

MIL-L-10547E

26 November 1975

SUPERSEDING

MIL-L-10547D

31 March 1967

MILITARY SPECIFICATION

LINERS, CASE, AND SHEET, OVERWRAP;

WATER-VAPOORPROOF OR WATERPROOF, FLEXIBLE

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the fabricating, seam sealing, and creasing of flexible water-vaporproof and waterproof case liners, overwraps, and plastic bag liners.

1.2 Classification. Case liners, overwraps, and plastic bag liners shall be furnished in the following types and grades as specified (see 6.2). Grades A through F are applicable to the different types as per table I.

Type I	- High-top liner (see figure 1)
Type II	- Double-top pad liner (see figure 2)
Type III	- Overwrap sheet
Type IV	- Plastic bag liner
Grade A	- Water vaporproof
Grade B	- Waterproof; all temperature
Grade C	- Waterproof, asphalt-laminated kraft
Grade D	- Waterproof and greaseproof
Grade E	- Waterproof, greaseproof, transparent; all temperature
Grade F	- Waterproof, transparent; all temperature

- * 1.2.1 Styles. The style shall be at the option of the supplier unless otherwise specified (see 3.5.1.1 and 6.2). Styles are shown in figures 3 through 3 g.

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2. APPLICABLE DOCUMENTS

- * 2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS

FEDERAL

- L-P-378 - Plastic Sheet and Strip, Thin Gauge, Polyolefin
- EH-S-364 - Sieve, Test
- MSM-A-260 - Adhesive, Water-Resistant, (For Sealing Waterproofed Paper)
- PPP-B-636 - Boxes, Shipping, Fiberboard
- PPP-B-1055 - Barrier Material, Waterproofed, Flexible

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- MIL-B-121 - Barrier Material, Greaseproofed, Waterproofed, Flexible
- MIL-B-131 - Barrier Materials, Water-vaporproof, Flexible, Heat-Sealable
- MIL-B-13239 - Barrier Material, Waterproofed, Flexible, All Temperatures, Heat-sealable
- MIL-B-22191 - Barrier Materials, Transparent, Flexible, Heat-sealable

STANDARDS

FEDERAL

- FED-STD-356 - Commercial Packaging of Supplies and Equipment

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-129 - Marking for Shipment and Storage

(Copies of specifications and standards required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer).

- * 2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

United States Department of Health, Education and Welfare Publications:

Federal Food, Drug and Cosmetic Act,
and Regulations Promulgated Thereunder

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402).

3. REQUIREMENTS

- * 3.1 Material. Barrier materials used in case liners, overwraps, and plastic bag liners for subsistence and nonsubsistence items shall be furnished as specified in table I (see 6.2). Barrier materials shall meet the physical requirements when tested as specified in the applicable specification listed in table I.

TABLE I. Barrier materials for case liners, overwraps, and plastic bag liners

Use	<u>Linars, overwraps,</u>		Specification	<u>Barrier materials</u> <u>Classification</u>
	<u>Grade</u>	<u>Type</u>		
Subsistence item	C	I, II, III	PPP-B-1055	Classes H-2 thru H-5, M-1
	F	IV	L-P-378	Type I
Nonsubsistence item	A	I, III	MIL-B-131	Classes 1 and 2
	B	I, II, III	MIL-B-13239	Type CW-2
	C	I, II, III	PPP-B-1055	Classes E-1, E-2, H-2 through H-5, L-2, M-1
	D	I, II	MIL-B-121	Types I and II, grade A, class 1
	E	IV	MIL-B-22191	Type II

- * 3.2 Toxicity (subsistence items only). Barrier material when used for packing unpackaged food items shall conform to the Federal Food, Drug and Cosmetic Act, and Regulations Promulgated Thereunder (see 6.2).

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3.3 Sealing methods.

3.3.1 Seams other than closures.

- * 3.3.1.1 Grades A, B, D, E and F liners. The seams of grades A and D case liners, grades E and F plastic bag liners, and grade B case liners fabricated from heat sealable material shall be continuously heat sealed and shall conform to the requirements of 3.6.
- * 3.3.1.2 Grade C case liners. Grade C case liners fabricated from non-heat sealing material shall be continuously and securely sealed with a strip of adhesive conforming to MSN-A-360 or with other types of waterproof adhesive conforming to the requirements of 3.6.

3.3.2 Top seams and overwrap closures. Top seams and overwrap closure seams shall be made in accordance with the appendix of this specification.

3.4 Dimensions.

3.4.1 Formed case liners. Dimensions of formed case liners and plastic bag liners shall be based on the inside dimensions of the applicable box for which they are used and shall be determined as follows:

Type I:

Length	- Inside length of box plus 1/4 inch
Width	- Inside width of box plus 1/4 inch
Depth	- Inside depth of box plus 1/2 width plus not less than 3 inches for heat sealed, 6 inches for adhesive sealed, and 4 inches for pressure-sensitive sealed

Type II:

Length	- Same as type I
Width	- Same as type I
Depth	- Inside depth of box plus not less than 3 inches

Type IV:

Length	- Same as type I
Width	- Same as type I
Depth	- Inside depth of box plus inside width of box plus not less than 6 inches for folding

3.4.2 Set-up liner. The length, width, and depth shall be specified in that order, giving the inside dimensions of the liner. The depth shall have a tolerance of plus 1/2, minus 1/4 inch. The length and width shall have a tolerance of plus 3/8, minus 1/8 inch.

3.4.3 Flat liner. The depth shall be measured from the bottom edge to the open end and shall have a tolerance of plus 7/8, minus 1/8 inch; the width shall have a tolerance of plus 1, minus 1/4 inch.

3.4.4 Overwrap sheets. The overwrap sheets shall be of sufficient size to completely inclose the contents and to allow for sealing as specified in the appendix. This size shall be as specified (see 6.2) showing the length and width dimensions in that sequence.

3.5 Construction.

3.5.1 Types I, II and III, grades A, B, C, and D case liners and overwrap sheets.

3.5.1.1 Fabrication and assembly. Liners shall be fabricated in the types and styles shown in figures 1, 2, and 3 through 3g. Each style, when set up, yields a liner with a closed, rectangular bottom and an open top. Unless otherwise specified (see 6.2), the type and style of liner may be any of those shown herein. Case liners which otherwise meet the requirements of this specification may be supplied in styles other than shown herein, provided that each style is specifically approved by the procuring activity. All liners shall be furnished flat with unsealed tops, except the liner in figure 3a, which shall be folded as indicated. With the exception of heat-sealable materials, liners fabricated from material having one coated surface or one surface infused with asphalt or some other material shall be made with the coated or infused surface outside. For type II liners, two pads of the same material and shape, but measuring 1/4 inch less in both length and width than the liner, shall be used to effect a closure.

3.5.1.2 Crossing. Liners shall be crossed as indicated in the figure for the style desired, except when fabricated from grade A material or from grade C if the seams and seals are bonded with pressure-sensitive adhesive or pressure-sensitive adhesive tape.

3.5.1.3 Seam construction.

3.5.1.3.1 Heat seal seams. The heat seal seams shall be not less than 1/2 inch wide. The lay or fin shall not be less than 1-1/2 inches in width (see figures 4a and 4b). The sealed seam shall meet the requirements of 3.6.

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3.5.1.3.2 Adhesive and pressure-sensitive adhesive sealed seams. The adhesive or pressure-sensitive adhesive seal shall be not less than 1/2 inch wide for bottom seams and not less than 1/4 inch wide for longitudinal seams, and shall be located anywhere within a lap or fin which shall not be less than 1-1/2 inches in width (see figures 4a and 4b). The sealed seams shall meet the requirements of 3.6.

3.5.1.3.3 Pressure-sensitive adhesive tape sealed seams. The pressure-sensitive adhesive tape seal shall be made by joining sheets of barrier material with tape as indicated in figure 4c. The width of the tape shall be not less than 3 inches and meet the requirements of 3.6.

3.5.2 Type IV, grades I and F bag liners.

3.5.2.1 Fabrication and assembly. The liner shall be a flat tube plastic bag, or a rectangular plastic bag with gussets on the sides (see 3.4.2). The setup and flat liners shall be fabricated from plastic sheets or tubing with a minimum thickness of 0.005 inch in accordance with L-P-378, or a maximum thickness of 0.006 inch in accordance with type III of MIL-B-22191, as applicable. Bags fabricated from two sheets shall have two side seams and one bottom seam. Bags fabricated from preformed tubing shall be sealed on the bottom. The side seams shall be parallel to each other, and all seams shall be parallel to the edges of the bag. All seams shall be heat sealed, continuous, and meet the requirements of 3.6.

