defect.	49	Not a defect.	
Flakes, lead:						
Class A	X		X	50 and 51	X	
Class B	X		X	50	X	
Class C	X		X	51	X	
	Not a defect.		Not a defect.	51	Not a defect.	
	X		X	50	X	
Machine stop (also see charge mark):						
Class A	X		X	52	X	
Class B	X		X	52	X	
Class C	Not a defect.		Not a defect.	52	Not a defect.	
Pop (also see lead, burst):						
Through body	X		X	53	X	
Reinforcement exposed	X		X	54	X	
Reinforcement, not exposed:						
Class A	X		X	55	X	
Class B	X		X	55	X	
Class C	Not a defect.		Not a defect.	55	Not a defect.	

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TABLE I. Classification of defects, cont'd.

Defect	Fibre jacket		Wrap cured		Press cured		Miscellaneous	
	Major	Minor	Major	Minor	Major	Minor	Major	Minor
Cover: cont'd.								
Slit or stripper cut	----	----	----	----	X	----	----	----
Stripper cut (into braided cover)	----	----	----	----	X	----	----	----
Light cover, under gage, or thickness below tolerance limit	----	----	X	----	X	----	58 and 59	----
Light cover (roughness), thickness not below specified or not specified	----	----	----	X	----	X	60, 61, 62, and 63	----
Loose (also see blister)	----	----	X	----	X	----	65	64 and 65
Lubricant, excess	----	----	----	----	Not a defect.		66	----
Lump, foreign material inclusion or lamination	----	----	----	----	X	----	67 and 68	----
Lump, small protrusion, no hole: Class A	----	----	----	----	X	----	69	----
Classes B and C	----	----	----	----	----	X	69	----
Missing (reinforcement exposed)	----	----	X	----	X	----	70 and 71	70 and 71
Patched cover, open edges	----	----	X	----	X	----	72	72
Patched incorrect thickness (either high or low spot)	----	----	X	----	X	----	Not shown. Similar to figure 73.	Not shown. Similar to figure 73.
Patched-correct thickness and securely cured	----	----	Not a defect.	73 and 74	Not a defect.	73 and 74	Not shown. Similar to figures 73 and 74.	Not shown. Similar to figures 73 and 74.
Porosity: Extended area, over 10 percent of thickness	----	----	X	----	X	----	Not shown. Similar to figure 75.	Not shown. Similar to figure 75.
Extended area, under 10 percent of thickness	----	----	----	X	Not shown.	----	Not shown.	Not shown.
Small localized area, reinforcement not exposed	----	----	----	X	Not shown.	----	Not shown.	Not shown.
Small localized area, under 10 percent of thickness	----	----	Not a defect.	Not shown.	Not a defect.	Not shown.	Not shown.	Not shown.

Pricker mark, through to reinforcement (note: when specified in procurement document for service requirement, not a defect)	----	----	X	Not shown. Similar to figure 77.	X	77	X	Not shown. Similar to figure 77.
Pricker mark or air tracks, small area, not through to reinforcement	----	----	X	Not shown. Similar to figure 78.	----	78	X	Not shown. Similar to figure 78.
Ridge:	----	----						
Lamination or separation	----	----	X	79	X	Not shown. Similar to figure 79.	X	Not shown. Similar to figure 79.
Large	----	----	X	80	X	Not shown. Similar to figure 80.	X	Not shown. Similar to figure 80.
Small	----	----	X	81 and 82	----	Not shown. Similar to figures 81 and 82.	X	Not shown. Similar to figures 81 and 82.
Note: Edges of depressions due to wrapper wrinkles are usually sharply defined and regularly patterned thus distinguishing them from surface irregularities caused by buckled carcass which have rounded edges. Air Force procurement only—more than 6 percent of hose length	----	----						
Rough	----	----	X	81 and 82	X	83	X	Not shown. Similar to figures 81 and 82.
Slit	----	----						
Split	----	----	X	Not shown. Similar to figures 84 and 85.	See Lead, slit	84 and 85	X	Not shown. Similar to figures 84 and 85.
Stripper cut	----	----						
Thickness, over, not mentioned in procurement document	----	----	Not a defect.	Similar to figure 86.	Not a defect.	86	Not a defect.	Not shown. Similar to figure 86.
Thickness, under, below tolerance light. (Also see light (gage))	----	----	X	87	X	87	X	87
Thickness, eccentric (lopsided), outside tolerance	----	----	X	Not shown. Similar to figure 88.	X	88	X	Not shown. Similar to figure 88.
Thickness, eccentric (lopsided) tolerance met	----	----	Not a defect.	Similar to figure 88.	Not a defect.	88	Not a defect.	Not shown. Similar to figure 88.
Wrinkles	----	----	X	90	----	----	X	89
Wrinkles, wrapper, medium	----	----	X	91	----	----	----	----
Wrinkles, wrapper, small	----	----	Not a defect.	92 and 93	Not a defect.	----	----	----
Wrinkles, wrapper, fine	----	----	Not a defect.	92 and 93	Not a defect.	----	----	----

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TABLE I. Classification of defects, cont'd.

Defect	Fibre jacket		Wrap cured		Press cured		Miscellaneous	
	Major	Minor	Figure number	Major	Minor	Figure number	Major	Minor
Ends: Capped: Fabric exposed				X				
Flash or rind, excessive				X		94		
Flash or rind, small				X		95		
Loose				Not a defect.		95		
Missing, where specified				X		96		
Cut:				X		Not shown.		
Angle or diagonal, specified length	X		97	X		Not shown.	X	
Angle or diagonal, random length	Not a defect.		97	Not a defect.		Similar to figures 97 and 98.	Not a defect.	98
Ends:				X		99	X	
Ragged, specified length	Not shown.			Not a defect.		99	Not a defect.	100
Ragged, random length	Not a defect.			Not a defect.		99	Not a defect.	100
Untrimmed:				X		Not shown.	X	
Specified length	X		101	Not a defect.		Similar to figure 101.	Not shown.	101
Random length	Not a defect.		101	Not a defect.		101.	Not a defect.	101
Reinforced: (also see ends capped)				X		102 and 103	X	
Lamination (separation)				X		104, 105, and 106	X	
Void				X		107	X	
Fittings (couplings, end):				X		Not shown.	X	
Connections, flanges:				X		Similar to figure 107.	X	
Angle set	X		Not shown.	X		Not shown.	X	
Bands, clamps, ferrules or nipples	X		Not shown.	X		Not shown.	X	
—incorrectly placed	X		Not shown.	X		Not shown.	X	
Bands, clamps, ferrules or nipples	X		Not shown.	X		Not shown.	X	
—wrong size	X		Not shown.	X		Not shown.	X	
Bond, physical or vulcanized to hose, loose	X		Not shown.	X		Not shown.	X	
Bond, static wire or electrical to coupling where specified missing loose (does not make good electrical contact)	X		Not shown.	X		Not shown.	X	
Cracked or split metal	X		108 and 109	X		108 and 109	X	
Ferrule, not crimped properly	X		Not shown.	X		Not shown.	X	

Gasket (washer) incorrect size or missing	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.
Gasket, tail for expansion ring coupling, incorrect size or missing	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.
Gasket, tail, or binder washer for expansion ring coupling, not properly placed in recess	X	----	110	X	----	Not shown. Similar to figure 110.	X	----	Not shown. Similar to figure 110.	X	----	Not shown. Similar to figure 110.
Hole, bolt, flange connection missing outside tolerance improperly placed	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.
Holes, bolt, flange connection, not aligned less than 10 foot length	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.
Holes, bolt, flange connection, not aligned, 10 feet and over in length	Not a defect.	Not shown.	Not shown.	Not a defect.	Not shown.	Not shown.	Not a defect.	Not shown.	Not shown.	Not a defect.	Not shown.	Not shown.
Insertion distance wrong	X	----	Not shown. Similar to figure 111.	X	----	Not shown. Similar to figure 111.	X	----	Not shown.	X	----	Not shown. Similar to figure 111.
Nipple, loose	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.
Nipple not expanded (internal expanded type only)	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.
Expansion ring:												
Loose or not expanded	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.
Placement:												
In waterway, too much gap	X	----	112	X	----	Similar to figure 112.	X	----	Similar to figure 112.	X	----	Similar to figure 112.
Sleeve, not tightened properly	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.
Swivel, female, tight or frozen	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.
General:												
Cement in tube	----	X	113 and 114	----	X	113 and 114	----	X	113 and 114	----	X	113 and 114
Clamp mark	X	----	115 and 116	X	----	117	X	----	117	X	----	117
Crushed, wire reinforced	X	----	118	X	----	118	X	----	118	X	----	118
Fabric pulled out from coupling	X	----	119	X	----	Not shown. Similar to figure 119.	X	----	Not shown. Similar to figure 119.	X	----	Not shown.
Kinked, wire reinforced	----	----	----	X	----	120	X	----	Not shown. Similar to figure 120.	----	----	----
Rough, surface												
Skips, corrugated surface	----	----	----				See Cover: light (gage) figures 60 and 61					
Smooth, corrugated surface	----	----	----				Not a defect.		121			----
Twisted, nonwire reinforced	----	----	----				Not a defect.		122			----
Printing or branding:												
Color, wrong	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.
Illegible	X	----	Not shown. Similar to figure 124.	X	----	124	X	----	125	X	----	Not shown. Similar to figure 125.
Information, wrong	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.

## Fed. Std. No. 162a

TABLE I. Classification of defects, cont'd.

Defect	Fibre jacket		Wrap cured		Press cured		Miscellaneous		
	Major	Minor	Figure number	Major	Minor	Figure number	Major	Minor	Figure number
Printing or branding: cont'd. Location, improper	----	X	126	----	X	Not shown. Similar to figure 126.	----	X	Not shown. Similar to figure 126.
Loose, large area	----	----	127	X	----	127	X	----	----
Loose, small area	----	----	Not shown.	X	----	Not shown.	----	X	Not shown.
Missing, when specified	X	----	Not shown.	X	----	Not shown.	X	----	Not shown.
Slipped brand, legible	----	----	Not shown.	X	----	128	----	X	----
Slipped legible	----	----	129	Not a defect.	----	Not shown. Similar to figure 129.	Not a defect.	----	----
Reinforcement: Braided: Ball-up	X	----	Not shown. Similar to figures 130 and 131.	X	----	Not shown. Similar to figures 130 and 131.	X	----	130 and 131
Broken strand, more than two per plait or two in 2 inches	----	----	----	----	----	132	X	----	132
Broken strand, less than two per plait or less than two every 2 inches	----	----	----	----	----	Not shown.	----	X	Not shown.
Crossed strand, first braid	----	----	----	----	----	133	X	----	133
Crossed strand, other than first braid	----	----	----	----	----	134	Not a defect.	----	134
Dough (filler) where specified, absent or missing	----	----	135	X	----	135	X	----	135
Dough (filler) where specified, excessive	----	----	136	X	----	136	X	----	Not shown. Similar to figure 136.
Flare, wire at end $\frac{1}{8}$ inch greater than braid O.D.	----	----	----	----	----	137	X	----	137
Friction between braids where specified, missing	----	----	Not shown. Similar to figure 138.	X	----	138	X	----	138
Knot in yarn	----	----	Not shown. Similar to figure 139.	X	----	139	X	----	139
Looped strand, first braid, class A Classes B and C	----	----	Not shown. Similar to figure 140.	X	----	140	X	----	140
Other than first braid	----	----	Not shown. Similar to figure 140.	----	X	140	----	X	140



## Fed. Std. No. 162a

TABLE I. Classification of defects, cont'd.

Defect	Fibre jacket		Wrap cured		Press cured		Miscellaneous	
	Major	Minor	Major	Minor	Major	Minor	Major	Minor
Reinforcement: cont'd. Ply turnback at leading edge—improper ply distribution			X				X	
Wrapped fabric, wire reinforced: broken wire			X		Not shown.		X	
Corrugations bad			X		162		X	
Filler, insufficient (noncorrugated surface hose)				X	163			X
Filler, insufficient (noncorrugated surface hose (Air Force procurement only))			X		163		X	
Pitch-incorrect			X		164		X	
Pitch-uneven				X	165			X
Wire, rusty or wrong size			X		Not shown.		X	
Wire, not tied down properly at end			X		163		X	
Wire, static, bulge:			X		Not shown.		X	
With loose cover					Similar to figure 166.			
Dynamic use (Air Force procurement only)			X		166		X	
With adhered cover			Not a defect.		166		Not a defect.	
Yarn through cover			X		167		X	
Yarn in cover:								
Class A			X		Not shown.		X	
Classes B and C				X	Similar to figure 169.			X
Tube:								
Blister					(See Cover, rubber covered—blister.)			
Bloom					(See Cover, rubber covered—bloom.)			
Break					(See Cover, rubber covered—break.)			
Buckle	X		X		Not shown. Similar to figure 170.		X	
Bulge					(See Tube, buckle.)			
Bunching					(See Tube, buckle.)			
Cement, excess								
Class A	X		X		171 and 172		X	
Classes B and C		X		X	171 and 172			X
Crack					(See Cover, rubber covered—crack.)			
Dent					(See Cover, rubber covered—dent.)			

Discolored: not a defect unless specified in procurement document	(See Cover, rubber-covered—discolored.)			
	X ----	Not shown. Similar to figure 173.	X ----	Not shown. Similar to figure 173.
<b>Fold</b>	X ----	173	X ----	Not shown. Similar to figure 173.
<b>Hole</b>	X ----	Not shown. Similar to figures 174, 175, and 176.	X ----	174
<b>Lap, open or loose</b>	X ----	Not shown. Similar to figure 177.	X ----	177
<b>Loose (separation)</b>	X ----	178, 179, and 180	X ----	182 and 181
<b>Lubricant, excess or loose:</b>	X ----	183	X ----	Not shown. Similar to figure 183.
<b>Class A</b>	X ----	183	X ----	Not shown. Similar to figure 183.
<b>Classes B and C</b>	Not a defect.	184	Not a defect.	184
<b>Lubricant, normal amount</b>	X ----	Not shown.	X ----	Not shown.
<b>Lumps</b>	X ----	Not shown. Similar to figures 185 and 186.	X ----	Not shown. Similar to figures 185 and 186.
<b>Missing</b>	X ----	Not shown. Similar to figure 187.	X ----	Not shown. Similar to figure 187.
<b>Off-center:</b>	X ----	Not shown. Similar to figure 187.	X ----	187
<b>Tube-thickness below tolerance</b>	Not a defect.	188 and 189	Not a defect.	187
<b>Tube thickness meets tolerance</b>	X ----	Not shown. Similar to figure 190.	X ----	Not shown. Similar to figure 190.
<b>Pits, deep</b>	X ----	Not shown. Similar to figure 191.	X ----	Not shown. Similar to figure 191.
<b>Pits, small, less than 15 percent of tube thickness:</b>	X ----	Not shown. Similar to figure 190.	X ----	Not shown. Similar to figure 190.
<b>Class A</b>	X ----	Not shown. Similar to figure 190.	X ----	Not shown. Similar to figure 190.
<b>Classes B and C</b>	Not a defect.	Not shown. Similar to figure 191.	Not a defect.	191
<b>Pits, small irregularities</b>	X ----	Not shown. Similar to figure 192.	X ----	Not shown. Similar to figure 192.
<b>Porosity, more than 15 percent of tube thickness</b>	X ----	Not shown. Similar to figure 192.	X ----	Not shown. Similar to figure 192.
<b>Porosity-15 percent or less of tube thickness</b>	X ----	Not shown. Similar to figure 192.	X ----	Not shown. Similar to figure 192.
<b>Class A</b>	X ----	Not shown. Similar to figure 192.	X ----	Not shown. Similar to figure 192.
<b>Classes B and C</b>	Not a defect.	Not shown. Similar to figure 192.	Not a defect.	Not shown. Similar to figure 192.

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TABLE I. Classification of defects, cont'd.

Defect	Fibre jacket		Wrap cured		Press cured		Miscellaneous		
	Major	Minor	Figure number	Major	Minor	Figure number	Major	Minor	Figure number
Tube: cont'd.	(See Cover, rubber-covered—ridge.)								
Ridge									
Ring									
Class A	X	-----	Not shown. Similar to figures 193 and 194.	X	-----	193 and 194	X	-----	Not shown. Similar to figures 193 and 194.
Classes B and C	Not a defect.			Not a defect.		194	Not a defect.		Not a defect.
Size larger than size shown on figures 189 and 190	-----	X		-----	X		-----	X	
Ridge, over 1/4 inch or over 10 percent of tube thickness, whichever is greater	X	-----	Not shown. Similar to figure 195.	X	-----	195	X	-----	Not shown. Similar to figure 195.
Ridge, less than 1/4 inch or less than 10 percent of tube thickness, whichever is greater	-----			-----			-----		
Class A	-----	X	Not shown. Similar to figures 195 and 196.	-----	X	196	-----	X	Not shown. Similar to figures 195 and 196.
Classes B and C	Not a defect.			Not a defect.			Not a defect.		
Rough, over 1/4 inch or over 10 percent of tube thickness, whichever is greater	X	-----	Not shown. Similar to figure 197.	X	-----	197	X	-----	Not shown. Similar to figure 197.
Rough, less than 1/4 inch or less than 10 percent of tube thickness, whichever is greater	X	-----	198	X	-----	198	X	-----	Not shown. Similar to figure 198.
Scored (slit)	X	-----	Not shown. Similar to figure 199.	X	-----	199	X	-----	Not shown. Similar to figure 199.
Surface irregularity: when assembled with swaged fittings	X	-----	200	X	-----	200	X	-----	Not shown. Similar to figure 200.
All others	-----	X	201 and 202	-----	X	201 and 202	-----	X	Not shown. Similar to figures 201 and 202.
Wire through tube	X	-----	Not shown. Similar to figure 203.	X	-----	203	X	-----	Not shown. Similar to figure 203.
Yarn through tube	X	-----	Not shown. Similar to figure 204.	X	-----	204	X	-----	Not shown. Similar to figure 204.

**MILITARY INTEREST:**

**Custodians:**

Army—MO  
Navy—SH  
Air Force—69

**Review activities:**

Army—MO  
Navy—SH, YD  
Air Force—69

**User activities:**

Navy—WP, MC

**Preparing activity:**

Navy—SH

**CIVIL AGENCY INTEREST:**

GSA—FSS

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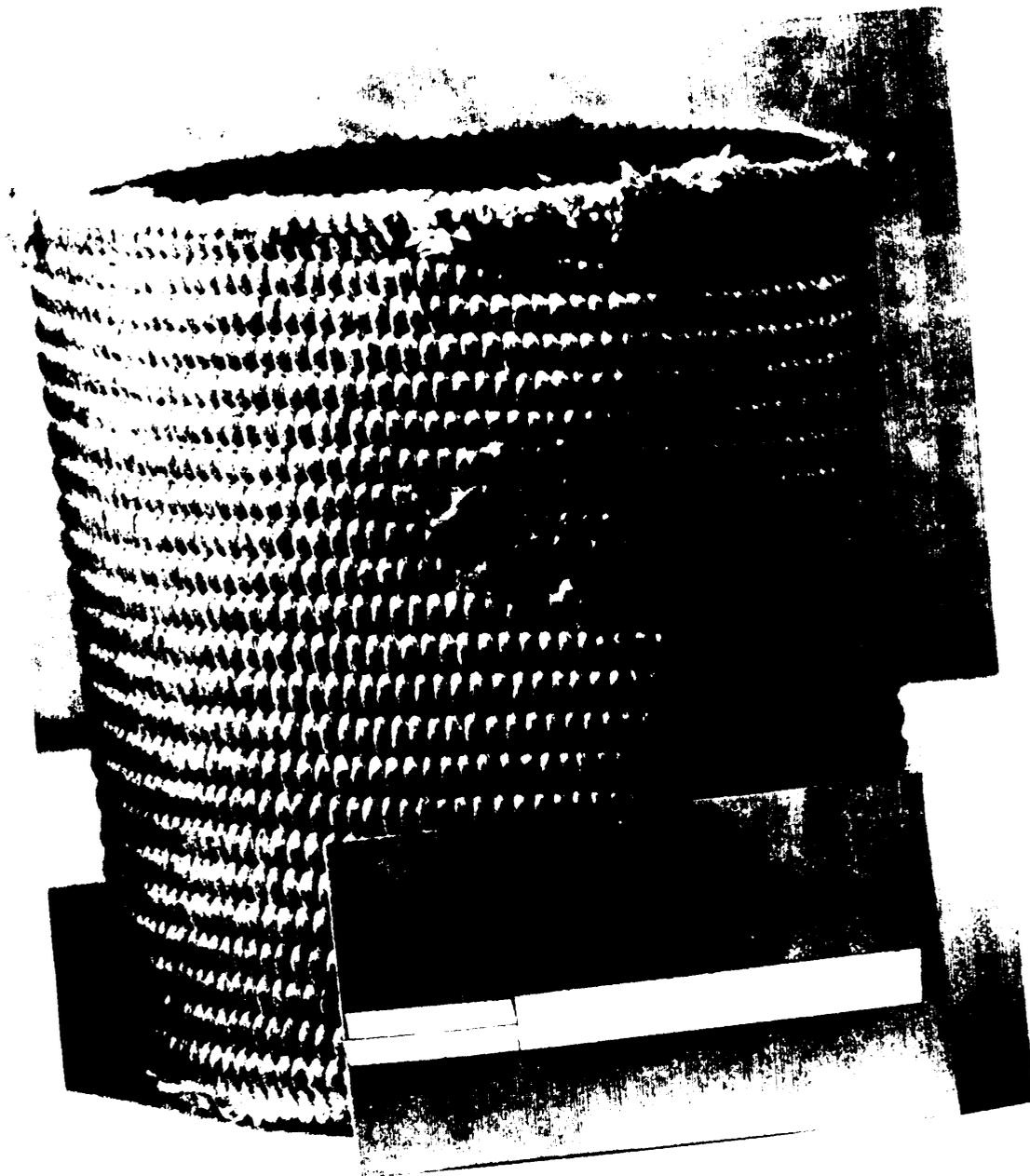


FIGURE 1. Abrasion—major.



FIGURE 2. Friction strike through—major.

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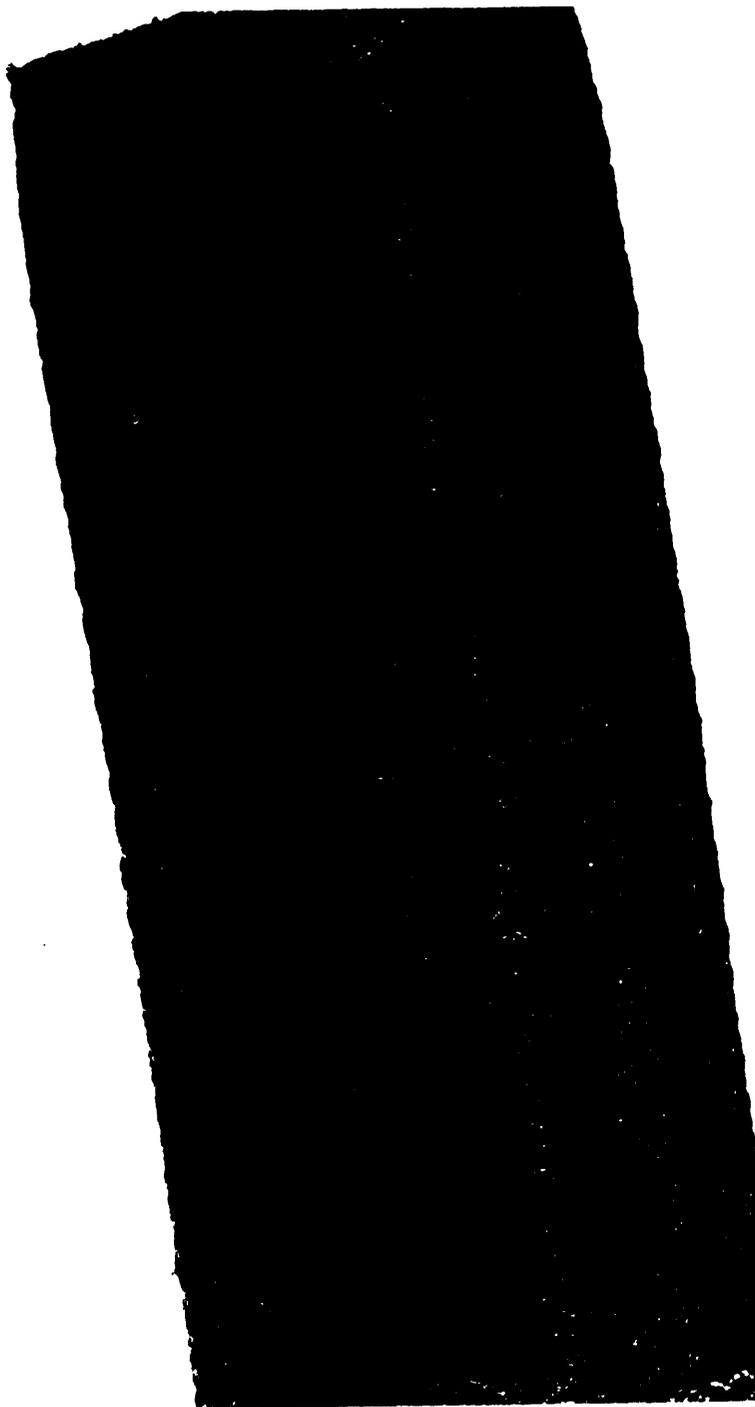


FIGURE 3. Friction strike through—minor.

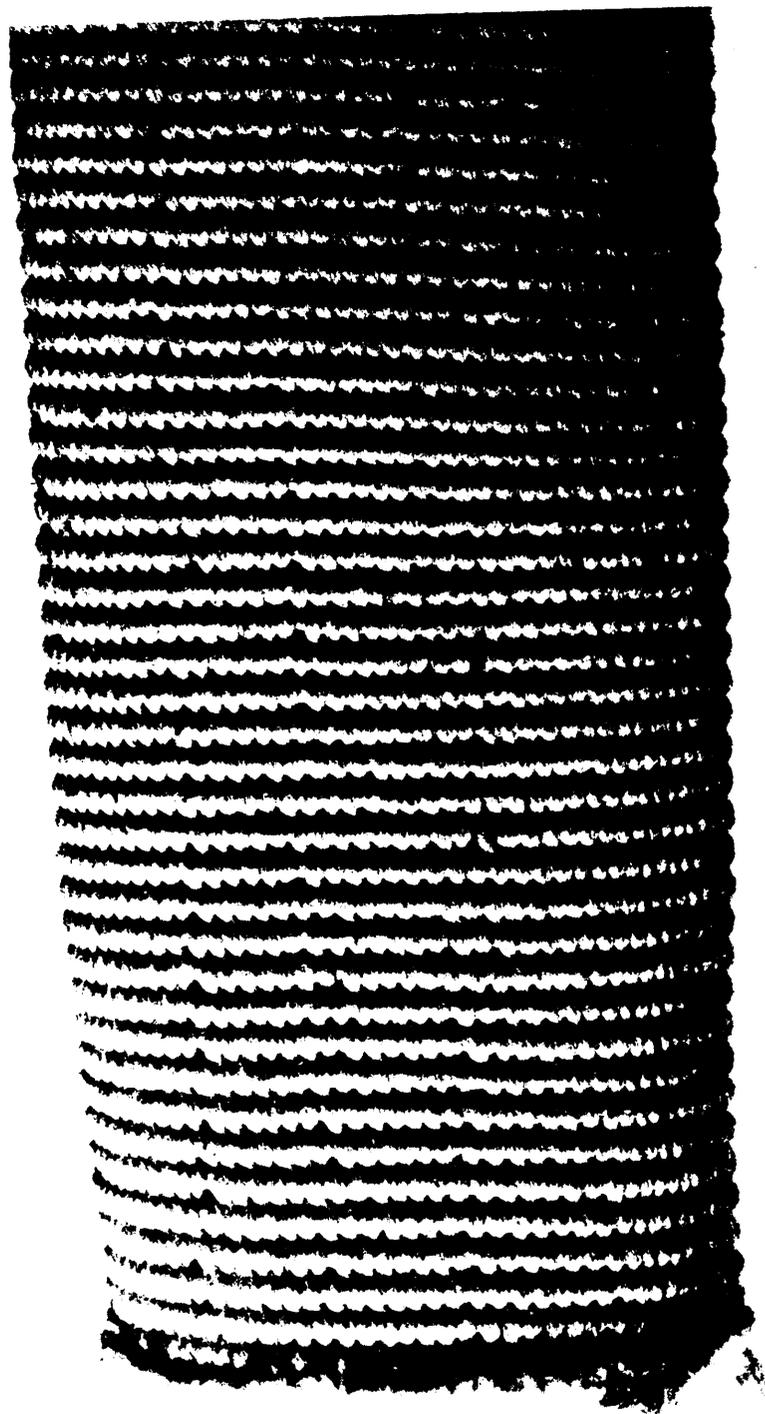


FIGURE 4. Jacket insufficient—major.

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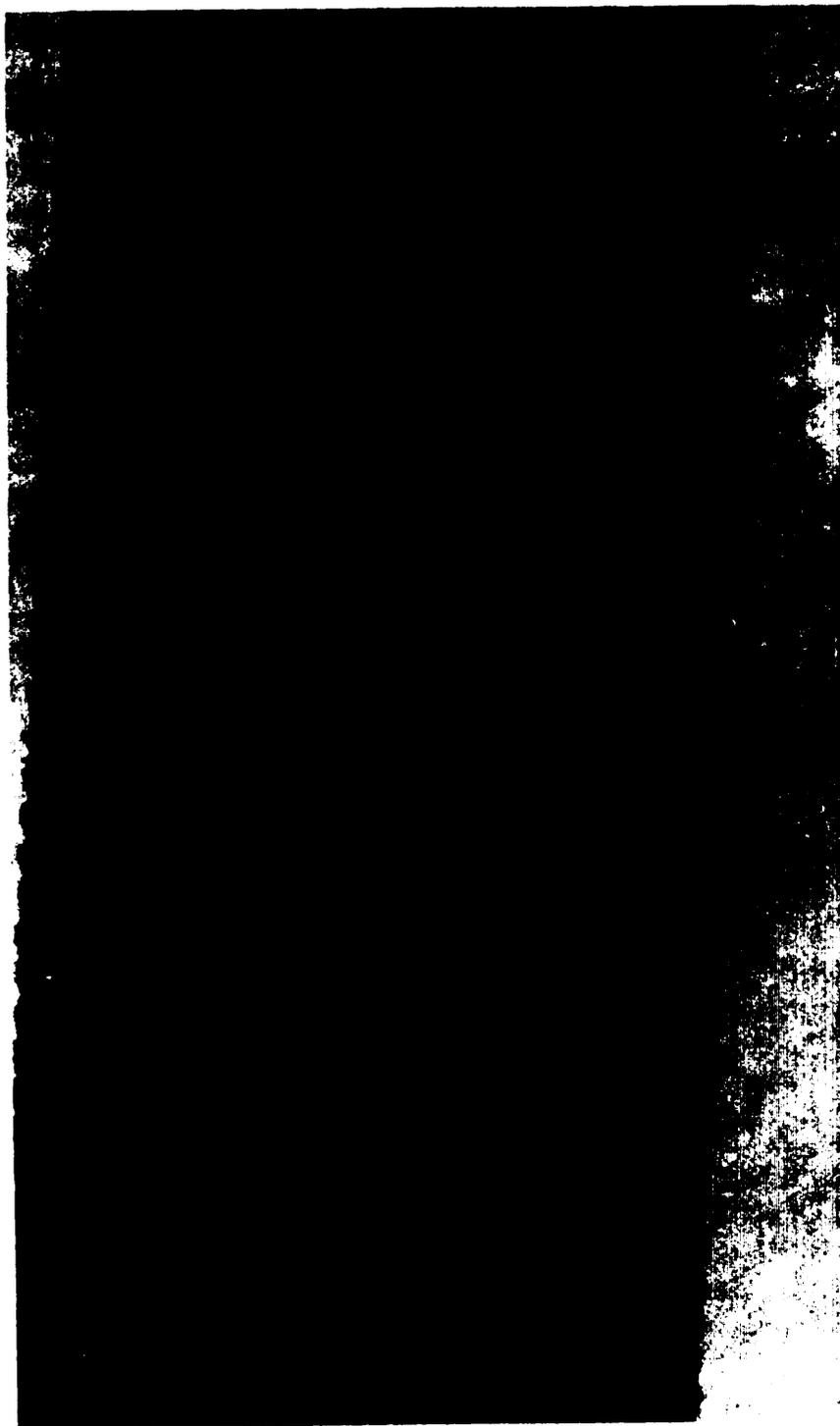


FIGURE 5. Jacket insufficient—minor.

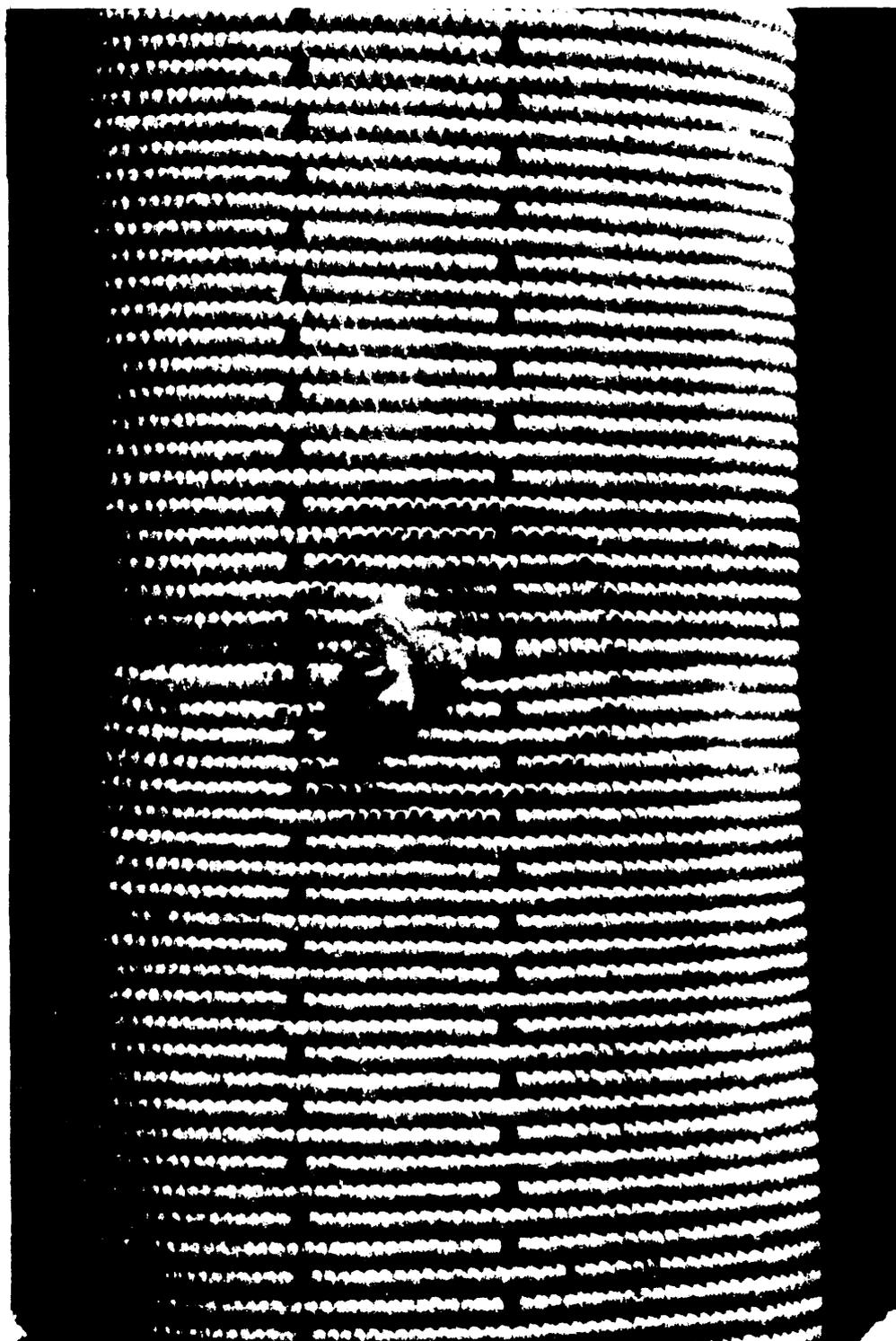


FIGURE 6. Knot filler—major.

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FIGURE 7. Knot filler—not a defect.

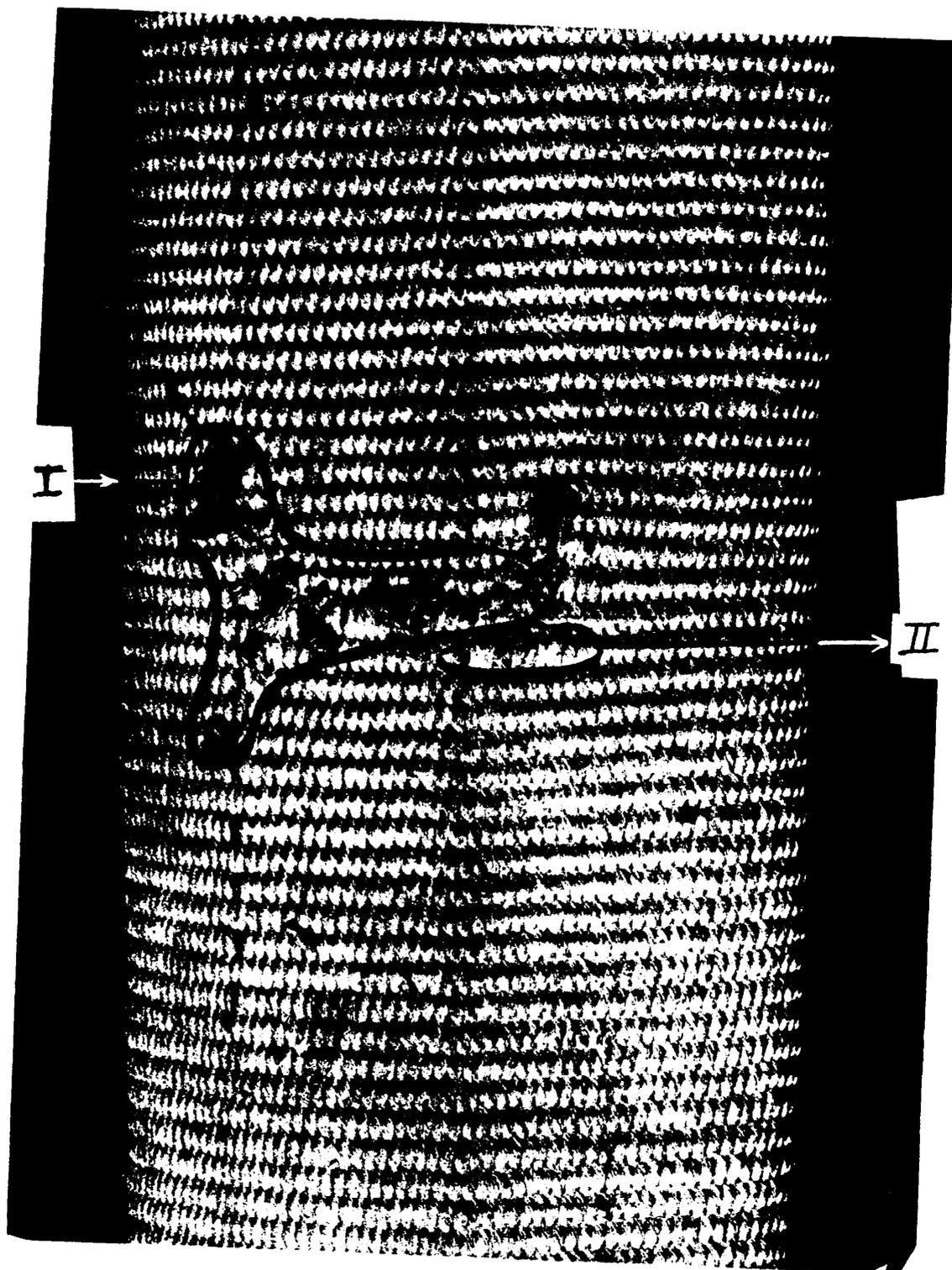


FIGURE 8. Yarn:

- I—Knotted—major.
- II—Irregularity—minor.

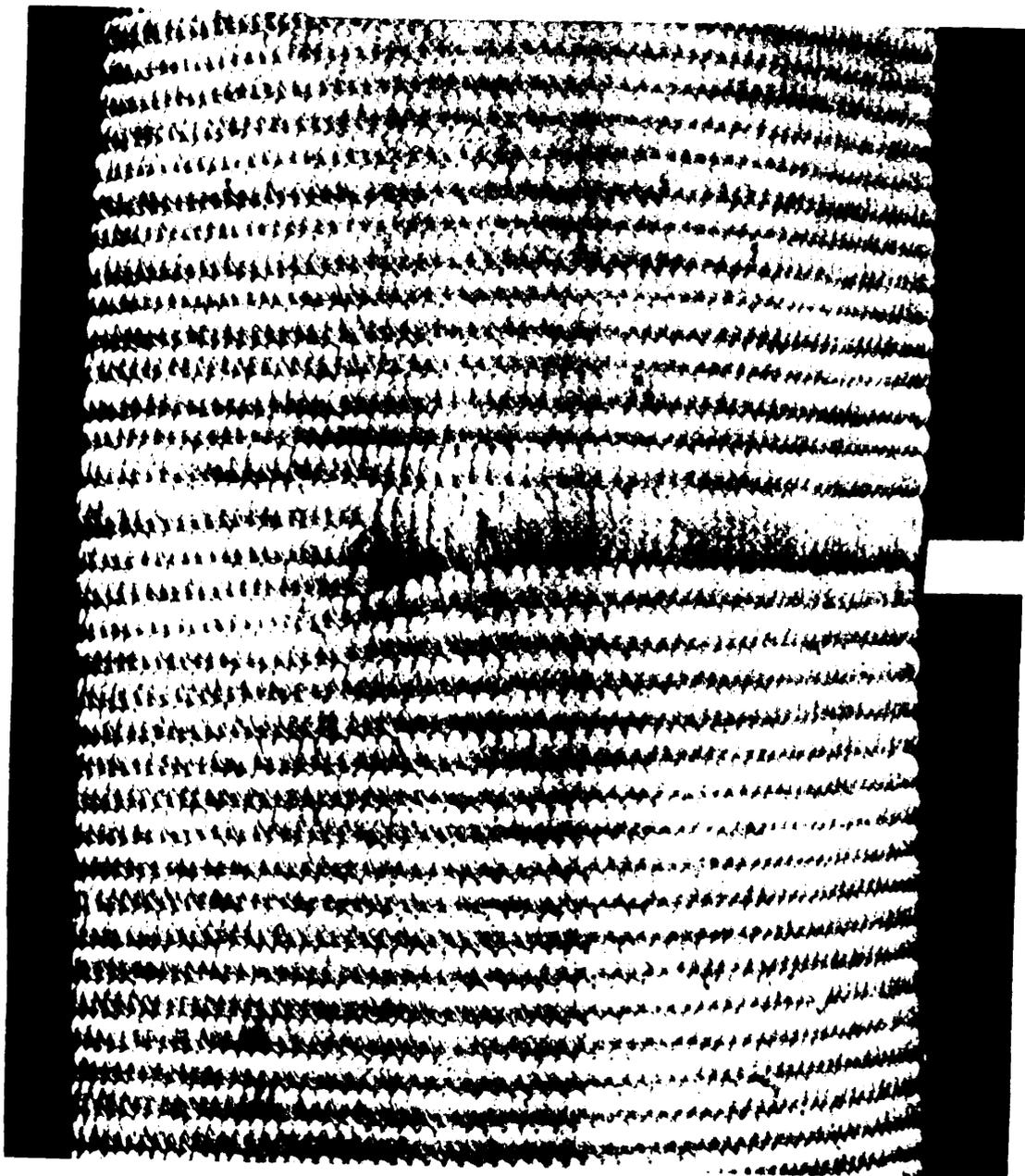


FIGURE 9. Pick missing or broken—major.

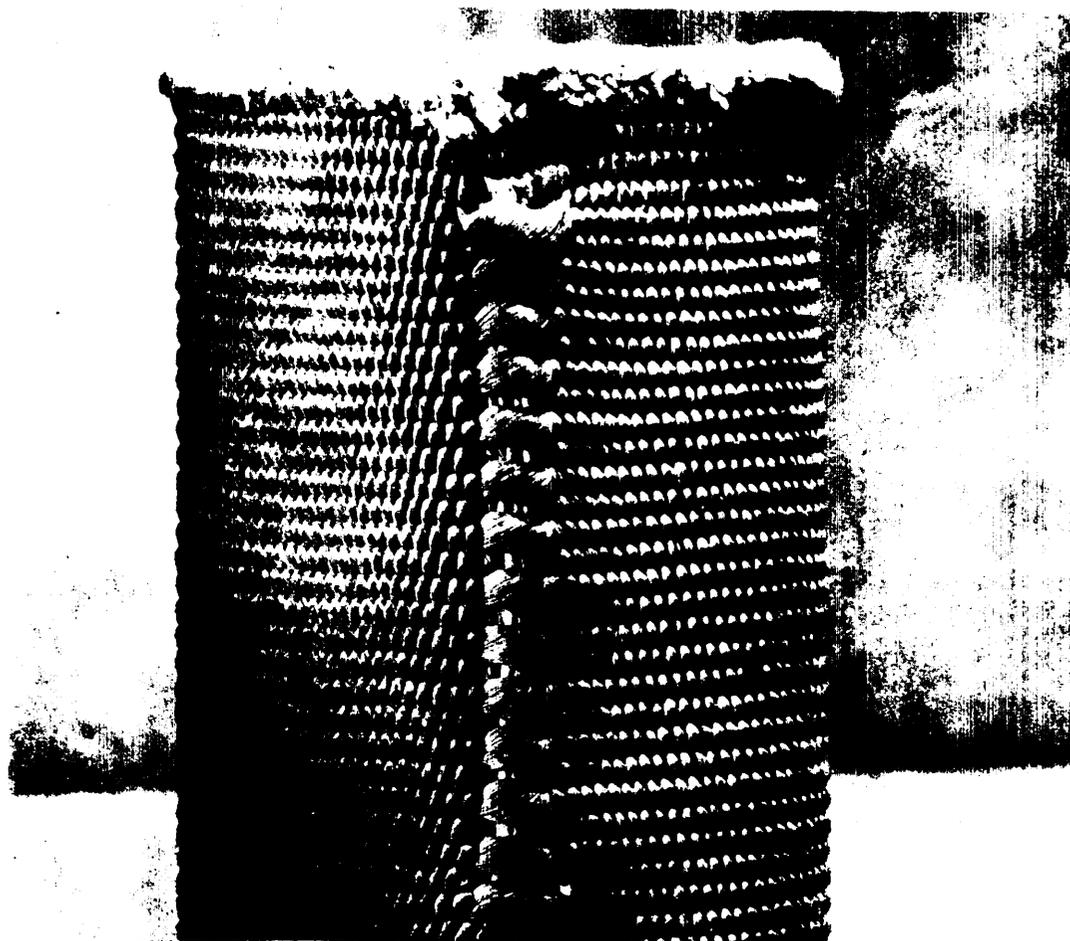


FIGURE 10. Skips, warp—major.

