Williams-Sonoma, Inc.

Corrugated Container Requirements

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1. PURPOSE

The purpose of this specification is to provide vendors with the basic construction, performance and application requirements for corrugated containers used for containing and protecting Williams-Sonoma, Inc. (WSI) products. Included in this specification is the identification, construction, and closure methods of the most commonly used corrugated containers.

2. APPLICATION

This specification applies to all corrugated containers in all applications, unless otherwise specified, for all Williams-Sonoma, Inc. business concepts.

3. CORRUGATED CONSTRUCTION AND PERFORMANCE

This section describes the general method of corrugated fiberboard construction:

3.1. Singlewall Corrugated

Singlewall corrugated fiberboard is made up of 3-plys consisting of 2 Liners and 1 medium (Liner/Medium/Liner):

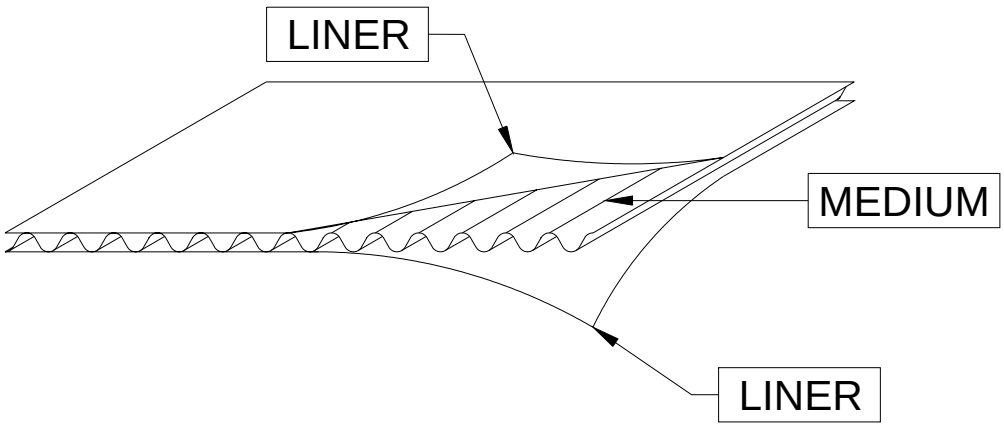

Figure 1. Singlewall Construction

3.2. Doublewall Corrugated

Doublewall corrugated fiberboard is made up of 5-plys consisting of 3 Liners and 2 mediums (Liner/Medium/Liner/Medium/Liner):

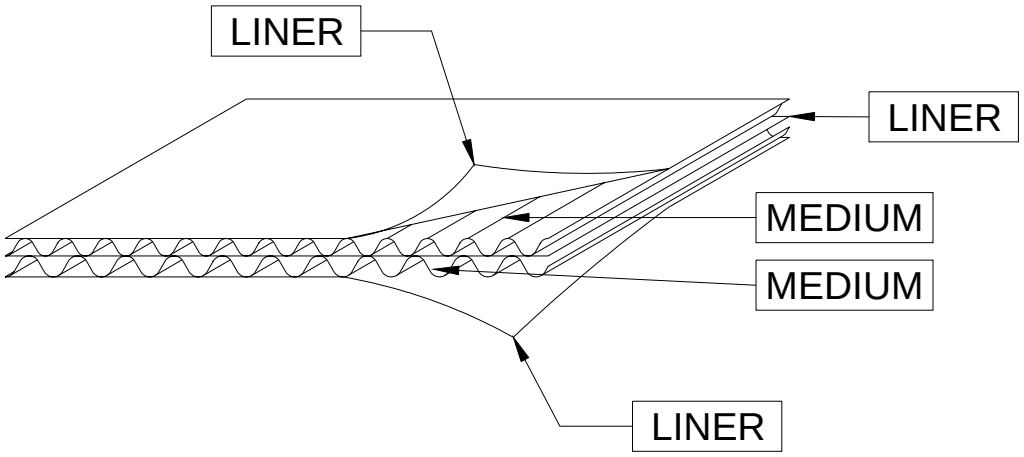

Figure 2. Double-wall Construction

3.3. Performance Requirements

The following table indicates the minimum performance requirements for various grades of corrugated board used for master cartons or when specified:

Products	Board Type	Minimum Burst Test	Edge Crush Test	Minimum Caliper
Mail Order Conveyable and Retail Distribution Lot Quantity Inner Cartons	Single-wall (B,C, and E-Flute)	200 lb/in^2 (1379 kPa)	32 lb/in (5.7 kg/cm)	**B**: .115 in. (2.92 mm) **C**: .148 in. (3.76 mm) **E**: .070 in. (1.78 mm)
Soft Lines	Doublewall (B/C Flute)	150 lb/in^2 (1034 kPa)	38 lb/in (6.8 kg/cm)	.255 in. (6.48 mm)
Hardlines	Doublewall (B/C Flute)	200 lb/in^2 (1379 kPa)	42 lb/in (7.5 kg/cm)	.260 in. (6.60 mm)
Mirrors, Chandeliers, and All Furniture Products	Doublewall (B/C Flute)	275 lb/in^2 (1896 kPa)	48 lb/in (8.6 kg/cm)	.260 in. (6.60 mm)

Table 1. Corrugated Board Performance Requirements

*Reference Test Procedure TAPPI T810 (Burst Strength) and TAPPI T811 (Edge Crush) for information on how to perform corrugated test.

3.4. Stacking Limitations

There are two types of loads for the purposes of stacking. These are Supportive and Non-supportive loads. Supportive loads are typically hard line items that help provide support to a corrugated container during stacking. Non-supportive loads are products that provide little or no structural support to the carton. These are typically soft line items, but can also be hard line items.

Material	Stack Weight Limit Non-Supportive Load
Singlewall 200 lb/in^2 (1379 kPa)	20 lbs. (9 kg)
Doublewall 150 lb/in^2 (1034 kPa)	55 lbs. (25 kg)
Doublewall 200 lb/in^2 (1379 kPa)	60 lbs. (27 kg)
Doublewall 275 lb/in^2 (1896 kPa)	75 lbs. (34 Kg)
Doublewall 350 lb/in^2 (2413 kPa)	90 lbs. (41 Kg)

Table 2. Non-Supportive Load Stack Weight Limits

Material	Stack Weight Limit Supportive Load
Singlewall 200 lb/in^2 (1379 kPa)	100 lbs. (45.5 kg)
Doublewall 150 lb/in^2 (1034 kPa)	275 lbs. (125 kg)
Doublewall 200 lb/in^2 (1379 kPa)	300 lbs. (136.5 kg)
Doublewall 275 lb/in^2 (1896 kPa)	375 lbs. (159 Kg)
Doublewall 350 lb/in^2 (2413 kPa)	450 lbs. (204.5 Kg)

Table 3. Supportive Load Stack Weight Limits

These weight limits take into account various environmental factors and are to be used as a guideline only for selecting burst strength for a carton. The stack weight on the bottom carton in a sea container or trailer should not exceed the stack weight limit supportive/non-supportive load value identified in the appropriate table above. If a product is excessively heavy and the stack weight exceeds the weights in the above tables, contact Packaging Engineering for assistance.

4. CARTON MATRIX AND GENERAL USAGE

The following table identifies the most common carton styles, their abbreviations, and typical usage:

Carton Style **(Int'l Fiberboard Case Code)**	**Acronym** **(Case Code)**	**Uses**
Regular Slotted Container (0201)	RSC (0201)	Most common carton style, used for a variety or products where the product can be easily removed from the carton without back strain.
Full Overlap Slotted Container (0203)	FOL (0203)	Uses similar to that of an RSC, but often used for heavier products, or where potential damage from box knives may result when using an RSC. Also used when additional side stacking strength is desired.
Half Slotted Container (0200)	HSC (0200)	Used together with a Design Style cover, whereby the HSC would be slid off the top of the product enabling easier access to the product. Typically used for smaller furniture products where an RSC would create difficult product removal, such as small bedside tables and night stands.
Five Panel Folder (0410)	FPF (0410)	Long narrow products with small widths and depths. Product Examples: Umbrellas, Curtain Rods, Bed Side Rails/Slats
One Piece Folder (0401)	OPF (0401)	Used for products that have similar length and width dimensions, but have short depths. Products such as mirrors, picture frames, and books.
Full Telescope Design Style Container (0301)	FTD (0301)	Used for products that have short depths, but where a FPF or OPF does not make sense due to corrugated usage or ease of packing. Products such as Headboards, and Dining Tables are typical.
Design Style Container with Cover (0306)	DSC (0306)	Similar uses as that for the FTD, but where high stacking strength is not needed. This would typically be used only for lightweight products.
Double Cover Container (0310)	DC (0310)	Used for large products such as dressers, armoires, media centers, where an HSC could not easily be slid over the top of the product.
Roll End Tuck Top Mailer (Die-cut) (0470)	RETT (0470)	Smaller products where ease of packing and product access is desired.
Roll End Tuck Top with Dust Flaps Mailer (Die-cut)	RETT/DF	Smaller products where ease of packing and product access is desired, in addition to greater stacking strength.
Roll End Lock Front with Dust Flaps Mailer (Die-cut) (0427)	RELF/DF (0427)	Smaller products where ease of packing and product access is desired, in addition to greater stacking strength. This mailer is used where an internal tuck interferes with the product.

Table 4. Container Styles

5. CLOSURE MATERIALS

5.1. Tape

5.1.1. Clear Polypropylene Tape

When Clear Tape is recommended, use 3M Scotch® Brand 373 Polypropylene Tape or equivalent. Available in widths of 2 inch (48 mm) and 3 inch (72 mm).