3.6 Physical properties. Adhesive sealed, heat sealed, pressure-sensitive adhesive sealed, and pressure-sensitive adhesive tape sealed seams of liners, overwraps and bag liners shall comply with the following requirements:

3.6.1 Seam strength. The seam shall withstand a minimum force of 3.5 pounds when tested as specified in 4.4.1.

3.6.2 Heat resistance. Separation or flow of adhesive shall not occur when tested as specified in 4.4.2.

3.6.3 Flexibility. No visible fracture or separation shall be evident when tested as specified in 4.4.3.

3.6.4 Water resistance. Water shall not penetrate the specimen in 8 hours when tested as specified in 4.4.4.

3.7 Marking (see 6.3). The outside surface of each liner or overwrap sheet shall be legibly imprinted, marked, or labeled at least once with the information specified hereinafter as applicable. The letters shall be upper-case, commercial Gothic and shall have a minimum height of 1/8 inch. The specification number MIL-L-10547E shall be not less than 1/2 inch in height. All markings shall be as permanent as the normal life expectancy of the liner or overwrap material. Marking shall be arranged substantially as follows:

Nomenclature (for example: "LINER, CASE, WATERPROOF, FLEXIBLE" or "SHEET, OVERWRAP, WATERPROOF, FLEXIBLE").

Type and grade for subsistence (or nonsubsistence) item and specification number (for example: "TYPE I, GRADE C FOR SUBSISTENCE ITEM, MIL-L-10547E").

Contract or order number.

Name and address of manufacturer.

Type or class of barrier material and its specification number (for example: "BARRIER MATERIAL: CLASS H-3(a), PPP-B-1055").

Length, width, and depth of set-up liner, in that order; or width and depth of flat liner, in that order.

3.8 Closing and sealing of case liners, overwraps, and bag liners. Case liners, overwrap sheets, and bag liners covered by this specification shall be closed and sealed in accordance with the appendix of this specification.

3.9 Workmanship. Liners, overwraps, and bag liners shall be uniformly constructed and shall be free from pinholes, tears, cuts, blisters, chafed spots, delaminations, and other imperfections which could impair their usefulness, and from contamination such as dirt, grease, oil, or foreign matter. Seams shall be continuous, uniform, and without ridges or creases that would permit water to enter. Finished liners shall not block or stick together to the extent that the material is damaged when the liners are opened and that the protective qualities are impaired.

4. QUALITY ASSURANCE PROVISIONS

- * 4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may utilize his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.
- * 4.2 Quality conformance inspection. Except as otherwise specified herein, sampling for inspection shall be performed in accordance with the provisions set forth in MIL-STD-105.
- * 4.2.1 Component and material inspection. In accordance with 4.1, above, components and materials shall be inspected and tested in accordance with all the requirements of referenced specifications, drawings and standards unless otherwise excluded, amended, modified or qualified in this specification or applicable purchase document.

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4.2.2 End item inspection. The inspection levels and acceptable quality levels (AQLs) for 4.2.2.1, 4.2.2.2 and 4.2.2.3 shall be as shown in table II. The sample unit for these inspections shall be one case liner, one overwrap sheet, or one plastic bag liner, as applicable. The lot size for determining sample size shall be expressed in terms of the sample unit.

TABLE II. Inspection levels and AQLs

For examination in	Inspection level	AQLs	
		Major	Total
4.2.2.1	S-3	2.5	10.0
4.2.2.2	S-2	—	4.0
4.2.2.3	S-2	—	6.5

4.2.2.1 Visual examination. The end item shall be examined for defects in table III in accordance with the inspection plan specified in 4.2.2.

TABLE III. Classification of defects

Defect	Classification	
	Major	Minor
Not type or grade specified	X	
Seam construction not as specified (see 3.5.1.3)	X	
Creasing not as specified <u>1/</u> (see 3.5.1.2)		X
Any pinhole, tear, cut, blister or chafed spot	X	
Delamination	X	
Not free from dirt, grease, oil or other foreign matter		X
Coated or infused surfaces not on outside, when applicable (see 3.5.1.1)	X	
Marking missing, incorrect, or illegible, when required (see 3.7 and 6.3)		X
Liners stick together to the extent that opening causes tearing or damage to any of the surfaces (see 3.9)	X	

1/ Applicable to case liners only.

- * 4.2.2.2 Dimensional examination. The end item shall be examined for compliance with dimensions specified in accordance with the inspection plan specified in 4.2.2. Any dimension not within the specification tolerance shall be a defect (see 3.4).
- * 4.2.2.3 End item testing. Each sample item shall be tested as specified in table IV in accordance with the inspection plan specified in 4.2.2. Failure of a test shall be recorded as a defect.

TABLE IV. Instructions for testing the end item

Characteristics	Requirement paragraph	Test method	Number determinations per sample unit	Results reported	
				Pass or fail	1/
Seam strength	3.6.1	4.4.1	2		x
Heat resistance	3.6.2	4.4.2	2		x
Flexibility	3.6.3	4.4.3	2		x
Water resistance	3.6.4	4.4.4	2		x

1/ If failure is indicated, report description of failure.

- * 4.2.3 Examination of preparation for delivery requirements. An examination shall be made to determine whether the packing and marking comply with the section 5 requirements. Defects shall be scored in accordance with table V. The sample unit shall be one shipping container fully prepared for delivery except that it need not be closed. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 with an AQL of 2.5 defects expressed in terms of defects per hundred units.

Examine

Defect

Marking (exterior)

Omitted; incorrect; illegible; of improper size, location, sequence or method of application

Materials

Any component missing, damaged or not as specified

Workmanship

Bulged or distorted container
Weight of content is more than specified

4.2.3.1 Examination of shipping container. When shipping containers are required to comply with PPF-B-636, examination for defects in the closure, waterproofing and reinforcing shall be in accordance with the appendix of PPF-B-636.

* 4.3 Certificate examination. Certificate of compliance, certified test reports, approval labels or listing marks or codes and standards, as applicable, that are submitted as proof of conformance with the specification requirements, shall be examined and validated.

4.4 Tests.

4.4.1 Seam strength. Cut from each sample liner, overwrap sheet or plastic bag liner containing a seam, a specimen that will form a strip 1 inch wide by 6 inches long, with the seam centrally located. The 6 inch dimension shall be perpendicular to the length of the seam. The specimens shall be conditioned at $73^{\circ} \pm 2^{\circ}\text{F}$ and 50 ± 2 percent relative humidity for a minimum of 48 hours and tested under this condition. Test each specimen for the strength of the seam by using a pendulum-type tensile testing machine equipped with flat grips which clamp the specimen firmly. The free ends (see figure 4) of the specimen shall be clamped in the grips and the stressing grip shall be actuated at a uniform rate of travel of 12 inches per minute. The pawls on the pendulum shall engage during the test. Record the seam strength values to the nearest 0.1 pound, and the nature of the failure of the flexible material, if any. If separation or breaks occur before a tension of 3.5 pounds is reached, the specimen shall be considered as having passed if fiber failure occurs on not less than 50 percent of the bonded area. If the specimen breaks before a tension of 3.5 pounds is reached, the specimen shall be reinforced on each side so that the specified tension can be obtained.

* 4.4.2 Heat resistance. Prepare test strips as specified in 4.4.1. By means of a paper clip attached to one free end, suspend the strips in a circulating air oven maintained at $140^{\circ} \pm 2^{\circ}\text{F}$. After 24 hours, remove the strips from the oven and examine them for separation of bond and flow of adhesive. To eliminate failures caused by excessive air disturbance, strips with hot-melt adhesives shall be tested in a gravity convection oven. Any indication of separation of the strips or flow of adhesive shall constitute failure of the test and shall be recorded as a defect.

* 4.4.3 Flexibility. From each sample liner, overwrap sheet or plastic bag liner, cut a 3 by 3 inch square with the seam centrally located. For taped seams, cut the square 2 inches larger than the tape. Condition the square and a 3/4 inch mandral for 2 hours at $0^{\circ} \pm 2^{\circ}\text{F}$. Maintaining this temperature, bend the test square in 3 to 5 seconds over the mandral through a 180 degree arc, placing the square with the length of the seam perpendicular to the mandral and the inner face against the mandral. (When the seam has a fin, the fin shall be flat against the outside of the test specimen).

Using normal vision, any visible fracture or separation shall constitute failure of the test and shall be recorded as a defect.

4.4.4 Water resistance.

4.4.4.1 Specimens for water resistance test. Cut test squares as specified in 4.4.3. For taped seams, cut the test squares 2 inches larger than the width of the tape (see figure 4c). Condition the specimen as cut for 2 hours at $73^{\circ} \pm 2^{\circ}\text{F}$ and 50 ± 2 percent relative humidity.

* 4.4.4.2 Method of creasing prior to test. Each specimen, after being further conditioned for 2 hours at $40^{\circ} \pm 2^{\circ}\text{F}$ and 60 ± 5 percent relative humidity, so that corners of the sheet diagonally opposite will be made to coincide. The folded specimen shall then be placed on a smooth, flat base or bottom plate having hinged to itself a top plate capable of matching and surfacing the bottom plate, and the points opposite the fold of the specimen shall be positioned away from the hinge and the fold toward the hinge. The top plate, weighing 10 pounds, shall then be positioned so that its center rests directly above the fold. The plate positioned in this manner shall remain on the specimen for a period of 30 seconds and at the end of this period the specimen shall be removed and the procedure repeated to establish a crease on the opposite side of the sample so that the second crease is formed at right angles to the first crease.

