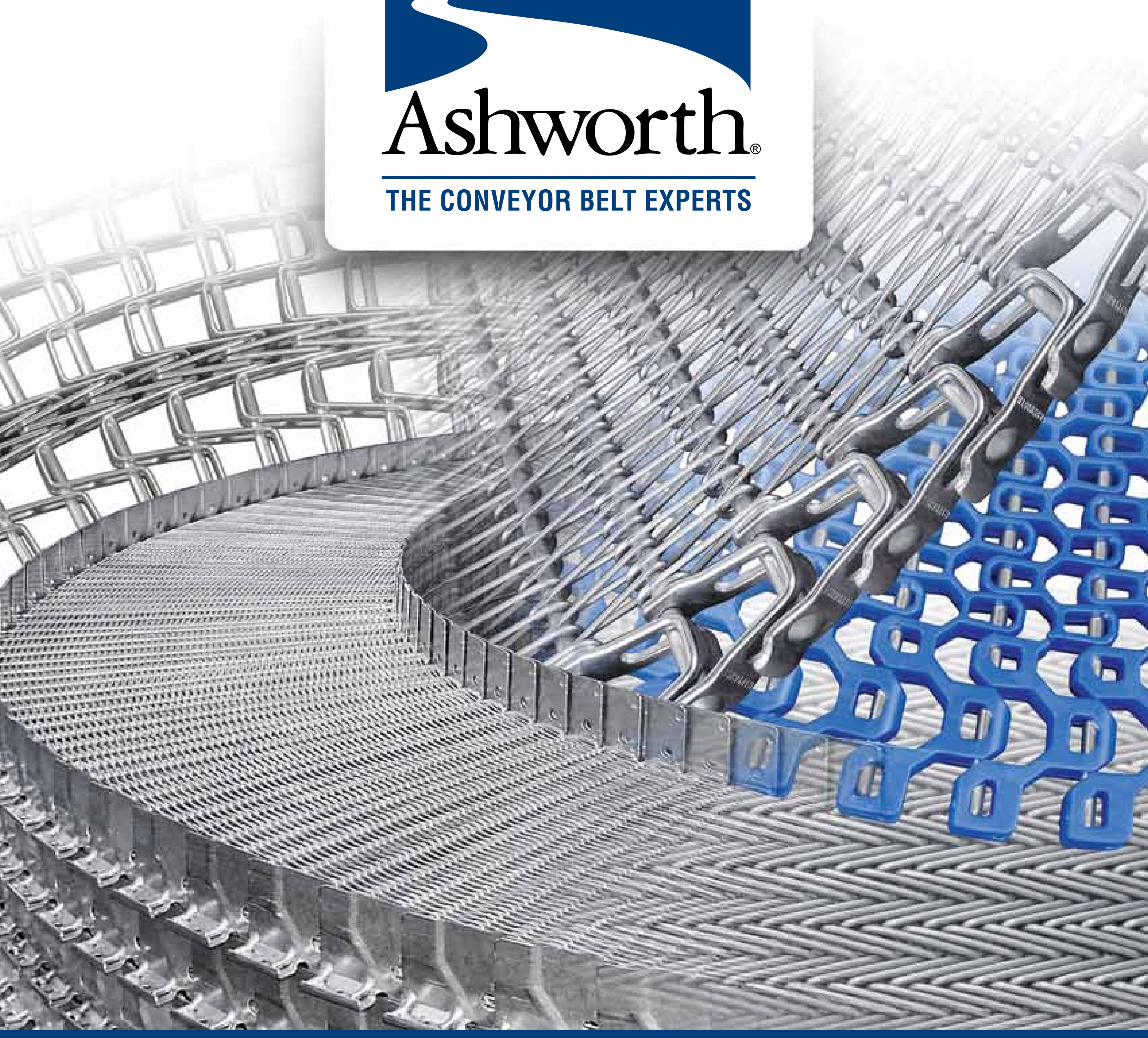
METAL OR PLASTIC | LOTENSION & STACKER | TURN-CURVE & STRAIGHT RUNNING

Conveyor Belt Product Catalog - Volume II

Ashworth®

THE CONVEYOR BELT EXPERTS



www.ashworth.com

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Mission Statement & Testimonials

Ashworth's mission is to be the market leader in each of the major industries we serve. We will earn this leadership position by providing our end-user customers and our channel partners with innovative, user-safe, high-quality, cost-effective and environmentally responsible products and service solutions. We will add value by providing customer-focused marketing and sales programs and a total commitment to customer satisfaction.

"Great service and support. Follow-up was great. We were very satisfied with our recent spiral project. Ashworth recognized all of our concerns and addressed them. Because of Ashworth, we no longer have to worry about downtime due to belt failure."
Refrigeration Manager
House of Raeford Farms

"Very reliable, backed by outstanding support. Top notch support is very important to me. Ashworth is very knowledgeable and has been instrumental on getting me up to speed on lotension."
Maintenance Manager
General Mills

"Excellent product - Good Value! Exceptional service - knowledge and ability with continuous ongoing product support. Product is durable and economical to own."
Maintenance Manager
T. Marzetti

"Outstanding customer service and excellent product knowledge. The support (ie: Tension Tests) help us feel confident our system is running well and will continue to run trouble free, reducing downtime."
Engineer & Manager
Raybern Foods LLC

"A great professional team that will pull out all the stops to assist a customer. We recently lost an oven band and required a new one to be fabricated and installed. The entire Ashworth team from order taking through logistics did an outstanding job!"
Production Manager
BFG Kitchener

"Ashworth was the original belt supplied with our spiral freezer. It lasted nearly 20 years! In our industry we can not afford long breakdowns. Ashworth has proven reliable and well supported."
Plant Engineer
S&F Foods

"We've purchased belts from Ashworth for 30 years. We switched to the Ashworth ExactaStack™ because Ashworth provides reliable products and services that reduce our maintenance costs."
Maintenance Manager
Pilgrim's

"Ashworth rushed 382 feet of belting for me and did an exceptional job of getting my factory back into production."
Engineering Manager
Seviroli Foods

"The product we purchased is reliable and durable which allows our systems to operate at maximum capacity for a long period of time."
Materials Manager
Energy Sciences, Inc.

About Ashworth

Tracing its roots to the 1860's, Ashworth has been a major supplier of conveyor belts to the food processing industry since 1946 when Ashworth formed the Metal Products Division in Worcester, Massachusetts, and began producing woven metal conveyor belts. In 1967, Ashworth revolutionized the food processing industry with the development of its patented lotension spiral system. Today, Ashworth's manufacturing facilities are located in Winchester, Virginia, and West Bromwich, United Kingdom and has a worldwide network of sales offices, distributors, and agents.

As the lotension experts, Ashworth offers the most comprehensive range of spiral and turn-curve belting available on the market. The all-metal Omni-Pro® is the new industry standard, and our Advantage™ series of plastic and steel hybrid belts has revolutionized the food processing industry. In 2009, we introduced a drop-in replacement self-stacking spiral belt, ExactaStack™, which is available in all industry-standard sizes and can be fitted with our patented Advantage™ overlay. We also know a thing or two about straight-running belts; the industry standard CB5 Baking Band® was introduced in 1963, and the positively driven woven wire Cleatrac® in 1988. Cleatrac® still provides the tightest transfers in the industry.

We know how important our product performance is to your business and that is why we offer Ashworth Factory Service, located in Northfield, Minnesota. This group of industry experts brings unparalleled design, service and support expertise for both spiral and straight-run systems to our customers. From our 24/7 emergency customer service and our full range of factory services to our broad selection of spiral and turn-curve belting, you can trust Ashworth to keep you running.

Ashworth®

THE CONVEYOR BELT EXPERTS

Ashworth's Manufacturing Facility–Winchester, Va.

A History of Firsts

1999	**Ashworth Offers the First Extended Warranties on Spiral Belting**
1995	**Ashworth Expands Internationally** The acquisition of Jonge Poerink of Borne, The Netherlands, provides Ashworth with facilities in Europe. The addition of Jonge Poerink's broad line of conveyor belts and systems makes Ashworth a global supplier with the industry's most extensive range of products and capabilities.
1991	**The Benefits of a Plastic Surface Combined with a Backbone of Steel** Ashworth was the first belt supplier to offer Hybrid belts, beginning with Omni-Lite®.
1988	**The Tightest Transfers in the Industry** Ashworth introduced the Cleatrac® belt, which offers the tightest product transfers in the industry.
1967	**The Revolutionary Lotension Spiral Conveyor System** Ashworth invented the Lotension Spiral Conveyor System and the related metal turn-curve belts that have become the worldwide standard for cooking, freezing, proofing and cooling applications.
1965	**More Options in Turn Curve Belting** Omni-Grid® is introduced and patented, extending Ashworth's line of turn-curve belts.
1963	**True Tracking** Ashworth introduced the true-tracking CB5 Baking Band® that remains the standard oven band in the baking industry today.
1959	**Ashworth's First Line of Metal Turn-Curve Belting** Ashworth introduces and patents Omni-Flex® turn-curve belts.
1955	**Ashworth Opens a Manufacturing Facility in Winchester, VA** Metal belt production is transferred from Worcester, Massachusetts to a new plant in Winchester, Virginia, which becomes the Belt Division Headquarters.
1946	**Ashworth Belting Production Begins** After over 80 years of manufacturing card clothing, Ashworth Bros., Inc., forms the Metal Products Division and begins production of woven metal conveyor belts in Worcester, Massachusetts.

Innovating The Future

2012 **Meeting Customer Demand in Japan**
Ashworth launches Ashworth Japan K.K. in Tokyo to meet increased demand in Japan.

2011 **Innovations in Can Making Mats**
Ashworth introduces ToughMat™, its new can making mat for IBO/OBO applications. Featuring PTFE coatings, ToughMat™ allows for tighter transfers, decreased energy costs and increased reliability and throughput.

2011 **Meeting Customer Demand in Asia**
Ashworth opens a new Asia/Pacific regional office in Singapore.

2011 **Ashworth Expands Further in Europe**
Ashworth Belts BV relocates its sales and support offices from Enschede, NL to Amsterdam, NL to better serve its clients throughout Europe, the Middle East and Africa.

2010 **Ashworth Expands Its Manufacturing Capabilities in Europe**
Ashworth opens a new manufacturing facility in West Bromwich, United Kingdom to continue supporting its customers throughout Europe, The Middle East and Africa including quick-ship orders.

2009 **A Self-Stacking Alternative**
Ashworth enters the self-stacking spiral belt market with ExactaStack™; designed for both complete installations or spliced-in sectional repairs. ExactaStack™ is available in all tier heights and widths including wide belts, and is delivered in our patented Rack & Roll crate system for easy installation and storage.

2007 **The New Standard in Lotension Belting**
The high strength Omni-Pro® hits the market with patented protrusion leg technology to keep systems running smoothly. Featuring patents on both the button-less rods and 360° welds, Omni-Pro® becomes the new standard in lotension belting.

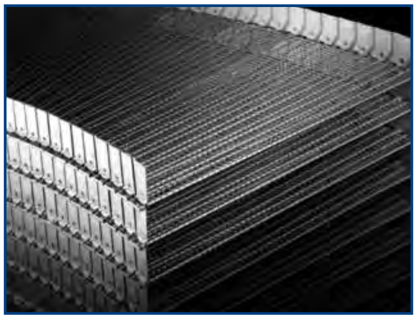
2007 **New Technologies and Services Launched**
Ashworth Engineering Services becomes Ashworth Factory Service Corporation, and opens its doors in Northfield, Minnesota. AFS provides both spiral and straight-running belt repair, installation, retrofit and optimization.

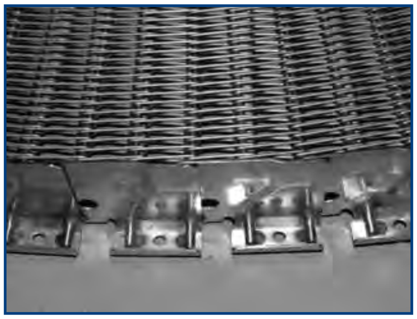
2006 **The First & Only NSF & USDA Plastic Spiral Belt**
The Advantage™ 120/200 series of belts continues to change the face of the belting industry as it becomes the first spiral belt to be tested and certified by NSF as well as USDA Accepted for Meat and Poultry.

2005 **Celebrating 50 Years of Production in Winchester**
Ashworth Bros., Inc. celebrates 50 years of manufacturing quality conveyor belts in Winchester, VA, USA.

2004 **Ashworth Introduces Advantage™ Plastic Spiral Belts**
Advantage™ spiral and turn-curve belts incorporate modular plastic conveying surface and plastic links together with stainless steel rods providing the industry's greatest beam strength and greatest air-flow, unmatched by all plastic belts.

▶▶ What's New





ExactaStack™ - Replacement Stacker Belt

The ExactaStack™ is available in all widths, tier heights, and mesh configurations including the patented Advantage™ overlay, for both spliced-in sections and complete self-stacking belt replacements.

The ExactaStack™ self-stacking spiral belt is a drop-in replacement for standard and wide belt stackers with no system drive modifications required.

ExactaStack™ is also available with Ashworth's patented Advantage™ plastic overlay. Because Advantage™ is easy to clean, it is the market's only plastic spiral belt that is USDA Accepted for meat and poultry. The combination of ExactaStack™ and Advantage™ makes it the market's first and only self-stacking spiral belt with a plastic overlay providing a perfect solution for existing sticky product applications. Advantage™ has also been proven by ETL Laboratories to have the greatest open area of all plastic spiral modular belting making it a perfect solution for vertical air-flow patterns in self-stacking spirals.

ExactaStack™ is manufactured to ensure quality craftsmanship, quick deliveries and cost savings. With every option available, including the Advantage™ overlay, Ashworth can provide the right belt for many specific production needs to increase capacity and minimize product damage.

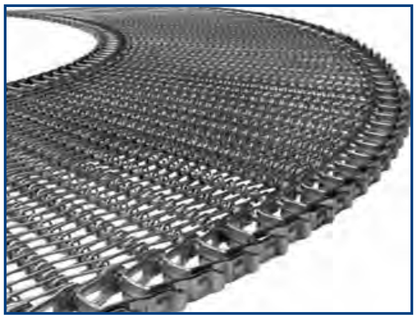
What's New

Omni-Pro® 150

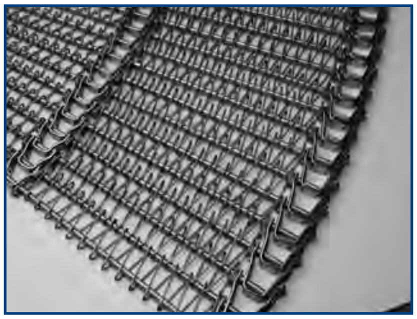
Ashworth Bros., Inc. introduced the 1½-inch pitch Omni-Pro® link to extend the Omni-Pro® line of spiral/turn-curve conveyor belts. The 1½-inch pitch Omni-Pro® 150 retains the same design features that allow the belt to minimize cage bar wear, maintenance costs and downtime in your most demanding high-tension spiral applications. Expanding the Omni-Pro® line reflects Ashworth's commitment to meet today's processing demands.

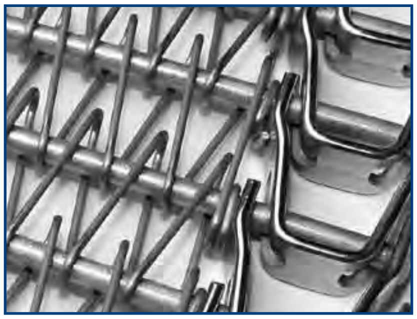
Omni-Pro® is one of the strongest belts on the market today and the Omni-Pro® 150 withstands spiral/turn-curve tensions of 400 pounds (136 kg) for 100,000 cycles vs. competing belts that rate for 50,000 cycles. The increased strength of the Omni-Pro® comes from the new 360° button-less weld technology utilizing a "zero tension" design which allows a higher load bearing capacity. Unlike a traditional bridge weld, the 360° button-less weld is free from surface imperfections and crevices which improves hygienic characteristics by eliminating the possibility of bacteria entrapments.

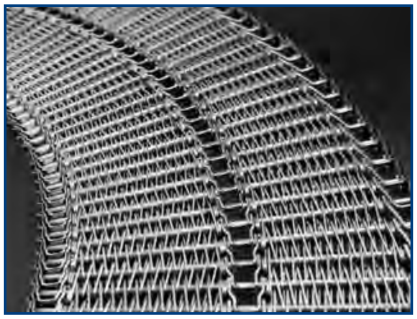
Omni-Pro's state-of-the-art link design includes a patented "protrusion leg" preventing welds from contacting spiral cage bars and permits the belt to run smoother with less system wear. Each link is formed with a patented coining process to prevent break-in wear, reducing belt elongation and increasing belt life. Turn ratios range from 1.6 to 2.5 and belt widths are available in even widths from 12 to 54 inches for spiral and turn curve applications.



What's New







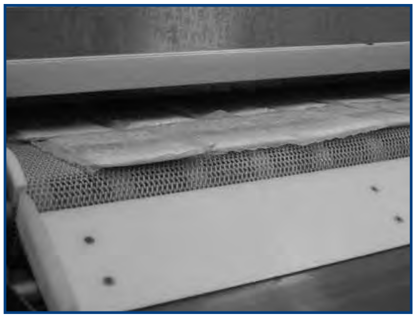
Small Radius Omni-Pro®

Ashworth Bros., Inc. introduction of the 3/4-inch pitch Small Radius Omni-Pro® Belt to extend the Omni-Pro® line of spiral/turn-curve conveyor belts. The 3/4-inch pitch Small Radius Omni-Pro® retains the same design features that allow the belt to minimize cage bar wear, maintenance costs and downtime in your most demanding high-tension spiral applications.

Omni-Pro® is one of the strongest belts on the market today and the 3/4-inch pitch Small Radius Omni-Pro® withstands spiral/turn-curve tensions of 150 pounds (68 kg) for 100,000 cycles vs. competing belts that rate for 50,000 cycles. Turn ratios range from 1.0 to 2.0 and belt widths are available in even widths from 12 to 48 inches for turn curve and spiral applications.

What's New

Fatigue Resistant Cleatrac® System



Ashworth Bros., Inc. developed a manufacturing process using a proprietary stainless steel specification to offer a belt having up to 2.5 times the working strength of our standard Cleatrac® belting. The strength of the Fatigue Resistant Cleatrac® System make this the ideal belt for use in tunnel freezers and tunnel oven applications.

The Fatigue Resistant Cleatrac® consists of a precision balanced weave wire mesh fabric consisting of alternating right and left-hand spirals joined by crimped connecting rods, with a matched positive drive system of sprockets, filler rolls, and support bearings.

Offering meshes in both 16 and 17 gauge stainless steel wire, Fatigue Resistant Cleatrac® can be used successfully in applications requiring longer conveyor lengths and increased belt strength. The Fatigue Resistant Cleatrac® offers reduced belt stretch and increased belt life.

To ensure correct product orientation and minimize product damage (and operating costs), the Fatigue Resistant Cleatrac® smoothly moves around the industry's smallest diameter sprockets.

Fatigue Resistant Cleatrac® conveyor belting lasts longer, requires less maintenance and reduces costs because of its more durable construction compared to single-plane wire designs. The balanced weave wire mesh design makes it resistant to damage from abrasives such as salts, product fines and breading.

Ashworth Factory Service

Factory Service for Lotension, Self Stacking Spirals, and Baking Bands	
System Service	Expert system service, analysis, and optimization
Troubleshooting & Technical Support	Available 24 hours a day, 7 days a week, 365 days a year
System Refurbishments	Complete inventory of system parts to keep you running
Installation & Commissioning	Turnkey installation and accountability to our customers
Electronic Controls Retrofit and Maintenance	Support, parts, replacement, and upgrades
Proactive Maintenance Program	Downtime prevention to maximize service life and throughput

Increase Capacity & Improve Efficiency—On-call 24/7/365

Located in Faribault, Minnesota, Ashworth Factory Service Corp. (AFS) offers a full range of engineering services and solutions for Lotension Spiral, Baking Band, and Stacker systems. Whether you need troubleshooting advice over the phone or a complete system overhaul, the Ashworth Factory Service team is available 24/7/365 to provide the support your company requires to increase capacity and improve efficiency. Ashworth Factory Service experts provide food processing companies peace of mind with decades of experience, quality workmanship, and comprehensive conveyor belt support.

"The technicians at Ashworth Factory Service are knowledgeable and provide very capable installation services. Ashworth is easy to work with and completed the installation to meet our plant schedule, plus the belt and service cost less than the competition."

Dale Walenski
Plant Engineer, McCain Foods

"Ashworth Factory Service is top-notch. They installed the belt, turn-key and stress free, allowing me to focus on other projects. We have reduced waste and downtime, and the belt has increased efficiency in our proofer."

Jon Sims
Maintenance Manager, San Francisco Foods

Lotension Spiral Services

Ashworth invented the lotension spiral in 1967 and remains the expert in lotension belt development and service. Our spiral services are geared towards improving capacity and efficiency in your lotension system. We also offer turnkey spiral systems and spiral relocation services. No one has more experience with lotension spiral systems than Ashworth.

Self-Stacking Spiral Services

Ashworth Factory service experts have spent thousands of hours optimizing spiral systems so they can provide you with services like Ashworth's turn-key ExactaStack™ installation. The service includes a new belt that fits your existing system, a skilled AFS technician to install your optimized belt, and an adjustment to your existing drive system for peak efficiency and service life.

Baking Band Services

The CB5 Baking Band® was invented in 1963 by Ashworth, and it's still the industry standard today. We are the experts to rely on for the maintenance and turn-key installation of your baking bands. AFS experts can prevent costly damage to your belts caused by misalignment and improper settings, as well as provide training on proper belt maintenance and tracking, in addition to our standard replacement and optimization services.

Ashworth Factory Service—**On-call 24/7/365**—Toll-Free: **1-866-204-1414**

Services		Lotension Spirals	Self Stacking Spirals	Baking Bands
System Service	Application engineering review	●	●	●
	Comprehensive service report	●	●	●
	Improve capacity	●	●	●
	Recommend drive/system upgrades	●	●	●
	Improve air flow techniques	●	●	●
	Spiral reconfiguration	●	●	
	Modify lengths of in-feed/discharge	●	●	
	Add tiers/change tier pitch	●	●	
	Add curve loader conveyors	●	●	
	Spiral relocation—across the plant or the country	●	●	
	Change direction of spiral	●		
	Alignment of terminal drums and snub rolls			●
	Belt positioning			●
	Hot & cold tracking benchmarks			●
Trouble Shooting/Technical Phone Support	Available 24 hours a day, 7 days a week, 365 days a year	●	●	●
	System corrections or adjustments	●	●	●
	System operations support	●	●	●
Installation & Commissioning	Turnkey installation	●	●	●
	On-site installation specialist	●	●	●
	Belt commissioning	●	●	●
System Refurbishments	Full line of belt system parts	●	●	●
	Emergency repairs	●	●	●
	Replace key components	●	●	●
	Spiral upgrades	●	●	
	Replace drive/drum bar caps	●	●	
	Replace track cap	●	●	
	Replace cage/drum teeth/drive	●	●	
	Replace idler sprocket/chain/wagon teeth	●	●	
	Replace cage/drum bearings	●	●	
Electronic Controls Retrofit	Revisions or replacement of existing systems	●	●	●
	Electronic overdrive control	●	●	●
	Touch screen improvement	●	●	●
	Safety systems upgrades	●	●	●
Proactive Maintenance Program	Scheduled system audit and recommendations	●	●	●
	Detailed report history	●	●	●
	On-site system training	●	●	●

▶▶ Spiral Belt Tension Test

Technical Specifications		
Measurable Tension Range	lb. (kg)	100 to 650 (46 to 295)
Suitable Temperature Range	° F (° C)	-40 to 120 (-40 to 49) For 120+ Contact Ashworth Engineering
Required Tier Clearance	in. (mm)	2.25 (57.2 mm) minimum
Belt Pitch Capability:		0.5 to 4.75 (12.7 to 120.7)
Display Units		Imperial, Metric available upon request

Ashworth's Spiral Belt Tension Test

Over 40 years ago, Ashworth invented spirals and spiral belting, and named them "Lotension" because low belt tensions improve spiral performance, prevent breakdowns, and extends belt life. Now, Ashworth offers the Spiral Belt Tension Test to help processors pinpoint undetected high-tension problems in spirals to extend belt life and prevent unexpected breakdowns.

The Spiral Belt Tension Test is performed with Ashworth's proprietary tension gauge that records belt tension throughout each tier in a spiral. By loading the recorded data into Ashworth's tension assessment program, a visual graph is created representing the variations in tension throughout the spiral system. By analyzing the results, Ashworth Factory Service can make recommendations to correct any unforeseen or potential problems.

