FENNER DUNLOP
CONVEYOR BELTING AMERICAS

Specification No. 12100

Vulcanized Splicing Procedures

Fenner Dunlop Americas Plied Conveyor Belt

Contents

Scope

These instructions refer to the materials and procedures involved in the vulcanized splicing of **Fenner Dunlop** plied belt constructions. Splicing follows the bias, lapped (step) design.

Fenner Dunlop cannot be held responsible for any modification or shortcut of these procedures. Any such shortcuts or departures could jeopardize the optimum splice performance. [1]

[1] NOTE: All recommendations for the use of any product or products described herein and all other data or information set forth in this document, whether concerning such products or otherwise, are furnished without any guarantee, warranty, representation or inducement of any kind, whether express or implied, including, but not limited to, implied warranties of merchantablility and fitness for a particular purpose, and Fenner Dunlop expressly disclaims liability under any theory including, without limitation, contract, negligence, misrepresentation or breach of any obligation relating to the recommendation, data or information set forth herein. Readers and customers are encouraged to conduct their own tests. Before using any product, read its label and all related instructions.

1. Health and Safety

The following instructions, procedures, and cautions should be observed at all times during the preparation and manufacture of **Fenner Dunlop's Plied Belt** vulcanized joints.

1.1 All electrical and mechanical equipment must comply with local site regulations.

1.2 Make sure the conveyor belt is properly tagged out (de-energized and secured), prior to initiating any work on the belt or splice.

1.3 The cements and primers specified are solvent based. The following precautions should be taken to ensure maximum safety.

a) The work area should be well ventilated.

b) Do not swallow or inhale vapor.

c) Avoid all contact with eyes, skin, and clothing. Rubber gloves and eye protection should be worn at all times when handling these products.

d) Accidental spills should be cleaned up immediately.

e) Follow the instructions on labels and MSDS sheets (includes First Aid procedures for treating persons affected by mishandling these products).

1.4 **Fire and Explosion Hazard**

a) Materials are flammable. Keep away from heat, sparks and flame.

b) In case of fire, do not use water. Use chemical foam or Carbon Dioxide.

c) Keep all containers closed when not in use.

1.5 Dispose as a hazardous waste, in accordance with applicable regulations.

2. Tools and Equipment

The vulcanized splicing of any conveyor belt can involve an assortment and variety of tools and equipment. The tools and equipment will vary according to the craftsmen that use them.

The following list provides a guide to the items required. This list is by no means complete nor does it constitute any endorsement or recommendation for use.

2.1 Hand Tools

a) Measure device – tape or ruler
b) Straight edge or chalk line, various squares
c) Marking pencil or pen
d) "One-ply" knife (or knives)
e) Other knives (mill, offset, bevel, utility, long, "v"-trim, etc.)
f) Pincers
g) Prodder (or "ply-lifter")
h) Stitchers
i) Rollers
j) Awl
k) Sandpaper (50 grit) – whetstone
l) Fabric shears
m) Assorted clamps, chains and "come-a-longs"

2.2 Power Tools

a) Stripping/pulling winch (or "tugger")
b) Wire-wheel rotary buffer (800-1200 max rpm)
c) Right-angle grinder (1800 max rpm)

2.3 Diagnostic Tools

a) Durometer – check hardness of belt ends and finished splice
b) Thickness gauge
c) Themocouples – verify actual platen temperature

2.4 Vulcanizing Equipment

a) Suitable surface area to allow completion of splice in one (1) cure
b) Size sufficient to allow for "heat" loss along edges of the platen surfaces.
c) Constant and uniform heat with easily monitored / adjustable controls
d) Temperature range of 300ºF to 307ºF (with $^{+}/_{-}$ variance of 5ºF)
e) Uniform pressure, 100 psi minimum capability

f) If necessary, compliance with local MSHA requirements
g) Capable of curing belts up to 2" thick
h) Edge or "blocking" irons (1/16" less than belt thickness). When possible seek width / thickness ratios of 6:1.

2.5 Miscellaneous

a) Required personal safety equipment (e.g., gloves, glasses, work boots, hardhat, etc.)
b) Paint brushes, assorted sizes
c) Cleaning rags, foxtail brushes, etc.

3. Materials

3.1 Fenner Dunlop splice cements and calendered rubber items have a dated shelf life of six (6) months. However, if refrigerated (preferably < 50ºF), the useful life can be extended to twelve (12) months. Store these materials in a cool, dark and safe area and always keep away from sunlight.

The materials provided in Tables 3A and 3B are required to complete a typical Plied Belt vulcanized splice.

Table 3A

Splice Material Selection Guide					
Belt Specification	**Cover Stock**	**Tie Gum**	**Cement**	**Primer**	**Solvent**
AS-A, AS-M, AS-N, MSHA-F, MSHA-FF, MSHA-FAR, MSHA-FFAR, CSA-FFAR, CSA-FF, MSHA-SFAR, MSHA-FFOR, CSA-FFOR, Granite, Platinum, Titanium, Abrader, Grade II, Matchless, Matchless Plus, MOR, ORWP, MOG, Guardian, Guardian AR, Fire Boss, Classic Grain Handler	Group 1	Group 1	Group 1	Group 1	Toluol
White Granite	Group 1 White	Group 1 White	Group 1 White	Group 1 White	Toluol
Sahara, Sahara-SAR	Group 2	Group 2	Group 2	Group 2	Toluol
Ultra Grain Handler, ORP	Group 3	Group 3	Group 3	Group 3	Xylene
AS-S, Fire Boss Plus, ORN, MSHA-FFORN, MSHA-FFORNS	Group 4	Group 4	Group 4	Group 4	Toluol
OHR, SOHR	Group 5	Group 5	Group 5	Group 5	Xylene
DeltaHeat	Group 6	Group 6	Group 6	Group 6	Toluol
White DeltaHeat	Group 6 White	Group 6 White	Group 6 White	Group 6 White	Toluol
CWOR	Group 7	Group 7	Group 7	Group 7	Toluol
Butyl	Group 8	Group 8	Group 8	Group 8	Toluol
Brown Sliderback	Group 9	Group 9	Group 9	Group 9	Toluol
Blue Sliderback	Group 10	Group 10	Group 10	Group 10	Toluol

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3.1.1 **Cement** – Bonding and/or "tackifying" splice interfaces. (Refer to Table 3A.)

3.1.2 **Solvent** – used for cleaning splice interfaces and tools/spills. (Refer to Table 3A.)

3.1.3 **Primer** – Applied to any exposed (no rubber) fabric surface. (Refer to Table 3A.)

3.1.4 **Tiegum** – Uncured rubber; enhances adhesion and flexibility between splice interfaces. (Refer to Table 3B.)

3.1.5 **Fabric** – Uncured, rubber calendered to fabric. Applied over the outer ply joints in both cover fill-ins. They enhance pulley flex dynamics and provide some tensile strength. (Refer to Table 3B.) [2]

3.1.6 **Cover Stock** – Uncured rubber; replaces the cover rubber removed in the fill-in regions.

3.1.7 **Release Paper** – (or cloth) prevents the splice from sticking to the platens.

