PRODUCT TECHNICAL BULLETIN

¾" & 1" Pitch SPACE SAVER OMNI-GRID®

Belt consists of an assembly of rods and links. A dual row of heavy duty, non-collapsing links is used on the inside edge, a long pitch collapsing link is used on the outside edge.

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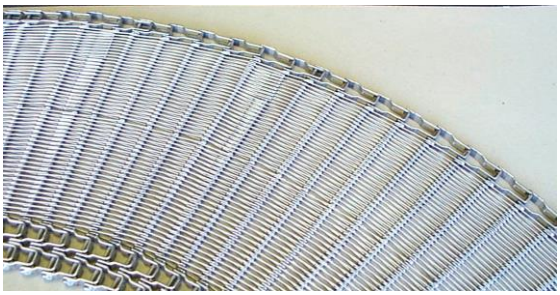


DEFINING CHARACTERISTICS

- **Turn Ratio:** 1.7 to 1 for 1 in pitch; 2.2 to 1 for ¾ in pitch
- **Longitudinal Pitch:** 1.08 in [27.4 mm] & .75 in [19.1]
- **Turn Capability:** Uni-directional
- **Standard Belt Widths:** 12 inches [305 mm] through 36 inches [914 mm]
- **Maximum Allowable Tension:** 150 lbs. [667 N] entering and exiting a turn
- **Conveying Surface:** ¾" Pitch = 3.426 inches [87.02 mm] less than nominal width; 1" Pitch = 3.646 inches [92.61 mm] less than nominal width
- **Method of Drive:** Sprocket driven on inside pair of links only; special dual tooth sprocket used.

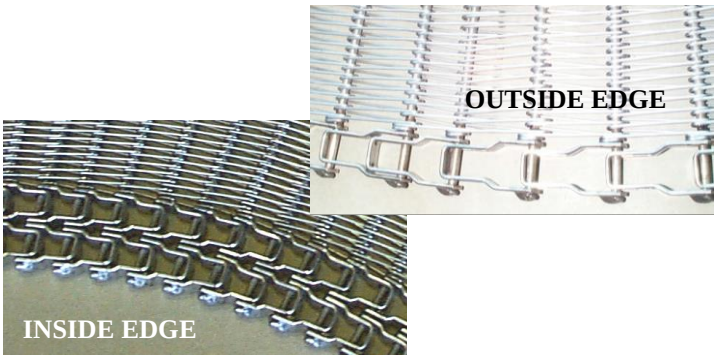
Consult our Product Engineers for approval of wider belt widths and concerns regarding belt strength.

BELT SPECIFICATIONS

Inside Turn Radius					
Belt Width		**¾" Pitch**		**1" Pitch**	
inches	***mm***	**inches**	***mm***	**inches**	***mm***
12	*305*	26.4	*671*	20.4	*518*
14	*356*	30.8	*782*	23.8	*605*
16	*406*	35.2	*894*	27.2	*691*
18	*457*	39.6	*1006*	30.6	*777*
20	*508*	44	*1118*	34	*864*
22	*559*	48.4	*1229*	37.4	*950*
24	*610*	52.8	*1341*	40.8	*1036*
26	*660*	57.2	*1453*	44.2	*1123*
28	*711*	61.6	*1566*	47.6	*1209*
30	*762*	66	*1676*	51	*1295*
32	*813*	70.4	*1788*	54.4	*1382*
34	*864*	74.8	*1900*	57.8	*1468*
36	*914*	79.2	*2012*	61.2	*1554*

Basic Construction:

- Stainless Steel construction
- 6 gauge (.192 in [4.9 mm]) connector rod
- Wear Resistant® links
- Heavy duty non-collapsing link, inside edge



BELT WEIGHT

Grid Frame Weight					
Belt Width		**3/4" Pitch**		**1" Pitch**	
in.	**mm**	**lbs./ft.**	**kgs/m**	**lbs./ft.**	**kgs/m**
12	305	2.93	4.36	2.54	3.78
14	355	3.20	4.76	2.73	4.06
16	406	3.46	5.15	2.92	4.34
18	457	3.73	5.55	3.10	4.61
20	508	4.00	5.95	3.29	4.90
22	559	4.27	6.35	3.48	5.18
24	610	4.54	6.75	3.66	5.45
26	660	4.81	7.16	3.85	5.73
28	711	5.08	7.56	4.04	6.01
30	762	5.35	7.96	4.23	6.29
32	813	5.62	8.36	4.41	6.56
34	864	5.89	8.76	4.60	6.84
36	914	6.16	9.17	4.79	7.13