The Ashworth Tension Gauge can measure spiral belt tensions of up to 650 lb. with tier spacing as low as 2.25 inches. It is designed to operate in freezing and ambient conditions, so tension measurements can be taken in fully operational freezers and coolers. The Tension Gauge can be used on any spiral belt; the belt does not need to be an Ashworth belt in order to be tested.

Ashworth has performed tension tests on numerous spirals and found most operating above the manufacturer's rating. After locating the high-tension problems, Ashworth Factory Service can provide solutions to save you from unexpected breakdowns.

Ashworth's Spiral Belt Tension Test is fast, easy and, one phone call away.

Contact Ashworth Factory Service to schedule your Spiral Belt Tension Test
It is fast, easy, and one phone call away.

Toll Free:

1-866-204-1414

FACTORY SERVICE

▶▶Ashworth Belt Tension Gauge

Ashworth's Tension Assessment Program

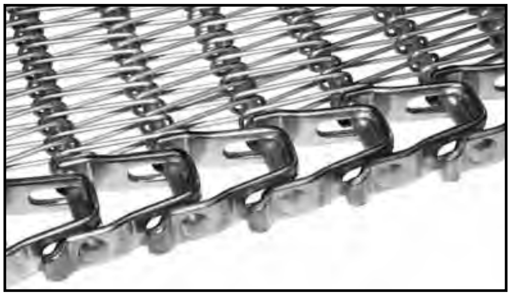
Ashworth's Tension Assessment screenshot illustrating the variations in tension throughout a spiral system

FACTORY SERVICE

NOTES

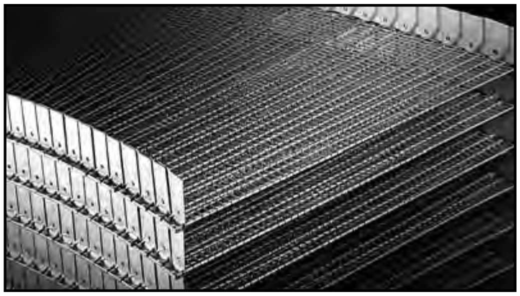
Spiral & Turn Curve Belts

As the inventor of the lotension spiral system, Ashworth offers a wide variety of all-metal and metal backbone/plastic surface hybrid belts for use in lotension systems. These belts allow the end user optimal production possibilities, while ensuring the strength, durability, and product release characteristics required for the most demanding applications.



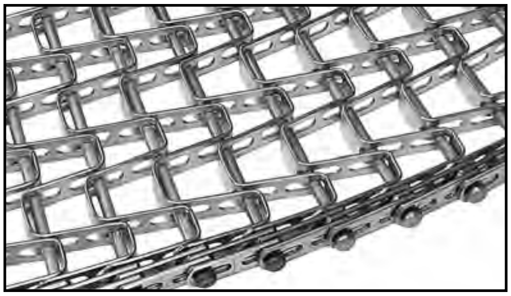
Omni-Pro®

Small Radius Omni-Pro®



ExactaStack™

Advantage™ 120/200



Omni-Flex®

Space Saver Omni-Grid®

Selection Guide for Spiral & Turn-Curve Belts

Specifications		Units	Omni-Pro 075	Omni-Pro 100	Omni-Pro 120	Omni-Pro 150	Small Radius Omni-Pro	Space Saver Omni-Grid®	ExactaStack™
Material(s)	Link		Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
	Rod		Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
	Mesh		Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Turn Ratio			2.2 to 2.5	1.6 to 2.5	1.7 to 2.8	1.6 to 2.5	1.1 to 2.0	0.7 to 2.2	1.7
Width Limits	Curve	in. (mm)	12.00–40.00 (304.8–1,016.0)	12.00–40.00 (304.8–1,016.0)	12.00–54.00 (304.8–1,371.6)	12.00–54.00 (304.8–1,371.6)	12.00–48.00 (304.8–1,219.2)	12.00–36.00 (304.8–9)	(420.0, 580.0, 640.0, 760.0, 920.0, 1,060.0)
	Straight	in. (mm)	12.00–48.00 (304.8–1,219.2)	12.00–48.00 (304.8–1,219.2)	12.00–60.00 (304.8–1,524.0)	12.00–60.00 (304.8–1,524.0)	N/A	N/A	N/A
Pitch		in. (mm)	0.75 (19.1)	1.08 (27.4)	1.20 (30.5)	1.50 (38.1)	1.08 (27.4) & 0.75 (19)	1.08 (27.4)	(30.0 to 59.9)
Maximum Tension	Curve*	lb. (kg)	150 (68)	200 (91)	400 (181)	400 (181)	150 (68)	150 (68)	N/A
	Straight*	lb. (kg)	300 (136)	400 (182)	800 (364)	800 (364)	300 (136)	300 (136)	N/A
Maximum Belt Pull	Curve*	lb. (kg)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Straight*	lb. (kg)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Spiral Applications									
Freezer			◆	◆	◆	◆	◆	◆	◆
Proofer			◆	◆	◆	◆	◆	◆	
Chiller			◆	◆	◆	◆	◆	◆	
Cooker			◆	◆	◆	◆	◆	◆	
Advantages									
Frozen Product Release									
Sanitary Design			◆	◆	◆	◆			
Superior Air Flow			◆	◆	◆	◆	◆	◆	◆
High Load Capacity			◆	◆	◆	◆			
Superior Beam Strength			◆	◆	◆	◆	◆	◆	◆
Small Footprint				◆			◆	◆	◆
Special Features									
Wear Resistant Links			◆	◆	◆	◆	◆	◆	
Fatigue Resistant Pickets									
Integral Guard Edge				◆	◆	◆			
Weldless Construction									
Flippable Design			◆	◆	◆	◆			
Self Stacking									◆

Selection Guide for Spiral & Turn-Curve Belts

Specifications		Units	Advantage™ 120	Advantage™ 200	Omni-Flex®	Fatigue Resistant Omni-Flex®	Small Radius Omni-Flex®
Material(s)	Link		Acetal	Acetal	Stainless Steel	Stainless Steel	Stainless Steel
	Rod		Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
	Mesh		Acetal	Acetal	Stainless Steel	Stainless Steel	Stainless Steel
Turn Ratio			1.5 to 2.8	1.5 to 2.8	1.8 to 4.0	1.8 to 4.0	1.0 to 2.0
Width Limits	Curve	in. (mm)	8.00–40.00 (203.2–1,016.0)	10.00–48.00 (254.0–1,219.2)	6.00–48.00 (152.4–1,219.2)	6.00–48.00 (152.4–1,219.2)	14.00–54.00 (355.6–1,371.6)
	Straight	in. (mm)	8.00–60.00 (203.2–1,524.0)	10.00–60.00 (254.0–1,524.0)	6.00–48.00 (152.4–1,219.2)	6.00–48.00 (152.4–1,219.2)	N/A
Pitch		in. (mm)	1.20 (30.5)	2.00 (50.8)	1.084 (27.53)	1.084 (27.53)	Inside Pickets: 1.084 (27.53) Outside Pickets: 1.5 (38.1)
Maximum Tension	Curve*	lb. (kg)	200 (91)	300 (136)	300 (136)	400 (181)	300 (136)
	Straight*	lb. (kg)	400 (182)	600 (273)	600 (273)	800 (362)	600 (273)
Maximum Belt Pull	Curve*	lb. (kg)	500 (226)	750 (340)	N/A	N/A	N/A
	Straight*	lb. (kg)	1000 (453)	1500 (680)	N/A	N/A	N/A
Spiral Applications							
Freezer			◆	◆	◆	◆	◆
Proofer			◆	◆			
Chiller			◆	◆	◆	◆	◆
Cooker							
Advantages							
Frozen Product Release			◆	◆			
Sanitary Design			◆	◆			
Superior Air Flow			◆	◆	◆	◆	◆
High Load Capacity			◆	◆	◆	◆	◆
Superior Beam Strength			◆	◆	◆	◆	◆
Small Footprint			◆	◆			◆
Special Features							
Wear Resistant Links							
Fatigue Resistant Pickets					◆	◆	◆
Integral Guard Edge			◆	◆			
Weldless Construction			◆	◆			
Flippable Design			◆	◆	◆	◆	
Self Stacking							

SPIRAL BELT SELECTION

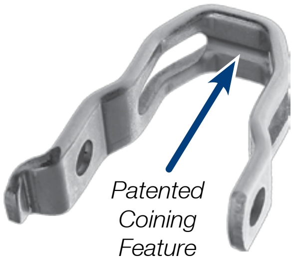
NOTES

Omni-Pro® Metal Spiral Belts

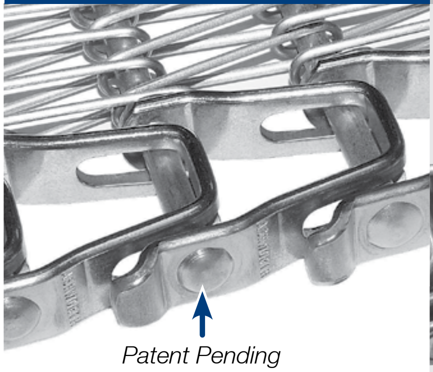
Evolutionary Steel Belts That Run Smoother, Stronger, Longer

Features & Benefits

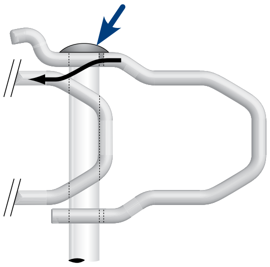
- **Proven Reliability—**All Ashworth belts are rated for 100,000 cycles versus competition ratings of only 50,000 cycles
- **Reduced Wear—**Patented "protrusion leg" design enables the belt to run smoother with less system wear
- **Added Strength & Easy to Clean—** Patent pending zero-tension, 360° buttonless welds increase load bearing capacity and are easier to clean versus traditional bridge welds
- **Increased Belt Life—**Patented coining feature reduces run-in wear and increases belt life

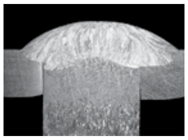


OMNI-PRO® LINK



Patent Pending Zero Tension, 360° Buttonless Weld

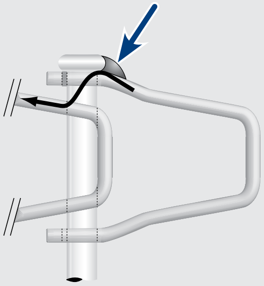




Cross-section of 360° Buttonless Weld

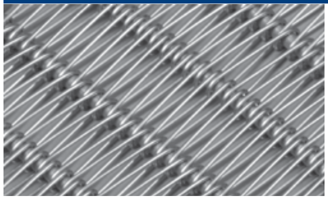
COMPETITOR LINK

Traditional Bridge-Tension Weld

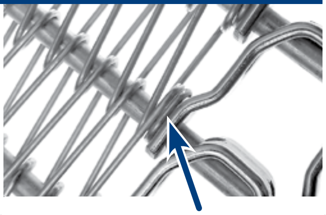


Cross-section of Traditional Bridge Weld

Omni-Pro® Standard Features

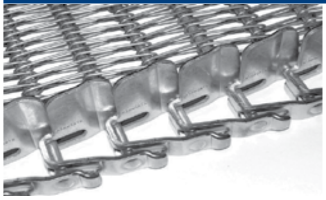


Omni-Tough® Mesh Overlay
2½ times stronger than conventional overlays and is resistant to product sticking in freezer applications

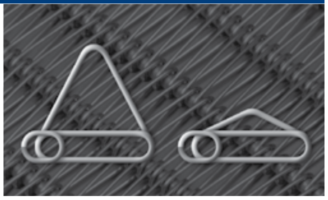


Patented Pigtail Spirals
Reduces wire breakage

Omni-Pro® Options



Integral Guard Edges
Available for 100/120/150, are more durable and easier to clean than modular guard edges



Patented Special Mesh Spirals
A cost effective solution for adding lane dividers or flights

SPIRAL PRODUCTS

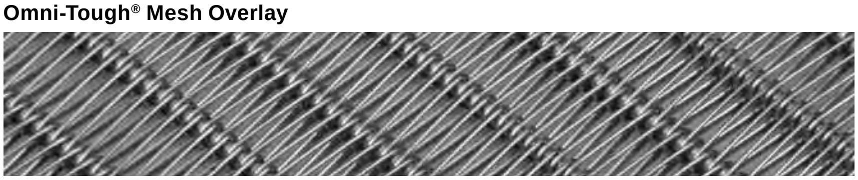
¾-Inch Pitch

Omni-Pro® 075

Technical Specifications		Units	
Turn Ratio			2.2 to 2.5
Pitch		in. (mm)	0.75 (19.1)
Available Widths: Curve/Spiral			12.00–40.00 (304.8–1016.0)
Available Widths: Straight Run			12.00–48.00 (304.8–1219.2)
Link Height			0.44 (11.1)
Link & Optional Mesh Overlay Material			Heavy duty, extended leg, stainless steel
Rod Diameter/Material			0.192 (4.9) stainless steel
Conveying Surface			2.13 (54.1) less than nominal width
Weight			See belt weight calculation
Allowable Tension	Curve/Spiral	lb. (kg)	150 (68) at 100,000 cycles
	Straight Run		250 (114) at 100,000 cycles
Turn Direction			Bi-directional (left & right)
Mode of Turning			Inside edge collapses in turn
Method of Drive			Sprocket driven on links

Available Options

Omni-Tough® Mesh Overlay



Omni-Tough® is a stainless steel, spring wire, spiral overlay available in 16 and 17 wire gauges. It is 2-1/2 times stronger and more damage-resistant than conventional wire overlays. Omni-Tough® provides a flatter surface than standard overlays and is also more resistant to product sticking in freezer applications.

Designation B / U X – Y – Z

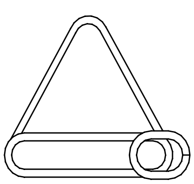
- Balanced Weave
- Unilateral Weave
- No. of Loops/Foot of Width
- No. of Spirals/Foot of Length
- Wire Gauge of Overlay

Examples:
B30-16-16
U42-16-17

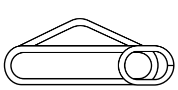
Variable Loop Count Overlay (Patented)
Overlay which has varied loop spacing across the width of the belt allows the loops to get progressively closer together as the spiral goes from the inside of the belt to the outside of the belt (inside and outside in respect to a turn).

Special Spirals (Patented)

- Available in Omni-Tough® overlay only
- One or more spirals on conveying surface are raised
- Used as lane dividers or flights
- Maximum height is equal to belt pitch
- Available options: height, spacing, location, shape, and number of lanes in belt

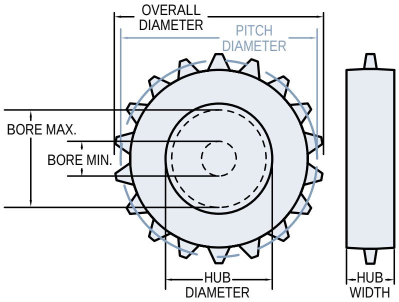


Equilateral Triangle



Isosceles Triangle

UHMWPE Sprockets



Nom. Size	Teeth	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#3	12	2.90 (73.7)	2.25 (57.2)	1.00 (25.4)	1.44 (36.6)

Sprockets available in Stainless Steel, Plain Steel, and UHMWPE.
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.
* Maximum bores provide adequate material thickness for standard keyway. Specify special sizes to be used when necessary.

Supports

Supports are required at a maximum of 18" apart on load side and 24" maximum on return side. Rollers may also be used. For light loads, support rails may be placed further apart: Consult Ashworth Engineering for assistance.

Belt Weight Calculation

Weight of Base Belt + Weight of Overlay

Steps of calculation:

- Determine weight of base belt
- Calculate conveying surface and convert to units of feet or meters
- Calculate square feet (square meter) of mesh/foot (meter) of belt length
- Use the conveying surface and mesh type to determine weight of mesh
- Add the weight of the base belt to weight of mesh overlay
- Multiply calculated value by belt length for total belt weight

Base Belt Weight

OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)	OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)
12 (305)	2.20 (3.3)	32 (813)	4.79 (7.1)
14 (356)	2.45 (3.6)	34 (864)	5.05 (7.5)
16 (406)	2.71 (4.0)	36 (914)	5.31 (7.9)
18 (457)	2.97 (4.4)	38 (965)	5.56 (8.3)
20 (508)	3.23 (4.8)	40 (1016)	5.82 (8.7)
22 (559)	3.49 (5.2)	42** (1067)	6.08 (9.0)
24 (610)	3.75 (5.6)	44** (1118)	6.34 (9.4)
26 (660)	4.01 (6.0)	46** (1168)	6.60 (9.8)
28 (711)	4.27 (6.4)	48** (1219)	6.86 (10.2)
30 (762)	4.53 (6.7)		

**Recommended for Straight run only.

Open Surface Area % for OP75

Mesh	Straight	2.2 Turn
none	74.4	69.7
18-16-16	65.1	58.6
18-16-17	66.3	60.1
24-16-16	62.0	55.0
24-16-17	63.6	56.9
30-16-16	58.7	51.1
30-16-17	60.9	53.7
36-16-16	55.8	47.6
36-16-17	58.2	50.5
42-16-16	52.7	43.9
42-16-17	55.5	47.3
48-16-16	49.6	40.3
48-16-17	52.8	44.1
54-16-16	46.5	36.6
54-16-17	50.1	40.9

Omni-Tough® Overlay Weight

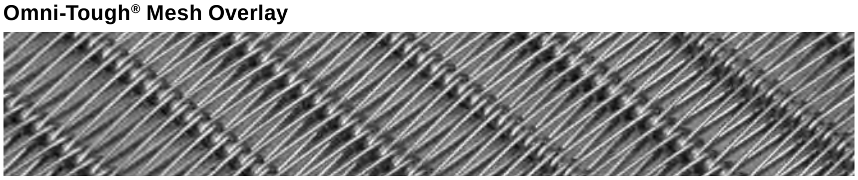
Mesh	16 ga. (1.6 mm) lb/ft² (kg/m²)	17 ga. (1.4 mm) lb/ft² (kg/m²)
18	0.65 (3.2)	N/A
24	0.84 (4.1)	N/A
30	1.04 (5.1)	N/A
36	1.24 (6.1)	0.91 (4.4)
42	1.44 (7.0)	1.06 (5.2)
48	1.64 (8.0)	1.21 (5.9)
54	1.84 (9.0)	1.36 (6.6)

1-Inch Pitch
Omni-Pro® 100

Technical Specifications		Units	
Turn Ratio			1.6 to 2.5
Pitch			1.08 (27.4)
Available Widths: Curve/Spiral			12.00–40.00 (304.8–1016)
Available Widths: Straight Run			12.00–48.00 (304.8–1219.2)
Link Height		in. (mm)	0.50 (12.7)
Link & Optional Mesh Overlay Material			Heavy duty, extended leg, stainless steel
Rod Diameter/Material			0.192 (4.9) stainless steel
Conveying Surface			2.75 (69.9) less than nominal width
Weight			See belt weight calculation
Allowable Tension	Curve/Spiral	lb. (kg)	200 (91) at 100,000 cycles
	Straight Run		400 (182) at 100,000 cycles
Turn Direction			Bi-directional (left & right)
Mode of Turning			Inside edge collapses in turn
Method of Drive			Sprocket driven on links

Available Options

Omni-Tough® Mesh Overlay



Omni-Tough® is a stainless steel, spring wire, spiral overlay available in 16 and 17 wire gauges. It is 2-1/2 times stronger and more damage-resistant than conventional wire overlays. Omni-Tough® provides a flatter surface than standard overlays and is also more resistant to product sticking in freezer applications.

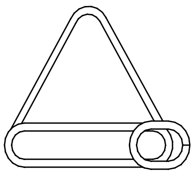
Designation B / U X – Y – Z

- Balanced Weave
- Unilateral Weave
- No. of Loops/Foot of Width
- No. of Spirals/Foot of Length
- Wire Gauge of Overlay

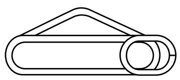
Examples:
B30-12-16
U42-12-17

Variable Loop Count Overlay (Patented)
Overlay which has varied loop spacing across the width of the belt allows the loops to get progressively closer together as the spiral goes from the inside of the belt to the outside of the belt (inside and outside in respect to a turn).

Special Spirals (Patented)
- Available in Omni-Tough® overlay only
- One or more spirals on conveying surface are raised
- Used as lane dividers or flights
- Maximum height is equal to belt pitch
- Available options: height, spacing, location, shape, and number of lanes in belt

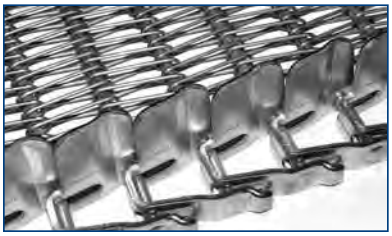


Equilateral Triangle



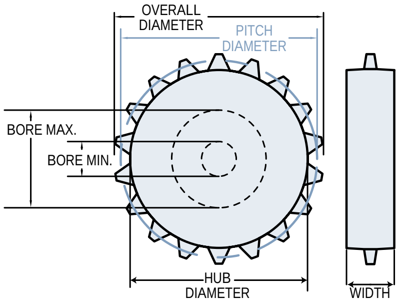
Isosceles Triangle

Integral Guard Edges



Integral Guard Edges are available for Omni-Pro® 100/120/150 and are more durable and easier to clean than modular guard edges

UHMWPE Sprockets



Nom. Size	Teeth	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#4	13	4.53 (115.1)	3.90 (99.1)	1.00 (25.4)	2.19 (55.6)
#6	18	6.24 (158.5)	5.65 (143.5)	1.00 (25.4)	3.75 (95.3)
#8	23	7.96 (202.2)	7.39 (187.7)	1.00 (25.4)	4.00 (101.6)

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.

Supports

Supports are required at a maximum of 18" apart on load side and 24" maximum on return side. Rollers may also be used. For light loads, support rails may be placed further apart: Consult Ashworth Engineering for assistance.

Belt Weight Calculation

Weight of Base Belt + Weight of Overlay

Steps of calculation:

- Determine weight of base belt
- Calculate conveying surface and convert to units of feet or meters
- Calculate square feet (square meter) of mesh/foot (meter) of belt length
- Use the conveying surface and mesh type to determine weight of mesh
- Add the weight of the base belt to weight of mesh overlay
- Multiply calculated value by belt length for total belt weight

Base Belt Weight

OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)	OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)
12 (305)	1.86 (2.8)	32 (813)	3.66 (5.4)
14 (356)	2.04 (3.0)	34 (864)	3.84 (5.7)
16 (406)	2.22 (3.3)	36 (914)	4.02 (6.0)
18 (457)	2.40 (3.6)	38 (965)	4.20 (6.3)
20 (508)	2.58 (3.8)	40 (1016)	4.38 (6.5)
22 (559)	2.76 (4.1)	42** (1067)	4.56 (6.8)
24 (610)	2.94 (4.4)	44** (1118)	4.74 (7.1)
26 (660)	3.12 (4.6)	46** (1168)	4.92 (7.3)
28 (711)	3.30 (4.9)	48** (1219)	5.10 (7.6)
30 (762)	3.48 (5.2)		

**Recommended for Straight run only.

Open Surface Area % for Omni-Pro® 100

mesh	straight	1.6 turn	1.7 turn	2.2 turn
none	82.2	78.0	78.2	78.9
18-12-16	72.9	66.4	66.7	67.9
18-12-17	74.1	68.3	68.6	69.7
24-12-16	69.8	62.6	62.9	64.2
24-12-17	71.4	64.6	64.9	65.9
30-12-16	66.7	58.8	59.1	60.5
30-12-17	68.7	61.2	61.6	62.9
36-12-16	63.6	54.9	55.3	56.9
36-12-17	66.0	57.9	58.6	59.7
42-12-16	60.5	51.1	51.5	53.2
42-12-17	63.3	54.6	55.0	56.5
48-12-16	57.4	47.3	47.7	49.5
48-12-17	60.6	51.2	54.5	53.3
54-12-16	54.3	43.4	43.9	45.8
54-12-17	57.9	47.9	48.3	50.1

Omni-Tough® Overlay Weight

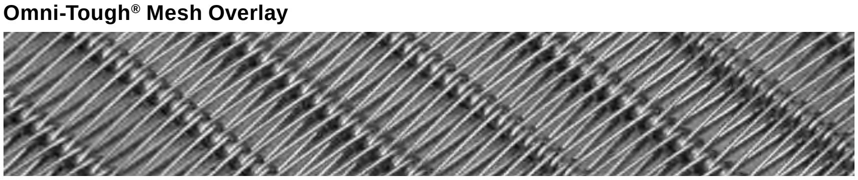
Mesh	16 ga. (1.6 mm) lb/ft² (kg/m²)	17 ga. (1.4 mm) lb/ft² (kg/m²)
18	0.55 (2.7)	N/A
24	0.74 (3.6)	N/A
30	0.93 (4.5)	N/A
36	1.08 (5.3)	0.82 (4.0)
42	1.26 (6.2)	0.95 (4.6)
48	1.44 (7.0)	1.08 (5.3)
54	1.62 (7.9)	1.22 (6.0)

1.2-Inch Pitch
Omni-Pro® 120

Technical Specifications		Units	
Turn Ratio			1.7 to 2.5
Pitch		in. (mm)	1.20 (30.5)
Available Widths: Curve/Spiral		in. (mm)	12.00–54 (304.8–1371.6)
Available Widths: Straight Run		in. (mm)	12.00–60 (304.8–1524.0)
Link Height		in. (mm)	0.59 (15.0)
Link & Optional Mesh Overlay Material		in. (mm)	Heavy duty, extended leg, stainless steel
Rod Diameter/Material		in. (mm)	0.236 (5.9) stainless steel
Conveying Surface		in. (mm)	3.13 (79.5) less than nominal width
Weight			See belt weight calculation
Allowable Tension	Curve/Spiral	lb. (kg)	400 (182) at 100,000 cycles
Allowable Tension	Straight Run	lb. (kg)	800 (364) at 100,000 cycles
Turn Direction			Bi-directional (left & right)
Mode of Turning			Inside edge collapses in turn
Method of Drive			Sprocket driven on links

Available Options

Omni-Tough® Mesh Overlay



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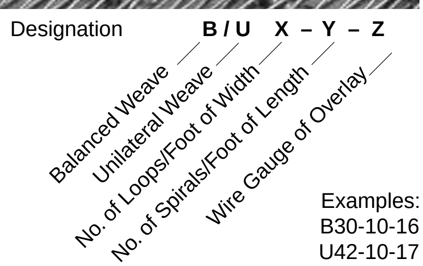
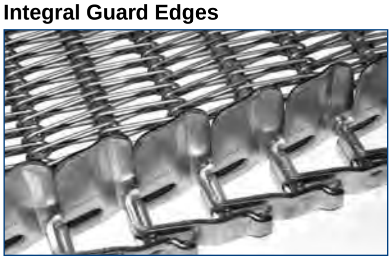


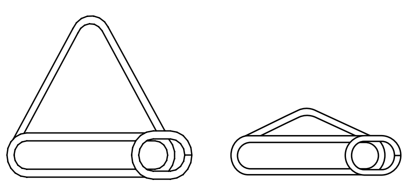
Variable Loop Count Overlay (Patented)
Overlay which has varied loop spacing across the width of the belt allows the loops to get progressively closer together as the spiral goes from the inside of the belt to the outside of the belt (inside and outside in respect to a turn).

