

MINI-FINGER SPLICE PROCEDURE

Vulcanized Splicing Procedures

**Fenner Dunlop Light Weight PVC
Solid Woven Conveyor Belt**

Using PVC & TPU Bonded Finger Joints

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Scope

These instructions refer to the materials and techniques involved in finger splicing solid woven PVC impregnated conveyor belt and must be strictly adhered to. Fenner Dunlop cannot be held responsible for any modification or shortcut in the operation of this procedure. ¹

The procedure employs PVC & TPU film as the bonding medium and is suitable for all **Fenner Dunlop PVC Light Weight** belt types from 90 to 150.

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 merchantability and fitness for a particular purpose, and Fenner Dunlop expressly disclaims liability under any theory including, without limitation, contract or 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.

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1. Health and Safety

The following instructions and procedures shall be observed at all times during the preparation and manufacture of vulcanized joints in Light Weight PVC Solid Woven Conveyor Belt.

1.1 All equipment used in the splicing of solid woven conveyor belt must comply with site regulations relating to the use of electrical equipment.

1.2 None of the substances used in the PVC splicing paste are classified as dangerous substances. However, the following precautions should be taken when handling the adhesive to ensure maximum safety. MSDS Sheets are available on request.

- a) The work area should be adequately ventilated.
- b) PVC or rubber gloves should be worn at all times along with safety glasses.
- c) Eye contact and ingestion should be prevented and skin contact should be avoided.
- d) Accidental spillages should be cleared immediately. The application of any absorbent dry powder such as sepiolite sand will help to remove stickiness and facilitate removal of the spillage.
- e) Empty and/or unused tins are not to be left at the job site and should be disposed of in an approved method.

1.3 First Aid procedures to be followed in treating persons affected by the mishandling of PVC adhesive are as follows:

- a) Eye Contact
Give prolonged irrigation with water to the affected eye and get medical attention.
- b) Ingestion
If any of the PVC adhesive gets into the mouth, rinse the mouth with water. If any of the PVC adhesive has been swallowed, drink plenty of water and get medical attention.
- c) Skin Contact
Wash the affected area with soap and water until all material is removed.

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1.4 Make sure the conveyor belt is properly tagged out, de-energized and secured prior to initiating any work on the system.

2. Tools and Equipment

2.1 A heated press capable of curing the whole area of the splice in one cure and can be heated up to 310° - 320°F (150°- 160°C) and held there at curing temperature. The press must have a method of measuring platen temperatures. This can normally be achieved by the use of hand held thermometers but in certain cases it is advisable to use thermocouples between the platen surface and the vulcanized joint.

The press must be capable of holding an even pressure over the whole splice area of a minimum of 20 lb/in².

Presses for use food handling belts must comply with the regulations of the relevant authority.

Recommended Press Platen sizes (Total Vulcanizing Area)

In all cases minimum platen width is calculated by adding 4” (100mm) to the belts’ width, i.e., 36” (900mm) wide belt needs a minimum platen width of 40” (1000mm). The minimum platen length required is splice length plus 2 inches.

2.2 A clamping plate to match the belt width and extending a minimum of 1” beyond each end of the press is required.

2.3 The clamping plate must have belt clamps built in to hold the area to be spliced from moving during the cure.

2.4 Suitable level working surface on which to prepare the belt ends for splicing and protection from the environment if outside.

2.5 Straight edge, soft light colored pencil and tape or ruler for measuring and marking out the splice fingers.

2.6 Utility knife, spare blades and a small 1” rotary type belt sander.

2.7 PVC or rubber gloves and goggles.

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- 2.8 Absorbent dry powder such as sepiolite sand to facilitate removal of any spillage.
- 2.9 Thermocouples and temperature reading device.

