



# Making Preventive Maintenance Pay Off

Presented by: Ashworth Bros., Inc  
Jon Lasecki, Chief Engineer  
September 25<sup>th</sup>, 2010



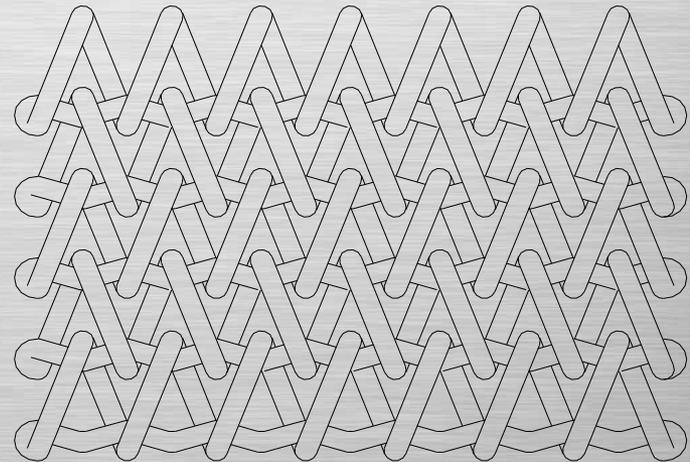
# Agenda



- 1) Basics
- 2) Options
- 3) Layouts
- 4) Installation
- 5) Control Systems
- 6) Tracking
- 7) Maintenance
- 8) Troubleshooting

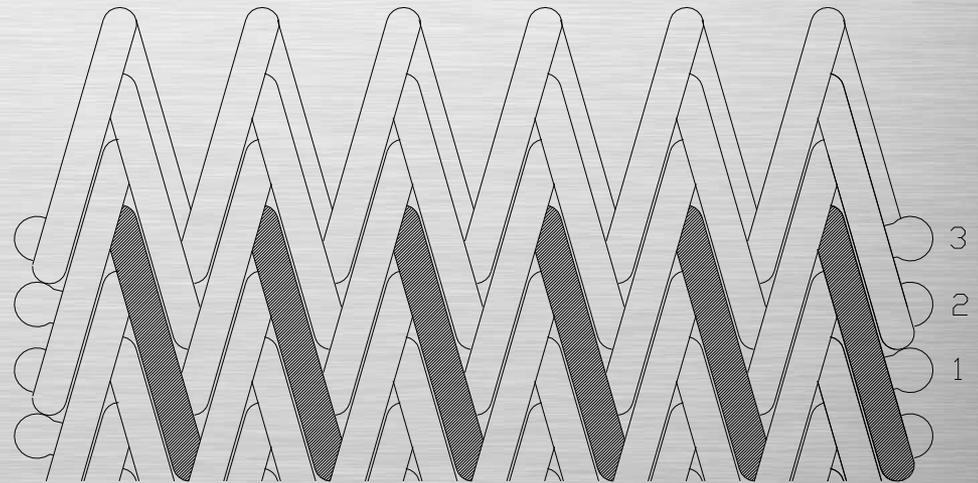
## Balanced Weave

- Alternating right and left hand spirals joined with a crimped connector
- B72-66-18
- B72-60-16



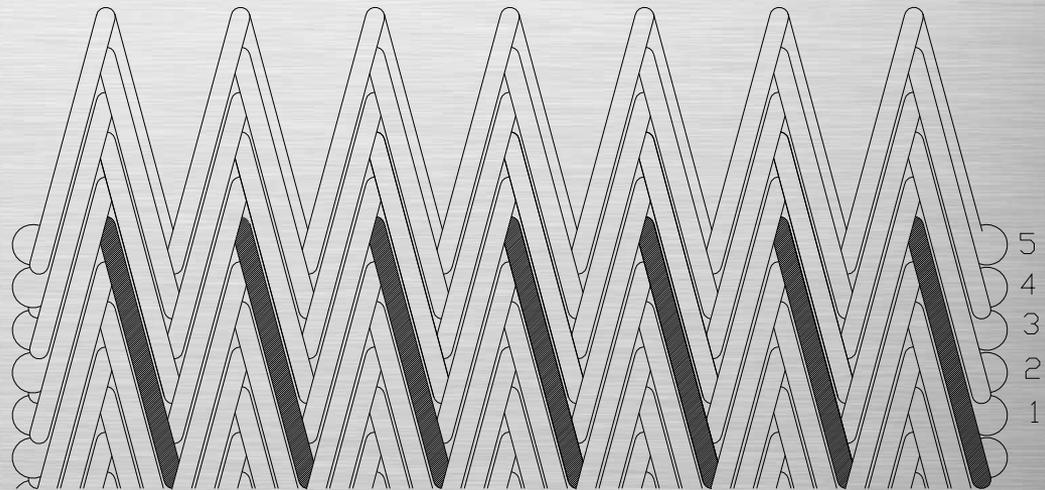
## CB3 Compound Balanced Weave

- Three balanced weave belts
- Alternating right and left hand spirals joined with a crimped connector
- CB3 42-72-1416



## CB5 Compound Balanced Weave

- Five balanced weave belts
- Alternating right and left hand spirals joined with a crimped connector
- CB5 27-84-1416

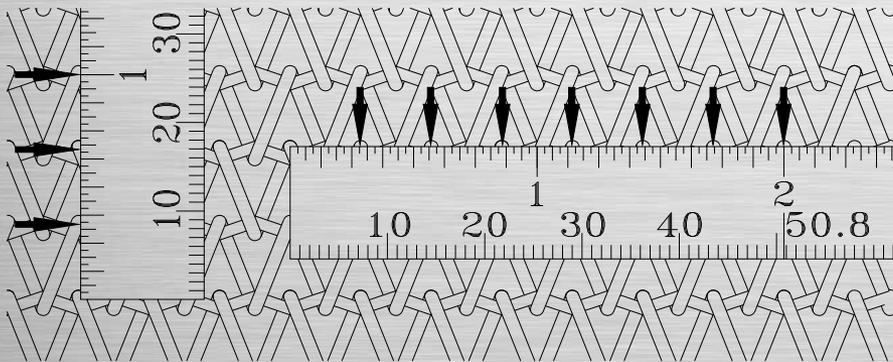


# Typical Nomenclature for Balanced Weave Mesh Designations



## BXX-YY-ZZ

- B** indicates a Balanced Weave mesh
- XX** number of loops in 12" of belt width
- YY** number of connectors in 12" of belt length
- ZZ** wire gages used to produce belt



If two different sizes of wire are used, the gage of the connector appears first followed by the gage of the spiral