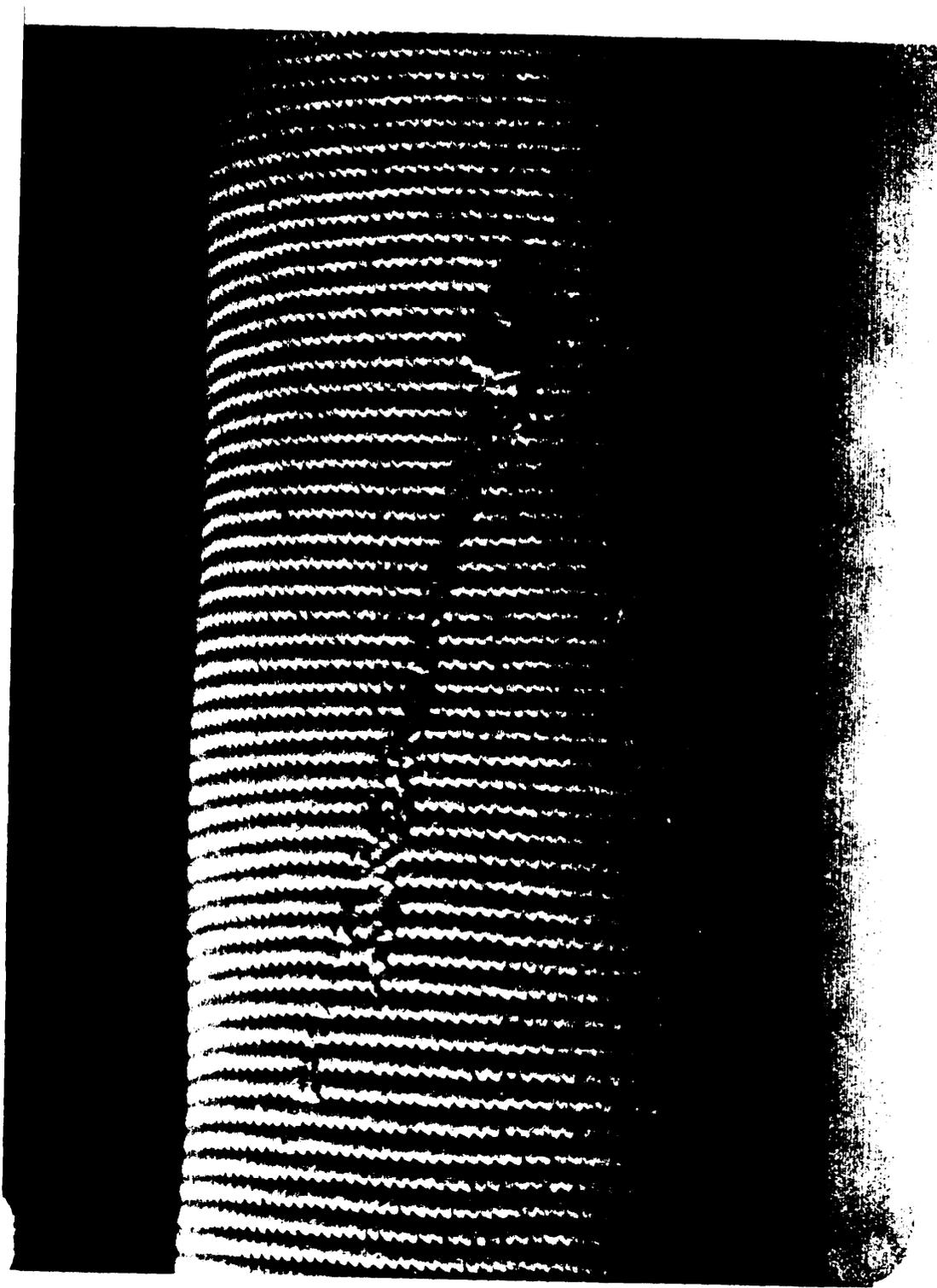


FIGURE 11. Snag—major.

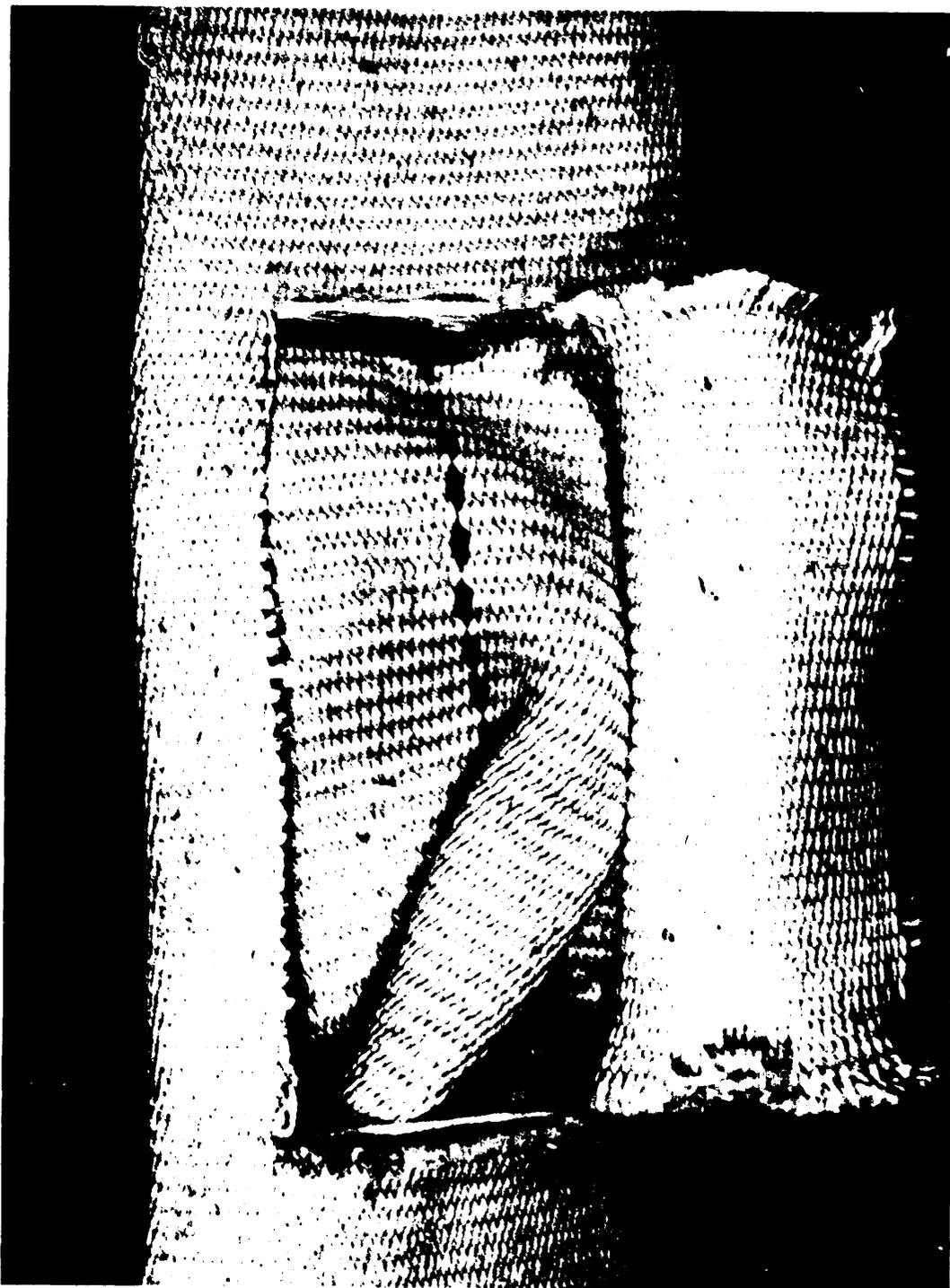


FIGURE 12. Twist, inner jacket—major.

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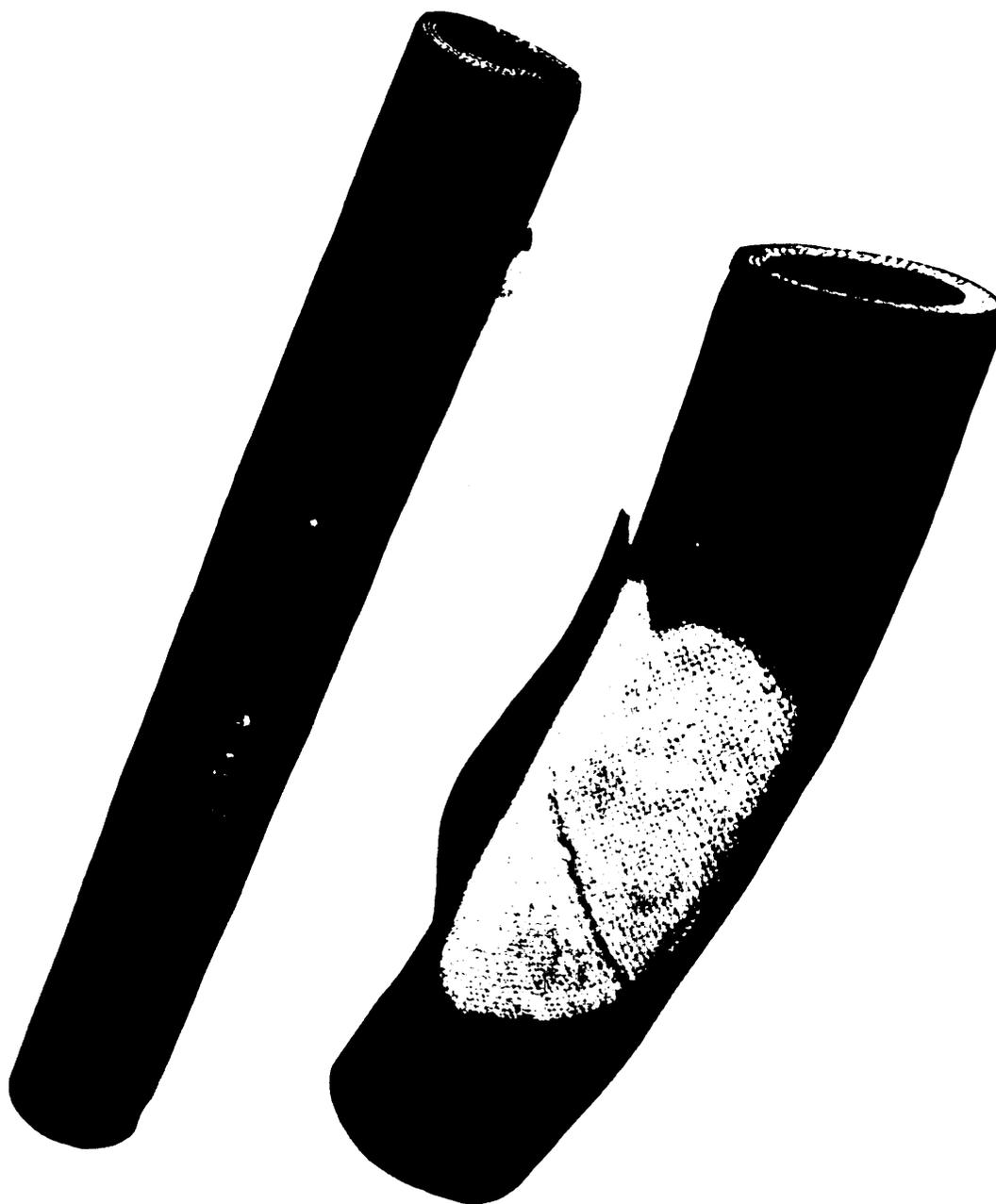


FIGURE 13. Blister under cover, large—major (cover removed for clarity).



FIGURE 14. Blister under cover, large—major.

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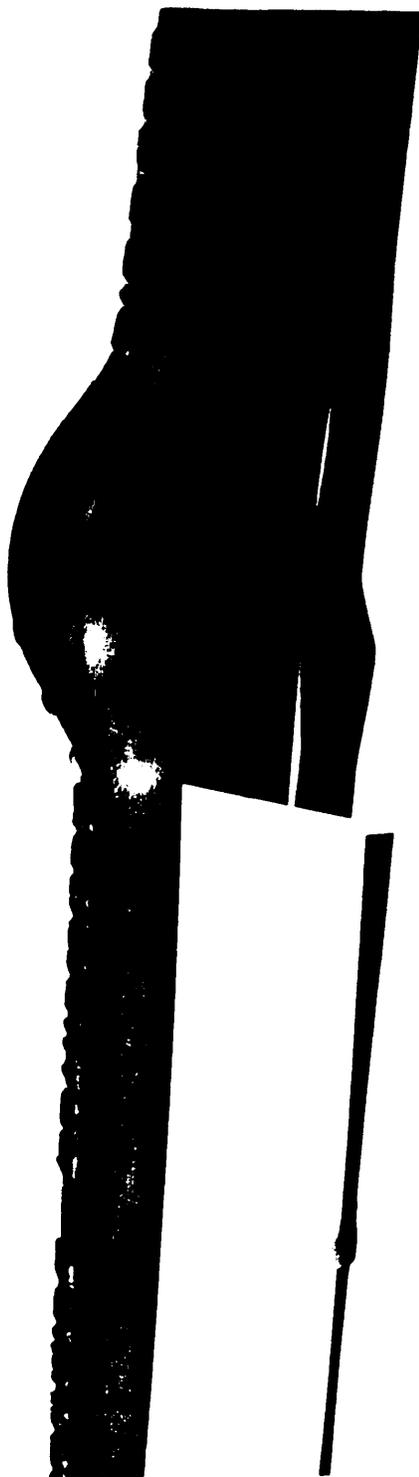


FIGURE 15. Blister under cover, large—major.



FIGURE 16. Blister under cover, large—major.

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FIGURE 17. Break—major.



FIGURE 18. Buckle (because interior contour will be affected)—major.

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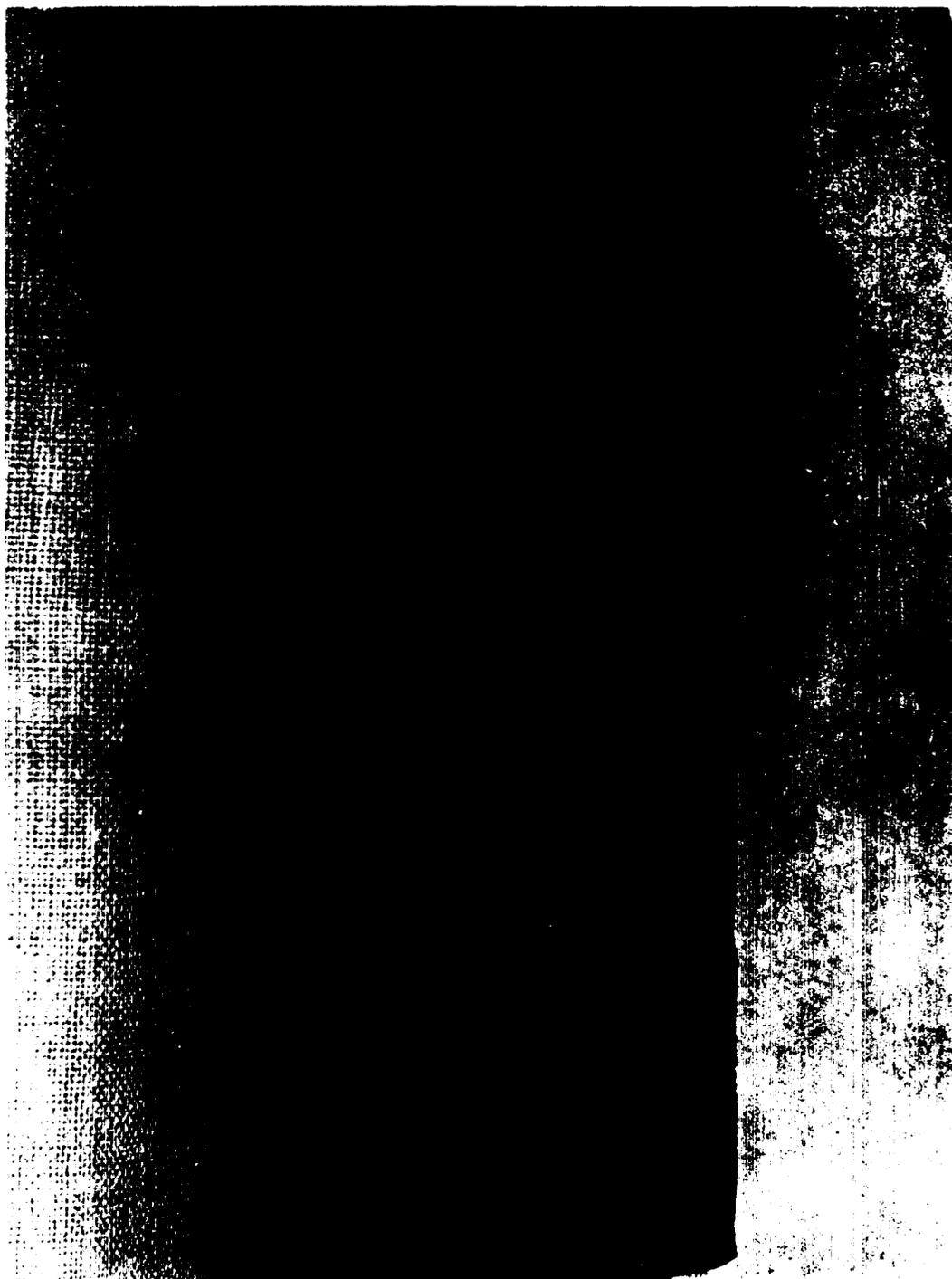


FIGURE 19. Bulge, large: dynamic use (Air Force procurement only), and class A  
—major: classes B and C—minor.

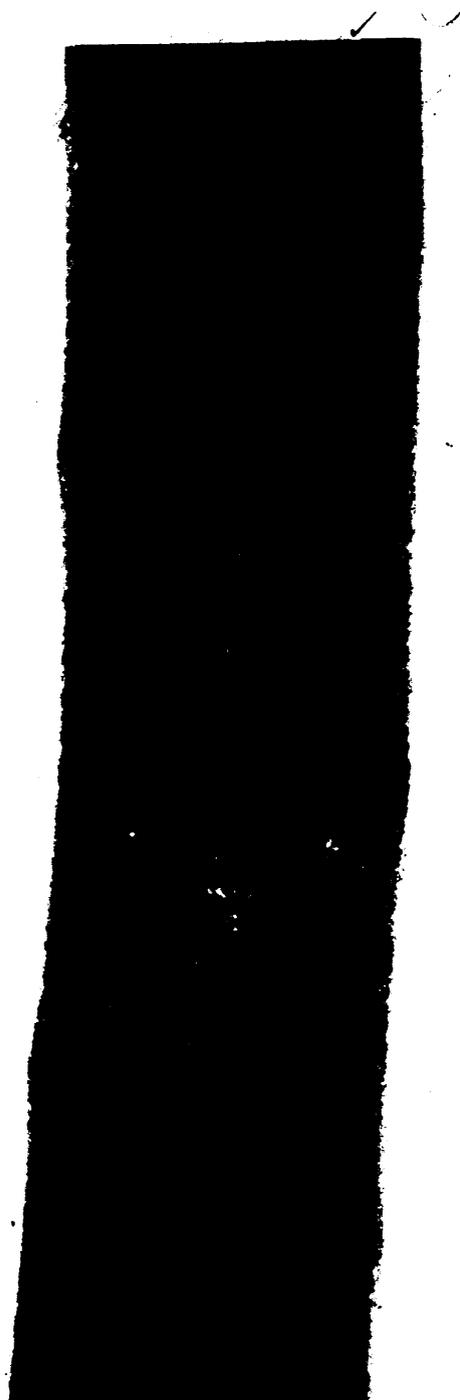


FIGURE 20. Bulge, small: dynamic use—service abrasion (Air Force procurement only)—major; other use—not a defect.

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FIGURE 21. Bump: in contour—minor; in nipple area—major.

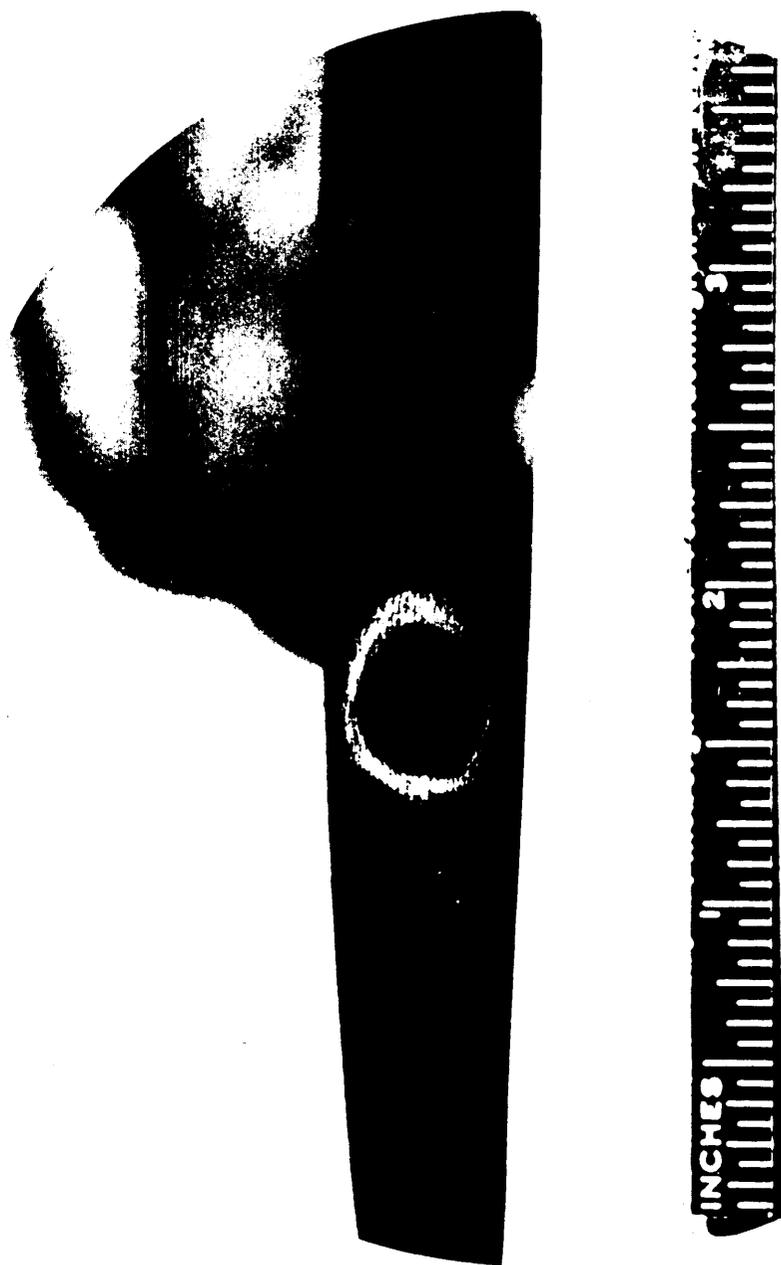


FIGURE 22. Crack—major.

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FIGURE 23. Dent—major,



FIGURE 24. Dent—major.

Fed. Std. No. 162a

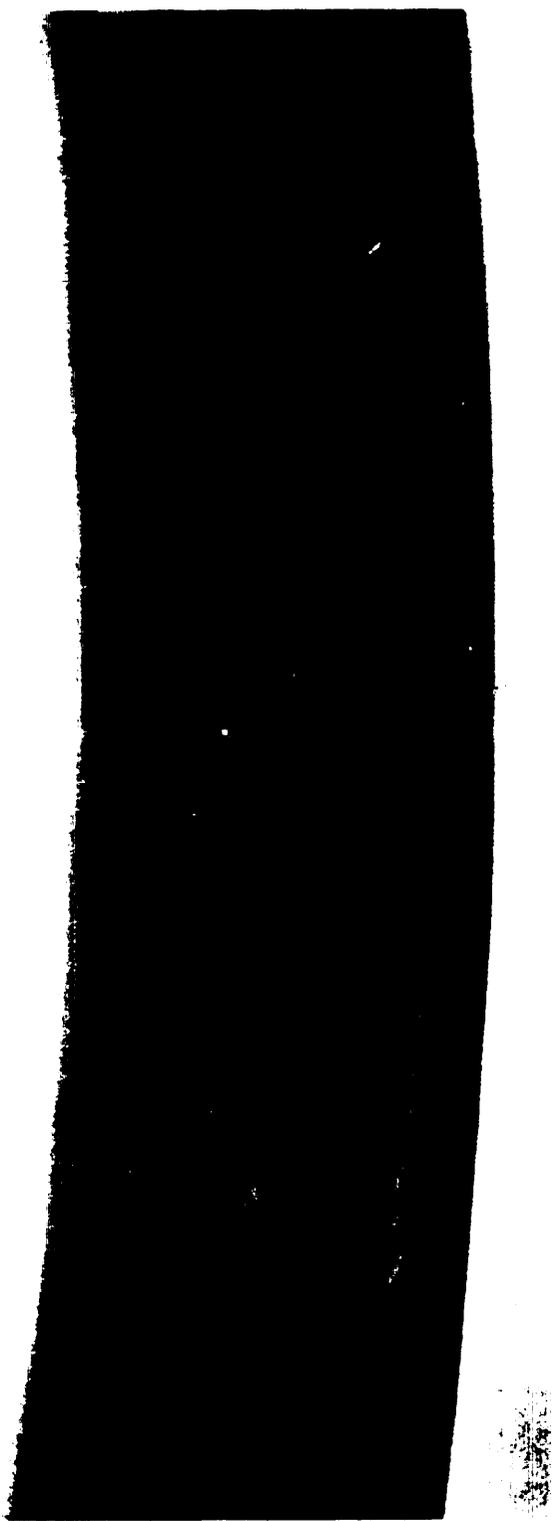


FIGURE 25. Depression, large area—major.

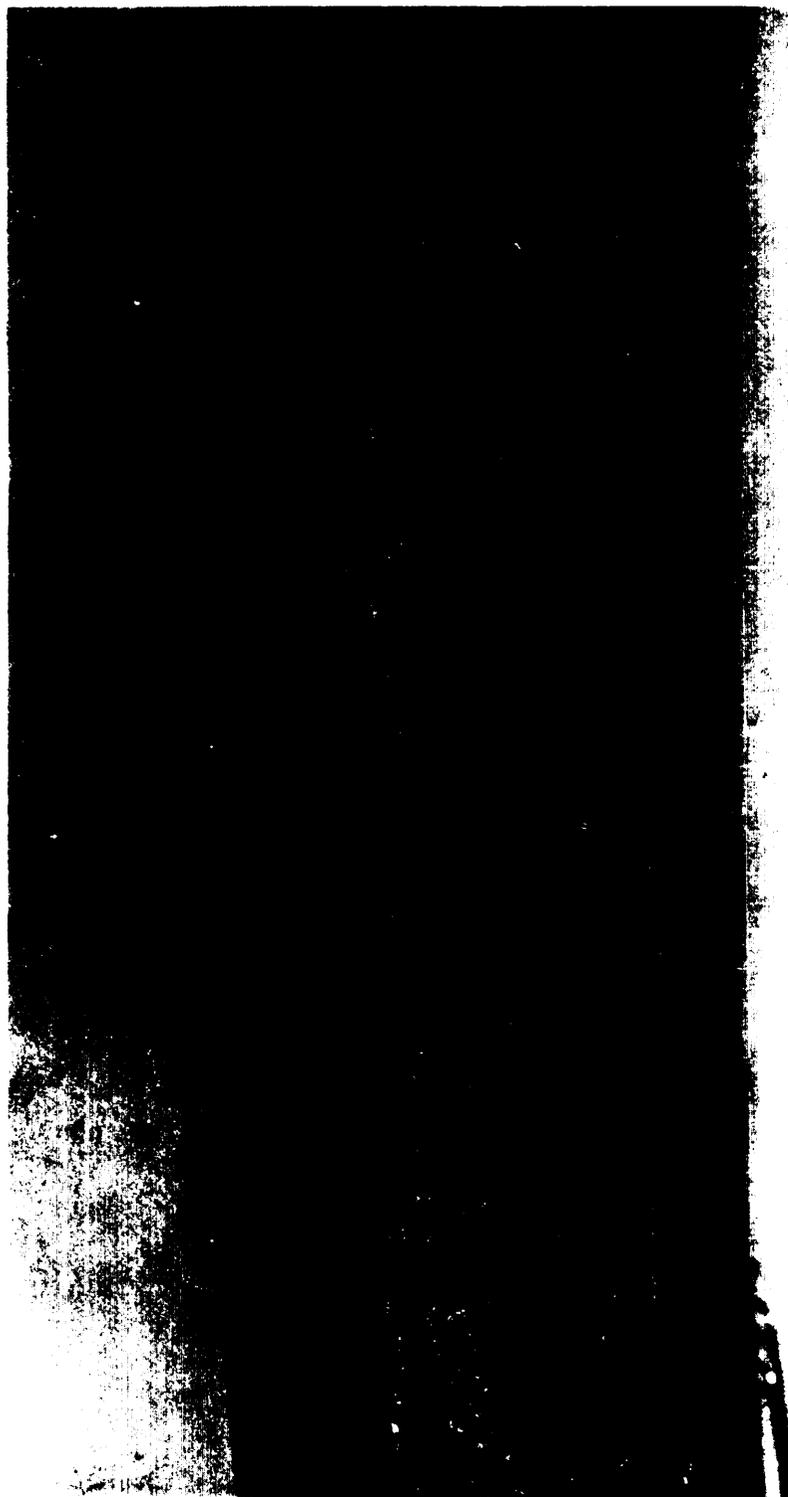


FIGURE 26. Depression, large area—major.

Fed. Std. No. 162a

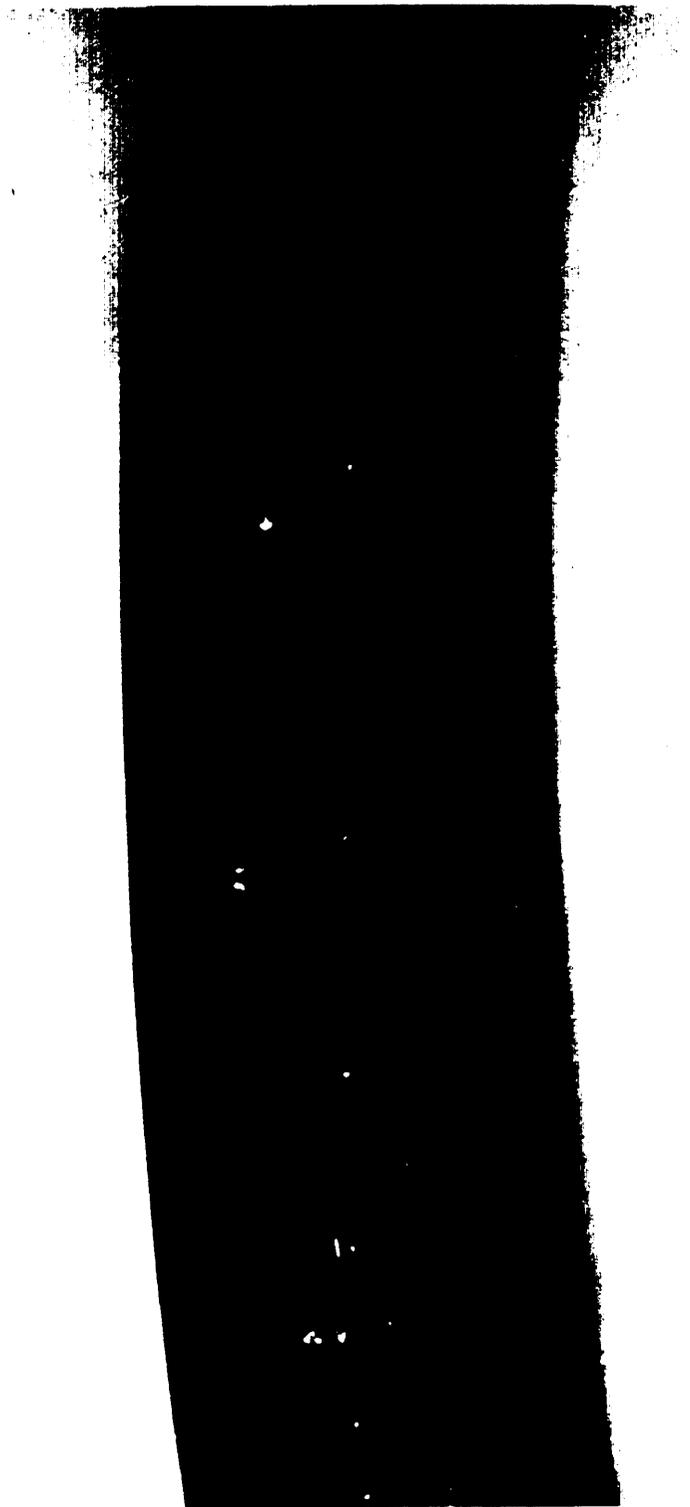


FIGURE 27. Depression. deep—major.

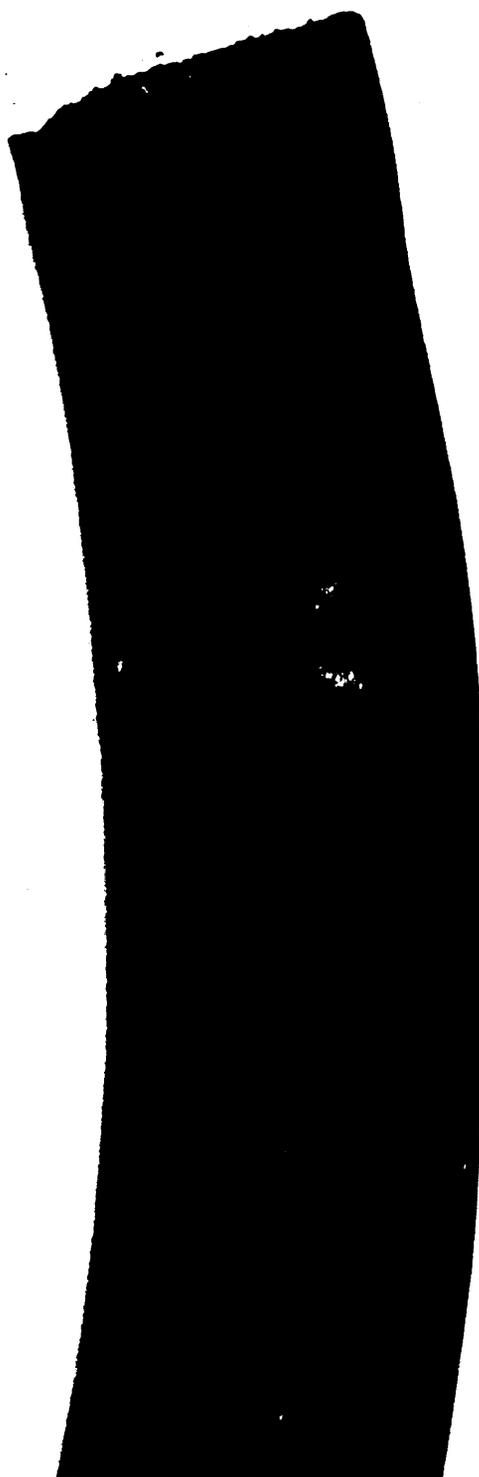


FIGURE 28. Depression, deep—major.

Fed. Std. No. 162a

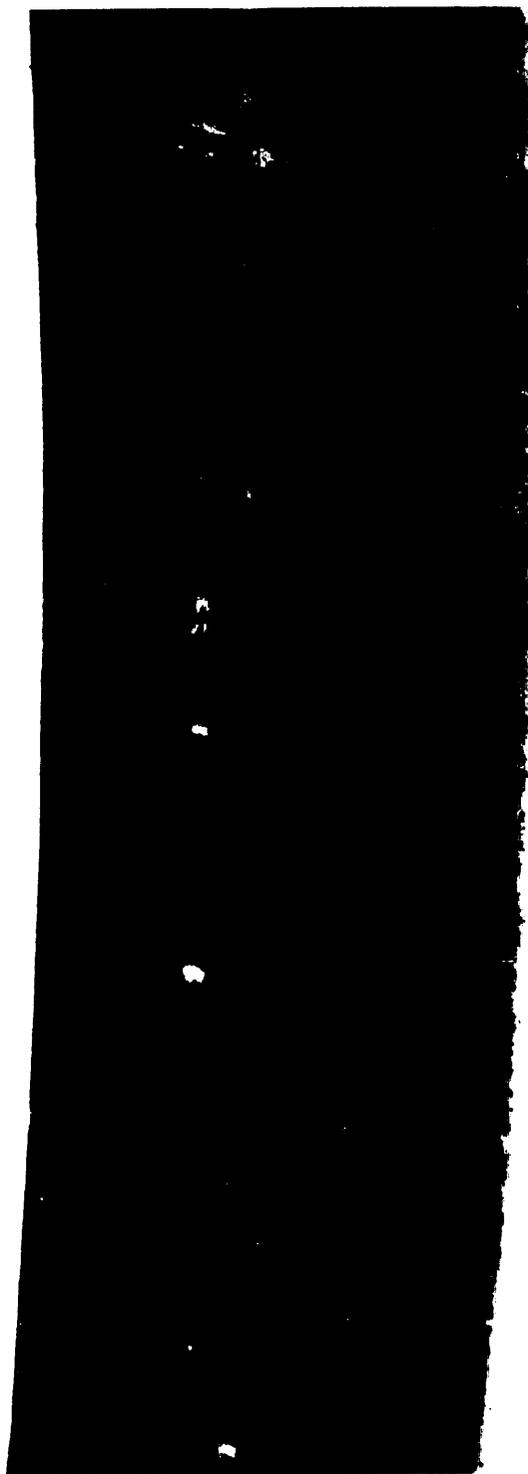


FIGURE 29. Depression, small and light: class A—major; classes B and C—minor.

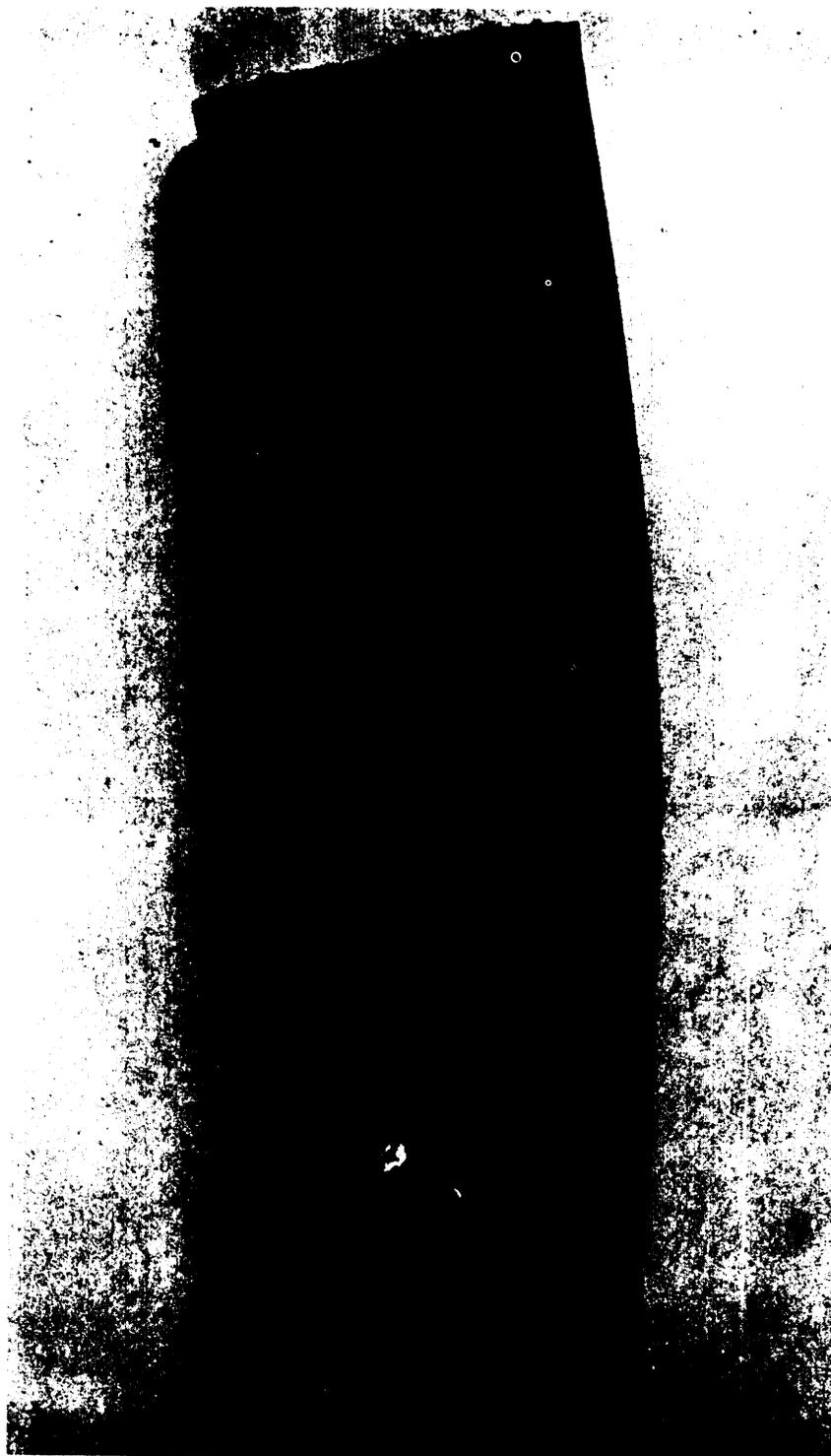


FIGURE 30. Depression, small and light: class A—major; classes B and C—minor.

Fed. Std. No. 162a

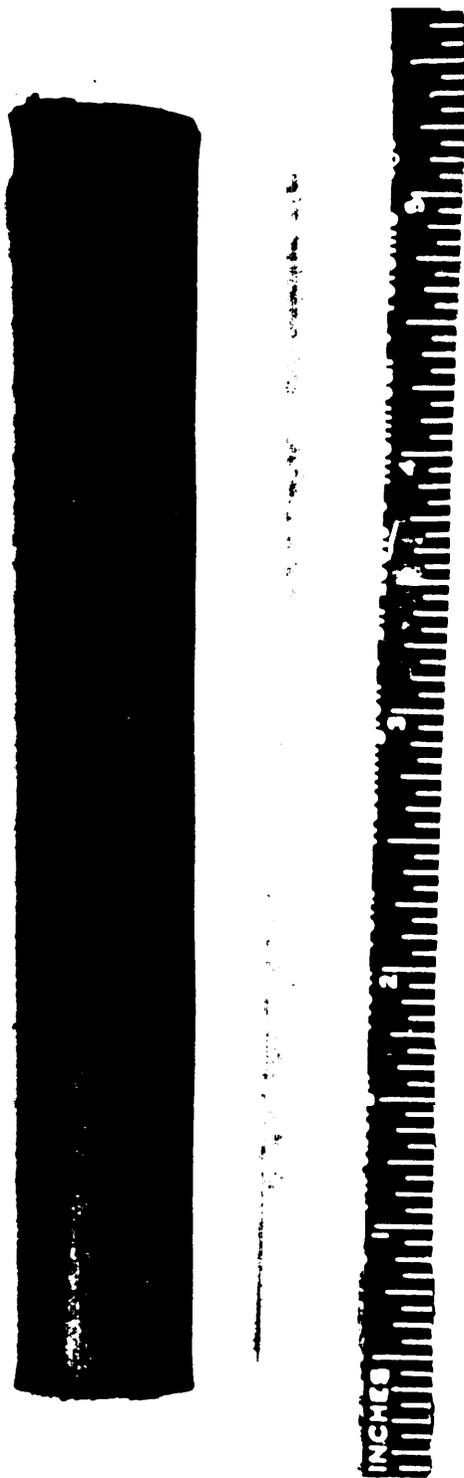


FIGURE 31. Depression. small and light: class A—major: classes B and C—minor.

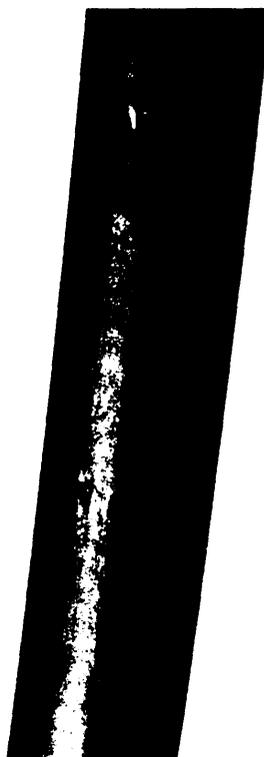


FIGURE 32. Depression, small and light: class A—major: classes B and C—minor.

