ASHWORTH ENGINEERING

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PRODUCT TECHNICAL BULLETIN

THE ADVANTAGE RL 75

(Patent Pending)

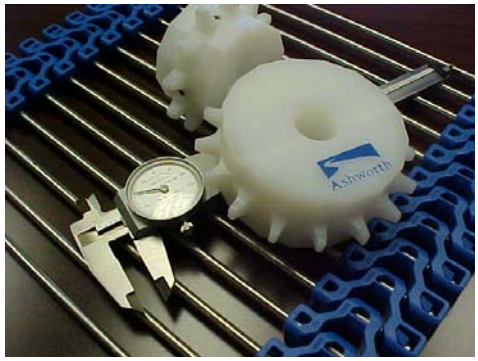


TABLE OF CONTENTS	Page

DESCRIPTION

The Advantage RL 75 is a 3/4" (19.1 mm) pitch hybrid belt for straight runs or turn-curve and spiral applications with turn ratios from 2.2 to 2.5. The belt is constructed with plastic links and stainless steel rods. The Advantage RL 75 features an open area of up to 75% for excellent airflow and sanitation. Operating temperatures up to 180°F (82°C) make The Advantage RL75 suitable for a wide range of applications. The unique rod retaining system eliminates the need for clips or fasteners and makes it possible to assemble or disassemble the belt in seconds with only your hands. Compared to competitive all-plastic spiral belting, The Advantage RL 75 is designed to provide superior open area, sanitation, and strength for cooling, freezing, and general conveying applications.

SPECIFICATIONS

Material	Acetal (POM) links, stainless steel rods
Color	Blue
Standard Widths	10" (254 mm) to 40" (1016 mm) for turn curve 10" (254 mm) to 60" (1524 mm) for straight run
Thickness	9/16" (14.3 mm)
Rods	0.192" (4.9 mm) stainless steel
Pitch	.75" (19.1 mm)
Turn Ratio	2.2 turn ratio standard
Turn Radius	Inside Turn Radius = Turn Ratio x Belt Width
Weight	2.15 lbs/ft² (10.5 kg/m²)
Turn Direction	Bi-directional (left and right)
Turning Mode	Inside edge collapses
Open Area (rod only)	Straight 2.2 Turn
Product Contact	75% 70%
Conveying Surface	Belt width – 4" (102 mm)

OPERATING RATINGS

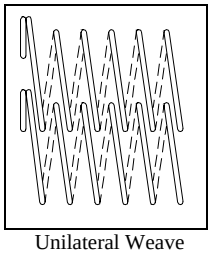
Allowable Tension	Operating (100K cycles)
Straight Run	300 lbs (136.4 kg)
Curve/Spiral	150 lbs (68.2 kg)

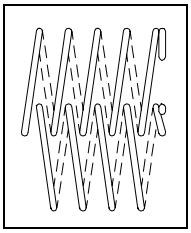
Temperature Rating

100% Strength	-50°F (-46°C) to 110°F (43°C)
90% Strength	up to 170°F (77°C)
80% Strength	up to 180°F (82°C)
50% Strength	up to 200°F (93°C) - not recommended
Belt Speed	Consult Ashworth engineering

BELT OPTIONS

OVERLAY DESIGNATION


Unilateral Weave


Balanced Weave

B X-Y-Z and U X-Y-Z

First Digit: B = Balanced Weave;
U = Unilateral Weave

X: First Number: No. of Loops per Foot of Width

Y: Second Number: No. of Spirals per Foot of Length (16 for 3/4 in. pitch)

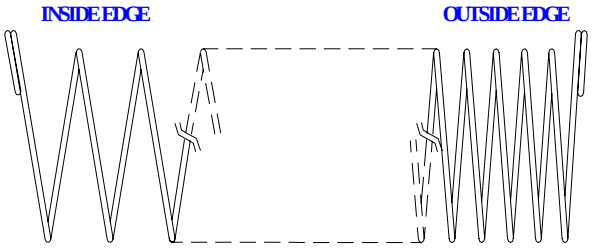
Z: Third Number: Wire Gauge

Examples:

B30-16-17 (3/4 Inch Pitch Advantage RL 75)
U42-16-16 (3/4 Inch Pitch Advantage RL 75)

Sizes: 16 and 17 ga. (.062 in. [1.6 mm] and .054 in. [1.4 mm] diameter)
Materials: High tensile spring wire (Omni Tough®)