## Balanced Weave

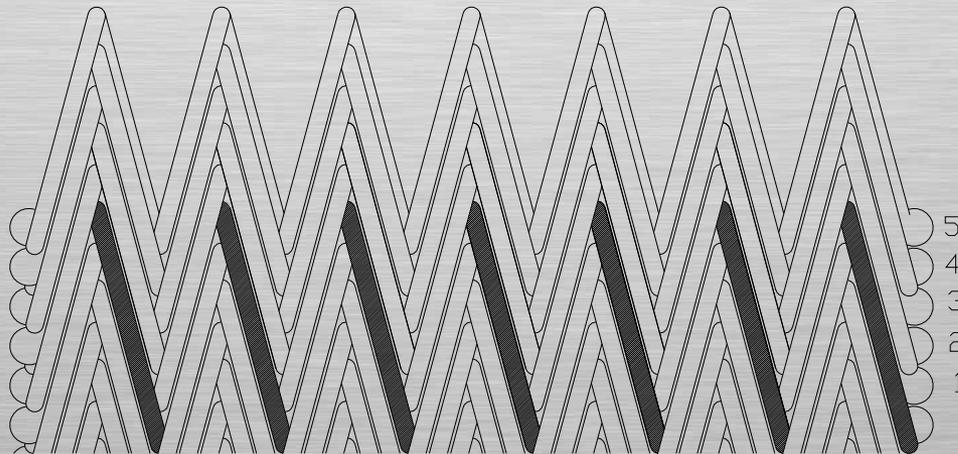
- Mesh choice is nearly unlimited. Selection should consider:
  - product support
  - heat exposure
  - belt strength required for the oven design



# Compound Balanced Weave – CB5 27-84-1416F



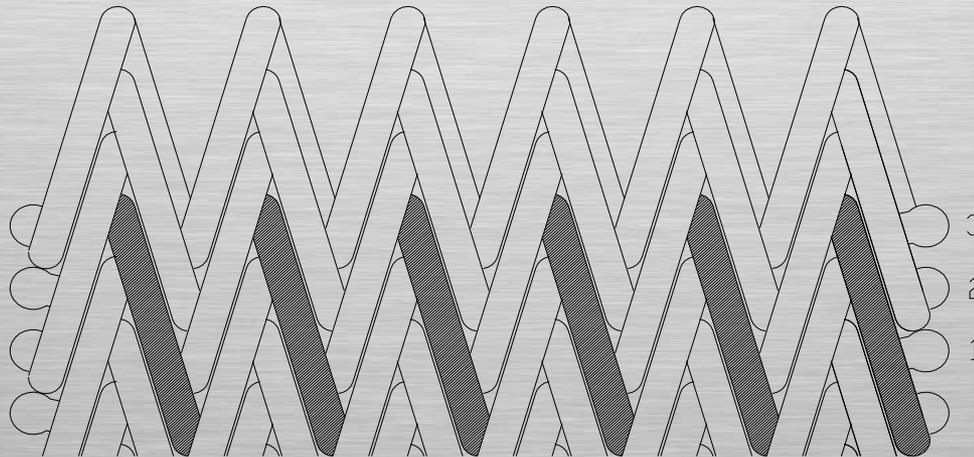
- 1963 - Introduced by Ashworth Bros., Inc.
- Today this specification is the most widely used dense mesh band in the western hemisphere



# Compound Balanced Weave – CB3 42-72-1416



- Finding more acceptance in the Tortilla Industry
- Can operate on smaller terminal rollers than the CB5 27-84-1416



# Compound Balanced Weave

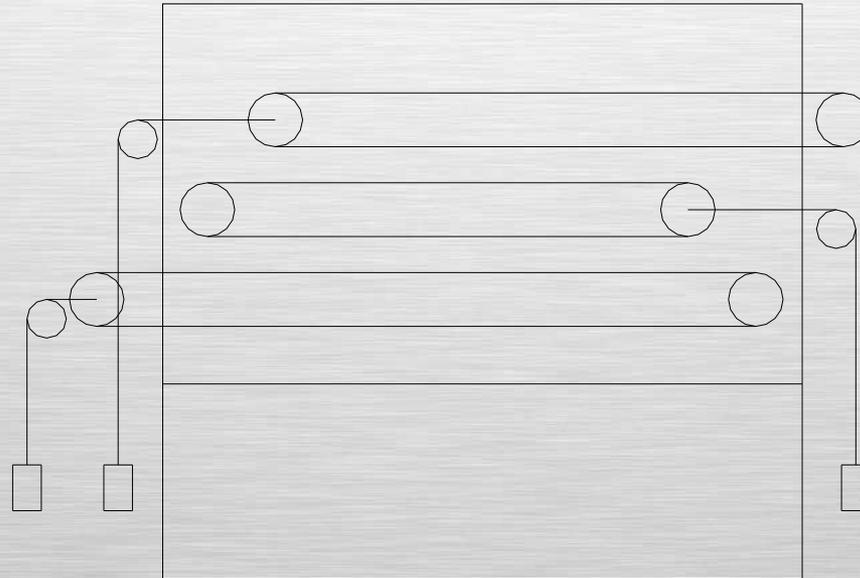


- Maintains heat for quick processing
- Leaves aesthetically pleasing marks on the product
- Crimped connector assures positive positioning of the spirals for true tracking



- **Material**
  - Typically annealed high carbon steel round wire
- **Flattened Wire**
  - If a more flat conveying surface is required the spirals can be made from a flattened wire
  - The letter "F" as a suffix is added to the mesh designation to specify *flattened wire*

# Layout of Baking Conveyors



- Terminal Drums
- Band Support
- Take Up
- Control Systems

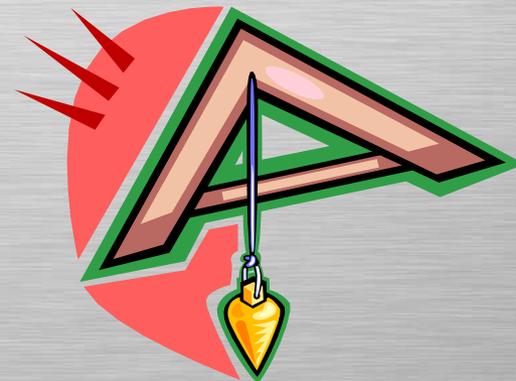
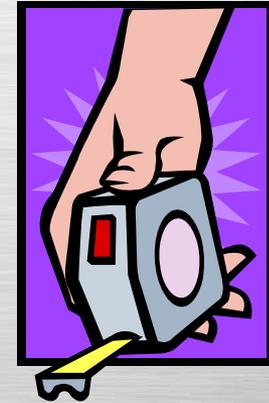
- **Located at the terminal ends of the conveyor**
- **One serves as drive and the other an idle**
- **Flat Faced – never crowned!!**
- **Must be large enough to insure good contact and maximum flexibility as the band travels around the drum**