Special Spirals (Patented)
- Available in Omni-Tough® overlay only
- One or more spirals on conveying surface are raised
- Used as lane dividers or flights
- Maximum height is equal to belt pitch
- Available options: height, spacing, location, shape, and number of lanes in belt

Integral Guard Edges

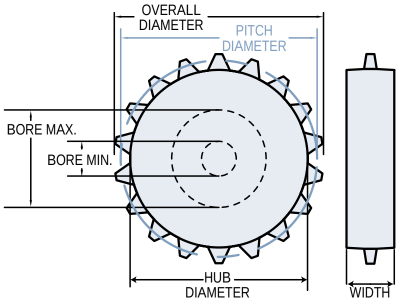


Integral Guard Edges are available for Omni-Pro® 100/120/150 and are more durable and easier to clean than modular guard edges



Equilateral Triangle *Isosceles Triangle*

Steel Drive Sprockets



Nom. Size	Teeth	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#6	16	6.11 (155.2)	5.47 (138.9)	0.75 (19.1)	3.00 (76.2)
#8	21	8.05 (204.5)	7.38 (187.5)	0.75 (19.1)	4.00 (101.6)

#8-21 tooth sprockets recommended with 7-11/16 in. (195 mm) diameter filler rolls.
#6-16 tooth available with 5-3/4 in. (146 mm) diameter filler rolls for retrofitted systems only.
* Maximum bores provide adequate material thickness for standard keyway.
Specify special sizes to be used when necessary.

Supports

Supports are required at a maximum of 18" apart on load side and 24" maximum on return side. Rollers may also be used. For light loads, support rails may be placed further apart: Consult Ashworth Engineering for assistance.

Belt Weight Calculation

Weight of Base Belt + Weight of Overlay

Steps of calculation:

- Determine weight of base belt
- Calculate conveying surface and convert to units of feet or meters
- Calculate square feet (square meter) of mesh/foot (meter) of belt length
- Use the conveying surface and mesh type to determine weight of mesh
- Add the weight of the base belt to weight of mesh overlay
- Multiply calculated value by belt length for total belt weight

Base Belt Weight

OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)	OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)	OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)
12 (305)	2.60 (3.9)	30 (762)	4.80 (7.1)	48 (1219)	7.01 (10.4)
14 (356)	2.84 (4.2)	32 (813)	5.05 (7.5)	50 (1270)	7.25 (10.8)
16 (406)	3.09 (4.6)	34 (864)	5.29 (7.9)	52 (1321)	7.50 (11.2)
18 (457)	3.33 (5.0)	36 (914)	5.54 (8.2)	54 (1372)	7.74 (11.5)
20 (508)	3.58 (5.3)	38 (965)	5.78 (8.6)	56 (1422)	7.99 (11.9)
22 (559)	3.82 (5.7)	40 (1016)	6.03 (9.0)	58 (1473)	8.23 (12.2)
24 (610)	4.07 (6.1)	42 (1067)	6.27 (9.3)	60 (1524)	8.48 (12.6)
26 (660)	4.31 (6.4)	44 (1118)	6.52 (9.7)		
28 (711)	4.56 (6.8)	46 (1168)	6.76 (10.1)		

Open Surface Area % for Omni-Pro® 120

Mesh	Straight	1.7 Turn	2.2 Turn
none	80.3	75.8	76.7
18-10-16	71.0	64.4	65.6
18-10-17	72.2	65.9	67.1
24-10-16	67.9	60.6	62.0
24-10-17	69.5	62.6	63.9
30-10-16	64.8	56.8	58.3
30-10-17	66.8	59.3	60.7
36-10-16	61.7	53.0	54.6
36-10-17	64.1	55.9	57.6
42-10-16	58.6	49.2	50.9
42-10-17	61.4	52.6	54.3
48-10-16	55.5	45.4	47.3
48-10-17	58.7	49.3	51.1
54-10-16	52.4	41.6	43.6
54-10-17	56.0	46.0	47.9

Omni-Tough® Overlay Weight

Mesh	16 ga. (1.6 mm) lb/ft² (kg/m²)	17 ga. (1.4 mm) lb/ft² (kg/m²)
18	0.53 (2.6)	N/A
24	0.69 (3.4)	N/A
30	0.86 (4.2)	N/A
36	1.03 (5.0)	0.78 (3.8)
42	1.20 (5.9)	0.91 (4.4)
48	1.37 (6.7)	1.03 (5.0)
54	1.54 (7.5)	1.16 (5.7)

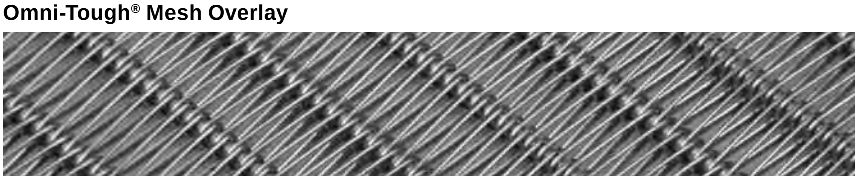
1½-Inch Pitch

Omni-Pro® 150

Technical Specifications		Units	
Turn Ratio			1.6 to 2.5
Pitch		in. (mm)	1.50 (38.1)
Available Widths: Curve/Spiral			12.00–54 (304.8–1371.6)
Available Widths: Straight Run			12.00–60 (304.8–1524.0)
Link Height			0.59 (15.0)
Link & Optional Mesh Overlay Material			Heavy duty, extended leg, stainless steel
Rod Diameter/Material			0.236 (6.0) stainless steel
Conveying Surface			3.13 (79.5) less than nominal width
Weight			See belt weight calculation
Allowable Tension	Curve/Spiral	lb. (kg)	400 (182) at 100,000 cycles
	Straight Run		800 (364) at 100,000 cycles
Turn Direction			Bi-directional (left & right)
Mode of Turning			Inside edge collapses in turn
Method of Drive			Sprocket driven on links

Available Options

Omni-Tough® Mesh Overlay



Omni-Tough® is a stainless steel, spring wire, spiral overlay available in 16 and 17 wire gauges. It is 2-1/2 times stronger and more damage-resistant than conventional wire overlays. Omni-Tough® provides a flatter surface than standard overlays and is also more resistant to product sticking in freezer applications.

Designation B / U X – Y – Z

- Balanced Weave
- Unilateral Weave
- No. of Loops/Foot of Width
- No. of Spirals/Foot of Length
- Wire Gauge of Overlay

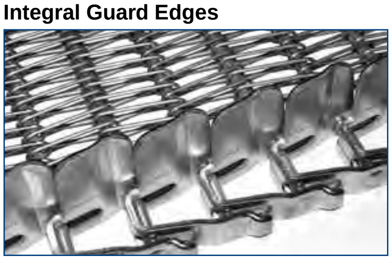
Examples:
B30-8-16
U42-8-17

Variable Loop Count Overlay (Patented)
Overlay which has varied loop spacing across the width of the belt allows the loops to get progressively closer together as the spiral goes from the inside of the belt to the outside of the belt (inside and outside in respect to a turn).

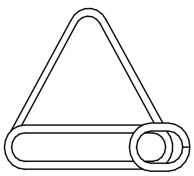
Special Spirals (Patented)

- Available in Omni-Tough® overlay only
- One or more spirals on conveying surface are raised
- Used as lane dividers or flights
- Maximum height is equal to belt pitch
- Available options: height, spacing, location, shape, and number of lanes in belt

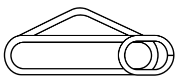
Integral Guard Edges



Integral Guard Edges are available for Omni-Pro® 100/120/150 and are more durable and easier to clean than modular guard edges



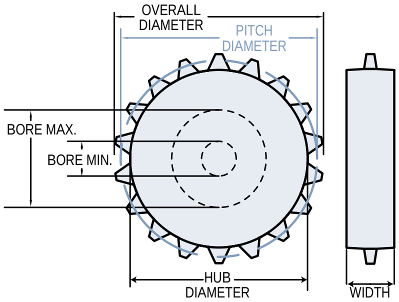
Equilateral Triangle



Isosceles Triangle

SPIRAL PRODUCTS

UHMWPE Sprockets



Nom. Size	Teeth	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#8	17	8.16 (207.3)	7.43 (188.7)	0.75 (19.1)	3 (76.2)

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.

Supports

Supports are required at a maximum of 18" apart on load side and 24" maximum on return side. Rollers may also be used. For light loads, support rails may be placed further apart: Consult Ashworth Engineering for assistance.

Belt Weight Calculation

Weight of Base Belt + Weight of Overlay

Steps of calculation:
- Determine weight of base belt
- Calculate conveying surface and convert to units of feet or meters
- Calculate square feet (square meter) of mesh/foot (meter) of belt length
- Use the conveying surface and mesh type to determine weight of mesh
- Add the weight of the base belt to weight of mesh overlay
- Multiply calculated value by belt length for total belt weight

Base Belt Weight

OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)	OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)	OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)
12 (305)	2.30 (3.4)	30 (762)	4.06 (6.0)	48 (1219)	5.82 (8.7)
14 (356)	2.49 (3.7)	32 (813)	4.26 (6.3)	50 (1270)	6.02 (9.0)
16 (406)	2.69 (4.0)	34 (864)	4.45 (6.6)	52 (1321)	6.22 (9.3)
18 (457)	2.88 (4.3)	36 (914)	4.65 (6.9)	54 (1372)	6.41 (9.5)
20 (508)	3.08 (4.6)	38 (965)	4.84 (7.2)	56 (1422)	6.61 (9.8)
22 (559)	3.28 (4.9)	40 (1016)	5.04 (7.5)	58 (1473)	6.80 (10.1)
24 (610)	3.47 (5.2)	42 (1067)	5.24 (7.8)	60 (1524)	7.00 (10.4)
26 (660)	3.67 (5.5)	44 (1118)	5.43 (8.1)		
28 (711)	3.86 (5.7)	46 (1168)	5.63 (8.4)		

Open Surface Area % for Omni-Pro® 150

Mesh	Straight	1.6 Turn	2.2 Turn
none	84.2	81.4	81.3
18-10-16	75.0	69.0	70.4
18-8-17	76.2	70.5	71.8
24-8-16	71.9	65.2	66.7
24-8-17	73.5	67.2	68.6
30-8-16	68.8	61.4	63.0
30-8-17	70.8	63.8	65.4
36-8-16	65.7	57.5	59.3
36-8-17	68.1	60.5	62.2
42-8-16	62.6	53.7	55.1
42-8-17	65.4	57.2	59.0
48-8-16	59.5	49.9	52.0
48-8-17	62.7	53.8	55.8
54-8-16	56.4	46.0	48.3
54-8-17	60.0	50.5	52.6

Omni-Tough® Overlay Weight

Mesh	16 ga. (1.6 mm) lb/ft² (kg/m²)	17 ga. (1.4 mm) lb/ft² (kg/m²)
18	0.53 (2.6)	N/A
24	0.69 (3.4)	N/A
30	0.86 (4.2)	N/A
36	1.03 (5.0)	0.78 (3.8)
42	1.20 (5.9)	0.91 (4.4)
48	1.37 (6.7)	1.03 (5.0)
54	1.54 (7.5)	1.16 (5.7)

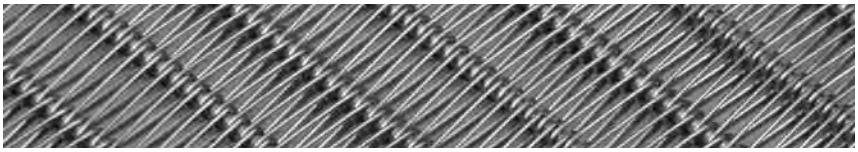
¾-Inch Pitch

Small Radius Omni-Pro®

Technical Specifications		Units	
Turn Ratio			1.0 to 2.0
Pitch		in. (mm)	0.75 (19.1)
Available Widths		in. (mm)	12.00–48.00 (304.8–1219.2)
Link Type/Material: Inside Edge		in. (mm)	Standard collapsing stainless steel
Link Type/Material: Center		in. (mm)	Heavy duty non-collapsing links stainless steel
Link Type/Material: Outside Edge		in. (mm)	Heavy duty collapsing stainless steel
Link Height		in. (mm)	0.438 (11.1)
Rod Diameter/Material		in. (mm)	0.192 (4.9) stainless steel
Conveying Surface		in. (mm)	Inside: Distance to center link minus 1.621 (41.2) Outside: Overall width minus the distance to the center link, minus 1.873 (47.6)
Weight			See belt weight calculation
Allowable Tension	Curve/Spiral	lb (kg)	150 (68) at 100,000 cycles
Allowable Tension	Straight Run	lb (kg)	300 (136) at 100,000 cycles
Turn Direction			Uni-directional (left or right—must specify direction)
Mode of Turning			Inside edge collapses in turn
Method of Drive			Sprocket driven on inside and center links only
Optional Mesh Overlay Material			Stainless steel

Available Options

Omni-Tough® Mesh Overlay



Omni-Tough® is a stainless steel, spring wire, spiral overlay for all Omni-Grid® conveyor belt constructions, available in both 16 and 17 wire gauges. It is 2-1/2 times stronger and more damage-resistant than conventional wire overlays without adding weight. Omni-Tough® provides a flatter surface than standard overlays and is also resistant to product sticking in freezer applications. Available in both straight and tapered spiral designs.

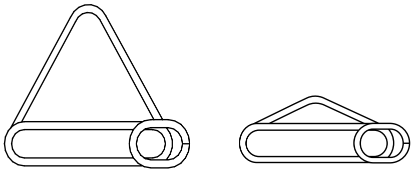
Designation **B / U X – Y – Z**

- B: Balanced Weave
- U: Unilateral Weave
- X: No. of Loops/Foot of Width
- Y: No. of Spirals/Foot of Length
- Z: Wire Gauge of Overlay

Designation Examples:
B30-12/16-16
U42-12/16-17

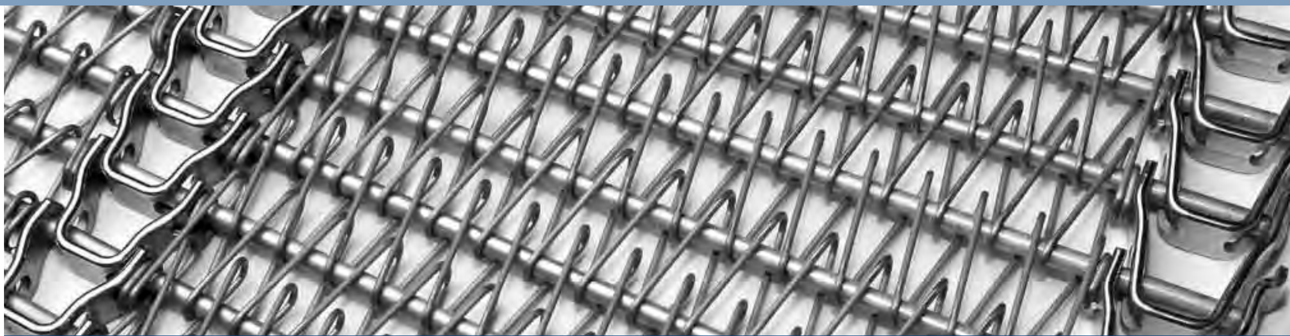
Variable Loop Count Overlay (Patented)
Overlay which has varied loop spacing across the width of the belt allows the loops to get progressively closer together as the spiral goes from the inside of the belt to the outside of the belt (inside and outside in respect to a turn).

Special Spirals (Patented)
- Available in Omni-Tough® overlay only
- One or more spirals on conveying surface are raised
- Used as lane dividers or flights
- Maximum height is equal to belt pitch
- Available options: height, spacing, location, shape, and number of lanes in belt

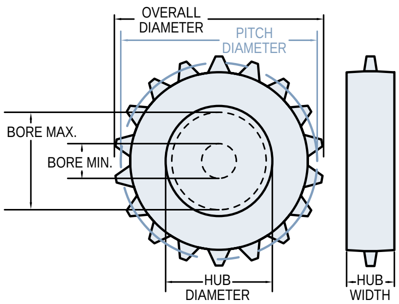


Equilateral Triangle *Isosceles Triangle*

SPIRAL PRODUCTS



Steel Sprockets *



Nom. Size	Teeth	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.** in. (mm)
#3	12	2.90 (73.7)	2.36 (59.9)	1.00 (25.4)	1.44 (36.6)

#3-12 tooth sprockets are available in T303 stainless steel and C1141 hardened steel.
3/4" pitch Omni-Pro® can use #60 roller chain sprockets modified as follows:
1. Face off sprocket such that the overall tooth width is 5/16 (7.94)
2. Chamfer corners of the newly machined teeth

*Stock Sprocket. More available upon request.
** Maximum bores provide adequate material thickness for standard keyway. Specify special sizes.

UHMWPE Drive Sprockets*

Nom. Size	Teeth	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.** in. (mm)
#3	12	2.9 (73.7)	2.36 (59.9)	1 (25.4)	1.44 (36.6)

*Stock Sprocket. More available upon request.
** Maximum bores provide adequate material thickness for standard keyway. Specify special sizes.

Belt Weight Calculation

Weight of Base Belt + Weight of Overlay

Steps of calculation:
- Determine weight of base belt
- Calculate conveying surface and convert to units of feet or meters
- Calculate square feet (square meter) of mesh/foot (meter) of belt length
- Use the conveying surface and mesh type to determine weight of mesh
- Add the weight of the base belt to weight of mesh overlay
- Multiply calculated value by belt length for total belt weight

Base Belt Weight

OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)	OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)	OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)
12 (305)	2.76 (4.1)	26 (660)	4.65 (6.9)	40 (1016)	6.54 (9.7)
14 (356)	3.03 (4.5)	28 (711)	4.92 (7.3)	42 (1067)	6.81 (10.1)
16 (406)	3.30 (4.9)	30 (762)	5.19 (7.7)	44 (1118)	7.08 (10.5)
18 (457)	3.57 (5.3)	32 (813)	5.46 (8.1)	46 (1168)	7.35 (10.9)
20 (508)	3.84 (5.7)	34 (864)	5.73 (8.5)	48 (1219)	7.62 (11.3)
22 (559)	4.11 (6.1)	36 (914)	6.00 (8.9)		
24 (610)	4.38 (6.5)	38 (965)	6.27 (9.3)		

Open Surface Area % for ¾" Small Radius Omni-Pro®

Mesh	Straight	1.1 Turn
none	74.4	75.9
18-12/16-16	60.1	63.3
18-12/16-17	61.9	64.2
24-12/16-16	55.6	58.3
24-12/16-17	58.0	60.6
30-12/16-16	51.1	54.1
30-12/16-17	54.1	56.9
36-12/16-16	46.6	49.8
36-12/16-17	50.2	53.2
42-12/16-16	42.1	45.6
42-12/16-17	46.3	49.5
48-12/16-16	37.6	41.3
48-12/16-17	42.3	45.8
54-12/16-16	33.0	37.0
54-12/16-17	38.3	42.0

Omni-Tough® Overlay Weight

Mesh	16 ga. (1.6 mm) Inside Mesh lb/ft² (kg/m²)	16 ga. (1.6 mm) Outside Mesh lb/ft² (kg/m²)	17 ga. (1.4 mm) Inside Mesh lb/ft² (kg/m²)	17 ga. (1.4 mm) Outside Mesh lb/ft² (kg/m²)
12	0.44 (2.1)	0.57 (2.8)	0.38 (1.9)	0.43 (2.1)
18	0.63 (3.1)	0.84 (4.1)	0.48 (2.3)	0.63 (3.1)
24	0.83 (4.1)	1.00 (4.9)	0.62 (3.0)	0.84 (4.1)
30	1.03 (5.0)	1.27 (6.2)	0.77 (3.8)	0.94 (4.6)
36	1.23 (6.0)	1.51 (7.4)	0.92 (4.5)	1.12 (5.5)
42	1.43 (7.0)	1.77 (8.6)	1.07 (5.2)	1.31 (6.4)
48	1.63 (8.0)	2.02 (9.9)	1.22 (6.0)	1.66 (8.1)
60	2.03 (9.9)	2.44 (11.9)	1.53 (7.5)	2.07 (10.1)

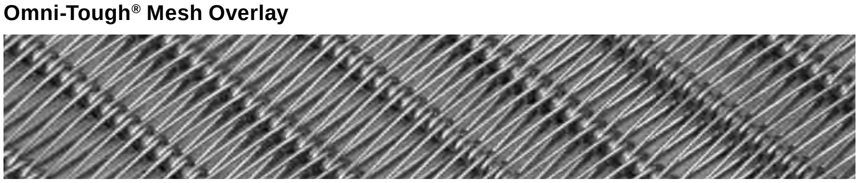
Note: 14 and 18 gauge mesh is available for certain applications.

1-Inch Pitch
Space Saver Omni-Grid®

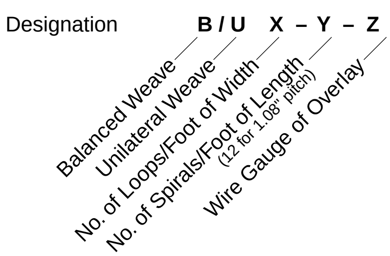
Technical Specifications		Units	
Turn Ratio			1.7 to 2.2
Pitch			1.08 (27.4)
Available Widths			12–36 (304.8–914.4)
Link Height			0.50 (12.7)
Link Material		in. (mm)	Stainless steel
Optional Mesh Overlay Material			Stainless steel
Rod Diameter/Material			0.192 (4.9) stainless steel
Conveying Surface			3.59 (91.2) less than nominal width
Weight			See belt weight calculation
Allowable Tension	Curve/Spiral	lb. (kg)	150 (68) at 100,000 cycles
	Straight Run		300 (136) at 100,000 cycles
Turn Direction			Uni-directional (left or right—must specify direction)
Mode of Turning			Outside edge expands in turn
Method of Drive			Sprocket driven on inside set of links only; special dual tooth sprocket required

Available Options

Omni-Tough® Mesh Overlay



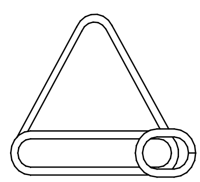
Omni-Tough® is a stainless steel, spring wire, spiral overlay for all Omni-Grid® conveyor belt constructions, available in both 16 and 17 wire gauges. It is 2-1/2 times stronger and more damage-resistant than conventional wire overlays without adding weight. Omni-Tough® provides a flatter surface than standard overlays and is also resistant to product sticking in freezer applications. Available in both straight and tapered spiral designs.