5.1.2. Water Activated Reinforced Paper Tape

When Reinforced Paper Tape is required, use Inter Tape Polymers Central Products Brand® #260 Kraft Tape or equivalent. Available in 3 inch (72mm) widths.

5.2. Strapping

5.2.1. Plastic Strapping

When plastic strapping is required, use Signode® Tenax® polyester strapping or equivalent. The strapping should be 0.5 inch (12 mm) with a strength rating of 500 lb. (2220 N) at minimum. Secure strapping with a tension weld, do not use metal strapping seals.

5.2.2. Rigid Plastic Edge Protectors

For all plastic strapping, use rigid edge protectors. Use Signode® P41 plastic edge protectors or equivalent.

5.2.3. Steel Strapping is not allowed.

5.2.4. Strapping should be spaced approximately 6 inches (15 cm) from the edge of the cartons and spaced no more than 24 inches (61 cm) apart.

2 straps at minimum widthwise and 2 straps lengthwise across the carton opening are required. Exception: If one of the carton dimensions to be strapped is less than 24 inches (61 cm), then no strapping in that direction is required.

6. REGULAR SLOTTED CONTAINERS

Regular Slotted Containers are the most widely used type of container. Corrugation direction should be aligned with the shipping orientation. Typical corrugation direction is shown in Figure 3.

6.1. RSC Layout

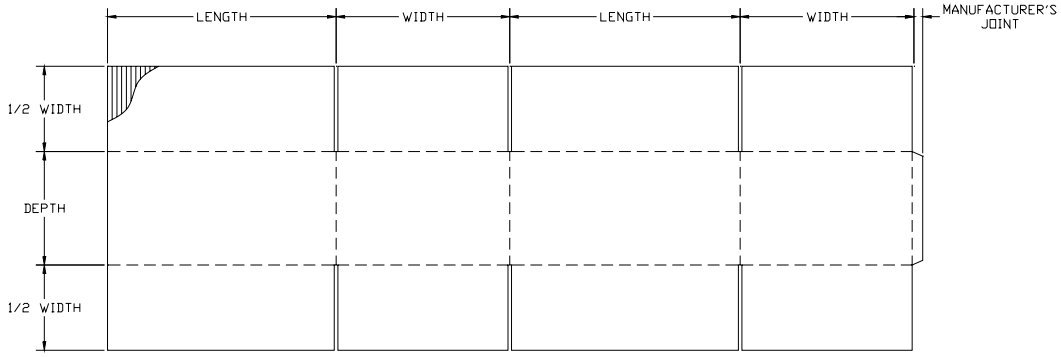

Figure 3. Typical RSC Layout

6.2. Manufacturer's Joint

The manufacturers joint should be an inside joint, and be secured with either glue or staples. If staples are used, the distance between staples must not exceed 1.5 in. (38 mm).

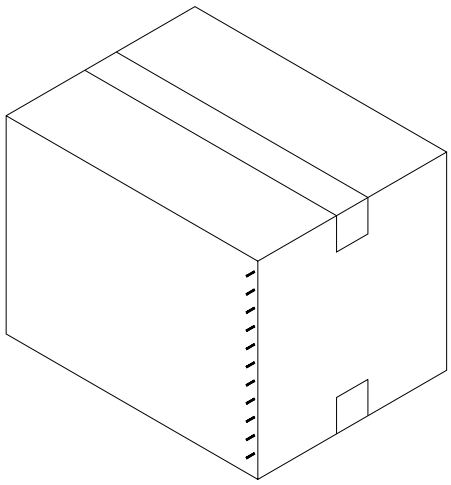

Figure 4. Inside Manufacturers Joint

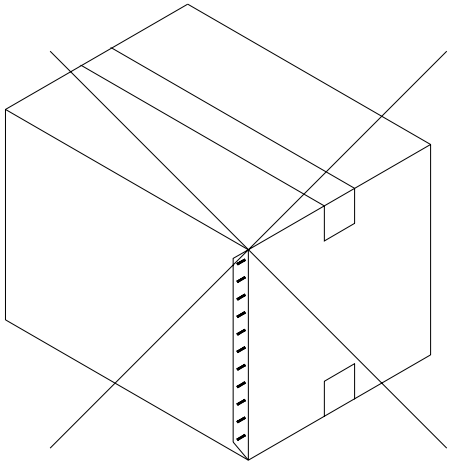

Figure 5. Outside Joint – Do Not Use Unless Otherwise Specified

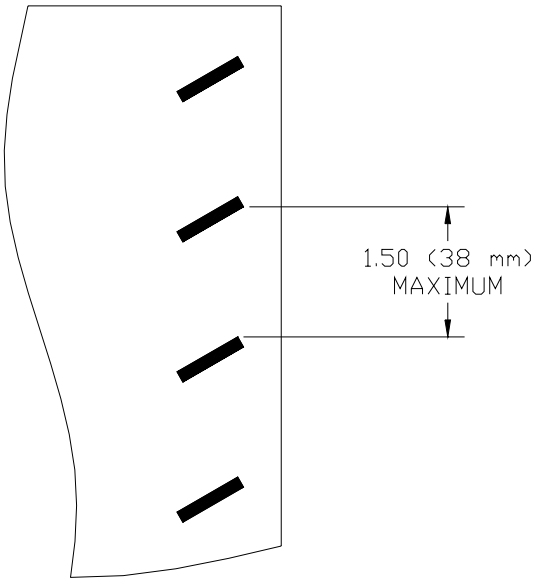

Figure 6. Stitch Joint Spacing

6.3. RSC Closure

Regular slotted containers shall be closed with tape. The following table lists the closure materials and methods to be used for RSC's based on packaged weight:

Packaged Product Weight	Tape	Taping Method
0-5 lbs. (0-2.6 kg)	2 inch (48 mm) polypropylene tape	Single Strip (See Figure 7)
6-20 lbs. (2.7-9.4 kg)	3 inch (72 mm) polypropylene tape	Single Strip (See Figure 7)
or	2 inch (48 mm) polypropylene tape	H-Pattern (see Figure 8)
21-40 lbs. (9.5-18.5 kg)	3 inch (72 mm) polypropylene tape	Single Strip (See Figure 7)
or	3 inch (72 mm) reinforced paper tape	Single Strip (See Figure 7)
41-60 lbs. (18.6-27.6 kg)	3 inch (72 mm) polypropylene tape	Sealed H-Pattern (see Figure 9)
or	3 inch (72 mm) reinforced paper tape	H-Pattern (see Figure 8)
61-80 lbs. (27.7 + kg)	3 inch (72 mm) reinforced paper tape	Sealed H-Pattern (see Figure 9)

Table 5. RSC Closure Material and Method

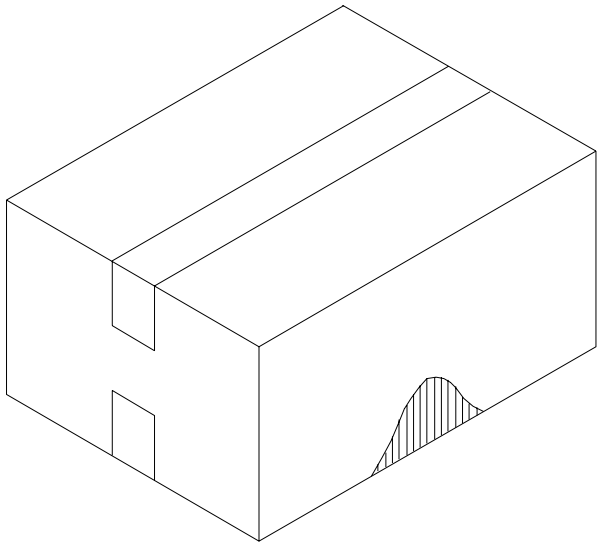

Figure 7. RSC Single Strip Taping Closure

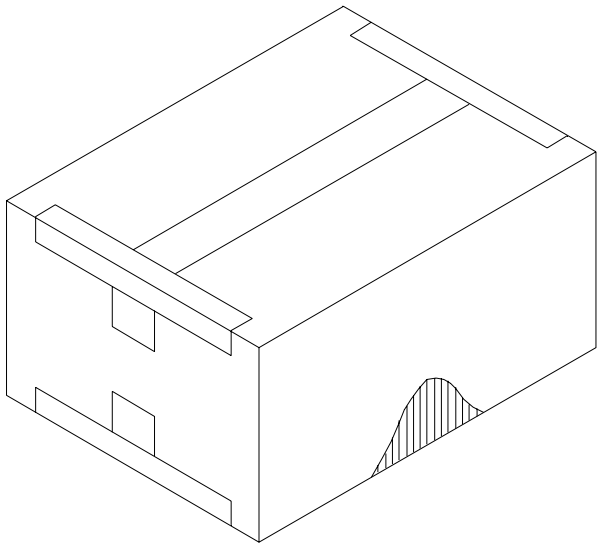

Figure 8. RSC H-Pattern Taping Closure

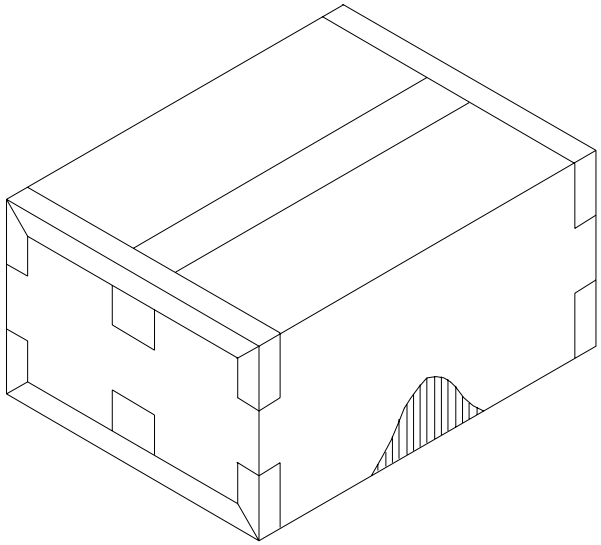

Figure 9. RSC Sealed H-Pattern Taping Closure

7. FULL OVERLAP SLOTTED CONTAINERS

Full Overlap Slotted (FOL) containers are used when additional strength is required for heavier items, and where additional side stacking strength may be needed. In addition to this, an FOL container usually prevents product damage that occurs when opening cartons with box knives. Corrugation direction is typically aligned with stacking orientation and box depth.