WIRE MESH OVERLAYS

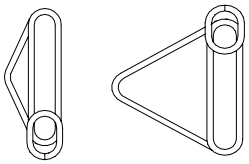


Variable Loop Count
(Patent No. 6,129,205)

- When belt collapses on inside edge to accommodate a turn, product support is maximized and wire overlay does not overlap.
- Mesh count is more open on the inside belt edge and progressively gets tighter across the width of the belt.
- Available in Omni-Tough® only
- Turn direction must be specified.
- Mesh designated as follows: B42/24-16-17 where belt has an inside mesh of 24 progressing to 42 spirals/foot.

Omni-Tough® (For more information reference Technical Product Bulletin "063 Omni-Tough")

- Provides a flatter mesh surface with a high resilience to impact.
- Available for most belt widths in most mesh configurations.
- Available in 16 and 17 ga. only.


Isosceles Triangle

Equilateral Triangle

Special Spirals:

- Available in Omni-Tough® only
- One or more spirals on conveying surface is raised
- Used as guard edges, lane dividers and flights

- Maximum height equal to belt pitch
- Available Options: height, spacing, location, shape, number of lanes in belt.

BELT WEIGHT

BELT WIDTH		TURN RADIUS		¾ Inch Pitch Rod Only		Calculating total belt weight:
in.	*mm*	in.	*mm*	lbs/ft	*kgs/m*	**Belt Weight** = (Weight of Base Belt) + (Weight of Mesh Overlay) **Steps of Calculation:** ◆ Determine weight of base belt in lbs./foot or kg/meter from accompanying table. ◆ Calculate conveying surface and convert to units of feet or meters. Overall – 4 inches (102 mm) ◆ Use the conveying surface and mesh type to determine weight of mesh in lbs/foot or kg/meter. ◆ Add weight of base belt to weight of mesh overlay, lbs/foot or kg/meter. ◆ Multiply calculated value by belt length (feet or meters) for total belt weight in units of lbs or kg.
6	*152*	13.2	*335*	1.37	*2.0*	
8	*203*	17.6	*447*	1.64	*2.4*	
10	*254*	22.0	*559*	1.91	*2.8*	
12	*305*	26.4	*671*	2.18	*3.3*	
14	*356*	30.8	*782*	2.45	*3.7*	
16	*406*	35.2	*894*	2.72	*4.1*	
18	*457*	39.6	*1006*	2.99	*4.5*	
20	*508*	44.0	*1118*	3.26	*4.9*	
22	*559*	48.4	*1229*	3.53	*5.3*	
24	*610*	52.8	*1341*	3.80	*5.7*	
26	*660*	57.2	*1453*	4.07	*6.1*	
28	*711*	61.6	*1565*	4.34	*6.5*	
30	*762*	66.0	*1676*	4.61	*6.9*	
32	*813*	70.4	*1788*	4.88	*7.3*	
34	*864*	74.8	*1900*	5.15	*7.7*	
36	*914*	79.2	*2012*	5.42	*8.1*	
38	*965*	83.6	*2123*	5.69	*8.5*	
40	*102*	88.0	*2235*	5.96	*8.9*	

3/4 Inch Pitch Advantage RL 75 Overlay Weights

Mesh Lateral Count	17 ga .054 in. [*1.4 mm*]		16 ga .0625 in. [*1.6 mm*]	
	lbs/ft²	*kgs/m²*	lbs/ft²	*kgs/m²*
12	.33	*1.66*	.44	*2.2*
18	.48	*2.3*	.63	*3.1*
24	.62	*3.0*	.83	*4.1*
30	.77	*3.8*	1.03	*5.0*
36	.92	*4.5*	1.23	*6.0*
42	1.07	*5.2*	1.43	*7.0*
48	1.22	*6.0*	1.63	*8.0*
60	1.53	*7.5*	2.03	*9.9*

TURN RATIO

The Advantage RL 75 is offered with a turn ratio 2.2. To find the turn ratio, divide the inside radius of the system by the belt width (TR = IR ÷ BW). If the calculated turn ratio is between 2.2 and 2.5 this belt will function correctly. A belt with a given turn ratio will work on a system with a larger turn ratio, but not on a system with a smaller turn ratio. Typically there is sufficient tolerance in the belt to accommodate system imperfections, such as a spiral cage that is slightly out-of-round.