Fed. Std. No. 162a

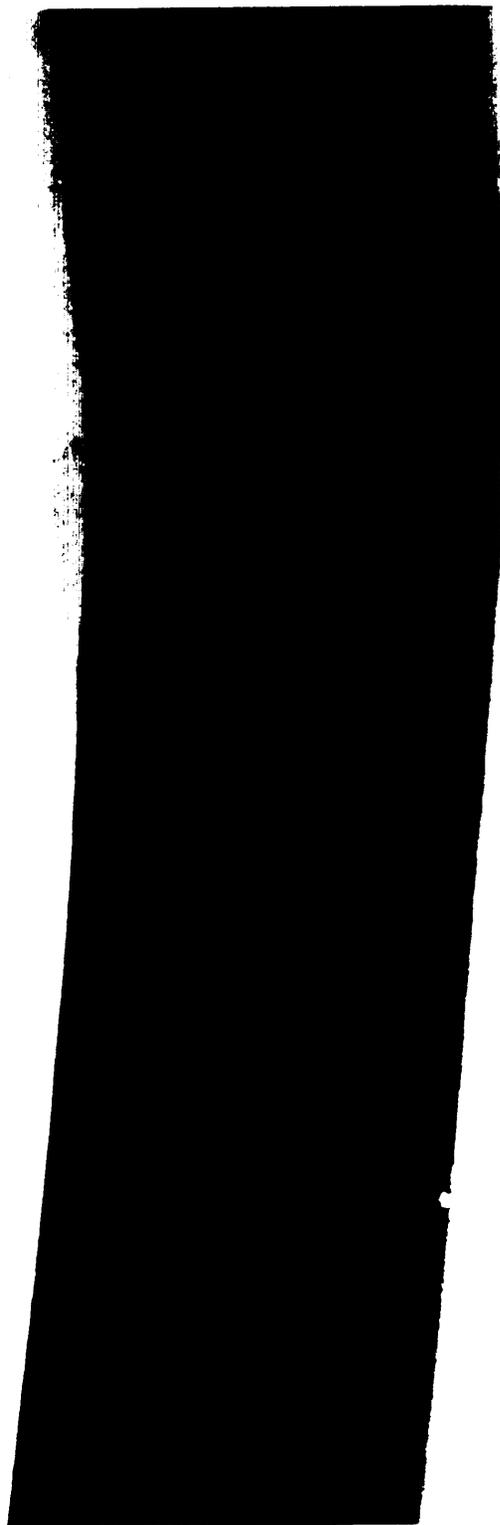


FIGURE 33. Depression, small and light—minor.



FIGURE 34. Depression, small and light—minor.

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FIGURE 35. Discolored—not a defect.



FIGURE 36. Dog leg—major.

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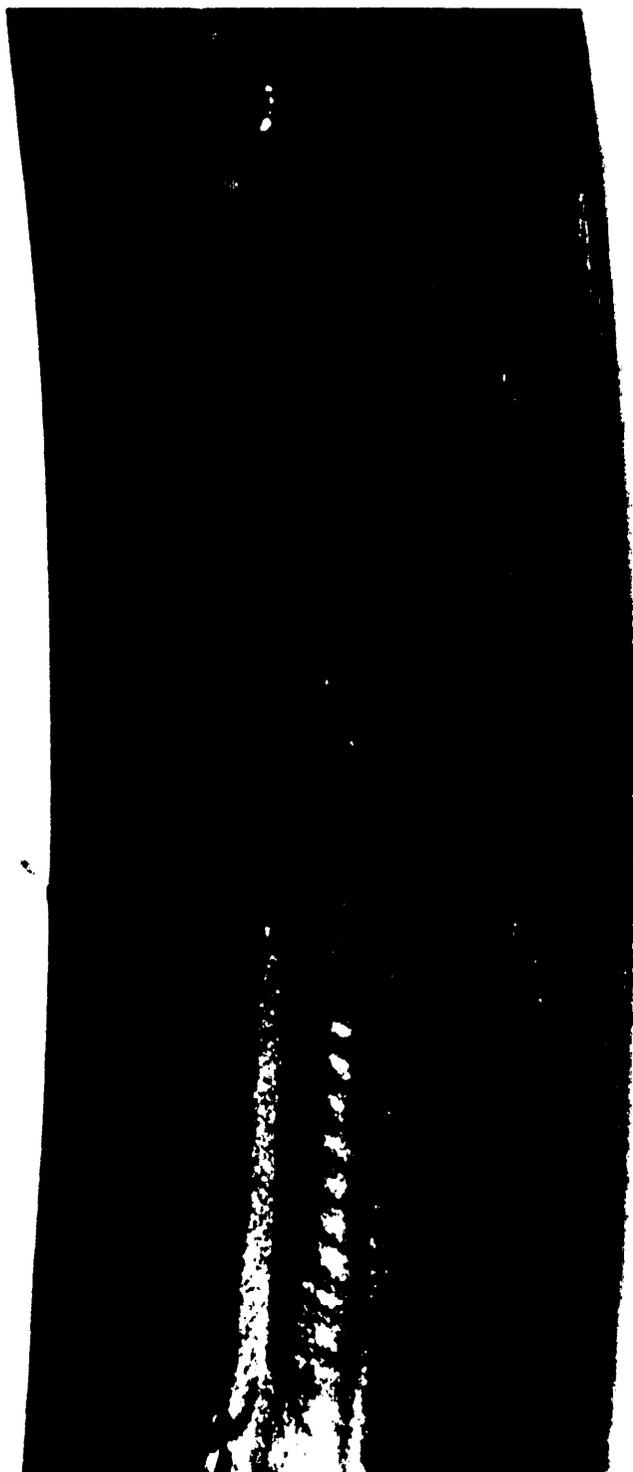


FIGURE 37. Groove, deep—major.



FIGURE 38. Rupture, large—major.

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FIGURE 39. Hole: reinforcement exposed—major.



FIGURE 40. Hole: reinforcement exposed—major.

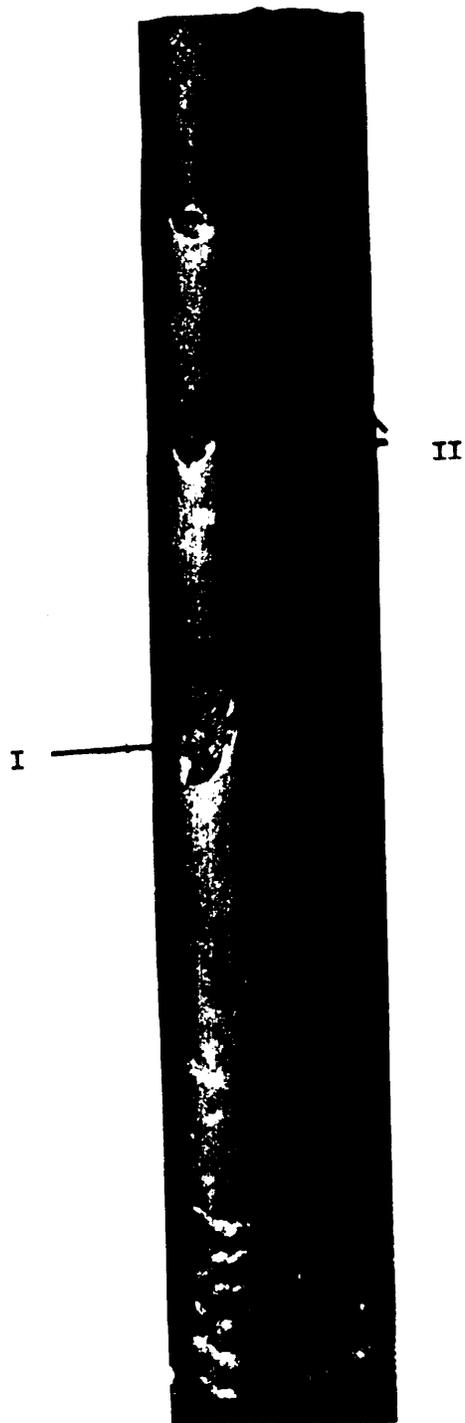


FIGURE 41. Hole, small.

- I—Reinforcement exposed—major.
- II—Reinforcement not exposed—minor.

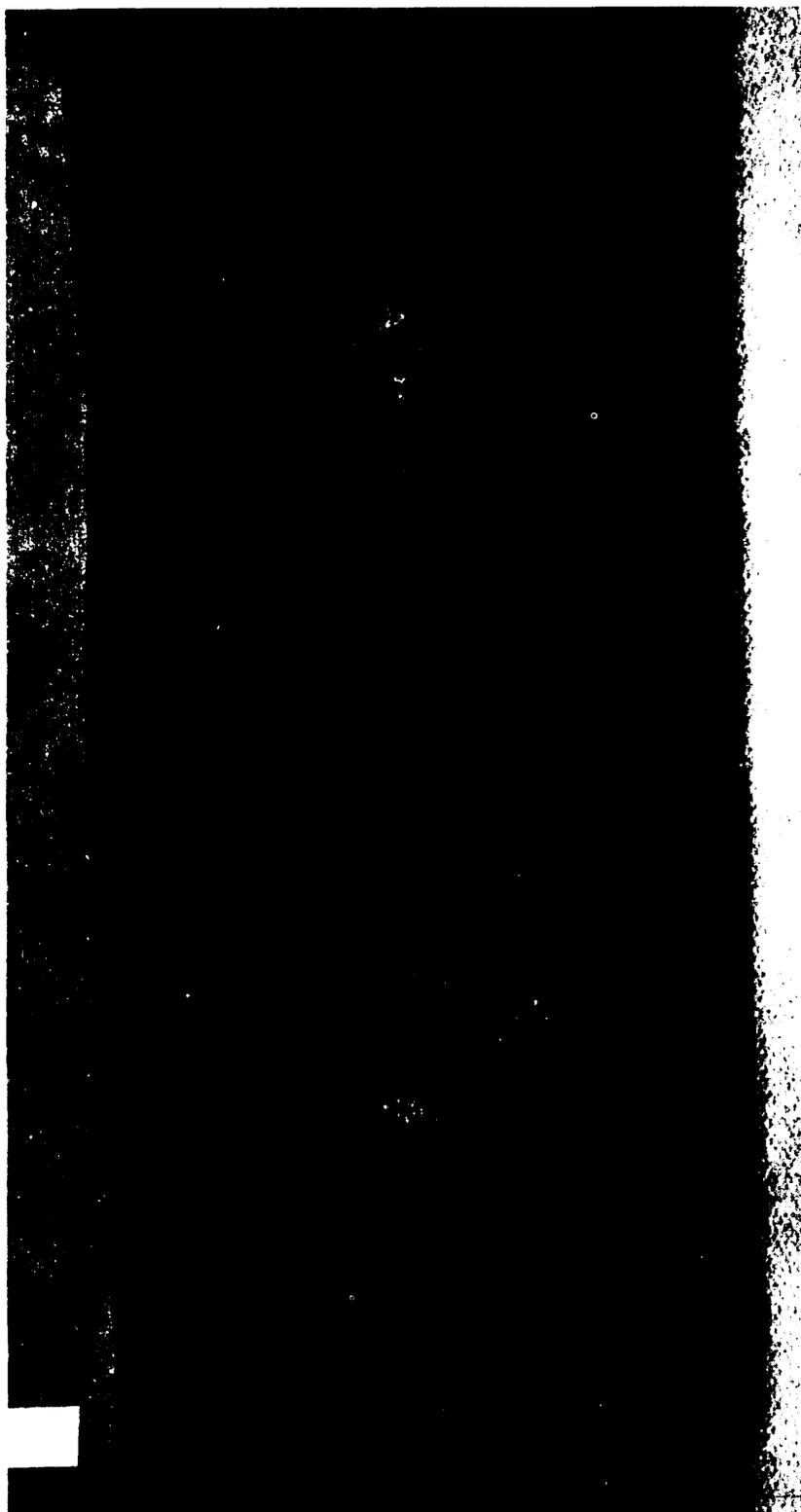


FIGURE 42. Lap: foldover, opening—major.

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FIGURE 43. Lap: foldover, opening—major.

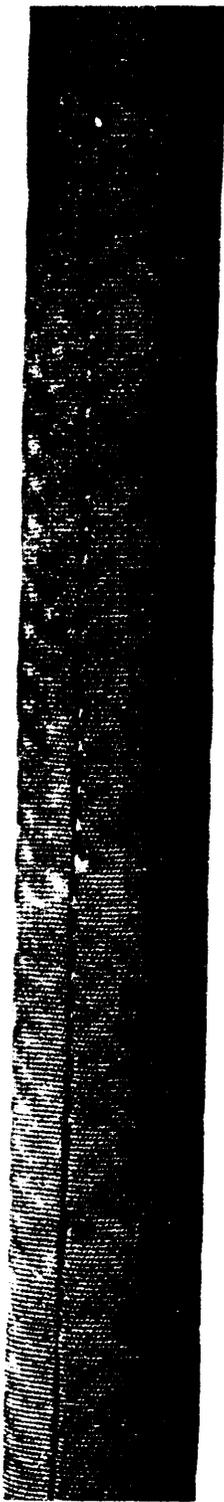


FIGURE 44. Lap: foldover, opening—major.

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FIGURE 45. Lap, open in fabric—major.

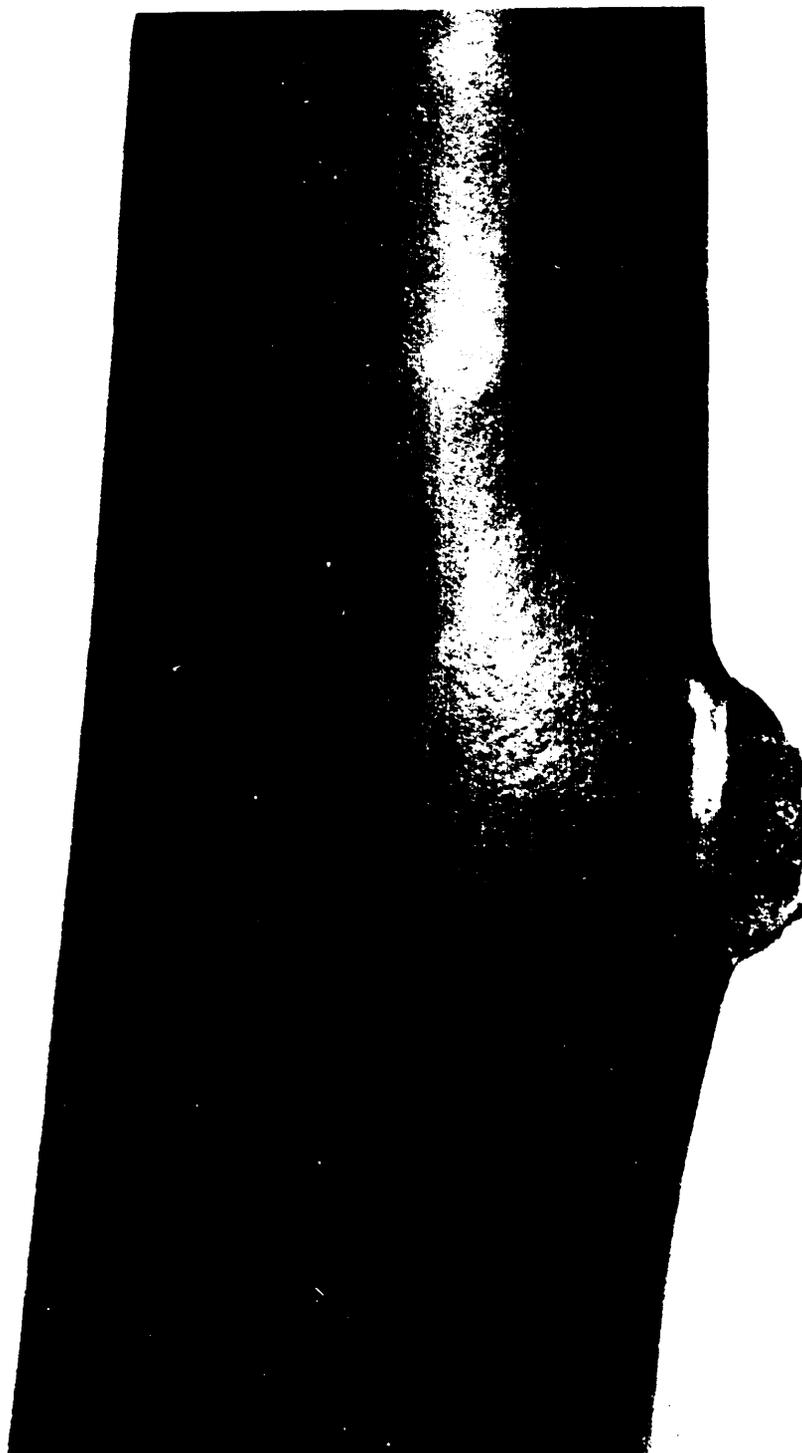


FIGURE 46. Lead, burst—major,

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FIGURE 47. Charge mark—major.



FIGURE 48. Charge mark:

- I —major.
- II —minor.
- III—Not a defect.

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FIGURE 49. Charge mark: class A—minor; classes B and C—not a defect.

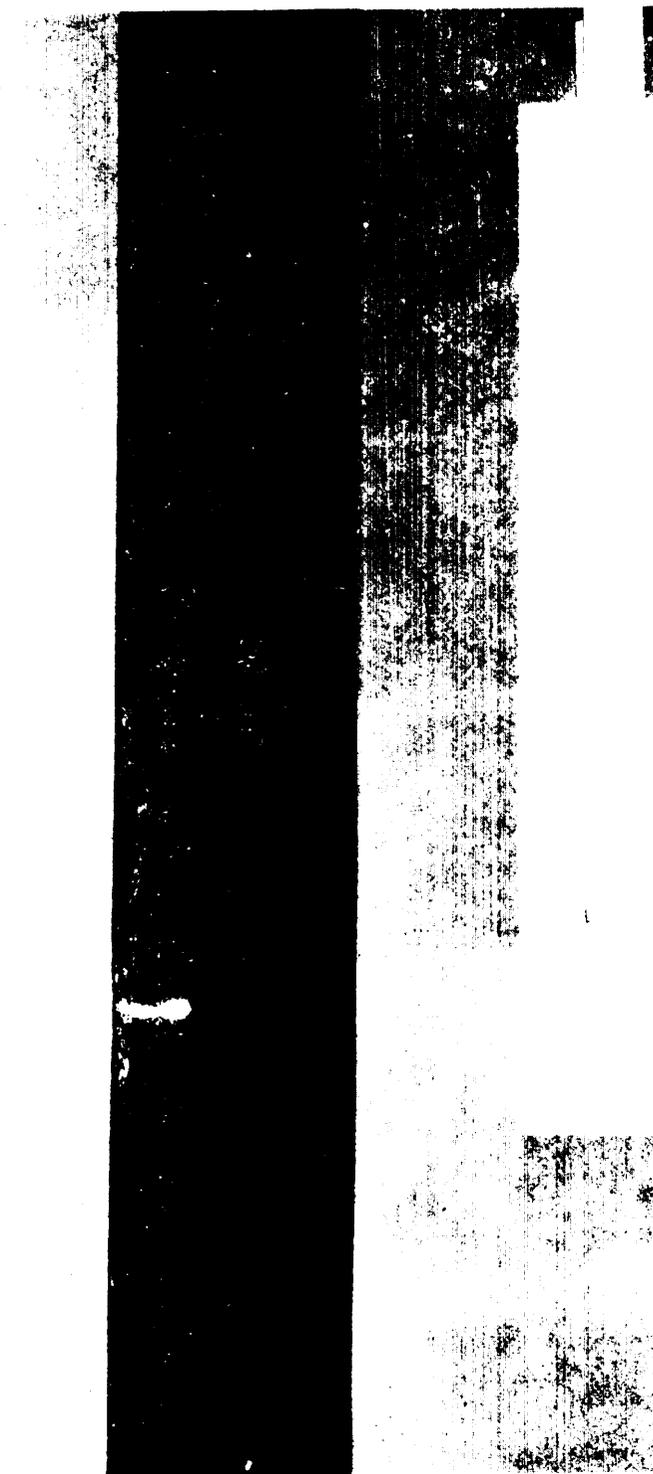


FIGURE 50. Flakes, lead: classes A and B—major; class C—minor.

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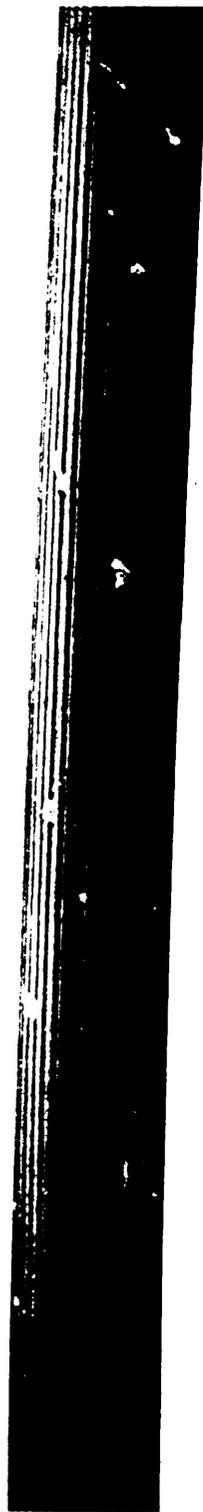


FIGURE 51. Flakes, lead: class A—major: class B—minor: class C—not a defect.



FIGURE 52. Machine stop: class A—major; class B—minor; class C—not a defect.

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FIGURE 53. Pop, lead, through body—major.



FIGURE 54. Pop, lead, reinforcement exposed—major.

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FIGURE 55. POP, lead, reinforcement not exposed: class A—major; class B—minor; class C—not a defect.

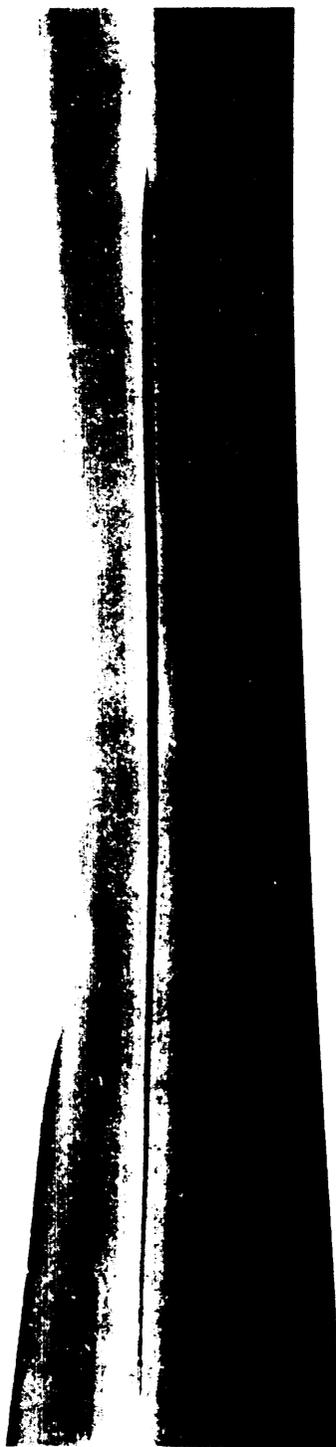


FIGURE 56. Slit or stripper cut—major.

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FIGURE 57. Stripper cut (into braided cover)—major.



FIGURE 58. Light cover, under gage, or thickness below tolerance limit—major.

Fed. Std. No. 162a

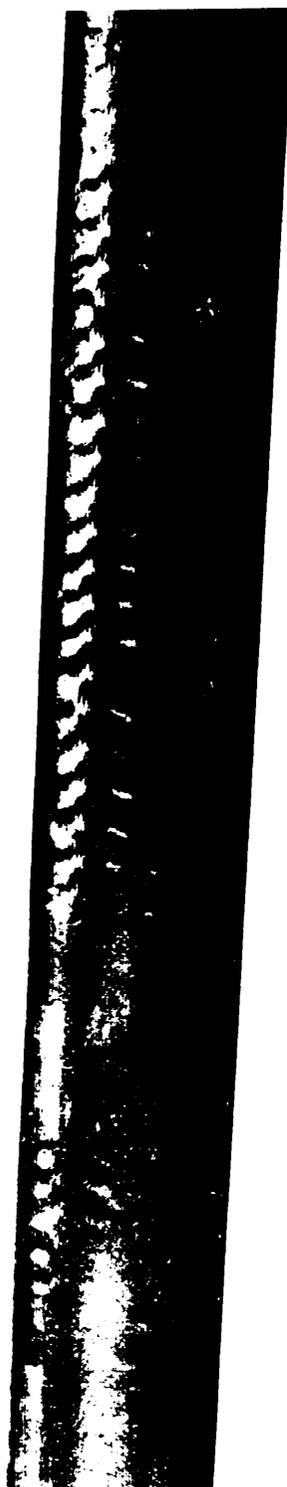


FIGURE 59. Light cover, under gage, or thickness below tolerance limit—major.



FIGURE 60. Light cover (roughness), thickness not below specified or not specified  
—minor.

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FIGURE 61. Light cover (roughness), thickness not below specified or not specified  
—minor.



FIGURE 62. Light cover (roughness), thickness not below specified or not specified  
—minor.

Fed. Std. No. 162a

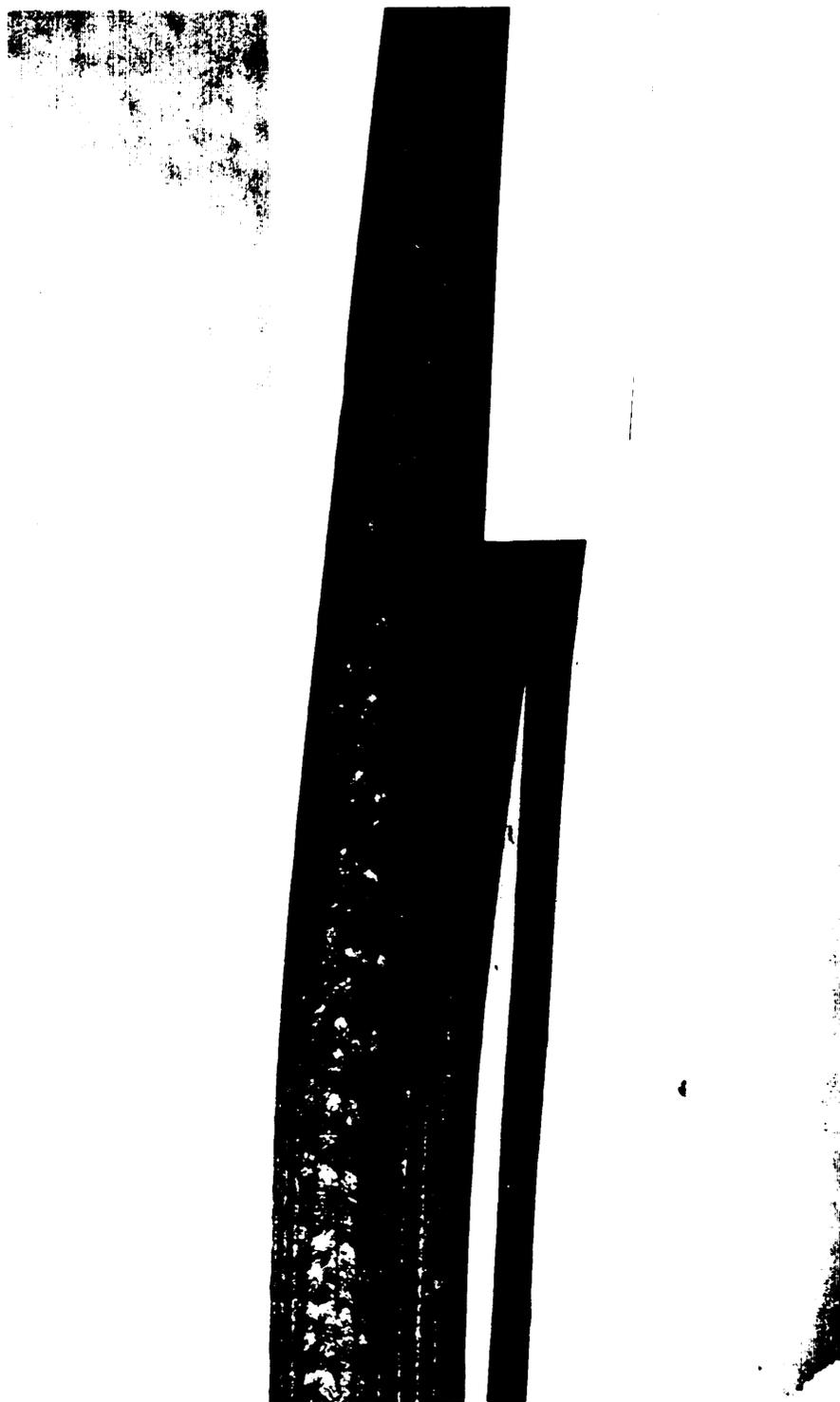


FIGURE 63. Light cover (roughness), thickness not below specified or not specified  
—minor.

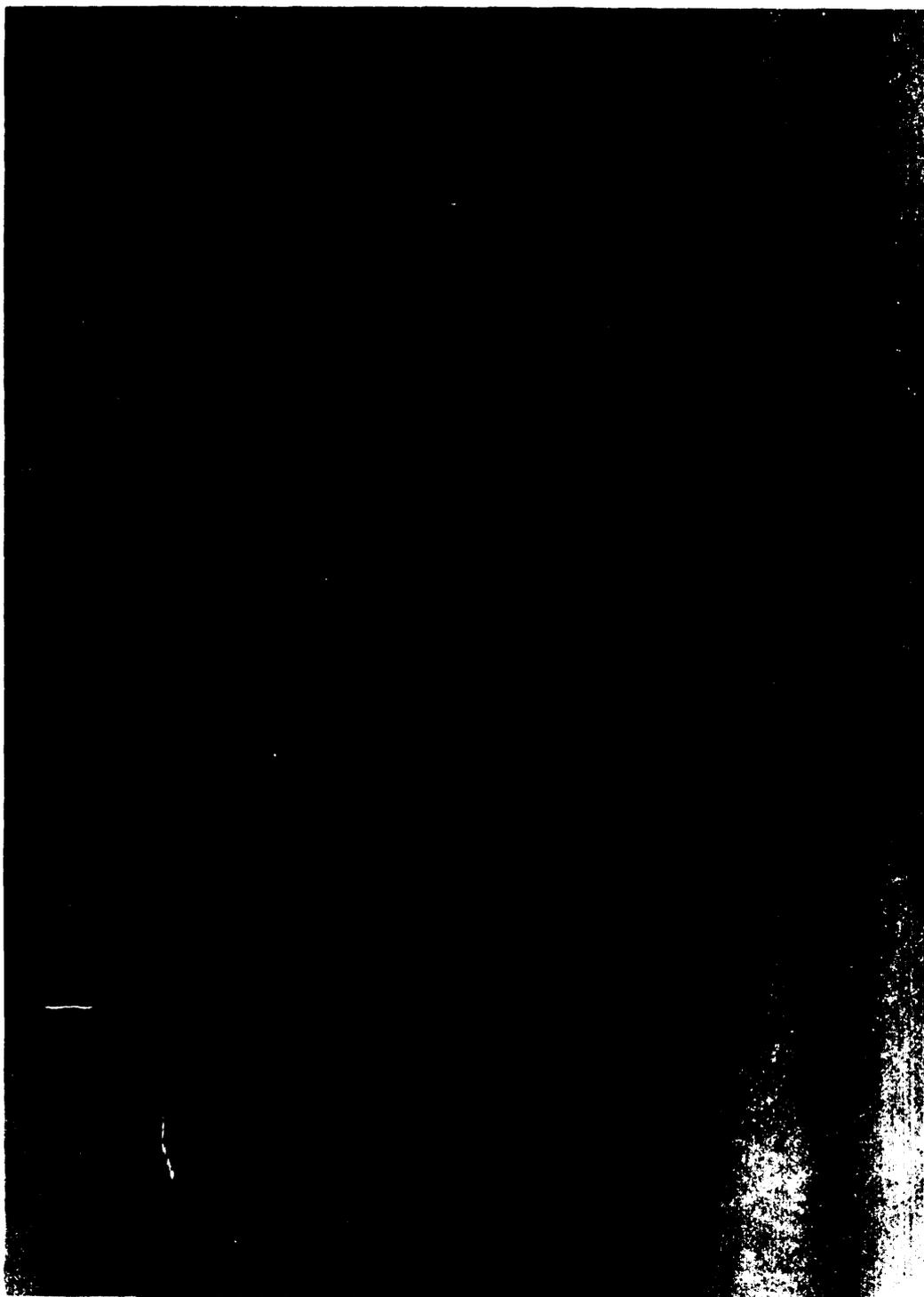


FIGURE 64. Loose cover—major.

Fed. Std. No. 162a



FIGURE 65. Loose cover—major.

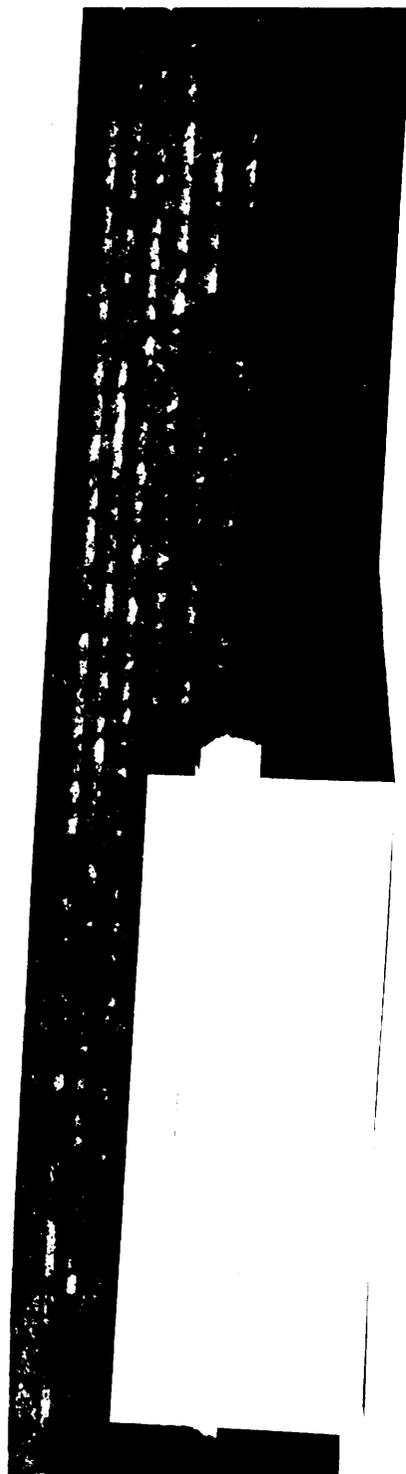


FIGURE 66. Lubricant, excess—not a defect.

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FIGURE 67. Lump, foreign material inclusion or lamination—major.

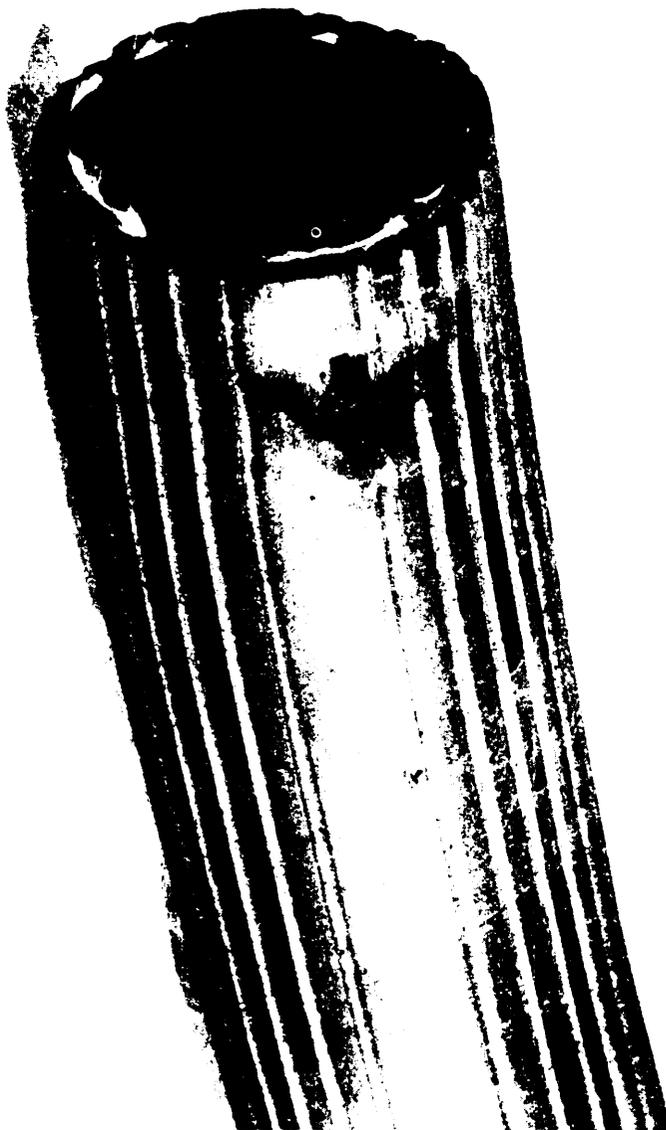


FIGURE 68. Lump, foreign material inclusion or lamination—major.

Fed. Std. No. 162a

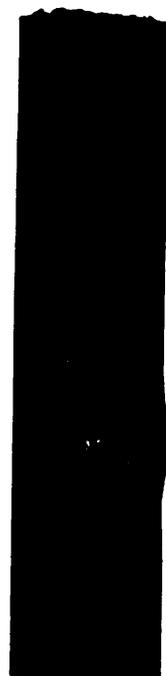


FIGURE 69. Lump, small protrusion, no hole: class A—major: classes B and C—minor.

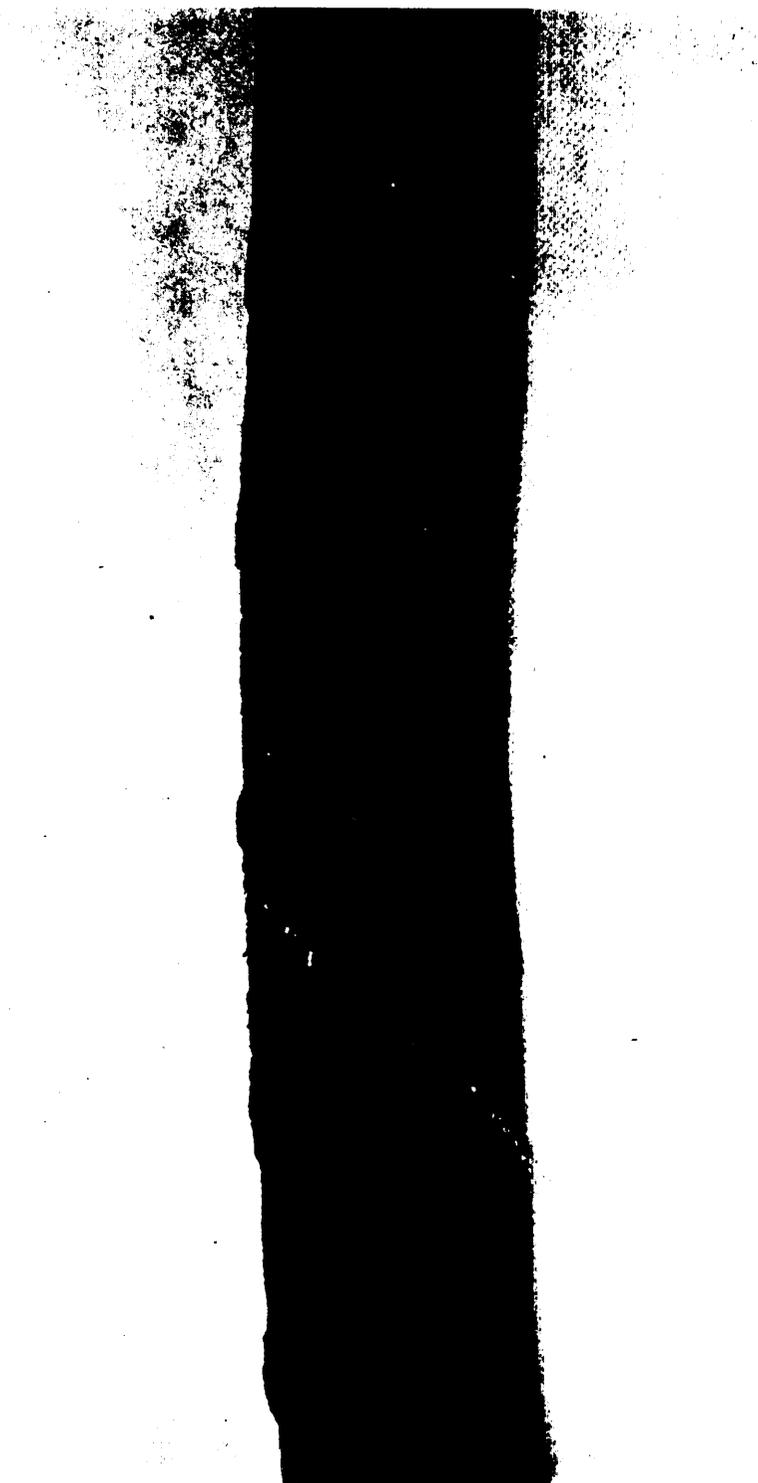


FIGURE 70. Missing cover, reinforcement exposed—major.

Fed. Std. No. 162a

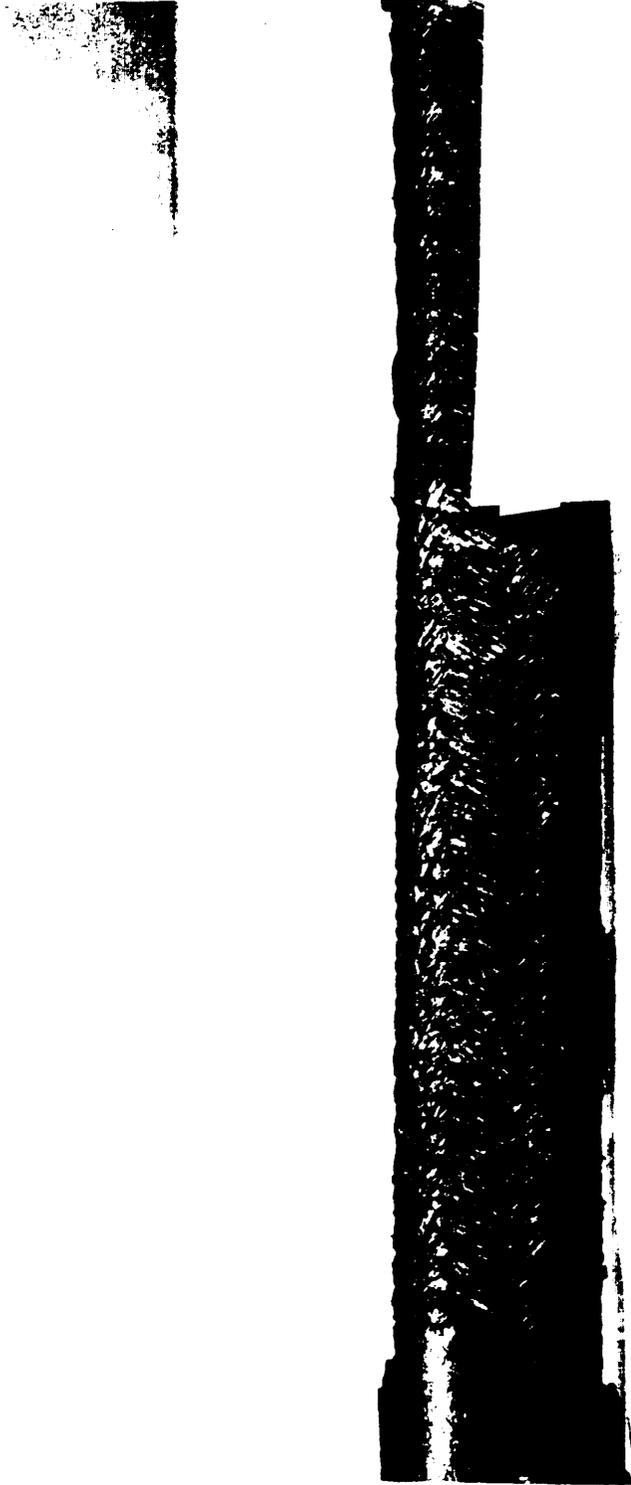


FIGURE 71. Missing cover, reinforcement exposed—major.

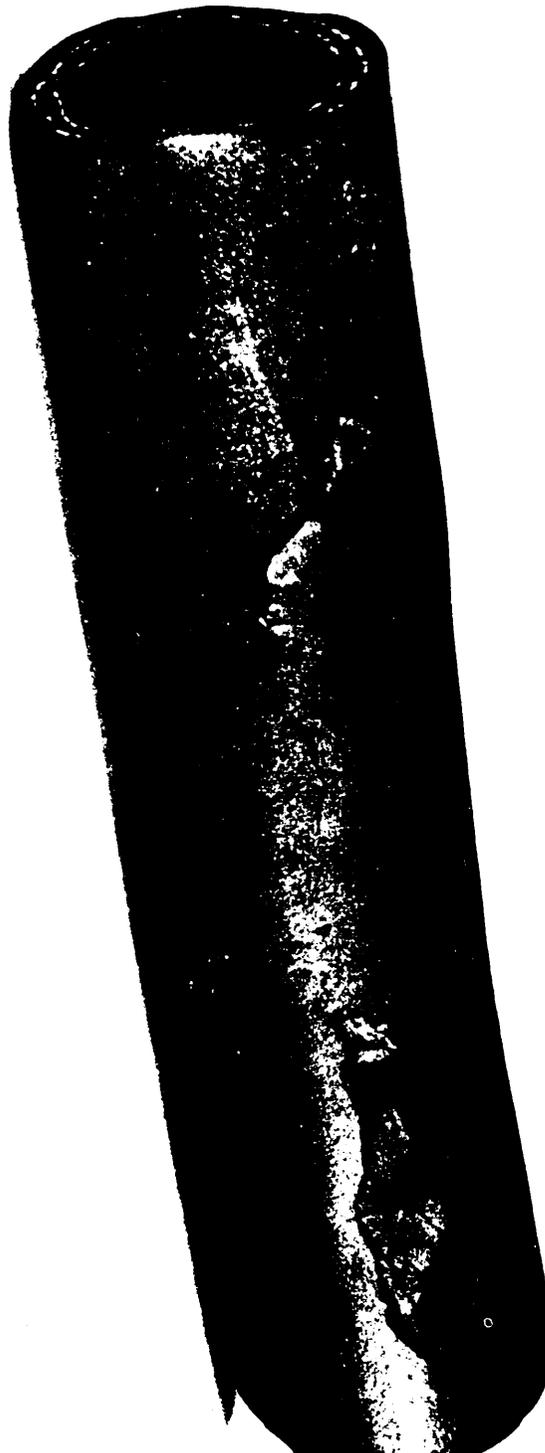


FIGURE 72. Patched cover, open edge—major.