3. Materials

3.1 The materials required (dependant on belt type & cover thickness) are:

Part Number	Description	Dimension / Unit
PVC Splice Materials		
8503-0900	PVC Splicing Foil - Black	.007 x 4 1/2" x 50'
8503-0901	PVC Splicing Foil - White	.007 x 4 1/2" x 50'
8503-0902	Urethane Splicing Foil - Clear	.007 x 4 1/2" x 50'
8503-0903	Urethane Splicing Foil - Black	.018 x 20" x 10'
8503-0904	Urethane Splicing Foil - White	.018 x 20" x 10'
8503-0905	Tereylene Mesh - Black	.010 x 57" x 10'
8503-0906	Tereylene Mesh - White	.010 x 57" x 10'
8503-0908	PVC Adhesive - A1404B - Clear	Quart

3.2 Storage and shelf life of materials

3.21 The PVC Adhesive should be stored at room temperature and protected from frost. Elevated temperatures {85°F (+30°C)} will lead to pre-gelation and thickening of the adhesive rendering it unsuitable and difficult to spread.

If the above conditions are met a shelf life of 6 months should be obtainable and up to 12 months if stored at 50 deg F.

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FOR LIGHT WEIGHT PVC BELTING
(PVC 90-150)**

This splice technique is recommended for all light duty PVC belting with tension ratings up to 150.

For belt styles with tension ratings beyond this range, consult the factory.

This technique and kits are designed to meet FDA requirements for food contact (white kits) or standard handling requirements (black kits).

Be sure to specify color, tension rating, surface finish and width of belts which the kits are intended for when ordering from the factory.

4. **Squaring Belt Ends**

4.1. Establish the belt's center point by measuring in equal distances from the belt's edges and marking several points at the center. Draw a line through these center points reaching in 30" from the belt end.

4.2. Place the edge of a framing square to this center line and draw another line perpendicular to it at the belt end. Using a sharp razor knife or other suitable cutting tool, cut through this line removing the uneven belt end. Be certain you make this cut vertical and straight as possible.

4.3. Repeat steps (1.1) and 1.2.) on the other belt end after careful measurement for the required net endless length has been made. Keep in mind that 4" of the belt length will be lost in the splice area and therefore, must be allowed for when measuring the net endless length.

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5. Removing Belt Covers

5.1. Using the squared belt ends as a base point, measure in 4 1/2" and draw another line also perpendicular to the belt's center line across the entire belt width.

5.2. In order to achieve maximum bond strength and allow room for the splice film, a thin layer of the belt's top cover must be removed. This can be easiest accomplished by etching the surface with a solvent such as Methyl Ethyl Keytone. Do this using a clean dry cloth dampened with the solvent and wiping until the cover has a dull appearance. This may also be accomplished by using belt grinding tools such as a small rotary belt sanding tool, again, just to remove a very thin layer of cover leaving a dull appearance. Which ever approach is used, be certain the entire belt end extending back to the line drawn 4 1/2" has been thoroughly and evenly dulled. For belts with skim or FS type surface finishes or used belts with worn covers, we recommend a 1" rotary type belt sander be used, only grinding enough to remove the thin surface finish and slightly fuzz the yarns.

5.3. Repeat above steps for other side of belt and other end of belt, both sides.

6. Drawing And Cutting Fingers

6.1. Measuring 4" in from the belt end, mark and draw another line perpendicular to the belt's center line across the entire belt width.

6.2. Draw the finger pattern on the belt end, to do this, simply start at the center point of a line just drawn across the belt 4" in and place marks 1" apart along this line in both directions to the belt edges. Next, starting at the center point of the belt end, split the 1" finger placing marks 1/2" on each side of the center point, then, continuing to the belt edges placing marks 1" apart. Place a framing square connecting the center line point 4" in with one of the marks placed at the belt's end 1/2" from the center line and connect them by drawing a continuous line. Move bottom of framing square to the other mark placed 1/2" from the center line at the belt's end and connect them. Move the top of the framing square to the same side of the center line with the lower part of framing square and to the first mark placed 1" over, then, connect them. From this point on, simply connect one mark to the next and follow the same for other side of center line. For other end of belt, simply reverse the marking outline by splitting the finger (1/2" each side) at the upper center point and measuring exactly 1" from the lower center point, otherwise, connect them in the same fashion. NOTE: The point of the outside fingers in the splice should be

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pointing in the opposite direction to normal travel of the belt. For any normal width belt having multiples of 1", the small outside finger will always be on the belt end where the center finger is split at the upper reference line.

6.3. Using a sharp razor knife, cut along this pattern, being careful to keep the cut vertical and straight as possible and avoid cutting the fingers too large by keeping the cut to the inside of the pattern lines. We recommend almost no gap remain between the fingers when they are placed together which will assure a good contact of the adhesive treatment when the two ends are placed together.