7.1. FOL Layout

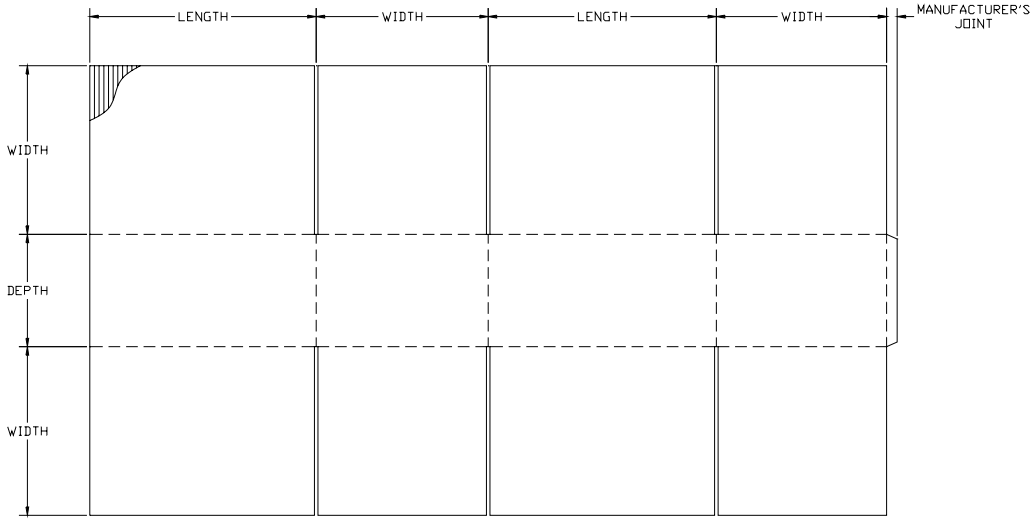

Figure 10. FOL Layout

7.2. Manufacturer's Joint

Refer to Section 6.2 for requirements.

7.3. FOL Closure

Full Overlap containers shall be closed with tape or with plastic strapping. The following table lists the closure materials and methods to be used for FOL's based on packaged weight:

Packaged Product Weight	Closure Material	Closure Method
0-10 lbs. (0-2.6 kg)	2 inch polypropylene tape	Strip Taping (see Figure 11)
11-50 lbs. (2.7-18.5 kg)	3 inch polypropylene tape	Standard Strip (see Figure 12)
51-80 lbs. (18.6-36.7 kg)	3 inch reinforced paper tape	Standard Strip (see Figure 12)
81+ lbs. (36.8+ kg)	Plastic strapping	2-Way strapping with Edge Protectors (see Figure 13)

Table 6. FOL Closure Material and Method

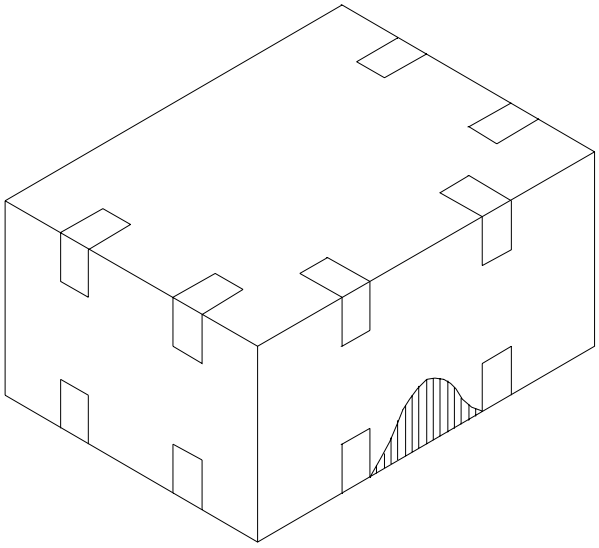

Figure 11. FOL Strip Taping Closure

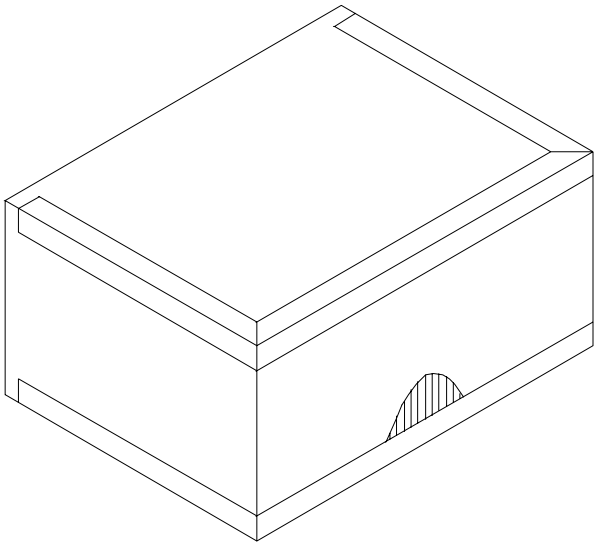

Figure 12. FOL Standard Strip Taping Closure

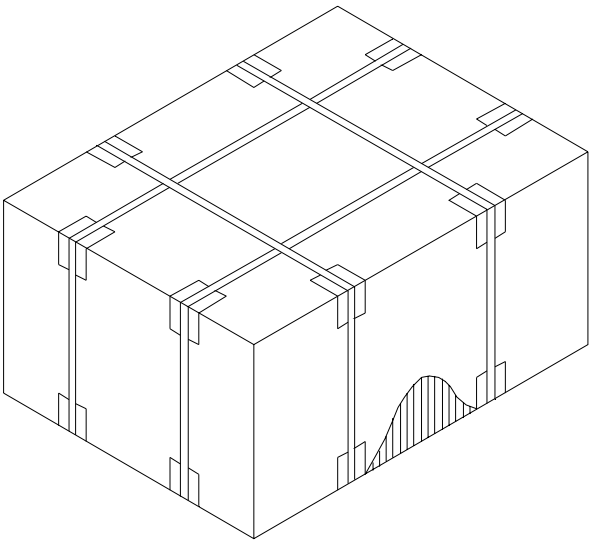

Figure 13. FOL Strapping Closure

8. HALF SLOTTED CONTAINERS

Half Slotted containers are typically used as telescoping HSC's or in combination with a single Design Style Tray (See Section 11). They are typically used for heavier products, products with a larger depth compared to FTD's, and product that require greater stacking strength due to the multiple layers of corrugated for the sidewalls of the container.

8.1. HSC Layout

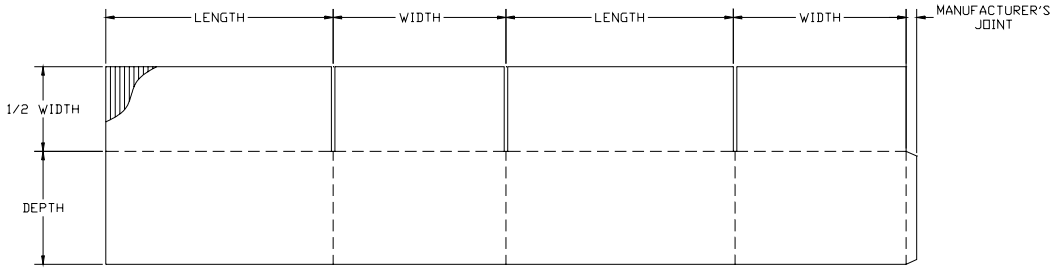

Figure 14. HSC Top Layout

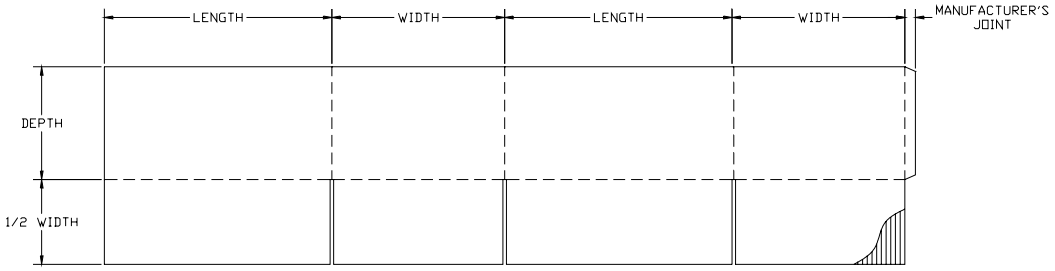

Figure 15. HSC Bottom Layout

8.2. Manufacturer's Joint

Refer to Section 6.2 for requirements.