Fed. Std. No. 162a



FIGURE 73. Patched cover:

- I—Incorrect thickness, high or low—major.
- II—Correct thickness and securely cured—not a defect.

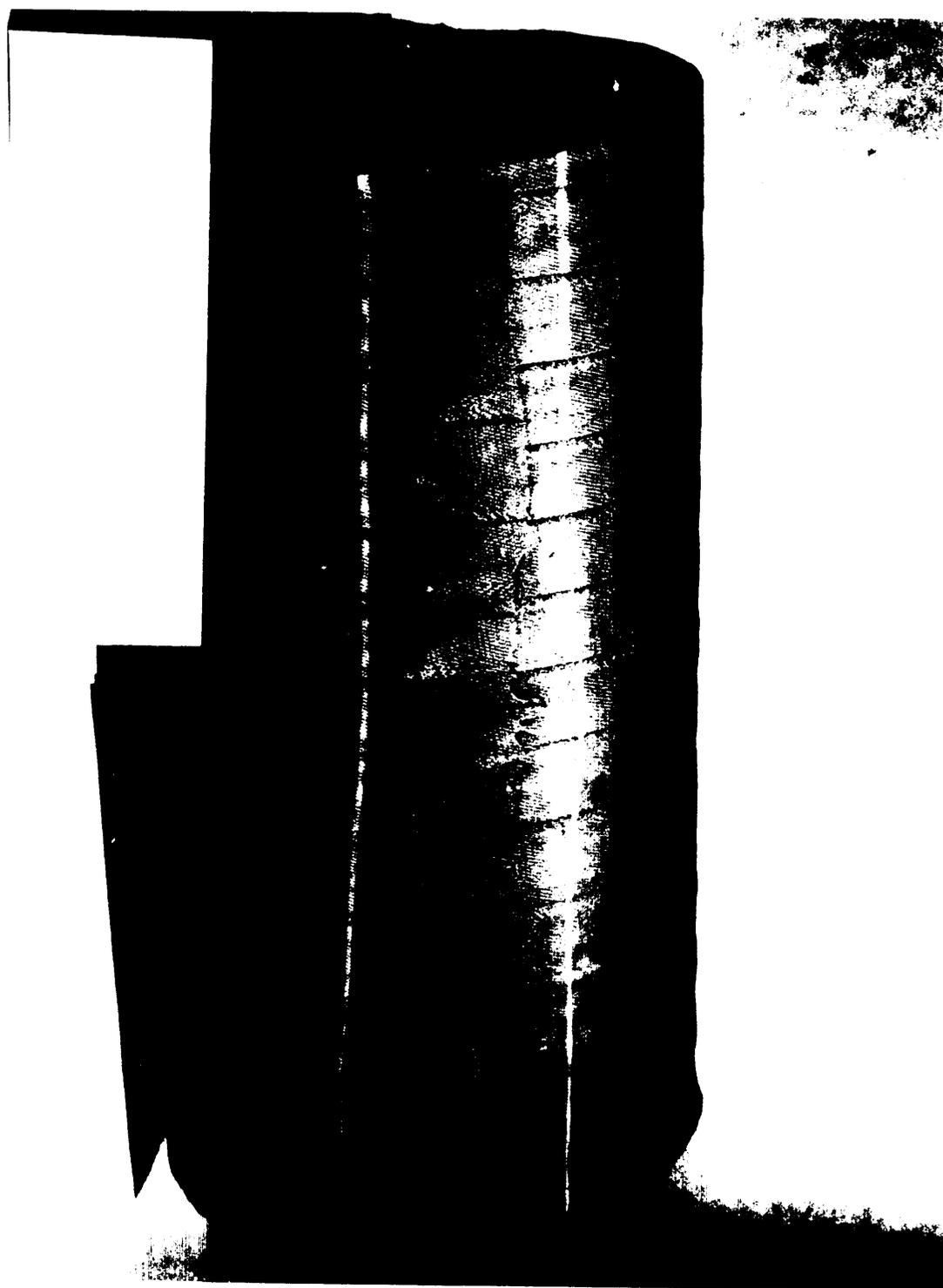


FIGURE 74. Patched cover—not a defect.

Fed. Std. No. 162a

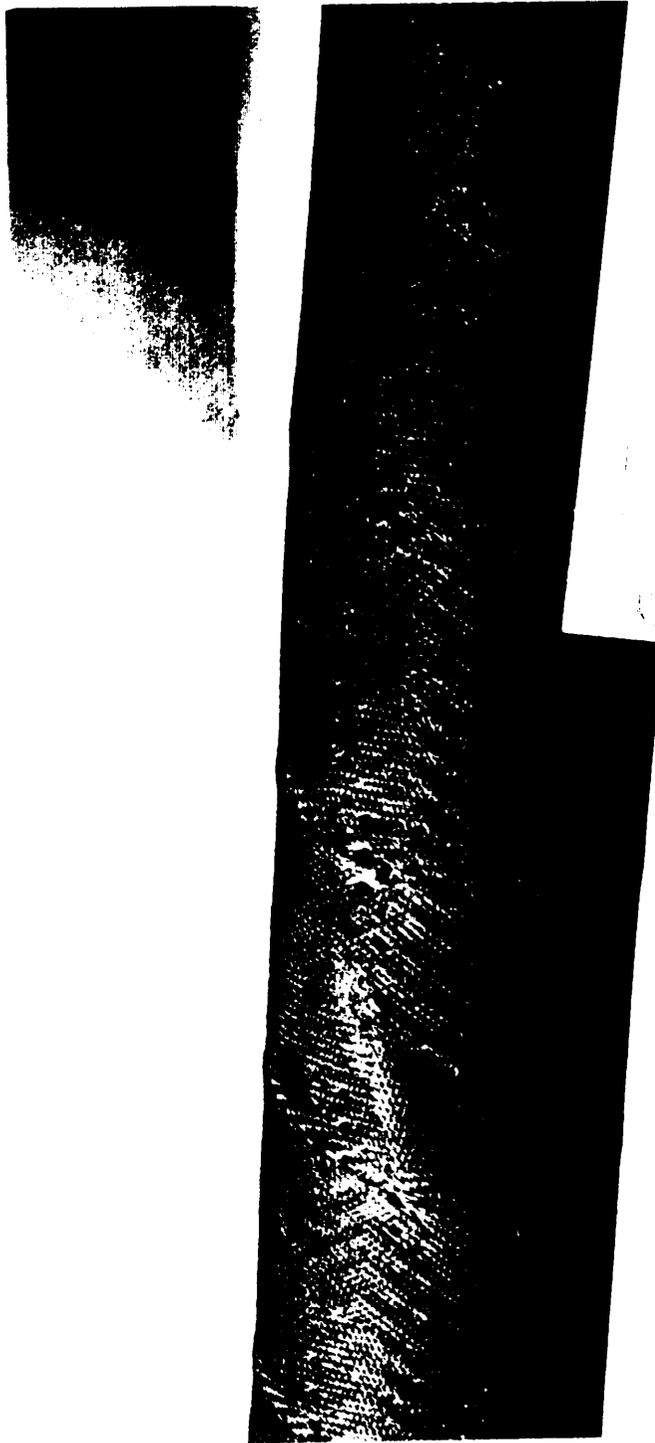


FIGURE 75. Porosity, extended area, over 10 percent of thickness—major.



FIGURE 76 Porosity, small localized area, reinforcement not exposed—minor.

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FIGURE 77. Pricker marks through to reinforcement—major (see note in table I for other classification).

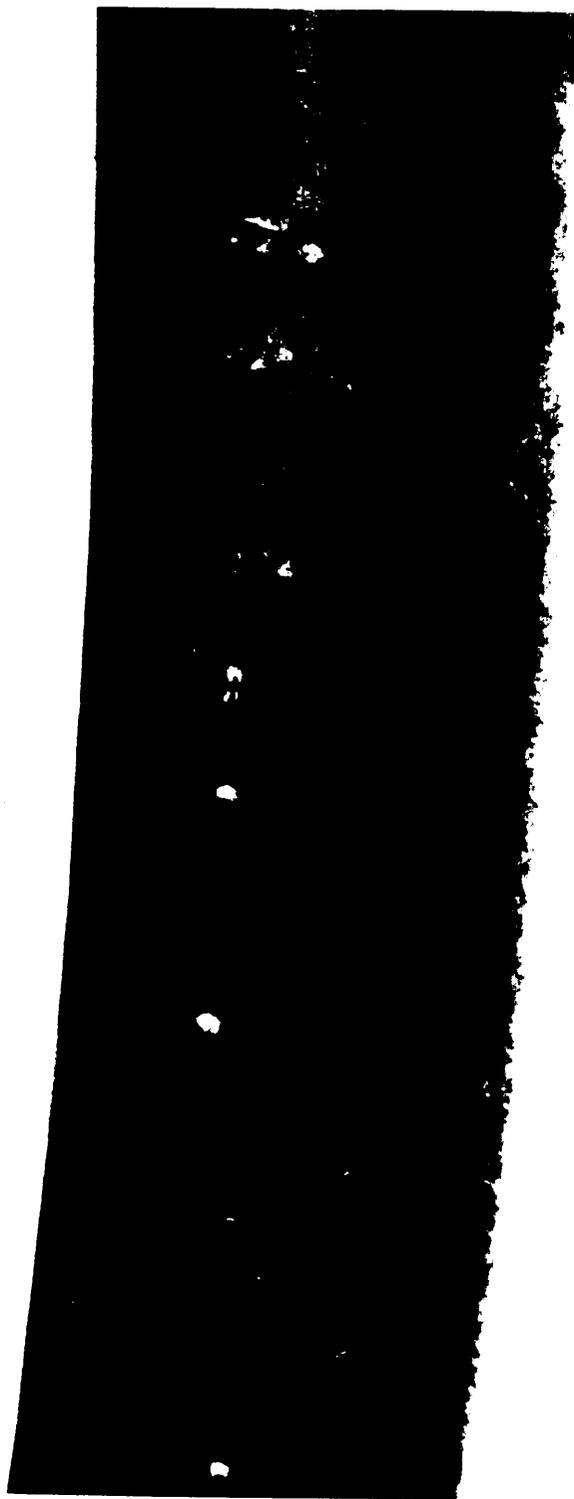


FIGURE 78. Pricker mark or air tracks, small area, not through to reinforcement—minor.

Fed. Std. No. 162a

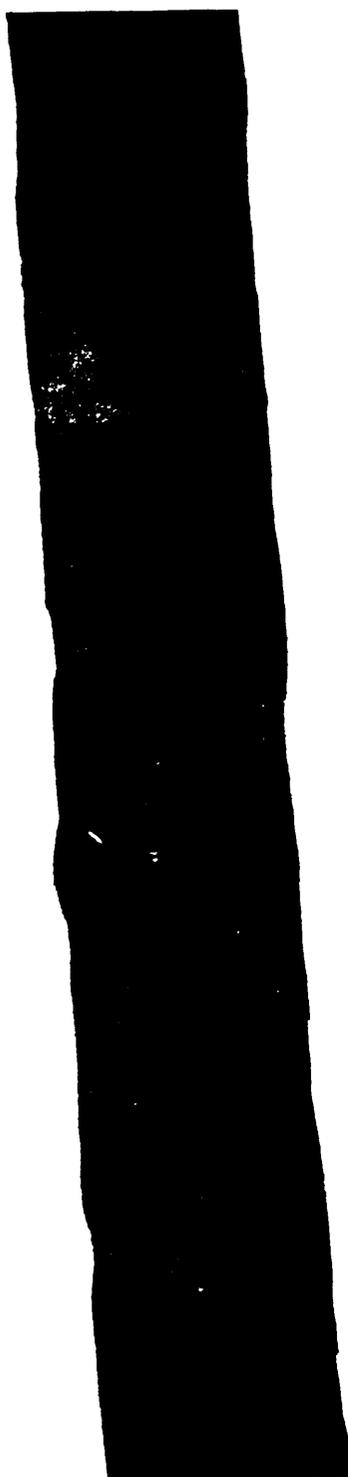


FIGURE 79. Ridge, lamination or separation—major.

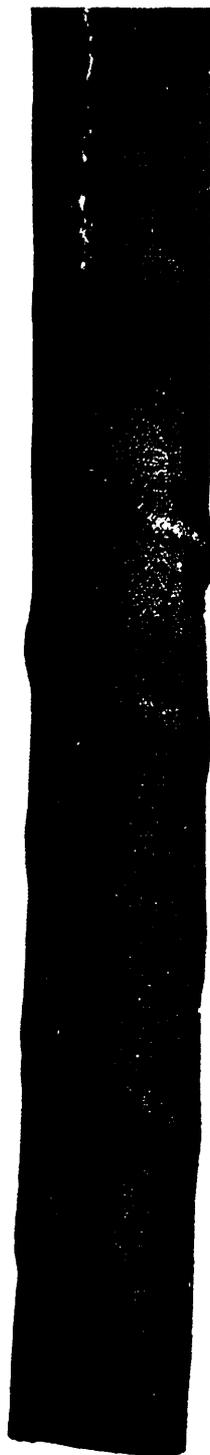


FIGURE 80. Ridge, large—major.

Fed. Std. No. 162a



FIGURE 81. Ridge. small—minor ( see note in table I for other classification).

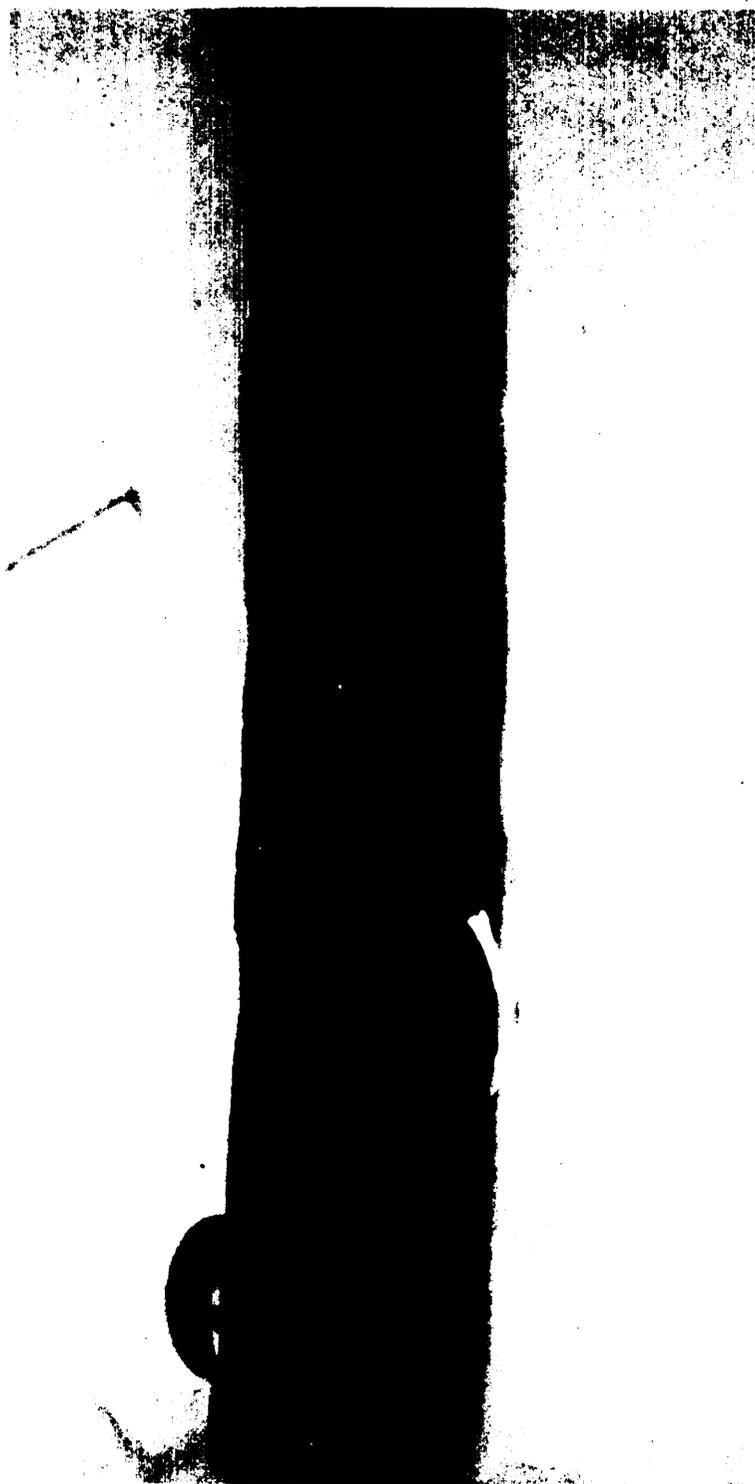


FIGURE 82. Ridge, small—minor (see note in table I for other classification).

Fed. Std. No. 162a

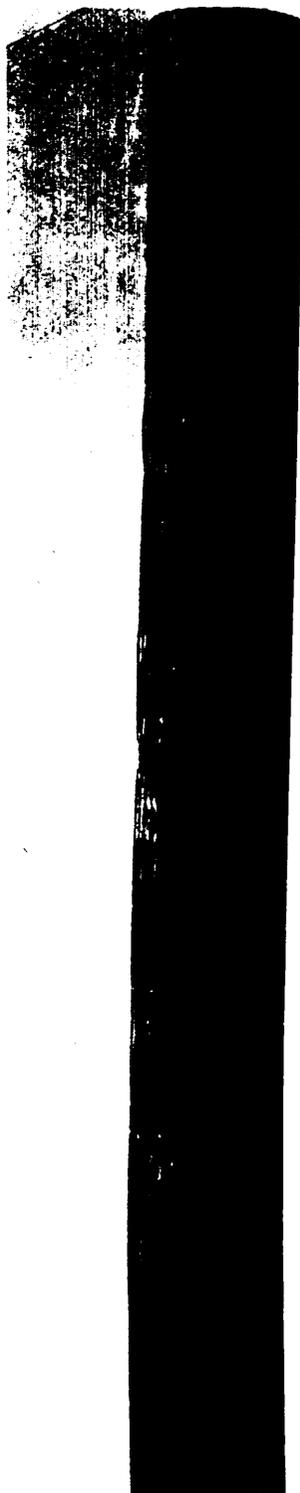


FIGURE 83. Rough cover—major.

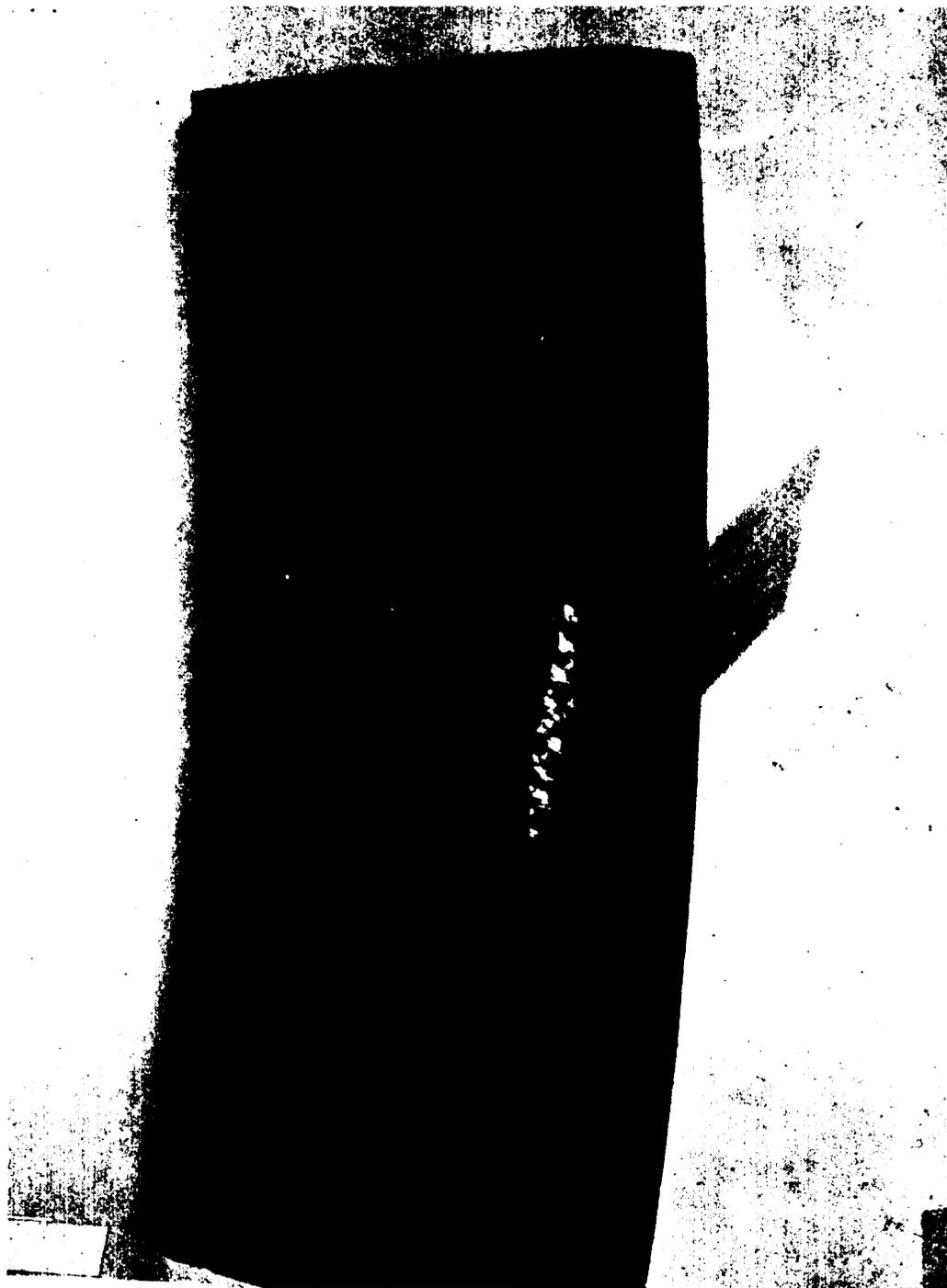


FIGURE 84. Split cover—major.

Fed. Std. No. 162a



FIGURE 85. Split cover—major.



FIGURE 86. Thickness, over (not mentioned in procurement document)—not a defect.

Fed. Std. No. 162a

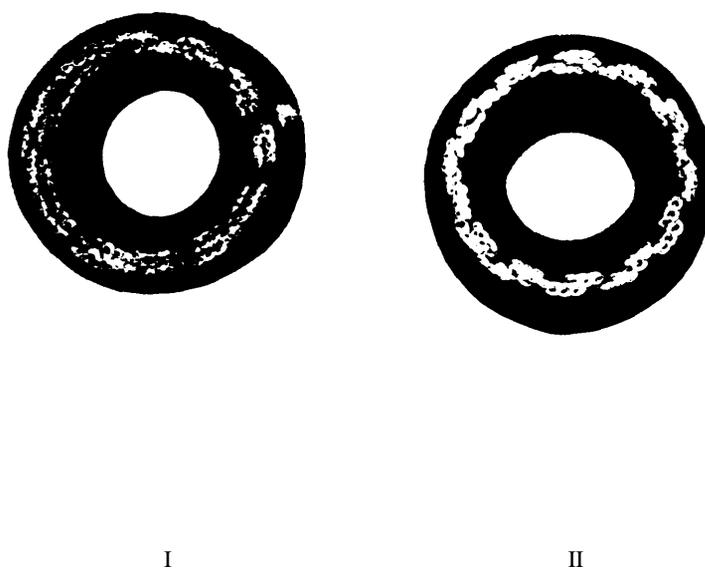


FIGURE 87. Thickness, under, below tolerance limit:  
I—Thin cover—major.  
II—Normal hose.

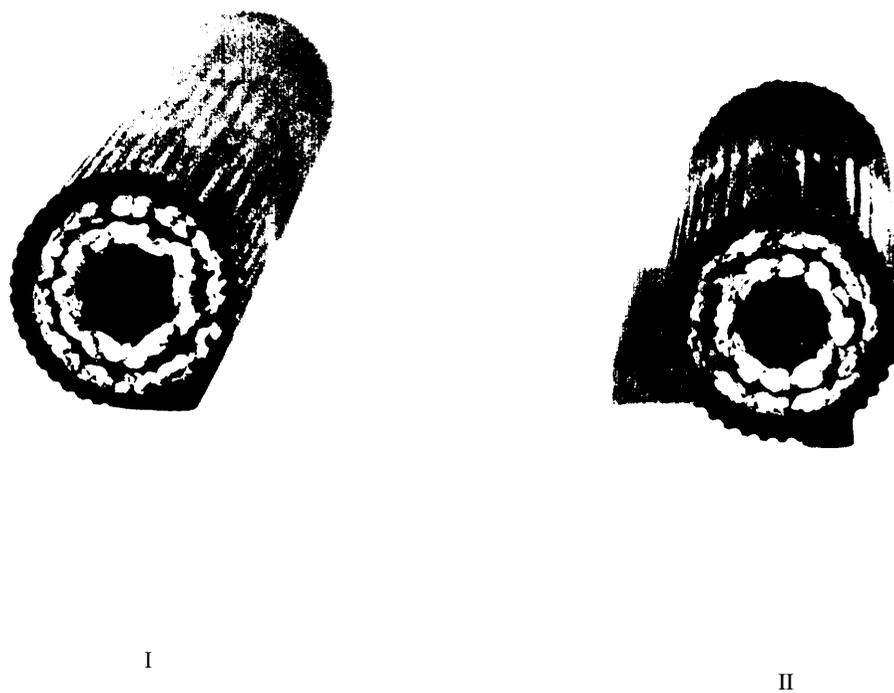


FIGURE 88. Thickness:  
I—Eccentric (lopsided): outside tolerance—major; tolerance met—not a defect.  
II—Normal hose.

Fed. Std. No. 162a



FIGURE 89. Wrinkles—major.

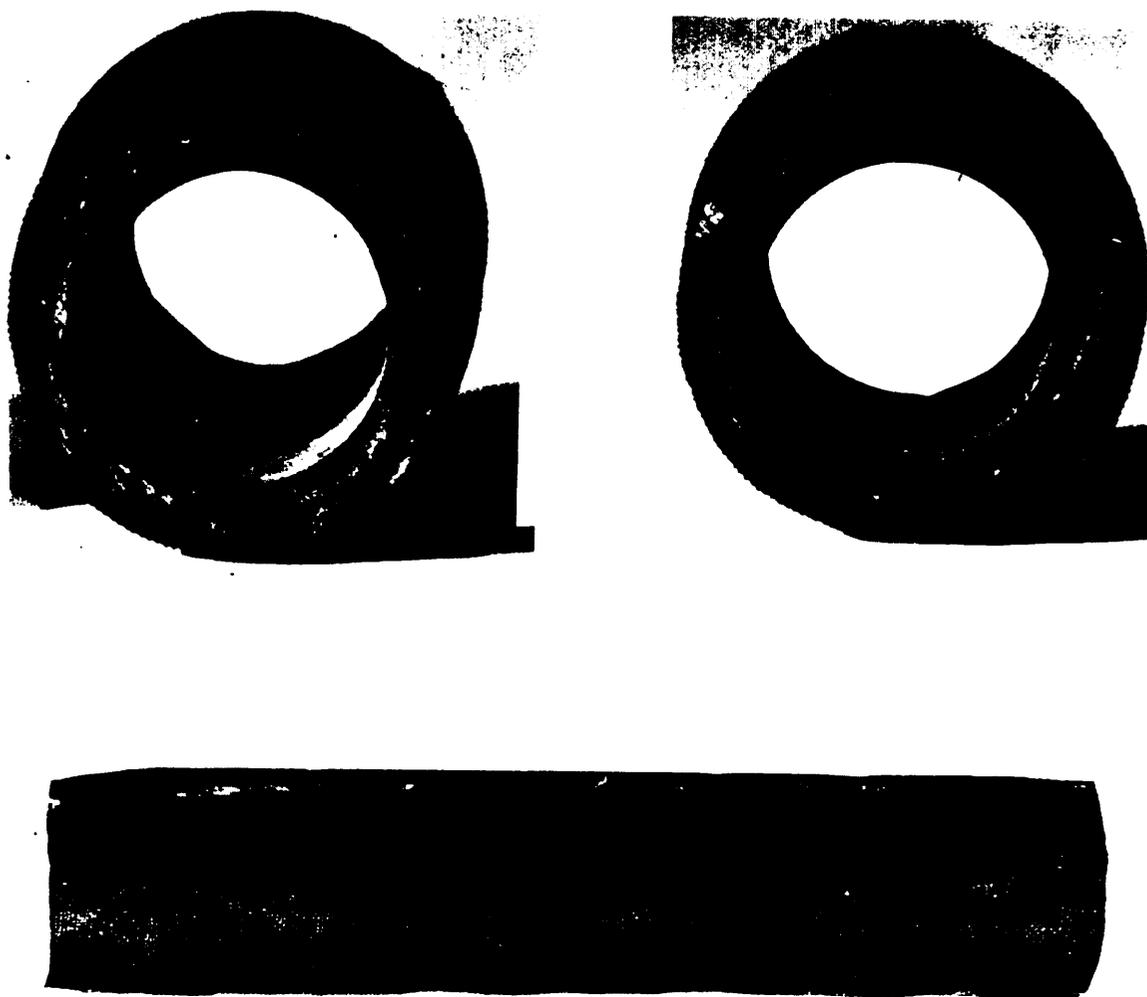


FIGURE 90. Wrinkles, wrapper, medium—major.

Fed. Std. No. 162a

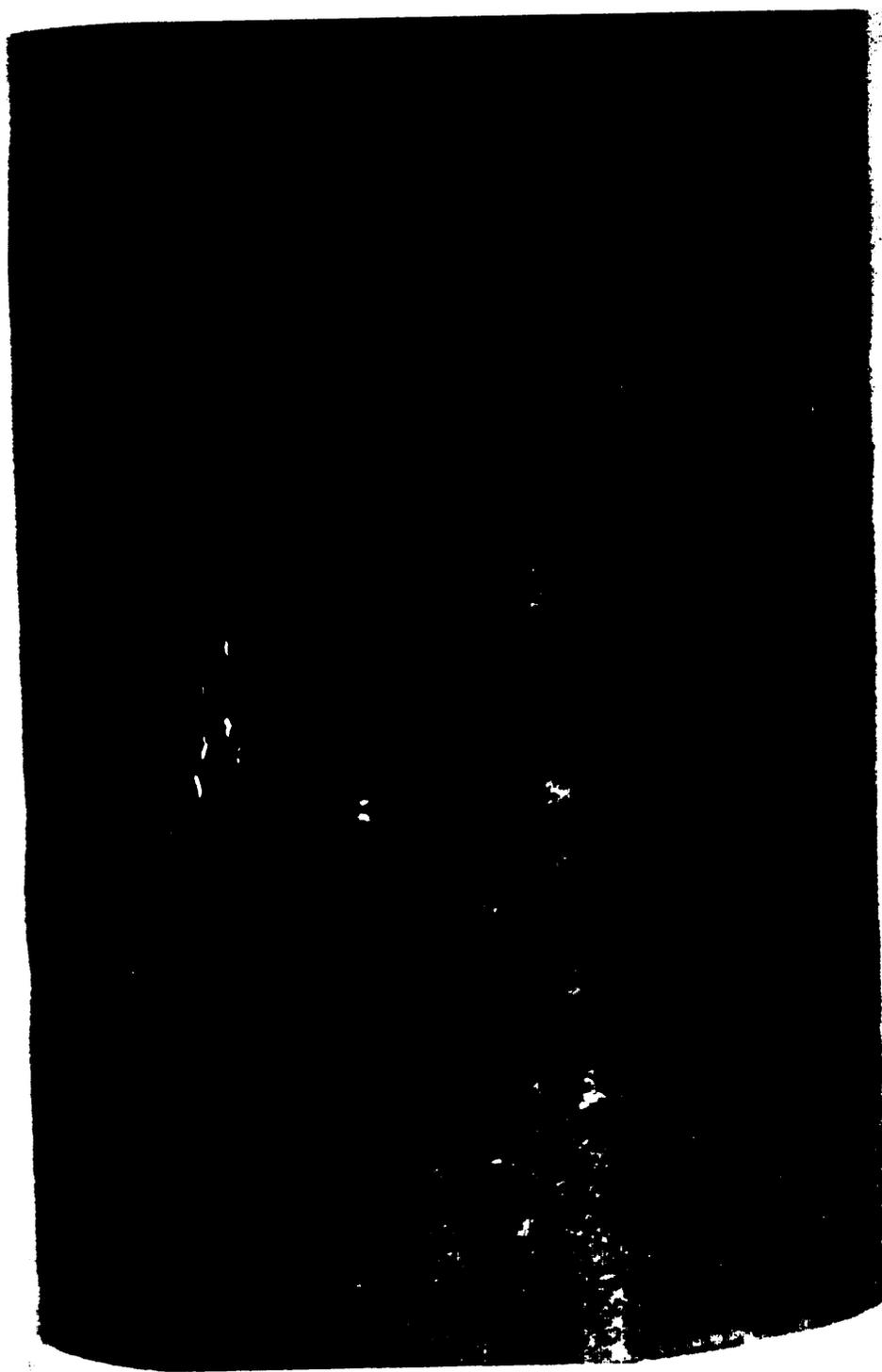


FIGURE 91. Wrinkles, wrapper, small—minor.



FIGURE 92. Wrinkles, wrapper, fine—not a defect.

Fed. Std. No. 162a



FIGURE 93. Wrinkles, wrapper, fine—not a defect.

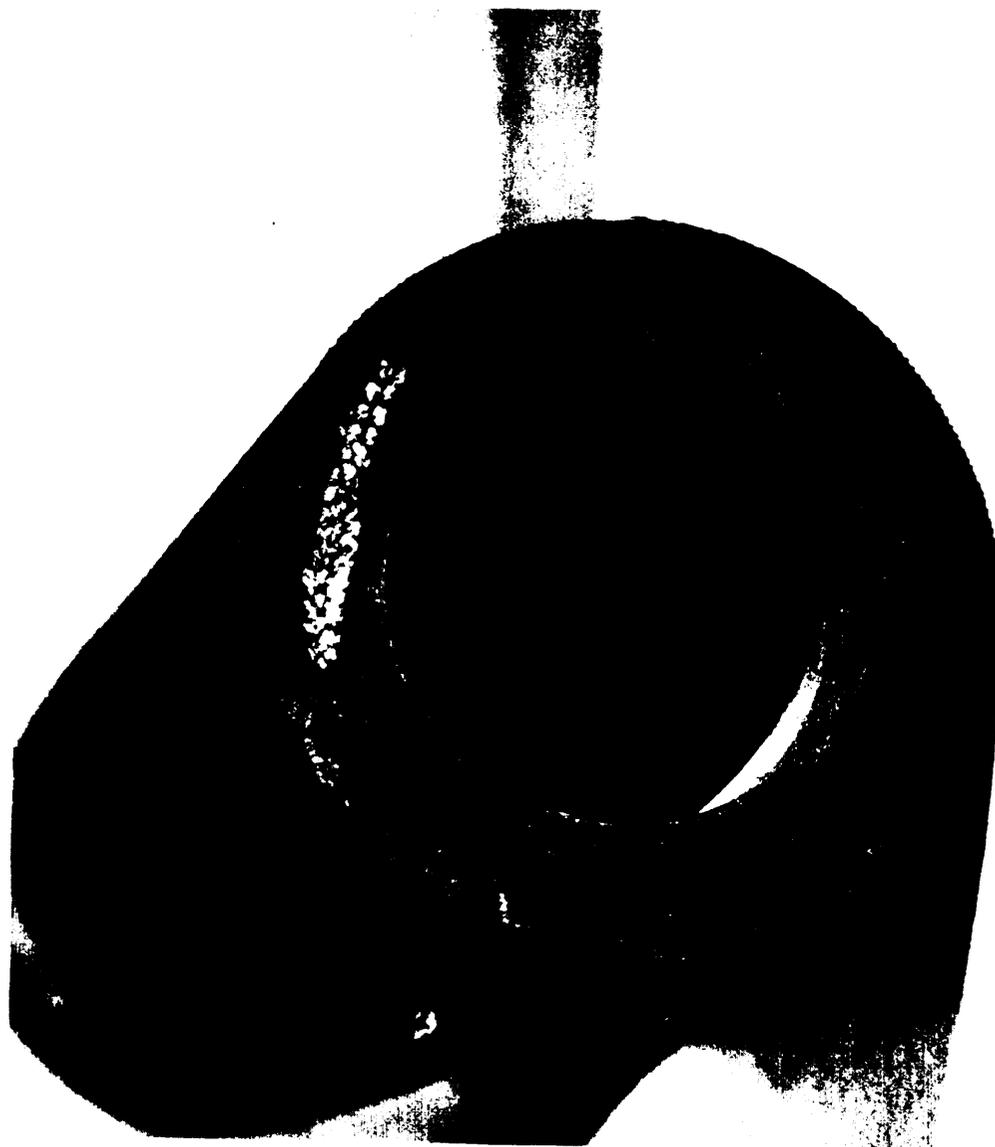


FIGURE 94. Capped, fabric exposed—major.

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I—Excessive—major.

II—Small—not a defect.

FIGURE 95. Flash or rind:

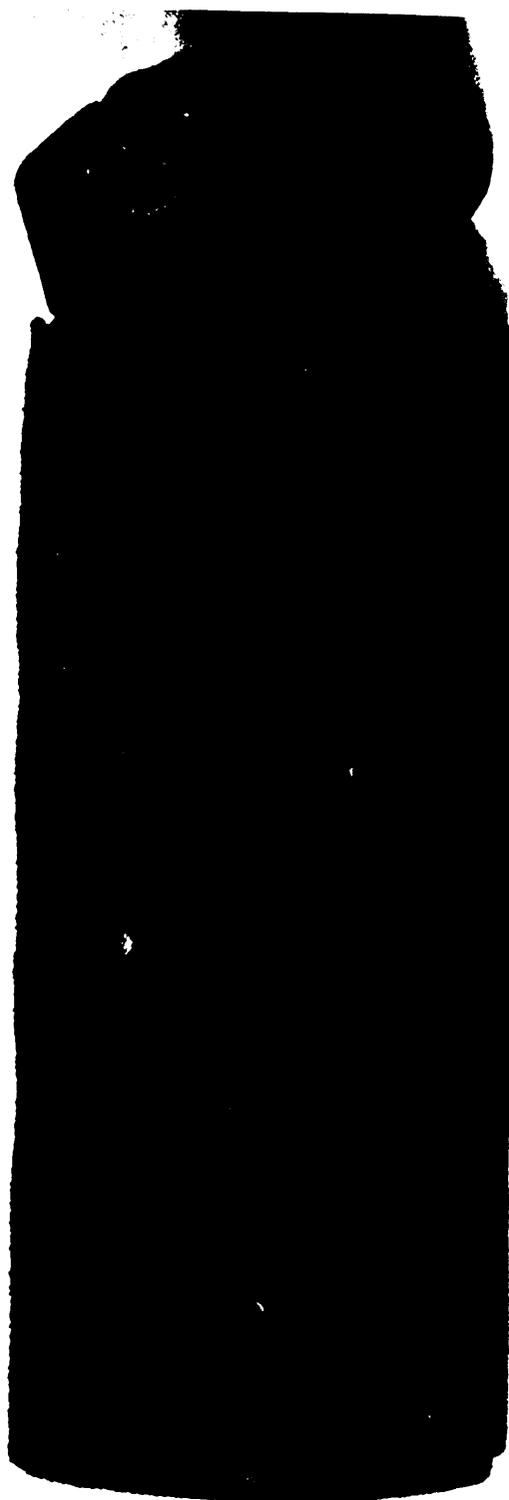
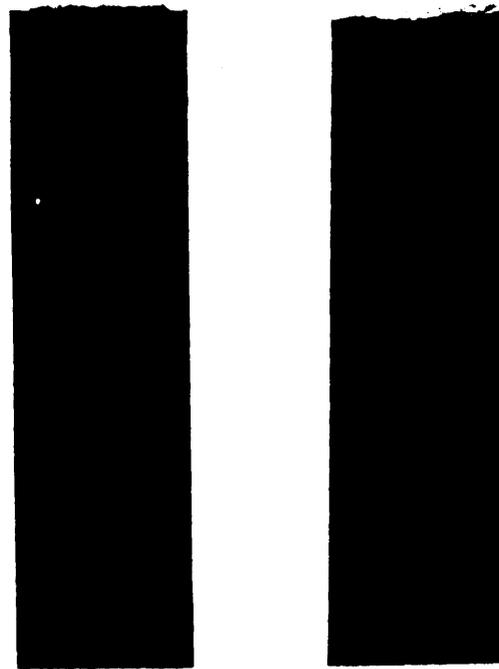


FIGURE 96. Loose ends—major.

Fed. Std. No. 162a



FIGURE 97. Cut, angle or diagonal: specified length—major; random length—not a defect.



I

II

I—Normal hose.

II—Angle end cut.

FIGURE 98. Cut, angle or diagonal: specified length—major; random length—not a defect.

Fed. Std. No. 162a

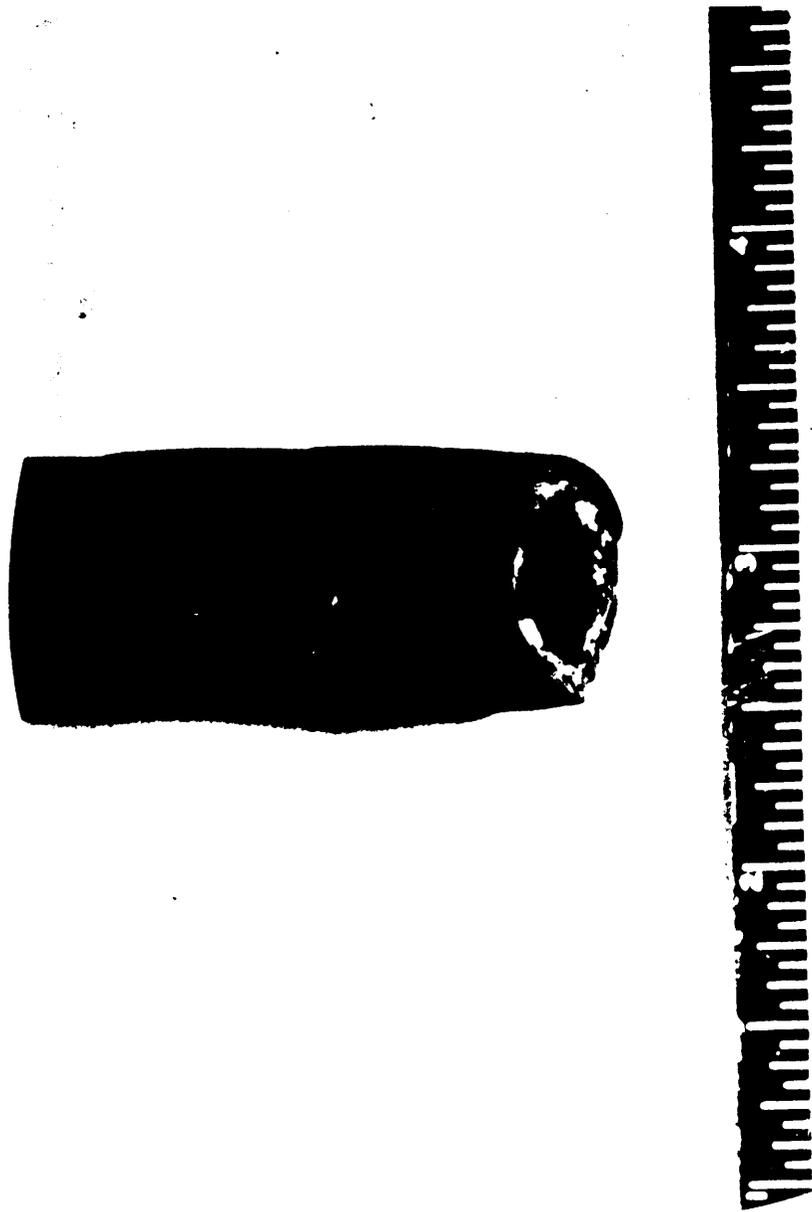


FIGURE 99. Ragged ends: specified length—major: random length—not a defect.

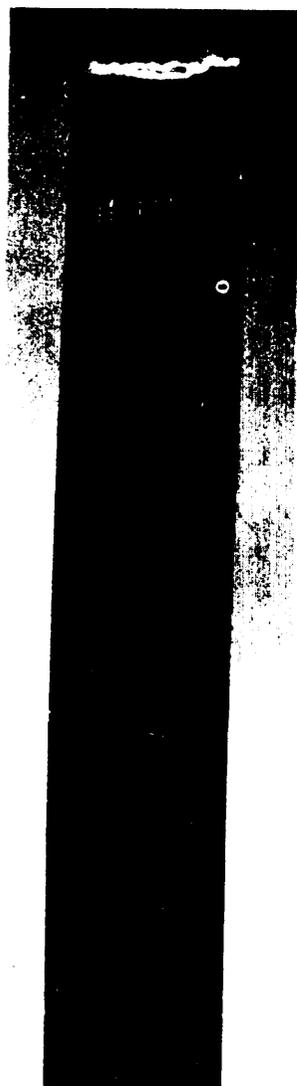


FIGURE 100. Ragged ends: specified length—major: random length—not a defect.

Fed. Std. No. 162a



FIGURE 101. Untrimmed ends: specified length—major; random length—not a defect.