4.4.4.3 Method of dry indicator test. The water resistance of the seams shall be determined by the dry indicator method as follows: A dry indicator (see 4.4.4.4), which changes color due to the permeation of moisture, shall be sprinkled evenly on the barrier material in the center of the sample, over an area approximately the same as will be covered by the watch glass referenced below which will be sealed over the indicator powder. Care should be taken to cover the seam and to apply this reagent as evenly as possible since bunching or piling of the reagent causes different values. A watch glass shall be sealed over the indicator powder using a mixture of 50 percent beeswax and 50 percent rosin. The watch glass sealed over the lap and fin seams (see figures 4a and 4b) shall be 2 inches in diameter. The diameter of the watch glass sealed over the pressure-sensitive adhesive tape seam (see figure 4c) shall be not less than 1 inch greater than the width of the tape. To provide assurance against the wicking of moisture, the cut edges of the barrier material portions of the seams in contact with water in the following test shall be coated with the wax and rosin mixture, except that the edges may be coated only if none of the coating is applied against the heat sealed adhesive, pressure-sensitive adhesive, or pressure-sensitive adhesive tape

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bonds of the seams. The specimen shall be floated on tap water maintained at $73^{\circ} \pm 2^{\circ}\text{F}$ with the seam, the fin, or the tape submerged. The timing required for a definite development of color to appear in the indicator shall be noted and recorded as the penetration time. Any specimen that shows evidence of water passage through the seam as indicated by complete color change in all or part of the dry indicator in less than eight hours shall be regarded as having failed and shall be recorded as a defect.

4.4.4.4 Indicator. The dry indicator shall be made of pure cane sugar, pure soluble starch, and methyl violet as follows: Grind each ingredient separately until it passes through a U. S. Standard No. 100 screen conforming to KR-8-366 and completely dry it in a desiccator over CaCl_2 before making the mixture. When dry, weigh and mix the following proportions by weight:

Sugar	45 ± 2
Soluble starch	5 ± 0.2
Dye	1 ± 0.5

Mix the ingredients by screening repeatedly through a US Standard No. 60 screen conforming to KR-8-366 until the mixture is uniform. Keep the indicator in a desiccator when it is not being used.

5. PREPARATION FOR DELIVERY

5.1 Packing. Packing shall be Level A, B, or Commercial as specified (see 6.2).

- 5.1.1 Level A. Liners and sheets of one description only shall be packed in a snug-fitting fiberboard shipping container conforming to style KSC, grade V2c of FPP-B-636. Each shipping container shall be inclosed in accordance with Method III, waterproofed in accordance with Method V, and reinforced as specified in the appendix of the container specification. Weight of contents of each fiberboard container shall not exceed 65 pounds.
- 5.1.2 Level B. Liners and sheets of one description only shall be packed in a snug-fitting fiberboard shipping container conforming to style KSC, type CF (variety SW) or SF, class domestic, grade 275 of FPP-B-636. Each fiberboard container shall be closed in accordance with method II as specified in the appendix of the container specification. Weight of contents of each fiberboard container shall not exceed 65 pounds.
- 5.1.2.1 When specified (see 6.2), the fiberboard shipping container shall be a grade V3c, V3e or V4e fiberboard box fabricated in accordance with FPP-B-636 and closed in accordance with method III as specified in the appendix of the container specification.

5.1.3 Commercial. Liners and sheets shall be packed in accordance with FED-STD-356, provided the quantity packed per shipping container is the same as that normally used by the supplier for retail distribution.

5.2 Marking.

5.2.1 Military (levels A and B). In addition to any special marking required by the contractor order, shipping containers shall be marked in accordance with MIL-STD-129.

5.2.2 Commercial. In addition to any special marking required by the contract or order, shipping containers shall be marked in accordance with FED-STD-356.

6. NOTES

6.1 Intended use. Case liners are fitted barriers used inside shipping containers: type I case liner is most frequently used; type II liners may be used when a level, rigid surface exists or when the depth of the case liner exceeds 36 inches. Type III overwrap sheets are barriers used around intermediate boxes. Type IV plastic bag liners are used in the same manner as type I and II case liners. The closed and sealed case liner, sealed overwrap sheet or plastic bag liner protect the contents from the entrance of water, dust, dirt or other contamination.

* 6.2 Ordering data. Procurement documents should specify the following:

- (a) Title, number and date of this specification.
- (b) Type, grade, and size of case liners, overwrap sheets or plastic bag liners (see 1.2, 3.1 and 3.4.4).
- (c) Whether barrier materials are to be used with subsistence items (see 3.2).
- (d) Style of case liner required if a preference exists (see 3.5.1.1).
- (e) Selection of the applicable level of packing (see 5.1).
- (f) When weather-resistant grade fiberboard shipping containers are required for level B packing (see 5.1.2.1).
- (g) When barrier closures are to be made with pressure-sensitive tape (see 30.3).

6.3 Marking. Marking requirements set forth in 3.7 are required only on direct procurement of liners and overwrap sheets.

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Custodians:

Army - GJ
Navy - SA
Air Force - 69

Preparing activity:

Army - GJ
Project No. 8135-0453

Review activities:

Army - MD, ME, MA
Navy - AS, YD
Air Force - 71, 80, 82, 84

User activities:

Navy - MC 08
Air Force - 70

APPENDIX

PLACEMENT AND CLOSURE REQUIREMENTS

10. SCOPE

10.1 This appendix contains the requirements and procedures for the closing and sealing of case liners, overwraps and plastic bag liners (see 3.8). Sketches of forming devices and the various types and styles of liners are also included.

20. APPLICABLE DOCUMENTS

- * 20.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of the appendix to the extent specified herein:

SPECIFICATIONS

FEDERAL

- FFP-F-320 - Fiberboard; Corrugated and Solid, Sheet Stock (Container Grade), and Cut Shapes
 FFP-T-60 - Tape: Packaging, Waterproof
 FFP-T-76 - Tape, Pressure-Sensitive Adhesive Paper, Water-resistant, (for Carton Sealing)

STANDARD

MILITARY

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

30. REQUIREMENTS

30.1 Responsible activity. The activity packing the shipping container or inclosing items in overwrap sheets shall be responsible for sealing the case liners or overwrap sheets. Unless specifically required by the contract or order, adhesives or pressure-sensitive adhesive tape for sealing the closure of case liners or overwrap sheets shall not be furnished by the manufacturer.

30.2 Placement of liner in shipping container

30.2.1 Apparatus. The opening and forming of a case liner by use of a wooden jig (see figure 5) consisting of two pieces with rounded edges and corners. The inner segments shape the bottom of the case liner, the outer segments shape the top of the case liner. The opened jig is 1/2 inch smaller in each spreading inside dimension of the liner. Other figures 6 and 6a.

30.2.2 Procedure. The jig is inserted into the case liner (see figures 7 and 8). The formed liner and jig are placed in the box (see figure 9). A liner may also be opened (see figures 6 and 6a). The length and width of the liner shall be smaller than the length and width of the box but the corners shall be rounded, and the sides shall be

30.3 Closing and sealing.

30.3.1 Type I. To close and seal a case liner, the two pieces are brought together as indicated in figure 10 at the top of the container to exhaust excess air. The closure shall be accomplished by applying a cover strip adhesive around the inside of the top edge of the liner. The sealed edge shall be approximately 2 inches wide. Adhesive shall be applied to the lap pressed against the liner. Additionally, to simplify the application of the adhesive, a cover strip, 3/4 inch thick, 6 inches wide, 6 inches longer than the liner, and slotted to hold the seam may be used. The cover strip shall be applied to the top surface of the triangular flap edges of the liner, the flaps shall be folded on the top of the liner. The closure of the style shall be accomplished by removing the cover strip from the adhesive, and pressing them together with knurled rolls (

TABLE VI. Closure for type I liners

Type of seal	Minimum width (inches) of bond	Method (paragraph)
Heat	1/2	3.3.1.1
Adhesive	1-1/2	3.3.1.2
Pressure-sensitive adhesive	3/4	3.3.1.2
Pressure-sensitive tape	3	3.3.1.2

- * 30.3.2 Type II. When the contents do not of themselves afford a smooth, rigid surface for the application of barrier pads, a corrugated fiberboard sheet, 1/2 inch smaller than the case liner, shall be placed over the contents. The fiberboard sheet shall conform to type CF, class domestic, variety SW, grade 125 of FFF-F-320. When intermediate containers affording a smooth, rigid surface are used, the fiberboard sheet may be eliminated. The inner barrier pad is placed on top of contents, fiberboard sheet, or intermediate container, as applicable. The top edge of the liner is coated on the inside with an approximately 2 inch wide strip of adhesive as specified in 3.3.1.2 and is sealed to the inserted pad as shown in figure 2. The lap is covered with adhesive, and the exposed area of the inserted pad is spotted with adhesive at regular intervals. The top pad is then pressed into place against the lap and the inserted pad.
- * 30.3.3 Type III. Overwrap sheets shall be closed and sealed using one of the methods indicated in table VII. When specified in the contract or order, overwraps shall be sealed with strip of class 1 pressure-sensitive adhesive tape conforming to FFF-T-60 or with pressure sensitive adhesive tape conforming to FFF-T-76.