8.3. HSC Closure

Refer to Table 5 RSC Closure Material and Method for individual HSC closure materials and methods. Note: If two HSC's are used as a shipping container, (telescoping HSC's) refer to Table 9 DST Closure Material & Methods for final closure. If the HSC is used with a DST that is not full telescoping, refer to Table 10.

9. FIVE PANEL FOLDERS

Five Panel Folders are typically used only for long items the have short widths and depths such as curtain rods, umbrella's, and bed side rails.

9.1. FPF Layout

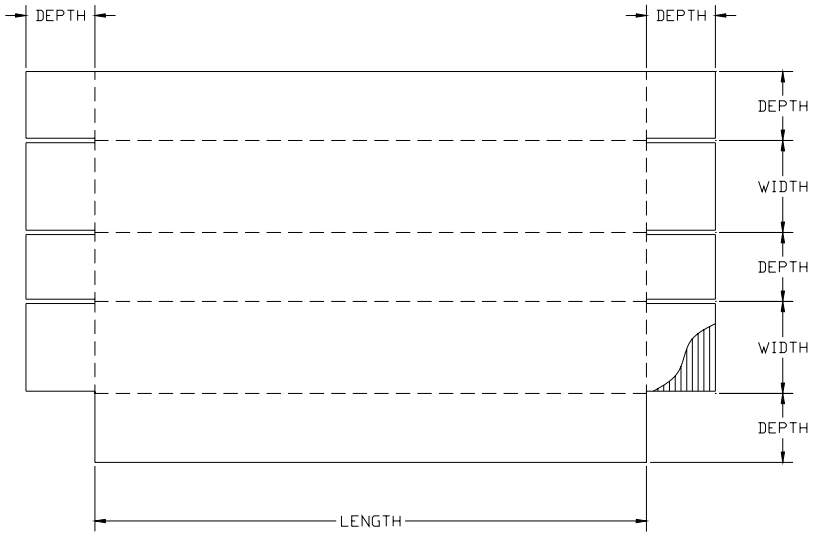

Figure 16. FPF Layout

9.2. FPF Closure

Five panel Folders shall be closed with Tape. For heavy items, tape and plastic strapping shall be used. The following table lists the closure materials and methods to be used for FPF's based on packaged weight:

Packaged Product Weight	Closure Material	Closure Method
0-5 lbs. (0-2.6 kg)	2 inch (48 mm) polypropylene tape	Taping (see Figure 17)
6-40 lbs. (2.7-18.5 kg)	3 inch (72 mm) polypropylene tape	Taping (see Figure 17)
41-60 lbs. (18.6-27.6 kg)	3 inch (72 mm) reinforced paper tape	Taping (see Figure 17)
61+ lbs. (27.7+ kg)	3 inch (72 mm) reinforced paper tape and plastic strapping	Taping and strapping with Edge Protectors (see Figure 18)

Table 7. FPF Closure Material and Method

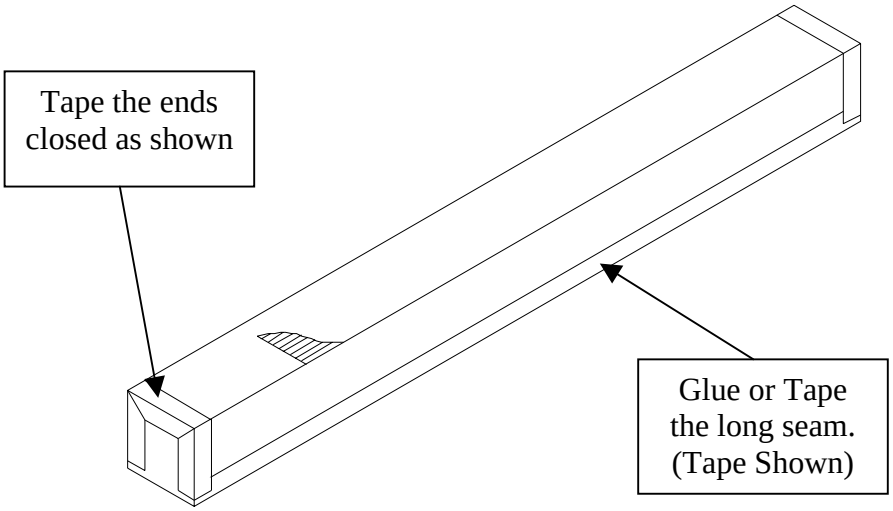

Figure 17. FPF Taping Closure

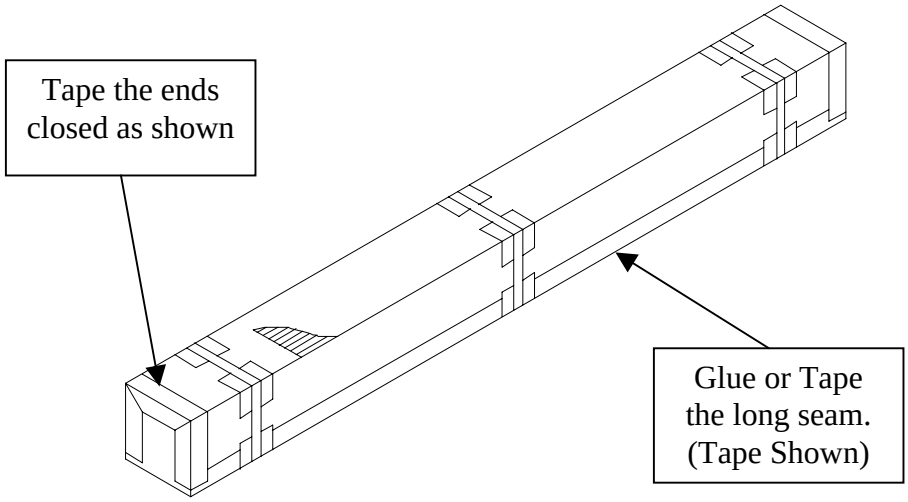

Figure 18. FPF Strapping and Taping Closure

10. ONE PIECE FOLDERS

One Piece Folders are used typically for products that have short depths but similar lengths and widths such as mirrors, picture frames, and books.

10.1. OPF Layout

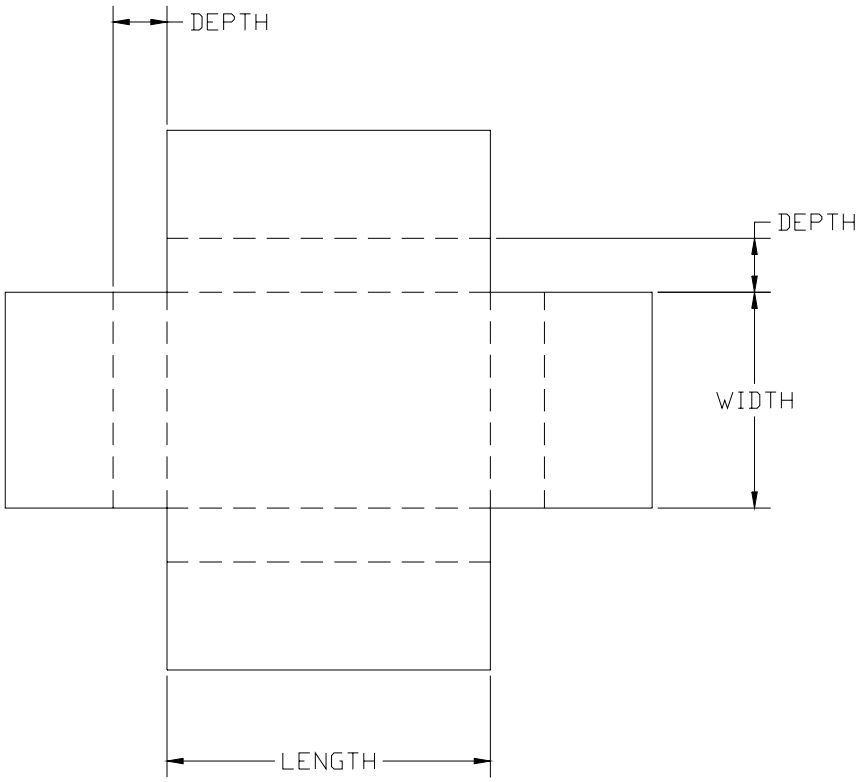

Figure 19. OPF Layout

10.2. OPF Closure

One Piece Folder's shall be closed with tape. The following table lists the closure materials and methods to be used for OPF's based on packaged weight (Note: Weight should not exceed 50 lbs for this style container):

Packaged Product Weight	Closure Material	Closure Method
0-5 lbs. (0-2.6 kg)	2 inch (48 mm) polypropylene tape	Single Strip Taping (See Figure 20)
6-20 lbs. (2.7-9.4 kg)	3 inch (72 mm) polypropylene tape	Single Strip Taping (See Figure 20)
21-40 lbs. (9.5-18.5 kg)	3 inch (72 mm) polypropylene tape	H-Pattern Taping (See Figure 21)
41-50 lbs. (18.6-22.7 kg)	3 inch (72 mm) reinforced paper tape	H-Pattern Taping (See Figure 21)