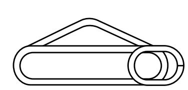
Designation Examples:
B30-12-16
U42-12-17

Variable Loop Count Overlay (Patented)
Overlay which has varied loop spacing across the width of the belt allows the loops to get progressively closer together as the spiral goes from the inside of the belt to the outside of the belt (inside and outside in respect to a turn).

Special Spirals (Patented)
- Available in Omni-Tough® overlay only
- One or more spirals on conveying surface are raised
- Used as lane dividers or flights
- Maximum height is equal to belt pitch
- Available options: height, spacing, location, shape, and number of lanes in belt



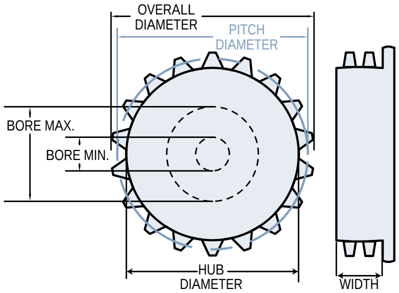
Equilateral Triangle



Isosceles Triangle

SPIRAL PRODUCTS

UHMWPE Drive Sprockets



Nom. Size	Teeth	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
*6	19	6.56 (166.6)	6.03 (153.2)	0.88 (22.4)	4.00 (101.6)

* Maximum bores provide adequate material thickness for standard keyway. Specify special sizes to be used when necessary.

Belt Weight Calculation

Weight of Base Belt + Weight of Overlay

Steps of calculation:

- Determine weight of base belt
- Calculate conveying surface and convert to units of feet or meters
- Calculate square feet (square meter) of mesh/foot (meter) of belt length
- Use the conveying surface and mesh type to determine weight of mesh
- Add the weight of the base belt to weight of mesh overlay
- Multiply calculated value by belt length for total belt weight

Base Belt Weight

OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)	OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)
12 (305)	2.54 (3.8)	26 (660)	3.85 (5.7)
14 (356)	2.73 (4.1)	28 (711)	4.04 (6.0)
16 (406)	2.92 (4.3)	30 (762)	4.23 (6.3)
18 (457)	3.10 (4.6)	32 (813)	4.41 (6.6)
20 (508)	3.29 (4.9)	34 (864)	4.60 (6.8)
22 (559)	3.48 (5.2)	36 (914)	4.79 (7.1)
24 (610)	3.66 (5.4)		

Open Surface Area % for Space Saver Omni-Grid®

Mesh	Straight	1.7 Turn
none	82.2	85.1
18-12-16	69.2	74.1
18-12-17	70.8	75.5
24-12-16	65.0	70.6
24-12-17	67.2	72.5
30-12-16	60.8	67.1
30-12-17	63.6	69.4
36-12-16	56.6	63.6
36-12-17	59.9	66.4
42-12-16	52.4	60.6
42-12-17	56.2	63.3
48-12-16	48.1	56.5
48-12-17	52.5	60.6
54-12-16	43.9	52.9
54-12-17	48.8	57.1

Omni-Tough® Overlay Weight

Mesh	16 ga. (1.6 mm) lb/ft² (kg/m²)	17 ga. (1.4 mm) lb/ft² (kg/m²)
12	0.38 (1.9)	0.29 (1.4)
18	0.55 (2.7)	0.42 (2.1)
24	0.74 (3.6)	0.56 (2.7)
30	0.93 (4.5)	0.68 (3.3)
36	1.08 (5.3)	0.82 (4.0)
42	1.26 (6.2)	0.95 (4.6)
48	1.44 (7.0)	1.08 (5.3)
54	1.62 (7.9)	1.21 (5.9)
60	1.80 (8.8)	1.35 (6.6)

Note: 14 and 18 gauge mesh is available for certain applications.

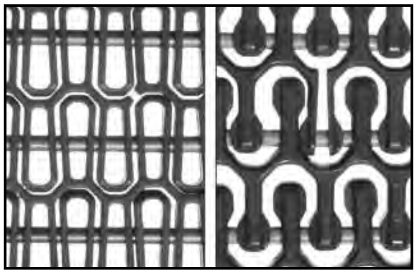
NOTES

Advantage™ Plastic Spiral Belts

Tested. Certified. Safer.

Advantage™ 120 & 200

- **Easy to Clean—The ONLY USDA Accepted spiral belt** for meat & poultry, as well as NSF Certified & BISSC 3rd Party Verified
- **Greatest Airflow for Shortest Dwell Times—**With the greatest open area, Advantage™ has been ETL proven to have up to 370% less back pressure when compared to all competitors' plastic spiral belts
- **Quick No-Weld Repairs—**Patented rod locking design allows quick, easy assembly using only a screwdriver
- **Strongest Plastic Belt—**Stainless steel rods handles 2.5 times the tension than the competition's all-plastic belts in spiral applications
- **Guaranteed Not to Sag—**Stainless steel rods provide superior beam strength eliminating the need for additional support rails, which reduces friction, tension and energy consumption
- **Guaranteed No Black Speck—**Acetal links prevent stainless steels parts from rubbing each other, the cause of black specks



Compare the rod exposure and 67% open area of Advantage™ 200 (left) to the all-plastic belt competition (right).

Assembly and disassembly are quick and easy, requiring only a screwdriver.

The Advantage™ 120 and 200 feature unique fully slotted rod openings, allowing for more open area and belt strength.

SPIRAL PRODUCTS

Plastic Belt Air Flow Performance

Advantage™ 200 and 120 vs. the Competition

Open Area and Air Flow Performance

A primary feature of Ashworth's Advantage™ belts is their large open area as compared to modular all-plastic belts. The larger the open area, the easier it is for air to flow through the belt, resulting in shorter dwell times, greater throughput, and less energy consumption.

To prove how efficient Ashworth's Advantage™ belts are, Ashworth commissioned Intertek ETL Testing Services (ETL), an independent Nationally Registered Testing Laboratory (NRTL), to conduct comparative air flow tests and quantify air pressure drop (air flow resistance) of all commonly available plastic spiral belts.

ETL's test setup consisted of a fan controlled by a variable speed drive to vary air flow volumes. Air pressure upstream and downstream of the belts was measured and collected using inclined manometers.

Procedure

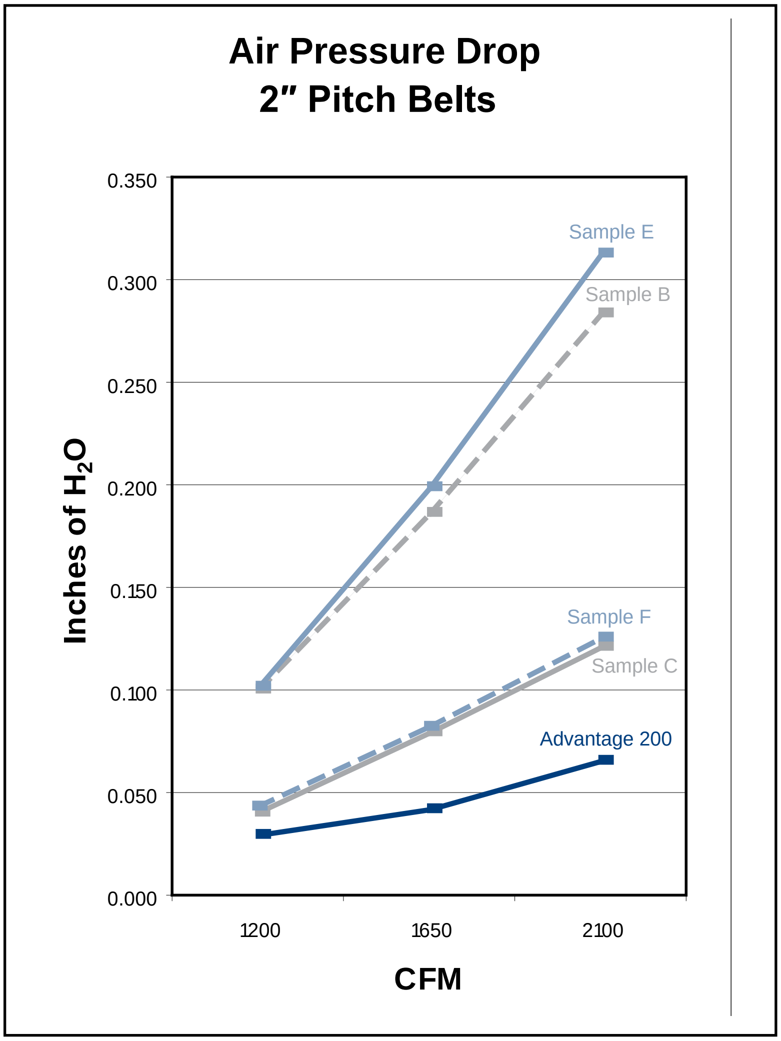
Each conveyor belt sample was clamped to the discharge of a 24" (609.6 mm) high by 18" (457.2 mm) wide duct in both a fully expanded and a fully collapsed condition. The selected air flow volumes were 1,200 cfm, 1,650 cfm, and 2,100 cfm; typical air flows used in spiral freezers. The test method employed was ANSI/AMCA 210-99, ANSI/ASHRAE 51-1999, American National Standard "Laboratory Methods of Testing Fans for Rating." An orifice metering station was employed for measuring the air volume.

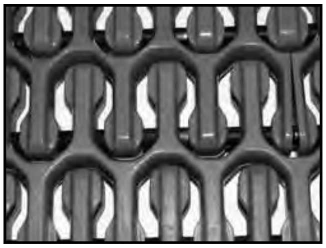
ETL measured the pressure drop across each belt in both an open and closed position at each of the three air volumes for a total of six readings. The open and closed readings for each air volume were averaged to simulate the position of a belt in a spiral with the inside edge being fully collapsed and the outside edge being fully open.

Results

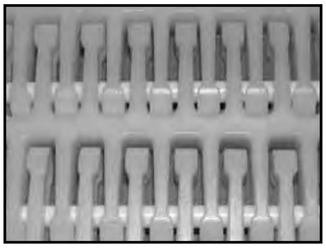
These readings represent the air pressure drop that would be measured as air flows through each tier of the spiral. Results for 2" (51 mm) pitch belts are shown in Figure 1.

[Figure 1]



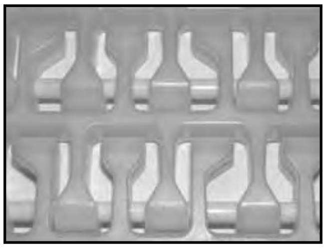


Sample E



Sample B

Sample F



Sample C

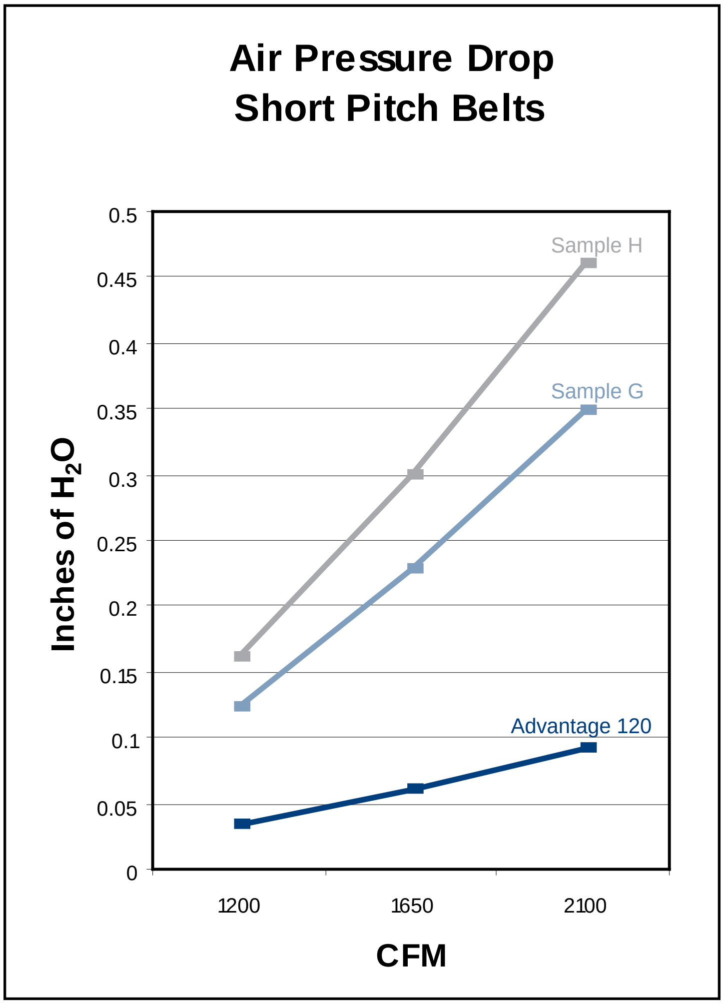
Ashworth's Advantage™ 200
The difference in open area between Ashworth's Advantage™ 200 and the competition is unquestionable.

The lower the air pressure drop, the more efficient the belt is since more air is passing through it. More air flow results in greater air contact with your product, lower dwell times, and increased production. Less air resistance also increases your evaporator fans' efficiency, resulting in lower electricity bills. ETL's testing proved that the Advantage™ 200 (depicted by the dark blue line at the bottom of Figure 1) performs remarkably better than any of the competitors' all-plastic belts.

For smaller pitched belts, the results were even more dramatic. Ashworth's Advantage™ 120 belt (depicted by the dark blue line at the bottom of Figure 2) had 278% less pressure drop than its closest competitor and 401% less than its worst performing competitor.

Results for belts with pitches of 1.2" to 1.5" (30.48 mm to 38.10 mm) are depicted in Figure 2.

[Figure 2]



Sample H

Sample G

Ashworth's Advantage™ 120
The difference in open area between Ashworth's Advantage™ 120 and the competition is again evident.

Summary

The results are clear. Ashworth's Advantage™ belts are significantly superior in enabling greater air flow. Advantage™ belts are designed with steel cross rods, rather than plastic cross rods. Steel rods carry heavier loads than plastic, so the Advantage's surface modules are less bulky than the all-plastic modular belts. Less bulky modules increase the belt's open area and, the greater the open area, the greater the air flow through the belt. The resulting benefits are reduced dwell times, faster freezing, higher throughput, and reduced energy consumption.

Note: A copy of the original Intertek ETL test report is available from Ashworth upon request. ETL's original test data is summarized below.

ETL Test Results—Advantage™ 200 vs. 2" Pitch All-Plastic Belts

Belts		Ashworth Advantage™ 200 (ETL Sample D)	ETL Sample C	ETL Sample F	ETL Sample B	ETL Sample E
CFM	Belt Position	Static Pressure Drop (Inches)				
1200	Open	0.010	0.008	0.012	0.017	0.011
	Closed	0.047	0.072	0.072	0.183	0.192
	Average	**0.029**	**0.040**	**0.042**	**0.100**	**0.102**
1650	Open	0.016	0.016	0.024	0.033	0.022
	Closed	0.068	0.142	0.136	0.340	0.375
	Average	**0.042**	**0.079**	**0.080**	**0.187**	**0.199**
2100	Open	0.025	0.027	0.038	0.052	0.035
	Closed	0.106	0.216	0.210	0.515	0.590
	Average	**0.066**	**0.122**	**0.124**	**0.284**	**0.313**
Increased Air Pressure Drop as Compared to Advantage™ 200 @ 2100 cfm		**N/A**	**85%**	**88%**	**330%**	**374%**

Note: Figures denoted in the white cells are ETL's test readings for open and closed belt positions. Ashworth calculated the average of ETL's test readings.

ETL Test Results—Advantage™ 120 vs. Short Pitch All-Plastic Belts

Belts		Ashworth Advantage™ 120 (ETL Sample A)	ETL Sample G	ETL Sample H
CFM	Belt Position	Static Pressure Drop (Inches)		
1200	Open	0.011	0.020	0.040
	Closed	0.055	0.224	0.280
	Average	**0.033**	**0.122**	**0.160**
1650	Open	0.019	0.040	0.077
	Closed	0.103	0.415	0.520
	Average	**0.061**	**0.228**	**0.299**
2100	Open	0.030	0.061	0.126
	Closed	0.154	0.635	0.795
	Average	**0.092**	**0.348**	**0.461**
Increased Air Pressure Drop as Compared to Advantage™ 120 @ 2100 cfm		**N/A**	**278%**	**401%**

Note: Figures denoted in the white cells are ETL's test readings for open and closed belt positions. Ashworth calculated the average of ETL's test readings.

1.2-Inch Pitch
Advantage™ 120

Technical Specifications		Units	
Turn Ratio			1.6–2.8
Pitch		in. (mm)	1.20 (30.5)
Available Widths: Curve/Spiral			8–40 (203–1016) in 1 (25.4) increments
Available Widths: Straight Run			8–60 (203–1524) in 1 (25.4) increments
Conveying Surface			Full belt width (subtract 1.0 (25.4) from side with guard edges)
Rod Diameter/Material			0.192 (4.9) stainless steel
Link Height			0.56 (14.2)
Weight			See belt weight chart
Maximum Temperature		°F (°C)	180 (82)
Minimum Temperature			-50 (-45)
Open Area			67% expanded / 61% average in turn
Average Air Pressure Drop		inH2O (Pa)	0.061 (15.2) in a turn at 550 FPM
Maximum Belt Pull	Curve/Spiral	lb. (kg)	500 (226)
	Straight Run		1000 (453)
Maximum Allowable Tension	Curve/Spiral		200 (91) at 100,000 cycles
	Straight Run		400 (182) at 100,000 cycles
Link & Module Material			Blue acetal (POM)
Turn Direction			Bi-directional (left & right)
Mode of Turning			Inside edge collapses in turn
Method of Drive			Sprocket driven on links
Patent Number			7,073,662 (And other foreign, domestic, and pending patents)

Available Options

Integrated Guard Edges

Optional integrated guard edges are molded into the link and can be installed on one or both belt edges. Available in 1/2" and 1" (12.7 and 25.4 mm) heights.

Lane Dividers

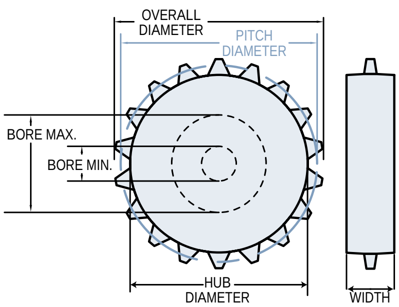
Optional rod-anchored stainless steel lane dividers can be installed at customer specified locations within the surface module section of the belt. Available in 1/2" and 1" (12.7 and 25.4 mm) heights.

Friction Top (FDA Approved)

Optional friction top modules are available for Advantage™ belts. Gray in color, friction top modules are placed within the surface module section of the belt.

SPIRAL PRODUCTS

UHMWPE Drive Sprockets



Nom. Size	Teeth	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#4	11	4.19 (106.4)	3.46 (87.9)	0.75 (19.1)	1.75 (44.5)
#5	13	4.90 (124.5)	4.23 (107.4)	0.75 (19.1)	2.25 (57.1)
#6	16	6.05 (153.7)	5.38 (136.7)	0.75 (19.1)	3.00 (76.2)
#8	21	7.88 (200.2)	7.27 (184.7)	0.75 (19.1)	4.00 (101.6)

*Maximum bores provide adequate material thickness for standard keyway.
Specify special sizes to be used when necessary.

Belt Weight by Width

Belt Width in. (mm)	Belt Weight lb/ft. (kg/m)	Belt Width in. (mm)	Belt Weight lb/ft. (kg/m)	Belt Width in. (mm)	Belt Weight lb/ft. (kg/m)
8 (203)	1.3 (1.9)	26 (660)	4.0 (6.0)	44 (1118)	6.7 (10.0)
10 (254)	1.7 (2.5)	28 (711)	4.3 (6.4)	46 (1168)	6.9 (10.3)
12 (305)	2.0 (3.0)	30 (762)	4.7 (7.0)	48 (1219)	7.2 (10.7)
14 (356)	2.3 (3.4)	32 (813)	4.9 (7.3)	50 (1270)	7.5 (11.2)
16 (406)	2.6 (3.9)	34 (864)	5.2 (7.7)	52 (1321)	7.8 (11.6)
18 (457)	2.9 (4.3)	36 (914)	5.5 (8.2)	54 (1372)	8.1 (12.1)
20 (508)	3.2 (4.8)	38 (965)	5.8 (8.6)	56 (1422)	8.4 (12.5)
22 (559)	3.5 (5.2)	40 (1016)	6.1 (9.1)	58 (1473)	8.7 (12.9)
24 (610)	3.7 (5.5)	42 (1067)	6.4 (9.5)	60 (1524)	9.0 (13.4)

NSF Certification

The Advantage™ 120 is NSF Certified to NSF/3-A/ANSI 14159-3 hygiene requirements for the design of mechanical belt conveyors used in meat and poultry processing.

2-Inch Pitch
Advantage™ 200

Technical Specifications		Units	
Turn Ratio			1.5 to 2.8
Pitch		in. (mm)	2.00 (50.8)
Available Widths: Curve/Spiral		in. (mm)	10–48 (254–1219) in 1.0 (25.4) increments
Available Widths: Straight Run		in. (mm)	10–60 (254–1524 in 1.0 (25.4) increments
Conveying Surface		in. (mm)	Full belt width (subtract 1.25 (31.8) from side with guard edges)
Rod Diameter/Material		in. (mm)	0.236 (6.0) stainless steel
Link Height		in. (mm)	0.56 (14.2)
Weight			See belt weight chart
Maximum Temperature		°F (°C)	180 (82)
Minimum Temperature		°F (°C)	-50 (-45)
Open Area			67% expanded / 61% average in turn
Average Air Pressure Drop		inH2O (Pa)	0.042 (10.5) in a turn at 550 FPM
Maximum Belt Pull	Curve/Spiral	lb. (kg)	750 (340)
Maximum Belt Pull	Straight Run	lb. (kg)	1500 (680)
Maximum Allow-able Tension	Curve/Spiral	lb. (kg)	300 (136) at 100,000 cycles
Maximum Allow-able Tension	Straight Run	lb. (kg)	600 (273) at 100,000 cycles
Link & Module Material			Blue acetal (POM)
Turn Direction			Bi-directional (left & right)
Mode of Turning			Inside edge collapses in turn
Method of Drive			Sprocket driven on links
Patent Number			7,073,662 (And other foreign, domestic, and pending patents)

Available Options

Integrated Guard Edges

Optional integrated guard edges are molded into the link and can be installed on one or both belt edges. Available in 1/2" and 1" (12.7 and 25.4 mm) heights.

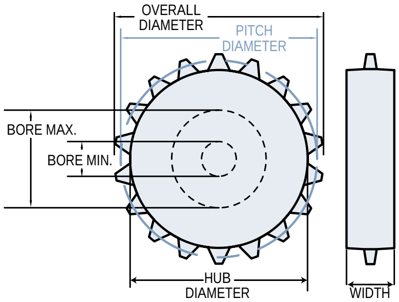
Lane Dividers

Optional rod-anchored stainless steel lane dividers can be installed at customer specified locations within the surface module section of the belt. Available in 1/2" and 1" (12.7 and 25.4 mm) heights.

Friction Top (FDA Approved)

Optional friction top modules are available for Advantage™ belts. Gray in color, friction top modules are placed within the surface module section of the belt.

UHMWPE Drive Sprockets



Nom. Size	Teeth	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#6	10	6.47 (164.3)	5.59 (142.0)	0.75 (19.1)	3.25 (82.6)
#8	13	8.36 (212.3)	7.55 (191.8)	0.75 (19.1)	4.00 (101.6)

*Maximum bores provide adequate material thickness for standard keyway.
Specify special sizes to be used when necessary.

Belt Weight by Width

Belt Width in. (mm)	Belt Weight lb/ft. (kg/m)	Belt Width in. (mm)	Belt Weight lb/ft. (kg/m)	Belt Width in. (mm)	Belt Weight lb/ft. (kg/m)
10 (254)	1.5 (2.2)	28 (711)	3.9 (5.8)	46 (1168)	6.2 (9.2)
12 (305)	1.8 (2.7)	30 (762)	4.2 (6.3)	48 (1219)	6.5 (9.7)
14 (356)	2.1 (3.1)	32 (813)	4.4 (6.5)	50 (1270)	6.8 (10.1)
16 (406)	2.3 (3.4)	34 (864)	4.7 (7.0)	52 (1321)	7.0 (10.4)
18 (457)	2.6 (3.9)	36 (914)	6.0 (8.9)	54 (1372)	7.3 (10.9)
20 (508)	2.9 (4.3)	38 (965)	5.2 (7.7)	56 (1422)	7.6 (11.3)
22 (559)	3.2 (4.8)	40 (1016)	5.5 (8.2)	58 (1473)	7.8 (11.6)
24 (610)	3.4 (5.1)	42 (1067)	5.8 (8.6)	60 (1524)	8.1 (12.1)
26 (660)	3.6 (5.4)	44 (1118)	6.0 (8.9)		

NSF Certification

The Advantage™ 200 is NSF Certified to NSF/3-A/ANSI 14159-3 hygiene requirements for the design of mechanical belt conveyors used in meat and poultry processing.