TABLE VII. Closures for overwraps

Type of seal	Minimum width (inches) of bond	Method (paragraph)
Heat	1/2	3.3.1.1
Adhesive	2	3.3.1.2
Pressure-sensitive adhesive	3/4	3.3.1.2
Pressure-sensitive tape	3	30.3.3

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30.3.4 Type IV, grades E and F. The square plastic bag shall be closed by folding down the top opening so that at least three 180° folds are formed. Before folding, excess air shall be removed from the bag. The folds thus formed shall be held in place with tape conforming to FPP-T-60 or FPP-T-76. A strip of minimum 3 inch wide tape shall be applied over the entire width of the closure when packing materials that may sift. A strip of minimum 1 inch wide tape shall be applied across the folds when packing materials that will not sift.

40.1 Examination of closed and sealed case liners, overwraps, and plastic bag liners. The closed and sealed case liners overwraps and bag liners shall be examined in accordance with classification of defects in table VIII to determine compliance with the closing and sealing requirements of this appendix. The sample unit shall be one filled and closed case liner; overwrap or bag liner. The lot size for purposes of determining sample size shall be expressed in units of case liners, overwraps, or bag liners of one type, grade and size. The inspection level shall be S-3 and the AQL expressed as defects per hundred units shall be 2.5 for major defects and 10.0 for total defects. The application of the inspection level and AQLs shall be in accordance with MIL-STD-105.

TABLE VIII. Examination for closing and sealing

Examine	Defect	Classification	
		Major	Minor
Closing and sealing (all types)	Overlaps less than specified each type seal, as applicable (see figure 4)		X
Type I liner	Closure seals not type specified (see table VI)	X	
	Width of seals (bead) less than specified (see table VI)		X
	Seals not continuous or complete over entire length of seams	X	
	Excess air not exhausted from liner		X
	Triangular flaps not sealed in place		X
Type II liner	Closure not accomplished by specified method (see 30.3.2)	X	
	Adhesive not as specified (see 3.1.2)		X
	Barrier pad missing when required (see 30.3.2)	X	

TABLE VIII. Examination for closing and sealing (cont'd)

Examine	Defect	Classification	
		Major	Minor
Type III sheet	Closure seals not type specified (see table VII)	X	
	Width of welds (bond) less than specified (see table VII)		X
	Closure seals not continuous or complete over entire length of sheet	X	
Type IV bag	Top closure not folded as speci- fied	X	
	Folded closure not secured with tape	X	
	Excess air not removed from bag		X
Workmanship	Tear, hole, or open seam or seal Not clean	X	X

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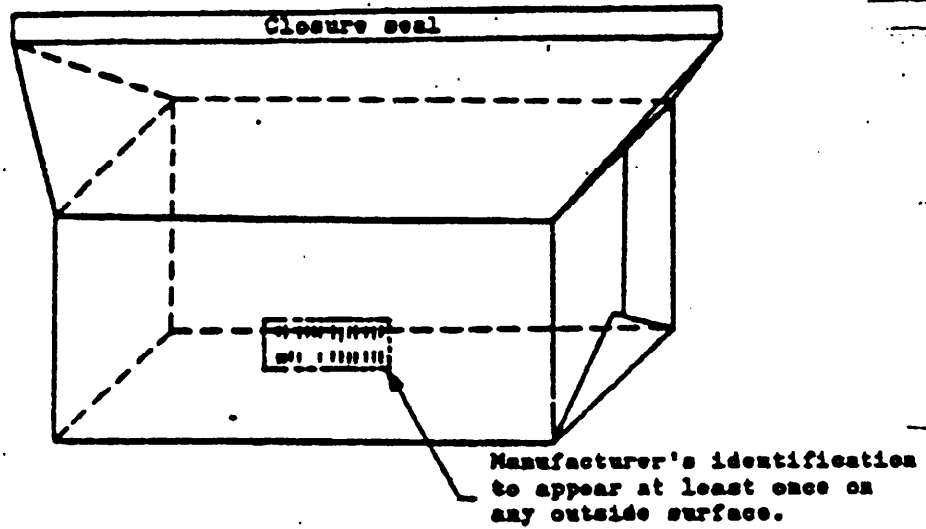


Figure 1. - Type I, high top construction case liner, any style.

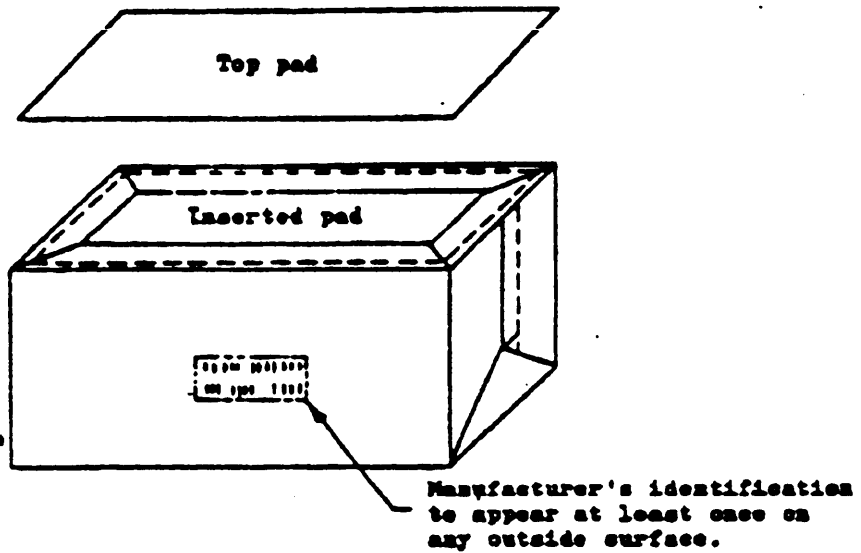


Figure 2. - Type II, double-top-pad construction case liner, any style.

Style A liner

Greased or scored to established dimensions (see 3.4.3).

Flat
(as furnished by supplier)

After forming

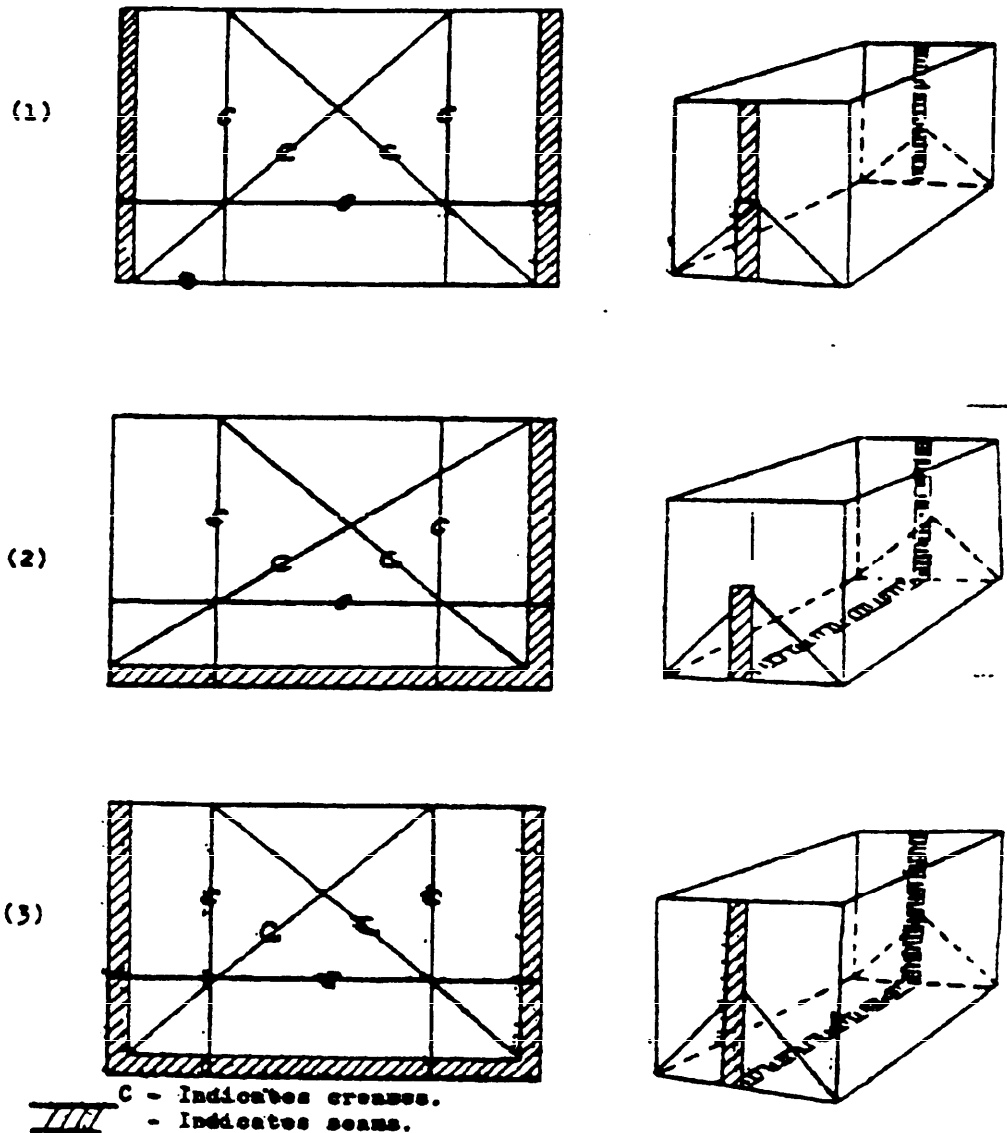


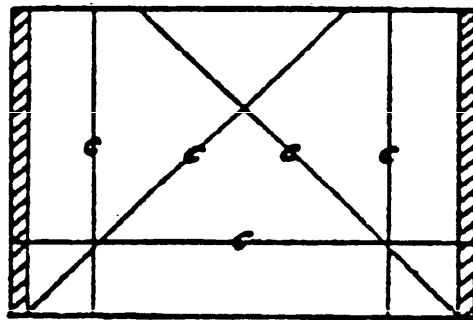
Figure 3. - Methods of fabrication for styles of type I or II case liners.