Table 3B

Plied Belt Splice Materials & Gauges Tiegums & Splice Fabrics				
	Tiegum Gauge (in)		Splice Fabric	
Belt Style	Between Plies	Fill-in (Adjacent to Splice Fabric)	Type	OA Gauge (in)*
2-160	0.060	0.040	R 110 NN	0.063
2-220	0.060	0.040	R 110 NN	0.063
2-250	0.060	0.040	R 110 NN	0.063
2-300	0.080	0.040	R 110 NN	0.063
2-400	0.080	0.040	R 110 NN	0.063
2-500	0.080	0.040	R 110 NN	0.063
2-600	0.080	0.040	R 110 NN	0.063
3-240	0.040	0.040	B 95 NN	0.055
3-330	0.040	0.040	B 95 NN	0.055
3-375	0.040	0.040	B 95 NN	0.055
3-450	0.040	0.040	B 95 NN	0.055
3-600	0.040	0.040	B 95 NN	0.055
3-750	0.040	0.040	B 95 NN	0.055
3-900	0.060	0.040	B 95 NN	0.055
3-1500	0.080	0.040	R 110 NN	0.063
4-440	0.040	0.040	B 95 NN	0.055
4-500	0.040	0.040	B 95 NN	0.055
4-600	0.040	0.040	B 95 NN	0.055
4-800	0.040	0.040	B 95 NN	0.055
4-1000	0.040	0.040	B 95 NN	0.055
4-1200	0.060	0.040	B 95 NN	0.055
4-2000	0.080	0.040	R 110 NN	0.063
5-550	0.040	0.040	B 95 NN	0.055
5-750	0.040	0.040	B 95 NN	0.055
5-1000	0.040	0.040	B 95 NN	0.055
5-1250	0.040	0.040	B 95 NN	0.055
5-1500	0.040	0.040	B 95 NN	0.055

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[2] If longitudinal seams are necessary when apply any splice fabric, keep those seams away from the idler junction regions of the splice.

4.0 'Laying Out' the Belt Ends

4.1 **Fenner Dunlop Plied Belt** follows a basic "bias-lapped" splice pattern. All cover and ply "cut" lines follow along a 22º bias angle (as measured from the square cut end).

Fenner Dunlop Plied Belt belts are generally spliced with all ply joints "butted". However, belt specs (R3-1500, R4-2000) that utilize high tension fabric (500 lbs/in) require their outer ply joints to be "fingered". Finger joints will necessitate slight modifications to some of the following procedures. Those modifications appear specifically in portions of Sections 4, 5, and 6. If any procedure presented is different for these five constructions, that difference is fully explained and appears in the footnotes as **Plied Belt** step *Finger Splices*.

All the procedures that follow reference a **Plied Belt** splice being built or assembled, with the top cover facing up (bottom cover down).

4.2 With each belt end properly positioned on the worktable mark the centerline on both top covers. [3]

4.3 Fold one belt end (referred to as the second belt end) back on itself. Refer to Diagram 4A below.

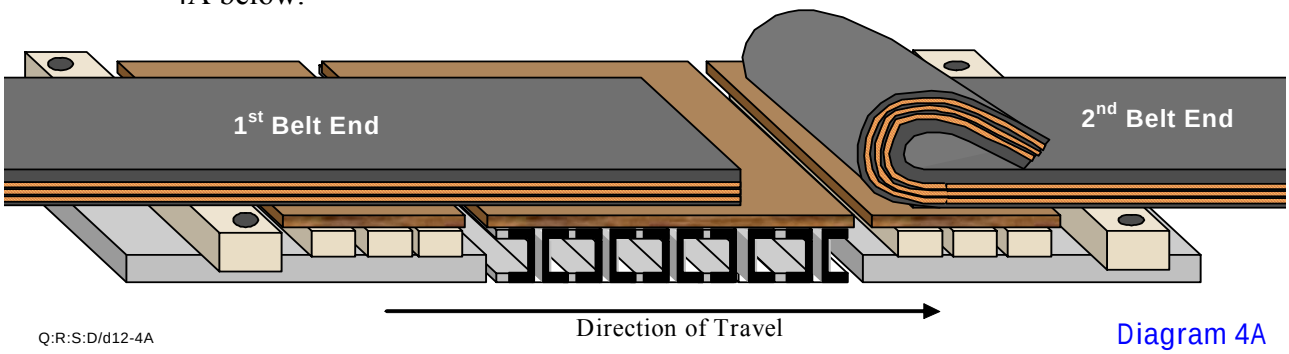

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Diagram 4A

[3] This is done simply be marking the mid-point of the belt at several locations along the belt end (typically, 3-4 times the belt width in length) and then drawing a straight line through the marks obtained.
These centerlines must be visible as they are referenced many times through the splice process. Their proper alignment will assure a "straight" tracking final product.

Typically, this end will be the leading belt end if the splice is being made along the carrying strand of the conveyor.[4]

4.4 With the belt end remaining on the worktable (referred to as the 'first' belt end), square that belt end by drawing a line across the belt 90º to the centerline. See line 'A-A' in Diagram 4B below.[5]

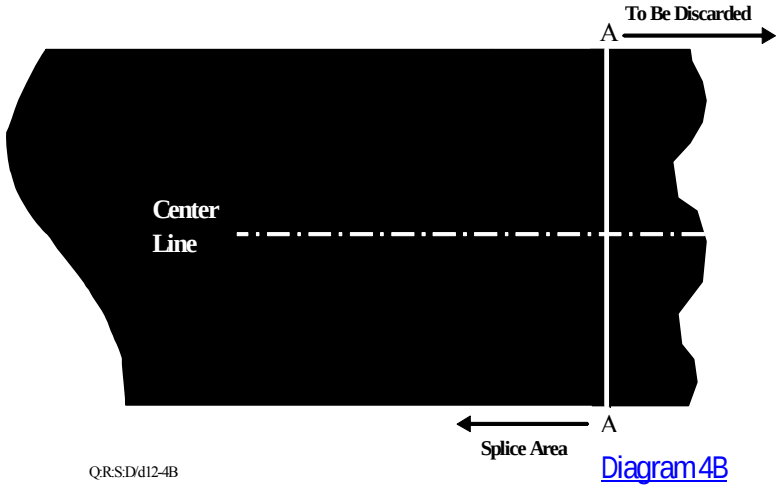

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Diagram 4B

4.5 From the square cut end, along one edge measure the 'lead' length. Draw a line 'A-B' joining the end of the lead length back to the square end cut along the opposite belt edge. The first drawn bias line will be the bottom ply "cut" line representing the bottom ply joint in the finished splice. An example of a 2 ply belt is provided in Diagram 2.[6]

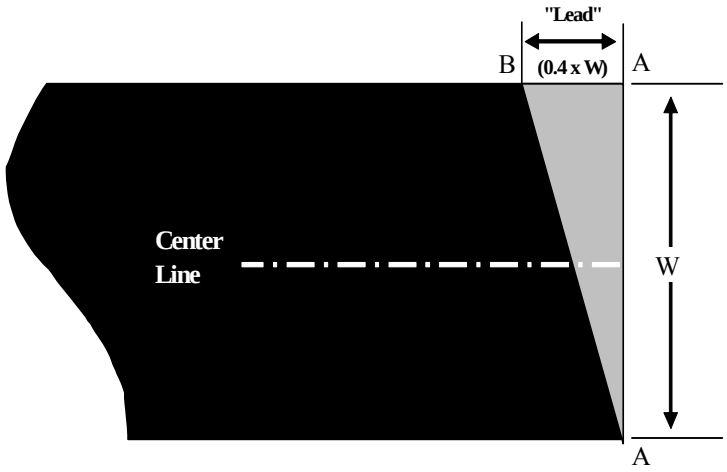

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Diagram 4C

[4] In cases where the primary drive pulley contacts the top cover, or in most regenerative (downhill) applications, a "top cover lead" splice is preferred.