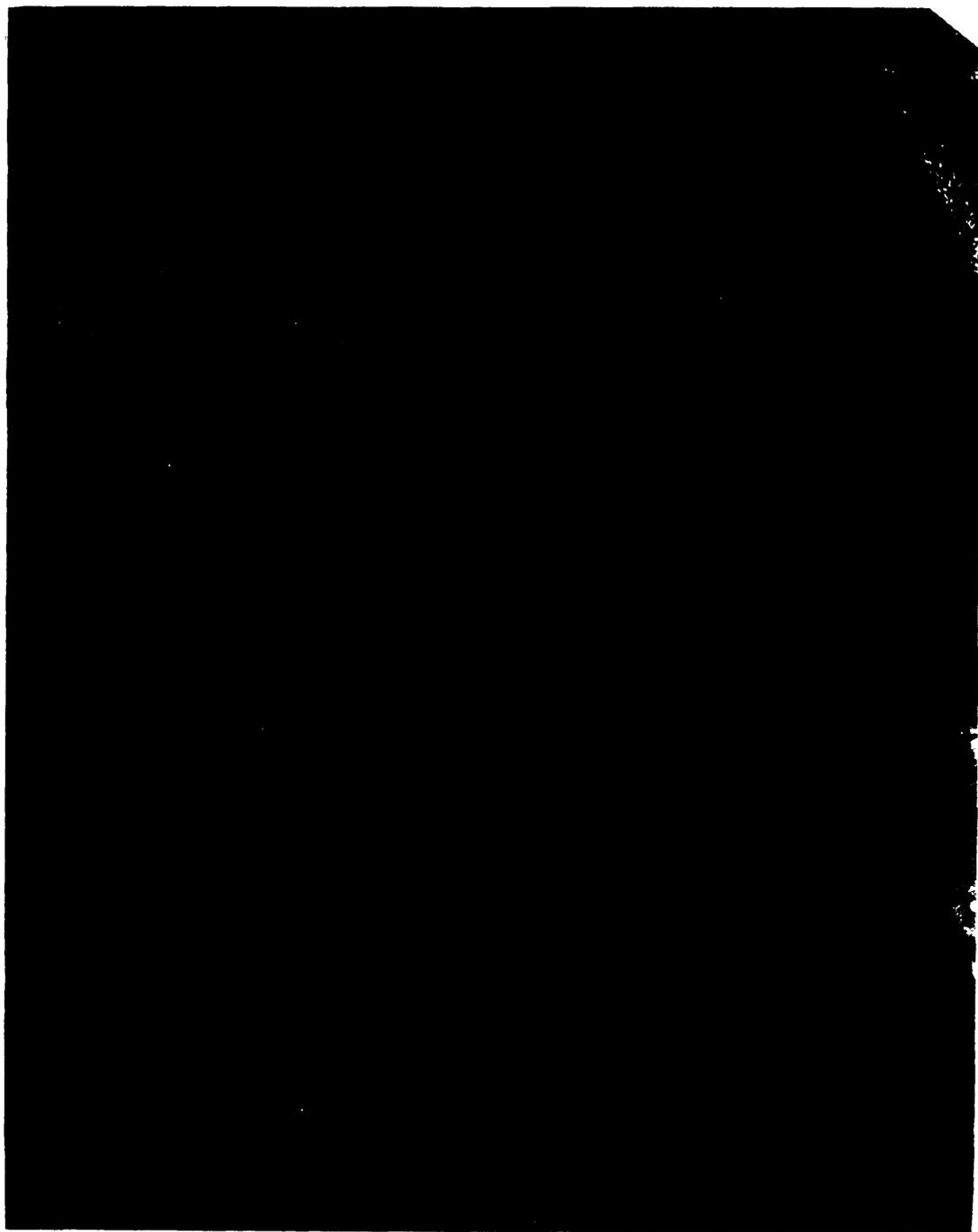


FIGURE 102. Reinforced ends, lamination (separation)—major.

Fed. Std. No. 162a

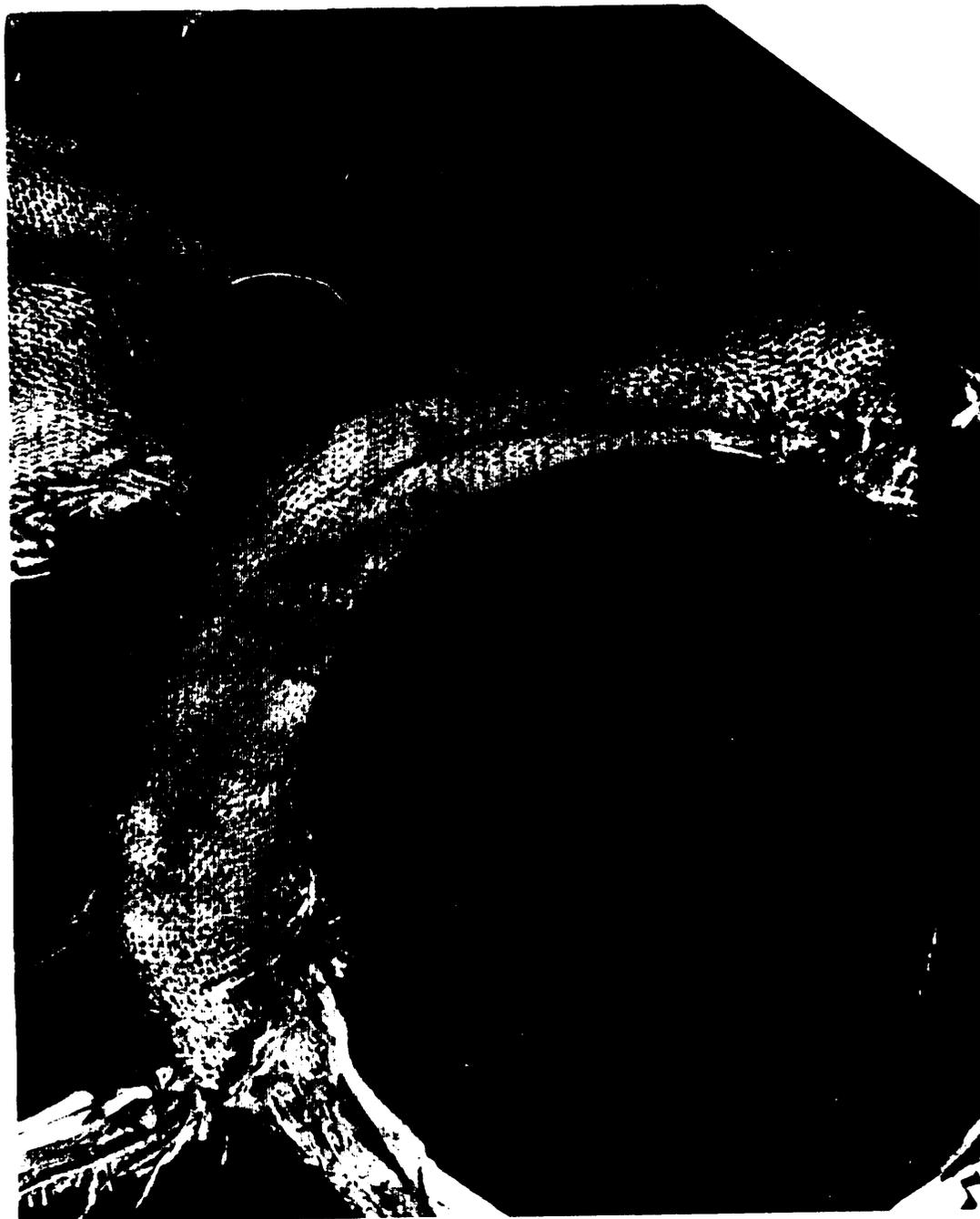


FIGURE 103. Reinforced ends, lamination (separation)—major.

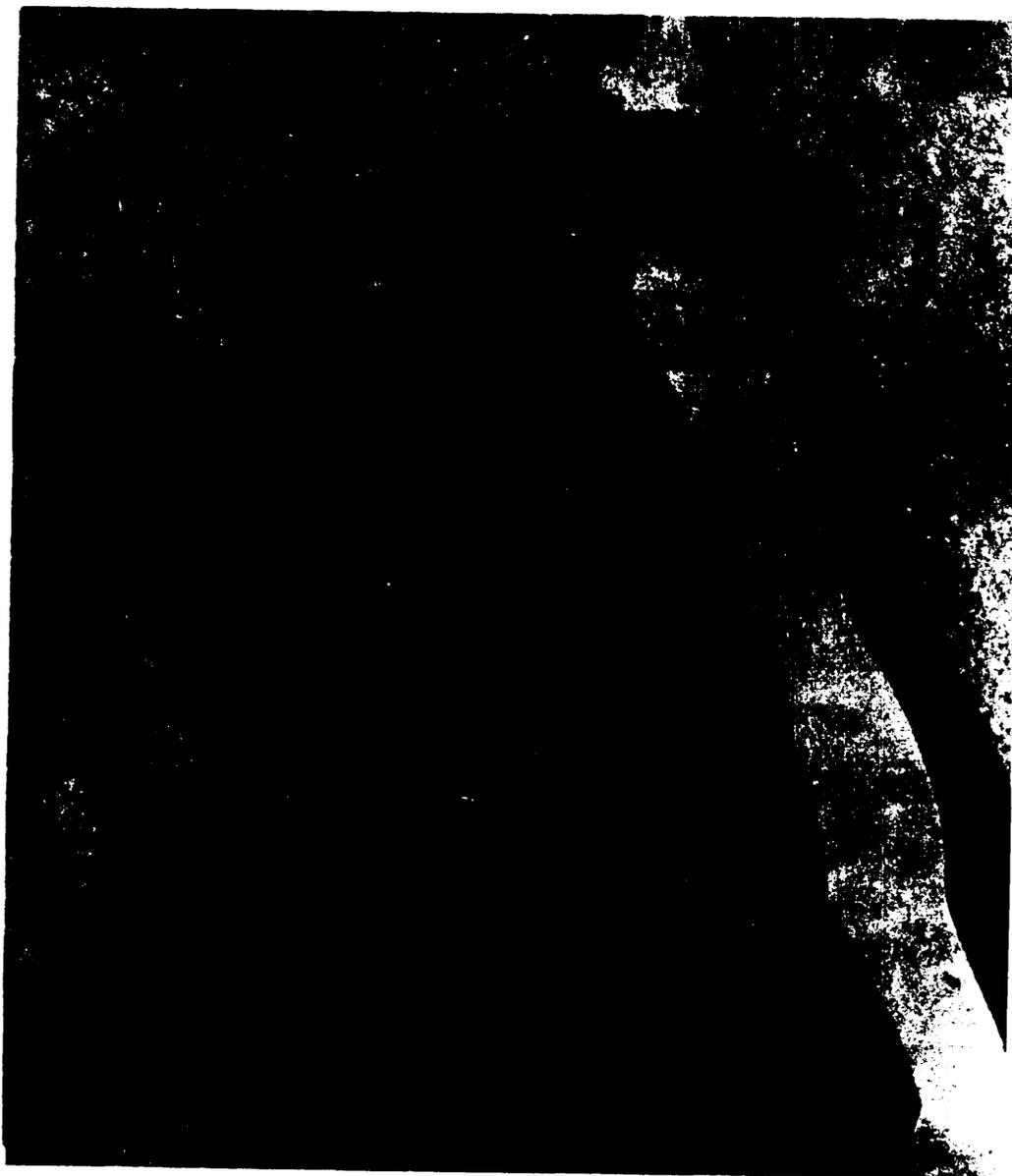


FIGURE 104. Reinforced ends, void—major.

Fed. Std. No. 162a



FIGURE 105. Reinforced ends, void—major.



FIGURE 106. Reinforced ends, void—major.

Fed. Std. No. 162a



FIGURE 107. Connections, flanges, angle set—major.

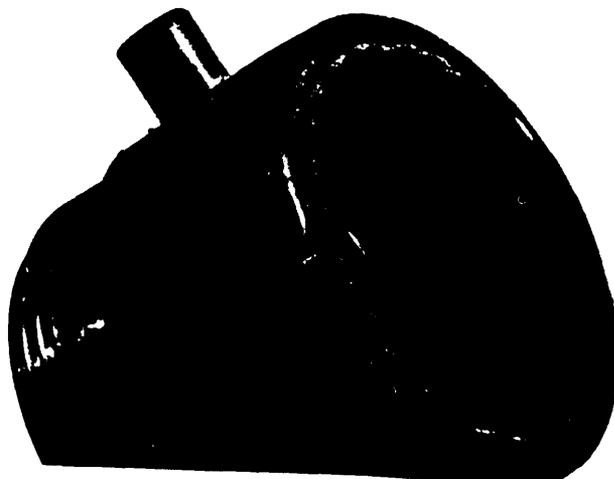


FIGURE 108. Cracked or split metal couplings—major.

Fed. Std. No. 162a

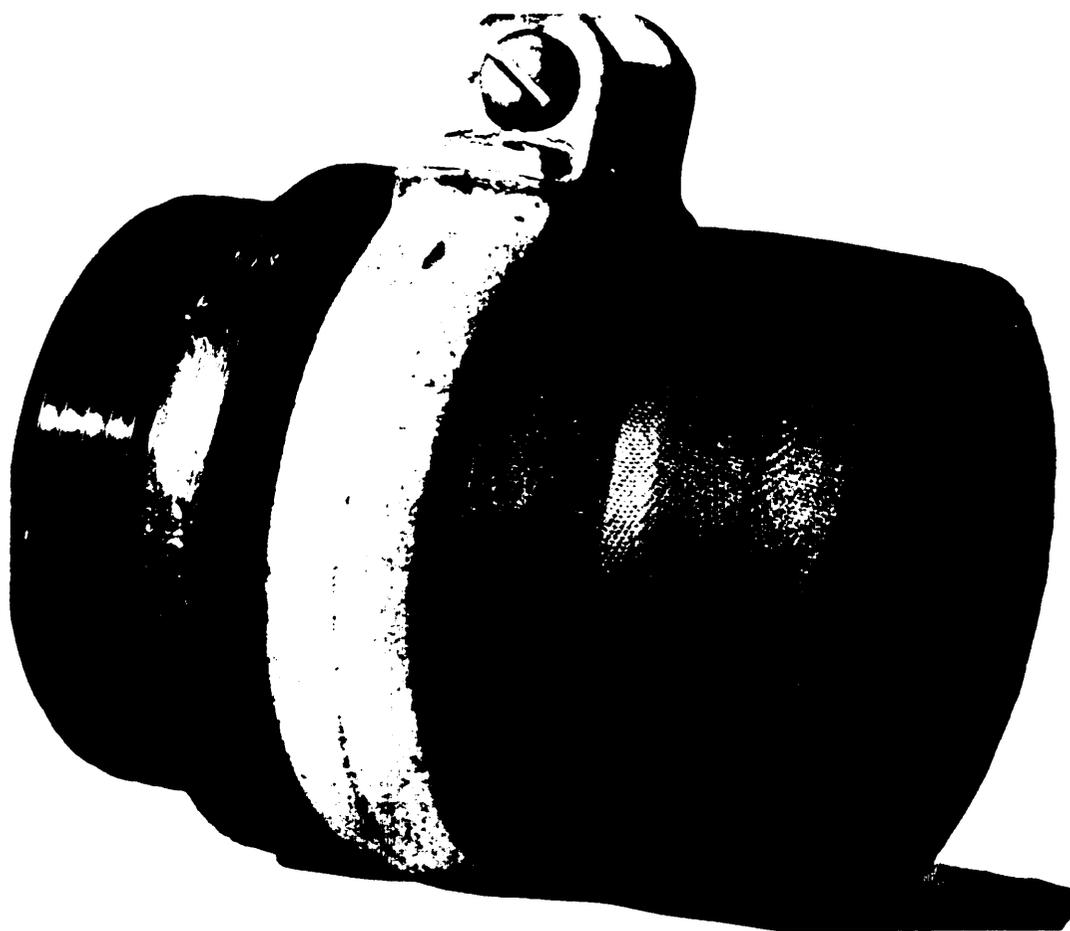


FIGURE 109. Cracked or split metal clamp—major.

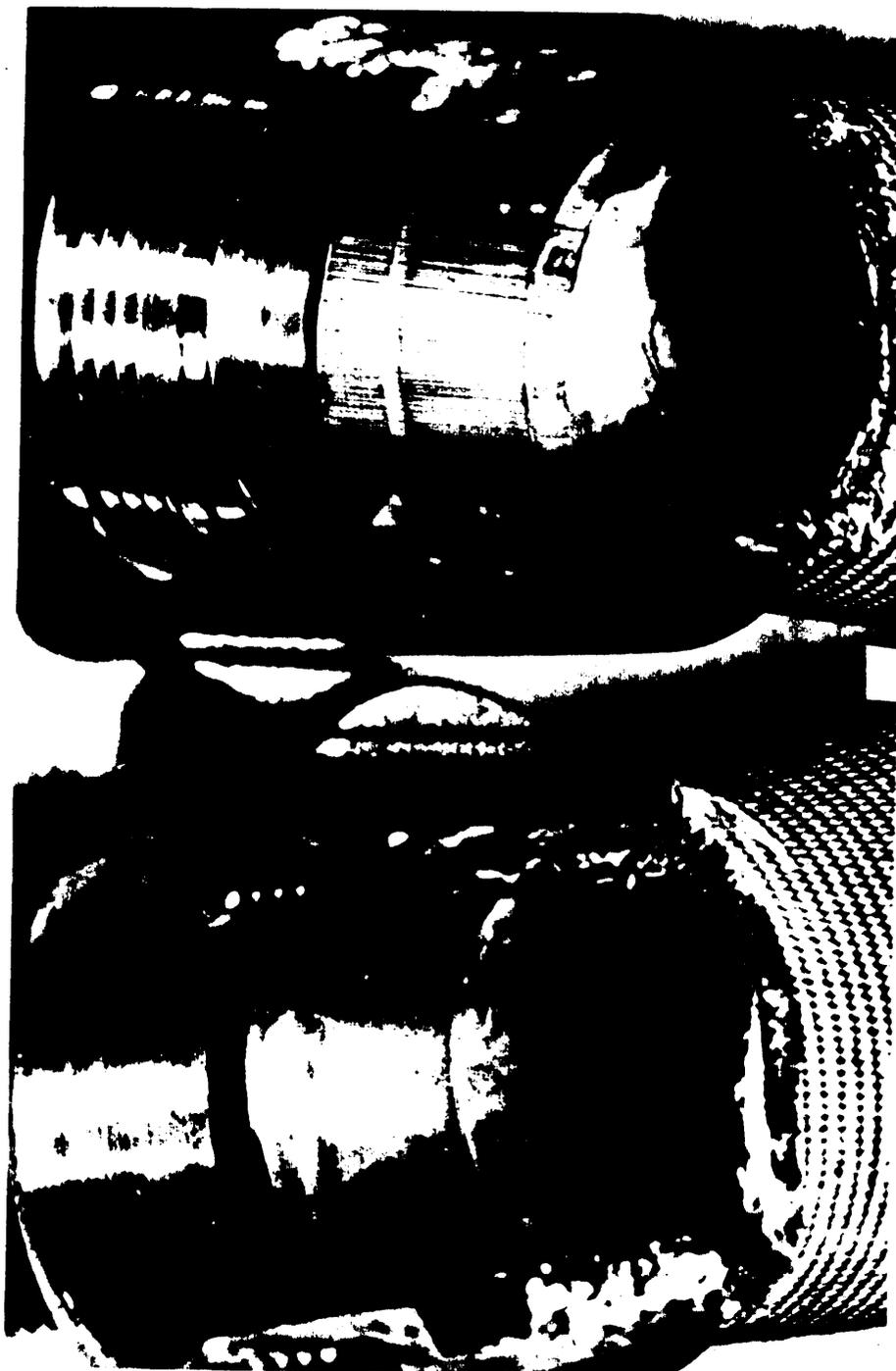


FIGURE 110. Gasket, tail or binder washer for expansion ring coupling:  
I—Not properly placed—major.  
II—Correct placement.

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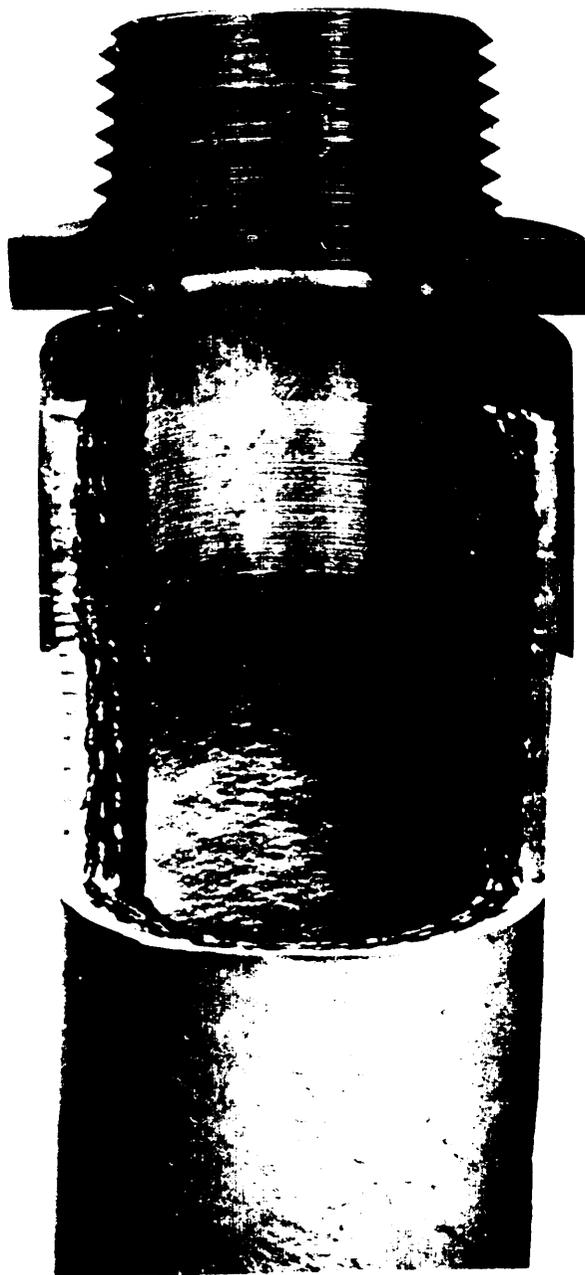


FIGURE III. Insertion distance wrong—major.

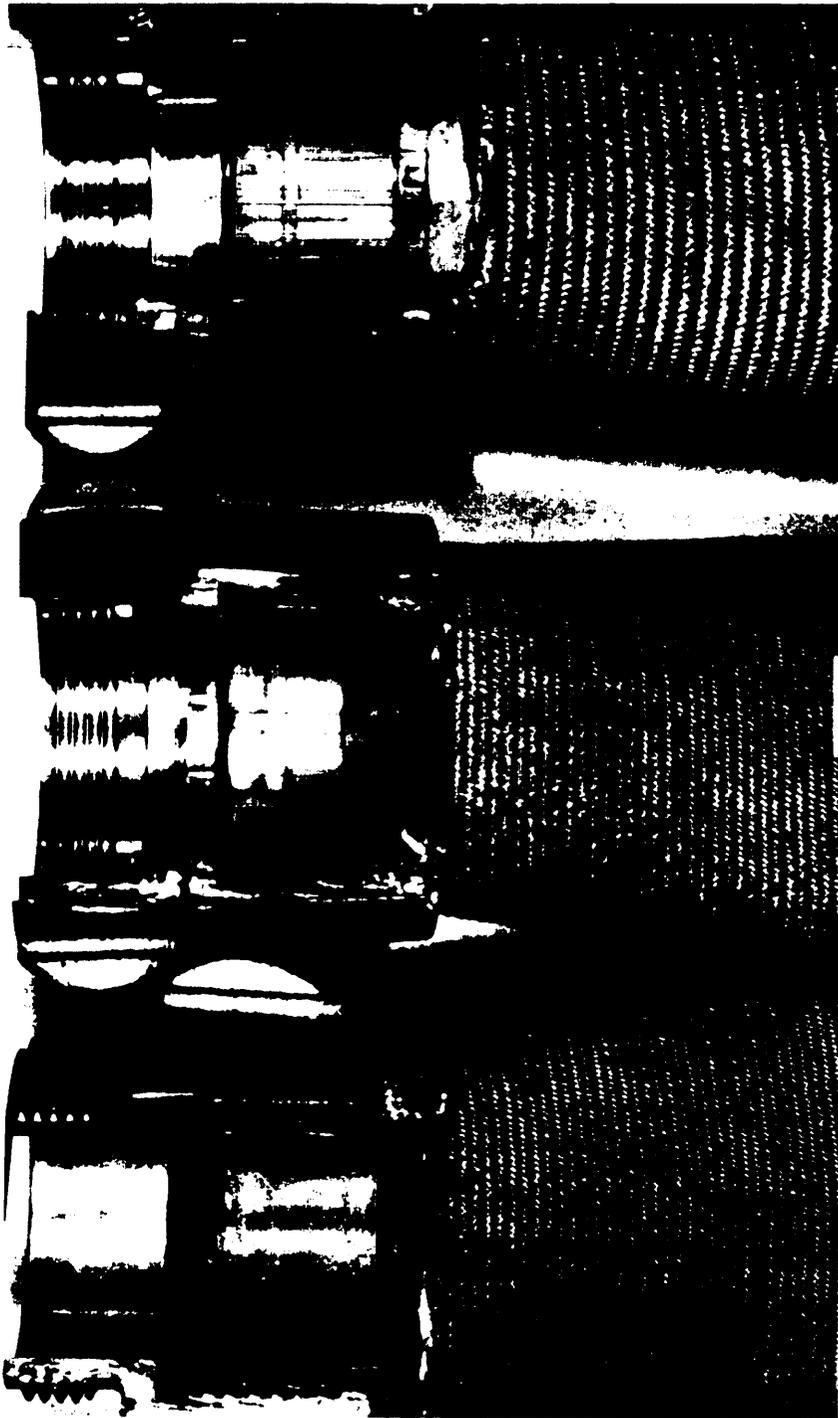


FIGURE 112. Ring, expansion, improperly placed:  
I—Correct.  
II—Ring in waterway—major.  
III—Too much gap—major.

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FIGURE 113. Cement in tube—minor.

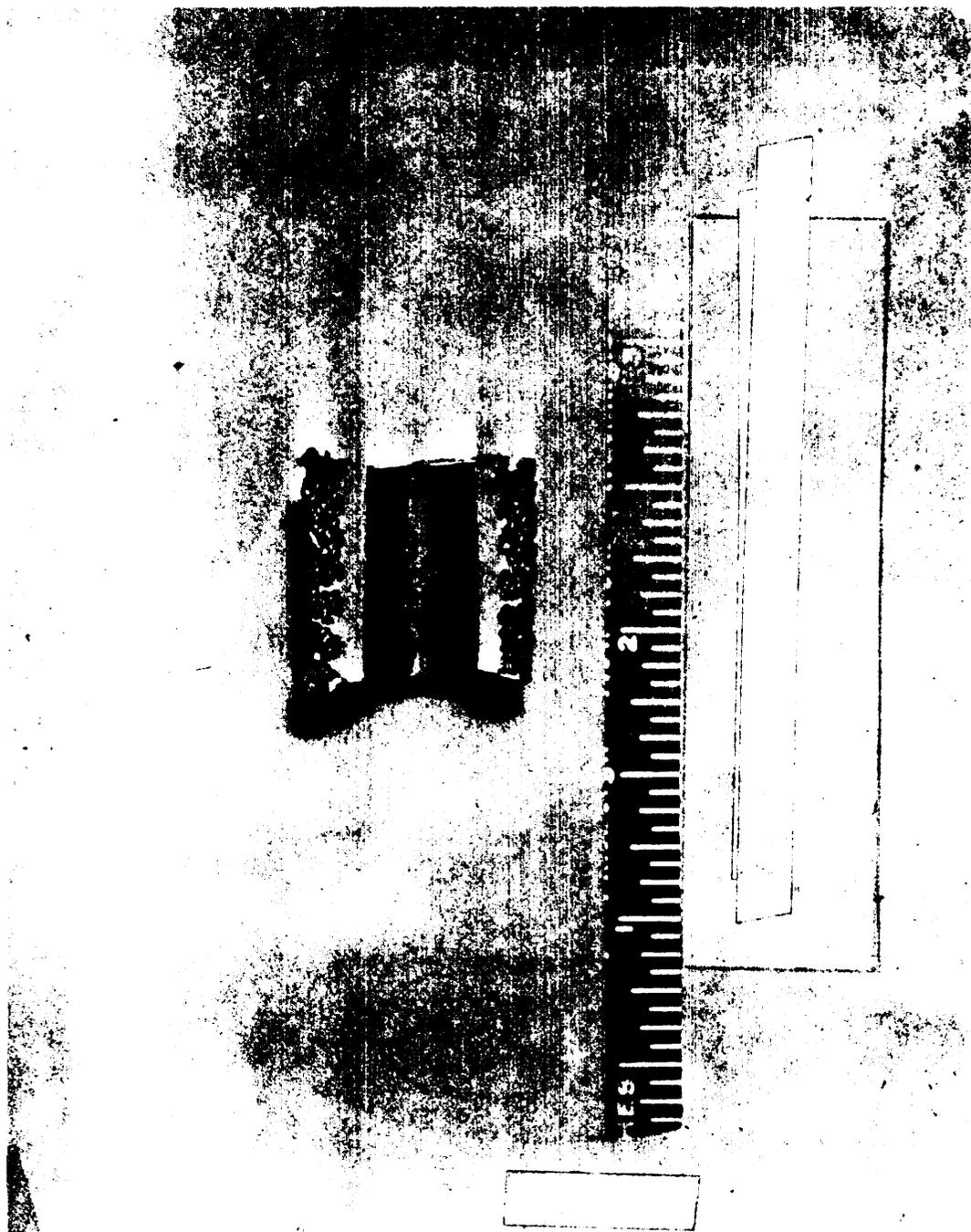


FIGURE 114. Cement in tube—minor.

Fed. Std. No. 162a

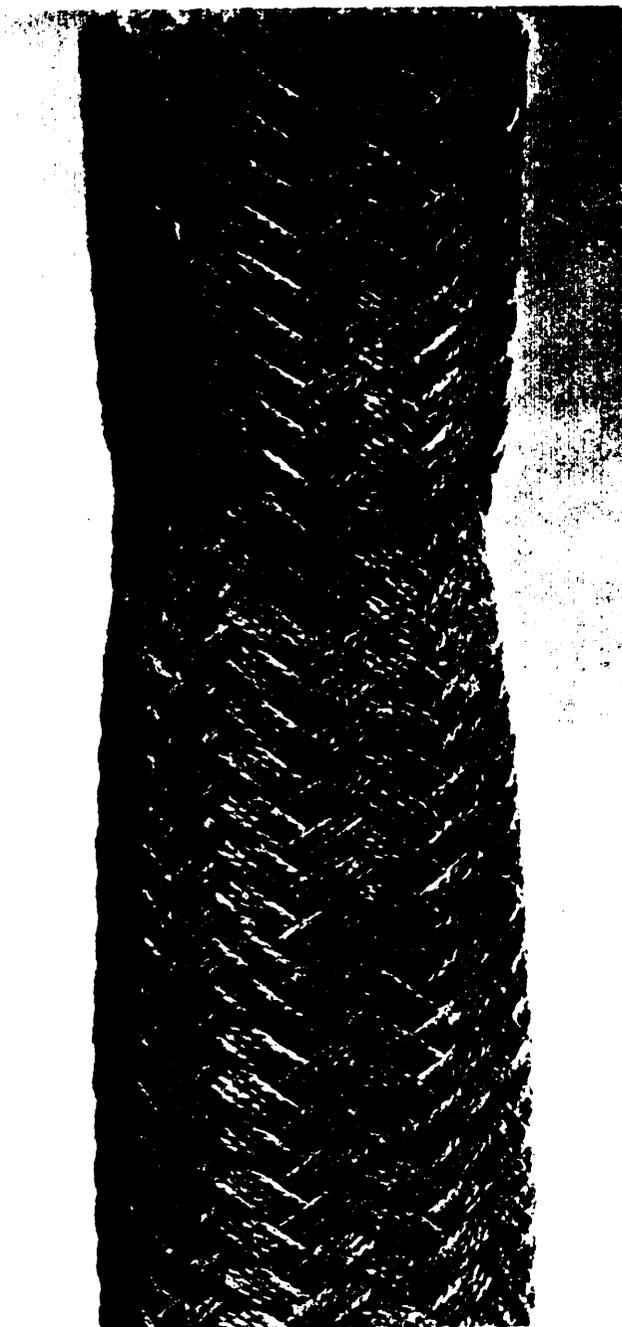


FIGURE 115. Clamp mark—major.

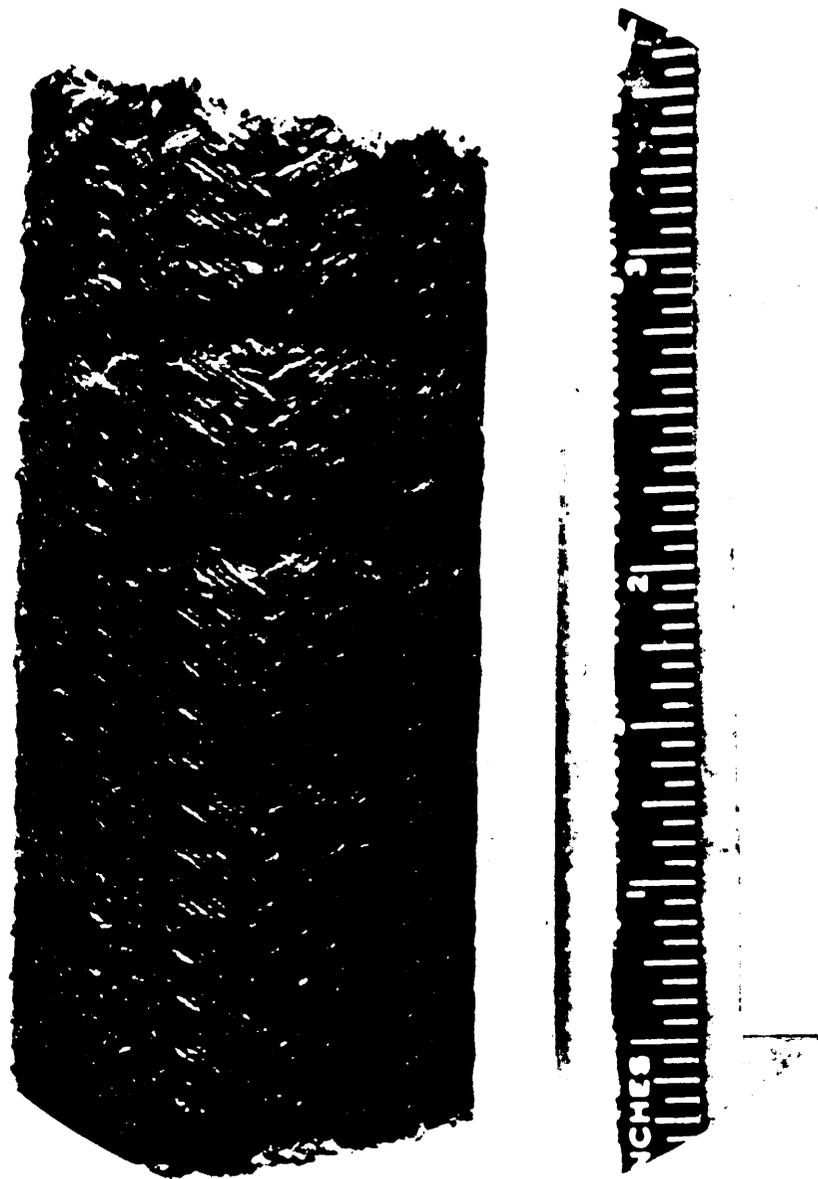


FIGURE 116. Clamp mark—major.

Fed. Std. No. 162a



FIGURE 117. Clamp mark—major.

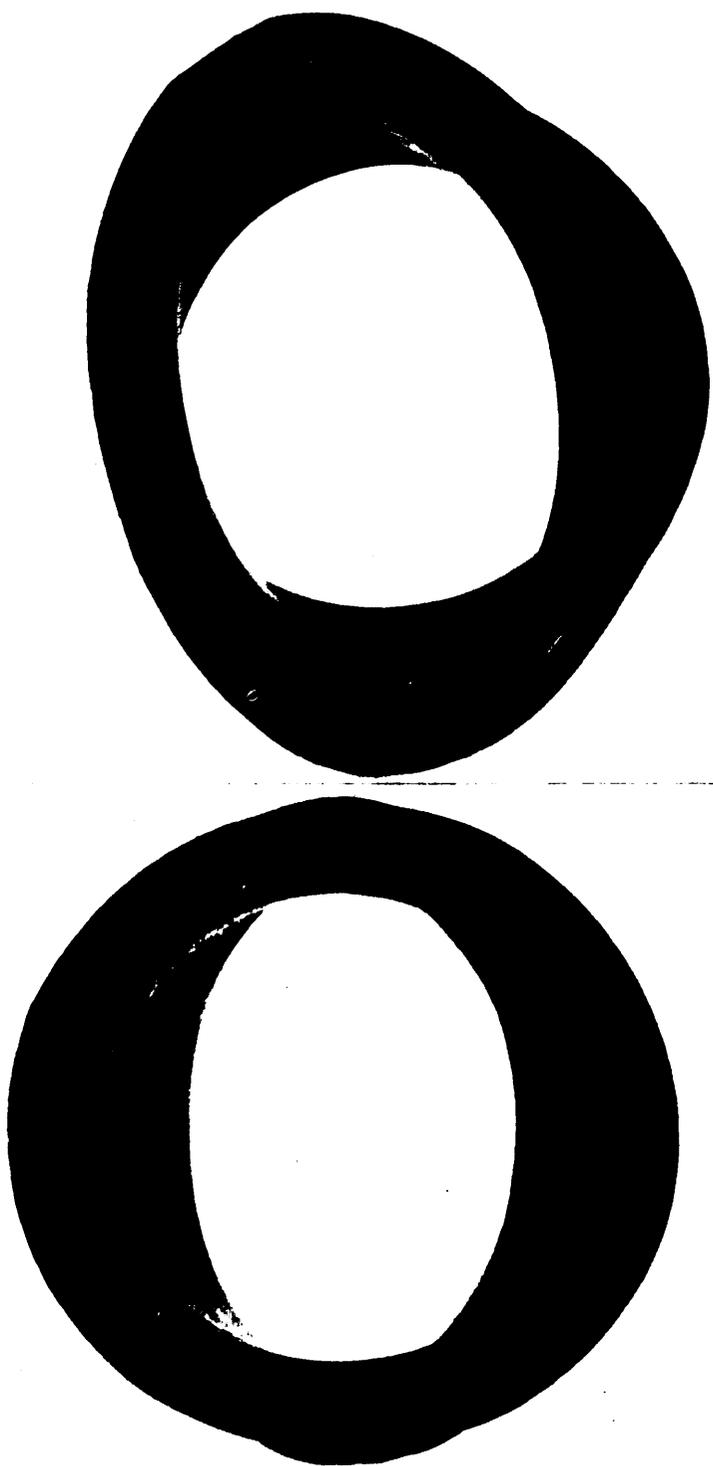


FIGURE 118. Crushed, wire reinforced—major.

Fed. Std. No. 162a



FIGURE 119. Fabric pulled out from coupling—major.



FIGURE 120. Kinked, wire reinforced—major.

Fed. Std. No. 162a

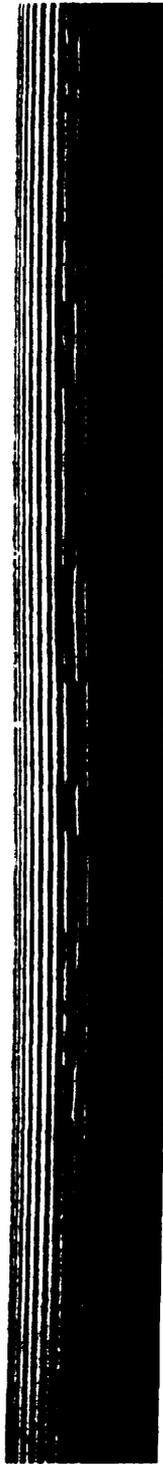


FIGURE 121. Skips, corrugated surface—not a defect.



FIGURE 122. Smooth, corrugated surface—not a defect.

Fed. Std. No. 162a



FIGURE 123. Twisted, nonwire reinforced—major.

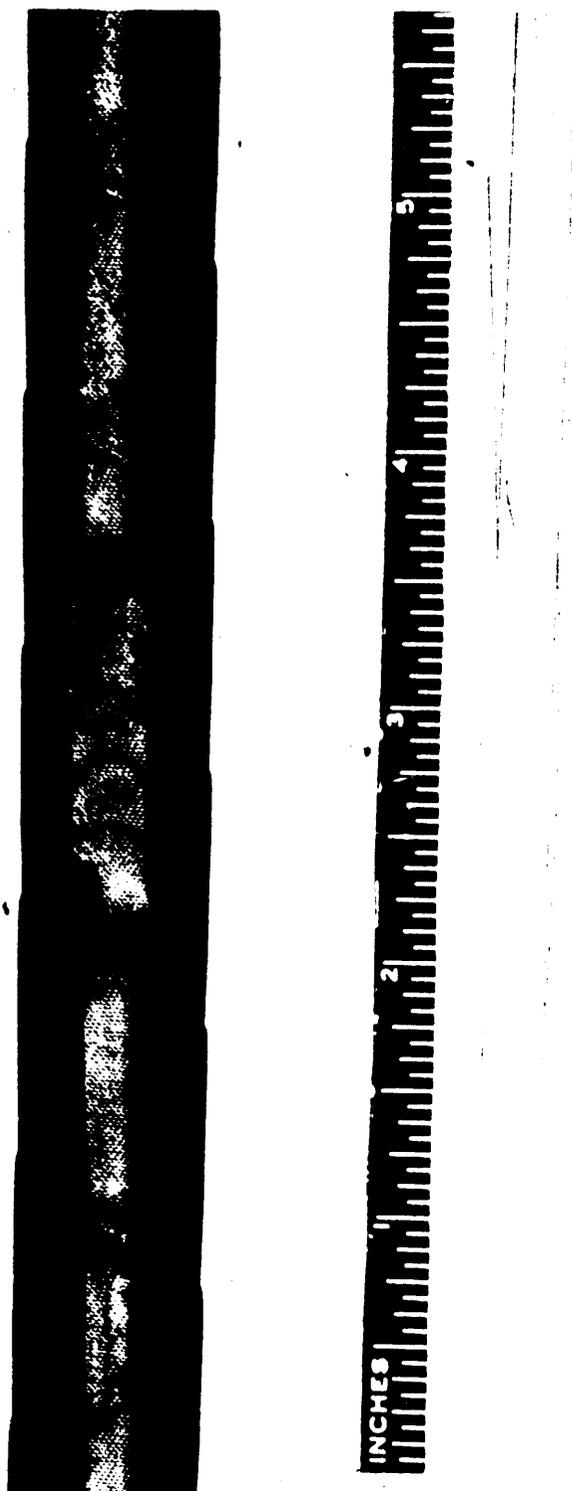


FIGURE 124. Illegible—major.

Fed. Std. No. 162a

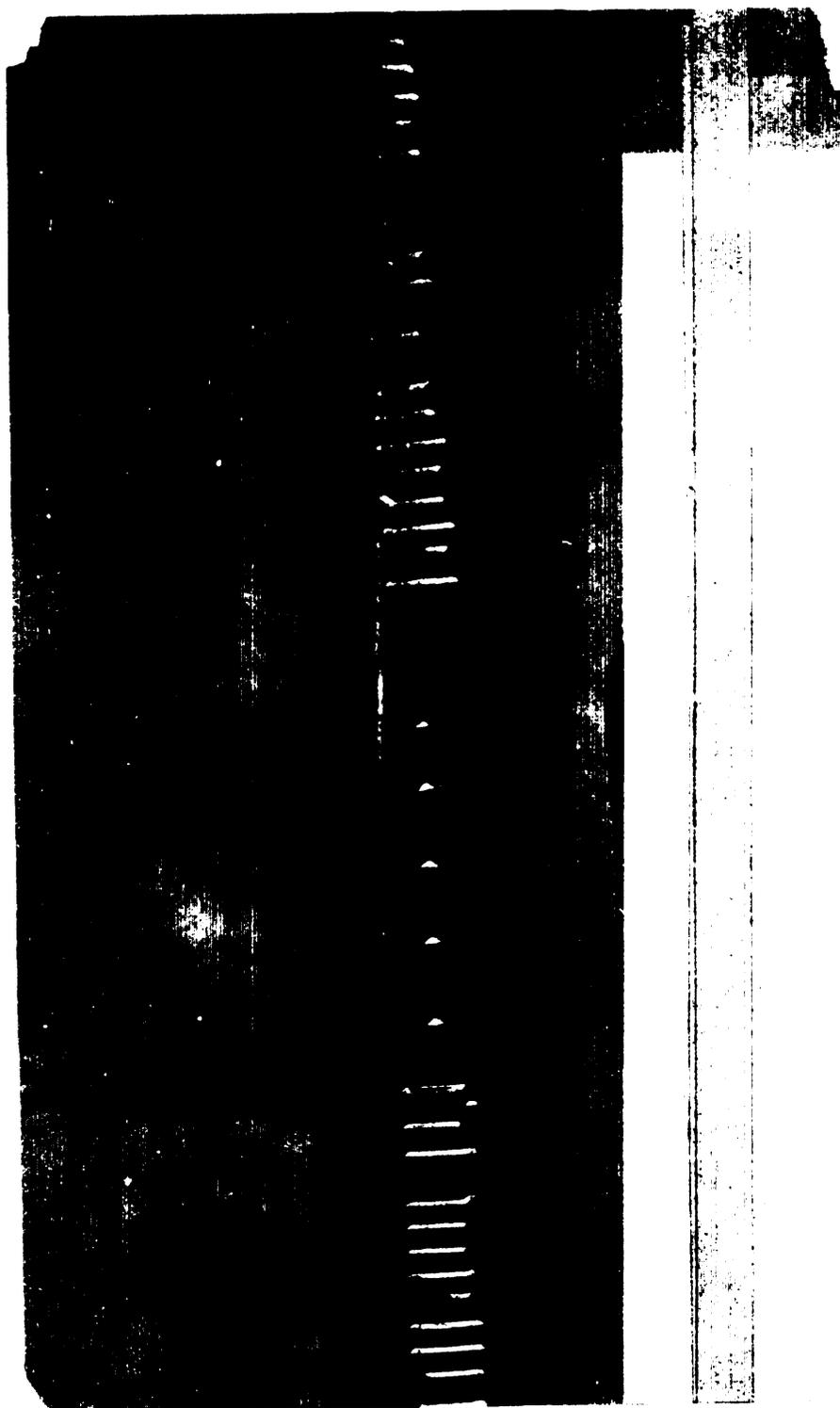


FIGURE 125. Illegible—major.