Table 8. OPF Closure Material and Method

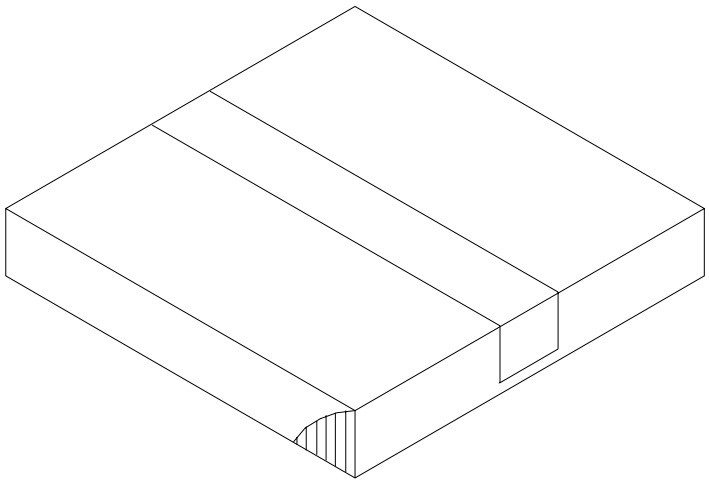

Figure 20. OPF Single Strip Taping

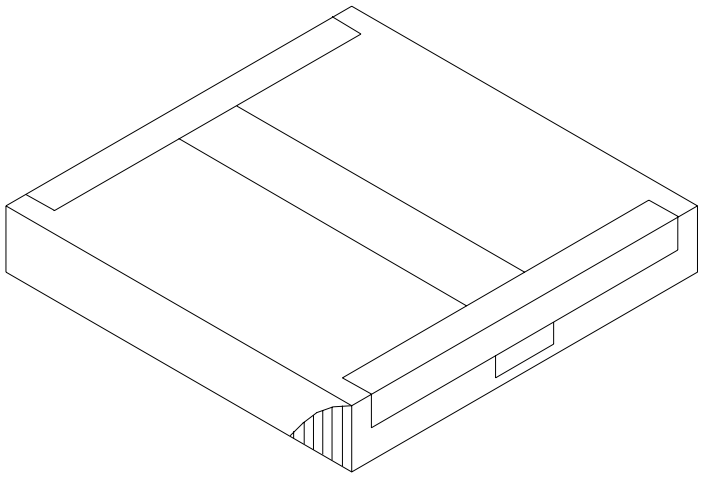

Figure 21. OPF H-Pattern Taping

11. FULL TELESCOPE DESIGN STYLE TRAYS

The Full Telescoping Design Style Trays are primarily for products that are long and wide, but have short depths such as headboards, footboards, dining tables, large mirrors, and large picture frames. The Top Tray is designed to slide over the bottom tray. Note the difference in slot direction to minimize the number of layers of corrugated to 4 along a side of the closed carton.

11.1. FTD Layout

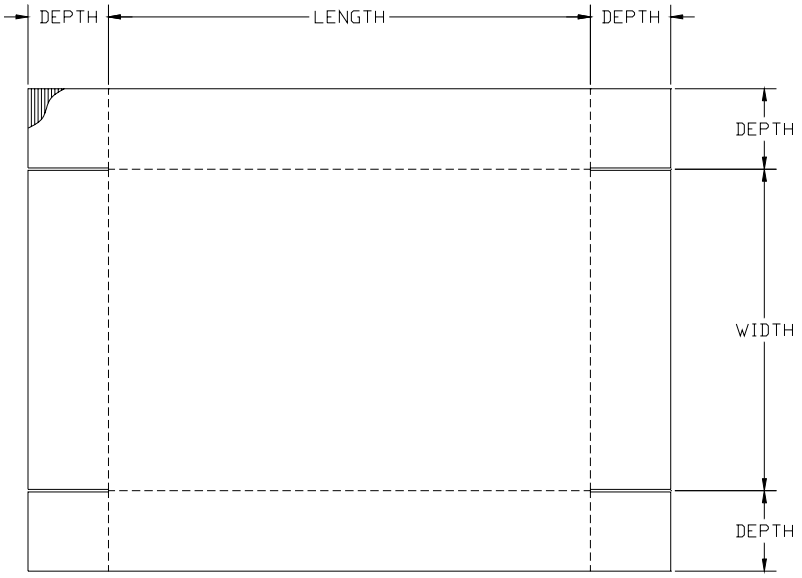

Figure 22. FTD Bottom Layout

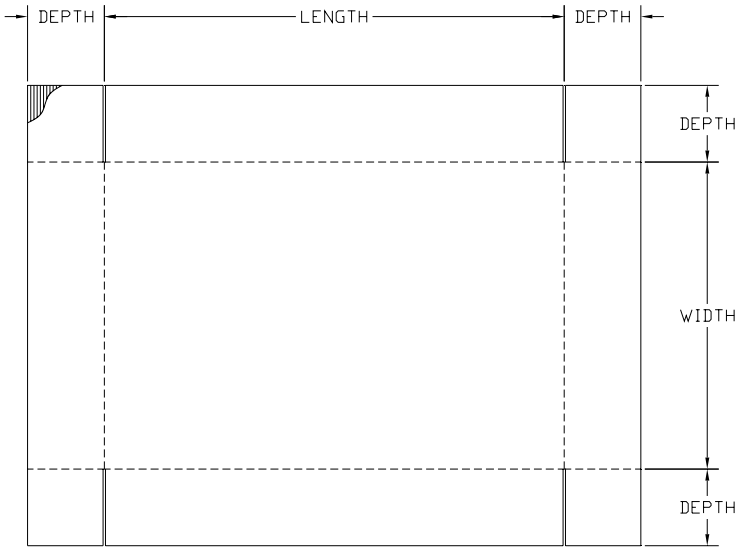

Figure 23. FTD Top Layout

11.2. Manufacturer's Joint

The manufacturers joint should be secured with staples, glue, or tape. If staples are used, the distance between staples must not exceed 2.0 in. (5 cm). It is much preferred that the joint be stitched or glued, but taping is an acceptable alternative at this time. If tape is used for the manufacturer's joint, use 3 inch (72 mm) reinforced paper tape for all products 21 lbs (9.5 kg) and over and 3 inch (48 mm) polypropylene tape for product less than 21 lbs (9.5 kg). See Figure 25 for taping manufacturer's joints.

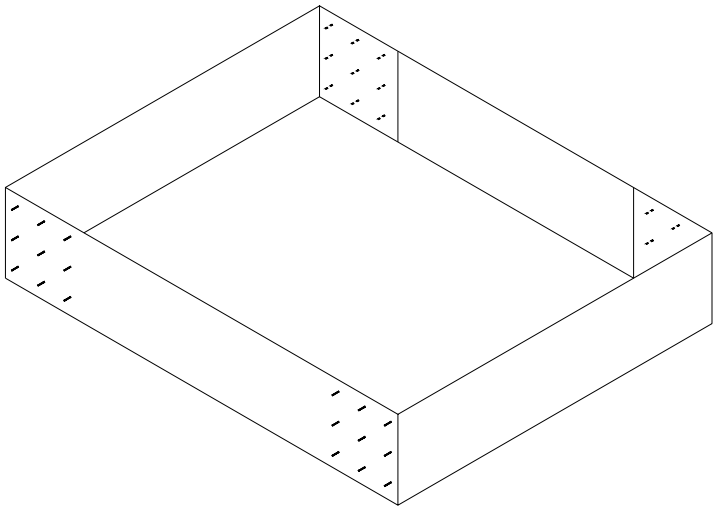

Figure 24. Stitch Joint for FTD Tray

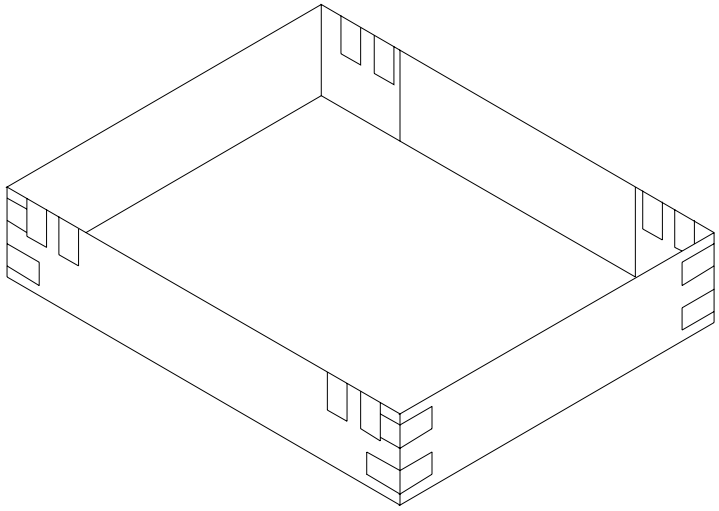

Figure 25. Tape Joint for FTD Tray

11.3. FTD Closure

Full Telescoping Design Style Trays shall be closed with tape or plastic straps. The following table lists the closure materials and methods to be used for FTD's based on packaged weight:

Packaged Product Weight	Closure Material	Closure Method
0-5 lbs. (0-2.6 kg)	2 inch (48 mm) polypropylene tape	Strip Taping (see Figure 26)
6-20 lbs. (2.7-9.4 kg)	3 inch (72 mm) polypropylene tape	Strip Taping (see Figure 26)
21-50 lbs. (9.5-23.1 kg) Note: If shipping by UPS, then use tape up to 70 lbs. (31.7 kg)	3 inch (72 mm) reinforced paper tape	Taping (see Figure 27)
51+ lbs. (23.2+ kg) For UPS Shipments: 71+ lbs. (31.8 kg)	Plastic strapping	Plastic strapping with Edge Protectors (see Figure 28)