NSF®

United States Department of Agriculture USDA AMS Accepted Equipment

SPIRAL PRODUCTS

SPIRAL PRODUCTS

NOTES

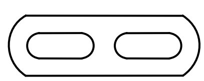
Omni-Flex® Rugged Metal Spiral Belts

Superior Strength & Load Capacity for High Speed, High Tension Spiral and Turn-Curve Applications

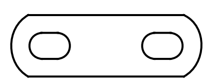
Ashworth Omni-Flex® belts are the original turn-curve conveyor belts and have been delivering reliable performance since 1959. These flat wire belts are constructed with heavy duty, precision formed rod ends for extended cage life and buttonheads for maximum strength and reduced wear. Unlike straight-running flat wire belts, Omni-Flex® belts are constructed with slots instead of holes. The slotted design allows the belt to collapse on either side, for both left-hand and right-hand turns.

Stainless Steel, Heavy Duty Construction
All Omni-Flex® components are precision crafted from premium quality stainless steel to exacting standards. The finish is smooth and burr-free for easy clean-up and excellent sanitary properties. Two rows of reinforcing bar links are standard to provide strength.

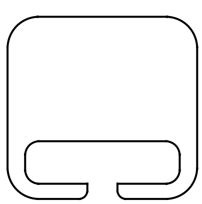
Broad Range of Sizes & Accessories
Available flat wire mesh dimensions for Omni-Flex® belts include 1" x 1", 1/2" x 1" and 1/3" x 1". Ashworth patented fatigue-resistant pickets are available on most Omni-Flex® belts and increase belt service life by about 30%. Other accessories such as guard edges, reinforcing bar links, and lane dividers are available for special needs.



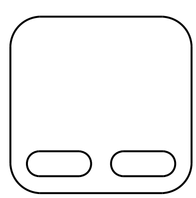
Standard Bar Link



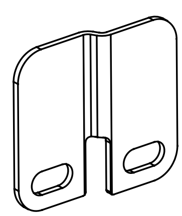
Short Slotted Bar Link



Detachable Lane Divider



Guard Edge Plate

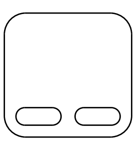


Non-Detachable Lane Divider

1-Inch Pitch
Omni-Flex® E1 & E2

Technical Specifications	Units	
Turn Ratio		1.8 (without bar links)
Pitch		1.084 (27.5)
Available Widths		6.00–48.00 (152.4–1219.2)
Picket Dimension/Material: E1 & E2		0.500 x .062 (12.7 x 1.6) stainless steel flat wire
Nominal Picket (Mesh) Shape: E1		1.00 x 1.00 (25.4 x 25.4)
Nominal Picket (Mesh) Shape: E2	in. (mm)	0.50 x 1.00 (12.7 x 25.4)
Rod Diameter/Material		0.192 (4.9) / stainless steel
Bar Links		Double, heavy duty, collapsing 0.090 (2.3) thick, on inside and outside belt edges
Conveying Surface: Standard Links		0.25 (6.4) less than nominal belt width
Thickness		0.50 (12.7)
Weight		See belt weight chart
Allowable Tension	lb. (kg)	300 (136) at 100,000 cycles
Turn Direction		Bi-directional (left & right)
Mode of Turning		Inside edge collapses in turn
Method of Drive	in. (mm)	Positive drive with matching sprockets spaced a max. of 6 (152.4) apart or Friction drive with a minimum 12 (304.8) diameter flat faced drum

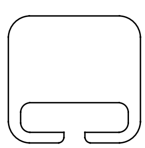
Available Options



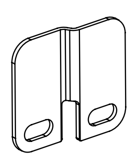
Guard Edge

Guard Edges
Plates assembled onto belt edges to prevent product from falling off. Guard edges serve to replace bar links on a one-to-one basis. Available heights (above the conveying surface) are: 0.50" (12.7 mm), 0.75" (19.1 mm), 1" (25.4 mm), 1.5" (38.1 mm), and 2" (50.8 mm).

Lane Dividers



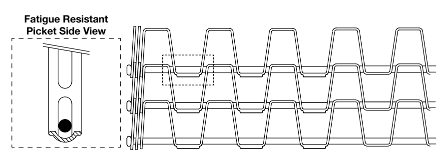
Detachable Lane Divider



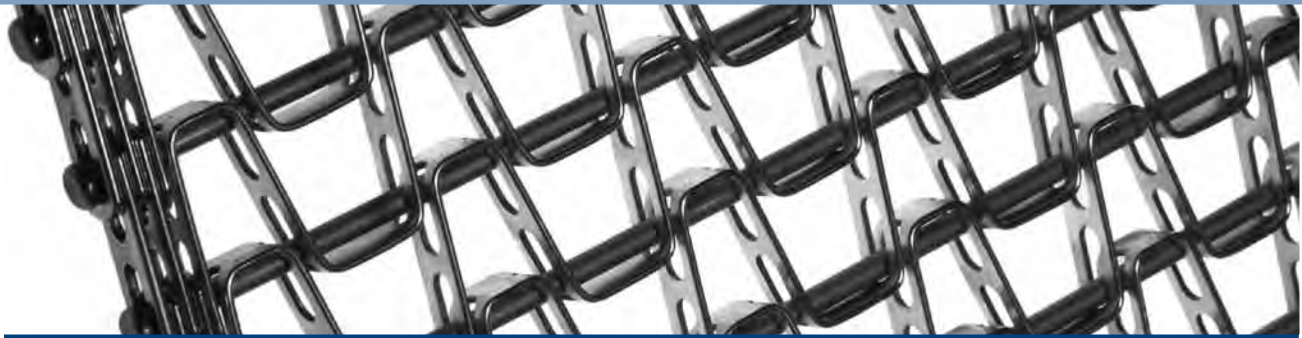
Non-Detachable Lane Divider

Detachable or non-detachable plates assembled into the belt's surface to locate product. Available heights (above the conveying surface) are: 0.50" (12.7 mm), 0.75" (19.1 mm), 1" (25.4 mm), 1.5" (38.1 mm), and 2" (50.8 mm). The maximum number of lane dividers = Belt Width / 9" (228.6 mm).

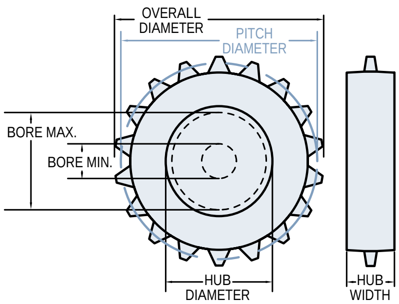
Fatigue Resistant Pickets (Patented)



These special pickets, which are manufactured with an outward facing radius centered on the trailing face of the picket, are designed to extend the service life of the belt by approximately 30%. This radius serves to lengthen the belt pitch in selected openings near the outside edge of the belt. This causes the bar links to bear the full load of the belt in a turn, relieving stress on the picket, which increases the belt's service life.



Steel Sprockets



Nom. Size	Teeth	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#4	13	4.53 (115.1)	3.90 (99.1)	1.00 (25.4)	2.63 (66.8)
#6	18	6.24 (158.5)	5.65 (143.5)	1.00 (25.4)	3.50 (88.9)
#8	23	7.96 (202.2)	7.39 (187.7)	1.00 (25.4)	4.50 (114.3)

UHMWPE Drive Sprockets

Nom. Size	Teeth	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#4	13	4.53 (115.1)	3.90 (99.1)	1.00 (25.4)	2.19 (55.6)
#6	18	6.24 (158.5)	5.65 (143.5)	1.00 (25.4)	3.75 (95.3)
#8	23	7.96 (202.2)	7.39 (187.7)	1.00 (25.4)	4.00 (101.6)

* Maximum bores provide adequate material thickness for standard keyway. Specify special sizes.

Open Surface Area % for Omni-Flex® E1

Mesh	Straight	2.0 Turn
1 x 1	70.4	64.5

Open Surface Area % for Omni-Flex® E2

Mesh	Straight	2.0 Turn
½ x 1	64.0	52.0

Base Belt Weight

Belt Width in. (mm)	E1–Weight per Unit of Length lb/ft (kg/m)	E2–Weight per Unit of Length lb/ft (kg/m)
6 (152)	1.94 (2.9)	2.04 (3.0)
8 (203)	2.46 (3.7)	2.60 (3.9)
10 (254)	2.97 (4.4)	3.16 (4.7)
12 (305)	3.49 (5.2)	3.72 (5.5)
14 (356)	4.01 (6.0)	4.28 (6.4)
16 (406)	4.52 (6.7)	4.84 (7.2)
18 (457)	5.04 (7.5)	5.39 (8.0)
20 (508)	5.56 (8.3)	5.95 (8.9)
22 (559)	6.07 (9.0)	6.51 (9.7)
24 (610)	6.59 (9.8)	7.07 (10.5)
26 (660)	7.11 (10.6)	7.63 (11.4)
28 (711)	7.62 (11.3)	8.19 (12.2)
30 (762)	8.14 (12.1)	8.74 (13.0)
32 (813)	8.66 (12.9)	9.30 (13.8)
34 (864)	9.17 (13.6)	9.86 (14.7)
36 (914)	9.69 (14.4)	10.42 (15.5)
38 (965)	10.21 (15.2)	10.98 (16.3)
40 (1016)	10.72 (16.0)	11.54 (17.2)
42 (1067)	11.24 (16.7)	12.09 (18.0)
44 (1118)	11.76 (17.5)	12.65 (18.8)
46 (1168)	12.27 (18.3)	13.21 (19.7)
48 (1219)	12.79 (19.0)	13.77 (20.5)

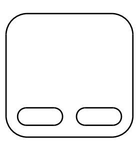
Note: Weights listed apply to standard construction Omni-Flex® with double bar links on both edges of the belt. Consult Ashworth Engineering for weights of non-standard configured belts.

1-Inch Pitch

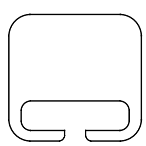
Omni-Flex® E3

Technical Specifications	Units	
Turn Ratio		2.0 and above (with bar links)
Pitch		1.084 (27.5)
Available Widths		6–48 (152.4–1219.2)
Picket Dimension/Material		0.50 x .05 (12.7 x 1.3) stainless steel flat wire
Nominal Picket (Mesh) Shape	in. (mm)	0.33 x 1.00 (8.4 x 25.4)
Rod Diameter/Material		0.192 (4.9) / stainless steel
Bar Links		Double, heavy duty, 0.09 (2.3) thick, on inside and outside belt edges
Conveying Surface: Standard Links		0.25 (6.4) less than nominal belt width
Thickness		0.5 (12.7)
Weight		See belt weight chart
Allowable Tension	lb. (kg)	300 (136) at 100,000 cycles
Turn Direction		Bi-directional (left & right)
Mode of Turning		Inside edge collapses in turn
Method of Drive	in. (mm)	Positive drive with matching sprockets spaced a max. of 6 (152.4) apart or Friction drive with a minimum 12 (304.8) diameter flat faced drum

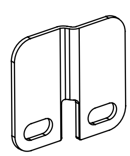
Available Options



Guard Edge



Detachable Lane Divider



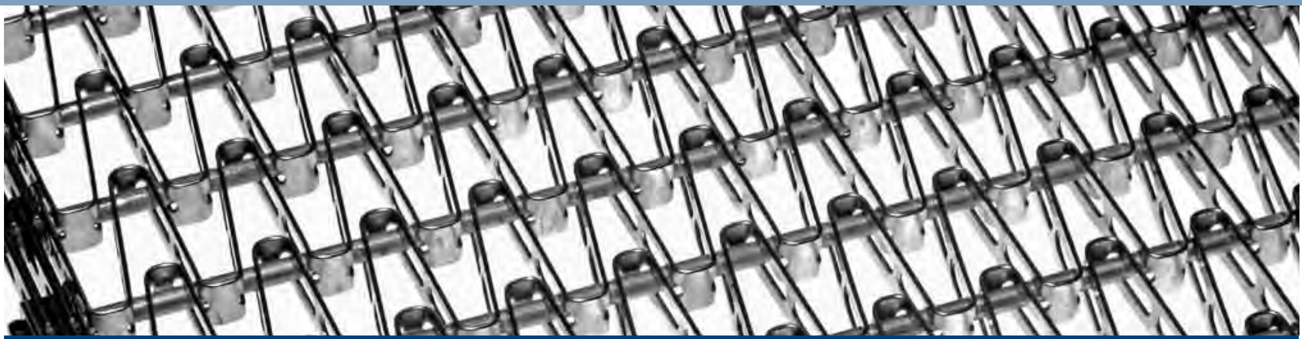
Non-Detachable Lane Divider

Guard Edges

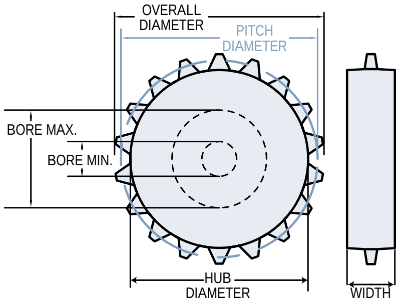
Plates assembled onto belt edges to prevent product from falling off. Guard edges serve to replace bar links on a one-to-one basis. Available heights (above the conveying surface) are: 0.50" (12.7 mm), 0.75" (19.1 mm), 1" (25.4 mm), 1.5" (38.1 mm), and 2" (50.8 mm).

Lane Dividers

Detachable or non-detachable plates assembled onto the belt's surface to locate product. Available heights (above the conveying surface) are: 0.50" (12.7 mm), 0.75" (19.1 mm), 1" (25.4 mm), 1.5" (38.1 mm), and 2" (50.8 mm). The maximum number of lane dividers = Belt Width / 9" (228.6 mm).



Steel Sprockets



Nom. Size	Teeth	Overall Diameter in. (mm)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Hub Width in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#4	13	5.03 (127.8)	4.53 (115.1)	3.90 (99.1)	1.50 (38.1)	1.00 (25.4)	2.63 (66.8)
#6	18	6.65 (168.9)	6.24 (158.5)	5.65 (143.5)	1.50 (38.1)	1.00 (25.4)	3.50 (88.9)
#8	23	8.39 (213.1)	7.96 (202.2)	7.39 (187.7)	1.50 (38.1)	1.00 (25.4)	4.50 (114.3)

*Maximum bores provide adequate material thickness for standard keyway. Specify special sizes.

UHMWPE Drive Sprockets

Nom. Size	Teeth	Overall Diameter in. (mm)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Hub Width in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#4	13	4.90 (124.5)	4.53 (115.1)	3.90 (99.1)	2.00 (50.8)	1.00 (25.4)	2.19 (55.6)
#6	18	6.65 (168.9)	6.24 (158.5)	5.65 (143.5)	2.00 (50.8)	1.00 (25.4)	3.75 (95.3)
#8	23	8.39 (213.1)	7.96 (202.2)	7.39 (187.7)	2.00 (50.8)	1.00 (25.4)	4.00 (101.6)

* Maximum bores provide adequate material thickness for standard keyway. Specify special sizes.

Open Surface Area % for Omni-Flex® E3

Mesh	Straight	2.0 Turn
1⁄3 x 1	57.7	49.2

Base Belt Weight

OA Belt Width in. (mm)	Base Belt Weight lb/ft (kg/m)
6 (152)	2.03 (3.0)
8 (203)	2.58 (3.8)
10 (254)	3.14 (4.7)
12 (305)	3.69 (5.5)
14 (356)	4.24 (6.3)
16 (406)	4.80 (7.1)
18 (457)	5.35 (8.0)
20 (508)	5.90 (8.8)
22 (559)	6.46 (9.6)
24 (610)	7.01 (10.4)
26 (660)	7.56 (11.3)
28 (711)	8.12 (12.1)
30 (762)	8.67 (12.9)
32 (813)	9.22 (13.7)
34 (864)	9.78 (14.6)
36 (914)	10.33 (15.4)
38 (965)	10.88 (16.2)
40 (1016)	11.44 (17.0)
42 (1067)	11.99 (17.8)
44 (1118)	12.54 (18.7)
46 (1168)	13.10 (19.5)
48 (1219)	13.65 (20.3)

Note: Weights listed apply to standard construction Omni-Flex® E3 with double bar links on both edges of the belt. Consult Ashworth Engineering for weights of non-standard configured belts.

SPIRAL PRODUCTS

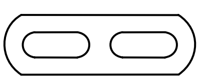
1-Inch Pitch

Small Radius Omni-Flex® G1 & G3

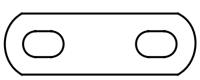
Technical Specifications	Units	
Turn Ratio		1.0 and greater
Pitch: Inside Pickets	in. (mm)	1.084 (27.5)
Pitch: Outside Pickets		1.50 (38.1)
Available Widths: G1		14.00–54.00 (355.6–1371.6)
Available Widths: G3		12–54 (304.8–1371.6)
Picket Dimension/Material: Inside		0.50 x 0.06 (12.7 x 1.5) stainless steel flat wire
Picket Dimension/Material: Outside		0.50 x 0.05 (12.7 x 1.3) stainless steel flat wire
Nom. Picket (Mesh) Shape: G1 Inside		1.00 x 1.00 (25.4 x 25.4)
Nom. Picket (Mesh) Shape: G1 Outside		1.00 x 1.50 (25.4 x 38.1)
Nom. Picket (Mesh Shape: G3 Inside		0.50 x 1.00 (12.7 x 25.4)
Nom. Picket (Mesh) Shape: G3 Outside		0.50 x 1.50 (12.7 x 38.1)
Rod Diameter/Material		0.192 (4.9) / stainless steel
Bar Links		Double, heavy duty, 0.09 (2.3) thick, assembled in the center of the belt
Conveying Surface: Standard Links		0.25 (6.4) less than nominal belt width
Thickness		0.50 (12.7)
Weight		See belt weight chart
Allowable Tension	lb. (kg)	300 (136) at 100,000 cycles
Turn Direction		Uni-directional (left or right—must specify direction)
Mode of Turning		Inside edge collapses in turn
Method of Drive		Positive drive with matching sprockets, toothless idlers support outside pickets

Available Options

Bar Links on Inside Edge

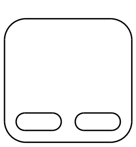


Standard Bar Link



Short Slotted Bar Link

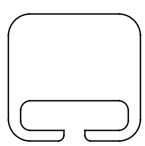
One double row of bar links at the center of the belt is standard on all Omni-Flex® belts in order to carry belt tension. A double row of bar links configured at the inside edge of the belt is optional.



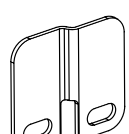
Guard Edge

Guard Edges
Plates assembled onto belt edges to prevent product from falling off. Guard edges serve to replace bar links on a one-to-one basis. Available heights (above the conveying surface) are: 0.50" (12.7 mm), 0.75" (19.1 mm), 1" (25.4 mm), 1.5" (38.1 mm), and 2" (50.8 mm).

Lane Dividers



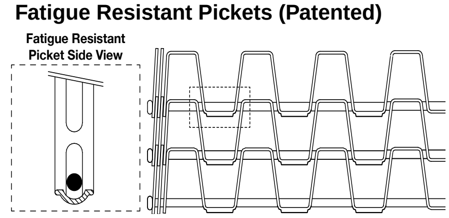
Detachable Lane Divider



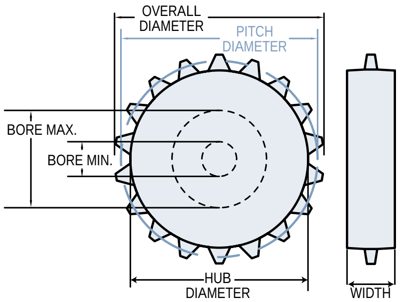
Non-Detachable Lane Divider

Detachable or non-detachable plates assembled onto the belt's surface to locate product. Available heights (above the conveying surface) are: 0.50" (12.7 mm), 0.75" (19.1 mm), 1" (25.4 mm), 1.5" (38.1 mm), and 2" (50.8 mm). The maximum number of lane dividers = Belt Width / 9" (228.6 mm).

Fatigue Resistant Pickets (Patented)



These special pickets, which are manufactured with an outward facing radius centered on the trailing face of the picket, are designed to extend the service life of the belt by approximately 30%. This radius serves to lengthen the belt pitch in selected openings near the outside edge of the belt. This causes the bar links to bear the full load of the belt in a turn, relieving stress on the picket, which increases the belt's service life.



UHMWPE Drive Sprockets

Nom. Size	Teeth	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#4	13	4.53 (115.1)	3.90 (99.1)	1.00 (25.4)	2.19 (55.6)
#6	18	6.24 (158.5)	5.65 (143.5)	1.00 (25.4)	3.75 (95.3)
#8	23	7.96 (202.2)	7.39 (187.7)	1.00 (25.4)	4.00 (101.6)

* Maximum bores provide adequate material thickness for standard keyway. Specify special sizes.

Open Surface Area % for Omni-Flex® G1

Mesh	Straight	1.0 Turn
1x1-1x1½	65.8	66.6

Open Surface Area % for Omni-Flex® G3

Mesh	Straight	1.0 Turn
½x1-½x1½	62.6	63.5

Base Belt Weight

Belt Width in. (mm)	G1 Weight per Unit of Length lb/ft (kg/m)	G3 Weight per Unit of Length lb/ft (kg/m)
12 (305)	N/A N/A	3.49 (5.2)
14 (356)	3.61 (5.4)	4.01 (6.0)
16 (406)	4.07 (6.1)	4.54 (6.8)
18 (457)	4.54 (6.8)	5.06 (7.5)
20 (508)	5.01 (7.5)	5.59 (8.3)
22 (559)	5.47 (8.1)	6.11 (9.1)
24 (610)	5.94 (8.8)	6.64 (9.9)
26 (660)	6.41 (9.5)	7.16 (10.7)
28 (711)	6.87 (10.2)	7.69 (11.4)
30 (762)	7.34 (10.9)	8.21 (12.2)
32 (813)	7.81 (11.6)	8.74 (13.0)
34 (864)	8.27 (12.3)	9.26 (13.8)
36 (914)	8.74 (13.0)	9.79 (14.6)
38 (965)	9.21 (13.7)	10.31 (15.3)
40 (1016)	9.67 (14.4)	10.84 (16.1)
42 (1067)	10.14 (15.1)	11.36 (16.9)
44 (1118)	10.61 (15.8)	11.89 (17.7)
46 (1168)	11.07 (16.5)	12.41 (18.5)
48 (1219)	11.54 (17.2)	12.94 (19.3)
50 (1270)	12.01 (17.9)	13.46 (20.0)
52 (1321)	12.47 (18.6)	13.99 (20.8)
54 (1372)	12.94 (19.3)	14.51 (21.6)

Note: Weights listed apply to standard construction Small Radius Omni-Flex® with double bar links assembled in the center of the belt and with no bar links along the edges. Consult Ashworth Engineering for weights of non-standard configured belts.

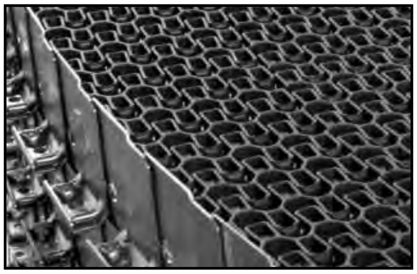
SPIRAL PRODUCTS

NOTES

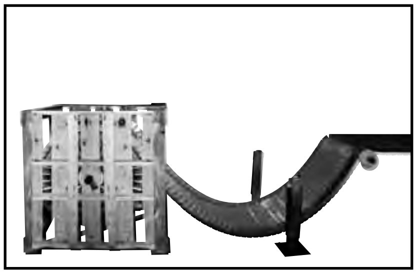
ExactaStack™
Drop-in Replacement Belt for Self Stacking Spirals

ExactaStack™ & ExactaStack™ WD

- **Drop-in Replacement—**Available in all widths, tier heights, and mesh configurations for both spliced-in sections and complete belt replacements, no system drive modifications required.
- **USDA Plastic Overlay—**The only stacker belt available with a plastic module overlay that is both USDA Accepted for meat and poultry and proven by ETL to have the greatest open area, perfect for a stacker's vertical airflow.
- **Turn-Key—**Expert technical support and full turn-key installation from the belting experts who invented spirals.
- **Made in the USA—**For fast deliveries and competitive pricing.
- **ExactaStack's "Rack & Roll®" Crating System—**For space-saving storage and quick roll-out/roll-in belt replacements.