Style A4 liner

Creased or scored to established dimensions (see 3.4.3), and
refolded for shipping and ease of opening and inserting.

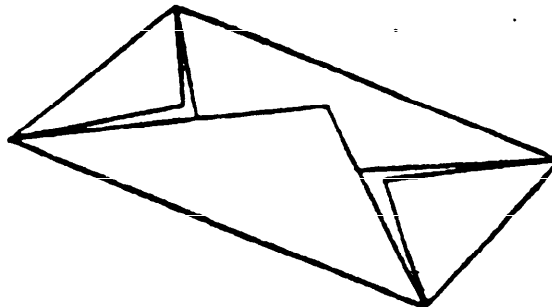
Flat

(4) a

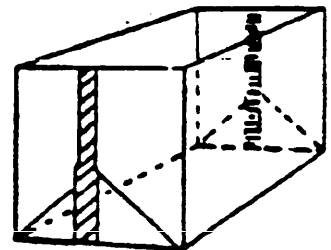


Folded (see 3.4.2)
(As furnished by supplier.)

(4) b



After forming



(Supplied only where depth of bag when set up is less than width.)


-  C - Indicates creases.
- Indicates seams.

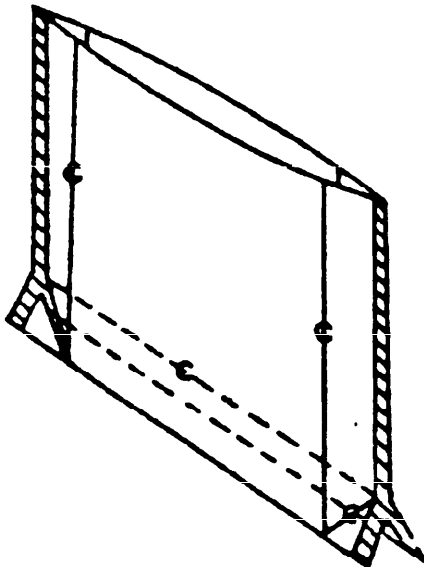
Figure 3a. - Methods of fabrication for styles of type I or II case liners.

Style B liner

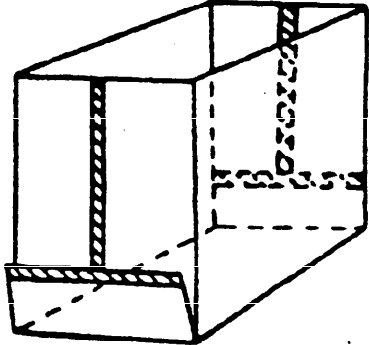
Creased or scored to established dimensions (see 3.4.3)

Flat

(As furnished by supplier.)



After forming



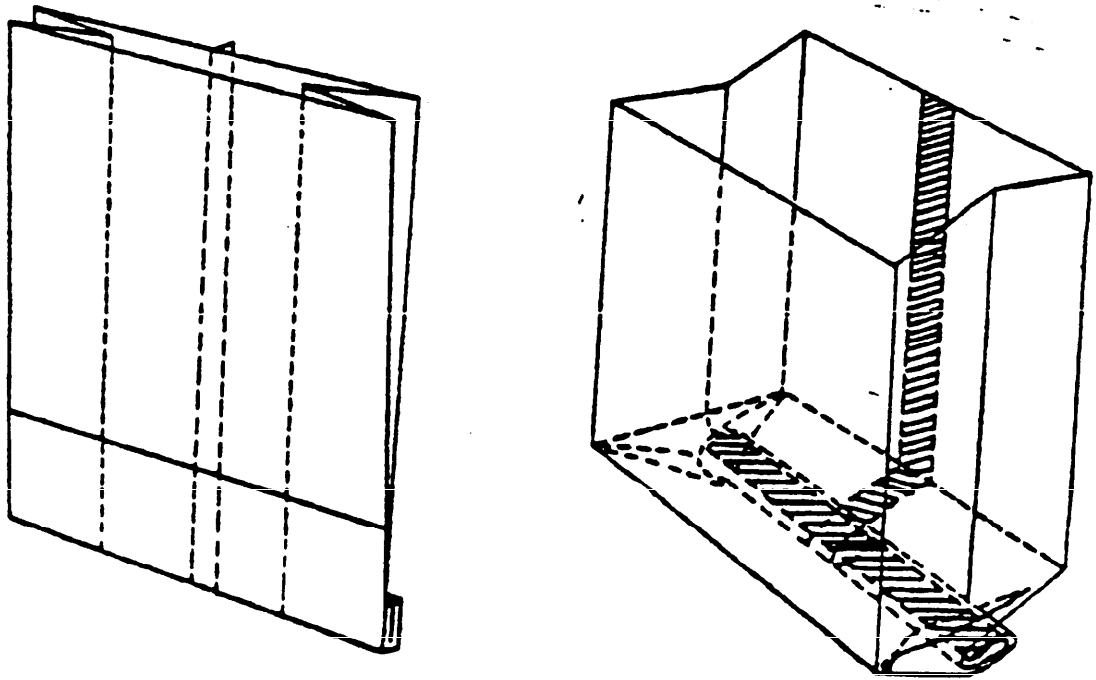
C - Indicated creases

 - Indicates seams.

Figure 3b. - Methods of fabrication for styles of type I or II case liners.

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Style C liner
Center and bottom seams
Gusseted tube with double turn over bottom.
Cressed or scored to established dimensions (see 3.4.3).



 - Indicated seams

Figure 3c. - Methods of fabrication for styles of type I or II case liners.

Style D liner
Satchel bottom style.
Cressed or scored to established dimensions (see 3.4.3).

C - Indicates creases.
/// - Indicates seams.

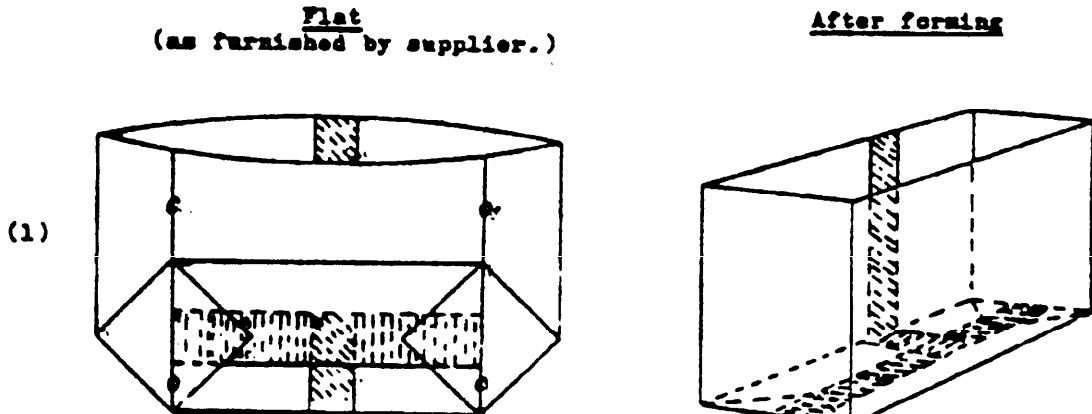


Figure 3d. - Methods of fabrication for styles of type I or type II case liners.

Style E liner
Automatic satchel bottom style.
Cressed or scored to established dimensions (see 3.4.3).

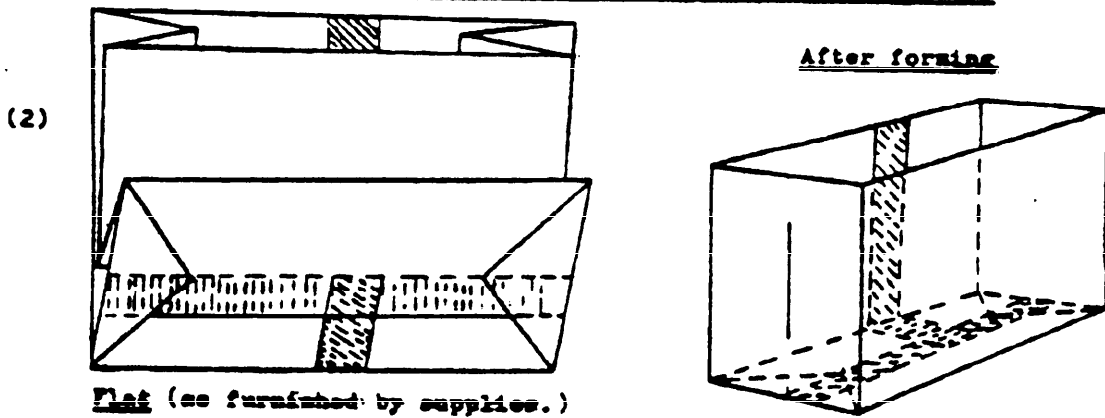
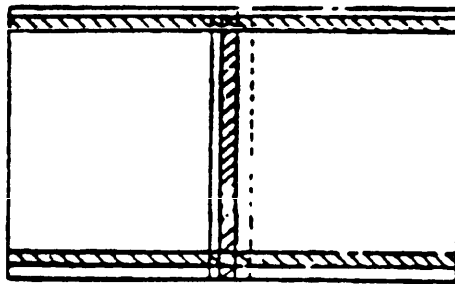


Figure 3e. - Methods of fabrication for styles of type I or II case liners.