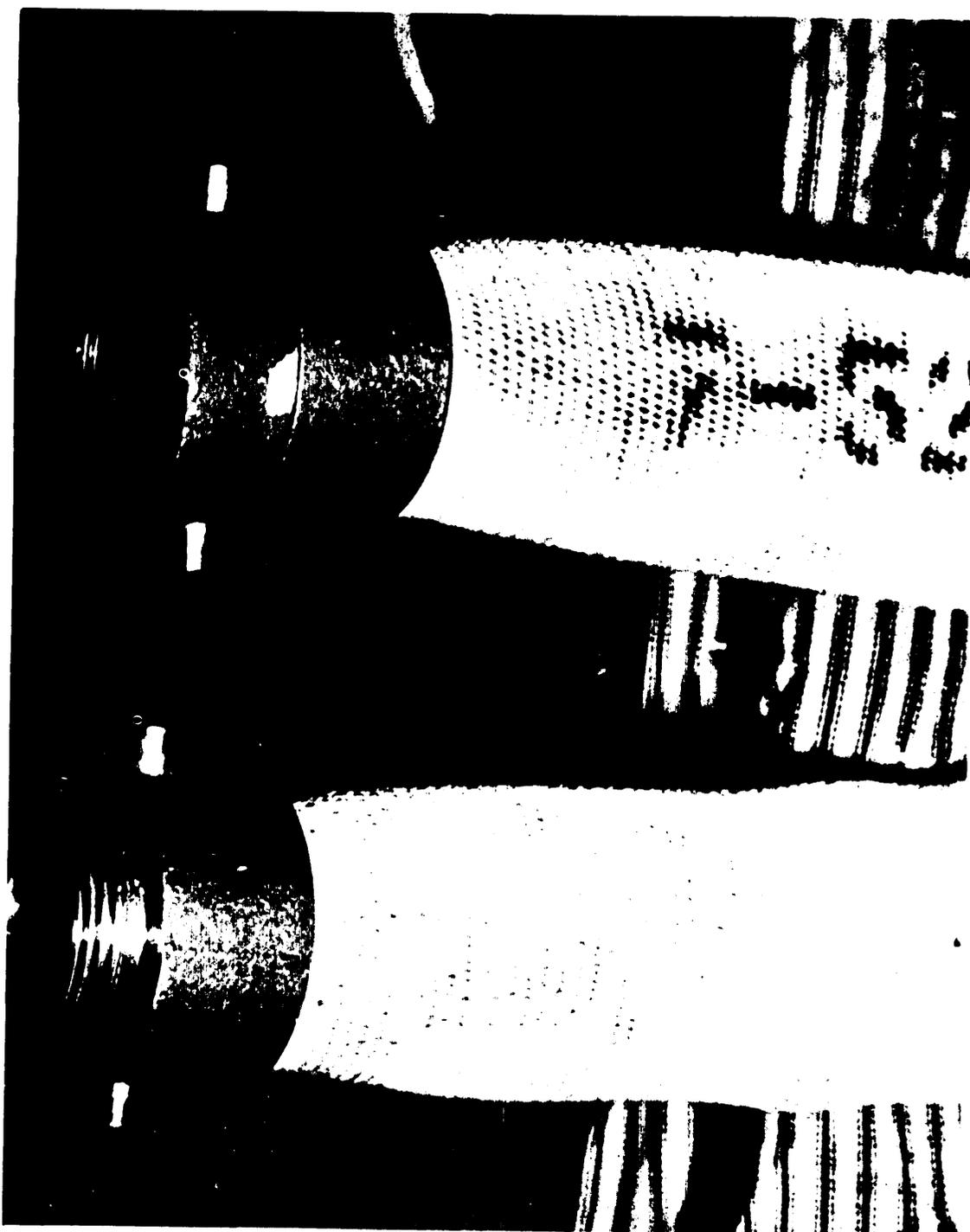


FIGURE 126. Location, improper—minor.

Fed. Std. No. 162a



FIGURE 127. Loose, large area—major.

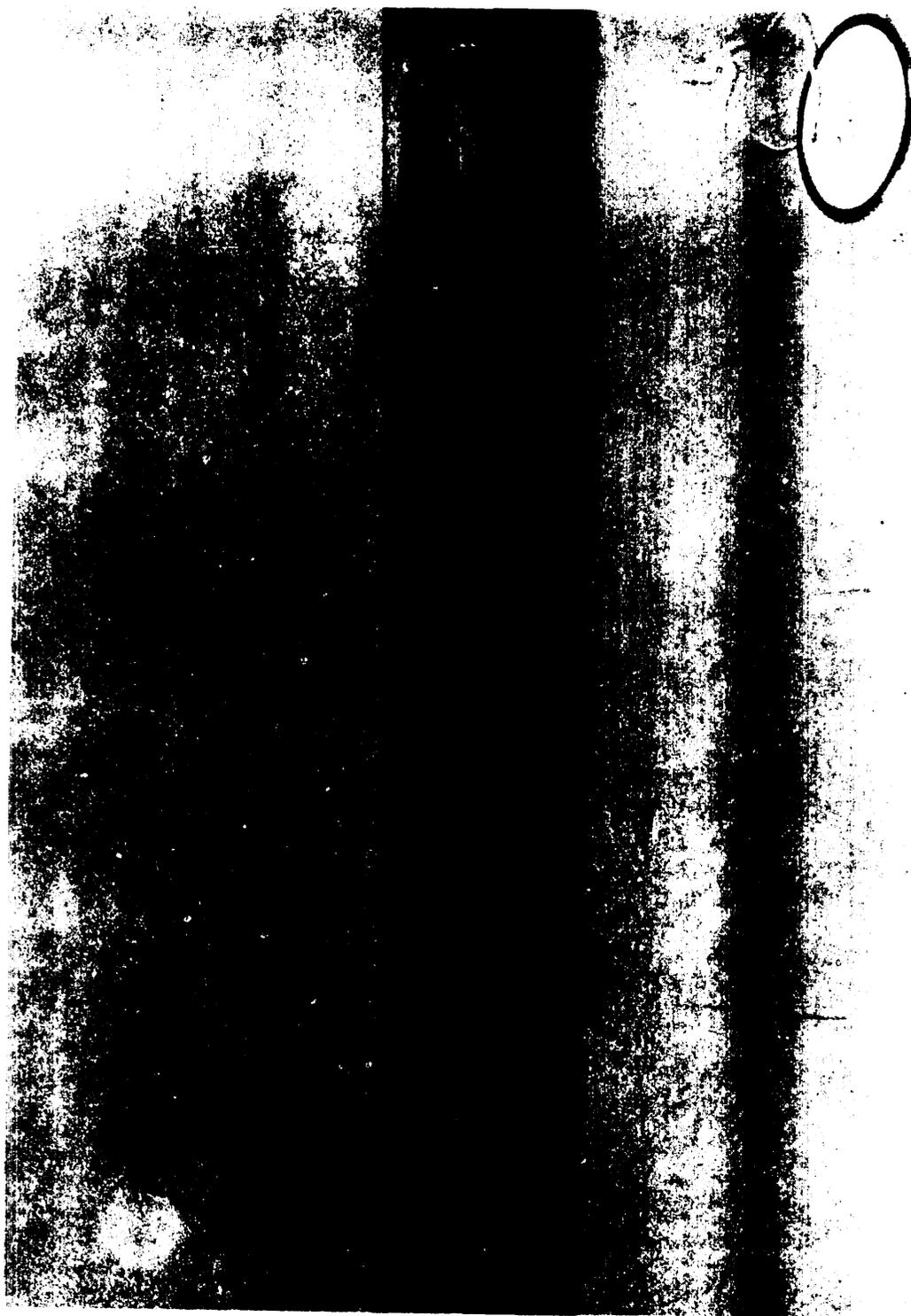


FIGURE 128. Slipped brand, legible—minor,

Fed. Std. No. 162a

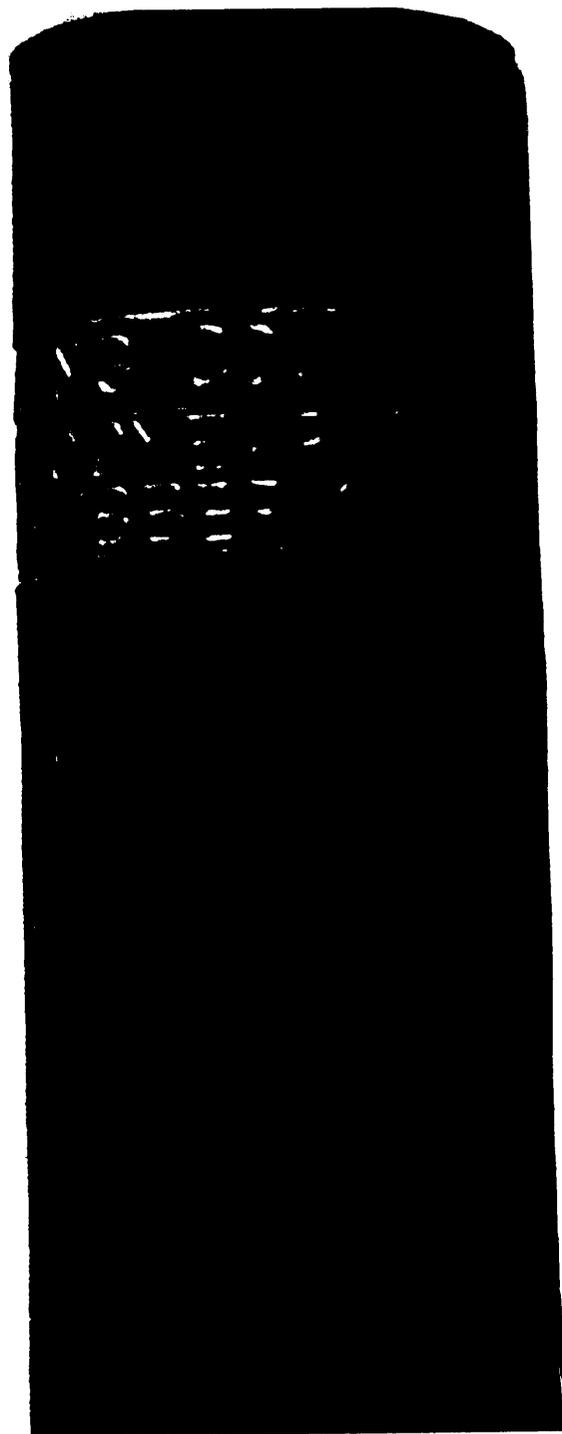


FIGURE 129. Slipped brand, legible—not a defect.



FIGURE 130. Ball-up:  
I—Yarn ball-up—major.  
II—Normal hose.

Fed. Std. No. 162a

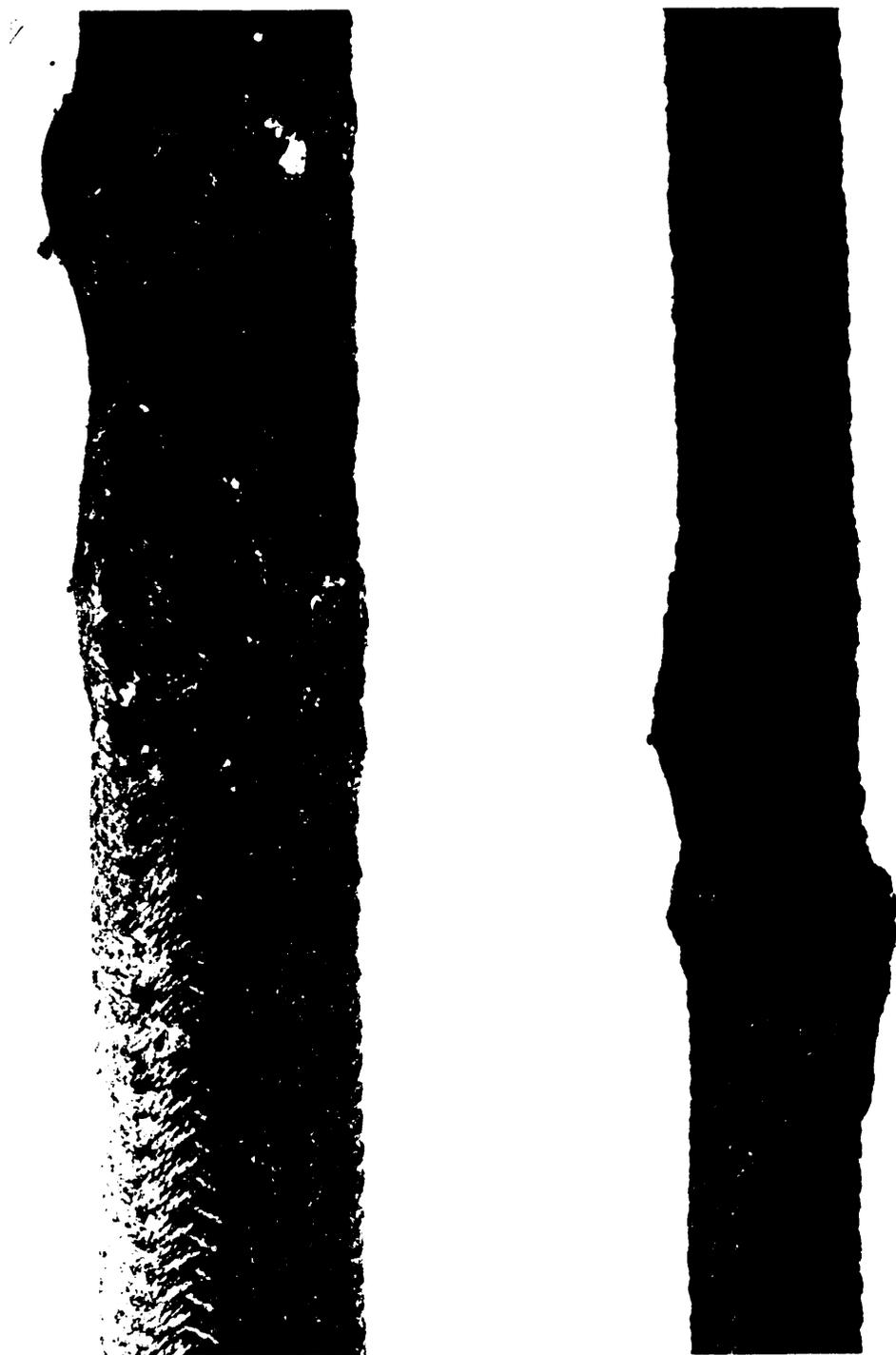


FIGURE 131. Ball-up—major.

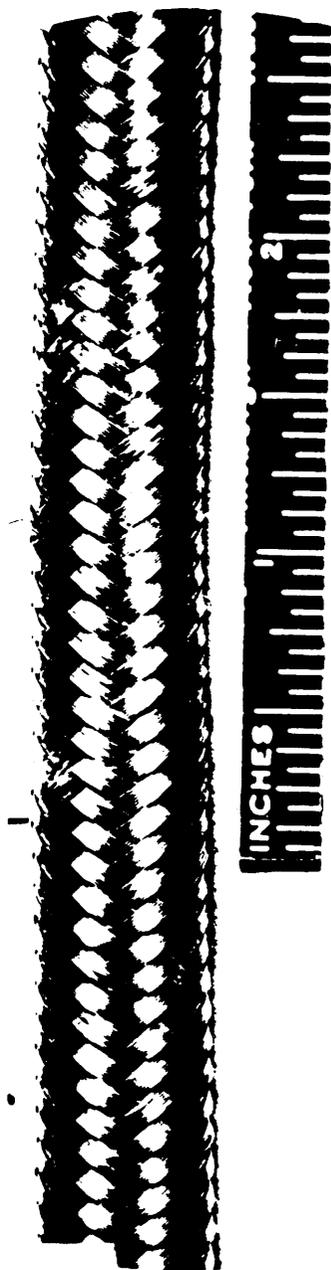


FIGURE 132. Broken strand, more than two per plait or two in 2 inches—major.

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FIGURE 133. Crossed strand: first braid—major.

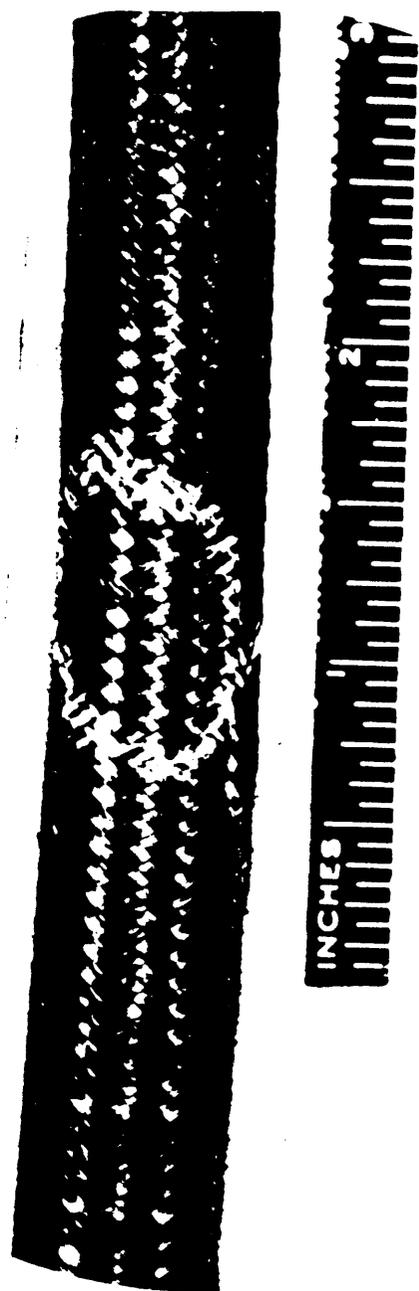


FIGURE 134. Crossed strand: other than first braid—not a defect.

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FIGURE 135. Dough (filler). where specified, absent or missing—major.



FIGURE 136. Dough (filler), where specified, excessive—major.

Fed. Std. No. 162a

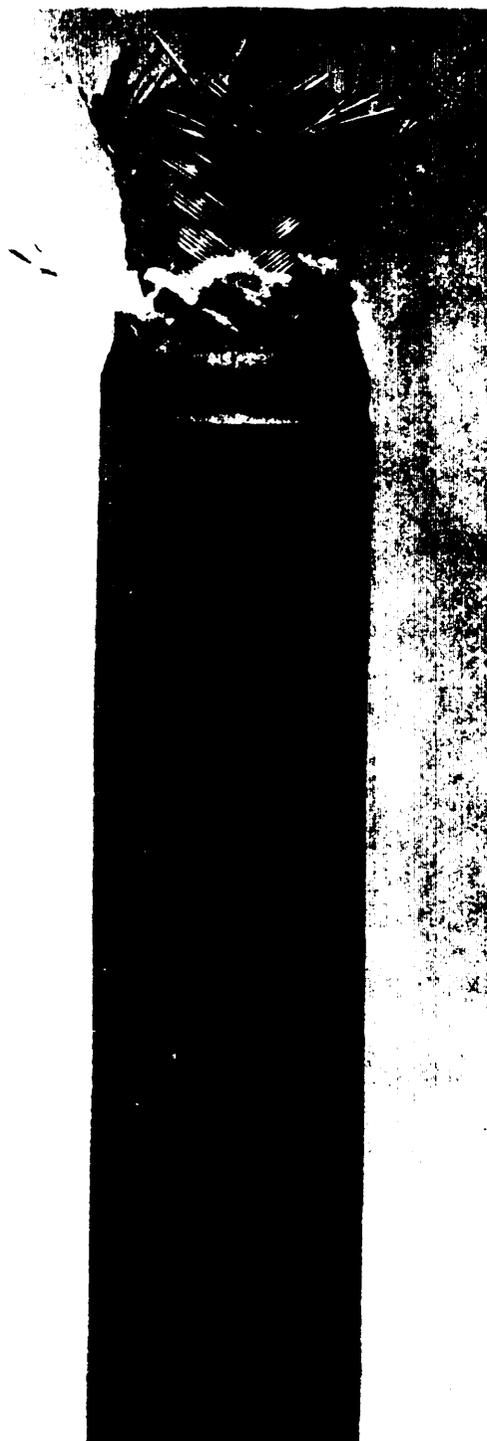


FIGURE 137. Flare, wire at  $\frac{1}{8}$  inch greater than braid O. D.—major.

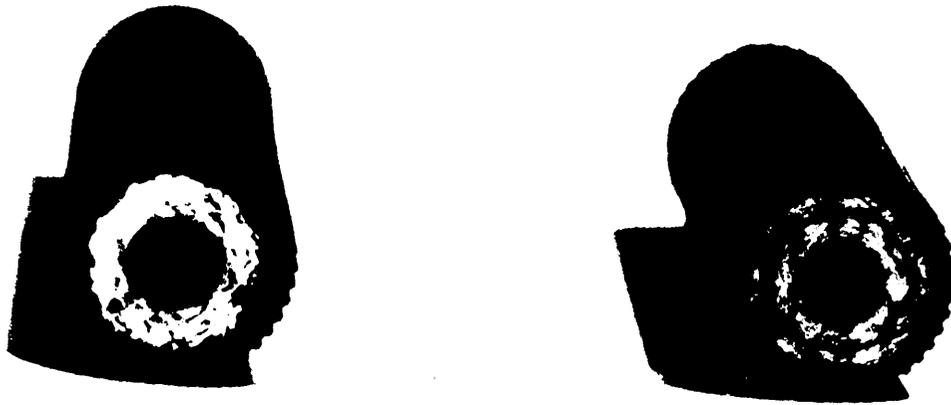


FIGURE 138. Friction between braids, where specified, missing:  
I—Friction missing—major.  
II—Normal hose.

Fed. Std. No. 162a



FIGURE 139. Knot in yarn:  
I—Knot in yarn—major.  
II—Normal hose.

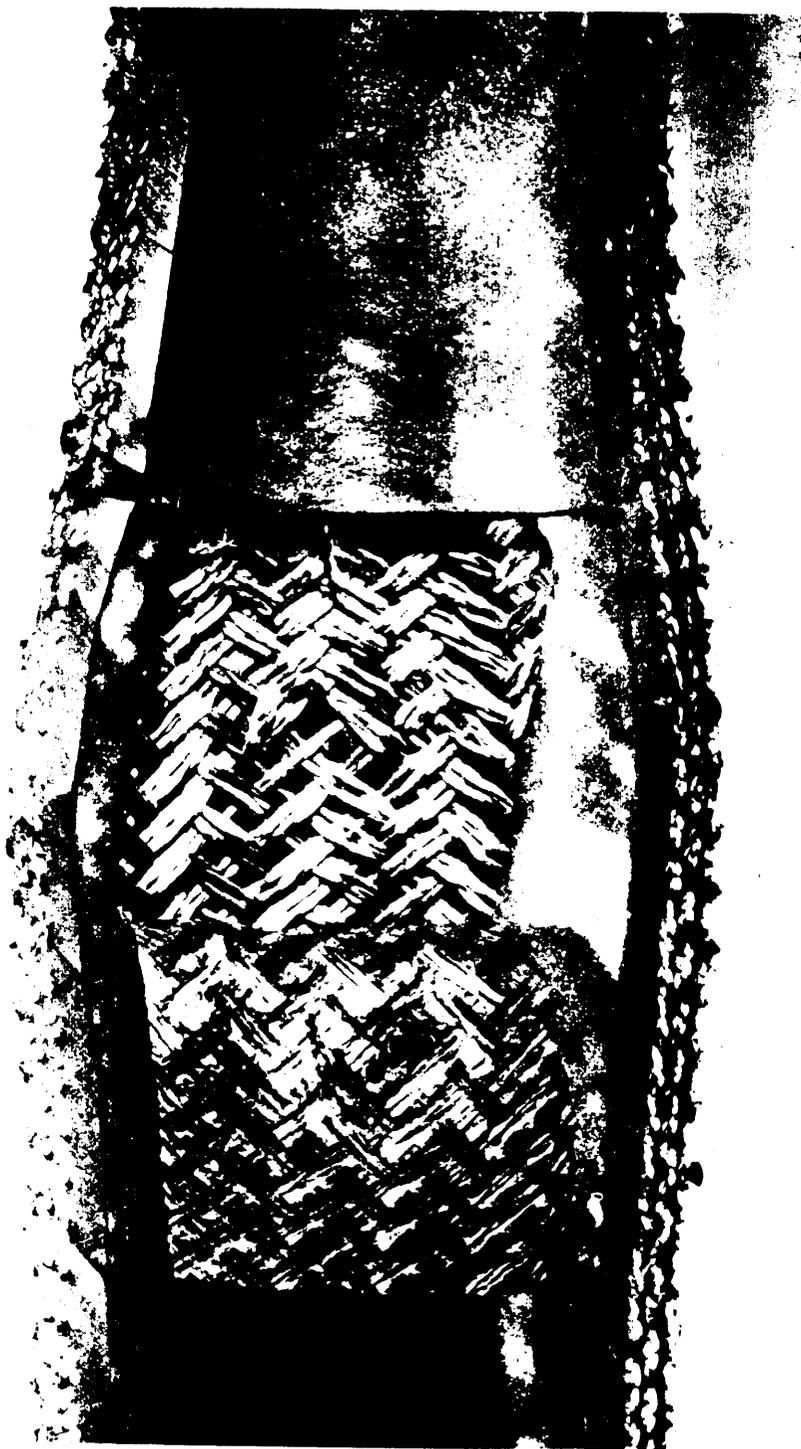


FIGURE 140. Looped strand: first braid, class A—major; first braid, classes B and C—minor; other than first braid—minor

Fed. Std. No. 162a

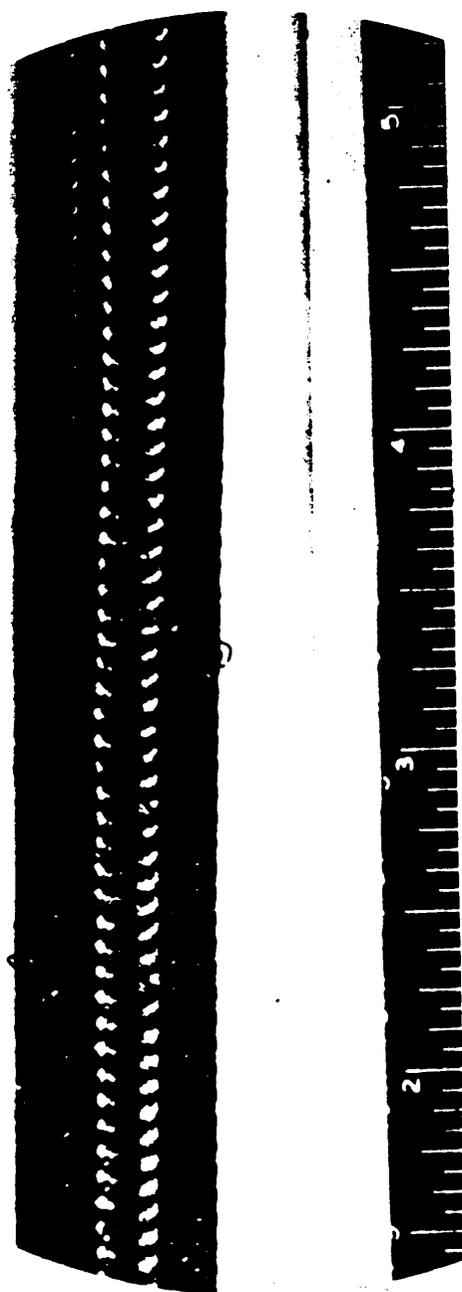


FIGURE 141. Looped wires, more than two per plait (carrier) or two in 2 inches—major.

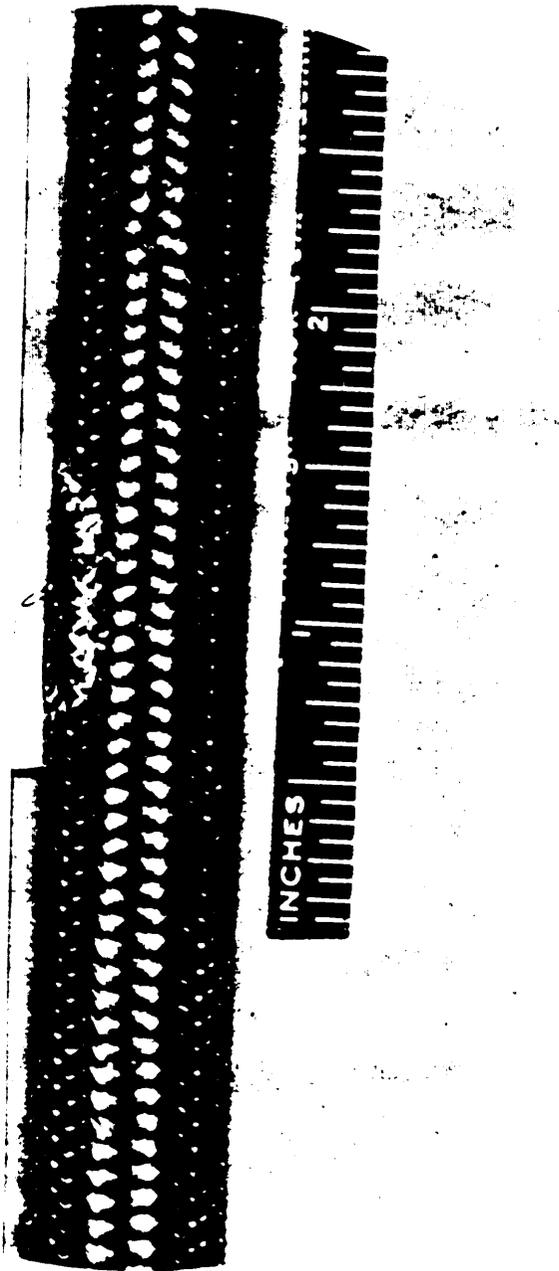


FIGURE 142. Looped wires, less than two per plait (carrier) or less than two in 2 inches—minor.

Fed. Std. No. 162a

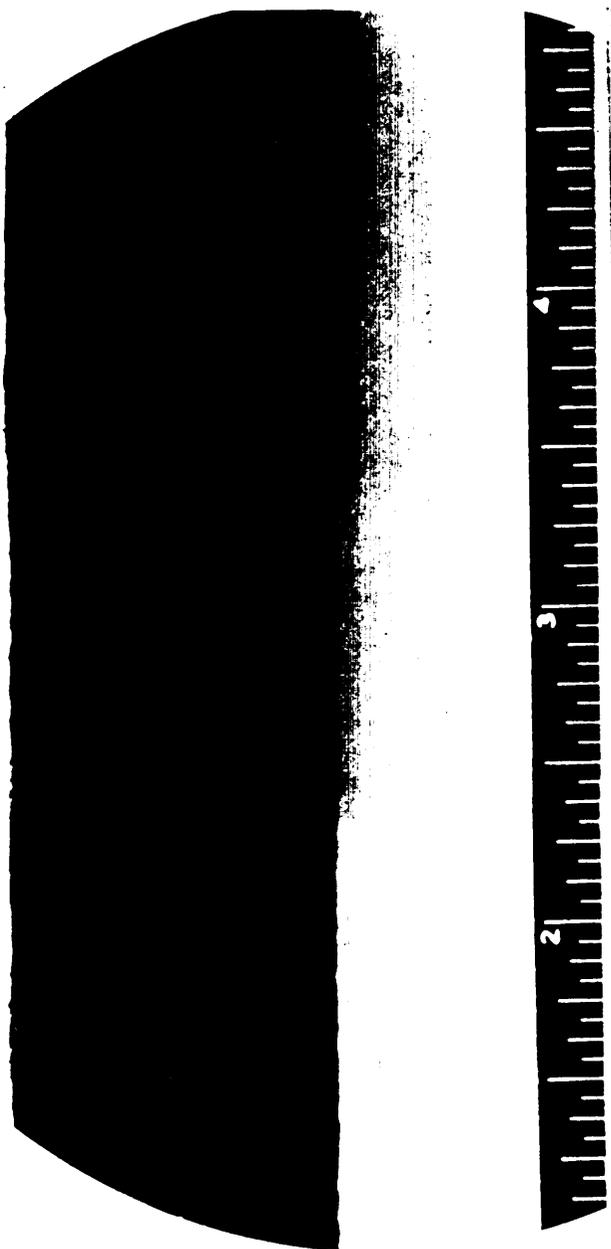


FIGURE 143. Loose braid, more than two plaits (carrier) in either direction—  
minor.

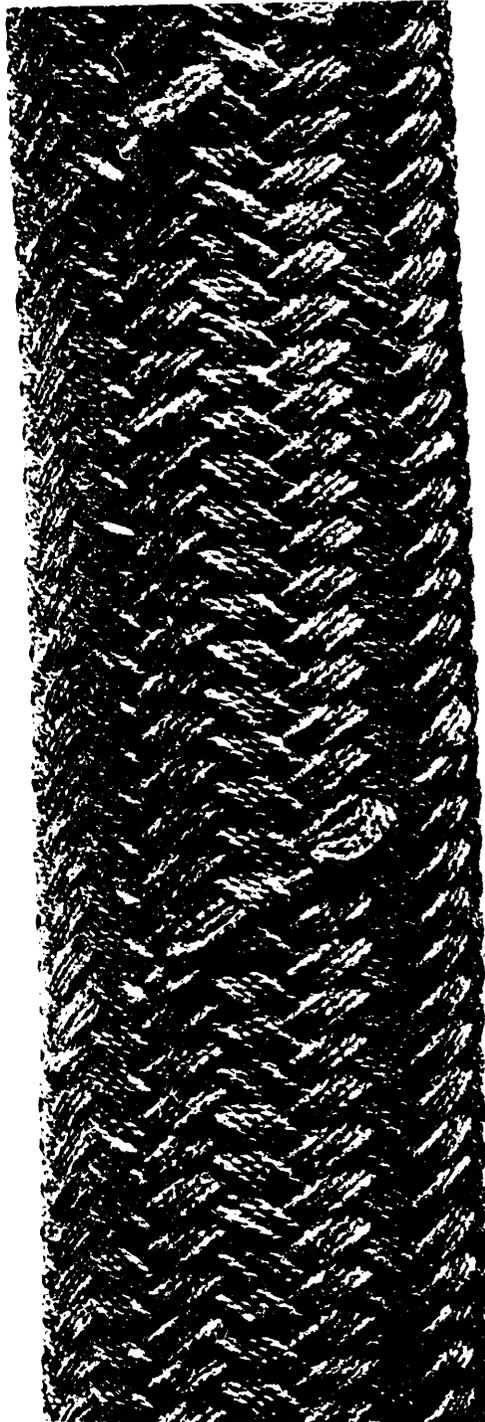


FIGURE 144. Loose braid, one plait (carrier) in either direction—not a defect.

Fed. Std. No. 162a



FIGURE 145. Loose braid, one plait (carrier) in either direction—not a defect.

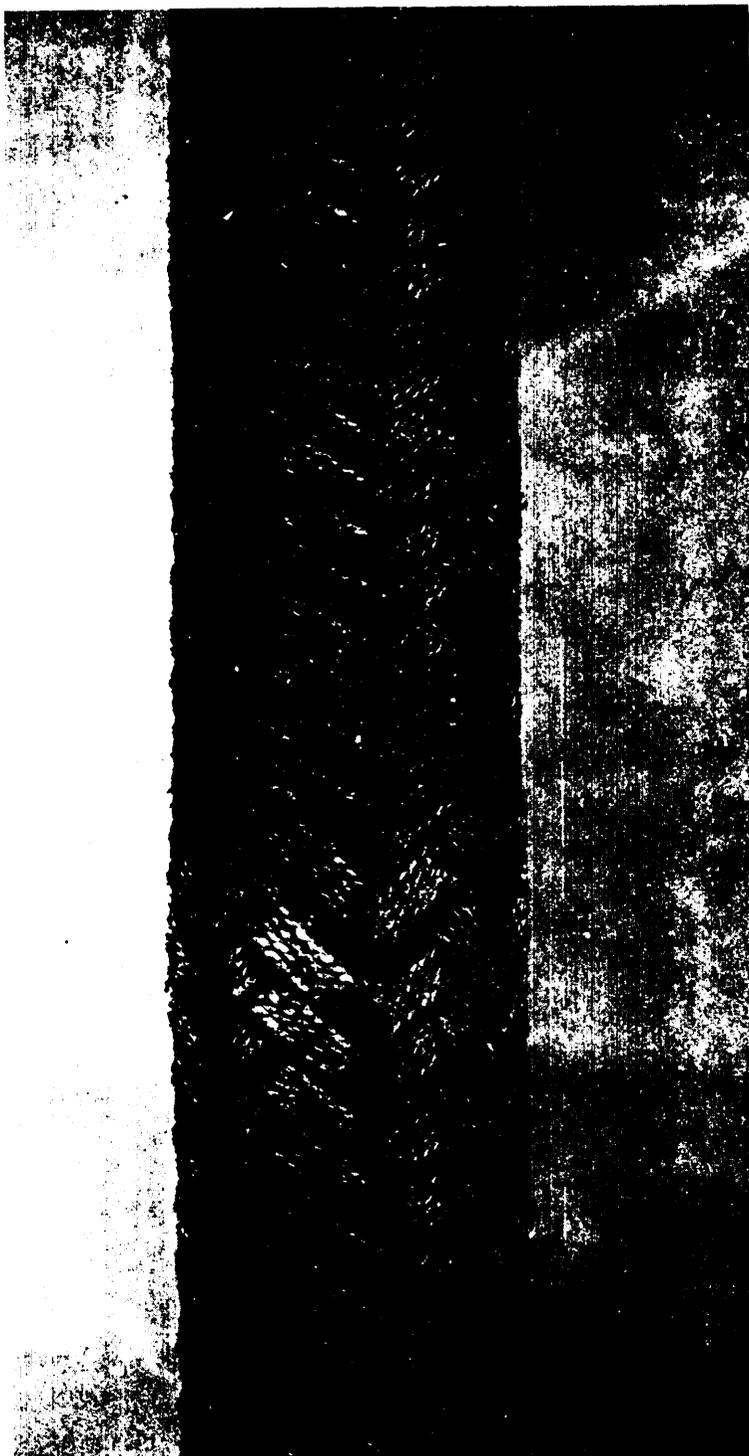


FIGURE 146. Pitch, out of tolerance—major.

Fed. Std. No. 162a

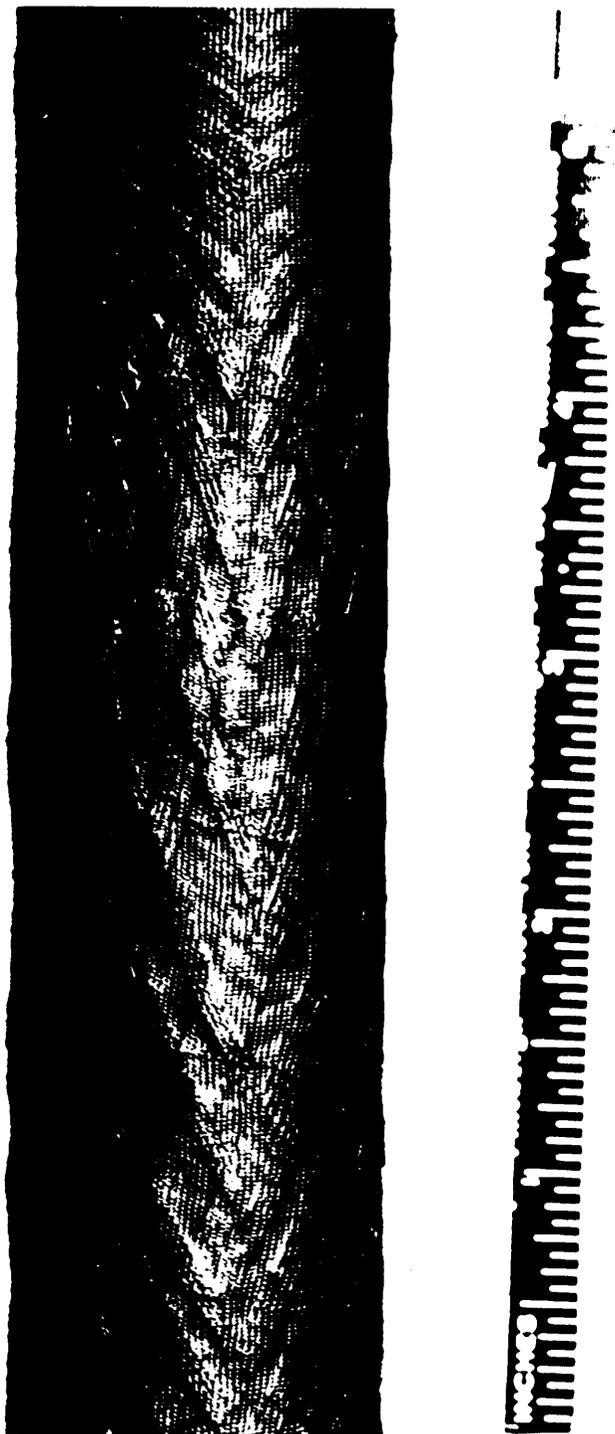


FIGURE 147. Pitch, out of tolerance—major.

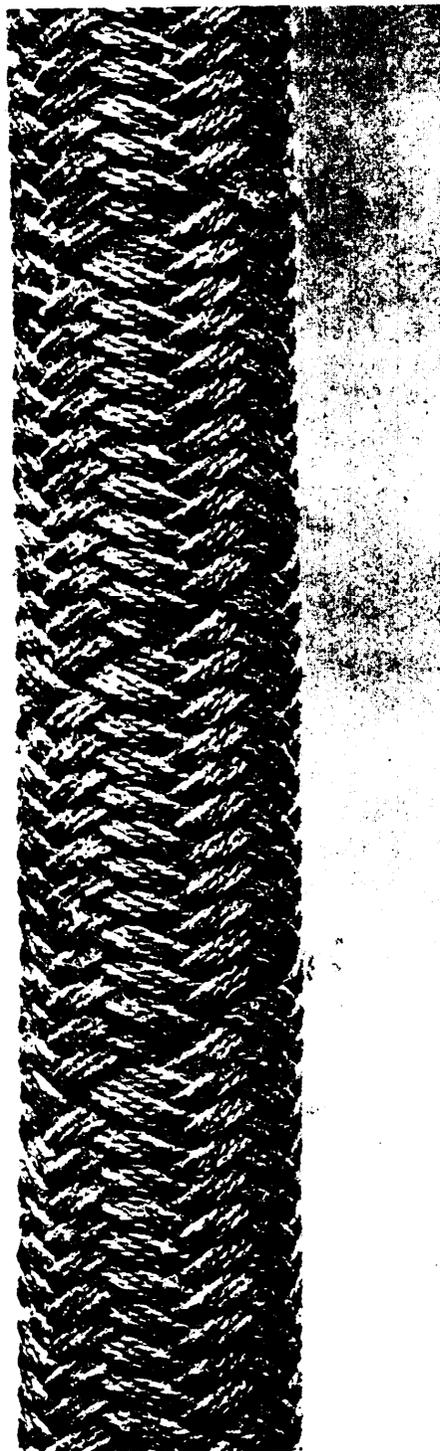


FIGURE 148. Missing plait (carrier or strand), one only: class A—major; classes B and C—minor.

Fed. Std. No. 162a

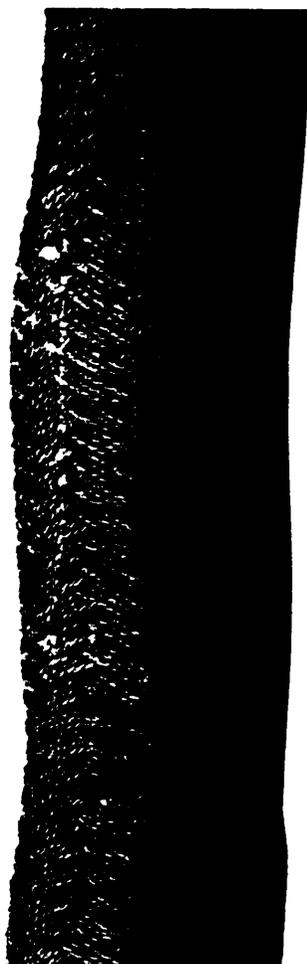


FIGURE 149. Wavy braid—minor.



FIGURE 150. Wire through cover—major.

Fed. Std. No. 162a

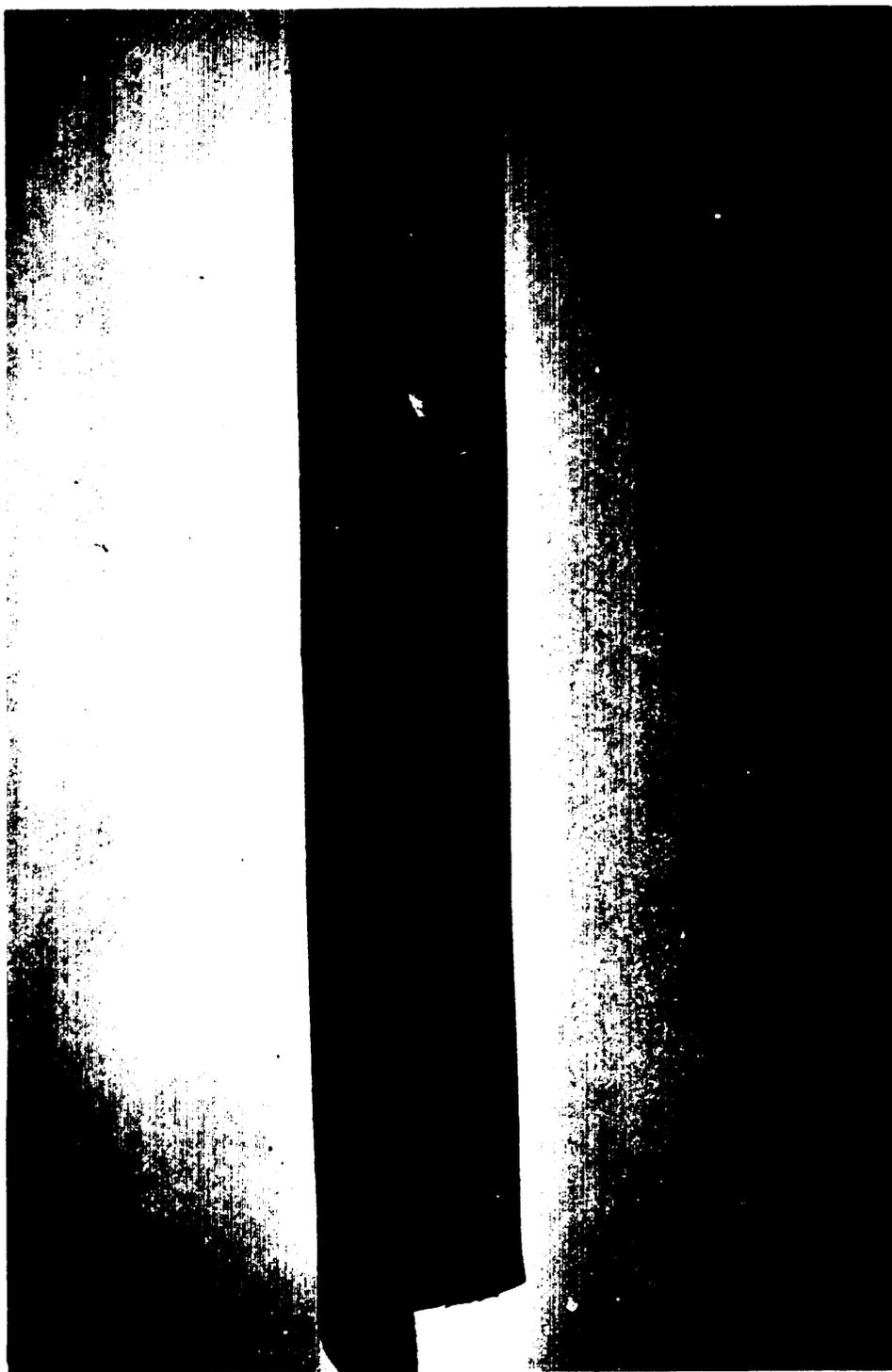


FIGURE 151. Wire through cover—major.