[5] The "arc scribing" and the "carpenter's square" are two acceptable methods available for creating this perpendicular cut line, 'A A'. Use one of these methods.

[6] This splice layout above (as those that follow) illustrates a right-hand "lead". In service, the orientation of the splice bias angle is not typically important. However, when using a rhombic-shaped vulcanizer, you may want to match your splice orientation with that of your platens.

4.6 Refer to the splice "Step Length" dimensions outlined in Table 4.

Table 4

Plied Belting Vulcanized Splice Dimensions

Belt Style	No. of Plies	Step Length (Inches)	Fill-In Length (Inches)	Overall Splice Length (in) w/o bias angle	"Outer" Ply Joint Type
2-160	2	6	4	10	Butt
2-220	2	8	4	12	Butt
2-250	2	10	4	14	Butt
2-300	2	12	4	16	Butt
2-400	2	15	4	19	Butt
2-500	2	18	4	22	Butt
2-600	2	20	4	24	Butt
3-240	3	6	4	16	Butt
3-330	3	8	4	20	Butt
3-375	3	10	4	24	Butt
3-450	3	12	4	28	Butt
3-600	3	15	4	34	Butt
3-750	3	18	4	40	Butt
3-900	3	20	4	44	Butt
3-1500	3	30	12	72	Fingers
4-440	4	8	4	28	Butt
4-500	4	10	4	34	Butt
4-600	4	12	4	40	Butt
4-800	4	15	4	49	Butt
4-1000	4	18	4	58	Butt
4-1200	4	20	4	64	Butt
4-2000	4	30	12	102	Fingers
5-550	5	8	4	36	Butt
5-750	5	12	4	52	Butt
5-1000	5	15	4	64	Butt
5-1250	5	18	4	76	Butt
5-1500	5	20	4	84	Butt

From the bias line 'A-B' drawn in Step 4.5 (bottom ply cut line), measure and mark along both belt edges the step lengths for the remaining plies. Draw each of these bias-ply cut lines across the top cover. In the 3 ply splice layout example illustrated in Diagram 4D, the two remaining ply "cut" lines are marked as 'C D' and 'E F'. [7]

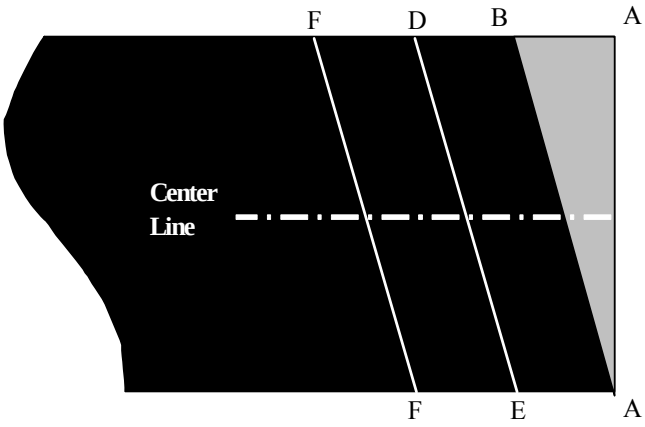

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Diagram 4D

4.7 Refer to the splice "Fill-In Length" dimensions in Table 4. Taking ½ of this value, measure from the top ply cut mark and draw the top cover bevel cut line. (Referred in Diagram 4E as 'G H'.)

Turn this belt end back onto itself. In a similar fashion, measure from the bottom ply cut mark and draw the bottom cover bevel cut line. (Referred in Diagram 4E as 'I J'. [8]

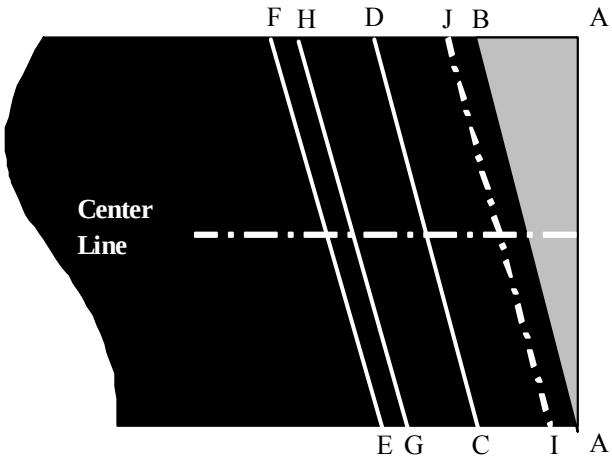

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Diagram 4E

[7] **Plied Belt** step *Finger Splices*! Mark the ply cut lines for the outer plies 3" longer and for any internal plies, mark them as ¼" longer.

[8] **Plied Belt** step *Finger Splices*! Both cover bevel lines are to be drawn 9" from the outer ply cut lines (measured and marked in 4.6).

4.8 Return the first belt end back to the worktable. Extend all of the ply cut lines vertically along both belt edges. (Refer to Diagram 4F.)

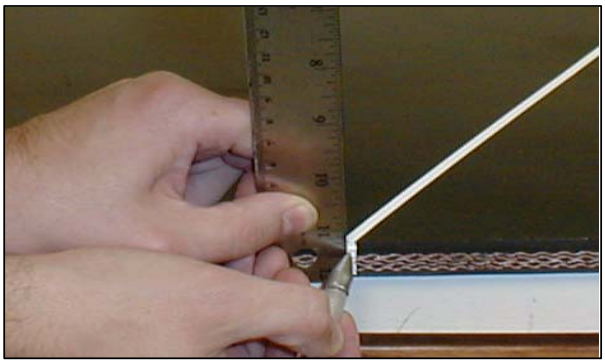

Diagram 4F

4.9 Return the 'second' belt end (folded onto itself in 4.3) to overlap the 'first' belt end. (Refer to Diagram 4G.) Align both centerlines. [9]

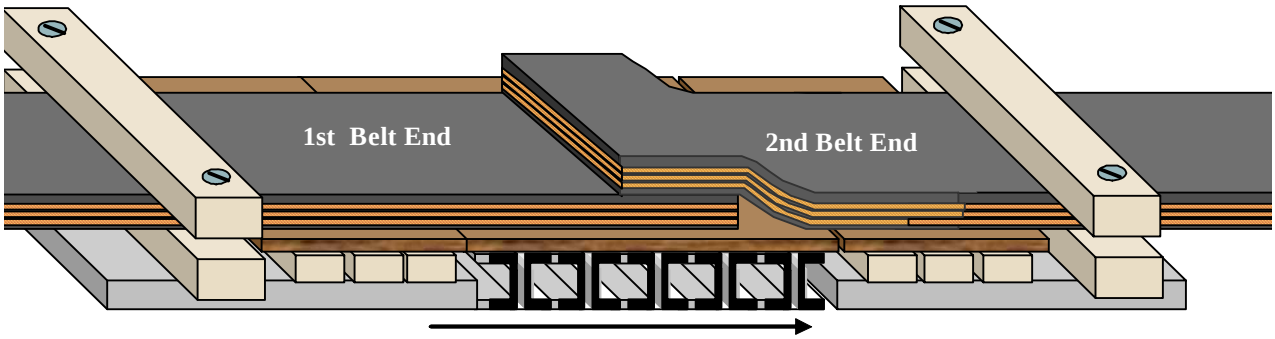

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Diagram 4G

4.10 With the edges of both belts alighted, vertically transfer the ply cut marks from the first belt end to the edges of the second belt end above it. [10]

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[9] Once both centerlines are properly aligned take steps to secure or clamp the alignment.