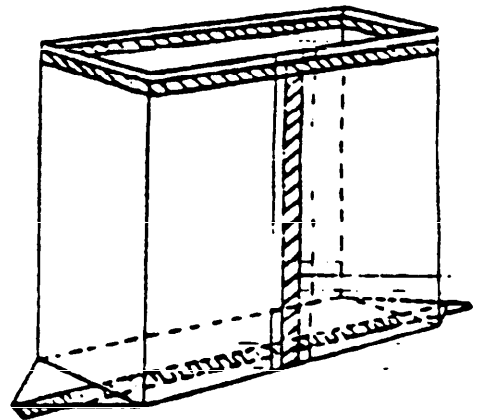
Style F liner

Inside hot melt or other type of pressure-sensitive adhesive seam for closure protected with a strippable covering.

Flat
(As furnished by supplier.)



After forming




 - Indicates seams.

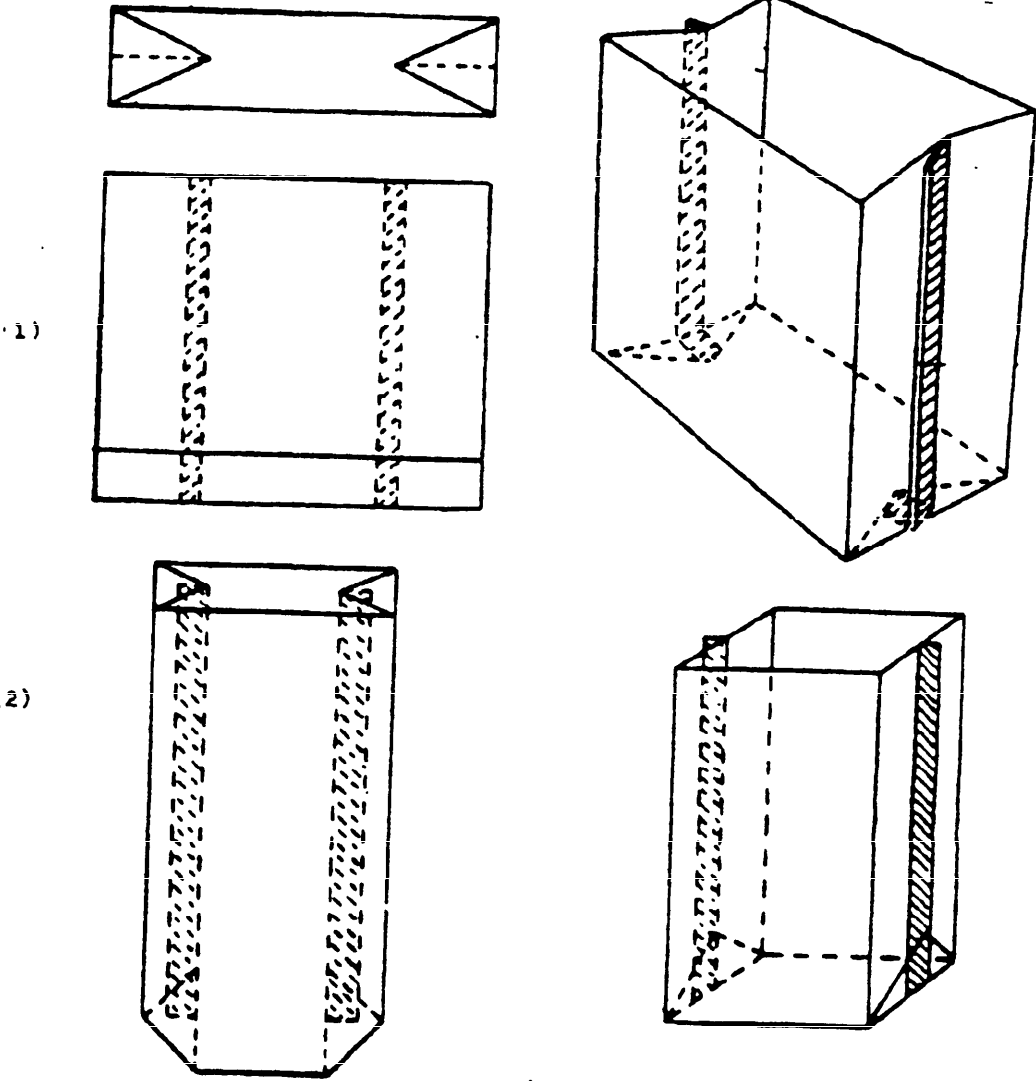
Figure 3f. - Methods of fabrication for styles of type I or II case liners.

Style G liner

Creased or scored to established dimensions (see 3.4.3).

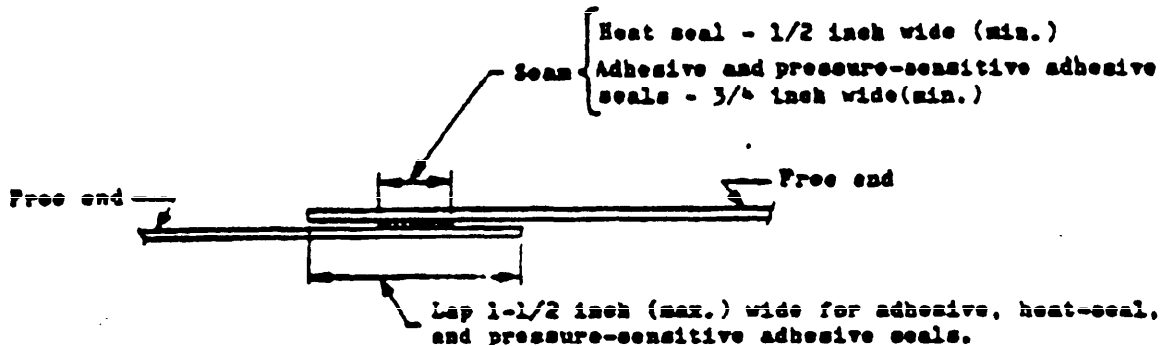
Flat
(As furnished by supplier.)

After forming

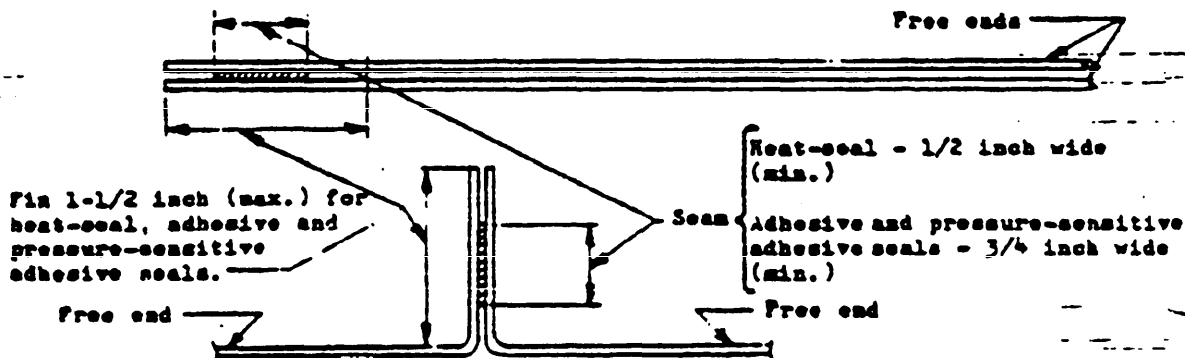


//// - Indicates seams

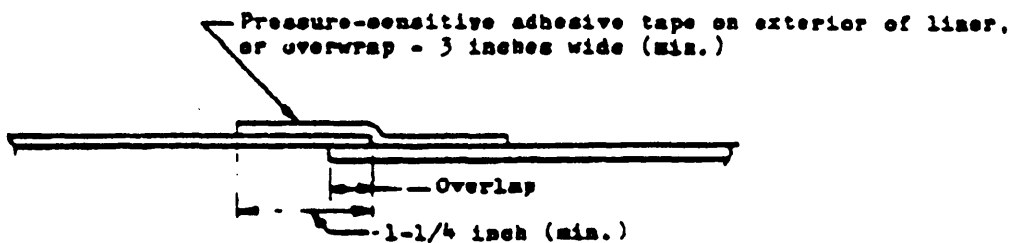
Figure 3g. - Methods of fabrication for styles of type I or II case liners.



a. Lap seam



b. Fin seam



c. Pressure-sensitive adhesive tape seam

Figure 4. - Seam Construction (see 3.6)