ExactaStack™ with the patented Advantage™ plastic module overlay



ExactaStack™ is shipped in the Rack & Roll® crating system for easy installation.

ExactaStack™ is available in all widths, tier heights, and mesh configurations for either sectional or complete replacement.

ExactaStack™ Turn-Key Belt Replacement

- **Turn-Key and Stress Free—**Skilled Ashworth Factory Service technicians will install your new ExactaStack™ belt, inspect the drive system, make the necessary adjustments for optimal performance, and then provide a detailed system report certified by our spiral belt experts.
- **What's included?**
  - A completely new ExactaStack™ belt that will meet your production needs
  - The services of an Ashworth Factory Service Representative to recommend the belt that is right for you
  - The services of an Ashworth Factory Service technician to install your optimized belt
  - Adjustment of the drive system to match the new belt and a system inspection report

SPIRAL PRODUCTS

ExactaStack™ Standard Belt

Technical Specifications	Units	
Turn Ratio		Approximately 1.7 (designed to fit existing systems)
Pitch	mm	60 is the longitudinal pitch per link; 30 is the intermediate rod spacing.
Available Widths	mm	420, 580, 640, 760
Conveying Surface	mm	45 less than belt width
Tier Height	mm	60, 80, 100, 120, 150, 180, 220
Rod Diameter	mm	5.0
Weight		See belt weight chart
Material		Stainless steel links, rods, and mesh
Turn Direction		Clockwise or counterclockwise
Allowable Tension		Belts will carry the maximum load specified by the system manufacturer for an equivalent belt
Mode of Turning		Inside edge collapses in turn

Available Options

Wire Mesh Overlays

Mesh is specified using the standard designation for existing systems, X-Y-Z, as shown below.

X = Belt Width	Y = Pitch	Z = Wire Dia.
42 = 420 mm	6 mm	1.6 mm
58 = 580 mm	9 mm	1.8 mm
64 = 640 mm	13 mm	
76 = 760 mm	20 mm	

Standard mesh overlay for ExactaStack™ is a right-hand wind, unilateral weave (see illustration) comprised of two mating spirals. The first terminates with round pigtails on the leading side of the spiral. The second terminates with oval pigtails on the trailing side of the spiral and has one less loop across the width of the belt such that the oval pigtails are nested within the round pigtails on the adjacent spiral. The pigtails of both spirals are installed on the connecting rod joining the links. A washer is installed between the link and the spirals on the collapsing side only.

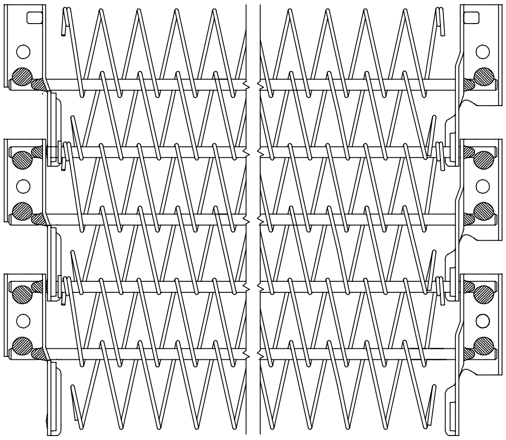
Special Wire Mesh Overlays

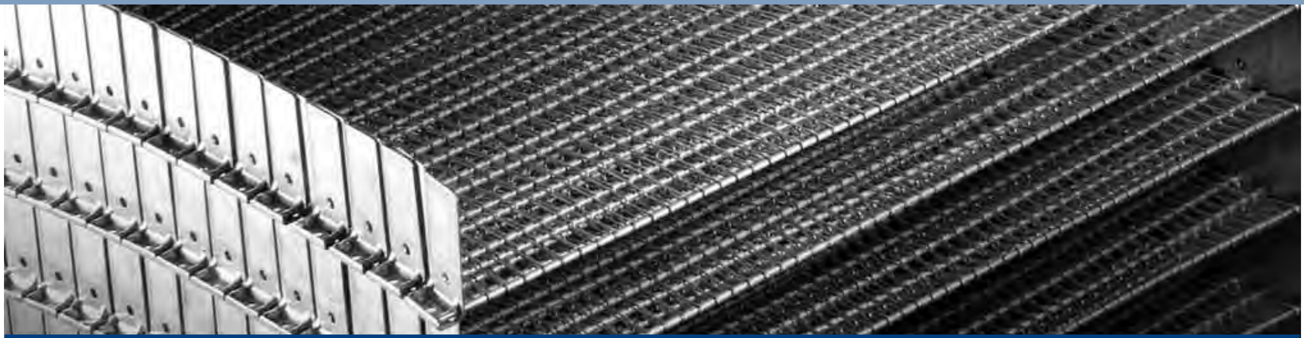
Typically, special mesh configurations can be made to match existing belts with non-standard mesh overlay. Please consult Ashworth engineering.

Special Plastic Overlay

Plastic mesh with nominal 13 mm (0.5") openings is available. Maximum operating temperature is 180°F. Plastic mesh is not suitable for applications where caustic cleaners are used. Please consult Ashworth engineering.

Open Surface Area % for ExactaStack™		
Mesh	Straight	1.7 turn
M6-1.6	57.2	47.5
M9-1.6	65.9	58.2
M13-1.6	71.3	64.8
M20-1.6	75.6	70.1





Belt Width	Link Height	Mesh Pitch→ 6 mm	9 mm	13 mm	20 mm	Plastic
		Belt Weight (lb/ft)				
420 mm	60 mm	4.64	4.06	3.68	3.39	4.25
	80 mm	5.03	4.45	4.06	3.78	4.64
	100 mm	5.41	4.83	4.45	4.16	5.03
	120 mm	5.80	5.22	4.83	4.55	5.41
	150 mm	6.38	5.80	5.41	5.13	5.99
	180 mm	6.96	6.38	5.99	5.71	6.57
	220 mm	7.73	7.15	6.76	6.48	7.34
580 mm	60 mm	5.97	5.12	4.59	4.19	5.37
	80 mm	6.36	5.50	4.98	4.58	5.75
	100 mm	6.74	5.89	5.36	4.96	6.14
	120 mm	7.13	6.27	5.75	5.35	6.52
	150 mm	7.71	6.85	6.33	5.93	7.10
	180 mm	8.29	7.43	6.91	6.51	7.68
	220 mm	9.06	8.20	7.68	7.28	8.45
640 mm	60 mm	6.47	5.53	4.95	4.49	5.78
	80 mm	6.86	5.92	5.33	4.88	6.17
	100 mm	7.25	6.30	5.72	5.26	6.55
	120 mm	7.63	6.69	6.11	5.65	6.94
	150 mm	8.21	7.27	6.68	6.23	7.52
	180 mm	8.79	7.85	7.26	6.81	8.10
	220 mm	9.56	8.62	8.04	7.58	8.87
760 mm	60 mm	7.48	6.33	5.64	5.09	6.61
	80 mm	7.87	6.72	6.02	5.47	7.00
	100 mm	8.25	7.10	6.41	5.86	7.39
	120 mm	8.64	7.49	6.80	6.25	7.77
	150 mm	9.22	8.07	7.38	6.83	8.35
	180 mm	9.80	8.65	7.95	7.40	8.93
	220 mm	10.57	9.42	8.73	8.18	9.70

Note: Multiply lb/ft x 1.49 to convert to kg/m

ExactaStack™ WD

Technical Specifications	Units	
Turn Ratio		Approximately 1.92 (7 mm rods) / 1.75 (6 mm rods) (designed to fit existing systems)
Pitch	mm	60 is the longitudinal pitch per link; 30 is the intermediate rod spacing
Available Widths	mm	760, 920, 1060
Conveying Surface	mm	42 less than belt width
Tier Height	mm	Nominal tier heights of 80, 100, 120, 150, 180, 220
Rod Diameter	mm	6.0 or 7.0 depending on belt width
Weight		See belt weight chart
Material		Stainless steel links, rods, and mesh
Turn Direction		Clockwise or counterclockwise
Allowable Tension		Belts will carry the maximum load specified by the system manufacturer for an equivalent belt
Mode of Turning		Inside edge collapses in turn

Available Options

Wire Mesh Overlays

Mesh is specified using the standard designation for existing systems, X-Y-Z, as shown below.

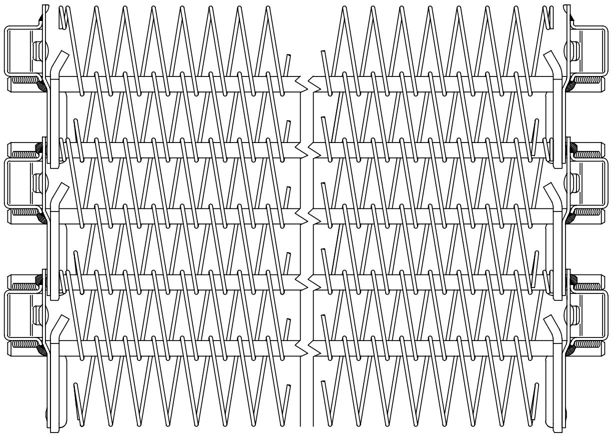
X = Belt Width	Y = Pitch	Z = Wire Dia.
76 = 760 mm	6 mm	1.6 mm
92 = 920 mm	9 mm	1.8 mm
106 = 1060 mm	13 mm	
	20 mm	

Standard mesh overlay for ExactaStack™ WD is a right-hand wind, unilateral weave (see illustration) comprised of two mating spirals. The first terminates with round pigtails on the leading side of the spiral. The second terminates with oval pigtails on the trailing side of the spiral and has one less loop across the width of the belt such that the oval pigtails are nested within the round pigtails on the adjacent spiral. The pigtails of both spirals are installed on the connecting rod joining the links. Tension links are installed between the links and spirals on both sides of the belt.

Special Wire Mesh Overlays

Typically, special mesh configurations can be made to match existing belts with non-standard mesh overlay. Please consult Ashworth engineering

Open Surface Area % for ExactaStack™ WD		
Mesh	Straight	1.7 turn
M6-1.6	50.4	39.1
M9-1.6	59.2	49.9
M13-1.6	64.5	56.4
M20-1.6	68.8	61.7



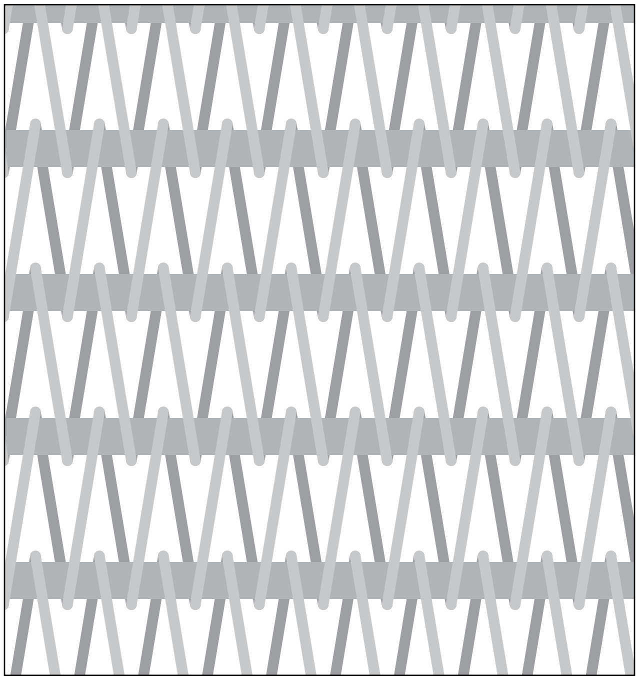
Belt Weight (lb/ft)

Belt Width	Link Height	Mesh Pitch→	6 mm		9 mm		13 mm		20 mm	
		Wire→	1.6 mm	1.8 mm	1.6 mm	1.8 mm	1.6 mm	1.8 mm	1.6 mm	1.8 mm
760 mm	80 mm		9.57	10.52	8.40	9.04	7.68	8.12	7.10	7.40
	100 mm		9.96	10.91	8.79	9.43	8.06	8.51	7.49	7.78
	120 mm		10.34	11.29	9.17	9.81	8.45	8.90	7.87	8.17
	150 mm		10.92	11.87	9.75	10.39	9.03	9.48	8.45	8.75
	180 mm		11.50	12.45	10.30	10.97	9.61	10.05	9.03	9.33
	220 mm		12.27	13.22	11.10	11.74	10.38	10.83	9.80	10.10
920 mm	80 mm		13.00	14.21	11.50	12.31	10.57	11.13	9.86	10.23
	100 mm		13.38	14.59	11.89	12.70	10.95	11.52	10.24	10.62
	120 mm		13.77	14.98	12.27	13.09	11.34	11.90	10.63	11.01
	150 mm		14.35	15.56	12.85	13.67	11.92	12.48	11.21	11.58
	180 mm		14.93	16.14	13.43	14.24	12.50	13.06	11.79	12.16
	220 mm		15.70	16.91	14.20	15.02	13.27	13.83	12.56	12.94
1060 mm	80 mm		14.71	16.12	12.93	13.87	11.87	12.53	11.05	11.48
	100 mm		15.10	16.51	13.32	14.25	12.26	12.91	11.43	11.87
	120 mm		15.48	16.89	13.70	14.64	12.64	13.30	11.82	12.26
	150 mm		16.06	17.47	14.28	15.22	13.22	13.88	12.40	12.84
	180 mm		16.64	18.05	14.86	15.80	13.80	14.46	12.98	13.41
	220 mm		17.41	18.82	15.63	16.57	14.57	15.23	13.75	14.19

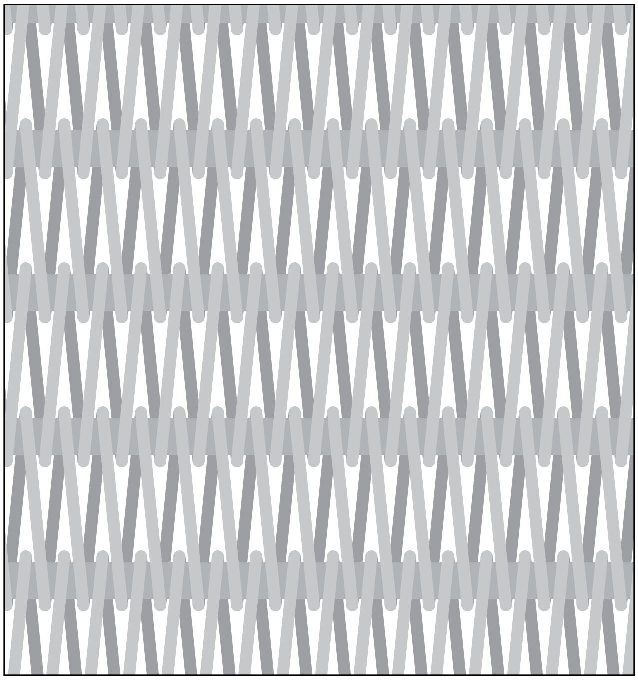
Note: Multiply lb/ft x 1.49 to convert to kg/m