FIGURE 152. Wire through cover—major.

Fed. Std. No. 162a

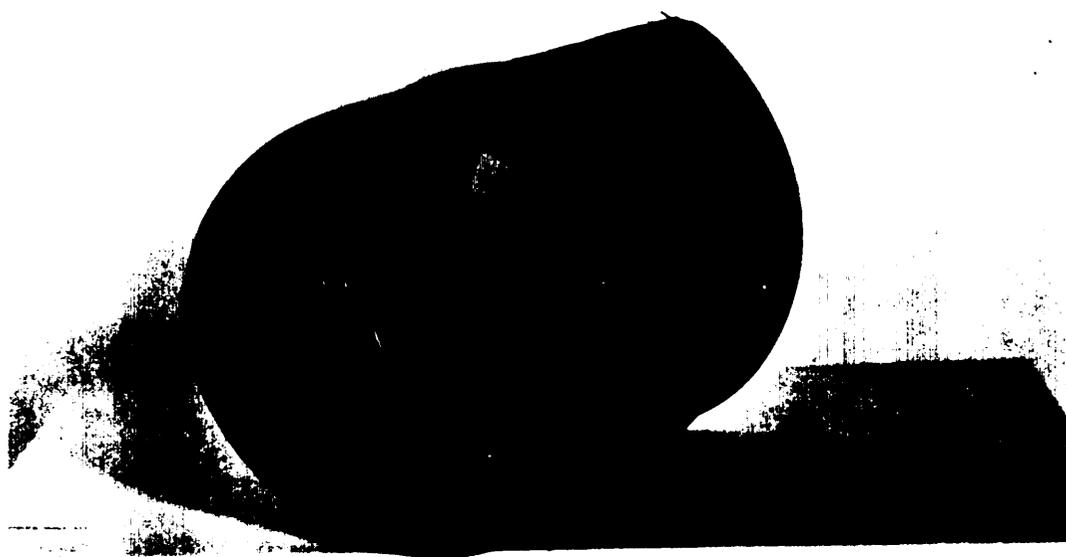


FIGURE 153. Wire through tube—major.

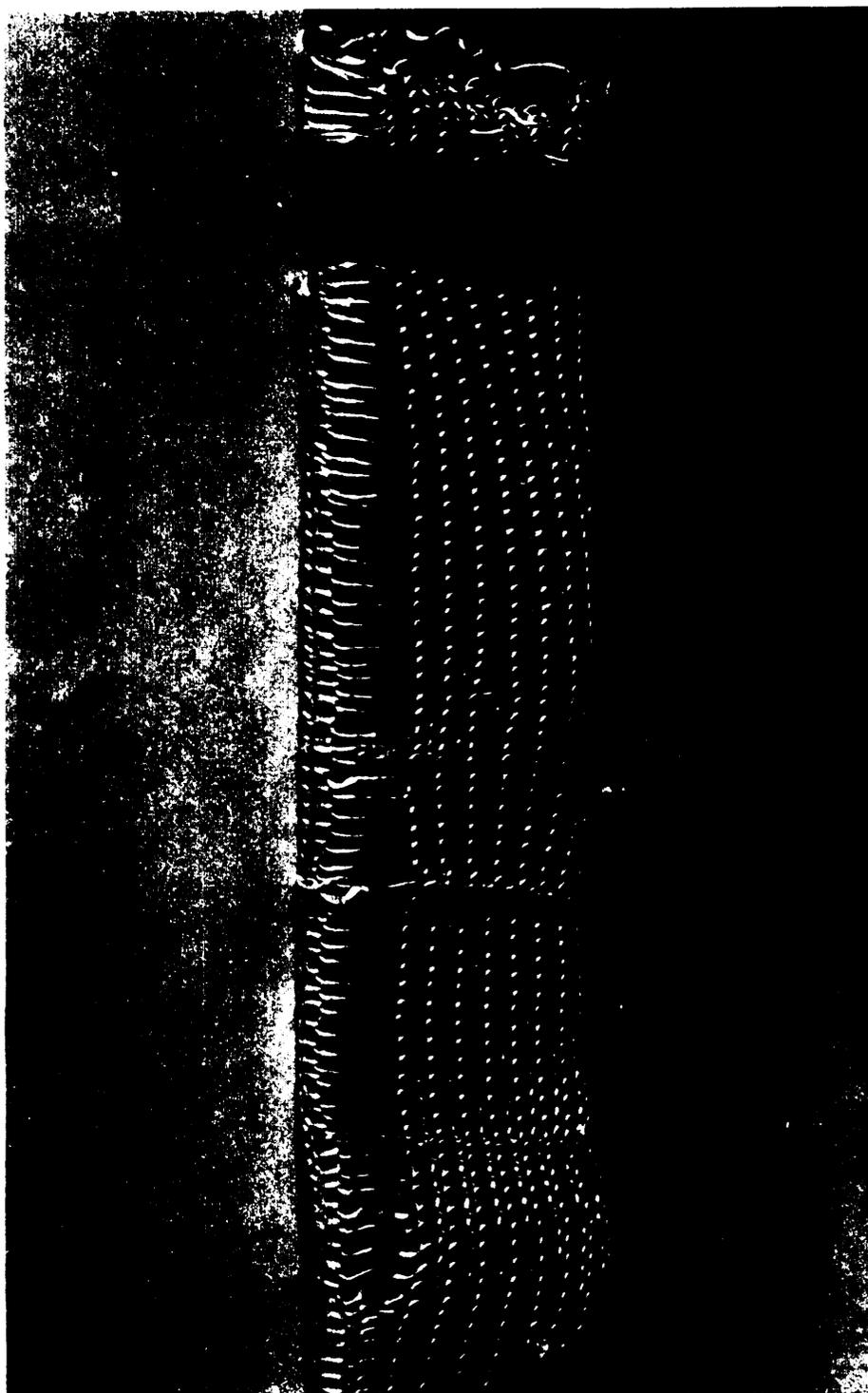


FIGURE 154. Knitted, skip—major.

Fed. Std. No. 162a



FIGURE 155. Woven jacket, rubber covered, ball-up—major.

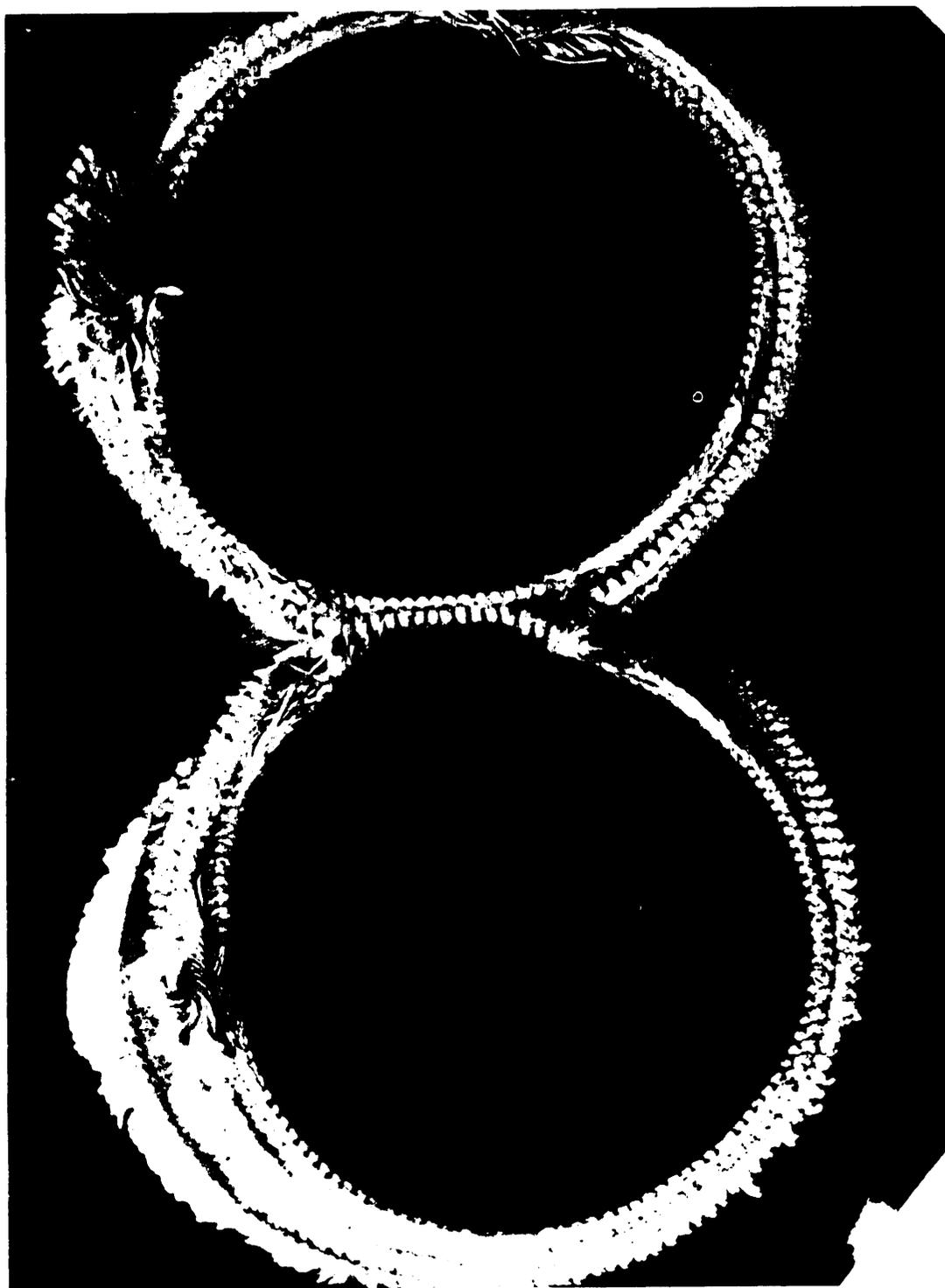


FIGURE 156. Yarn imbedded between jacket: more than 2 feet long—major; less than 6 inches from end—major; less than 2 feet long—minor; 6 inches or more from end—minor.

Fed. Std. No. 162a

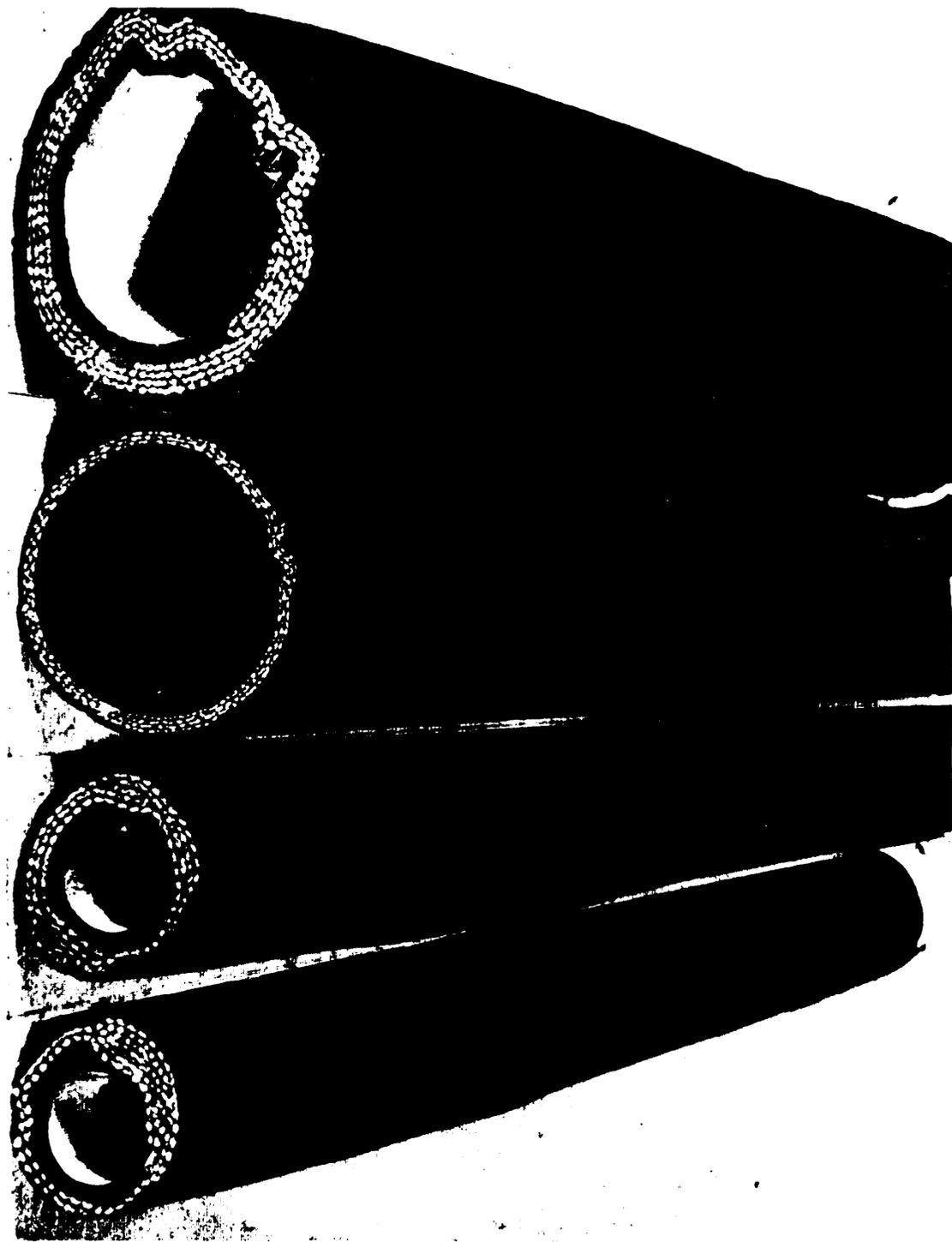


FIGURE 157. Wrapped fabric, buckled or wrinkled—major.



FIGURE 158. Wrapped fabric, buckled or wrinkled—major.

Fed. Std. No. 162a



FIGURE 159. Wrapped fabric, buckled or wrinkled—major.

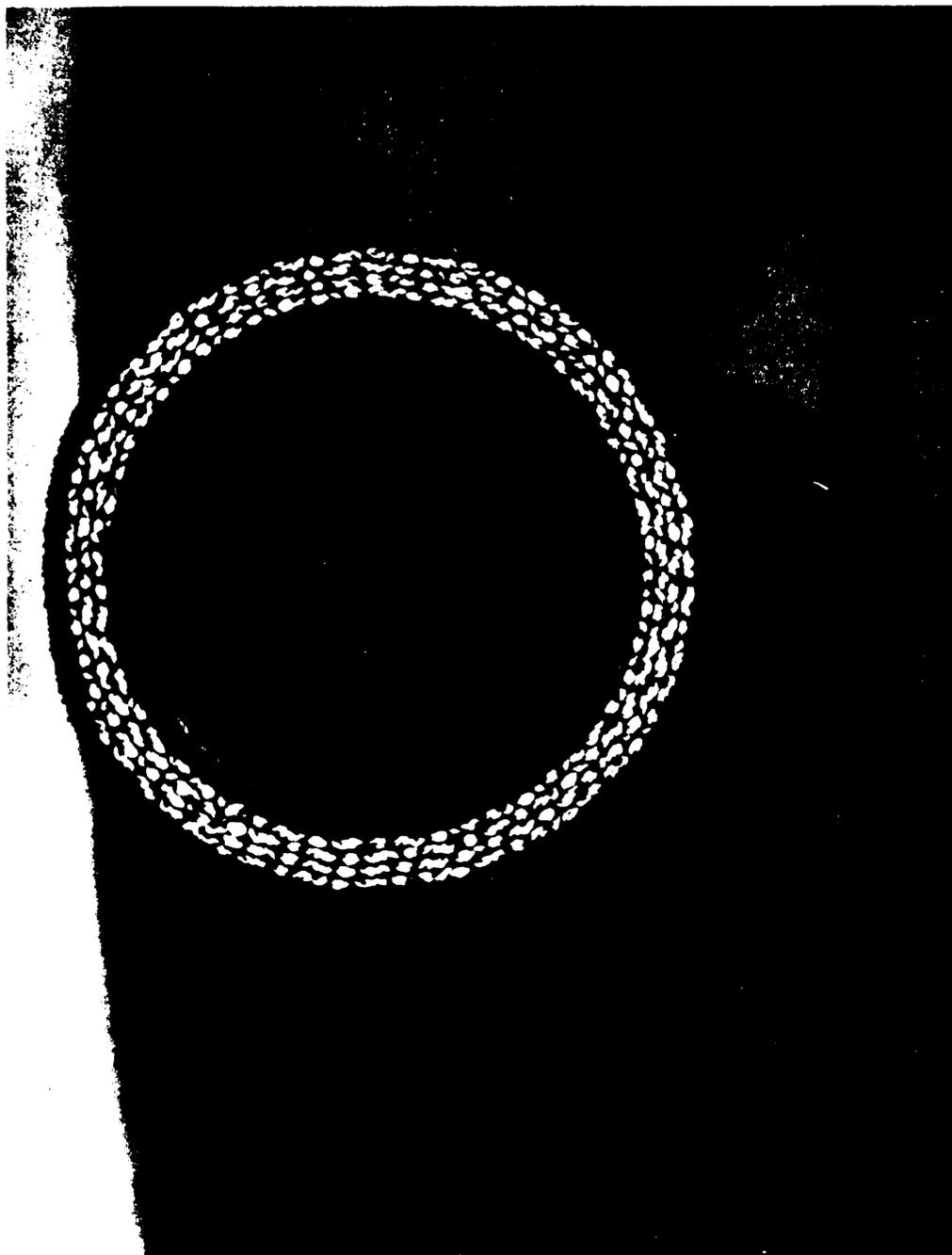


FIGURE 160. Incorrect number of plies or open lap—major (4 ply example).

Fed. Std. No. 162a

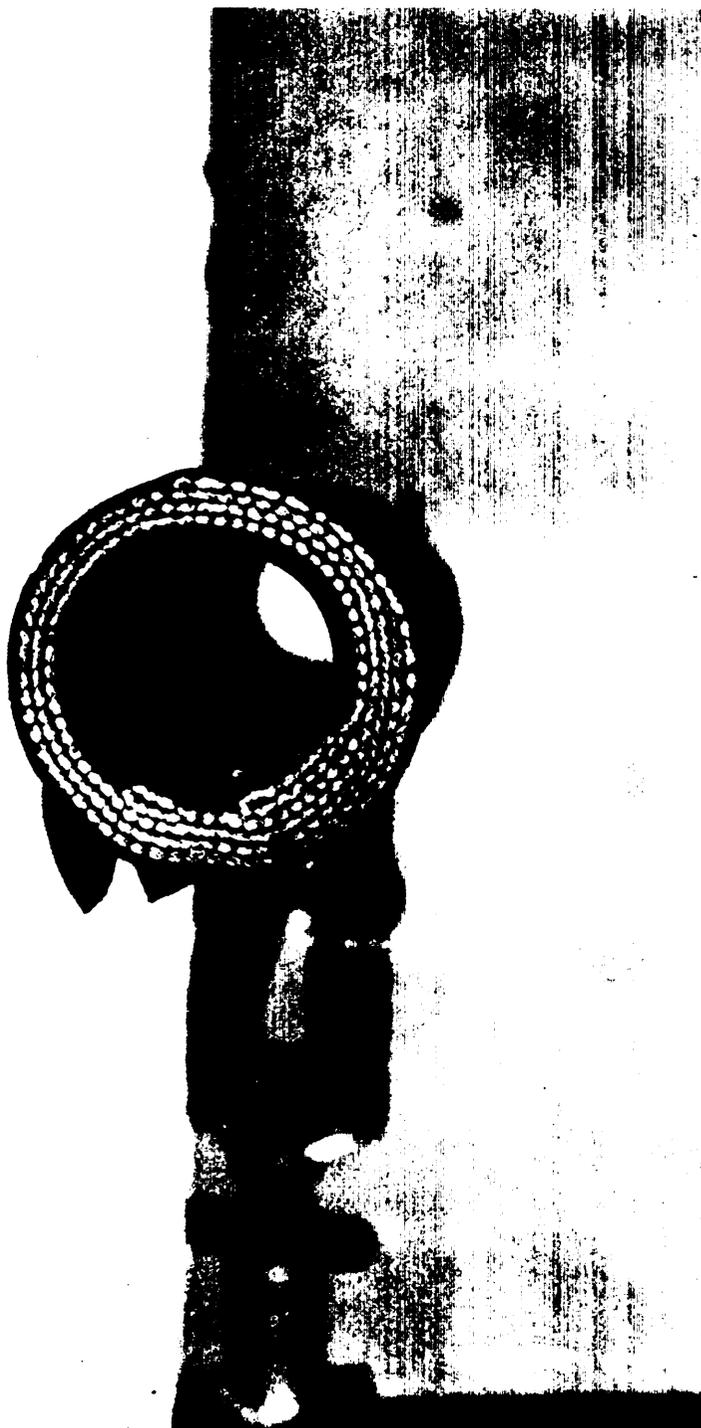


FIGURE 161. Ply turnback at leading edge, improper ply distribution—major.



FIGURE 162. Corrugations bad—major.

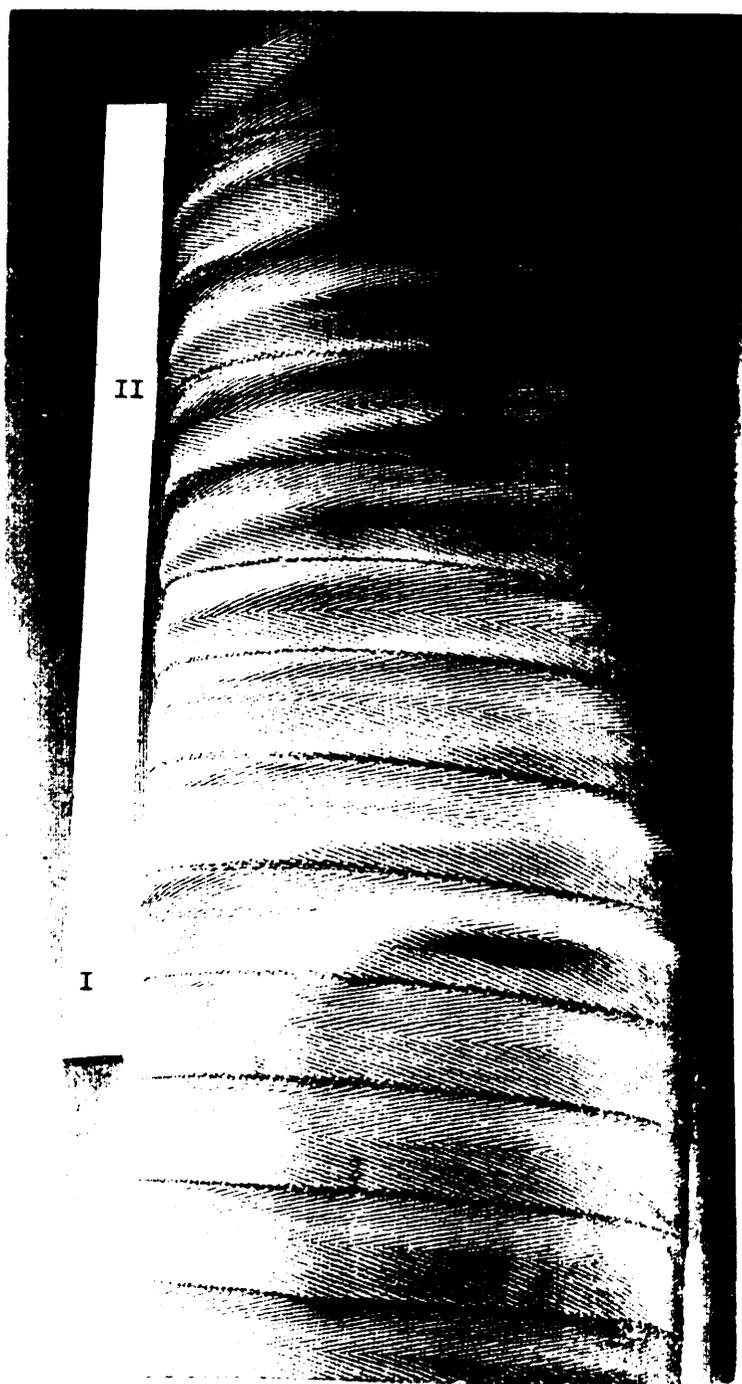


FIGURE 163. Filler, insufficient:  
I—Wire not properly tied down at end—minor.  
II—Filler, insufficient (noncorrugated surface hose)—minor; for Air Force procurement only—major.

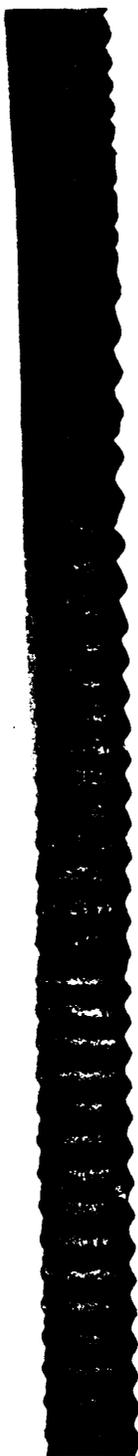


FIGURE 164. Pitch incorrect—major.

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FIGURE 165. Pitch uneven—minor.

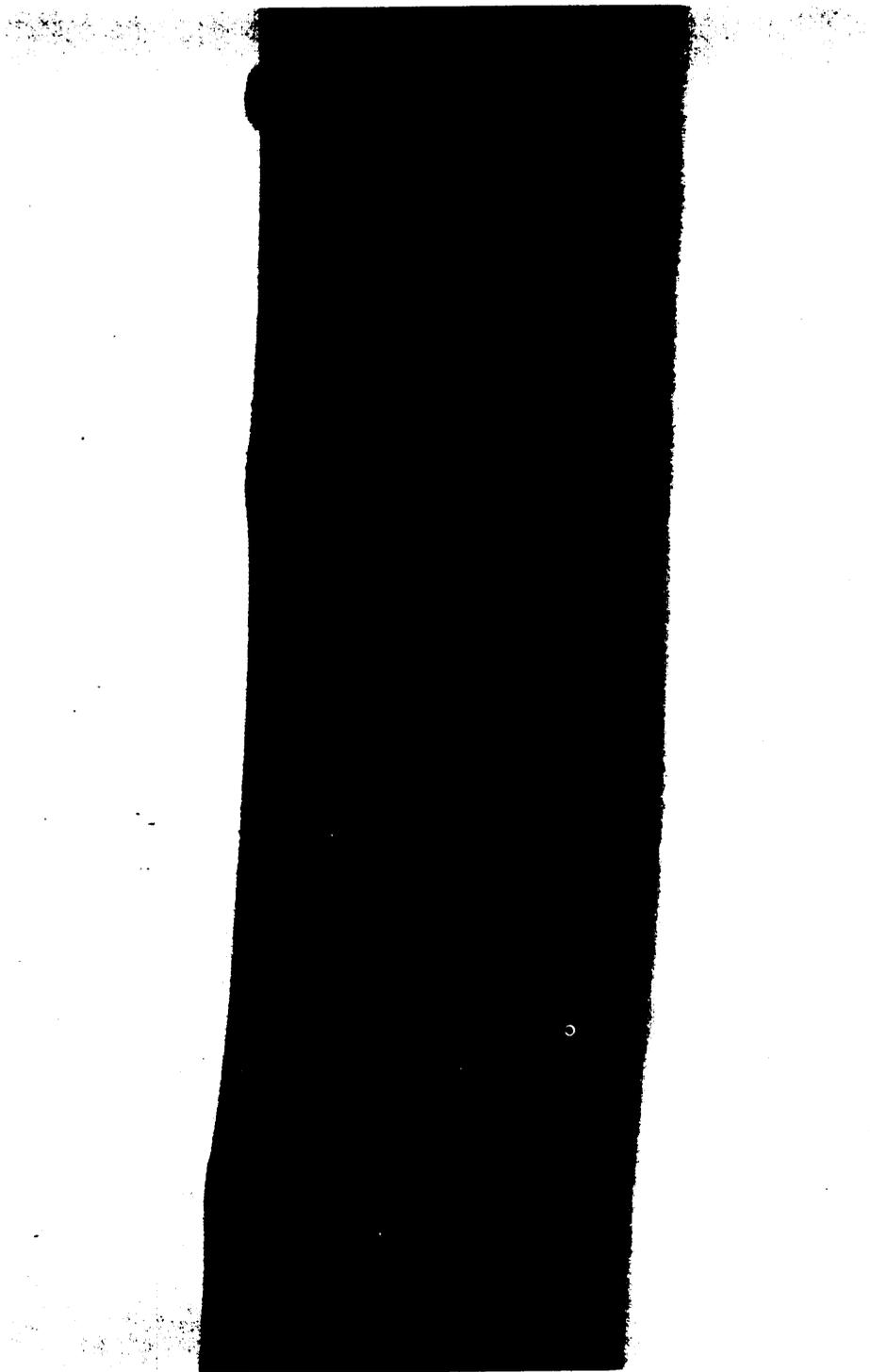


FIGURE 166. Wire, static, bulge: with loose cover—major; dynamic use (Air Force procurement only)—major; with adhered cover—not a defect.

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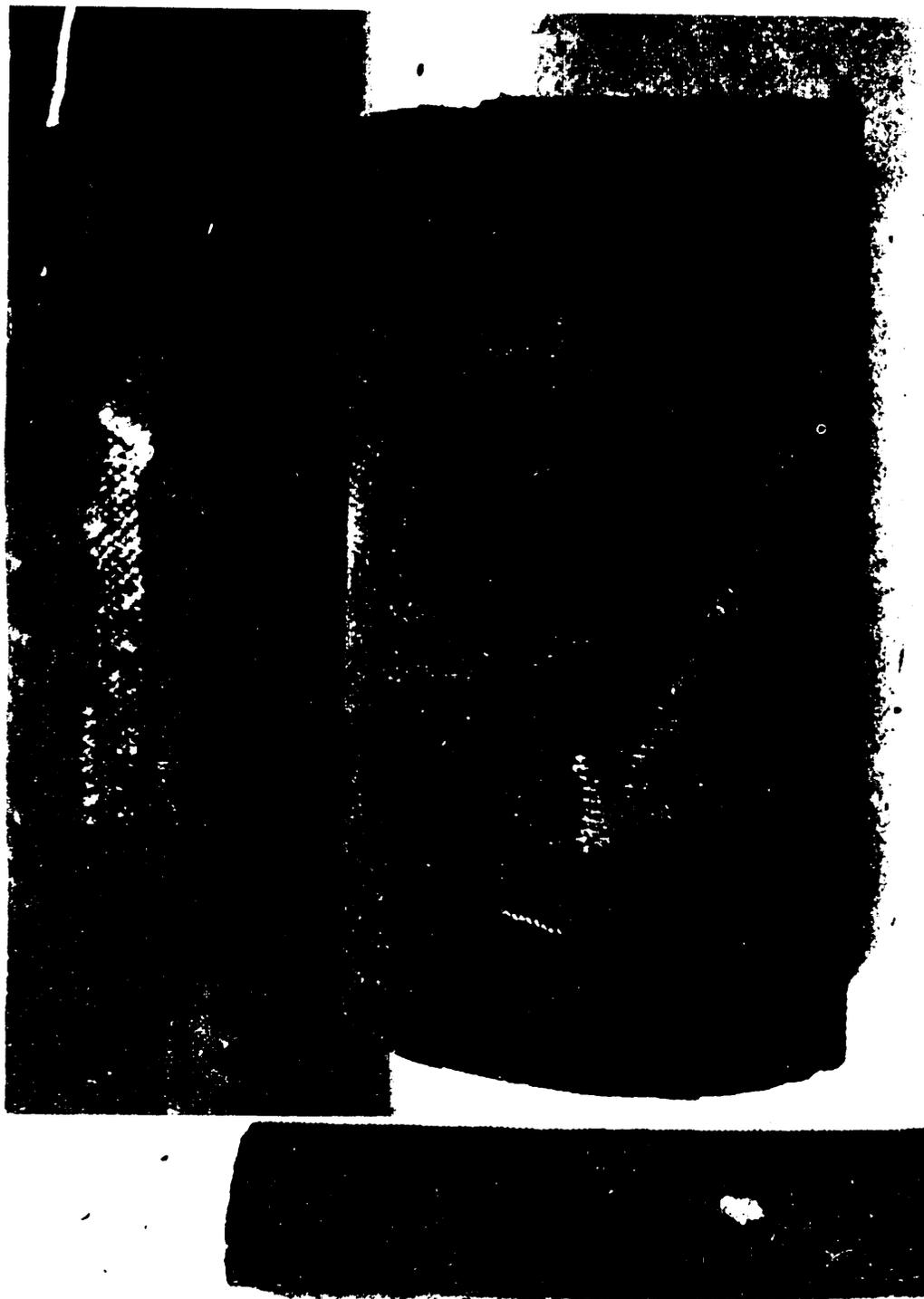


FIGURE 167. Yarn through cover—major.



FIGURE 168. Yarn through cover—major.

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FIGURE 169. Yarn in cover: class A—major; classes B and C—minor.



FIGURE 170. Buckle—major.

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FIGURE 171. Cement, excess: class A—major; classes B and C—minor.



FIGURE 172. Cement, excess: class A—major; classes B and C—minor.

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FIGURE 173. Fold—major.

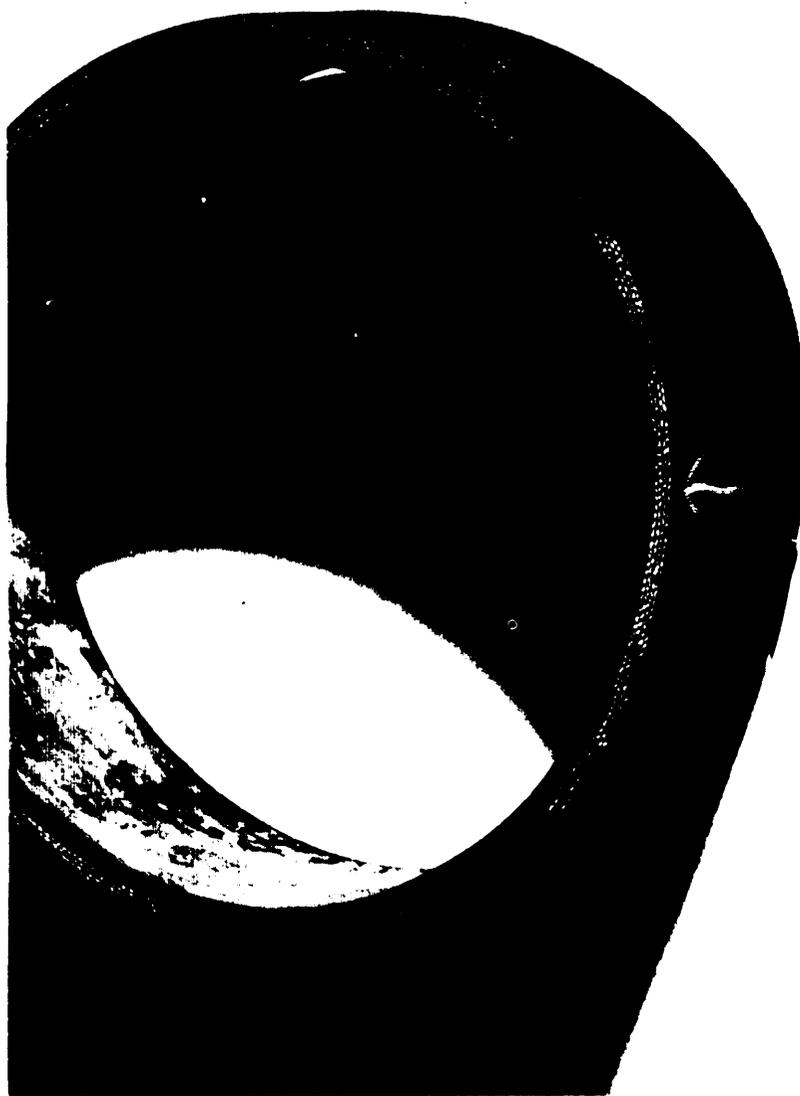


FIGURE 174. Hole—major.

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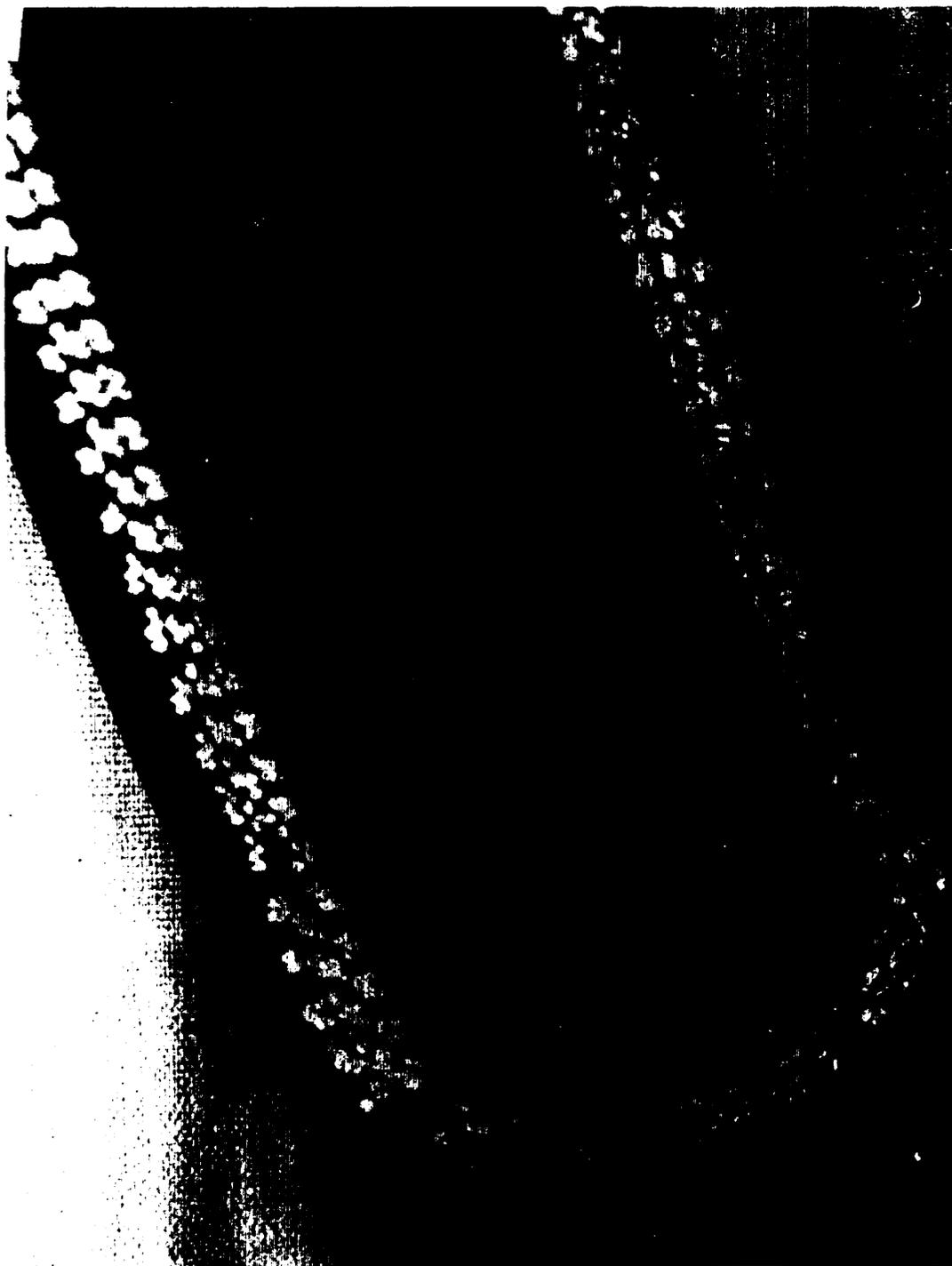


FIGURE 175. Hole—major.



FIGURE 176. Hole—major.

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FIGURE 177. Lap, open or loose—major.

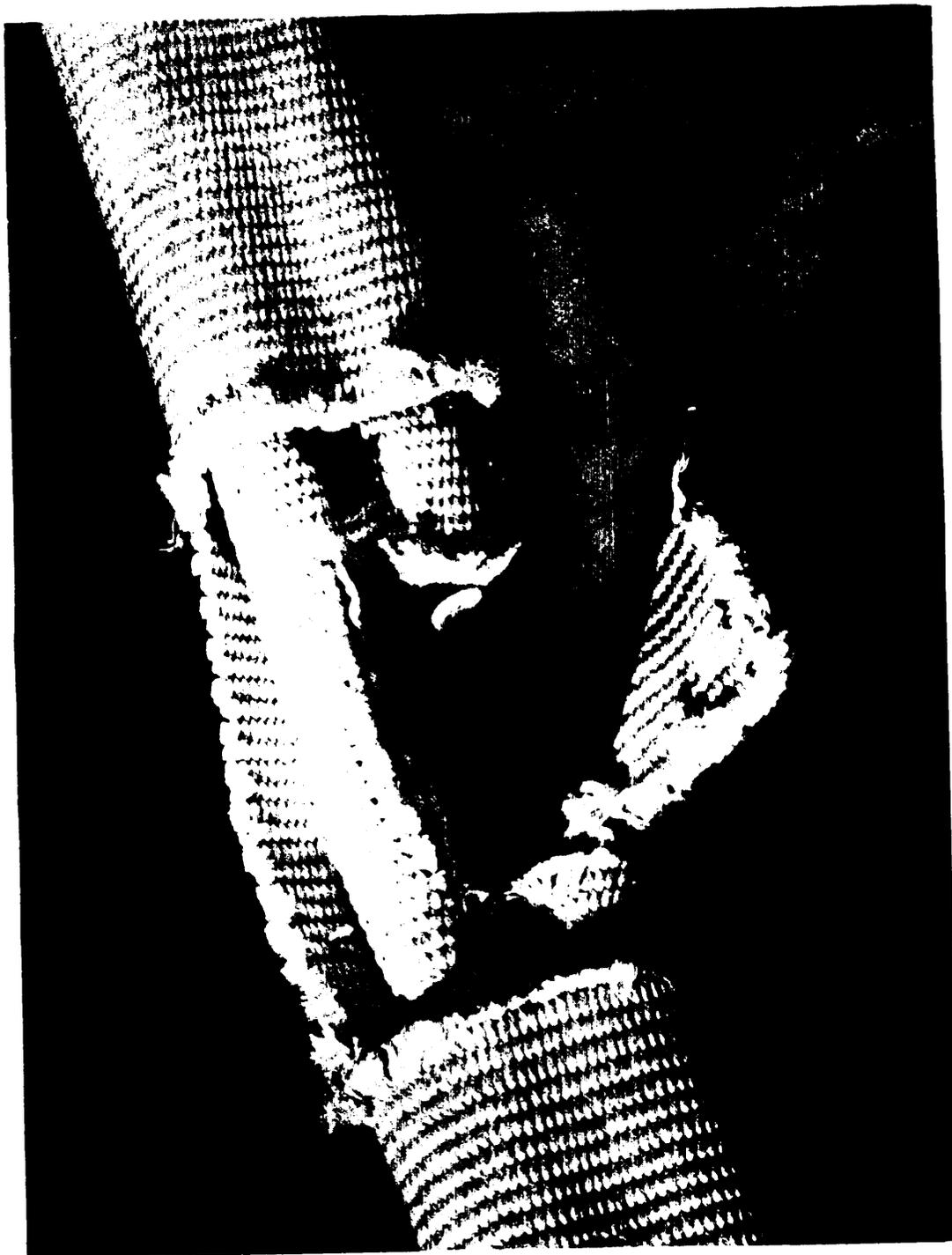


FIGURE 178. Loose (separation)—major. (See fig. 179.)