- **Minimum Drum Diameter =**
  - For BW -  $180 / (\text{mesh second count})$ 
    - B72-60-16 = 3 inches
  - For CB3 -  $180 / (\text{mesh second count} / 3)$ 
    - CB3 42-72-1416 = 7.5 inches
  - For CB5 -  $180 / (\text{mesh second count} / 5)$ 
    - CB5 27-84-1416 = 10.75 inches

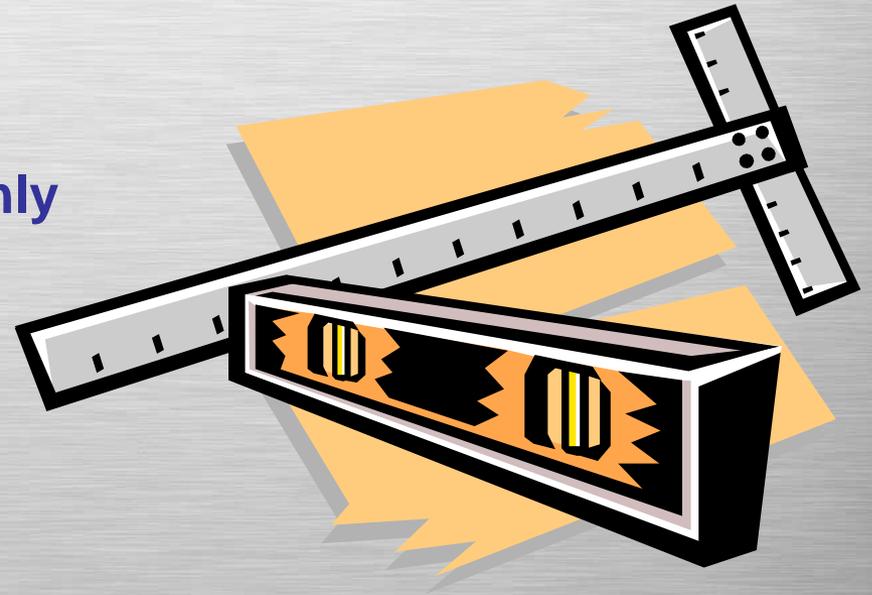


# Terminal Drums

- Drums are several inches wider than the band
- Must be level, parallel to each other, and square to the centerline of the conveyor
- Must be clean, no product build-up on surface



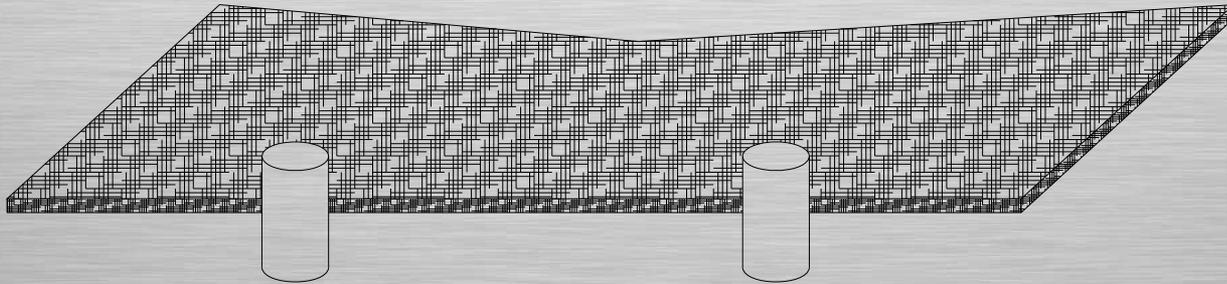
- **Skid Rails**
  - Most common in Tortilla Ovens
  - Must be level and have a uniform surface
  - Adjustments can be made only when the oven is cold



- **Free Turning Rollers - Recommended**
  - Free turning, horizontally adjustable
  - Externally mounted bearings
  - Minimize wear on the band
  - Account for lower tension to overcome friction in the system
  - Aid in band tracking



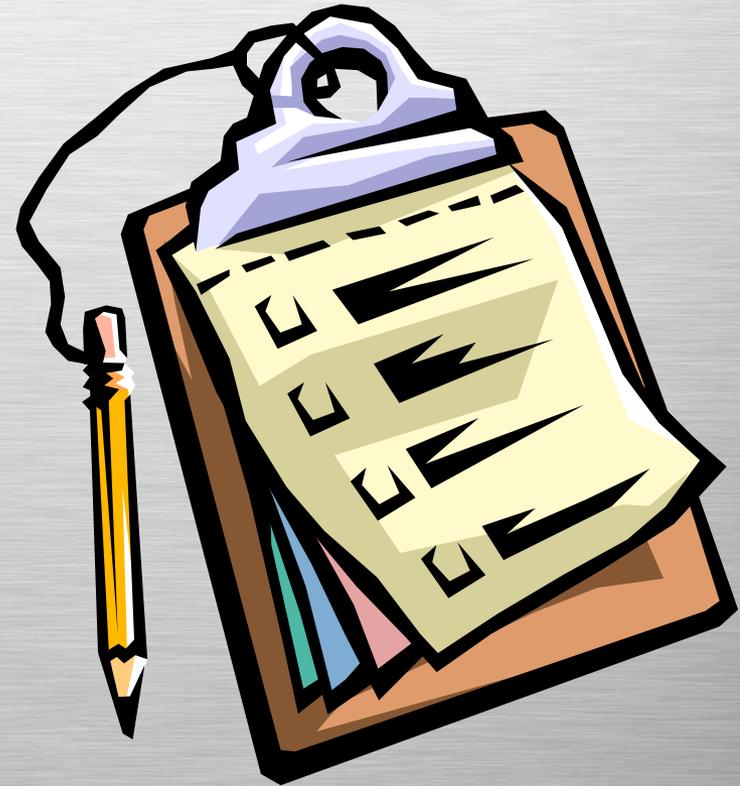
- Most commonly are small vertical rollers
- Commonly mounted at the edges of the belt near the terminal drums



- **Select a band suitable for the product and baking environment**
- **Consider:**
  - *Material* suitable for process environment
  - *Bake surface* compatible with dough
  - *Opening size* with consideration of product size, air flow, and band temperature
  - *Markings* on the product
  - *Band strength* required for oven design