[10] Of critical importance is the alignment and subsequent matching of all ply cut lines.
Plied Belt *step Finger Splices*! Mark the outer ply cut lines of the 'second' belt end so that when cut they will overlap those of the first belt end by 6 inches. For any internal plies, mark those on the 'second' end so that when cut they will overlap the first end by ½".
Plied Belt *step Finger Splices!* When completed, the step lengths involving any outer ply joint will be measured to the center of the 'finger' joints, which will be 6" from either adjacent cover bevel.

4.11 With the second belt end still overlapping the first belt end, draw the cover bevel cut line into the top cover. Then, fold the second belt end back onto itself. Complete the layout of this end by measuring and drawing the remaining ply cut lines and the cover bevel cut line onto the bottom cover. Follow the procedures outlined in Steps 4.6 and 4.7. Although the procedures are similar they are followed in reverse, bottom cover now up, etc. [11]

[11] **Plied Belt** *step Finger Splices!* Both cover bevel lines are to be drawn 9" from the outer ply cut lines (marked along the edges in 4.10.

5.0 Stepping and Preparing the Belt Ends

5.1 With the first belt end still on the worktable with the second belt end folded over, cut the entire belt across line 'A B'. Discard the remnant end piece denoted by the area 'A B A'.

5.2 Initiate the step-down process on the first belt end by removing both top and bottom cover fill-ins. [12]

The cover bevel lines are to be cut at a 45º angle. [13]

Our 3-ply splice example should now look similar to that depicted in Diagram 5A.

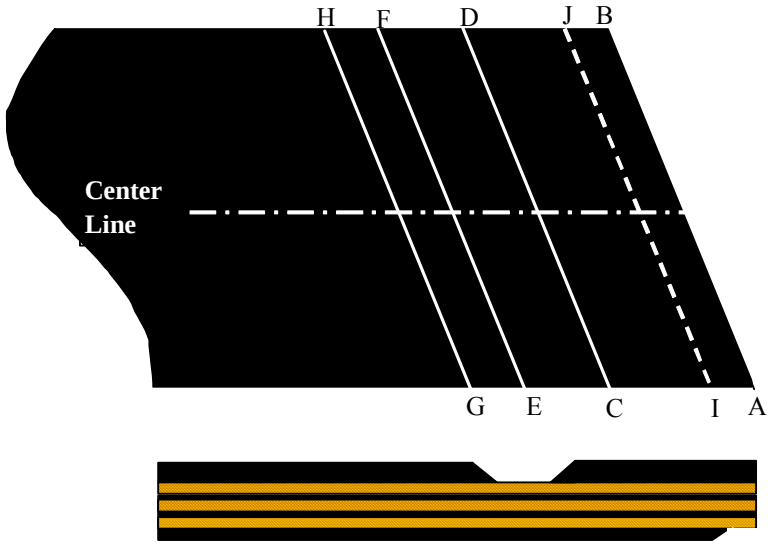

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Diagram 5A

5.3 Plied Belt is normally furnished as a cut-edge construction. However, when provided as a molded edge construction, care must be taken to retain the rubber along the capped edge as the belt end is stepped down.

This is often done by making a vertical cut along both belt edges no deeper than the surface of the splice fabric that remains. After each ply has been stepped down and

[12] With the full support of the carcass, it will be much easier to turn the belt over and remove the thinner bottom cover fill-in first. When removing this top cover fill-in rubber, extend past the top ply cut line an inch or so. This will make the cutting and removal of the top ply easier.

[13] Take extreme care not to cut or nick any of the adjoining plies. Use a knife that has a rounded tip on its blade.

removed, shave off the excess rubber along both edges to match the carcass thickness of each remaining step.

5.4 Continue the step-down process. Cut through the top ply using a one-ply knife along 'E F' as shown in Diagram 5A. [14]

5.5 Separate the top ply and pull off to belt end. Use a prodder (or ply lifter) along the ply cut line to help separate the plies. [15]

5.6 Repeat Steps 5.4 and 5.5 with all remaining plies. This completes the step-down process of the first belt end. Diagram 5B depicts what a 3 ply **Plied Belt** splice should like at this point.

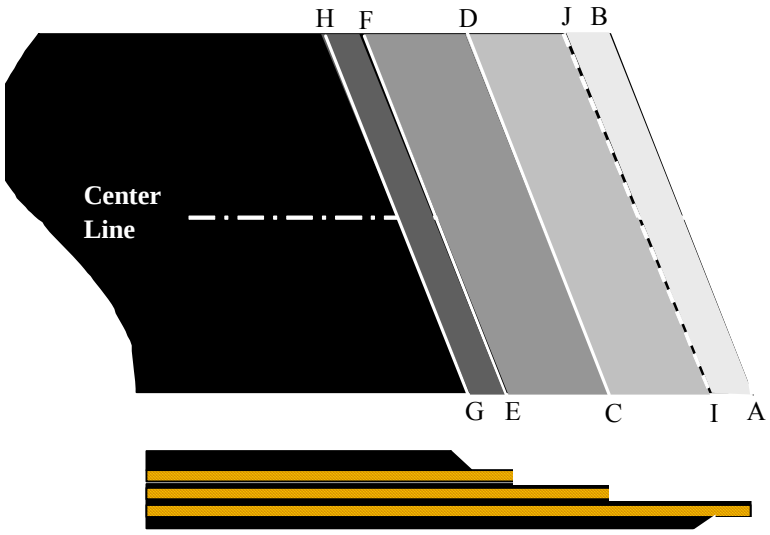

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Diagram 5B

5.7 With the second belt end folded back on itself, follow 5.1 through 5.6. However in preparing the second belt end, the step down process will be in reverse of that used for the first belt end. For example, the steps in this belt end are made from the bottom/pulley cover to the top/carry cover. [16]

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[14] Make every effort to cut only the ply intended and not any part of the adjacent carcass ply. Use a one-ply knife of proper gauge for all ply cuts. Hold at 45º and keep the cutting edge sharp.

[15] Avoid damaging the ply beneath. Make certain that the prodder's edges are round and dull and advance with strokes parallel to the cut. NEVER use a common screwdriver as a prodder.

[16] **Plied Belt** *step Finger Splices* – Overlap your two 'step-downed' belt ends, aligning both centerlines. Check that both outer plies overlap by exactly 6 inches and that any inner ply overlaps by ½". If not, adjust accordingly. Cut your belt fingers in each outer ply of both ends. Follow the **Plied Belt** finger dimensions as outline in Diagram 5C.
Center a finger on the centerline of each belt end, making certain that the edge fingers trail away in the direction of belt travel. Make your finger cuts as accurately and as straight as possible.