Table 9. FTD Closure Material and Method

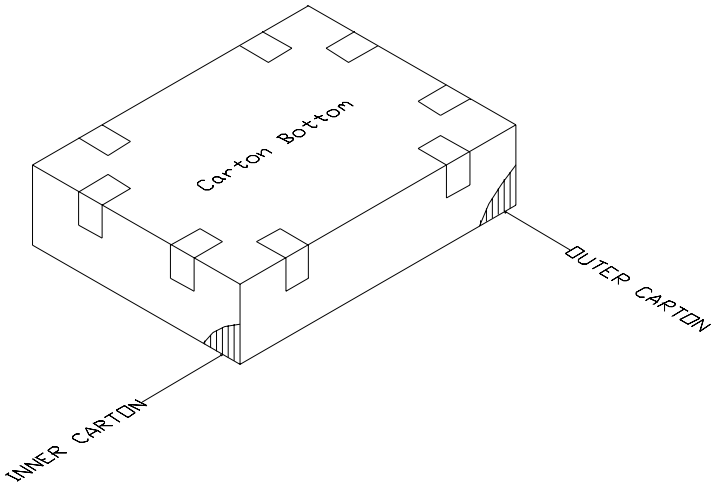

Figure 26. FTD Strip Tape Closure

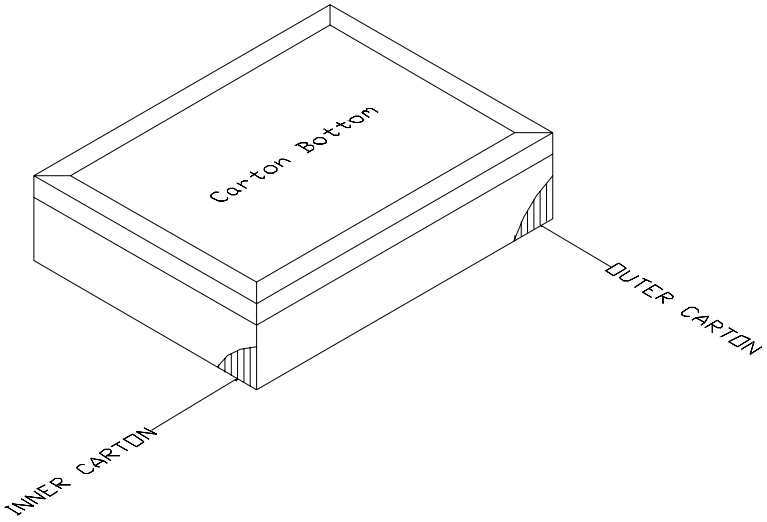

Figure 27. FTD Standard Taping Closure

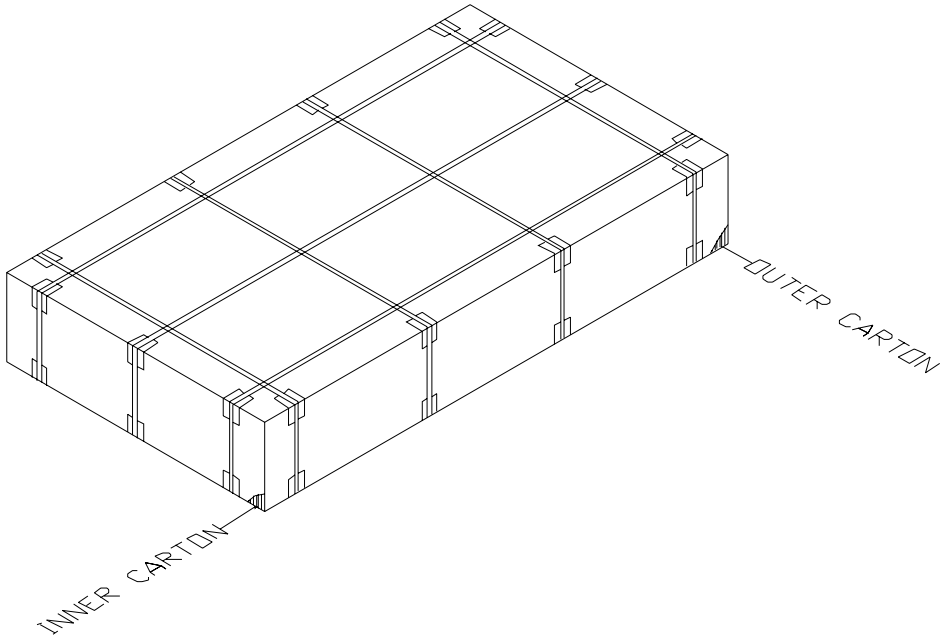

Figure 28. FTD Strapping Closure

12. DESIGN STYLE CONTAINER WITH COVER

Design Style Containers with Covers are typically used for products that do not need the higher stacking strength that FTD's provide. Often the products support their own weight and do not rely on the corrugated container to provide stacking strength. Products such as wreaths, where the depth is relatively small shallow and where the product length and width are similar, sometimes are packaged in a DSC.

12.1. DSC Layout

Design Style Containers with Covers are constructed in the same fashion as FTD's. The only difference is that the cover does not fully extend down the side of the bottom tray but rather only extends down partially, typically 2-3 inches (50-75 mm)

13. DSC CLOSURE

Design Style Container's with covers shall be closed with tape or plastic strapping. The following table lists the DSC closure material and method based on packaged weight:

Packaged Product Weight	Closure Material	Closure Method
0-5 lbs. (0-2.6 kg)	2 inch (48 mm) polypropylene tape	Strip Taping (See Figure 29)
6-20 lbs. (2.7-9.4 kg)	3 inch (72 mm) polypropylene tape	Strip Taping (See Figure 29)
21-50 lbs. (9.5-23.1 kg) Note: If shipping by UPS, then use tape up to 70 lbs. (31.7 kg)	3 inch (72 mm) reinforced paper tape	Strip Taping (See Figure 29)
51+ lbs. (23.2+ kg) For UPS Shipments: 71+ lbs. (31.8 kg)	Plastic strapping	Plastic strapping with Edge Protectors (See Figure 30)

Table 10. DSC Closure Material and Method

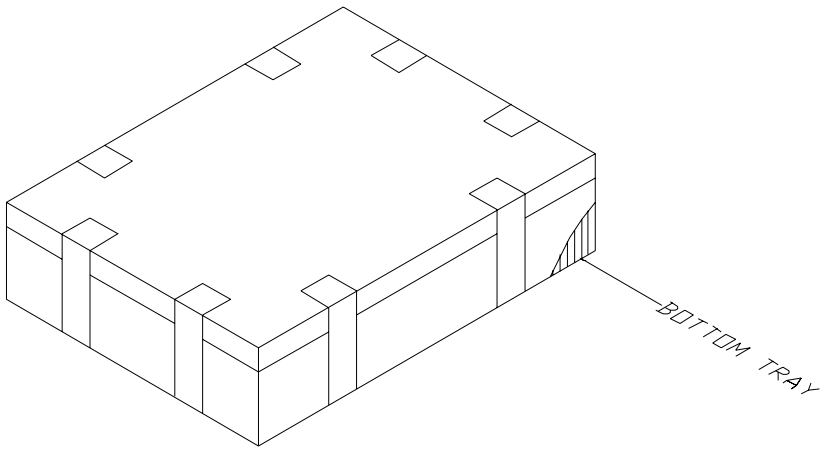

Figure 29. DSC Strip Taping Closure

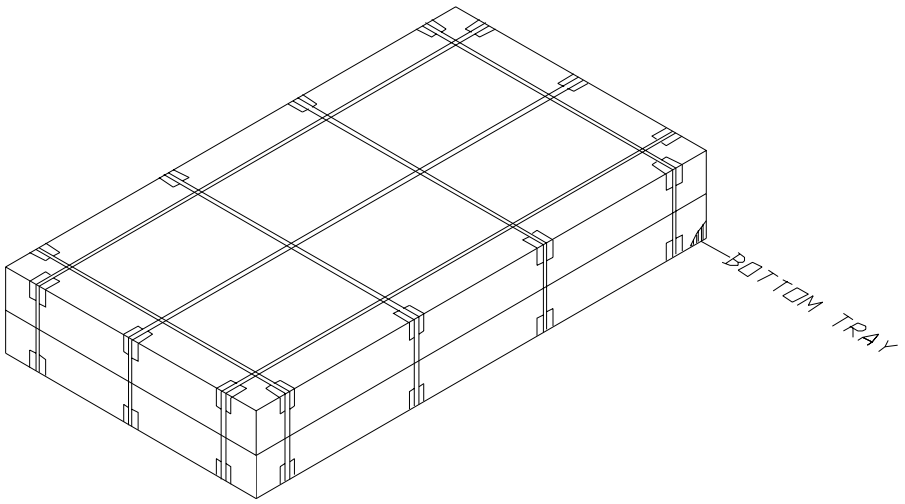

Figure 30. DSC Strapping Closure

14. DOUBLE COVER CONTAINERS

Double Cover Containers are used for large products. These are typically case-goods such as dressers, armoires, and media centers. The products are heavy, and large, and this style container is often used with a pallet.

14.1. DC Layout

Double Cover Containers are constructed in the same fashion as FTD's. The only difference is that the cover does not fully extend down the side of the bottom tray but rather only extends down partially.

14.2. DC Closure

All Double Cover Container's shall be closed with plastic strapping with edge protectors. When palletized, run strapping underneath the pallet to allow for securement.