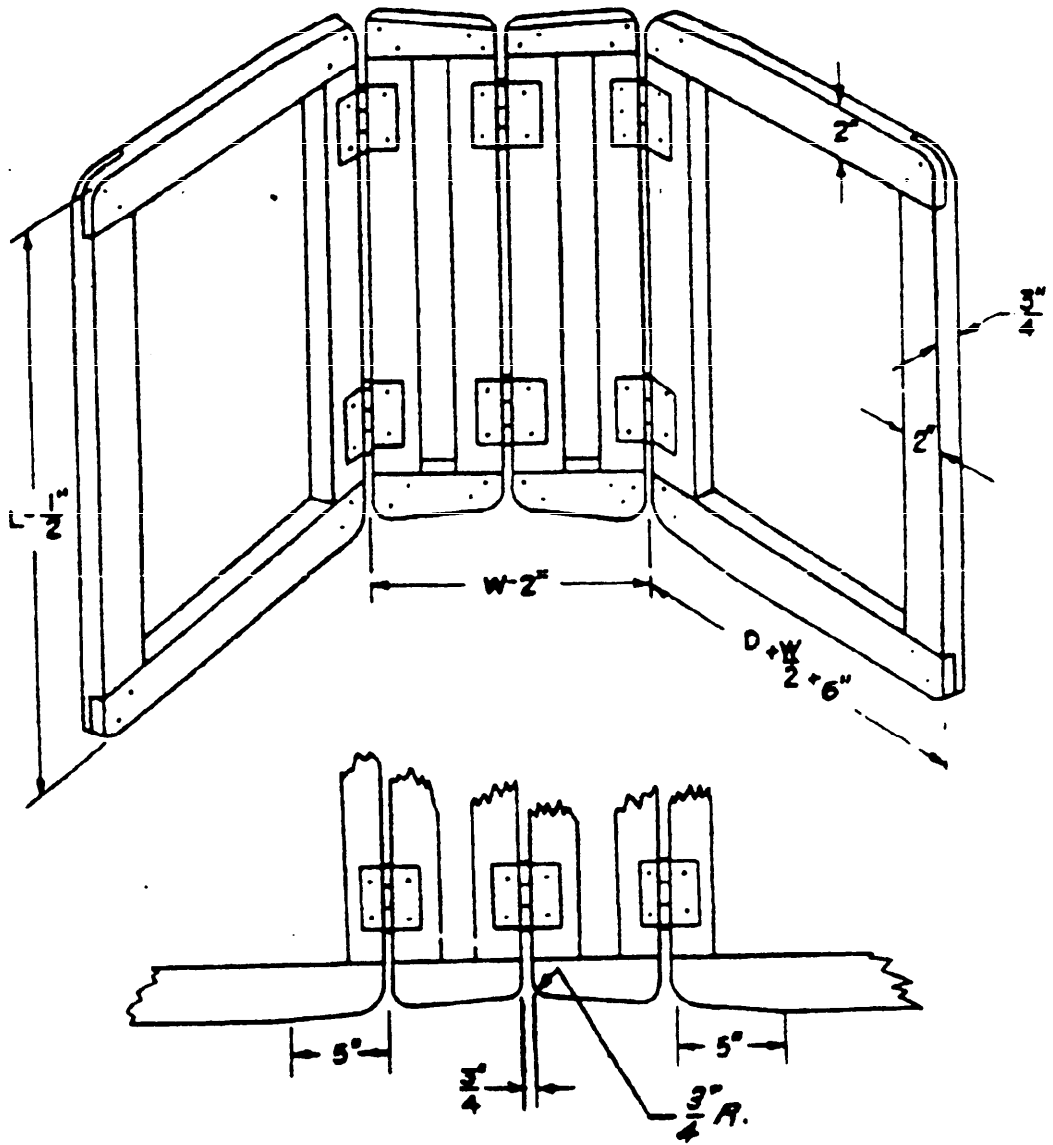
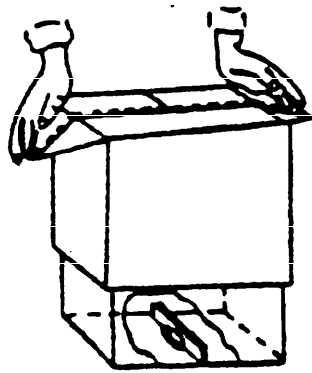
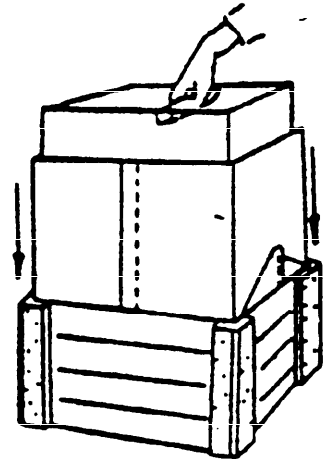


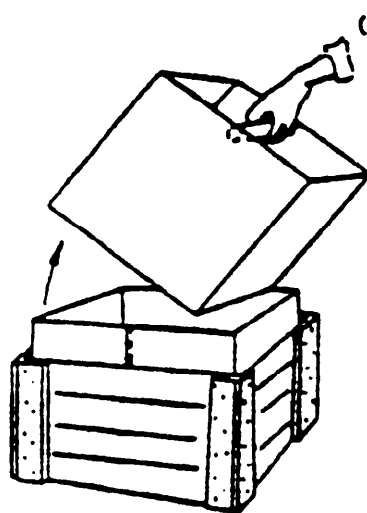
Figure 5. - Jig for opening case liners.



(1). Invert mandrel, slip liner over mandrel, form ears.



(2). Turn mandrel, place in shipping container leaving liner on mandrel.



(3). Remove mandrel, leaving formed liner in container.

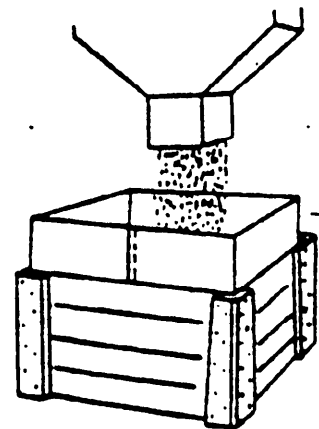
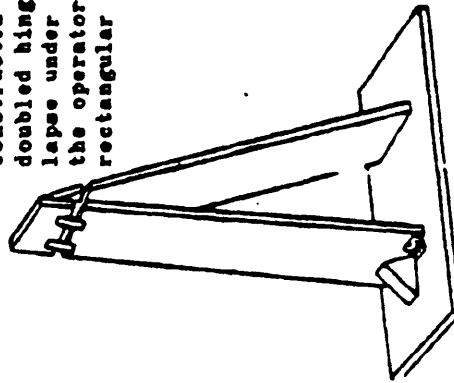


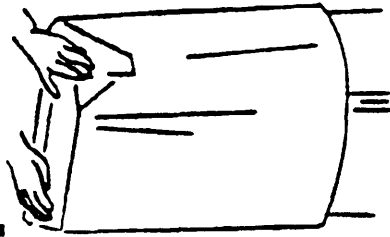
Figure 6. - Method of forming pouch-type liner over mandrel.

(1) Closed position of forming device

to be used. This form should be constructed with the top section doubled hinged so that it will collapse under light pressure from the operator's hands to form a rectangular or square top.

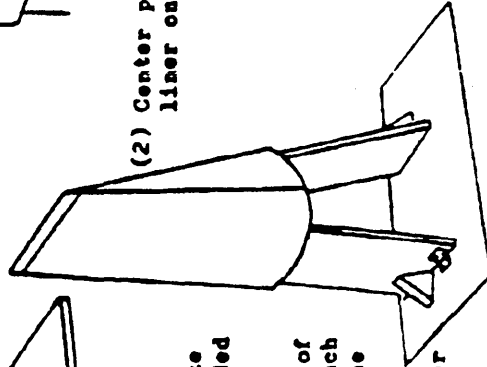


(3) Press down on top with hands to form liner into shape. Fold protruding ears over and down along side of liner.



IMPORTANT: This forming device must be made to correct dimensions to accommodate a given size box or carton. It is recommended that the device when opened measure approximately 1/2 inch smaller than the inside length of the outer container, and 1/4 inch less than the inside width. The height should be at least 10 inches greater than the total of width and height of the outer container.

(2) Center pressure-sensitive liner on forming device.



(4) While holding folds in position, remove liner from form and insert into outer container. Load contents into liner. (After loading follow detail instructions for sealing pressure-sensitive liners.)

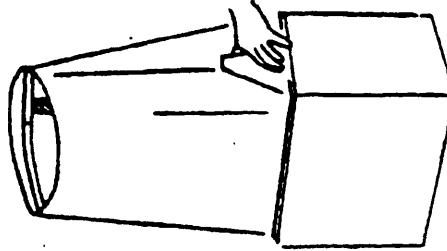


Figure 6a. - Detail for performing pressure-sensitive liners of flat pouches.