Belt Weight = (Weight of Grid Frame) + (Weight of Mesh Overlay)

- Calculate in units of weight per unit length – lbs/feet or kgs/meter.
- Determine weight of base belt from chart at left
- If belt has a mesh overlay, Calculate Conveying Surface and convert to units of feet or meters.
- If applicable, determine weight of mesh, see mesh chart under Standard Options
- Sum the above weights to obtain the total belt weight.
- Multiply calculated value by belt length for total belt weight.

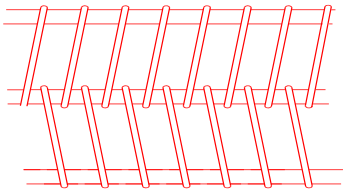
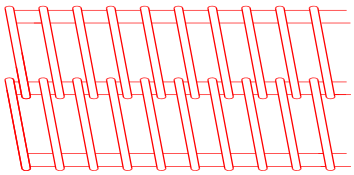
Sample Calculation:

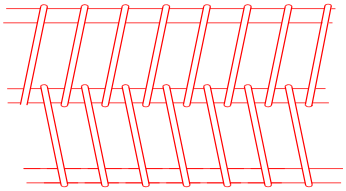
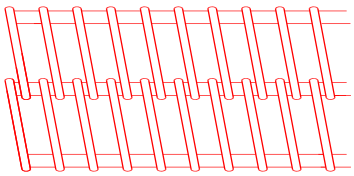
For a 36" wide belt with an overlay of B36-16-16 (reference above calculations for conveying surface),

Belt Weight = 6.16 lbs/ft + (32.574in)(1 ft/12 in)(1.43 lbs/sq.ft)

Belt Weight = 10.04 lbs/ft.

BELT OPTIONS

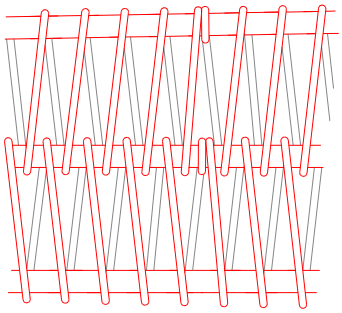
OMNI-TOUGH ® MESH OVERLAYS AVAILABLE				
Overlay Type	**Mesh Designation**	**Minimum Belt Width in [mm]**	**Maximum Belt Width in [mm]**	**Mesh Weight lbs/sq. ft. [kg/sq. m.]**
3/4 inch Pitch				
BALANCED WEAVE 	B24-16-16	12 [305]	36 [914]	1.00 [4.9]
	B24-16-17	12 [305]	36 [914]	0.75 [3.7]
	B30-16-16	12 [305]	36 [914]	1.27 [6.2]
	B30-16-17	12 [305]	36 [914]	0.94 [4.6]
	B36-16-16	12 [305]	36 [914]	1.51 [7.4]
	B36-16-17	12 [305]	36 [914]	1.12 [5.5]
UNILATERAL WEAVE 	U36-16-16	12 [305]	36 [914]	1.51 [7.4]
	U36-16-17	12 [305]	36 [914]	1.12 [5.5]
	U42-16-16	24 [610]	36 [914]	1.77 [8.7]
	U48-16-16	24 [610]	36 [914]	2.02 [9.9]
	U48-16-17	24 [610]	36 [914]	1.51 [7.4]
	U54-16-17	30 [762]	36 [914]	1.58 [7.7]