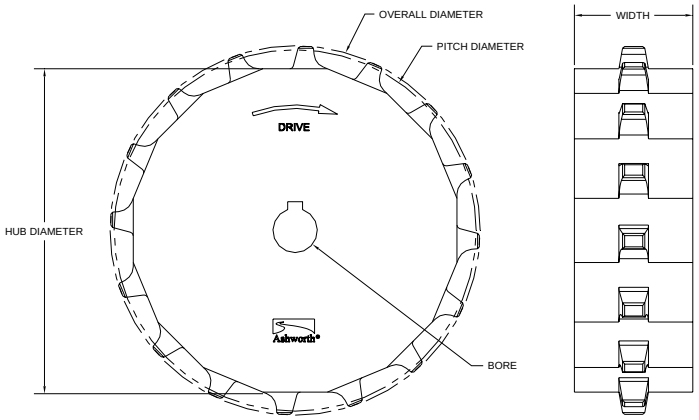
SPROCKETS AND IDLERS

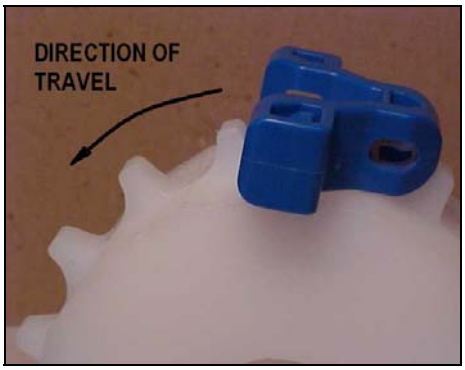
DRIVE SPROCKETS

- Use 2 sprockets on the drive shaft to engage the links at each belt edge. The drive direction is indicated on the sprocket. Both sprockets should be keyed to the shaft. Support idlers should be spaced evenly every 8-16 inches (200-400 mm) along the shaft between the sprockets. Make sure to use sprockets and idlers that are designed for The Advantage RL 75.
- To transfer sufficient driving force to the belt, a minimum of 180º of belt wrap is recommended on the drive sprockets.

Nominal Size	No. of Teeth	Overall Diameter		Pitch Diameter		Hub Diameter		Hub Width		Bore Minimum		Bore Maximum*	
		inch	Mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
#3	12	3.14	78.8	2.92	74.1	2.26	57.3	1.50	38.1	0.75	19.1	1.50	38.1
#4	16	4.09	103.9	3.84	97.6	3.21	81.5	1.50	38.1	0.75	19.1	2.25	57.1
#6	25	6.25	158.8	5.98	152.0	5.37	136.5	1.50	38.1	0.75	19.1	3.50	88.9

*****Maximum bores provide adequate material thickness for standard Keyway. Specify special sizes to be used when necessary.*
Standard material: UHMWPE
Range: -50°F [-46°C] to 180°F [82°C]



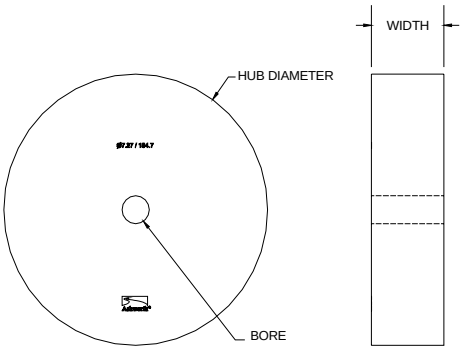


SUPPORT IDLERS

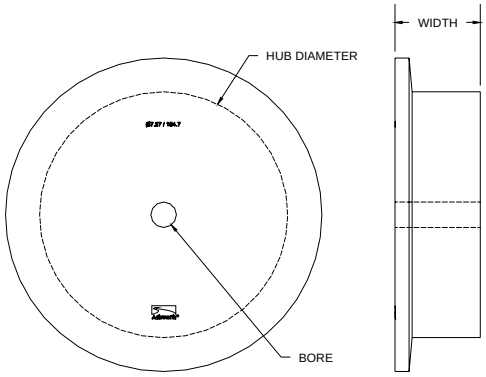
- Flanged idlers are recommended to guide the belt edges at all shafts other than the drive shaft, with support idlers spaced every 8-16 inches (200-400 mm) between the flanged idlers. Make sure to use idlers that are designed for The Advantage RL 75.
- Place set collars at the outside of the flanged idlers, making sure to allow approximately 1/8 inch [3 mm] between belt edge and flange on each side.