NOTES

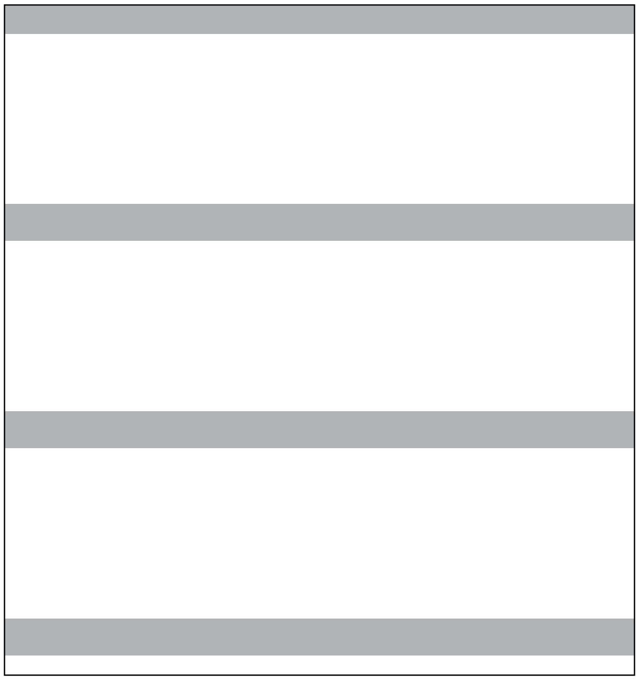
Mesh Diagrams–Omni-Pro®



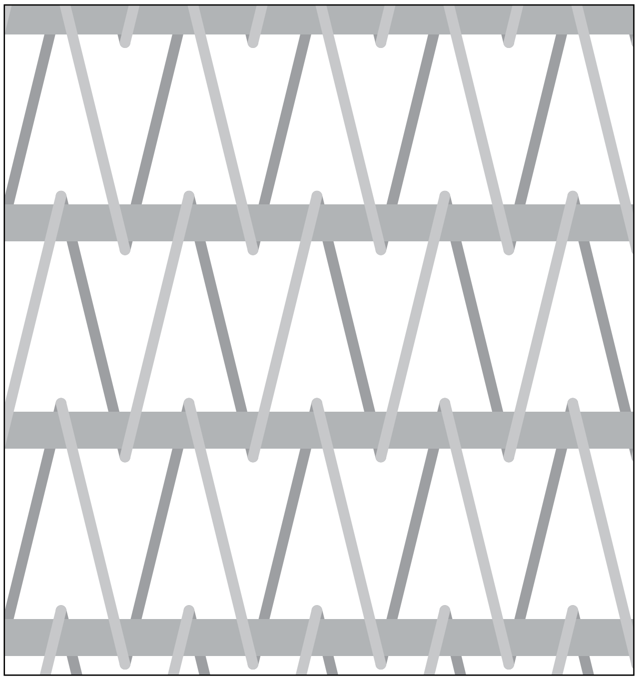
Omni-Pro® 075 with B36-16-17 Mesh



Omni-Pro® 075 with B60-16-16 Mesh

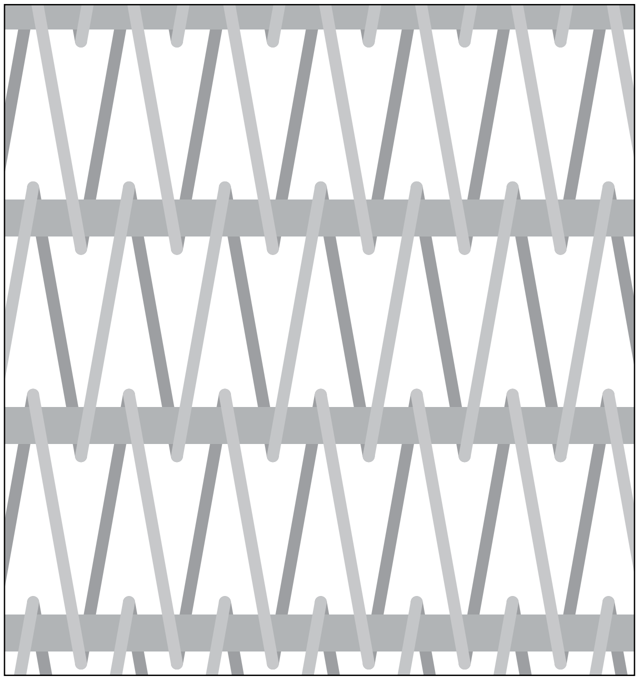


Omni-Pro® 100 with No Mesh

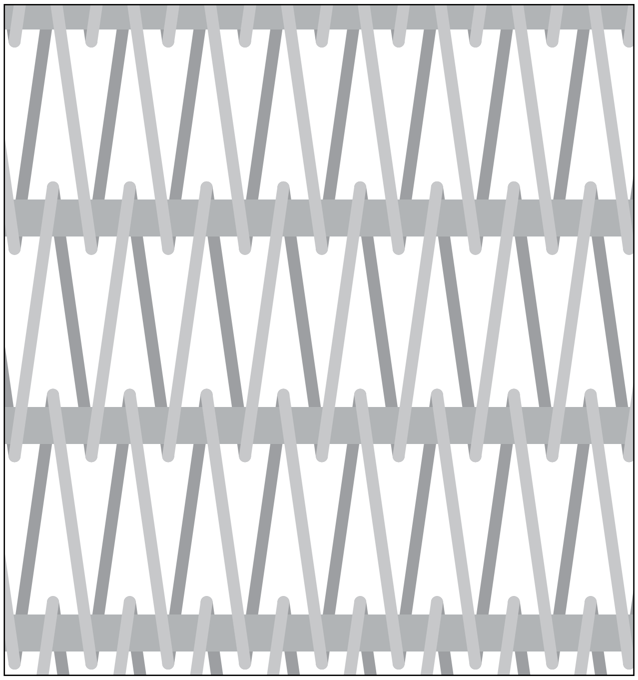


Omni-Pro® 100 with B18-12-17 Mesh

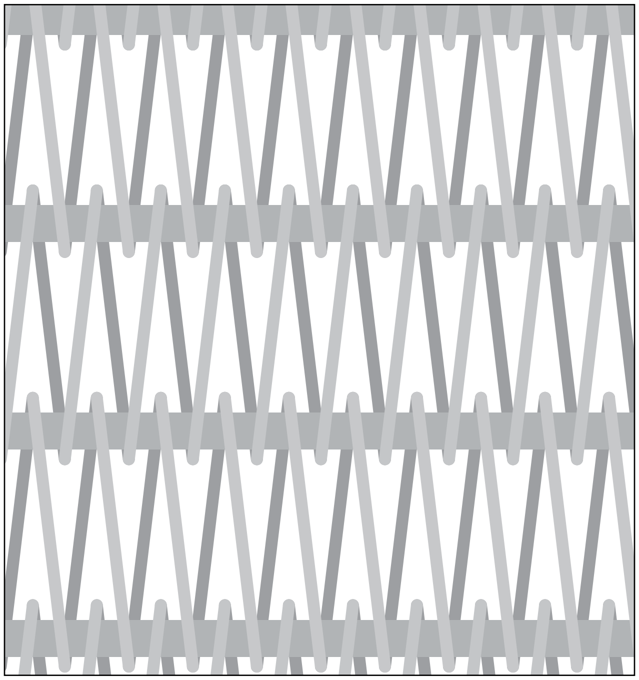
Mesh Diagrams–Omni-Pro®



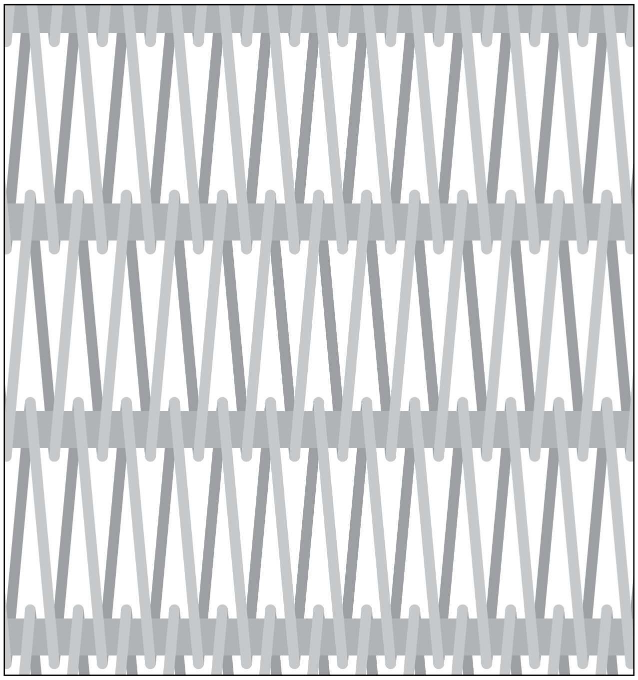
Omni-Pro® 100 with B24-12-16 Mesh



Omni-Pro® 100 with B30-12-17 Mesh

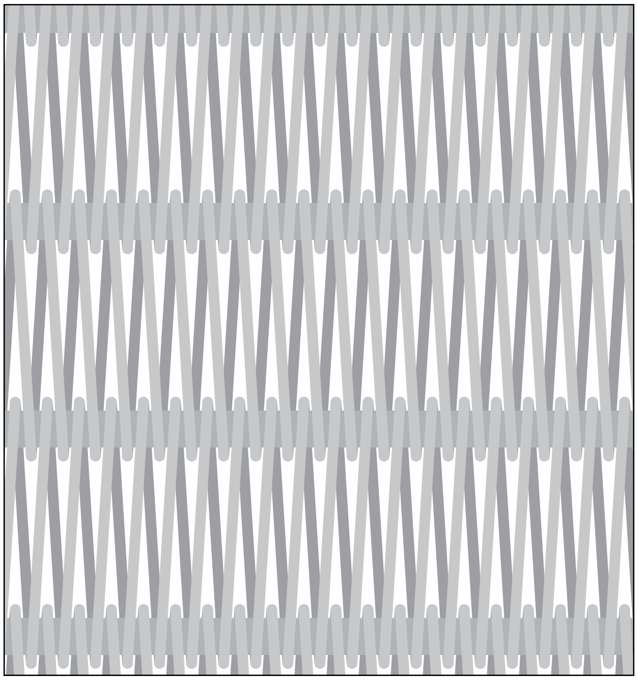


Omni-Pro® 100 with B36-12-16 Mesh

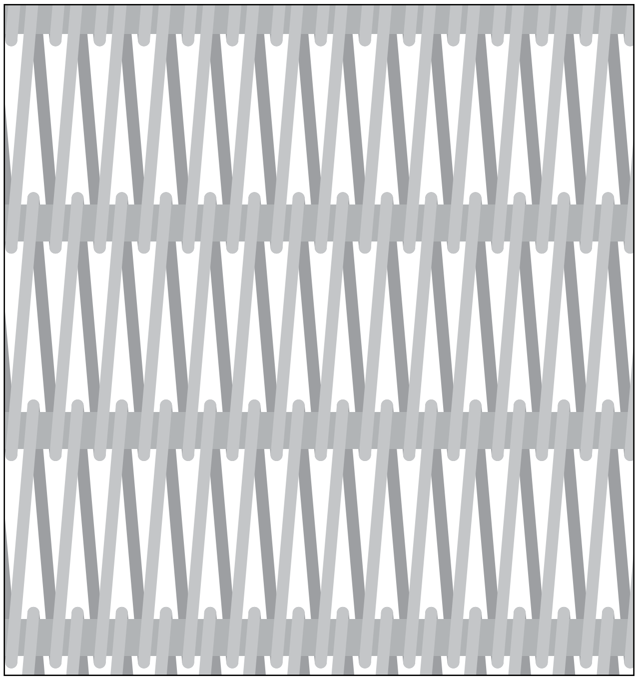


Omni-Pro® 100 with B48-12-17 Mesh

Mesh Diagrams–Omni-Pro®

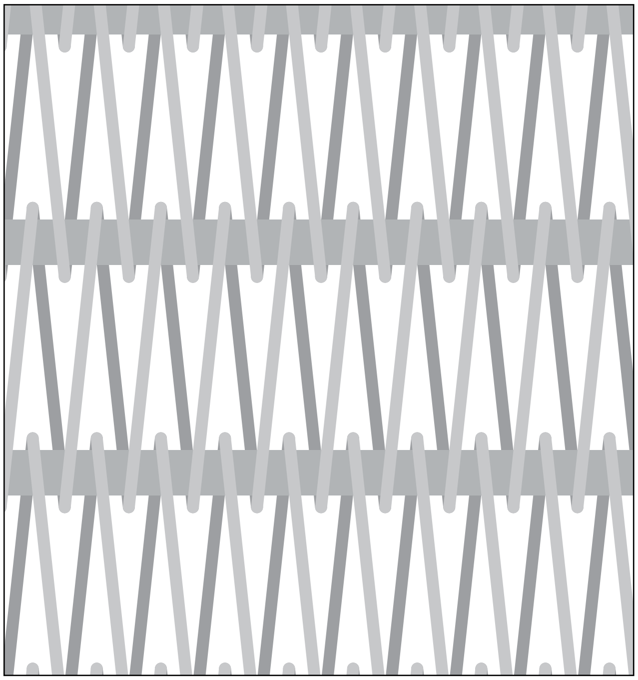


Omni-Pro® 100 with B72-12-17 Mesh

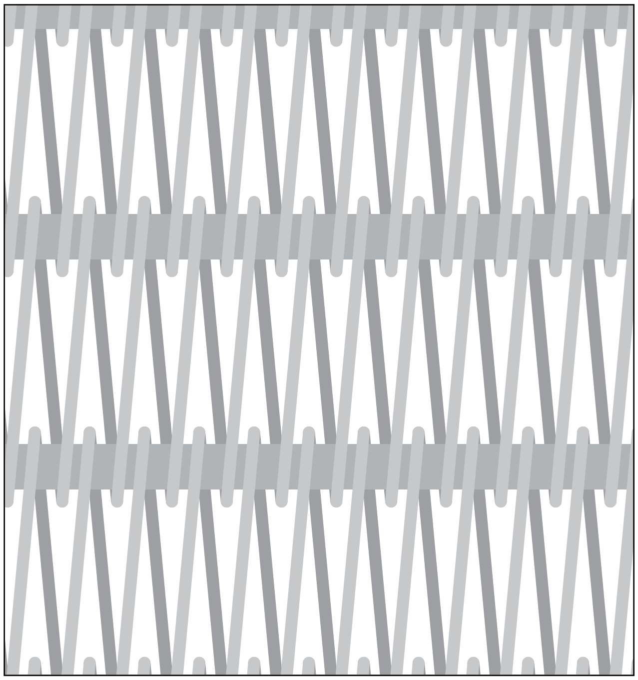


Omni-Pro® 100 with U54-12-16 Mesh

Available on select widths. Contact Customer Service for further information.



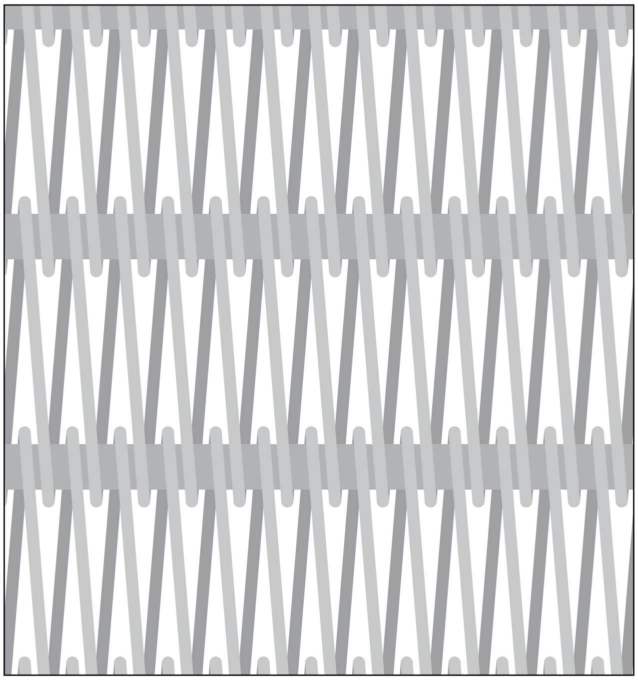
Omni-Pro® 120 with B36-10-16 Mesh



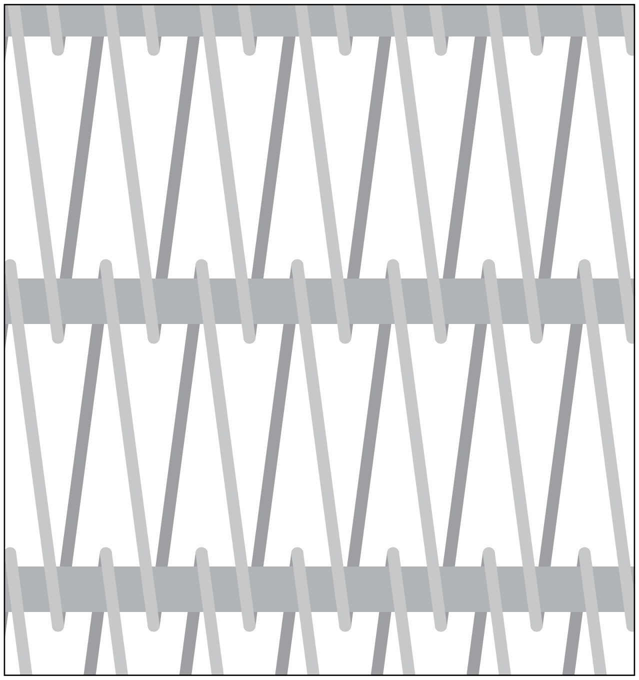
Omni-Pro® 120 with U42-10-16 Mesh

Available on select widths. Contact Customer Service for further information.

Mesh Diagrams–Omni-Pro®

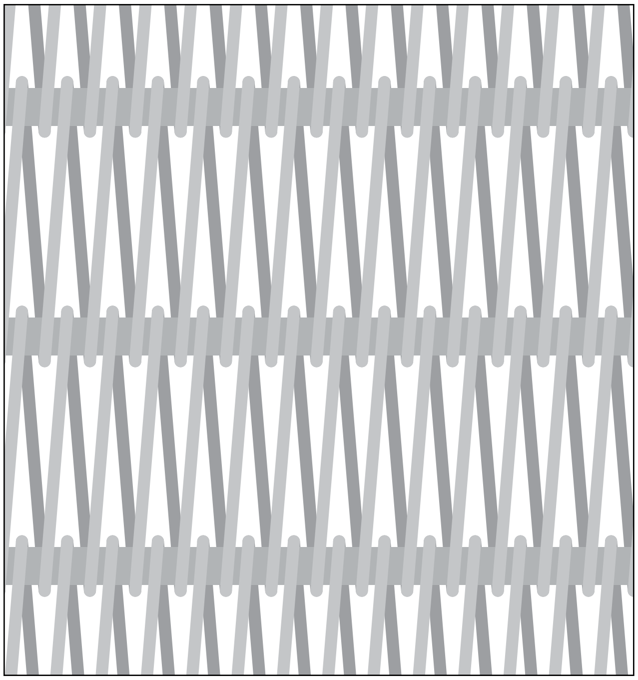


Omni-Pro® 120 with U48-10-16 Mesh
Available on select widths. Contact Customer Service for further information.

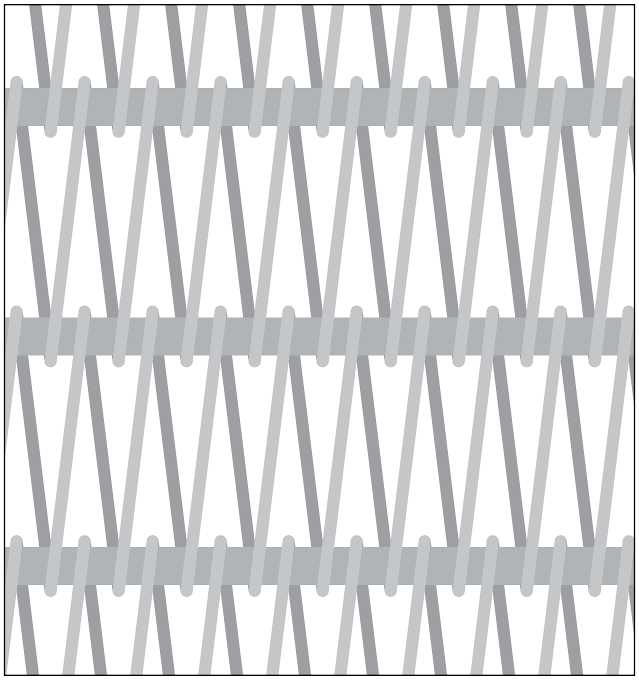


Omni-Pro® 150 with U24-8-16 Mesh
Available on select widths. Contact Customer Service for further information.

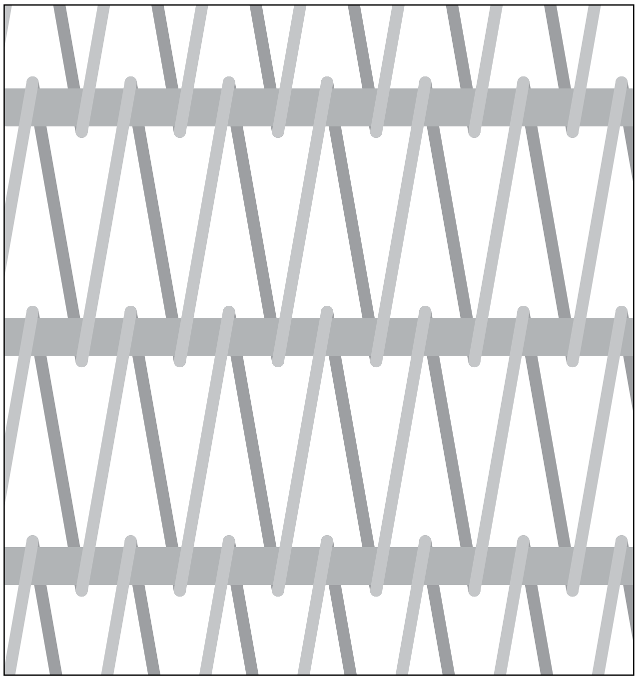
Mesh Diagrams - ExactaStack™



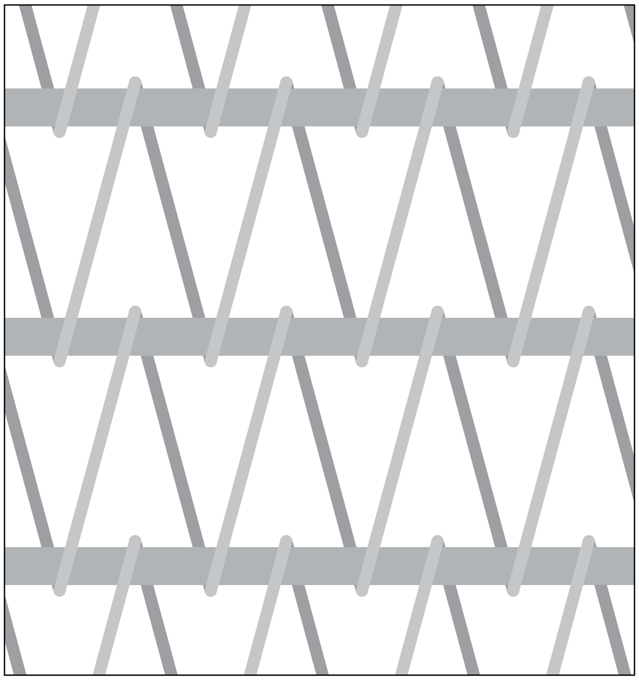
ExactaStack™ with 6 mm mesh



ExactaStack™ with 9 mm mesh

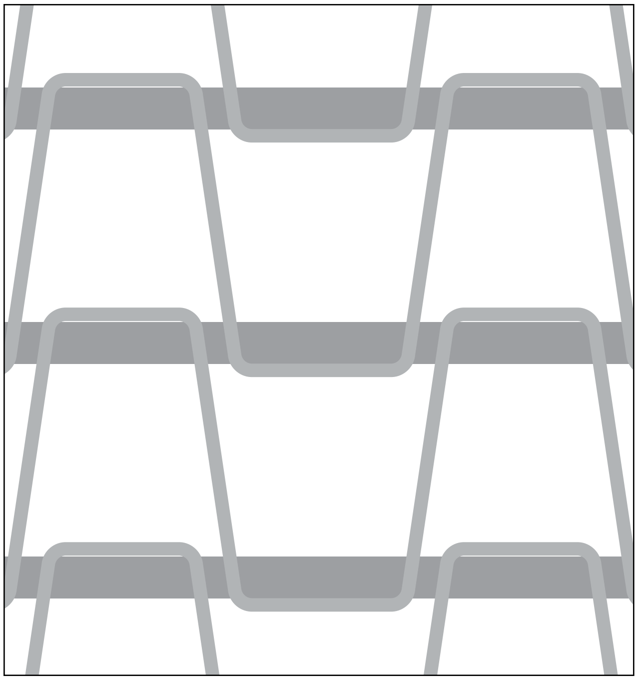


ExactaStack™ with 13 mm mesh

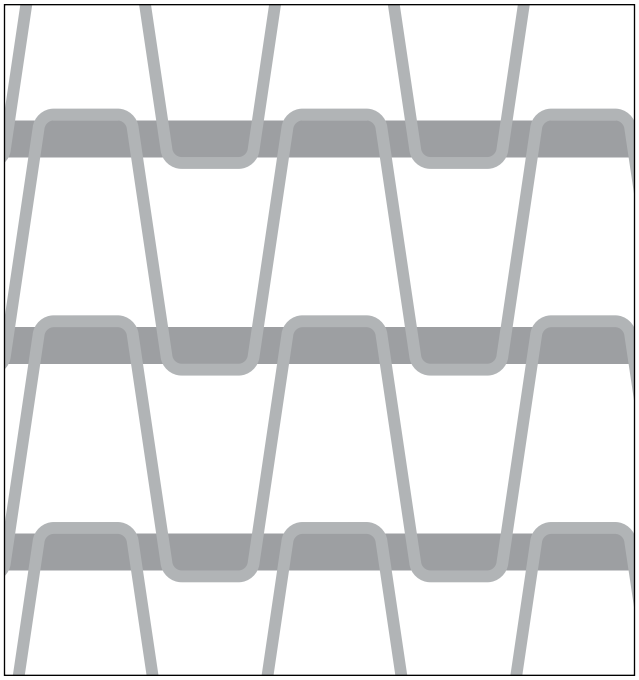


ExactaStack™ with 20 mm mesh

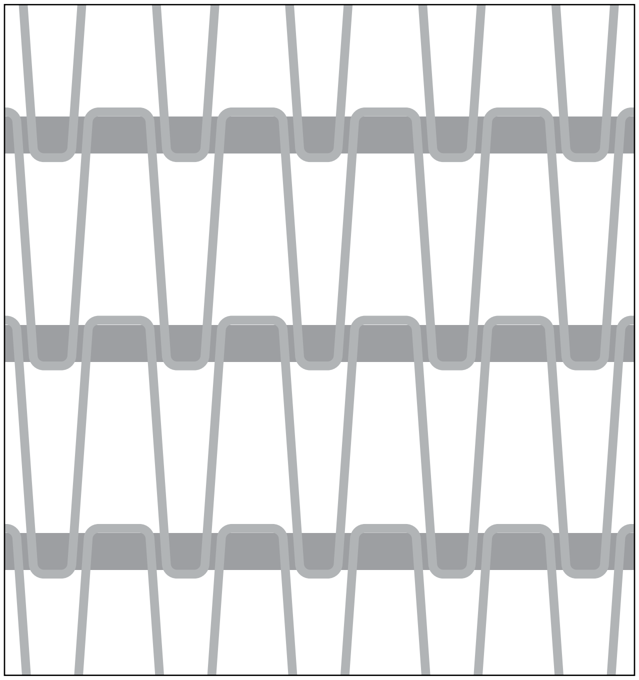
Mesh Diagrams–Omni-Flex®



Omni-Flex® E1

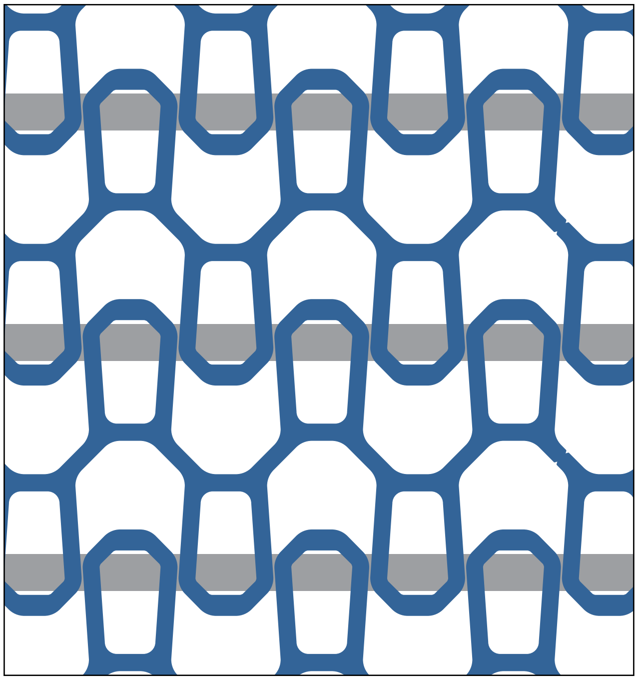


Omni-Flex® E2

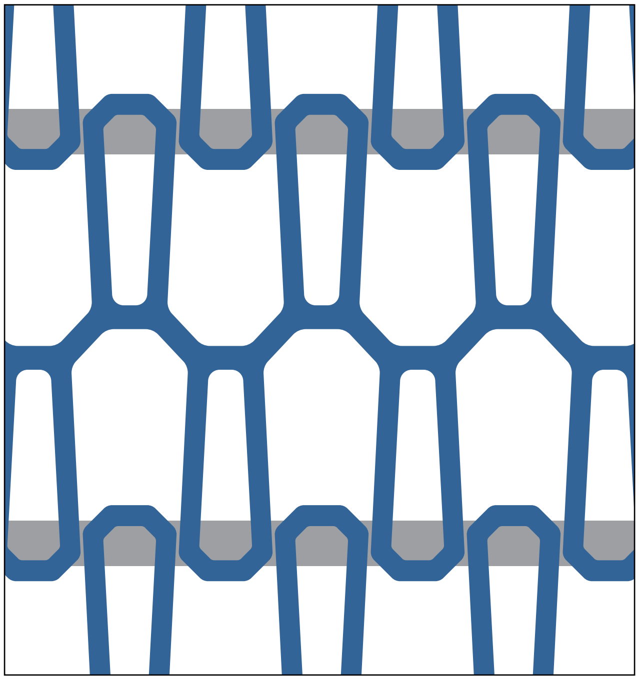


Omni-Flex® E3

Mesh Diagrams - Advantage™



Advantage™ 120 (Also available for ExactaStack™)

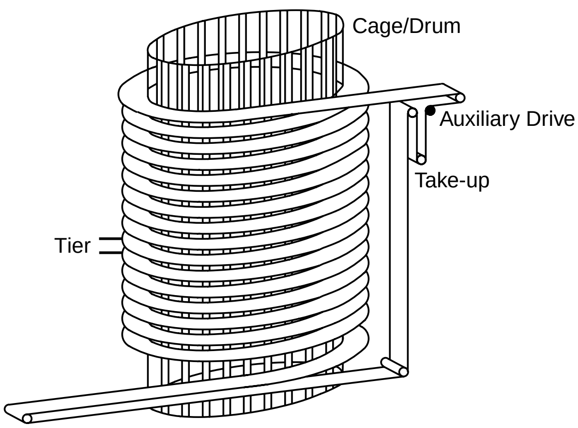


Advantage™ 200

Concepts of Lotension

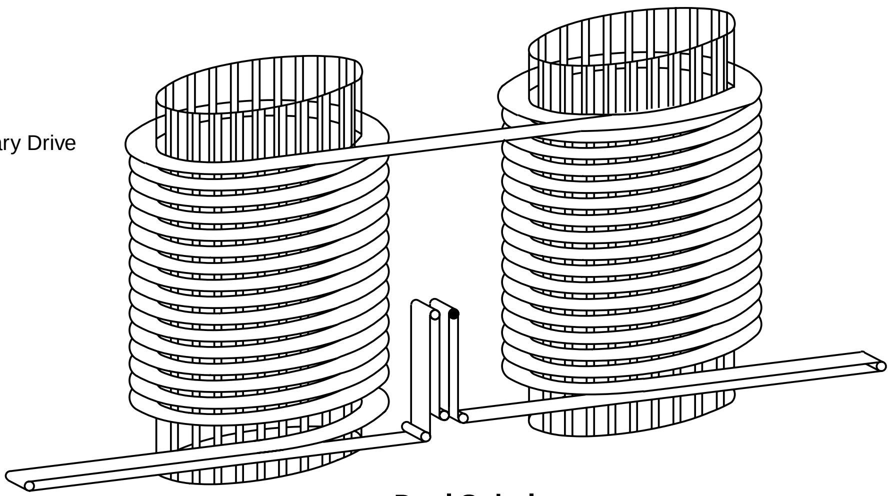
Invented By Ashworth

Food manufacturers have increasingly turned to lotension spiral technology as a means of achieving production efficiencies in cooking, proofing, cooling, and freezing of their products. Spiral systems offer significant advantages such as a smaller footprint and increased production capacity. Due to the low tension nature of the systems, they reduce wear on the belts and other conveyor system components, typically reducing downtime and replacement costs.



Single Spiral

[Figure 3]



Dual Spiral

[Figure 4]

Most ovens, proofers, coolers, and freezers have single spirals (Figure 3). These units typically load at the bottom and discharge product at the top and are optimally employed when the production process requires a change in elevation. Sometimes, however, dual spirals (Figure 4) are used, with two cages driving the same belt. This allows the product to be loaded and unloaded on the same production level and/or to further increase dwell time of the product.