OMNI-TOUGH ® MESH OVERLAYS AVAILABLE				
Overlay Type	**Mesh Designation**	**Minimum Belt Width in [mm]**	**Maximum Belt Width in [mm]**	**Mesh Weight lbs/sq. ft. [kg/sq. m.]**
1 inch Pitch				
BALANCED WEAVE 	B24-12-16	12 [305]	36 [914]	0.91 [4.4]
	B24-12-17	12 [305]	36 [914]	0.67 [3.3]
	B30-12-16	12 [305]	36 [914]	1.30 [5.5]
	B30-12-17	12 [305]	36 [914]	0.84 [4.1]
	B36-12-16	12 [305]	36 [914]	1.36 [6.6]
	B36-12-17	12 [305]	36 [914]	1.00 [4.9]
UNILATERAL WEAVE 	U36-12-16	12 [305]	36 [914]	1.36 [6.6]
	U36-12-17	12 [305]	36 [914]	1.00 [4.9]
	U42-12-16	12 [305]	36 [914]	1.58 [7.7]
	U42-12-17	12 [305]	36 [914]	1.17 [5.7]
	U48-12-16	12 [305]	36 [914]	1.80 [8.8]
	U48-12-17	12 [305]	36 [914]	1.41 [6.9]
	U54-12-17	30 [762]	36 [914]	1.50 [7.3]

NOTES:

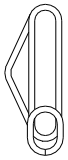
- The first set of numbers in the mesh designation indicates the number of spiral loops per foot of width.
- The second number specifies the number of pitches per linear foot.
- The last number is the wire gauge of the mesh.
- Omni-Tough mesh overlay for the 1 inch pitch belt is tapered, starting at 1.08 inch [27.4 mm] pitch and increasing to a nominal 1.75 inch [44.5 mm] Pitch.
- Spirals for unilateral mesh overlays are woven left hand (////) for the inside section and right hand (\\\\) for the outside section of the belt. A tapered spiral is optional for ¾ inch pitch belts.

- **Internal Pigtails** (standard feature on 1" SSOG, optional feature on ¾" SSOG) - secure the rod position within the overlay spirals, which is particularly helpful for applications with a soft or wet product. Internal pigtails may be manufactured into any Omni-Tough tapered spiral overlay.

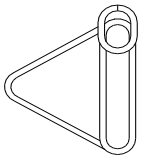


OMNI-TOUGH®

- 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 and number of lanes in belt.

SPROCKETS

Standard UHMW sprockets for 1.08 inch pitch.

No. of Teeth	Overall Diameter		Pitch Diameter		Flange Diameter		Flange Width		Hub Width		Hub Diameter & Type		Bore Minimum		Bore Maximum	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	Mm
19	--	--	--	--	7.50	190.5	.50	12.7	2.88	73.0	6.032	153.21	.875	22.23	4.00	101.6

Standard UHMW sprockets for 3/4 inch pitch.

No. of Teeth	Overall Diameter		Pitch Diameter		Flange Diameter		Flange Width		Hub Width		Hub Diameter & Type		Bore Minimum		Bore Maximum	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	Mm
27	--	--	--	--	7.5	190.5	.50	12.7	2.88	73.0	5.97	151.6	.875	22.23	3.50	88.9

NOTES:

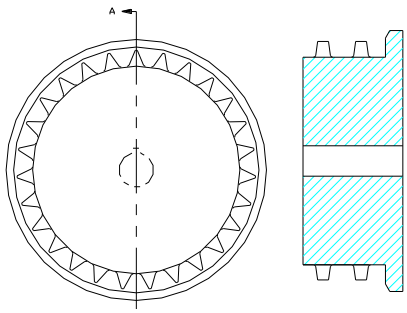
- UHMWPE material type components have a 150°F [66°C] maximum operating temperature.
- Maximum bore sizes listed for UHMWPE material is based on 1/2 inch [12.7 mm] of material above keyway.

SUPPORT:

Supports are required on a maximum of 6 inches apart on load side and 12 inches maximum on return side. Rollers may also be used.

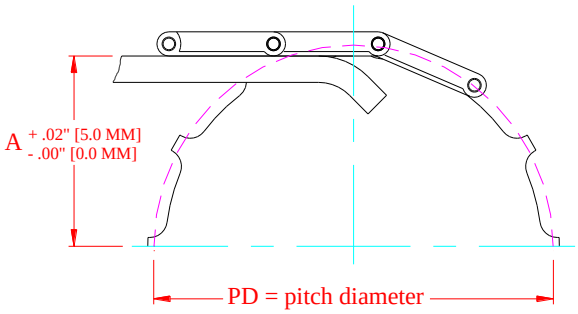
NOTE: For heavier load applications, additional support rollers may be required.