- **Purchase a band that will run straight**
- **Ashworth tracks all our BW belts prior to shipment**
- **Insure all components of the conveying system are in good condition and aligned properly**
- **Install the band without damage and in the proper direction of travel**

- **Inspection**
  - Belt path for obstructions
  - Conveyor and oven components are in good working condition



# Installation of Tortilla Bands



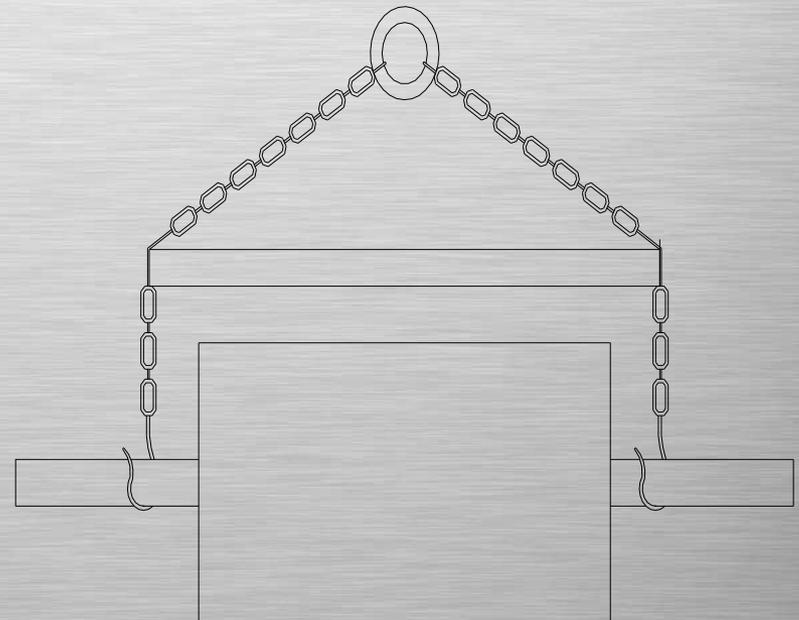
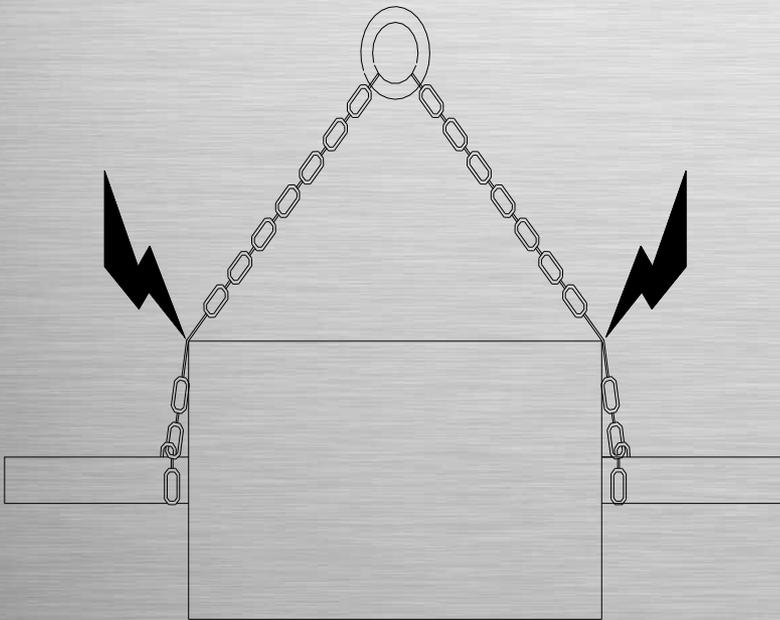
- **Adjust the conveyor components to create a straight path with uniform tension across the band width**
- **Exert zero or minimal forces to maintain this path**
- **Maintain this condition and alignment of band and the conveying system**

- **Conveyor Alignment**

- Terminal rollers must be level, parallel to each other, and perpendicular to the oven centerline
- Most common methods used to align terminals are:
  - "Diagonal-Parallel" method
  - "Centerline" method
- All measurements should be within  $\pm 1/32$  inch [1 mm].



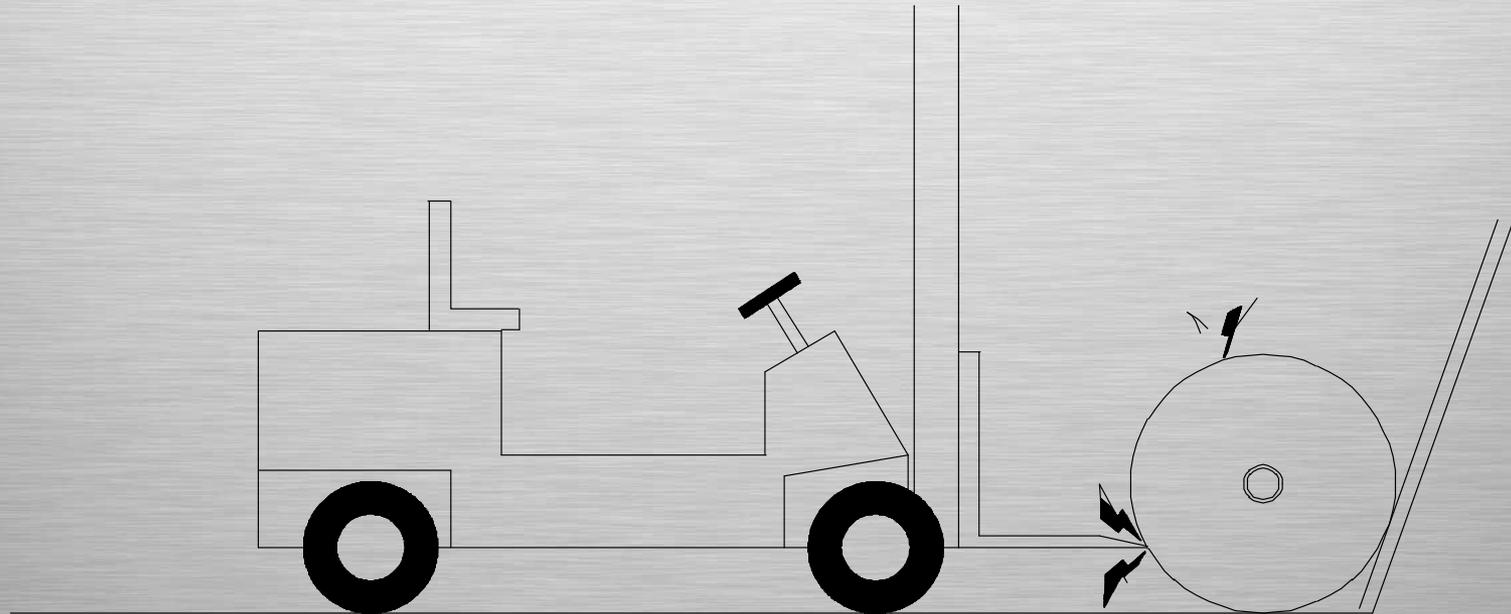
**Slings should include a spreader bar to prevent belt damage**