Nominal Size And Type	Overall Diameter		Hub Diameter		Width		Bore Minimum		Bore Maximum*	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
#3 Plain	2.26	57.3	-	-	2.00	50.8	0.75	19.1	1.50	38.1
#3 Flanged	3.38	85.9	2.26	57.3	2.38	60.3	0.75	19.1	1.50	38.1
#4 Plain	3.21	81.5	-	-	2.00	50.8	0.75	19.1	2.25	57.1
#4 Flanged	4.33	110.0	3.21	81.5	2.38	60.3	0.75	19.1	2.25	57.1
#6 Plain	5.37	136.5	-	-	2.00	50.8	0.75	19.1	3.50	88.9
#6 Flanged	6.49	164.9	5.37	136.5	2.38	60.3	0.75	19.1	3.50	88.9

*****Maximum bores provide adequate material thickness for standard Keyway. Specify special sizes to be used when necessary.*
Standard material: UHMWPE
Range: -50°F [-46°C] to 180°F [82°C]



Plain Idler

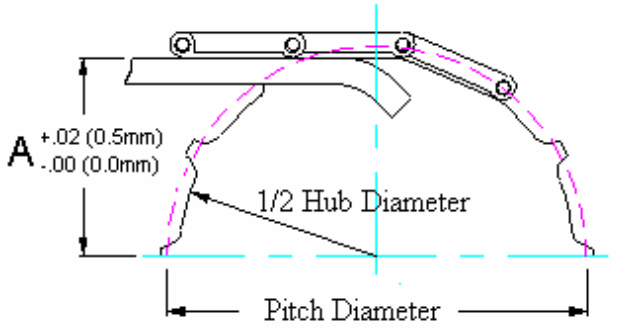


Flanged Idler

WEARSTRIP PLACEMENT

A = ½ Sprocket Hub Diameter

- This is only a guideline; it does not take into account the influence of speed.
  At speeds above 75 ft/min [23 m/min], Ashworth recommends increasing the distance A and shortening the wear strips as much as one belt pitch in length.



BELT SUPPORT RAILS

- For standard acetal (POM) Advantage RL 75 belt, use UHMW capped or stainless steel support rails under the links. If the belt is supported under the rods UHMW capped rails are recommended. Eliminate any sharp corners or rough surfaces that might gouge or prematurely wear the belt. Surface finish should be smooth to the touch.
- Support rail position should be either within 1-1/2 inches [38 mm] from the belt edge or greater than 2-1/4 inches [60 mm] from the belt edge to prevent binding of the links during operation. This is especially critical on turn curve applications. For straight running application the support rails should be positioned under the rods or greater than 2-1/4 inches [60 mm] from either belt edge..
- Support rail spacing should be selected based on the product weight and how evenly the weight is distributed on the belt surface. On the return path, rails can be spaced up to 40 inches (1000 mm) apart.

ENGINEERING CALCULATIONS

TURN RATIO

$$\text{Turn Ratio} = \frac{\text{Inside Turn Radius}}{\text{Belt Width}}$$

Turn Ratio is dimensionless. Inside Turn Radius and Belt Width must both be in the same unit of measurement, either both in inches or both in millimeters.

RADIUS WEIGHT (Belt Tension) – Spiral applications only

$$RW = R(WB+WL)(fr / fc)$$

where:
- **RW** = Radius Weight or Belt Tension
- **R** = System Radius (i.e. radius to outside edge of belt)
- **WB** = Weight of Belt per unit of length
- **WL** = Weight of Product per unit of length
- **fr** = Friction coefficient between belt and support rails
- **fc** = Friction coefficient between belt and cage bars

Calculation: (Convert all units to **feet (ft) and pounds (lbs)** or **meters (m) and kilograms (kg)**).

- Calculate the system radius (**R**) by measuring the inside turn radius and adding the belt width.
- Calculate the belt weight (**WB**) based on the weight per unit area given on page 3.
- Determine the weight of product (**WL**) that will be loaded on one foot (or meter) of belt length.
- Determine the friction coefficient (**fr**) between the belt and support rails (see chart below).
- Determine the friction coefficient (**fc**) between the belt and cage bars (see chart below).
- Substitute the values into the equation and calculate.