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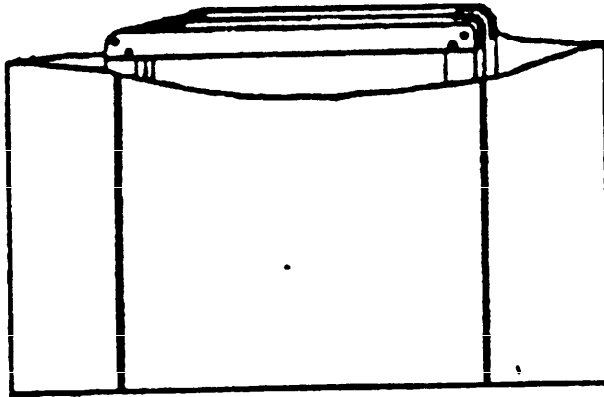


Figure 7. - Inserting folded jig in case liner.

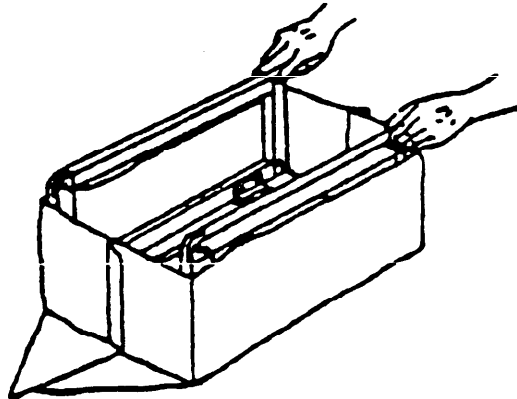


Figure 8. - Method of opening jig in case liner.

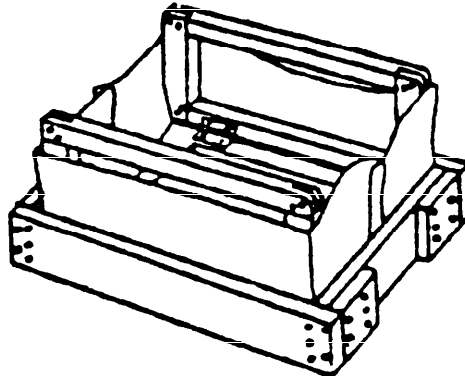
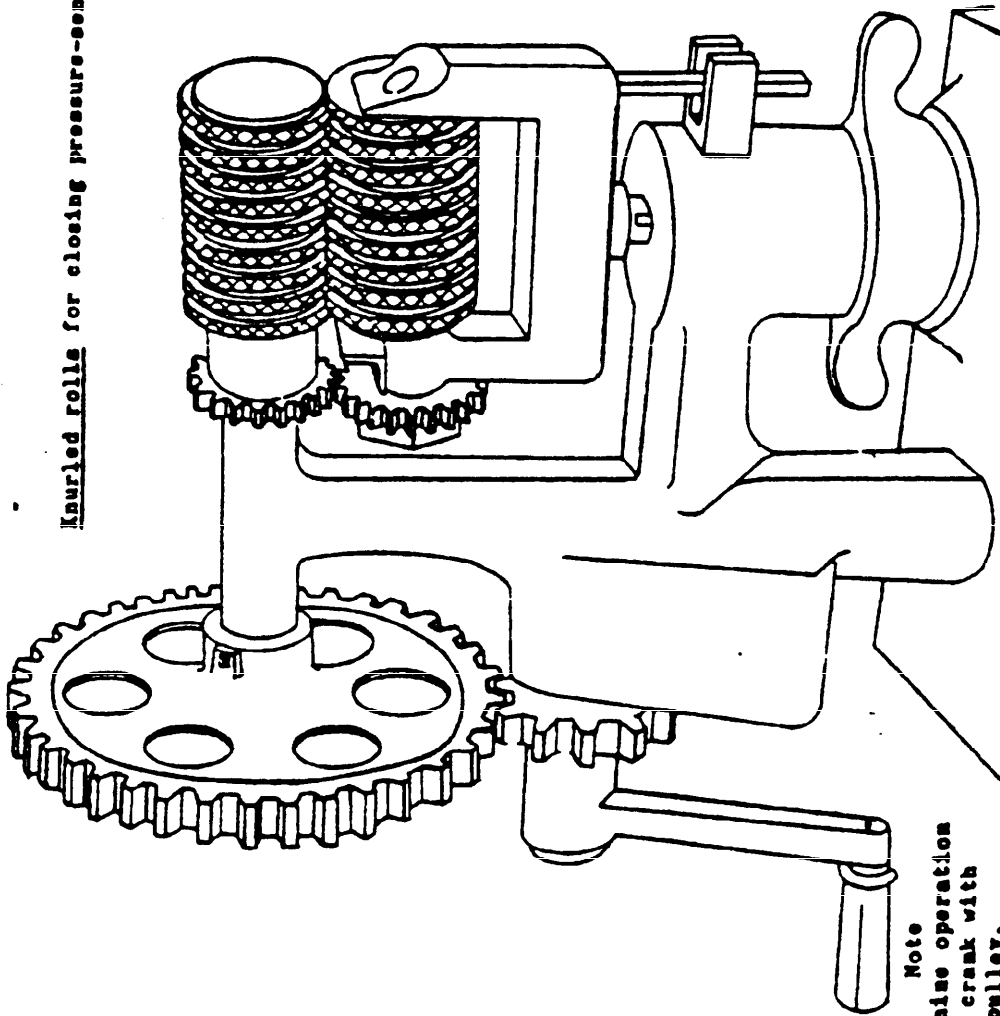


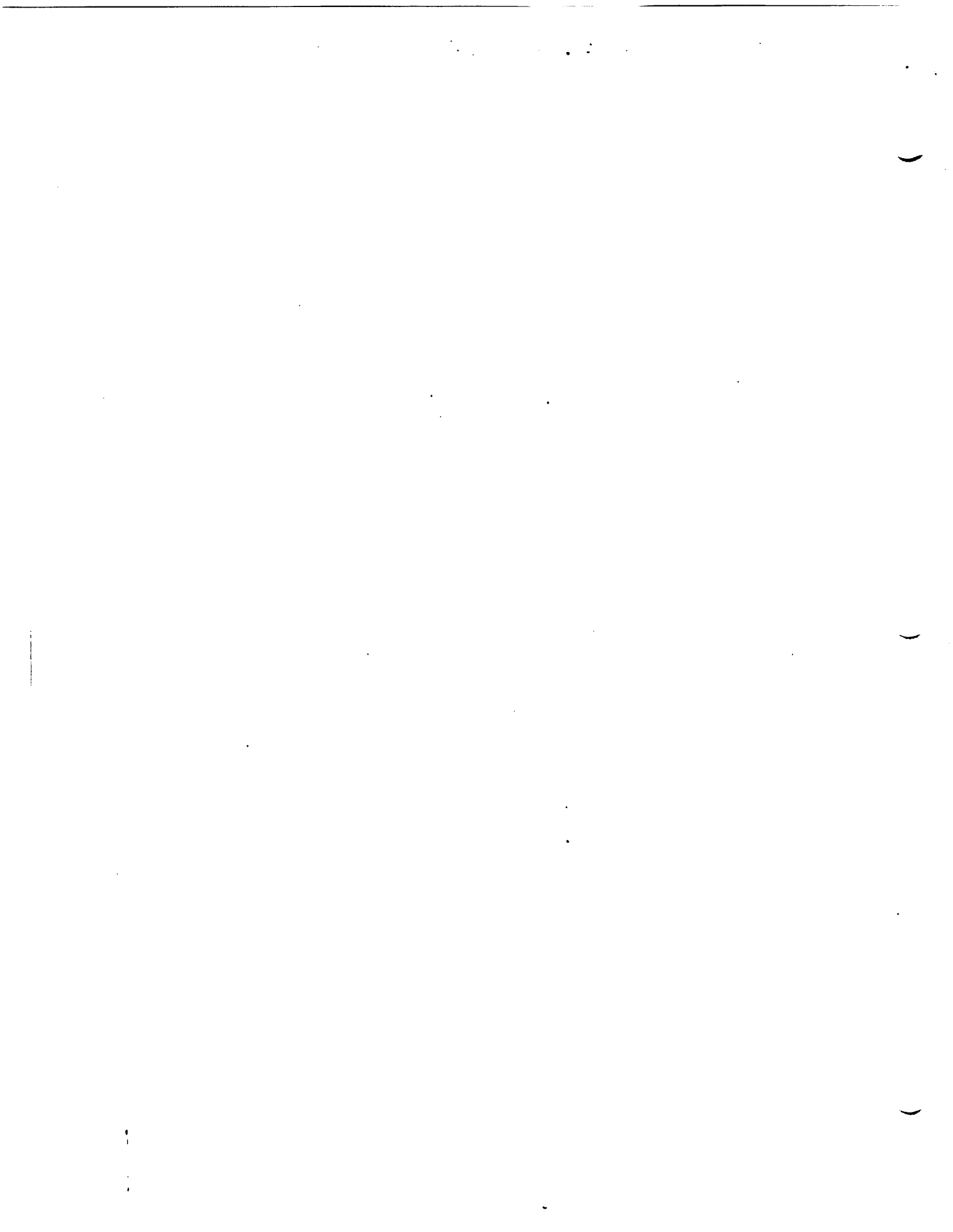
Figure 9. - Inserted opened jig with case liner in box.

Knurled rolls for closing pressure-sensitive seals.



Note
For machine operation
replace crank with
V-belt pulley.

Figure 10. - Hand or motor-driven knurled rolls.



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