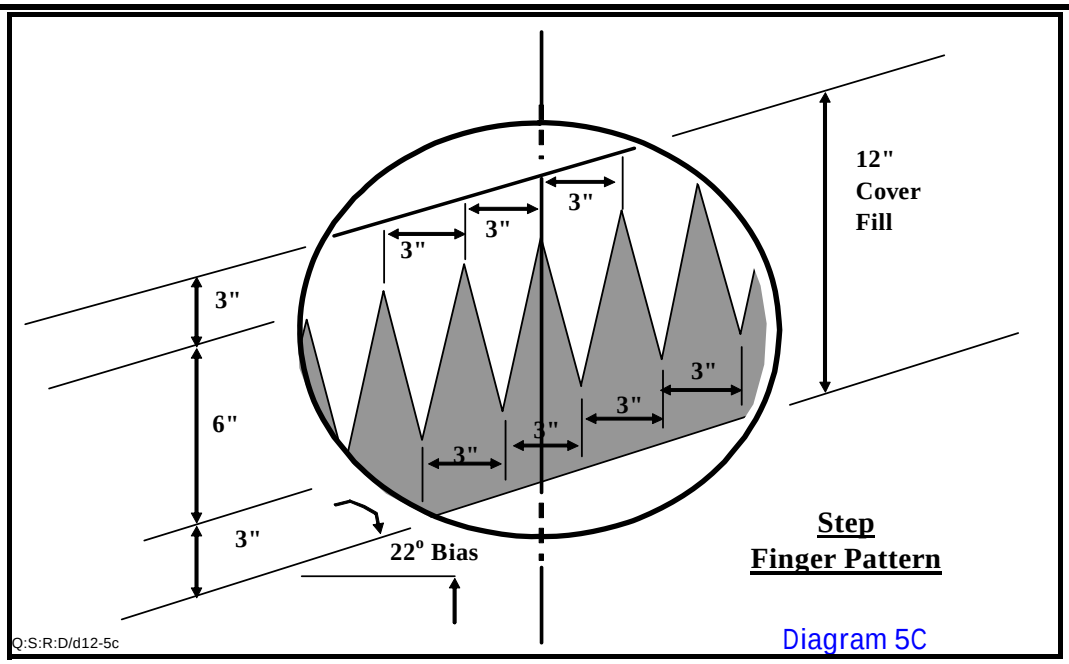

Diagram 5C

5.8 With each belt end, roughen or buff the surface of both the top and bottom cover bevels. Also, along a path approximately 1½" wide, buff all cover surfaces adjacent to each bevel across the entire belt width. Refer to Diagram 5D. [17]

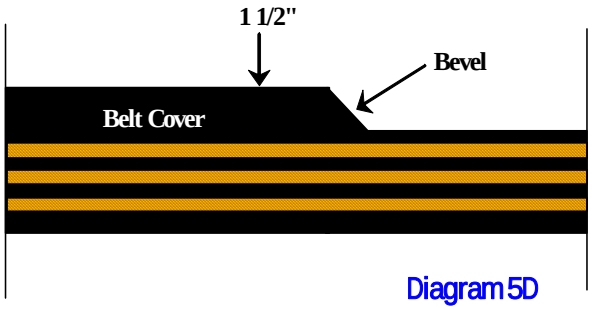

Diagram 5D

5.9 Brush both belt ends free of any loose rubber, dirt or other noticeable contaminants. Clear the worktable area of any similar debris. Clean all buffed cover rubber (four bevels and adjacent surfaces) with solvent. Allow to thoroughly dry. [18]

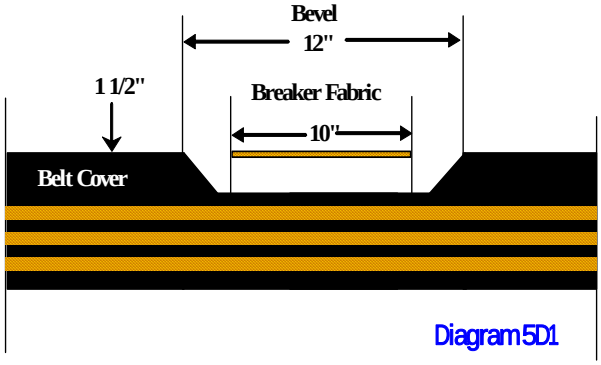

Diagram 5D1

[17] A rotary wire buffer or disk sander of less than 1800 rpm (to avoid burning the contacted rubber) can be used. Under no circumstances, nick, grind or burn any portion of the exposed carcass during the buffing process.

[18] Keep solvent away from any exposed carcass surface

6.0 Splice Assembly

6.1 When applying any calendered splice component (tie-gum, splice fabric or cover stock), the bonding surface should be first washed with solvent and then rolled into place. If solvent doesn't produce the tack desired on the bonding surface one coat of cement could be applied.

After positioned and rolled into place, remove any film that has been left on the outside of the bonded component. 'Stitch' areas that may need further compression. With thicker components never hesitate to use an awl to repeatedly puncture any composite of splice laminates. [19]

The finished splice should physically mirror the parent belt. This can best be achieved by maintaining proper gauge control when building the splice. If the splice is built light, it will likely become porous. If the splice is built heavy, the splice will bulge and distort, possibly encouraging abuse and/or poor tension sharing. In either case, splice integrity is compromised. [20]

6.2 Prepare a final 'dry fit' of the previously stripped and prepared belt ends. Ensure that the entire worktable area is free of dirt and contaminants.

After aligning their centerlines, overlap and mate the two belt ends together. Once aligned, check all ply joint locations for proper fit. If gaps or overlaps exist along these joints, trim and/or adjust accordingly. Check the clamps securing both belt ends to the conveyor structure and tighten or readjust, as necessary. [21]

6.3 The diagrams in Section 8 illustrate how **Plied Belt** belts of 2, 3, 4 and 5 plies are intended to mate when they are properly prepared, overlapped and bonded together. Verify that the splice dimensions (step lengths and fill-in lengths) match those in Table 4.

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[19] All calendered materials should be applied "wide" of the belt edges. Any such excess can be conveniently trimmed away before curing.

[20] Try to build your fill-ins about 0.040" heavier than the cover gauge that was removed. Check the gauge with an appropriate measuring instrument.

[21] **Plied Belt** *step Finger Splices!* Align the centerlines of both belt ends. Overlap and mate together. Secure one of the belt ends. Loosen the other and pull it away from its mate by ½". The other ply fingers should now have gaps of approximately 1/8" and any inner plies should butt snugly together. The 1/8" gap between fingers will allow tiegum to be inserted. Refer to Steps 6.9 and 6.10.

6.4 With a clean brush apply one (1) coat of P-1940 primer to any exposed or bare fabric surface on either side of both belt ends. Allow to thoroughly dry. [22]

6.5 On all step and cover fill-in surfaces of both belt ends, including the buffed sections of cover adjacent to the bevels, apply one coat of cement. [23].

6.6 With both belts in position on the worktable, carefully map the total area of the bottom cover fill-in, specifically the cover bevel locations. The bottom cover insert is to suitably fill this void of rubber cover. [24] Refer to Diagram 6A.

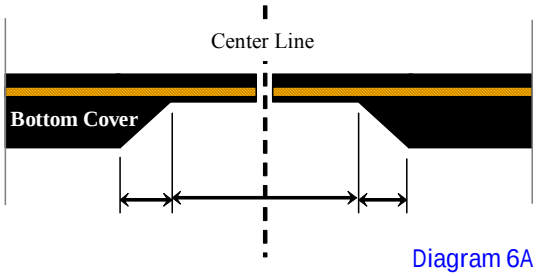

Diagram 6A

6.7 For **Plied Belt**, the bottom cover insert consists of layering tiegum, splice fabric and cover stock together. Refer to Table 3B for the correct splice fabric selection, and tiegum gauge.

Using the dimensions from the map in Step 6.6, prepare the bottom cover insert. Start with the bottom cover stock. Apply the splice fabric. When positioned in the fill-in, the **Plied Belt** splice fabric should have at least ⅛" of clearance from either cover bevel. If necessary, trim this fabric to suit. Apply a strip of tiegum to extend up to the cover bevel and over the buffed cover surface by approximately 1 ½". [25] (Diagram 6B).