Friction Coefficients Between Belt Edge Links And Wear Strip Material		
Module Material	**Stainless Steel Wet [Dry]**	**UHMW Wet [Dry]**
Acetal (POM)	0.18 [0.20]	0.13 [0.15]

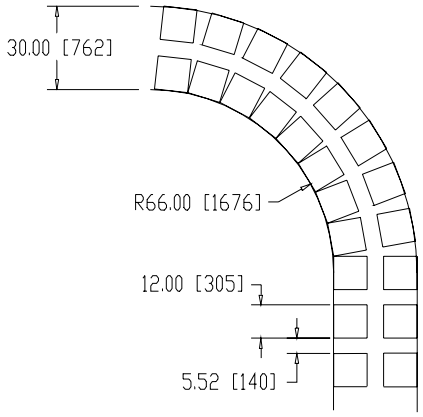
Friction Coefficients Between Metal Rods/Overlay And Wear Strip Material		
Rod/Overlay Material	**Stainless Steel Wet [Dry]**	**UHMW Wet [Dry]**
Stainless steel	Not recommended	0.18 [0.20]

To Reduce Belt Tension and Wear:

- Clean product debris from the support rails.
- Clean ice and product debris from the belt, sprockets, and idlers to prevent belt damage.
- Observe the effect of temperature on the coefficient of friction between the supports and the belt. Products may leave a slick residue at room temperature that can become viscous or sticky as the temperature decreases. At freezing temperatures the debris may become slick again or leave a rough surface depending upon its consistency.
- Lubricate the support rails to reduce friction between the belt and rails.
- Clean lubricants off the belts inside edge to increase driving friction (spiral systems only).
- Lubricate the inside edge wear strip (fixed turns only).
- Replace worn wear strips on supports and on the inside edge of turns.
- Remove weight from the take-up loop.
- Align sprockets properly and insure that they do not migrate on the shaft.
- Do not overload the belt.

- Decrease belt speed.

STANDARD LOADING – Turn curve applications



The allowable loading per length of belt is determined by the ratio of the inside turn radius and the radius to the tension link.

Allowable Loading per length of belt =
Radius to Tension Link / Inside Turn Radius

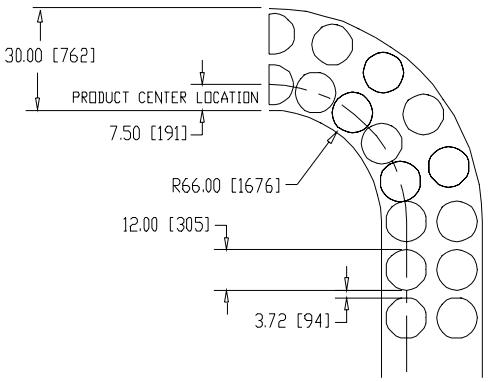
Sample Calculation:
Let BW = Belt Width = 30 in [762 mm]
IR = Inside Turn Radius = 66 in [1676 mm]

Radius to Tension Link = IR + BW
= 66 [1676] + 30 [762]
= 96 in [2438 mm]
Allowable Loading = 96 in / 66 in [2438/1676] = 1.46
Allowable loading is therefore one product length per 1.46 lengths of belt.

ADJUSTMENT FOR ROUND PRODUCT

Allowable loading per length of belt is determined by the ratio of the radius to the tension link to the radius to the product center.

Allowable Loading per length of belt =
Radius to Tension Link / Radius to Product Center



Sample Calculation:
Let BW = Belt Width = 30 in [762 mm]
IR = Inside Turn Radius = 66 in [1676 mm]
Let PC = Product Center = 7.5 in [191 mm]

Radius to Tension Link = IR + BW
= 30 [762] + 66 [1676]
= 96 in [2438 mm]

Radius to Product Center = IR + PC
= 66 [1676] + 7.5 [191]
= 73.5 in [1867 mm]
Allowable Loading = 96 in / 73.5 in [2438/1867] = 1.31
Allowable loading is therefore one product length per 1.31 lengths of belt.

SYSTEM REQUIREMENTS

STRAIGHT RUNS

Minimum straight run before and after every turn must be at least 1.5 x belt width.
Minimum straight run between two opposite curves is at least 2 x belt width.