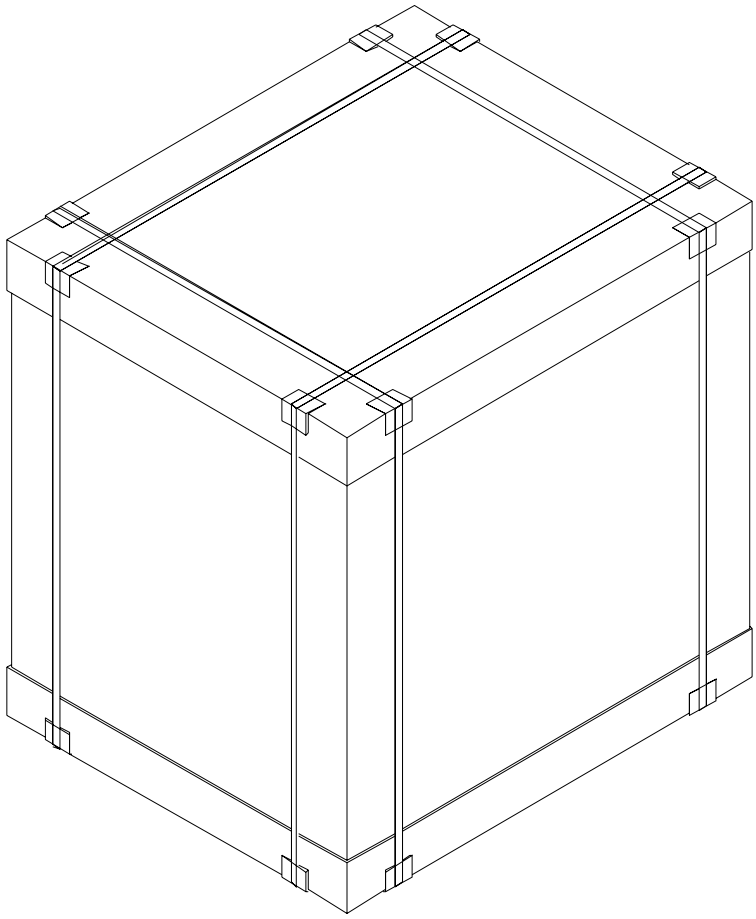

Figure 31. DC Strapping Closure

15. ROLL END TUCK TOP MAILERS

Roll End Tuck Top Mailers are typically used for smaller products that do not exceed about 40 lbs. (18.5 kg) in weight. Roll End Tuck Top Mailers with Dust Flaps are used for the same types of small lighter weight items but where additional stacking strength may be needed.

15.1. RETT Layout

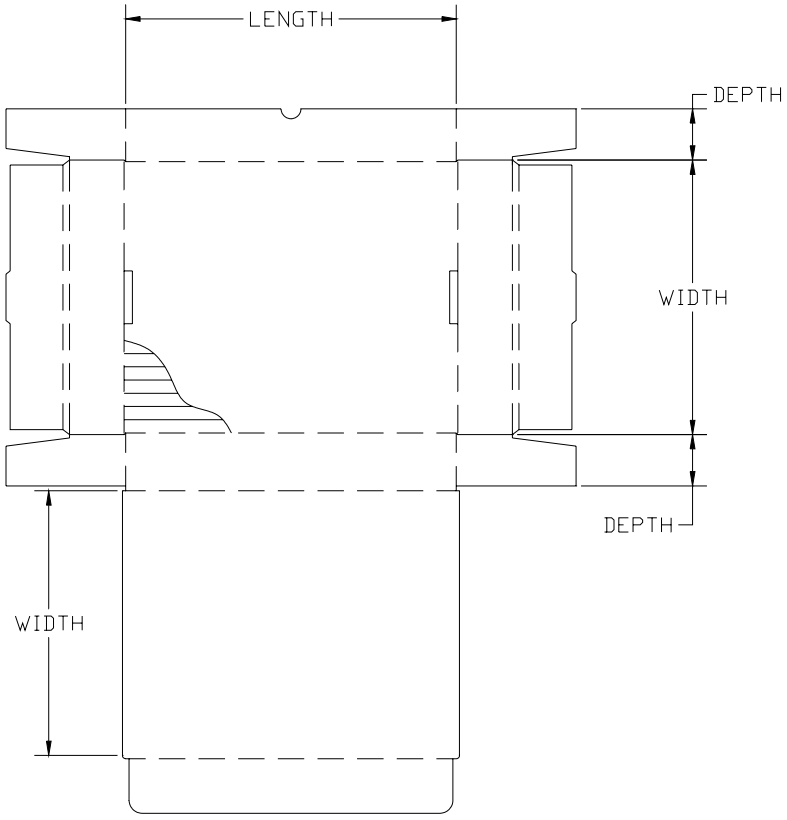

Figure 32. RETT Layout

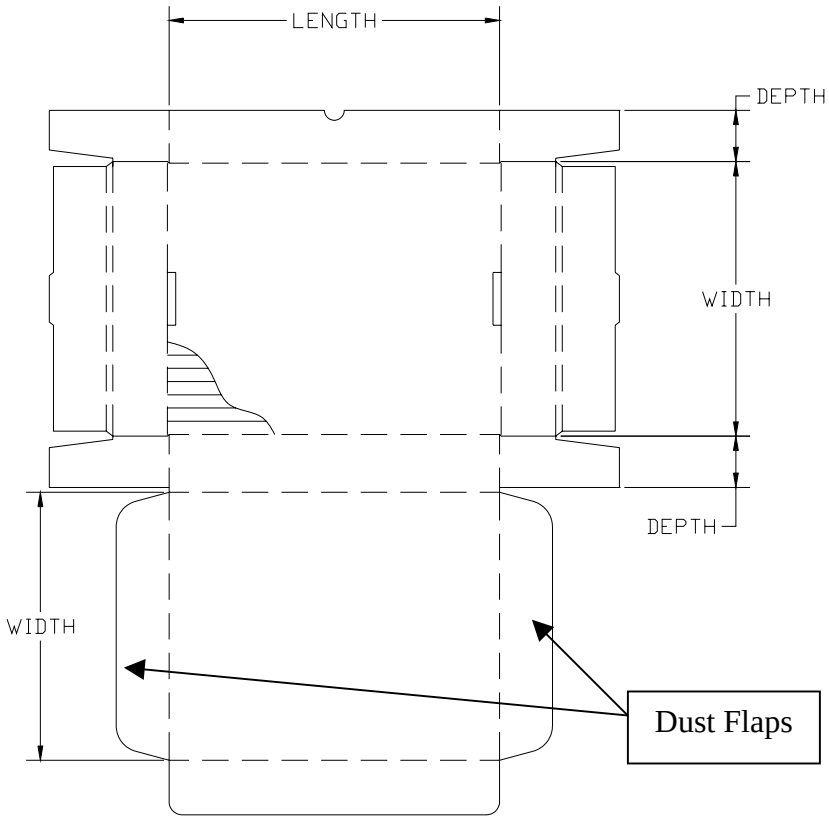

Figure 33. RETT/DF Layout

15.2. RETT and RETT/DF Closure

Roll End Tuck Top's with and without Dust Flaps shall be closed with tape. The following table lists the RETT and RETT/DF closure material and method based on packaged weight (Note: Weight should not exceed 40 lbs for this style container):

Packaged Product Weight	Closure Material	Closure Method
0-3 lbs. (0-1.7 kg)	2 inch (48 mm) diameter polypropylene spot label	Spot Label (See Figure 34)
4-10 lbs. (1.8-4.9 kg)	2 inch (48 mm) polypropylene tape	Strip Taping (See Figure 35)
11-20 lbs. (5.0-9.4 kg)	3 inch (72 mm) polypropylene tape	Strip Taping (See Figure 35)
21-40 lbs. (9.4-18.5 kg)	3 inch (72 mm) polypropylene tape	Strong Strip Taping (See Figure 36)