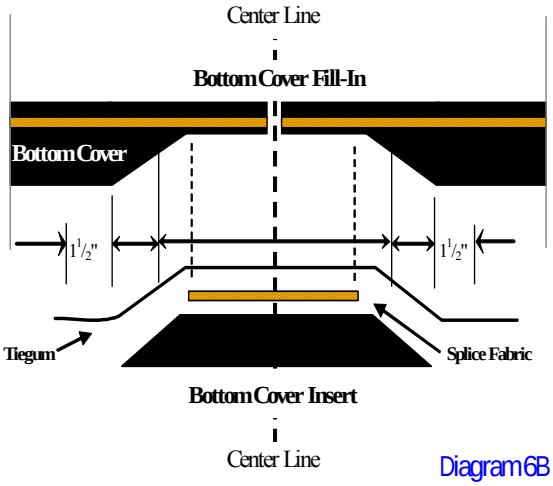

Diagram 6B

[22] Apply only one (1) coat of primer on any surface. If possible, try to keep the primer from contacting any bonding rubber surface.

[23] Additional coats of cement are permitted for enhanced tack, but not necessary for bonding purposes. When bonding splice components or surfaces together, a cemented surface can be tacky or dry but never wet.

[24] A proven way to do this is to transfer these locations to paper or film directly beneath the bottom cover fill-in.

[25] When building the insert, keep all the laminate materials centered. Doing so will make assembly easier, and assure a more favorable finished product.

6.8 Fold the second end of the belt back on itself. With the first belt end positioned on the worktable, apply the correct tiegum gauge over the entire carcass stepped area. Roll and remove any film. Stitch and perforate with an awl. [26]

6.9 Working with the first belt end, fold it back on itself. Position the bottom cover insert to properly fit this half of the cover fill-in area. Roll into place. Remove any film. Return the belt end back to the worktable taking care not to separate the insert from the fill-in. (Roll this interface again, if necessary.) [27]

6.10 Slowly and carefully return the second belt end back to the worktable. Begin mating the two belt ends together. Making certain all interfaces fit together as intended, starting with the bottom cover and bottom ply joint and finishing with the top ply joint. Roll and stitch down the belt ends as they are joined together being careful not to trap any air. [28]

6.11 Apply and enter the splice fabric over the top ply joint. As with the bottom cover insert (Step 6.7), both edges of the fabric should have at least ⅛" of clearance from either cover bevel. If necessary, trim the splice fabric to suit.

6.12 Apply strips of tiegum adjacent to both edges of the splice fabric that extend up the cover bevel and over the buffed and adjacent cover surface by approximately 1 ½" (same as Step 6.7).

6.13 Apply the top cover stock to this fill-in.

6.14 Trim off any excess rubber along both edges of the belt. Using an awl, make numerous punctures in both covers to allow for any trapped air to escape during vulcanization. [29]

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[26] **Plied Belt** *step Finger Splices!* This tiegum is only applied to the step surfaces themselves. At the finger locations, trim the excess tiegum away.

[27] **Plied Belt** *step Finger Splices!* Apply/stitch narrow strips of tiegum (1/8" wide x thickness of ply) adjacent to the edges of each bottom ply finger.

[28] Positioning scrap film between the belt ends will help minimize the possibility of trapping unwanted air. Remove the film just before any actual bonding takes place.
Plied Belt *step Finger Splices!* In the 1/8" gaps that exist between the finger joints of the top ply apply appropriate gauged tiegum. Stitch into place.

[29] Every splice requires a proper brand. This would be an ideal time to position your brand over the top cover fill-in.

7.0 Curing

7.1 Verify that the centerlines of each belt end are in proper alignment. This indicates that the splice, for the moment, is square. If necessary, slight alignment adjustment can be made. Cover the top and bottom fill-ins with release paper or cloth.

7.2 Position the edge bars firmly against the belt edges. Ideally these should be 1/16" thinner than the parent belt. Use clamps or come-alongs to maintain a tight seal between the belt and the edge bars, checking again as the vulcanizer temperature and pressure rise.

7.3 With the vulcanizer platens in place and properly secured, begin to apply pressure and heat. For pressure, all **Plied Belt** splices need 100 psi, Group 6 & 8 (EPDM & Butyl) based belts require 320ºF, while all other Fenner Dunlop grades require 300ºF.

Table 7

Fenner Dunlop Splice Material Curing Times		
Belt Type	**Belt Thickness (inches)**	**Cure Time**
Group 6	Up to & incl. 7/16	70 minutes
Group 6 (White)	15/32 - 1/2	75 minutes
Group 8	17/32 - 9/16	80 minutes
	19/32 - 5/8	85 minutes
	21/32 - 3/4	90 minutes
Group 1	Up to & incl. 5/8	40 minutes
Group 1 (White)	5/8 - 3/4	45 minutes
Group 2	3/4 - 7/8	50 minutes
Group 3	7/8 - 1	55 minutes
Group 4	1 - 1 & 1/8	60 minutes
Group 5	1 & 1/8 - 1 & 1/4	65 minutes
Group 7	1 & 1/4 - 1 & 1/2	75 minutes
Group 9	1 & 1/2 - 1 & 3/4	80 minutes

7.4 Once proper pressure and temperature levels have been reached, begin the cure cycle. DO NOT PREHEAT the vulcanizer. Cycle times are provided in Table 7. [30]

7.5 To improve flow of the splice materials and reduce air pockets at 230ºF turn off the power to the press for 5-min. Then turn the power back on and continue the heat up of the vulcanizer. DO NOT CHANGE PRESSURE AFTER IT AS BEEN SET.

[30] A field cure cycle begins the moment when all platen zones reach full temperature. Vulcanizer insrument readings are not always reliable. Therefore, Fenner Dunlop, strongly recommends the use of thermocouples. Not only do they have the required accuracy (+/- 5ºF cure temperature tolerance), they measure temperature at the platen/belt surface.

7.6 After the cure cycle is complete, begin the cool-down process. Keep the splice under full pressure until the temperature is below 150ºF. [31]

7.7 Remove the vulcanizer platens and inspect the entire splice. Trim the edges and/or buff to suit. [32]

[31] Never return a vulcanized splice back into service that is still hot to touch. Wait until the splice reaches ambient temperature.

[32] In particular, note the cover fill-in regions. Make certain that the lead bevels are flush with the belt or unwanted scraper abuse might result. Buff to suit.