SPIRAL CAGE BAR CAPS / INSIDE TURN RAILS

Spiral Cage Applications

A stainless steel drum, stainless steel cage bars, or UHMW capped cage bars are recommended. Stainless steel may increase the driving force against the belts inside edge. Eliminate any sharp corners or rough surfaces that might gouge or prematurely wear the belt. Surface finish should be smooth to the touch.

Turn Curve Applications

UHMW is recommended for the inside turn rails on conveyors.

FLIP UP DETECTORS

- During a retrofit or new installation be sure flip up detectors are acceptable for use on a plastic belt. Electrical or mechanical switches are recommended on every tier of an up cage or every other tier of a down cage and positioned to detect a change in belt position.

TAKE-UP

- Typically, catenary sag following the drive sprockets is satisfactory for straight run or fixed turn conveyors.
- In the case of a spiral cage, a double loop take up with free hanging weight is recommended due to the fact that plastic belting can require twice as much take-up travel as all-metal belting.
  A rule of thumb is that the take-up should be able to accommodate 2.5% of the total belt length. This value however depends on the temperature differences in the spiral.

GROUND STRAP

Plastic belts operating on plastic wear strips will generate and hold a mild static electrical charge. To prevent electrical shock, a grounding device should be installed. This is typically installed in the return path.

LUBRICATION

Lubrication is not required under normal operating conditions. However, lubrication will enhance belt performance, particularly at higher belt speeds or when conveying heavy product loads. Make sure any lubricant used is compatible with your belt material and product. On spiral systems, avoid lubricating the inside belt edge to prevent loss of driving force.

Suggested Types

- General Electric GE-SF-18-350.
- Dow Corning 200 Fluid

  Both are acceptable to -60° F [-51° C] and are FDA compliant.

Application Method

- Brush, fed from a drip reservoir, applied onto the belt's underside in the return path so that the belt coats the loaded path rails with the lubricant.
- Install and activate lubricator for either a predetermined application interval or when drive motor amperage indicates excessive belt tension.

FREEZERS AND CHILLERS

Clearance between modules and cross rods must be maintained to prevent the modules from taking load. Periodic belt stoppage allows frost to melt and upon reentry into the freezer, the water will become ice. Accumulation between the cross rod and body module will reduce the designed clearance. In addition, ice accumulation at the belts inside edge may prevent required collapse. Therefore, it is imperative to minimize belt stoppage in freezing applications.

OVERDRIVE (Spiral Cage, Ref. Technical Bulletin # "009 Measuring Overdrive")

- Allow 4 to 6 tier pitches of overdrive with UHMW capped cage bars.
- Allow 2 to 4 tier pitches of overdrive with stainless steel cage bars or a stainless steel drum.
- If the belt "surges," reduce the overdrive setting until the belt surge just stops. Note the motor amperage and take-up roll location.

BELT CLEANING AND WASHERS

- 150° F [66° C] maximum wash water temperature.
- Maximum module temperature change (thermal shock) of 160° F [71° C].
- In freezing applications, insure water is removed from belt prior to chamber entry.
- In order to insure proper operating belt tension, it is important to clean the belt support rails. Rails can be cleaned by attaching non-abrasive towels to the belt's underside and running these through the system on the rails. Remember to remove these towels before they go over the drive sprockets. Observing the drive amperage and/or take-up roll location will indicate when cleaning is required.
- Use of caustic washes with plastic belting is not recommended. Mild dish soap and water is the preferred method of wash down. If stronger detergents are used, the cleaner may be corrosive to the plastic; therefore belts should be rinsed with clear water immediately following use of detergents. **NOTE: All chemicals used on this belt should be reviewed by the chemical supplier for compatibility.**

FLIPPING BELT EDGE FOR EDGE

Ashworth recommends the belt be flipped when one belt edge measures 0.5% longer than the opposite edge (1/16" per foot or 5 mm per meter of belt).

FIRE WARNING *Safety Precautions for Plastic Belting*

Most plastic belting, including some Ashworth belts, contains thermoplastic components that can burn. If exposed to an open flame or to temperatures above stated specifications, belts may decompose and emit toxic fumes. Do not expose plastic belts to extreme temperatures or to an open flame. Additionally, these belts should not be used following any process, such as an oven, where products could be ignited before being placed on the belt. Refer to the appropriate MSDS (Material Safety Data Sheet) for other precautions and emergency response information.

Reference: Product Technical Bulletin "Conveyor Design Guidelines".

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