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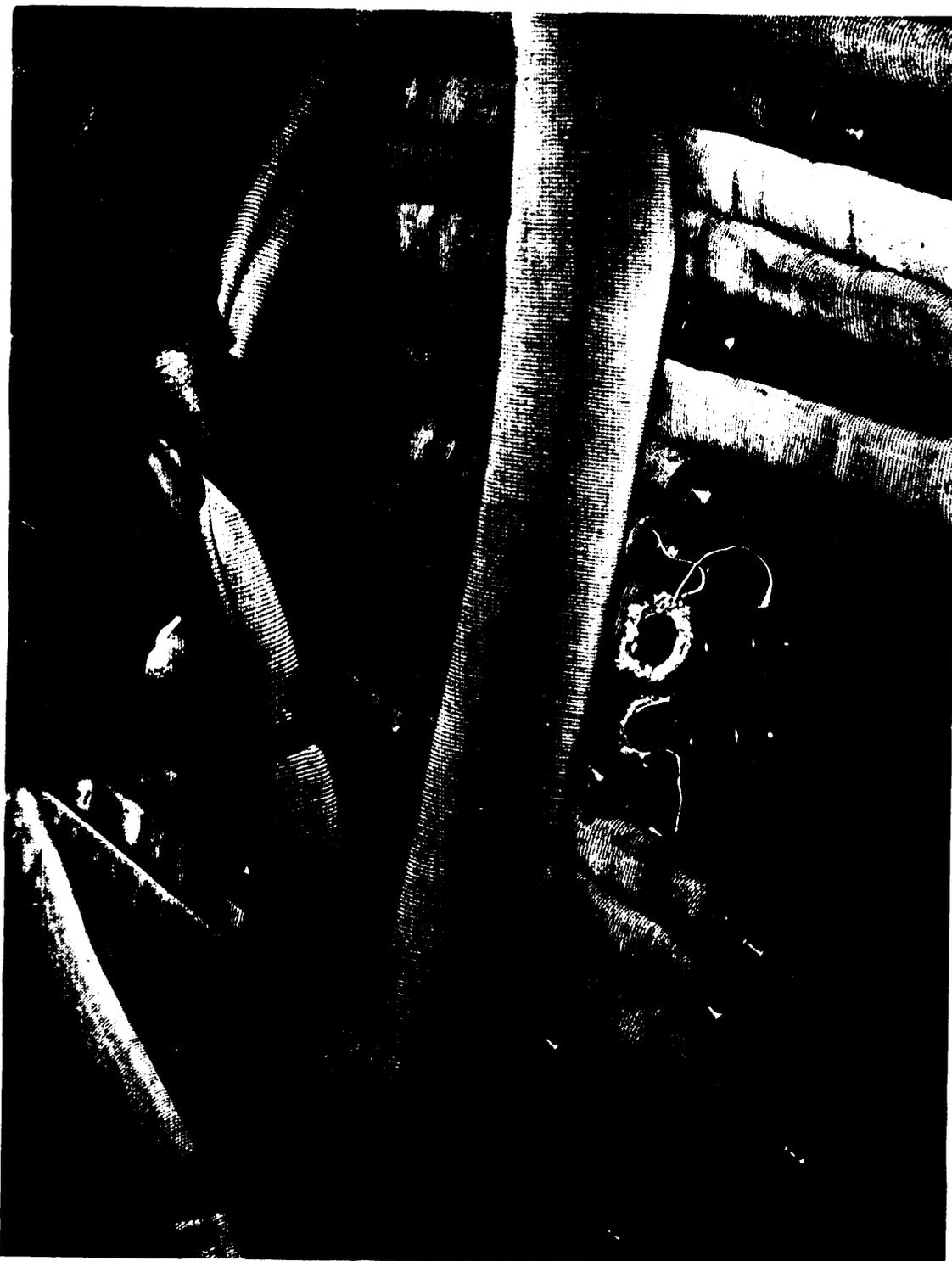


FIGURE 179. Loose (separation)—major. (Hose does not round out ahead of inspector's right hand); (see fig. 178.)

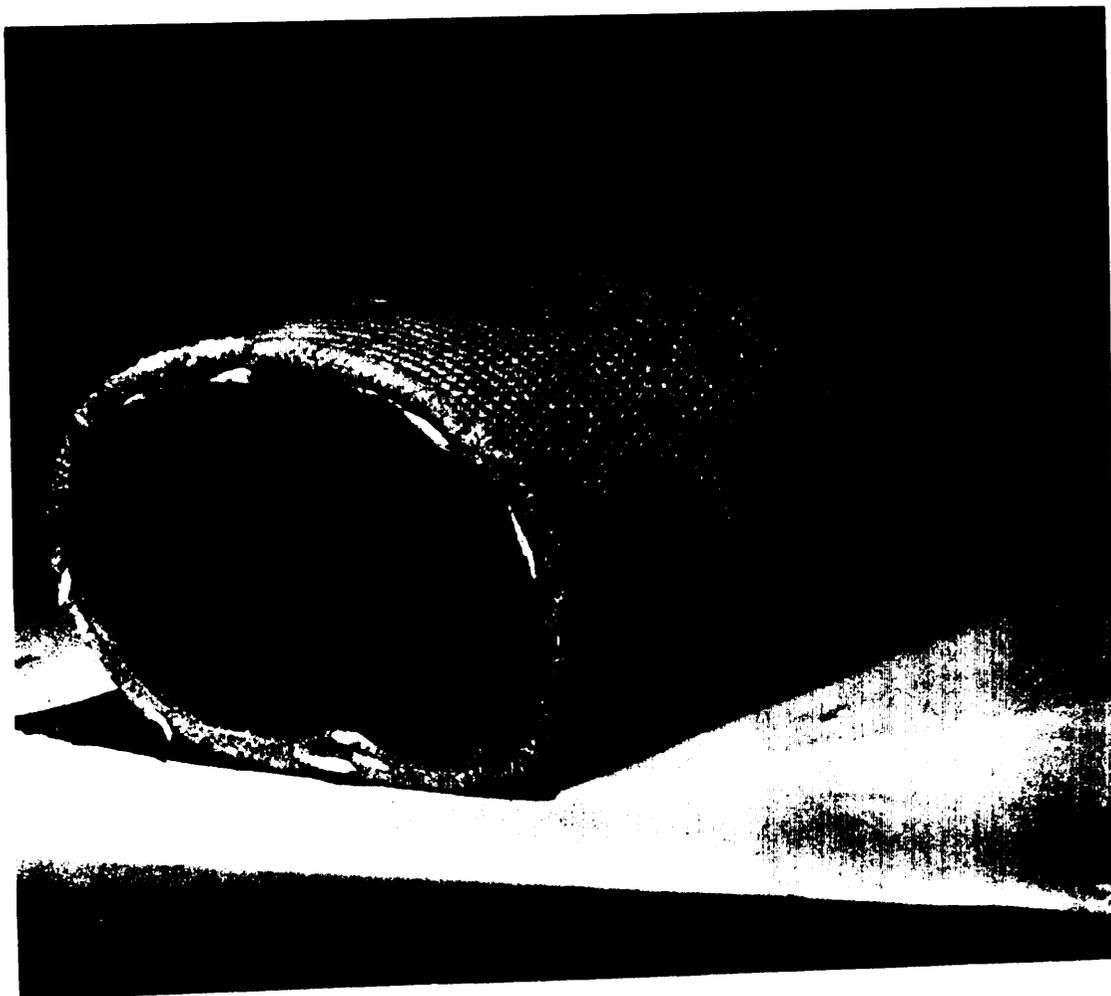


FIGURE 180. Loose (separation)—major.

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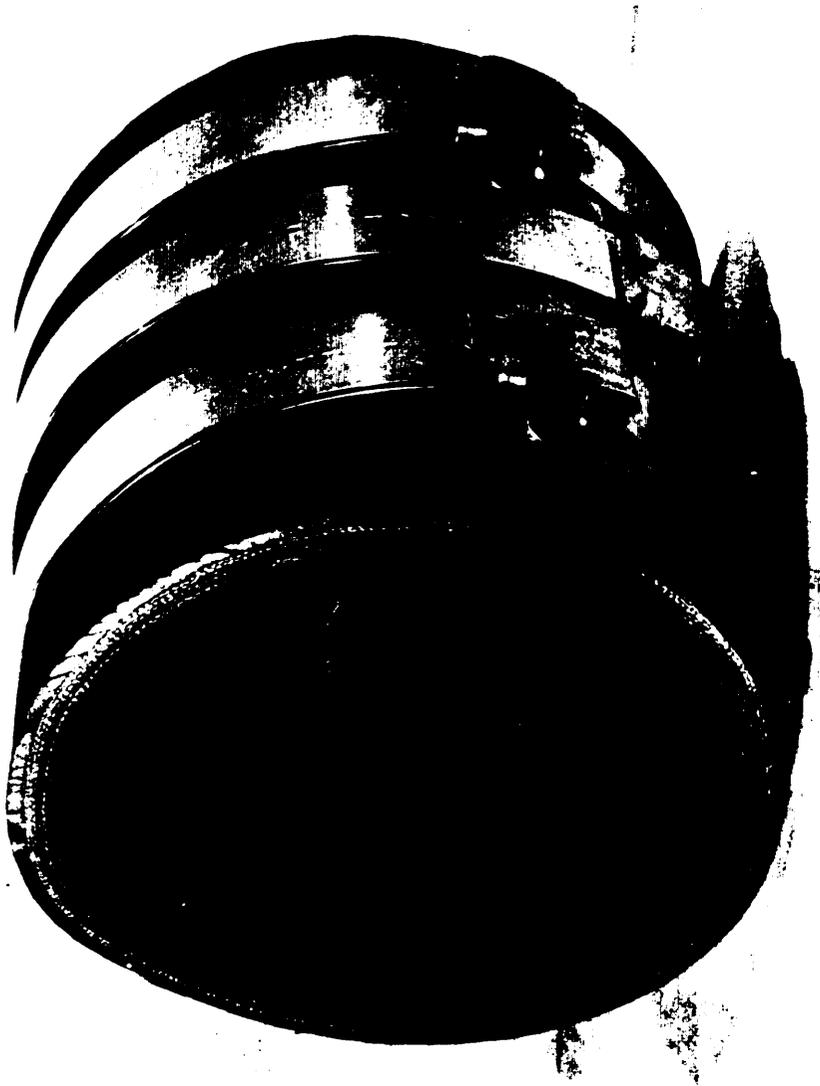


FIGURE 181. Loose (separation)—major.

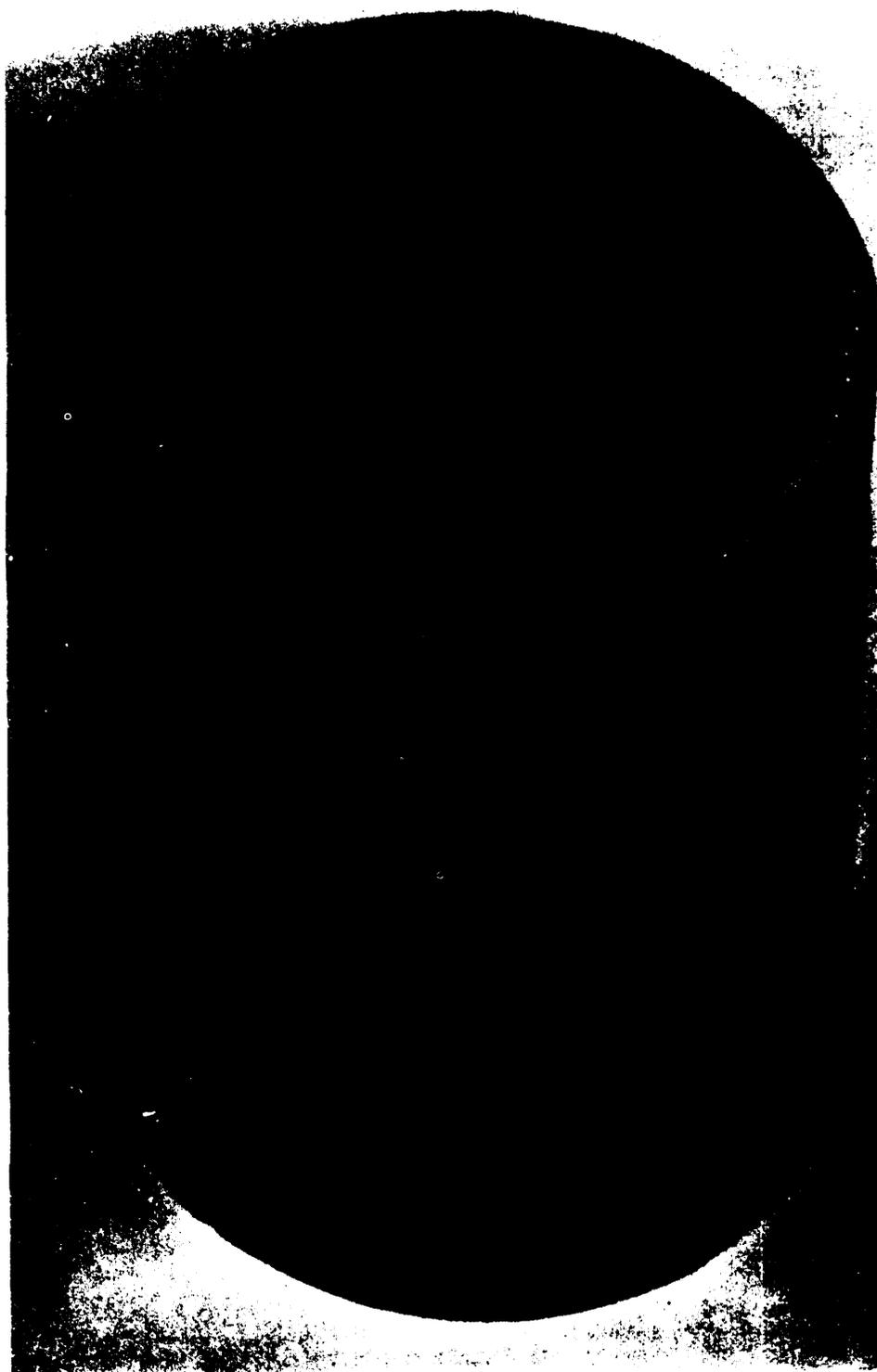


FIGURE 182. Loose (separation)—major.

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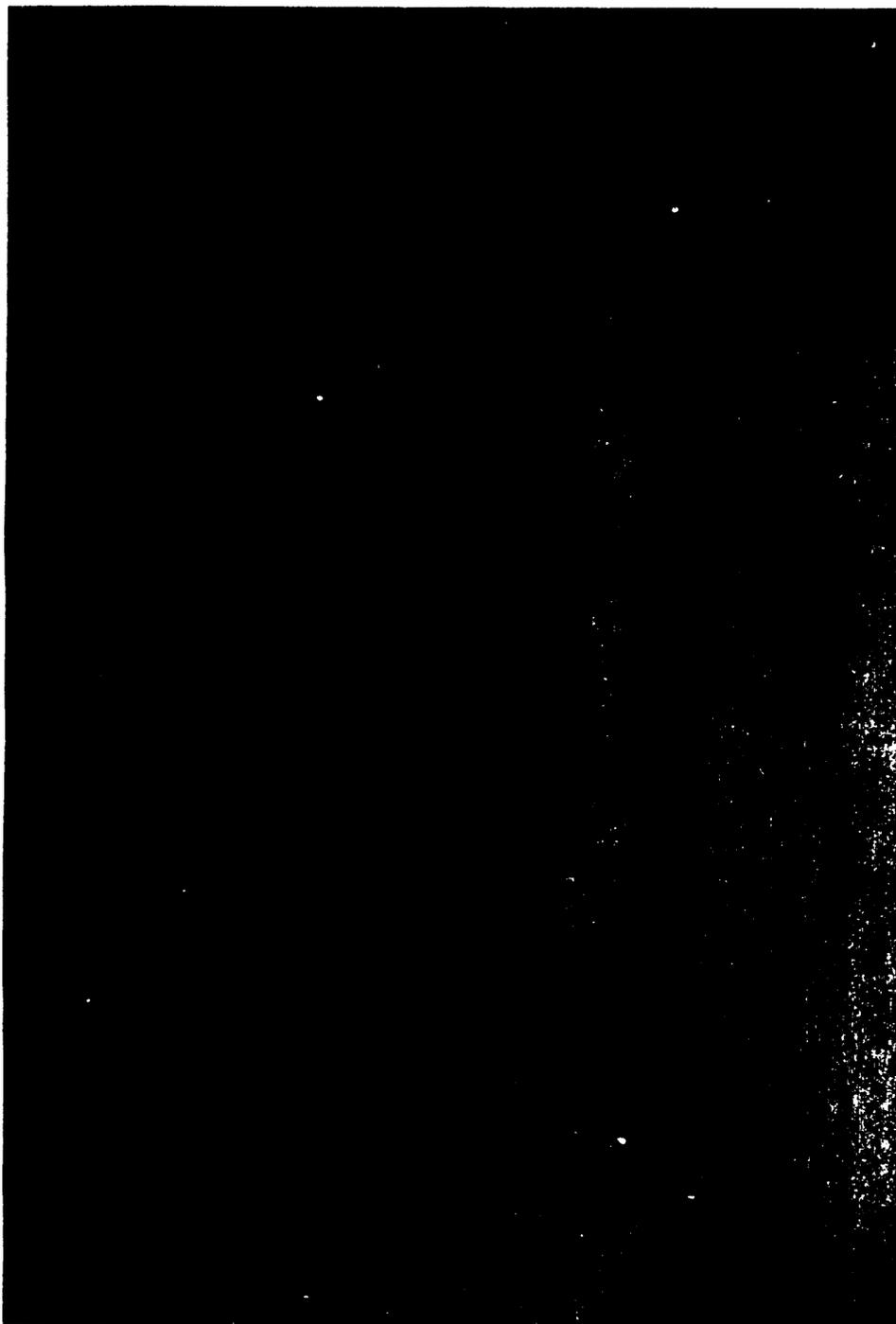


FIGURE 183. Lubricant, excess or loose: class A—major; classes B and C—minor.

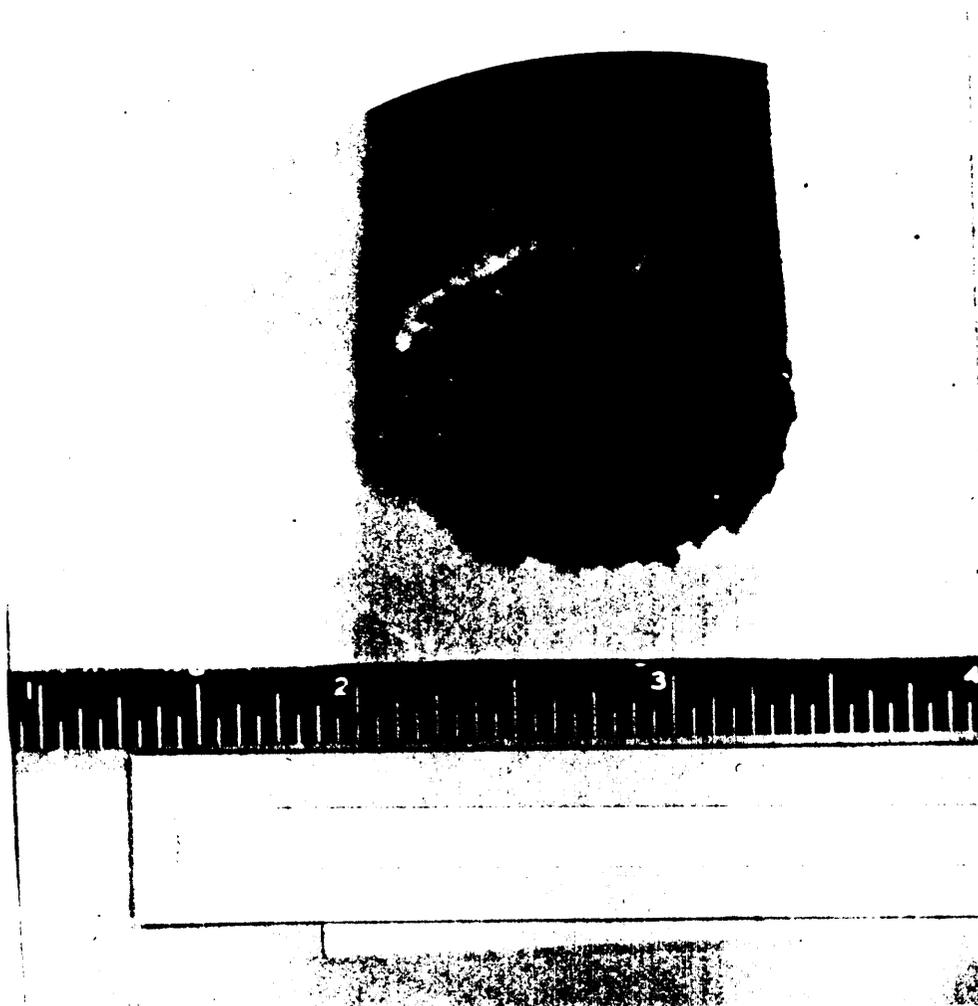
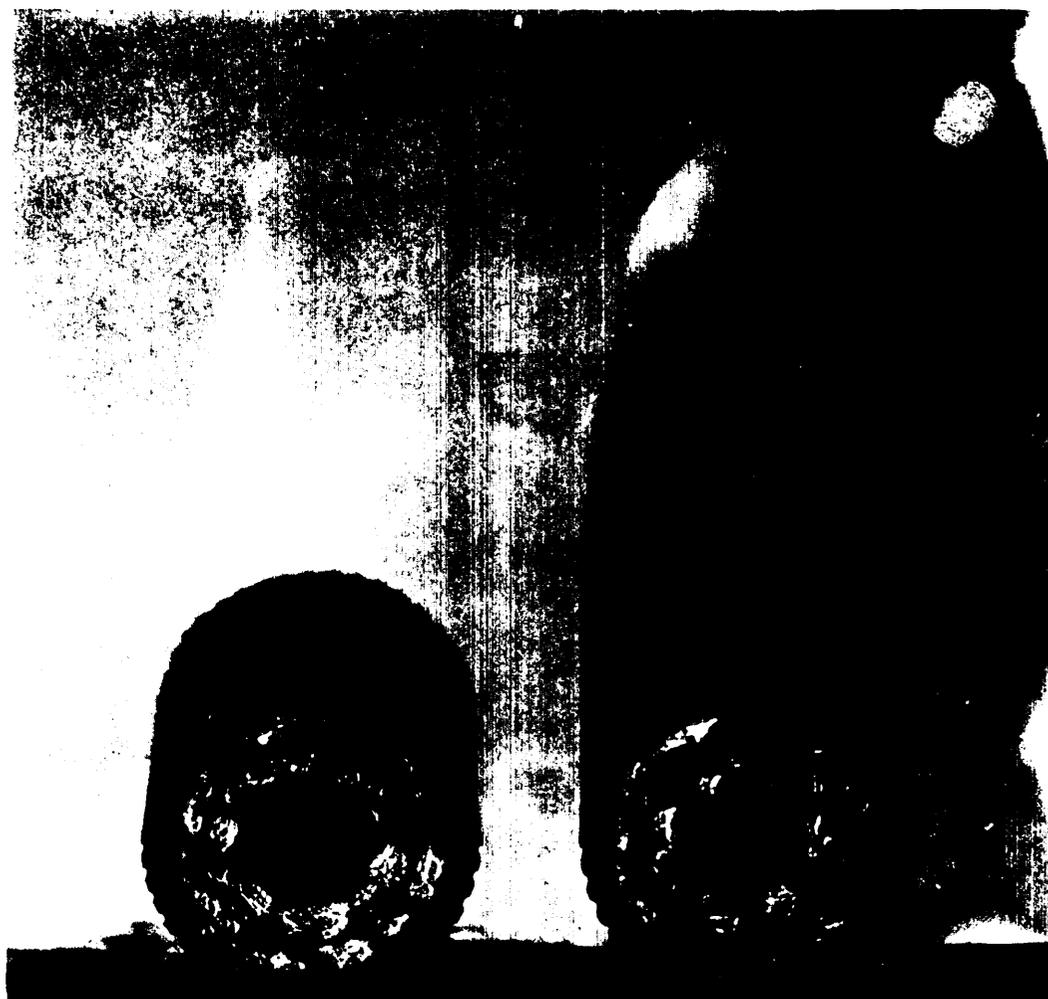


FIGURE 184. Lubricant, normal amount—not a defect.

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FIGURE 185. Tube missing—major.



I

II

FIGURE 186. Tube missing:  
I—Normal hose.  
II—Major.

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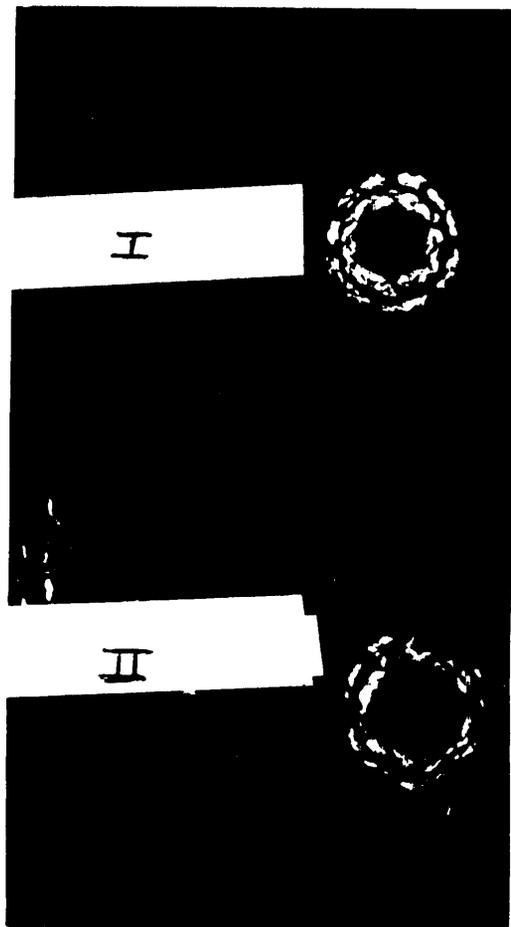


FIGURE 187. Off-center tube:  
I—Thickness meets tolerance—not a defect.  
II—Thickness below tolerance—major.



FIGURE 188. Pits deep—major.

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FIGURE 189. Pits deep—major.

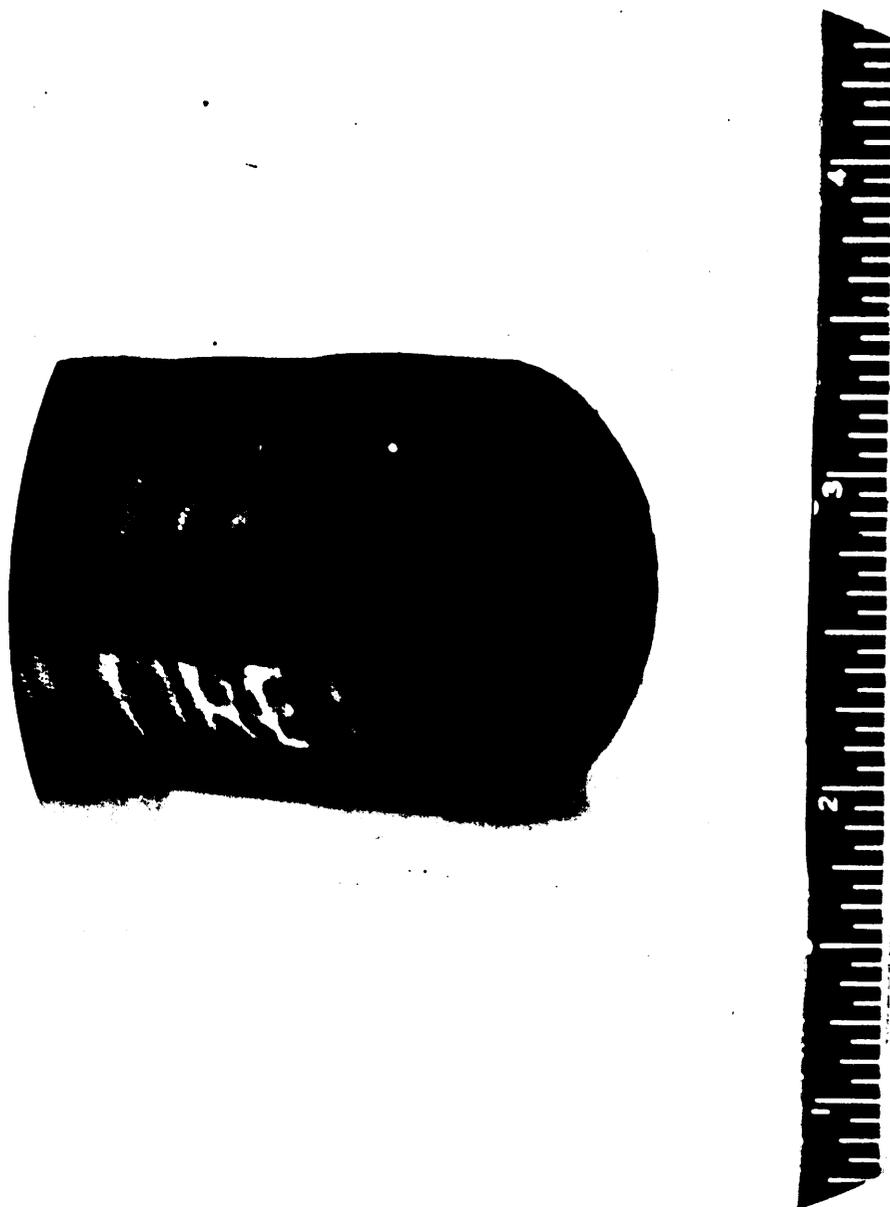


FIGURE 190. Pits, small, less than 15 percent of tube thickness: class A—major; classes B and C—minor.

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FIGURE 191. Pits, small irregularities—not a defect.

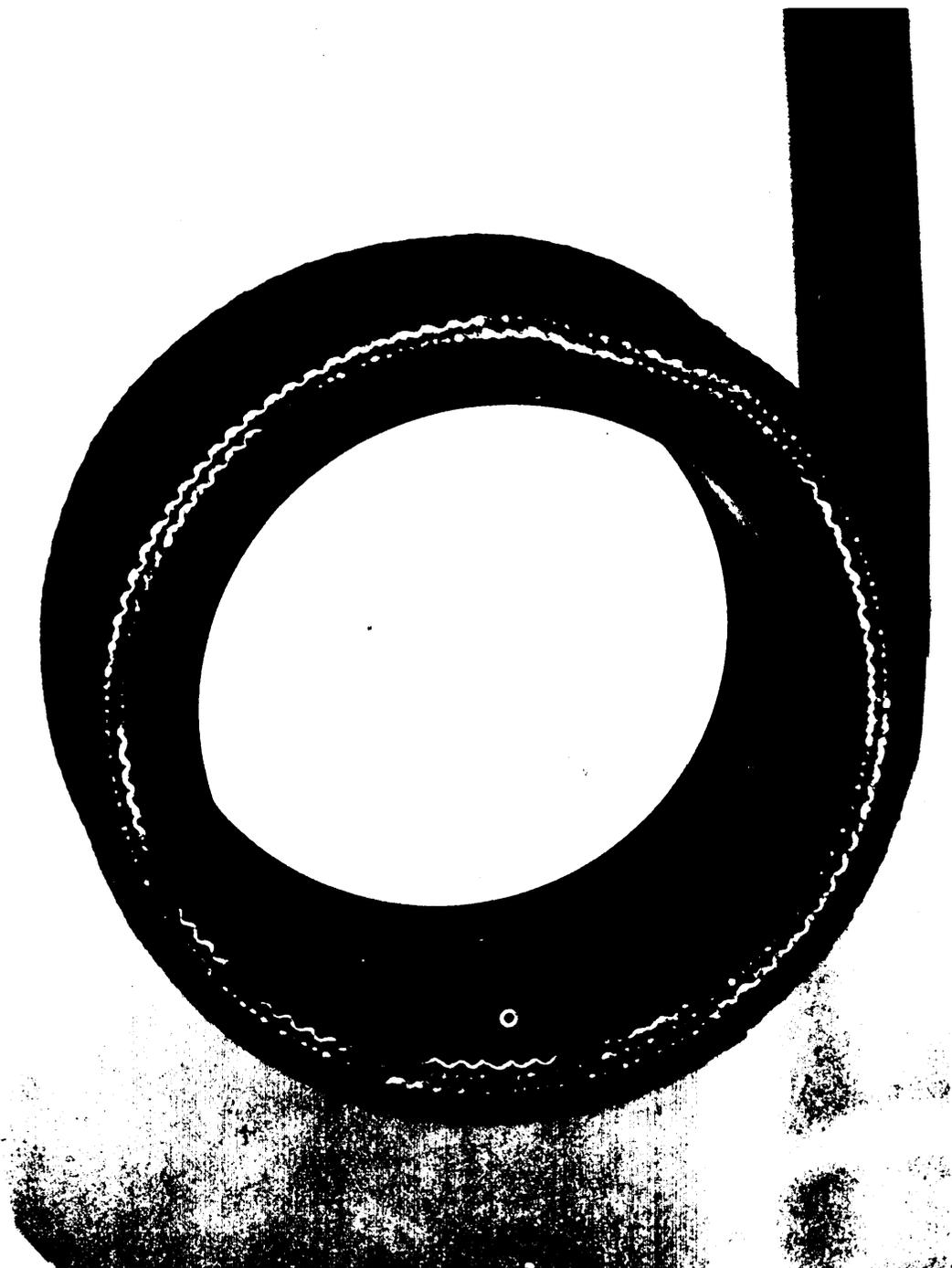


FIGURE 192. Porosity, more than 15 percent of tube thickness—major.

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FIGURE 193. Ring: class A—major; classes B and C—not a defect.

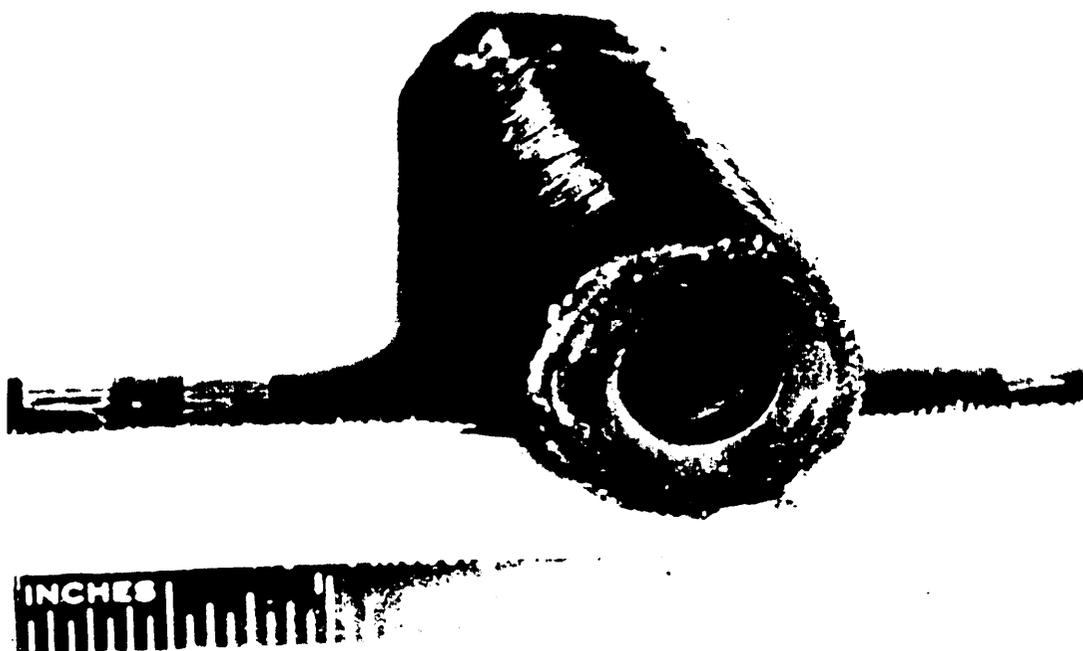


FIGURE 194. Ring: class A—major; classes B and C—not a defect.

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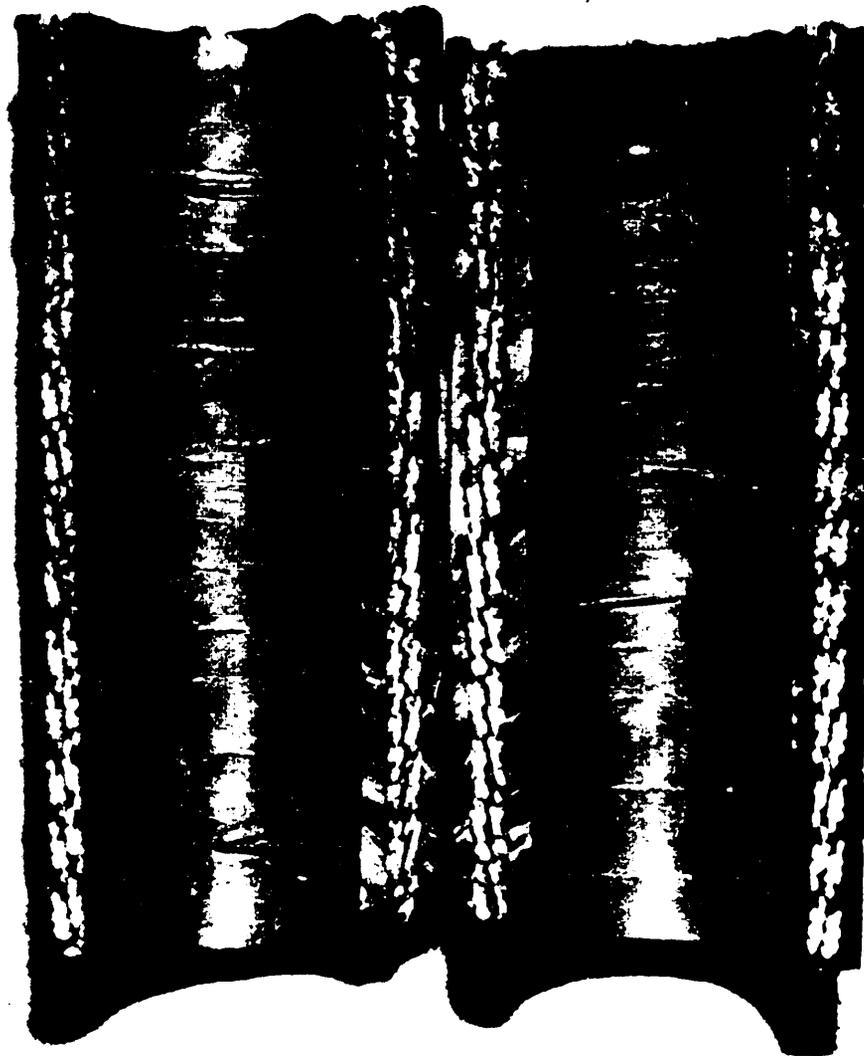


FIGURE 195. Ridge: over  $\frac{1}{64}$  inch or over 10 percent of tube thickness, whichever is greater—major; less than  $\frac{1}{64}$  inch or 10 percent of tube thickness, whichever is greater: class A—minor: classes B and C—not a defect.

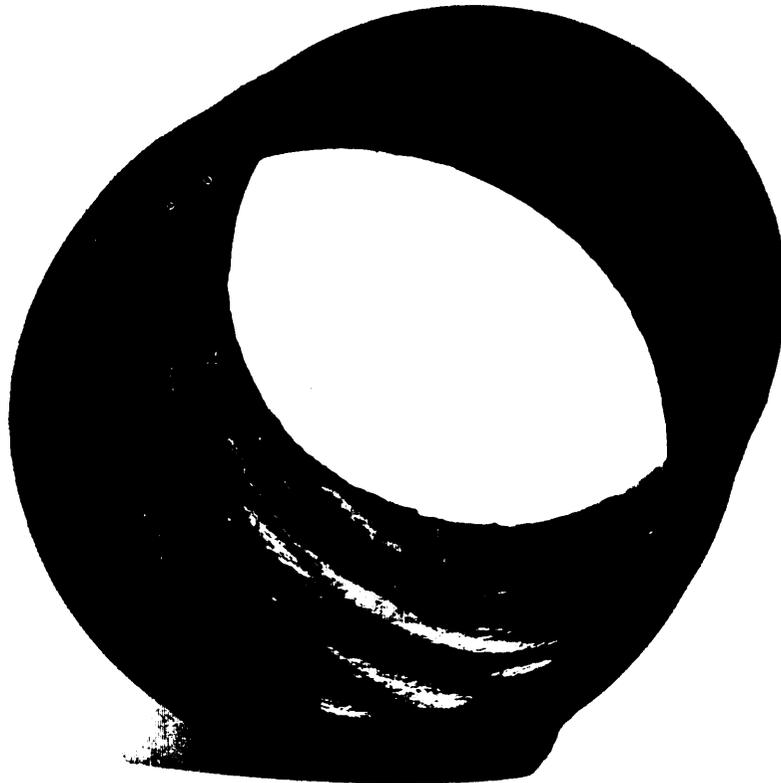


FIGURE 196. Ridge: over  $\frac{1}{64}$  inch or over 10 percent of tube thickness, whichever is greater—major; less than  $\frac{1}{64}$  inch or 10 percent of tube thickness, whichever is greater: class A—minor; classes B and C—not a defect.

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FIGURE 197. Rough, over  $\frac{1}{64}$  inch or over 10 percent of tube thickness, whichever is greater—major.

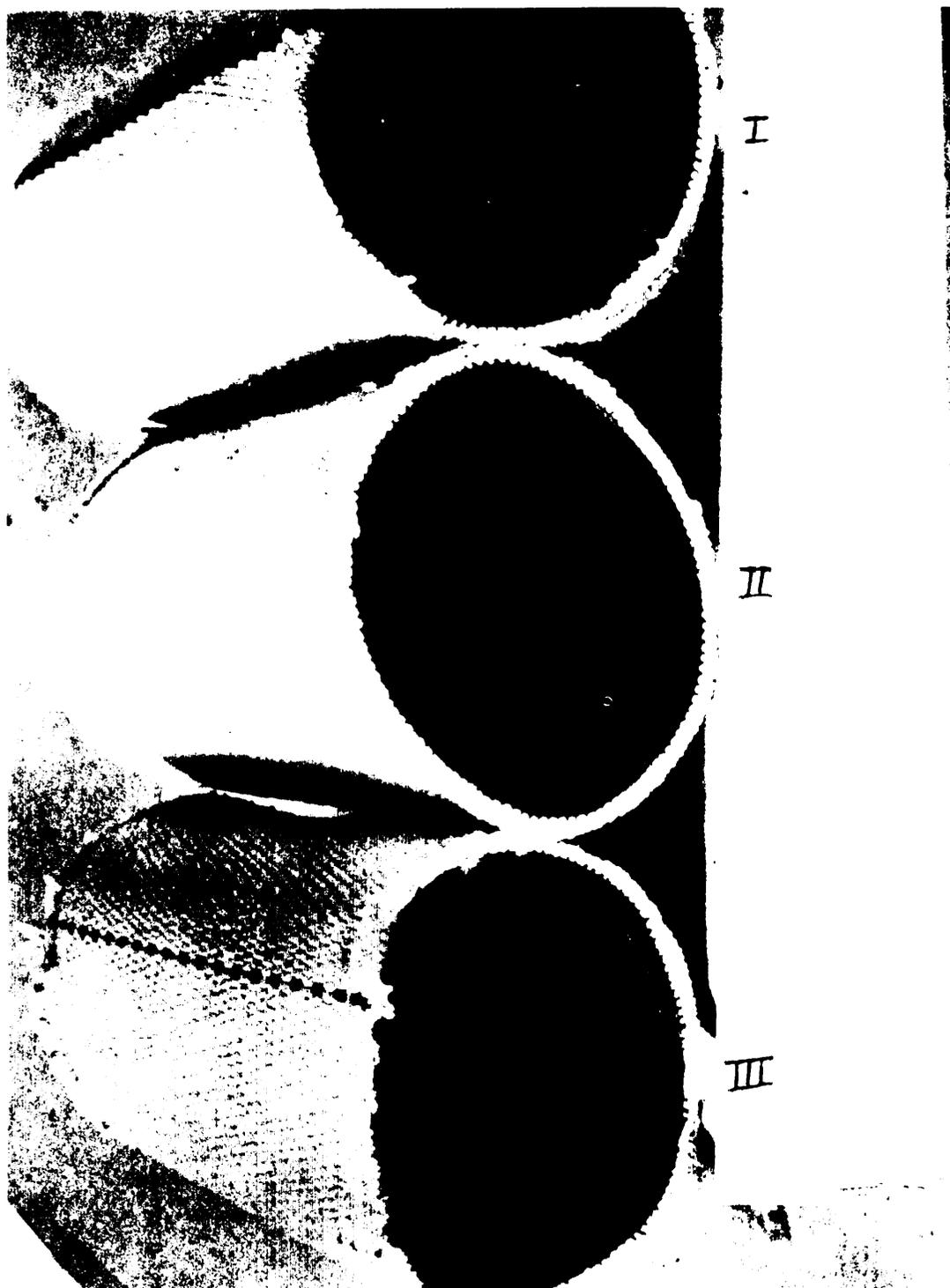


FIGURE 198. Rough, less than  $\frac{1}{64}$  inch or less than 10 percent of tube thickness, whichever is greater:

- I—Acceptable.
- II—Rough (corrugated)—minor.
- III—Roughness—minor.

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FIGURE 199. Scored (slit)—major.



FIGURE 200. Surface irregularity: when assembled with swaged fittings—major; all others—minor.

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FIGURE 201. Surface irregularity: when assembled with swaged fittings—major; all others—minor.



FIGURE 202. Surface irregularity: when assembled with swaged fittings—major; all others—minor.

Fed. Std. No. 162a



FIGURE 203. Wire through tube—major.

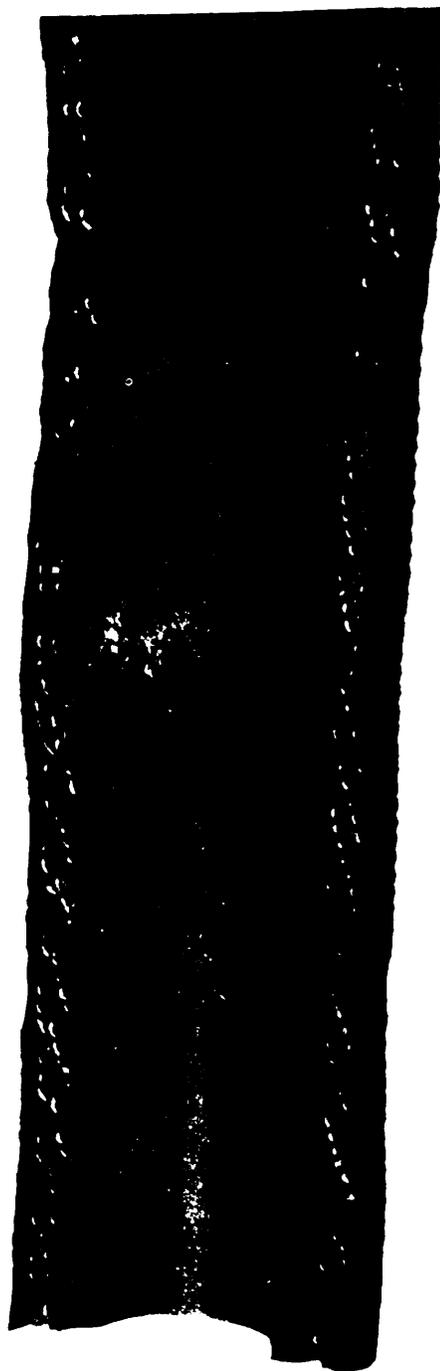


FIGURE 204. Yarn through tube—major.