8.0 Splice Layout Diagrams

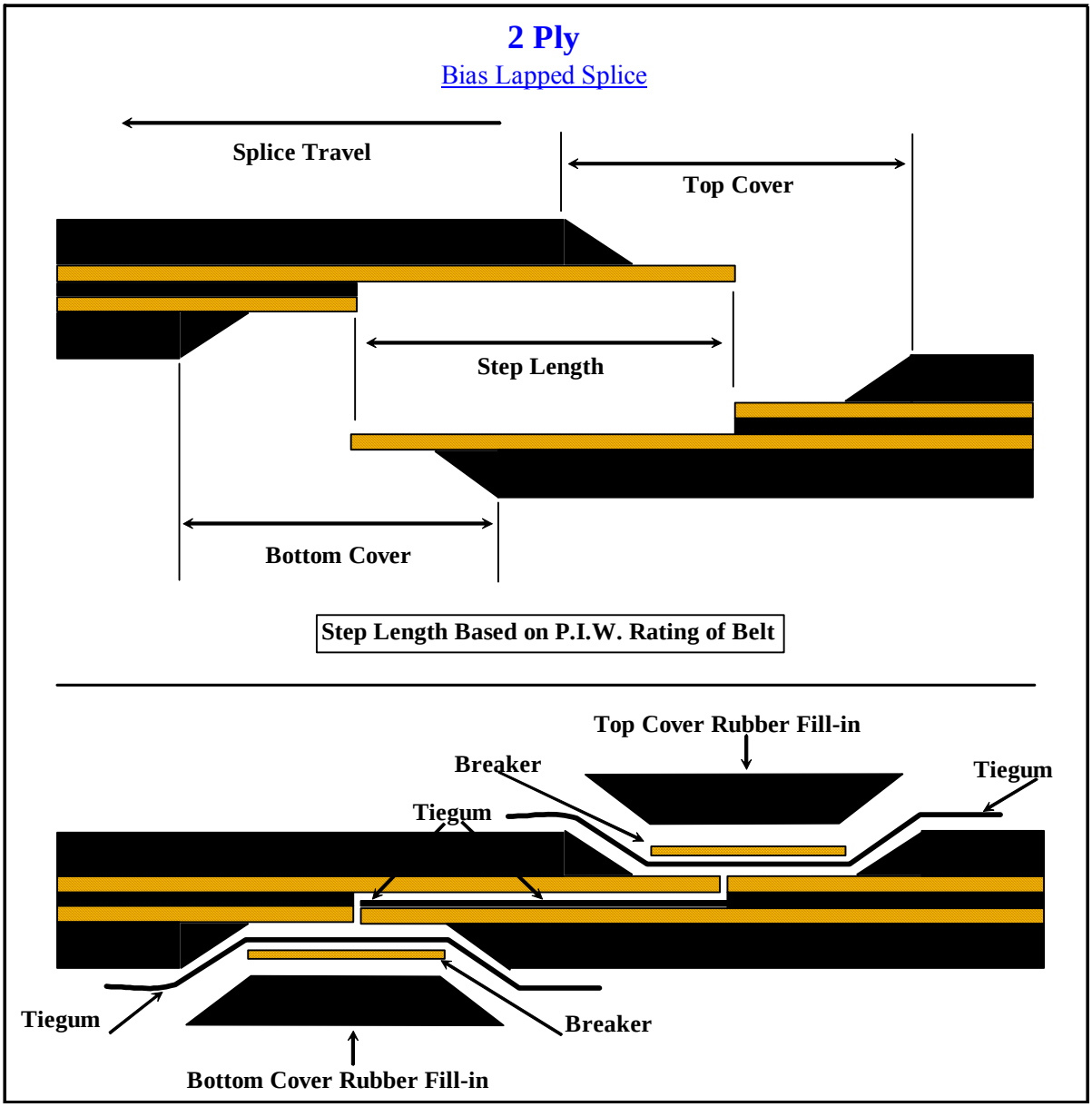

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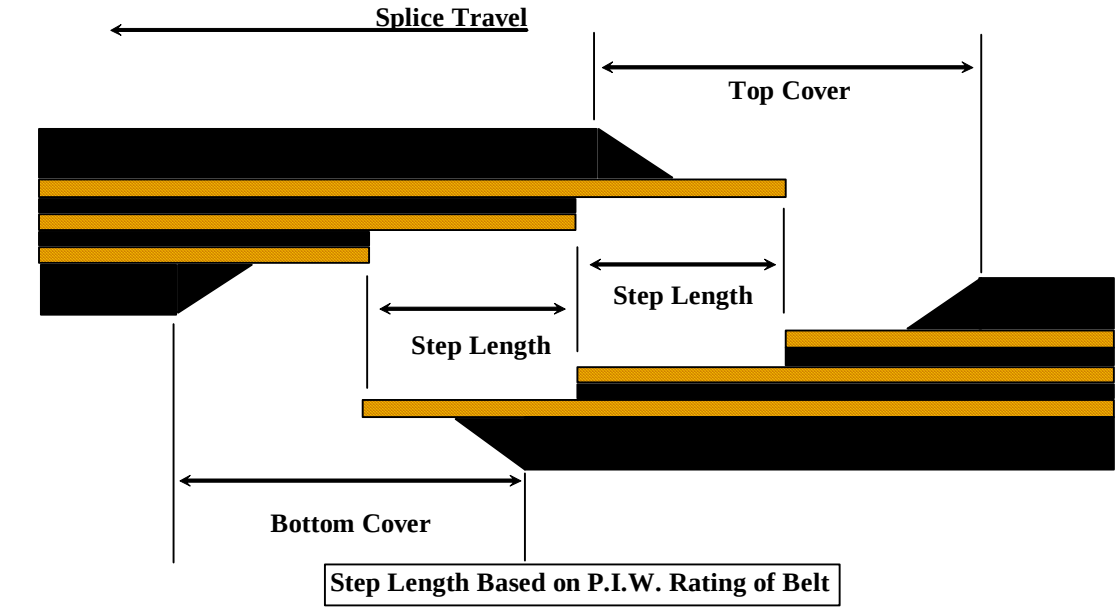
Diagram 8A