#6 27 Dual Tooth Flanged Sprocket



WEARSTRIP PLACEMENT

A = ½ X PD – Belt Thickness



- 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. (Nominal Belt Pitch = 1.08 inches [27.4 mm]) Belt Thickness = for 3/4 inch pitch is .4375 [11.1mm]; for 1 inch pitch is .50 [12.7mm].

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 same unit of measure.

Sample Calculation:

¾" Pitch
For Inside Turn Radius = 79.2", Belt Width = 36"

Turn Ratio = 79.2" ÷ 36"= 2.2

1" Pitch
For Inside Turn Radius = 61.2", Belt Width = 36"

Turn Ratio = 61.2" ÷ 36"= 1.7

BELT LENGTH

Belt Length calculation will depend on system layout.

CONVEYING SURFACE

Total Conveying Surface =
¾ inch = Belt Width – 3.426" [87.02 mm]

1 inch = Belt Width – 3.646" [92.61 mm]

Sample Calculation:
For a 36" wide belt, for B36-16-16

Total Conveying Surface = (36" – 3.426") =
32.574" [827.38 mm]

BELT TENSION

Estimated belt tension in a straight run:
T = [wLf$_r$ + WLf$_l$ + WH] x **C**
where
T = Belt Tension in pounds force (Newtons)
w = Weight of belt in pounds per linear foot (kilograms per linear meter)
L = Length of conveyor – center to center of terminals – in feet (meters)
f$_r$ = friction factor between belt and support rails, return side
W = weight of belt AND payload in pounds per linear foot (kilograms per linear meter)
f$_l$ = friction factor between belt and support rails, load side
H = rise of an incline conveyor (+ if incline; - if decline) in feet (meters)
C = Conversion factor – Imperial 1.0; Metric 9.8

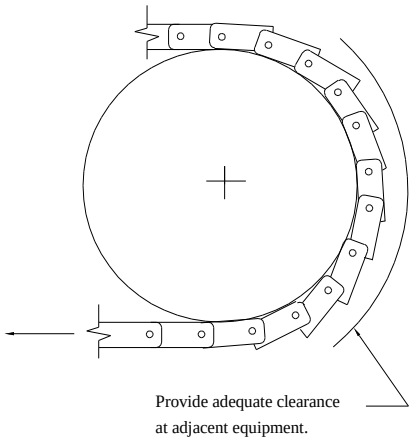
FRICTION FACTORS for Stainless Belt on UHMW Rails	
Friction Factor	Type of Product
0.20	clean, packaged
0.27	breaded, flour based
0.30	greasy, fried at < 32 ºF
0.35	sticky, glazed sugar based

CONVERSION FACTORS	
TO CONVERT:	**MULTIPLY BY:**
inches to meters	0.0254
lbs to kgs	0.4536
lbs/ft to kgs/meter	1.488
lbs/sq. ft. to kgs/sq. m.	4.882
lbs force to newtons	4.448

SYSTEM REQUIREMENTS

Transfers:
Because the outside section has a longer pitch than the inside section and the links in the outside row are in a collapsed position in straight runs, the forward corners of the links protrude above the belt surface at the terminals.

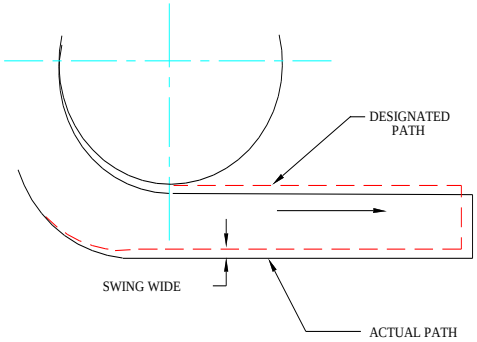
- **To provide a close transfer for the product to the adjacent equipment**, modify the transfer plate or blade in the area of the outside links to provide adequate clearance.



- **All Space Saver belts have a tendency to "swing wide"** to the outside at the exit of turns. Two factors are known to cause this:

1. In a turn, the tension is concentrated in the middle row of links. This stretches this row of links making it longer than the inside edge. This forces the belt into a "banana" shape.
2. The other cause is permanent elongation due to internal wear of the links.