# Band Installation



**Uncrate the band with care. Avoid blows or concentrated pressure on the roll circumference**

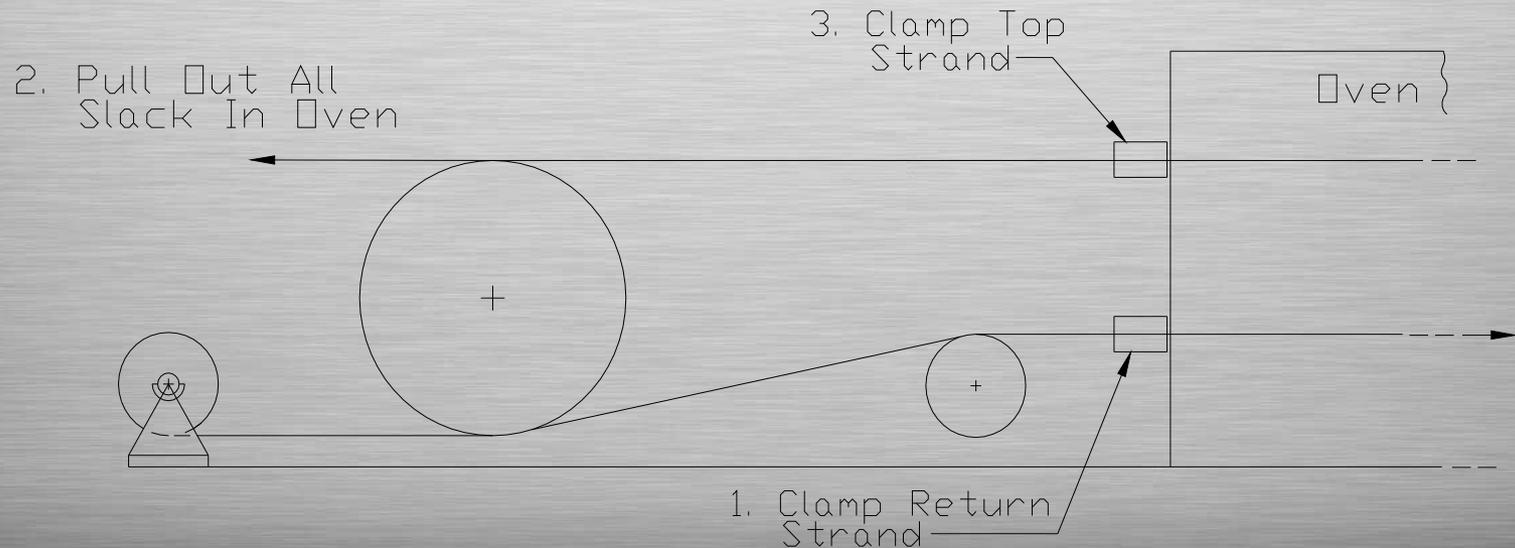


# Band Installation

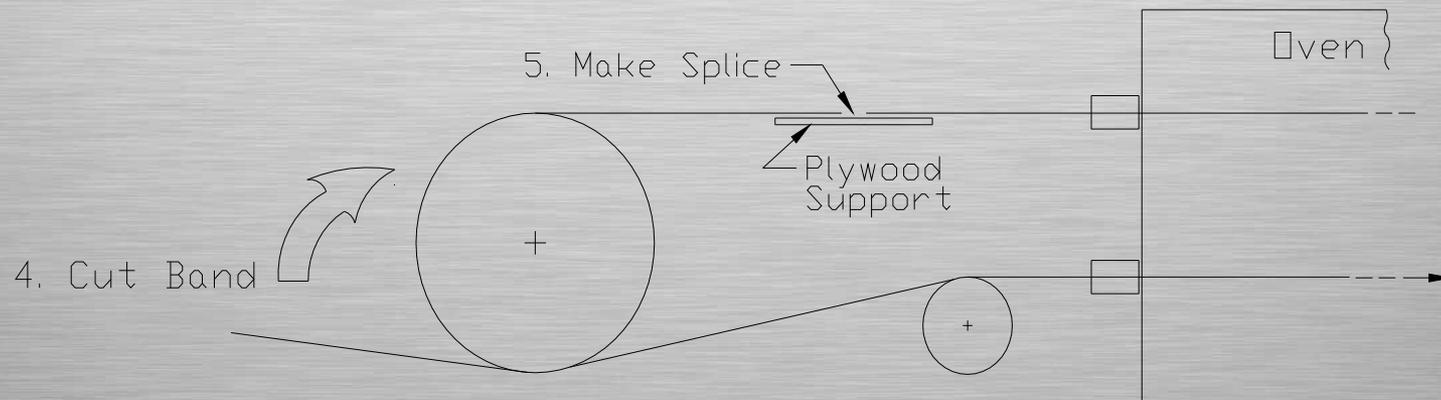


- **To make the final splice:**

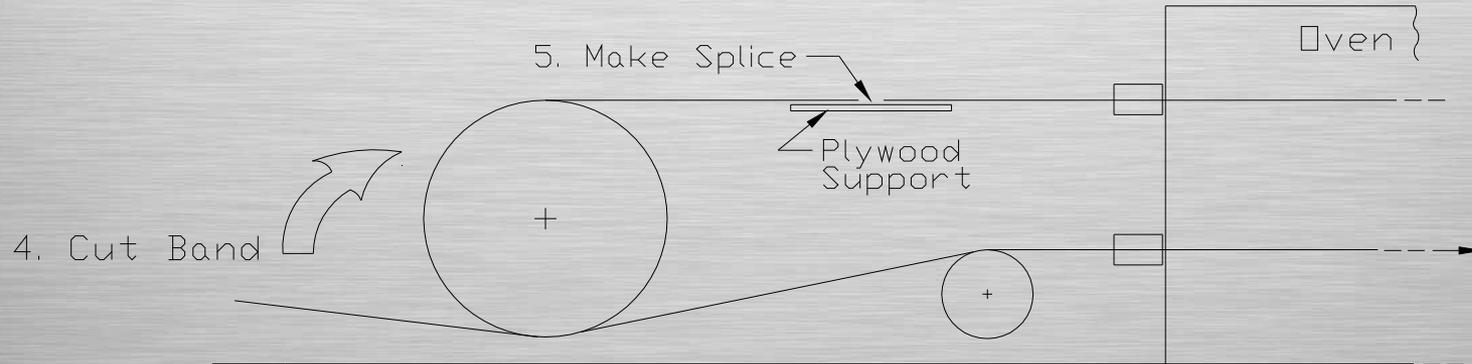
1. Clamp the band where it first enters the oven
2. Pull until the band is tight throughout the oven
3. Clamp the band at the oven exit