3 Ply

Bias Lapped Splice



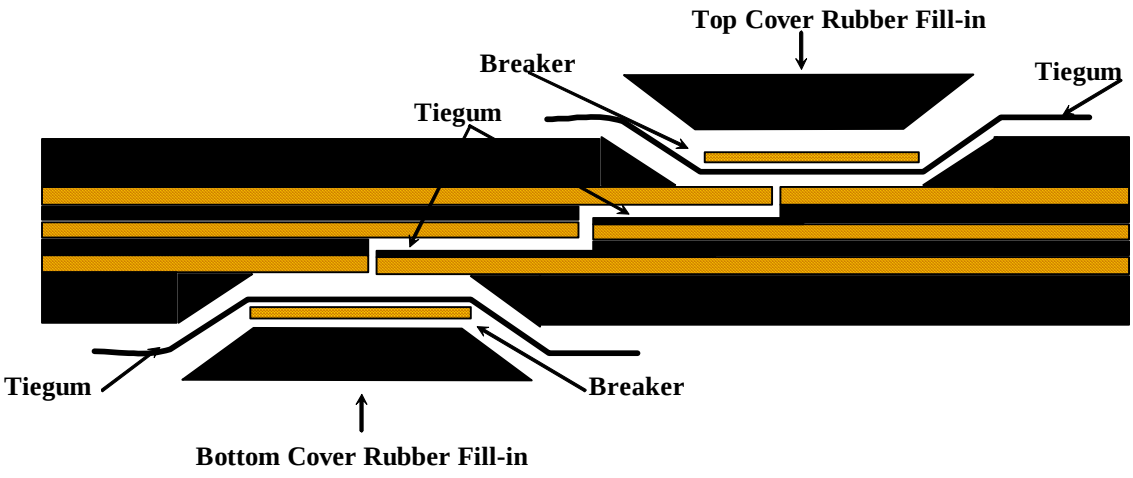


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Diagram 8B

4 Ply

Bias Lapped Splice

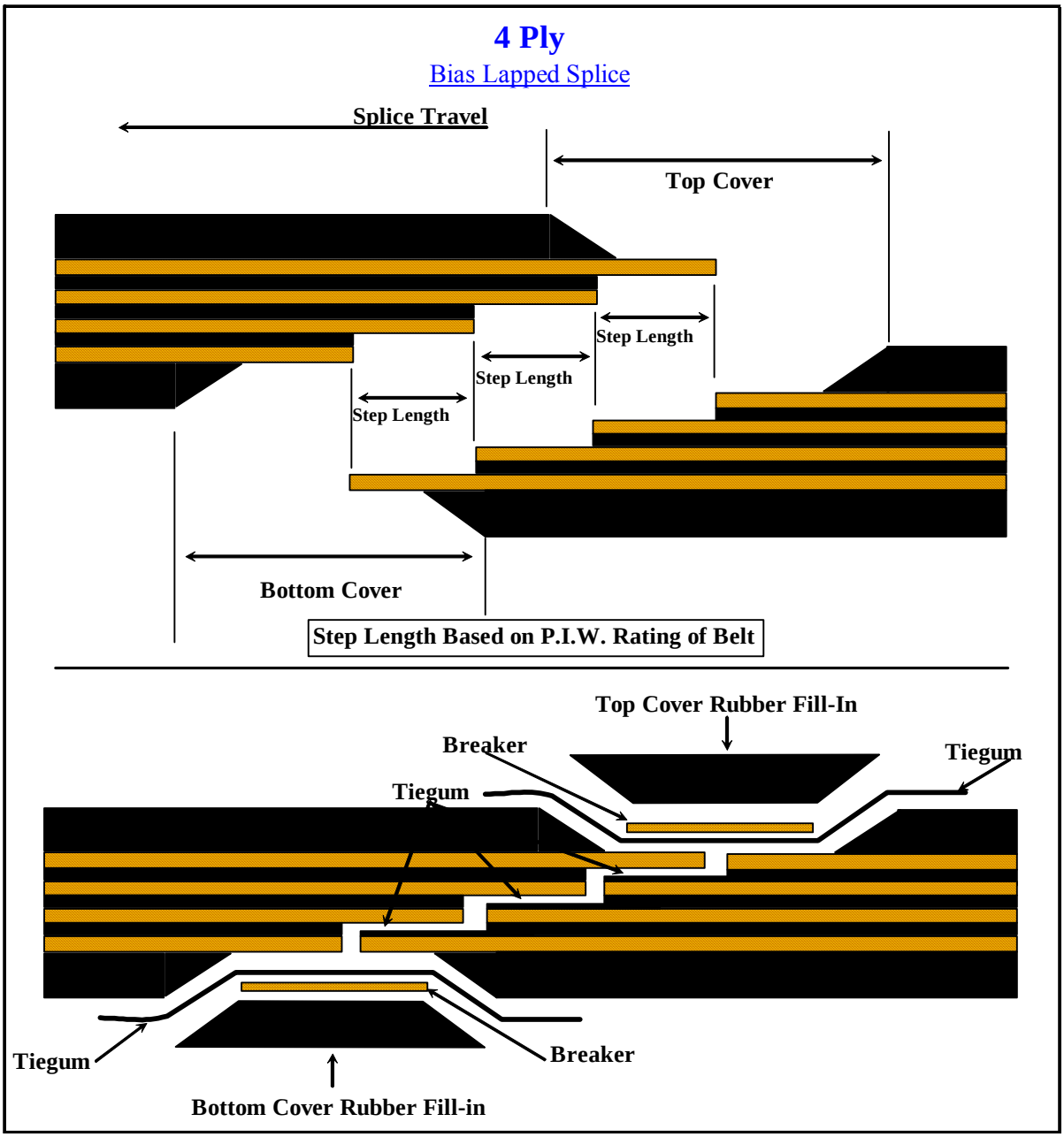

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Diagram 8C

5 Ply

Bias Lapped Splice

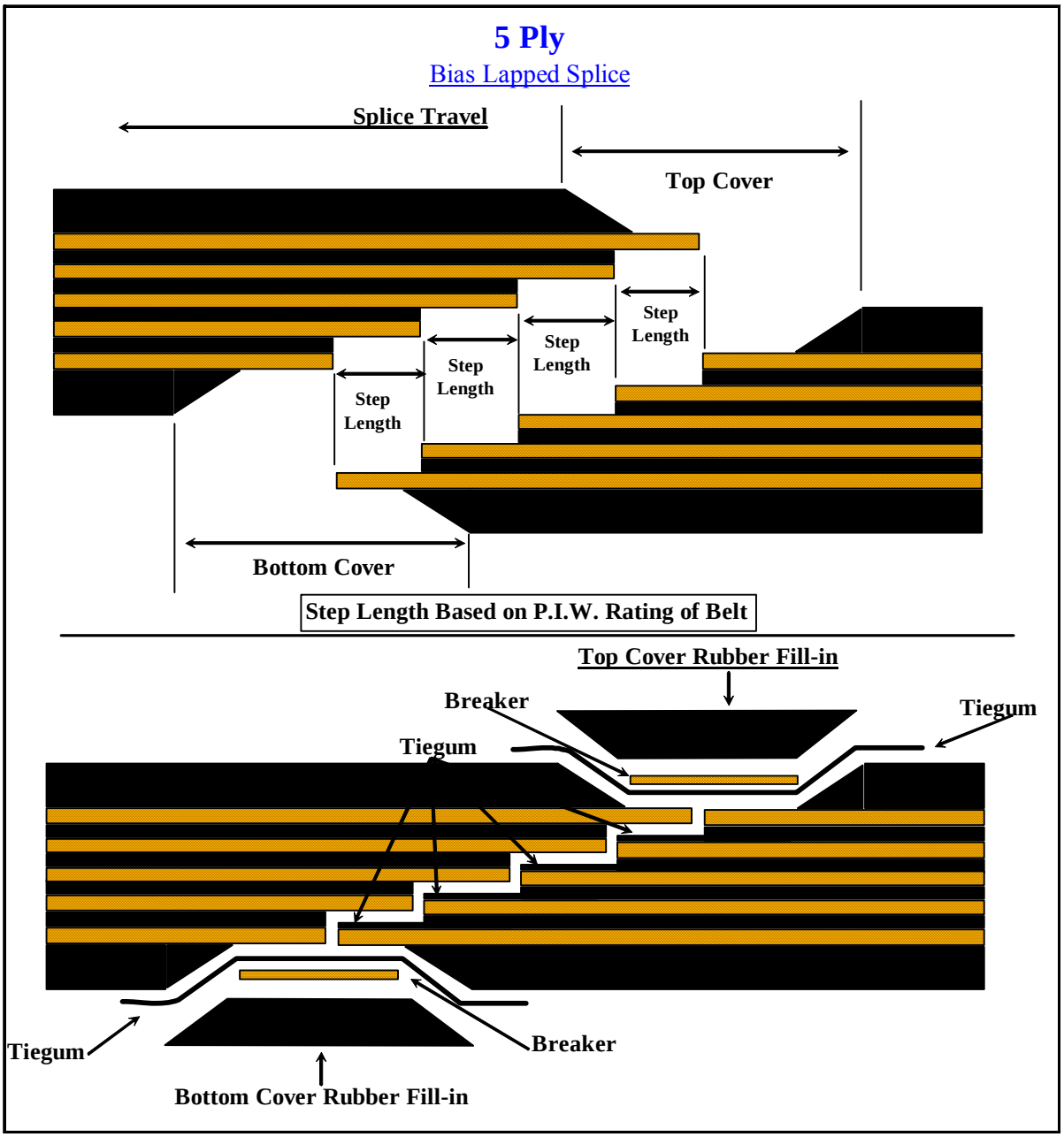

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Diagram 8D