Table 11. RETT and RETT/DF Closure Material and Method

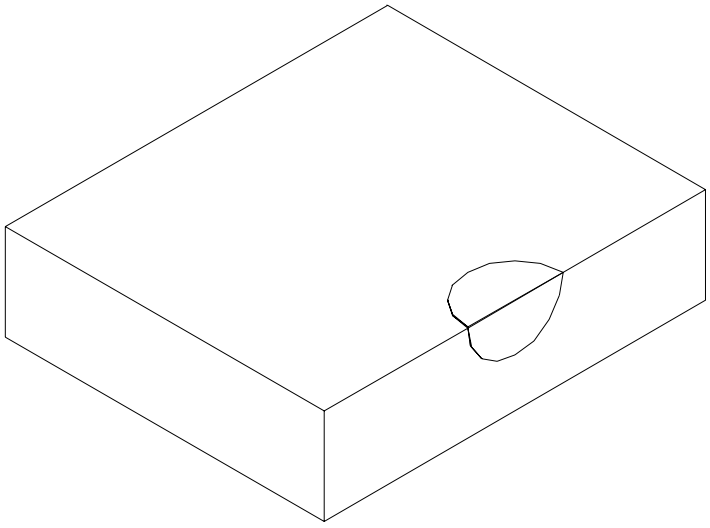

Figure 34. RETT and RETT/DF Spot Label Closure

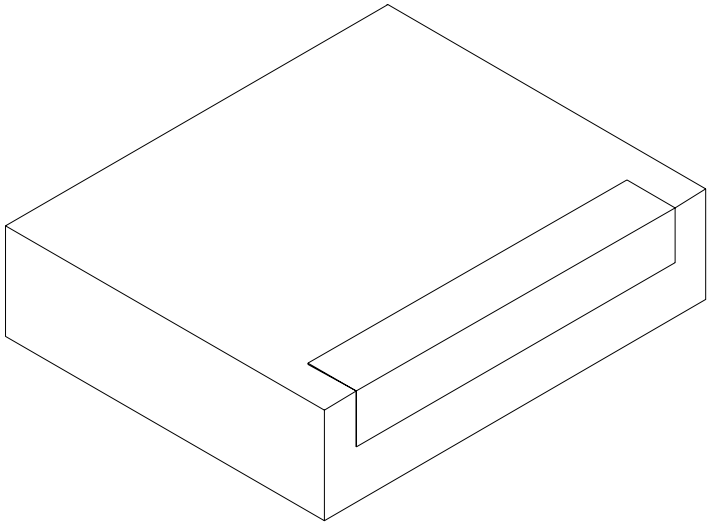

Figure 35. RETT and RETT/DF Strip Tape Closure

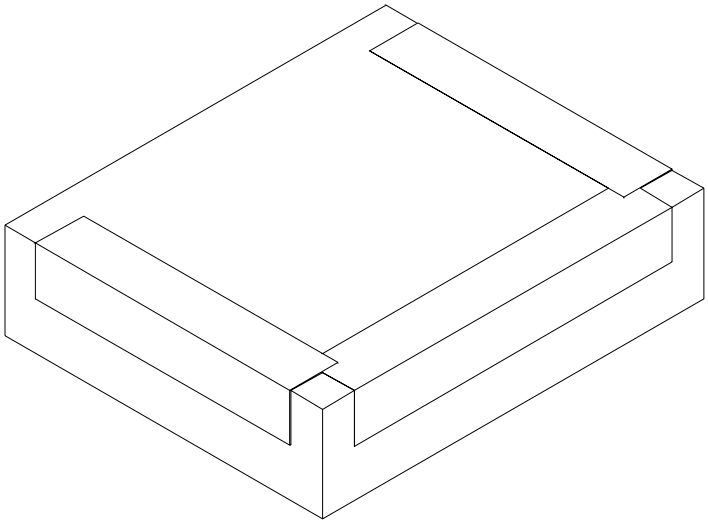

Figure 36. RETT and RETT/DF Strong Strip Tape Closure

16. ROLL END LOCK FRONT WITH DUST FLAPS MAILER

Roll End Lock Front Mailers are typically used for smaller products that do not exceed about 40 lbs. in weight.

16.1. RELF/DF Layout

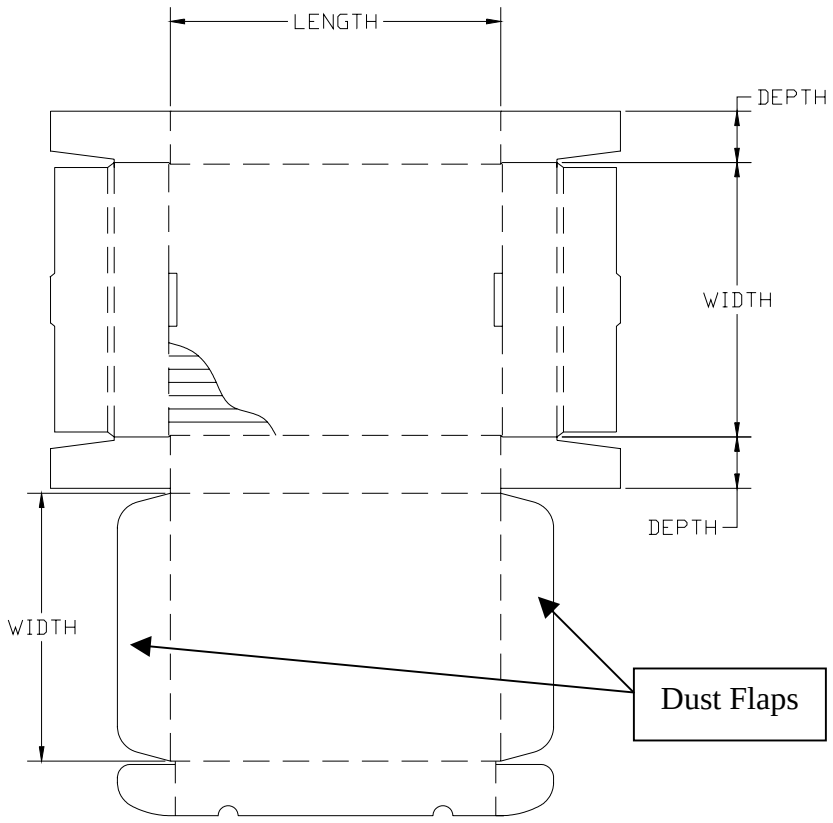

Figure 37. RELF/DF Layout

16.2. RELF/DF Closure

Roll End Lock Front with Dust Flap Mailer's shall be closed with tape. The following table lists the RELF/DF closure material and method based on packaged weight (Note: Weight should not exceed 40 lbs for this style container):

Packaged Product Weight	Closure Material	Closure Method
0-3 lbs. (0-1.7 kg)	2 inch (48 mm) diameter polypropylene spot label	Spot Label (See Figure 38)
4-10 lbs. (1.8-4.9 kg)	2 inch (48 mm) polypropylene tape	Strip Taping (See Figure 39)
11-20 lbs. (5.0-9.4 kg)	3 inch (72 mm) polypropylene tape	Strip Taping (See Figure 39)
21-40 lbs. (9.4-18.5 kg)	3 inch (72 mm) polypropylene tape	Strong Strip Taping (See Figure 40)

Table 12. RELF/DF Closure Material and Method

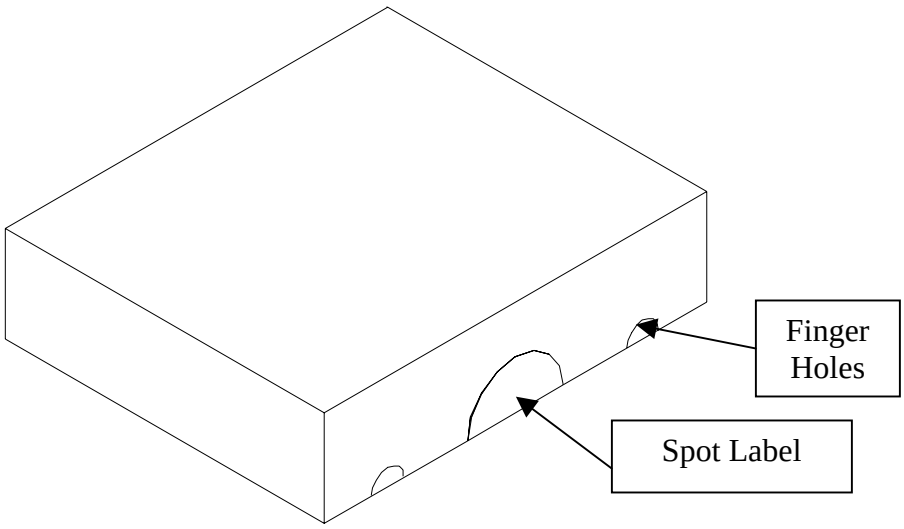

Figure 38. RELF/DF Spot Label Closure

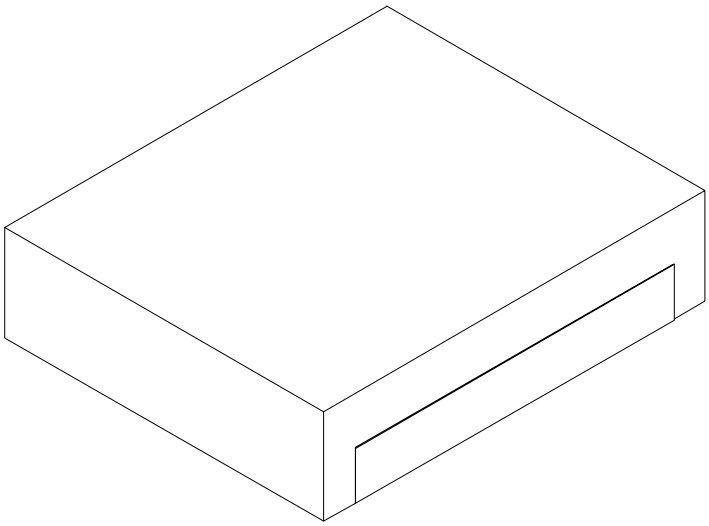

Figure 39. RELF/DF Strip Tape Closure

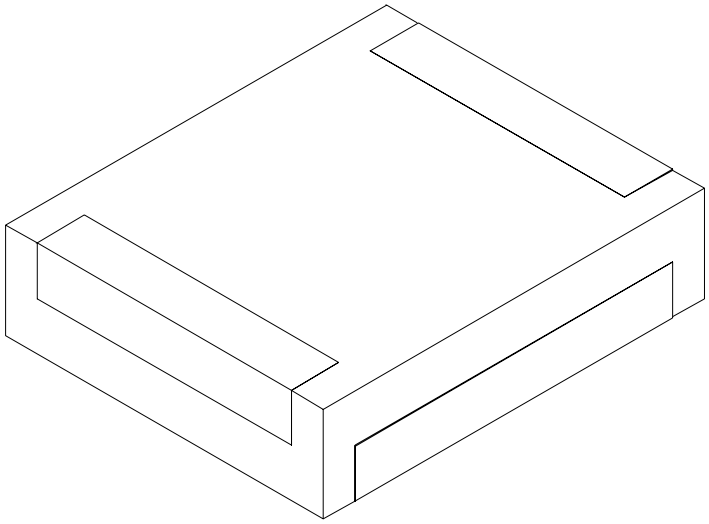

Figure 40. RELF/DF Strong Strip Tape Closure

17. REFERENCES

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