4. Disconnect the rope or cable and remove any excess band so that the final splice will fall on top between the oven and the drum. Make the final cut so that a right hand spiral is mating with a left hand spiral (Exception: Unilateral weaves have all the same hand spiral)



## 5. Insert the connectors and remove all clamps

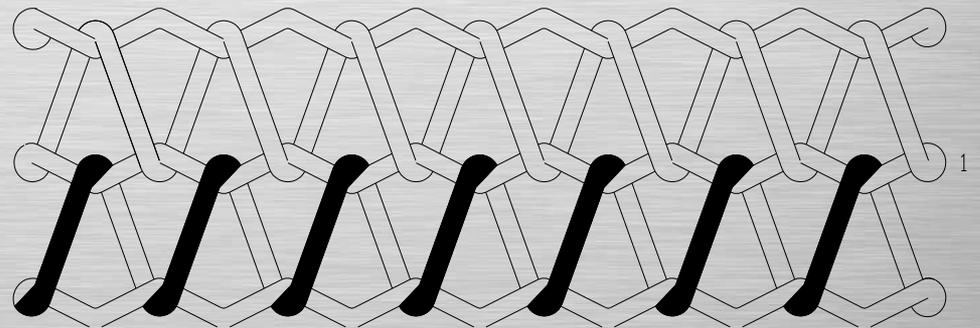


# Band Installation



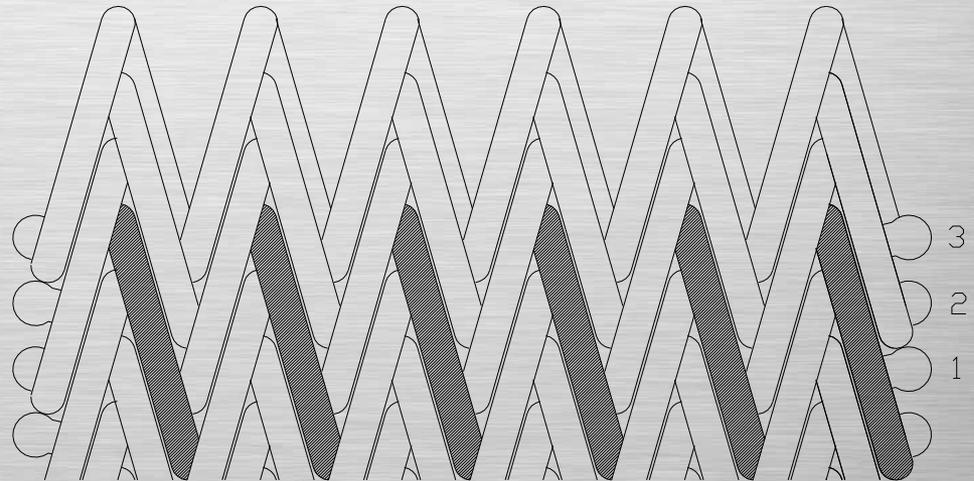
Splice together each succeeding roll of band using the correct number of connectors