7. Base Coat Adhesive Application

7.1. Before applying the base coat adhesive, be sure that both prepared ends of the belt are clean and free of dust or oils which may have accumulated during the grinding and cutting operation. Do this by simply wiping both prepared ends, both sides, with a clean cloth dampened with a solvent such as Methyl Ethyl Keytone. Be certain that all of the solvent used for this cleaning purpose has evaporated before proceeding.

7.2. Before using the PVC Adhesive - A1404B, be sure to stir well. Using a small paint brush apply a moderate layer of the adhesive evenly across the entire prepared area, including the sides of the fingers, both sides of the belt, both belt ends. Make sure the adhesive is "worked in" well by brushing back and forth in all directions. Do not apply too thick a coat as solvent may become entrapped. Allow the base coat adhesive to dry until it is tack-free (approximately 10 minutes).

8. Alignment Of Belt In The Platens And Cure

8.1. First, apply single strips of 1 1/2" wide masking tape across the belt width just behind the buffed and adhesive treated surface (both sides, both ends). This tape will serve to catch any of the top coat which might overflow onto the belt's surface during the cure. (OPTIONAL)

8.2 Place bottom platen in position and cover with Teflon coated fabric or other suitable release material to prevent sticking, place one belt end atop the platen along with side shim bars which are equal to or slightly thinner than the belt being spliced, 1" wide and long enough to extend about 4" to 6" beyond both ends of the platen. Position the prepared area of that end to the approximate center of the platen and using a lockdown clamp fixture or other type of clamping

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technique, lock this belt end firmly to the side shims bars (edge irons). Place the other prepared end in position and lock it loosely to the side shim bars using the same procedure. Using the lines which were drawn across the width of both belt ends 4" in, parallel (align) the belt ends while being certain the distance between the lines remain close to 4" and the fingers are butted snugly together to achieve good adhesive contact. After alignment has been accomplished, recheck all clamps to be certain of absolute tightness. Be absolutely certain the belt ends relocked securely across the entire width inside the clamp fixture, otherwise, when pressure is applied, the fingers would be forced out of position in an area not securely fastened. It may be necessary to use thin spacers (shims) between the belt and clamp fixture in areas not securely fastened to prevent this.

8.3. Carefully raise the fingers and lay one section of the PVC or TPU film strip atop the bottom platen and centered directly underneath the fingers. Place the other section of PCV or TPU film strip centered directly atop the fingers. Recheck alignment of the splice area to be certain it is centered atop the bottom platen and recheck bottom layer of plastic film for proper alignment directly underneath the fingers. Place the top platen into position with another piece of release fabric between the belt and the platen, then lock it securely in place. NOTE: For belts with skim or "FS" surface finishes, it may be necessary to have 2 layers of the film strips. If the belt being spliced has a skim or "FS" finish both sides the extra layer need only be applied to the top side.

8.4. The temperature and time required for proper cure is 320 deg F (plus or minus deg 5 F) for ten (10) minutes. If the platens are cold or only warm at this point, they must be preheated before applying pressure. Once the platens have reached a temperature of 315 deg F or above, then, and only then, apply 20 PSI pressure and maintain for ten (10) minutes. Much time can be saved by preheating the platens. If the platens were preheated to this temperature, simply leave it in place to preheat the splice film strips for three (3) minutes before applying pressure, then an additional eight (8) minute period after applying pressure.

9. Splice Cool Down And Trim

9.1. First, turn the platens off. If your platens are equipped with cooling coils, then cool them to below 175 deg F before removing pressure. If your platens do not have a cooling coil, allow them to air cool to below 250 deg F, then, release the pressure and while slowly sliding the top platen across the splice to one side, place on a heavy flat metal plate or plates atop the splice while being very careful not to allow it to buckle or raise from atop the bottom platen. Allow the flat metal weights to remain in place on top the splice area for a period of thirty (30) minutes before removing them and proceeding.

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9.2. Trim away the layers of masking tape along with any overflow while being careful not to cut into the belt (OPTIONAL).

9.3. Before applying full tension and operating the belt, be certain the splice area has cooled to a point where you can place your hands on it.