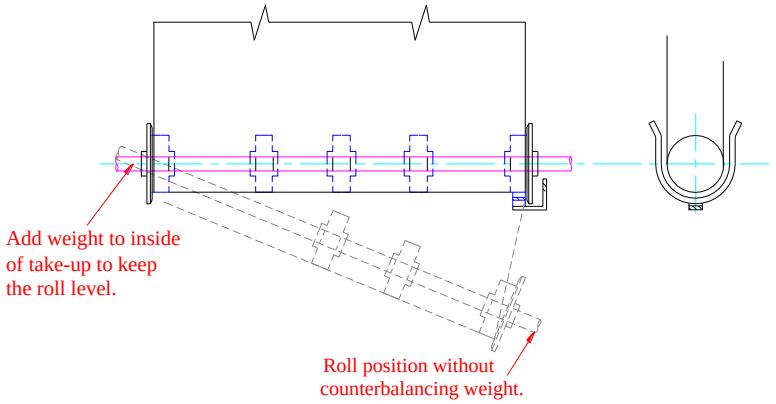
Solution:
Provide extra clearance between the belt and any exterior framework. We suggest one inch per foot of belt width, or 25 mm per 300 mm of width.



System Requirements (con't)

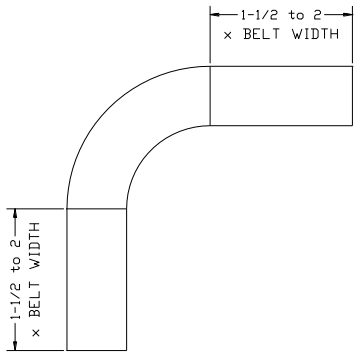
- **Space Saver belts usually will not hang squarely in a take-up loop** because the collapsed outside edge extends due to gravity. The belt will pivot about the inside links. This causes the take-up roll to hang at an angle and bind in the take-up frame.

Solution:
To keep the take-up level, add weight to the inside end to counter-balance the weight of the belt's outside section. Use a take-up that exerts minimum force on the belt. For spiral systems, a free-floating take-up system as shown is typical.



- **The inside belt section must be fully extended** before encountering any sprocket teeth. To insure this, provide a straight run of at least 1-1/2 x (the belt width) before and after turns.

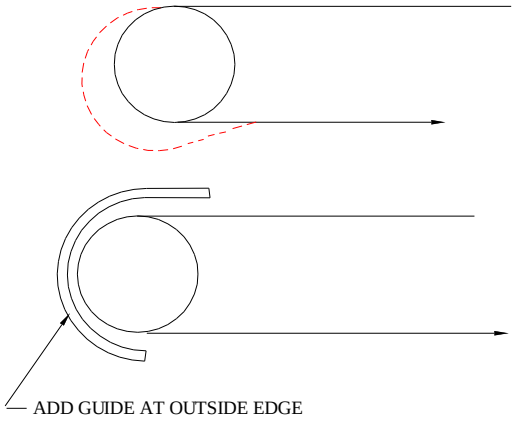
  For speeds of 60 fpm [18 m/min] and greater, increase straight run to at least 2 x (the belt width).



For wider belts at more than modest speeds, typically 60 fpm [18 m/min] and greater, two problems may occur at the terminal ends:

- The outside half of the belt may be affected by centrifugal force, causing it to **flare out**.

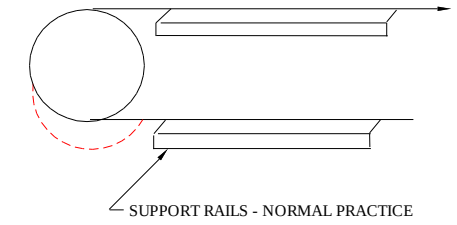
  If this occurs, add a guide over the outside edge to limit the flare out.

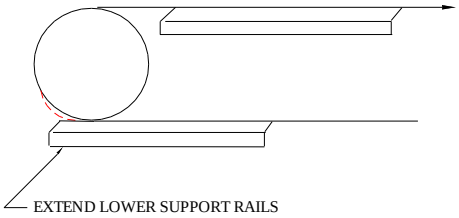


System Requirements (con't)

- Also, the weight of the outside half of the belt causes the **outside links to droop** at the terminals. While this drooping is not an operating problem, it does not present a good appearance and may interfere with other equipment.

  A simple correction is to extend the return support rails beyond the terminal centerline.





Reference: *Product Technical Bulletin "Conveyor Design Guidelines".*

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