**Balanced Weave**  
1 connector



# Band Installation

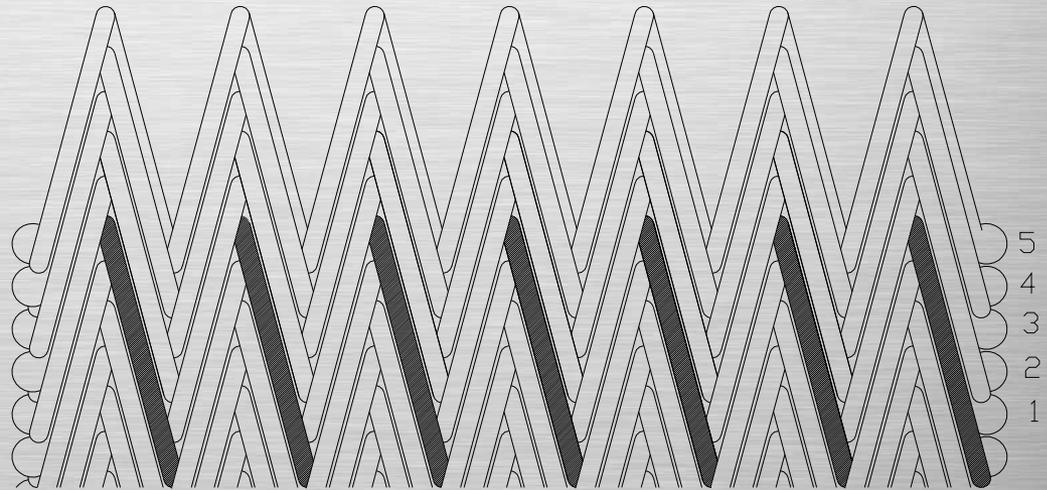
**CB3**  
3 connectors

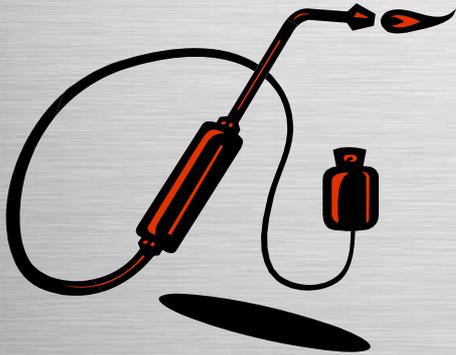


# Band Installation



**CB5**  
5 connectors

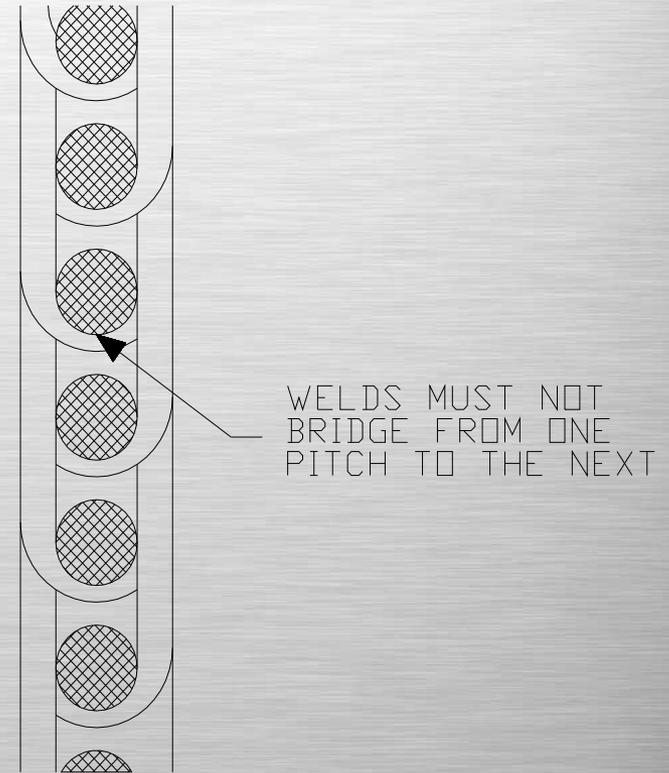




- Trim the connectors about 1/16 inch [2 mm] from the belt edge
- Use a small tip acetylene torch with reduced pressure and a neutral flame
- With sharp nosed pliers holding the spiral and connector in contact, apply the torch to the end of the connector until it forms a molten ball

# Band Installation

- Then flow it back to the spiral where the two will visibly flow together
- For the CB5, the spiral wire is small and will not tolerate a lot of heat before it disappears
- Remove the torch quickly when the flow takes place



- Apply tension necessary to cause the band to move
- Must be automatic to maintain uniform tension as the band expands and contracts with temperature
- Most oven systems today use free hanging weights or an air cylinder take-up



- **Band Take-Up**

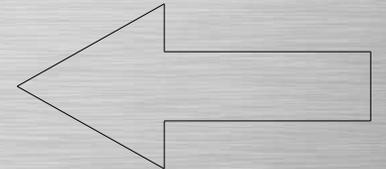
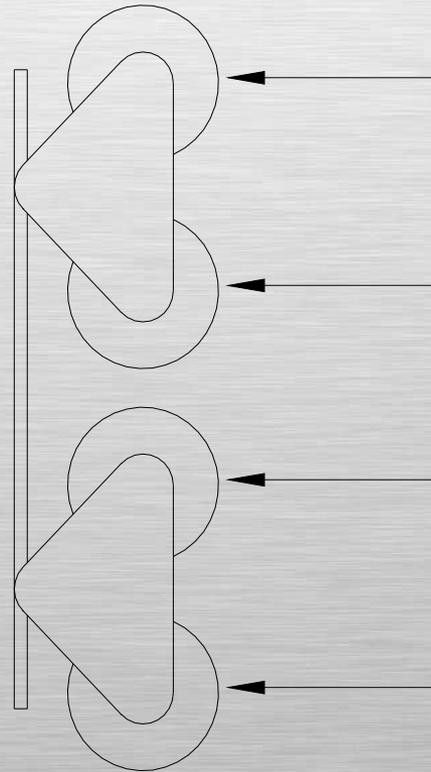
- Shortest position at the time of the final splice
- Insure that all components of the take-up move freely through its entire travel
- Free hanging weights must move in unison or tracking will be affected



- **If space permits Ashworth recommend some sort of control system**
- **Ashworth control systems are simple mechanical devices that have been successfully used for over 20 years**
- **No electrical or air power is required**
- **Designed in double tandem configuration (three pivot points) that divide any lateral forces among four contact points to avoid stressing the band edges**

# Control Systems

- Locate controls three (3) band widths prior to the terminal drums
- If the conveyor is less than 6x as long as wide locate the controls 1/3 the conveyor length prior to terminal drums



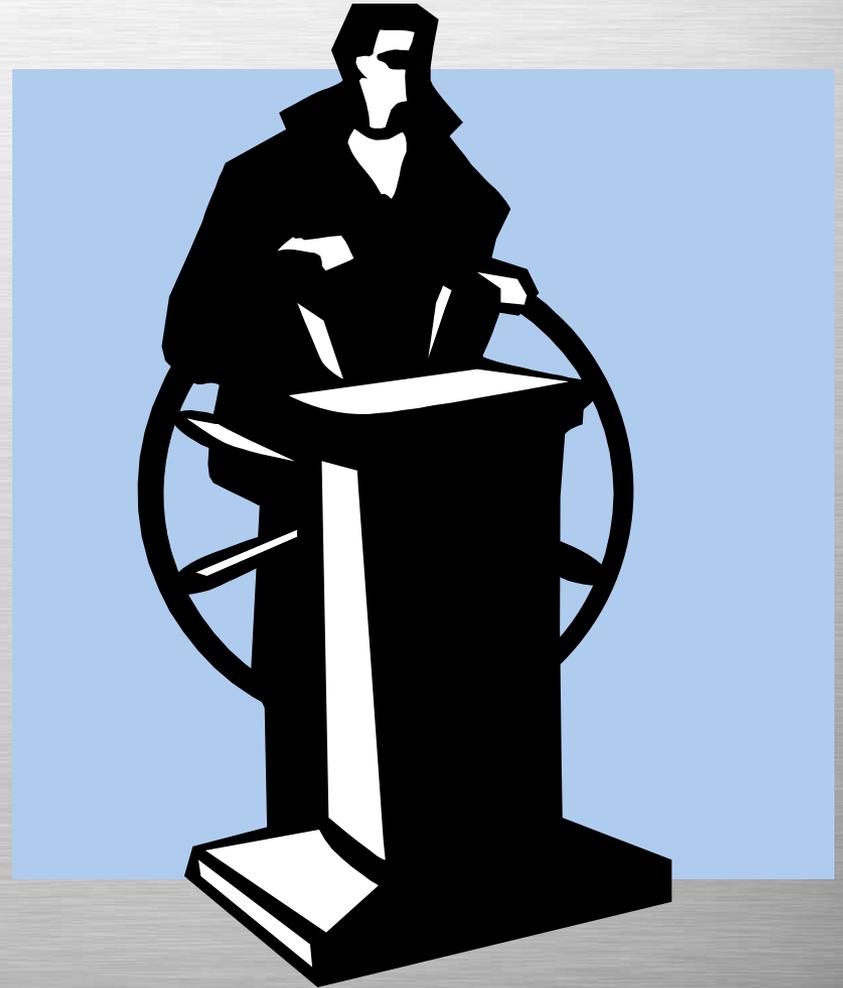
## Control Clearances

- A well tracked band will have only light contact with the controls, alternating in a slow cycle from one side to the other
- Proper operation requires correct set-up

- **Suitable for all spiral meshes.**
- **Guide rolls adjust vertically to move roll to new wear point**
- **Available with either ball bearings or ZW (zero wear) carbide bearings**
- **Two control units required per system**

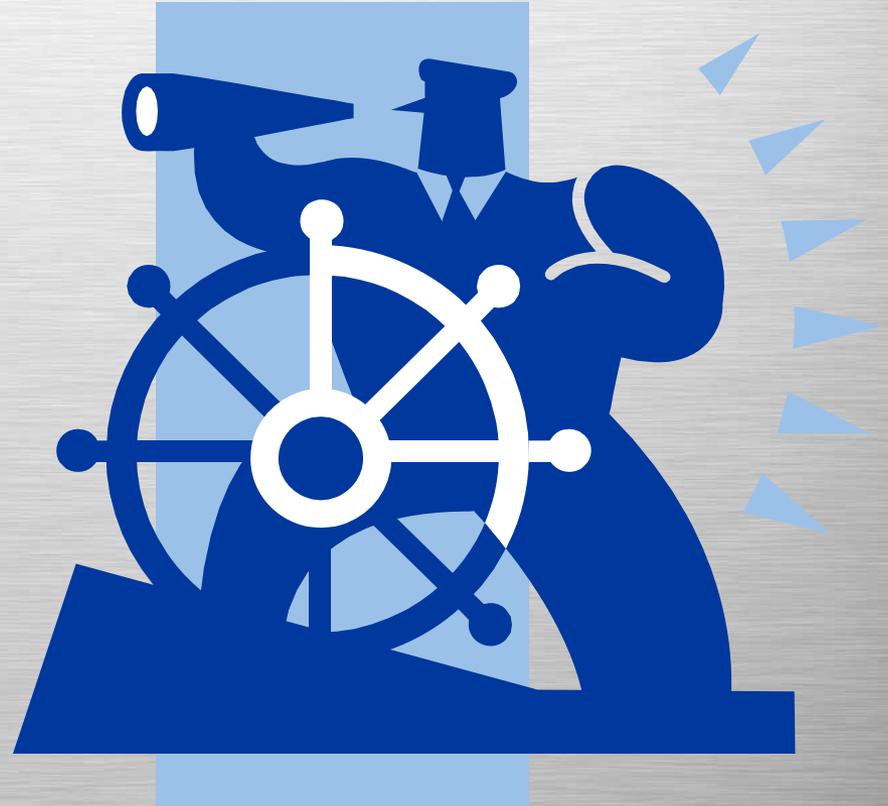
# Tracking the Band

- Tight confines of Tortilla ovens do not allow much adjustment
- Belt must be installed properly
- Must have confidence belt supplied was manufactured correctly

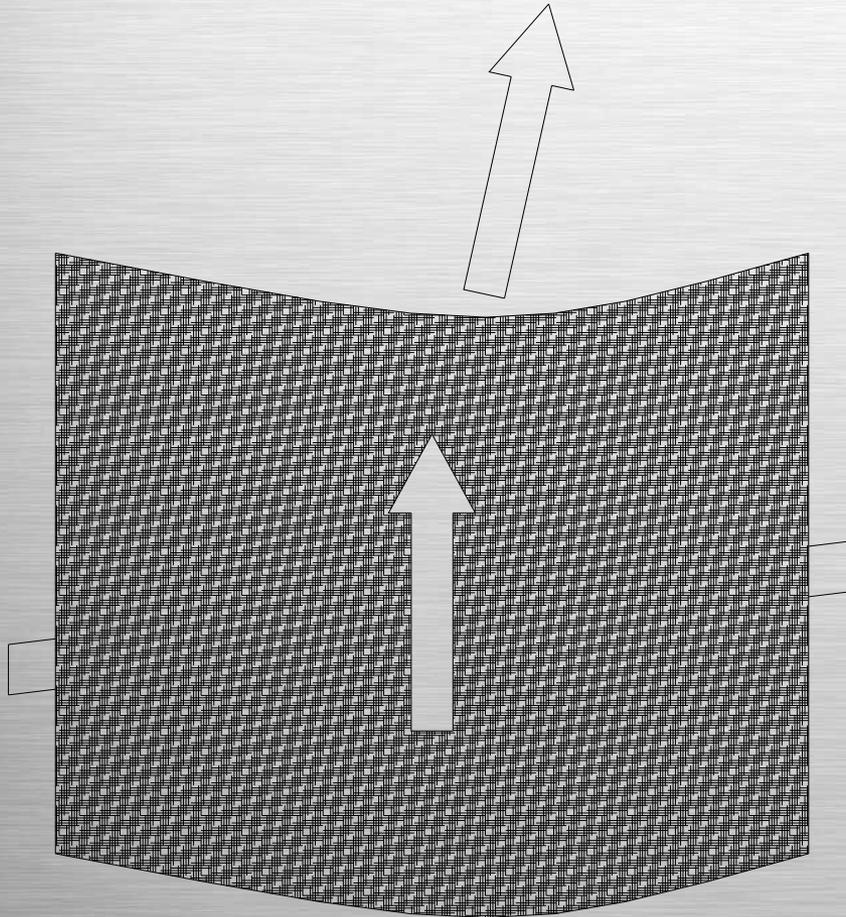


# Tracking the Band

- Track belt path using support rollers or adjusting height of skid rails
- **NEVER** adjust terminal drums or snub rolls



# Tracking the Band



- Belt traveling over skid bars will slide in the direction of any skew

## Inspection and Prevention

- Band
- Path
- Oven
- Drums and Major Rolls





- **Inspection and Prevention**
  - **Control System**
  - **Take-up**
  - **Roller Supports**
  - **Slider Supports**

- **Band mis-tracking**
  - Product loading
  - Temperature Variations
  - Frozen/broken bearings
  - Slider bed out of level
  - Skewed terminal rolls
    - Blocked take-up travel



- **Vibration**
  - Tension
  - Eccentric rollers
    - Product build-up
  - Loose framework
  - Band speed
  - Support spacing



- **Key is prevention**
  - Prevention through inspection
  - Monitor daily
  - Maintain a routine



# Cleaning Tortilla Bands

- Debris build-up is seldom a problem
- Inspection is key



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- **Technical details**
- **Illustrations**
- **Training**

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Thank You for Your Time & Attention



Questions  
&  
Answers