Lotension Drive

At the heart of the lotension spiral system is the drum or cage. ("Drum" and "cage" are used interchangeably throughout this catalog.) This forms the largest single component of the system, and provides the main source of drive for the conveyor belt. The typical spiral system is designed with the conveyor belt entering at the bottom of the drum and exiting at the top although some spirals' in-feed and out-feed are opposite of this set-up. During the belt's travel, its edge is held in tight contact with the drum, so that the friction created by the wraps of the belt around the drum is sufficient to drive the belt through the system. The drum is usually driven from underneath by an electric motor and can be either direct or chain-driven. The mechanism that keeps the belt tight against the drum is the secondary drive, normally called the take-up or auxiliary drive. The auxiliary drive provides just enough pull on the belt to keep the belt in tight contact with the drum and to help set belt speed, not to provide the driving force to the belt. This keeps belt tension low, hence, the name of the system: lotension.

Overdrive

As indicated, the belt is driven through the system by virtue of it being tightly held against the side of the cage or drum. The tighter the belt is against the drum the more effective the cage is in driving the belt through the spiral, until the point of maximum effectiveness is reached (without creating unnecessarily high tension levels within the system). At this point, a small amount of slip, also known as overdrive, exists between the cage and the conveyor belt. The belt is moving effectively at this speed, so it is unnecessary to increase the amount of force on the belt (via the auxiliary drive). The relationship between the speed of the belt and the speed of the cage can be measured in terms of the slip between the surfaces. Without slip, there is no overdrive and the amount of belt tension can reach high, unsatisfactory levels. This can cause damage to the belt and/or cage which may lead to system failure.

The amount of overdrive in a lotension spiral system is quantified and controlled. The intent is to set the amount of slip relative to the desired belt speed, in order to obtain the least amount of force needed to move the belt. Since the belt is being driven both horizontally and vertically around the cage, overdrive must be adjusted to compensate for the amount of required vertical movement. For this reason, the amount of slip or overdrive is measured in terms of vertical movement per revolution or tier pitch. In most lotension systems, a minimum of 2–4 tiers of overdrive are observed.

Lotension spiral systems are designed to have slip or overdrive built into the system's operation, so it is common to have the cage or drum start up before the auxiliary drive. This keeps system tension as low as possible. When the auxiliary drive starts, the belt is pulled tight around the cage and the conveyor belt starts to move. Because all belting materials contract in reaction to cold temperatures, this must be accounted for in design of the system. Multiple safety devices are used in a spiral system, including belt take-up mechanisms with proximity switches that signal abnormal changes in belt length and tension.

Spiral System Requirements

The following points are basic engineering considerations to keep in mind when designing and/or operating a lotension spiral system.

Straight Runs Before & After Curves

Spiral conveyor belts must run straight for certain calculated distances prior to entering, and upon exiting, curves. Straight runs before and after curves allow the belt's component parts to fully realign themselves so that the next curve can be successfully navigated by the belt. Failure to provide the minimal distance of straight run before or after a curve may result in belt damage. The following guidelines should be observed:

Stainless Steel Belts:
Minimum straight run before and after every turn should be at least 1.5 times the belt width.
Minimum straight run between two opposite curves should be at least 3 times the belt width.

Advantage™ Belts:
Minimum straight run before and after every turn should be at least 1.5 times the belt width.
Minimum straight run between two opposite curves should be at least 2 times the belt width.

Spiral Cage Bar Caps

Stainless Steel Belts:
Ultra High Molecular Weight Polyethylene (UHMWPE) capped cage bars are recommended to drive metal belts. UHMWPE cage bar cap profiles section.

Advantage™ Belts:
A stainless steel drum, stainless steel cage bars, or UHMWPE-capped cage bars are recommended. Stainless steel will typically increase the driving force against the belt's inside edge. Eliminate any sharp corners or rough surfaces that might gouge or prematurely wear the belt. Surface should be smooth to the touch.

Turn Curve Capping

UHMWPE is recommended for fixed inside turn rails on conveyors for Advantage™ and metal belts.

Flip-up Detectors

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. When Advantage™ belts are specified, it is important to ensure the detectors are compatible with plastic belts.

Take-up

In a straight run or fixed turn setup, an unsupported loop of belt (catenary sag) following the drive sprockets is a satisfactory take-up solution. In a spiral system, the following guidelines apply:

Stainless Steel Belts:
A rule of thumb is that the take-up should be able to accommodate 1.0% of the total belt length. This value is dependent on the temperature differences in the spiral.

Advantage™ Belts:
A double loop take-up with free hanging weight is recommended as plastic belts can require twice as much take-up travel as all-metal belts. Accordingly, the rule of thumb for Advantage™ belts is that the take-up should be able to accommodate 2.5% of the total belt length. As with steel belts, the actual value is dependent on the temperature differences in the spiral.

Lubrication

For information on lubricating spiral belting, reference the section, “Cleaning & Lubricating.”

Ground Strap

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

Overdrive

For information on overdrive requirements, please reference the section, “Measuring Overdrive.”

Flipping Spiral Belts

To minimize wear and to maximize the service life of a spiral conveyor belt, Ashworth recommends that the belt be “flipped” so that the inside of the edge of the belt becomes the outside edge and vice versa. Ashworth recommends that spiral belts be flipped when one belt edge measures 0.5% longer than the opposite edge (1/16" per foot [5 mm per meter] of belt).

Flipping a belt requires that the belt must first be un-installed and then re-installed on the spiral. See “Installation of Spiral Belts” section for more information on this topic.

Note: Belts equipped with optional features such as edge guards, friction modules, lane dividers, or other protruding options cannot be flipped.

Requirements Specific to Plastic Belts

Use in Freezers and Chillers:
Periodic starting and stopping of all plastic belting, including Advantage™ belts, in freezing applications allows accumulated frost on the belt to melt and, upon re-entering the freezer, become ice. Ice accumulation between the cross rod and body module reduces the design clearance, which could result in breakage of the modules. In addition, ice accumulation at the belt’s inside edge may prevent the belt from collapsing tightly enough to adequately grip the drum or cage bars, resulting in loss of the spiral drive. To diminish the likelihood of these problems, periodic stopping and starting of the spiral should be minimized.

Fire Safety Precautions:
Most plastic belting, including the Advantage™ belts, contain 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.

Spiral System Requirements

Wear Strip Placement

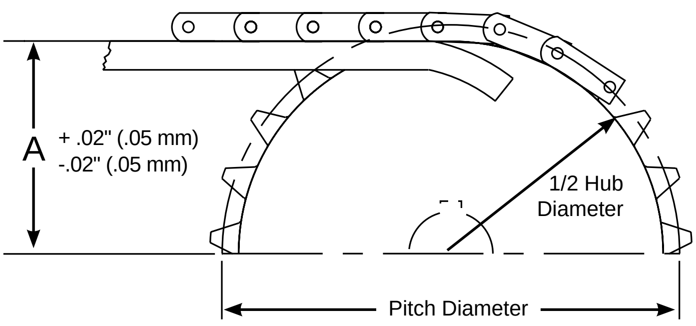
In most cases, the top surface of the wear strips (Figure 5) should be positioned at height according to the following formula:

A = 1/2 x (PD – BT)

Where:
A = calculated height
PD = sprocket pitch diameter
BT = belt thickness

Belt Thicknesses are:
Omni-Grid® and Omni-Flex® = 0.50" (12.7 mm)
Advantage™ and Omni-Pro® = 0.56" (14.29 mm)

Note: 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.



[Figure 5]

Belt Support Rails

For standard acetal (POM) Advantage™ belts, use UHMWPE-capped or stainless steel support rails. Steel belts typically require UHMWPE-capped support rails. The notable exception to this requirement is that ovens may require high temperature caps. 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 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 20" (500 mm) apart.

Ashworth Bros., Inc.

450 Armour Dale, Winchester, VA 22601
Phone: 540-662-3494 or 800-682-4594 Fax: 540-662-3150 or 800-532-1730 www.ashworth.com

Ashworth Inquiry No.: ________

TURN CURVE & LOTENSION SPIRAL APPLICATIONS

Company: ________ Date: ________
Address: ________
City: ________ State: ________ Zip: ________
Contact Name: ________ Title: ________
Phone: ________ Fax: ________
Email: ________
End User & Location: ________

☐ **Price Quote Only**
(complete section 1 only)
☐ **Recommendation**
(complete all four sections)

1. BELT TYPE (check one)

- ☐ OMNIFLEX® E1 (1x1)
- ☐ OMNIFLEX® E2 (½x1)
- ☐ OMNIFLEX® E3 (1/3x1)
- ☐ MEGAFLEX 125™ E4 (1x1¼)
- ☐ SMALL RAD. OMNIFLEX® G1 (1x1, 1x1½)
- ☐ SMALL RAD. OMNIFLEX® G3 (½x1, ½x1½)
- ☐ 3/4 IN. OMNIPRO® OP075
- ☐ 1 IN. OMNIPRO® OP100
- ☐ 1 IN. REDUCED RAD. OMNIPRO® 100 RROP100
- ☐ 1.2 IN. OMNIPRO® OP120
- ☐ 1.5 IN. OMNIPRO® OP150
- ☐ 1.5 IN. OMNIPRO® FLEX-LITE OP150FL

- ☐ *Recommend*
- ☐ 3/4 IN. PITCH OMNI-GRID®
- ☐ 3/4 IN. PITCH SMALL RADIUS OMNI-GRID®
- ☐ 1 IN. PITCH OMNI-GRID®
- ☐ 1 IN. PITCH REDUCED RADIUS OMNI-GRID®
- ☐ 1 IN. PITCH SMALL RADIUS OMNI-GRID®
- ☐ 1 IN. PITCH SUPER SMALL RADIUS OMNI-GRID®
- ☐ 1 IN PITCH SPACESAVER OMNI-GRID®
- ☐ 3/4 IN. PITCH ADVANTAGE® RL 75
- ☐ 1.2 IN. PITCH ADVANTAGE® 120
- ☐ 2.0 IN. PITCH ADVANTAGE® 200
- ☐

OMNIPRO® and OMNI-GRID® belts are available with mesh, Omni-Tough® and Omni-Lite® (1" pitch only) overlays. If you need an overlay please indicate the mesh designation or indicate the approximate mesh opening needed: ________

Belt Width: ________ in. or ________ mm **Approx. Belt Length:** ________ **Material:** ________

Special Features Needed (Guard Edges, lifts, etc.): ________

2. APPLICATION

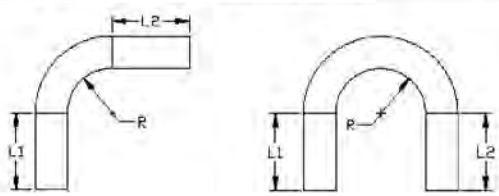
Specify units of measure.

Product: ________ **Process:** ________
Maximum load: ________ lb./lin. ft. ________ kg./lin. M. Max. Temperature: ________ Min. Temp.: ________
-or-
Production rate: ________ lbs./hr ________ kg./hr Belt speed: ☐ Constant ☐ Variable

Min. Size: ________ Min./Max. Speed: ________ Operating Speed: ________
Shape: ________ Corrosives or Other Conditions: ________
Projection: ________ ________

3A. TURN CURVE CONVEYOR

Specify units of measure. Use Section 3B for Spiral Systems.



If other, describe or sketch layout or attach drawing.

Data Sheet continued on next page

Ashworth Bros., Inc. – Data Sheet **Turn Curve & Lotension Spiral Systems**

In feed length (L1): ________ Degree of turn: ________ Inside Radius (R): ________ Out feed length (L2): ________

Note incline or decline of straight runs if applicable. Recommended minimum straight: 1½ x Belt Width (¾ x BW for Small Radius)

Does the belt turn ☐ to the right (clockwise) ☐ to the left (counter clockwise)

Belt Support Materials: Load Side: ________ Return Side: ________ Inside Rail of turn(s): ________

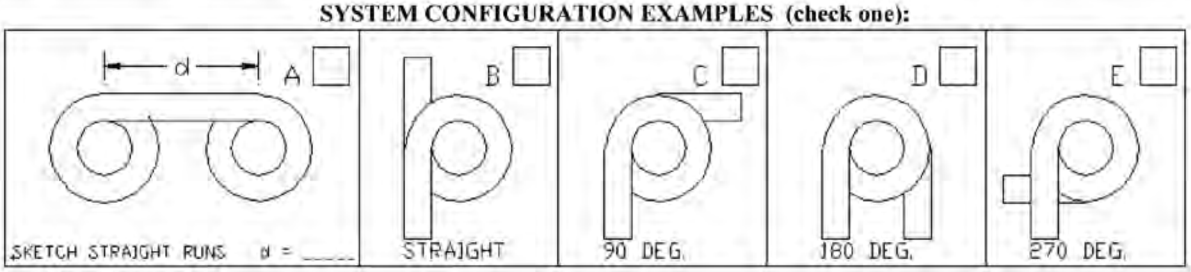
Drive location: ________ Take-Up (type, location): ________ Sprocket size preferred: ________

Remarks:

____

3B. LOTENSION SPIRAL SYSTEM *Specify units of measure. Use Section 3A for Turn Curve applications.*

SYSTEM CONFIGURATION EXAMPLES (check one):



➢ **For Example A**

First cage is: ☐ Up ☐ Down

☐ Straight-through ☐ 90° ☐ 180° ☐ 270° ☐ Other (specify):

If the system is other than straight-through, **return is:** ☐ A fixed turn ☐ A free turning wheel ☐ Return on cage

Does the belt on the first cage turn ☐ to the right (clockwise) ☐ to the left (counter clockwise)

Second cage is: ☐ Up ☐ Down

☐ Straight-through ☐ 90° ☐ 180° ☐ 270° ☐ Other (specify):°

If the system is other than straight-through, **return is:** ☐ A fixed turn ☐ A free turning wheel ☐ Return on cage

Does the belt on the second cage turn ☐ to the right (clockwise) ☐ to the left (counter clockwise)

Cage diameter: ________ **Cage Material:** ☐UHMW ☐ Steel Drum ☐ Other (specify): ________

Number of tiers on cage (include fractional amount, if applicable): ________ **Tier height or spacing:** ________

Is there a helper drive between cages? ☐ Yes ☐ No **Distance C-C between cages: d =** ________

Describe helper drive (if used) – style, length: ________________

➢ **For Examples** ☐B ☐C ☐D ☐E

Cage is ☐ Up ☐ Down

Cage diameter? ________ **Cage Material:** ☐ UHMW ☐ Steel Drum ☐ Other (specify): ________

Number of tiers on cage (include fractional amount for C, D, & E): ________ **Tier height or spacing:** ________

If the system is other than straight-through (i.e., example B) is the **return:**

☐ A fixed turn ☐ A free turning wheel ☐ Returning on the cage ☐ Recommend

Data Sheet continued on next page

Ashworth Bros., Inc. – Data Sheet **Turn Curve & Lotension Spiral Systems**

➢ **For all spiral systems** *(Specify units of measure)*:

Length of In feed
(center of cage to terminal roll): ____________

Length of Out feed/Discharge
(center of cage to terminal roll) : ____________

Does the belt on the cage turn ☐ to the right (clockwise) ☐ to the left (counter clockwise)

Belt supports: Wear strip material: ____________ How many rails? ____________

Is take-up located directly following the drive? ☐ No ☐ Yes If no, state location: ____________

NOTE: The take-up should be capable of taking up 1% of the belt length without adding excess tension

Will product have difficulty releasing from the belt? ☐ No ☐ Yes Will a scraper or breaker bar be used? ☐ No ☐ Yes

Required Dwell time: ________ Operating hours/day: ________ Operating days/week: ________

Preferred Drive Sprocket Diameter: ________ Is a belt lubricator used? ☐ No ☐ Yes

4. CLEANING & SANITATION

How often is belt cleaned? ____________ CIP ☐ Hand cleaned ☐

How are support rails cleaned? ____________ Are outside rails ragged with lubrication: ☐ No ☐ Yes

Type of lubrication used on rails: ____________

How often drive drum or sprockets inspected: ____________

Is inside rail on turn or cage cleaned when the belt is cleaned? ☐ No ☐ Yes

Cleaning chemicals used: ____________ Sanitizers used: ____________

Cleaning water temperature (if applicable): ____________

Remarks:

Plastic Belt Tension Ratings

Maximum Belt Pull vs. Maximum Allowable Tension

Deciphering the many terms and methodologies used by various conveyor belt manufacturers to quantify belt tension ratings can be confusing. Phrases such as belt strength, maximum belt pull, permissible tension strength, maximum allowable tension, and allowable tension can dilute the true purpose of tension ratings.

The most radical tension rating method in the industry is now one of the most common, as it is often used by all-plastic conveyor belt manufacturers. Ashworth labels this method **Maximum Belt Pull**. This measurement (usually measured in pounds or kilograms) represents the *absolute maximum amount of tension the belt can withstand just before it breaks*. The reason our competitors use this method is to produce and publish the highest possible tension ratings for their belts. However, this does not represent an apples-to-apples comparison for our customers.

In contrast, Ashworth uses a more conservative and realistic method of measuring tension for most of our belts. **Maximum Allowable Tension** is defined as *continuous or constant working strength*. This rating method builds in a real-world safety factor as compared to the Maximum Belt Pull rating where no safety factor is considered. Conservatively rating the belt with a built-in safety factor allows room for the belt to safely absorb tension peaks that can occur in spiral and turn-curve systems. This rating system lessens the concern for damaged belts and connected equipment due to excessive system tension.

The difference between a belt rated using the competition's Maximum Belt Pull method and one rated with Ashworth's Maximum Allowable Tension is the difference between a belt that is vulnerable to sudden, unexpected damage and a reliable Ashworth belt.

Many all-plastic conveyor belt manufacturers use Maximum Belt Pull terminology in an attempt to disguise the fact that their belts are not as strong as all-steel or metal/plastic hybrid belts in spiral or turn-curve applications. Ashworth does not favor this rating method; however, tension ratings for our Advantage™ family of belts are expressed in terms of Maximum Allowable Tension as well as Maximum Belt Pull. We do this to give our customers a true apples-to-apples comparison between Ashworth's hybrid Advantage™ belts and our competitors' all-plastic modular belts.

The table below illustrates the difference in the measurement techniques:

Belt Type	Maximum Belt Pull *(Competition's Methodology)*	Maximum Allowable Tension *(Ashworth Methodology)*	Difference
Advantage™ 200	750 lb.	300 lb.	2.50x
Advantage™ 120	500 lb.	200 lb.	2.50x

As illustrated in the table, the different measurement techniques yield large differences in the results. Maximum Belt Pull methodology results in tension ratings that are up to 2.5 times the result obtained using Maximum Allowable Tension. Don't be fooled by some manufacturers' rating methodology—**make sure you are comparing apples-to-apples when it comes to tension ratings**.

Maximum Allowable Tension Testing and Number of Test Cycles

Are published test ratings from one manufacturer to another directly comparable? Unfortunately, the answer to this question is no.

First of all, one must be sure the test methodology is comparable, as there is no recognized standard test rating methodology for either modular plastic or steel conveyor belts for maximum allowable tension. Ashworth tests its turn-curve conveyor belts on a 90° turn test conveyor where tension ratings are carefully monitored over the course of the test. A test belt is run for several weeks (more on test cycles below) and inspected on a regular basis to detect problems with links, rods, modules, sprockets, and any other critical components that have the potential to cause the belt to fail. Over the many years that Ashworth has been producing conveyor belts, we have found this test methodology accurate in determining our belts' maximum allowable tension and their potential service life in cycles.

Even in cases where the test method is judged to be comparable, a critical issue is how many test cycles are used in rating the belt. This is important because the majority of belt failures are caused by fatigue, and fatigue is both a function of the stress (i.e., the amount of tension placed on the belt) and the length of time the belt was subjected to that stress (i.e., the number of fatigue cycles).

The bottom line is that a belt that is rated at 50,000 cycles will have a higher maximum allowable tension rating than the same belt rated at 100,000 cycles. It is also important to note that, because of the way most conveyor belts wear, the relationship between maximum allowable tension ratings and fatigue cycles is not linear, so one cannot assume that a belt rated at 50,000 cycles will have twice the maximum allowable tension rating as a belt rated at 100,000 cycles.

Unless stated otherwise, all Ashworth maximum allowable tension ratings are published at 100,000 cycles. In contrast, some of Ashworth competitors quote and/or publish tension ratings at 50,000 cycles. The only way to make apples-to-apples comparison between different competitors' tension ratings is to make sure the basic tests are comparable, and that the tension ratings are specified at the same number of cycles. For more information on Ashworth's test methodology, please contact Ashworth.

Straight vs. Curve Runs and Their Affect on Tension Ratings

In addition to the different terminology used in the industry, it is also helpful to understand that almost all conveyor belts will have higher tension ratings in straight-running applications than in spiral or turn-curve applications (all other factors being equal). In straight-run applications, the entire load (i.e. tension) the belt carries is spread equally across the entire width of the belt. In contrast, in a turn-curve or spiral application the load is transferred from the interior sections of the belt to the outermost link or module. Consequently, for belts used in spiral or turn-curve applications, maximum tension ratings will be less than in straight-running applications. For belts manufactured using drive links on either side of the belt, turn-curve or spiral tension ratings will be approximately half of the belt's tension rating for straight-running applications.

Environmental and Application Influences—The Most Important Consideration

By far the most important point to remember about belt tension ratings is that *the amount of tension any particular belt can withstand is based on the complete set of environmental and application factors to which the belt is exposed*. Therefore it is advisable for the spiral operator to consult an Ashworth Sales, Customer Service or Engineering expert for assistance in selecting the best belt for their particular application.

NOTES

Lotension:
Spiral Belt Selection & Engineering Calculations

The following are basic engineering formulas used in the design of lotension spiral systems. Contact Ashworth engineering should you require further explanation or assistance.

Belt Selection

Ashworth lotension spiral conveyor belts are available in a wide variety of materials and designs with many available options. In selecting the belt that is optimal for your application, accurate information and careful consideration of your system's operating characteristics, the environmental conditions, and your product specifications are essential.

Use of the "Selection Guide for Spiral & Turn-Curve Belts", combined with some basic engineering calculations, will help you select the belt that is right for your particular system. Specific factors to evaluate include:

- Overall dimensions of the installed belt
- Overall dimensions of your spiral equipment and its in-feed and out-feed characteristics
- Characteristics of the product being conveyed including its size, shape, and weight
- Process change in the product during conveyance: cooling, freezing, proofing, and cooking
- Product transfer requirements
- Required levels of cleanliness and sanitation
- Characteristics of the operating environment; temperature, humidity, cleaning methods, and solutions

Turn Ratio

All spiral and turn-curve belts are designed to negotiate curves; however, some are designed to negotiate tighter turns than others. The turn ratio of the belt designates how tightly the belt will negotiate a turn. The lower the turn ratio, the tighter the belt will turn. To calculate a belt's required Turn Ratio (TR), measure and record the Inside Radius (IR) of the spiral cage and divide this number by the required Belt Width (BW). The required turn ratio can, therefore, be expressed as:

Turn Ratio = Inside Turn Radius divided by Belt Width

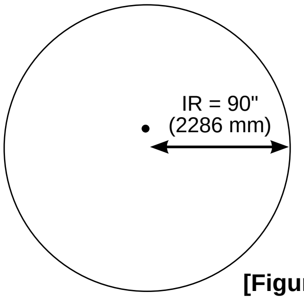
TR = IR / BW

Note: The inside turn radius of the system and the belt width must be in the same unit of measurement, either inches or millimeters.

If the turn ratio of the system does not exactly match one of the available belt ratios, specify the next smaller belt turn ratio. (Example: If the system turn ratio is 2.1, specify a belt turn ratio of 1.9 rather than 2.2.) In general, 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. However, take care not to select a belt with a turn ratio substantially less than the required system turn ratio. This may cause the belt to vibrate or "chatter" where the inside edge of the belt contacts the drum. As a rule of thumb, the belt's turn ratio should be no less than 0.3 of the system's turn ratio.

Sample Turn Ratio Calculation (Figure 6):

Spiral Cage Diameter = 15' = 180"
IR = 90" (2286 mm)
BW = 38" (965.2 mm)
TR = 90" (2286 mm) / 38" (965.2 mm) = 2.36
System requires a belt with a 2.2 turn ratio



[Figure 6]

Radius Weight (Belt Tension) Calculation for Spiral/Turn-Curve Applications

All spiral belts are designed to carry specific loads. Belt loading or belt tension is expressed in terms of Radius Weight or, in Ashworth terminology, Allowable Belt Tension. For more information on belt tension ratings, see the "Plastic Belt Tension Ratings" section.

Radius Weight is calculated using the following formula:

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

Where:
RW = Radius Weight or Belt Tension
R = System Radius (i.e., radius to outside edge of belt or tension link)
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

Note: This is a "rule of thumb" formula that provides an approximation of actual belt tension.

Calculation:

Note: Convert all units to feet (ft) and pounds (lb.) or meters (m) and kilograms (kg).

- Calculate the system radius (R) by measuring the inside turn radius and adding the belt width. For small radius belts, measure from the inside radius to the center link.
- Calculate the weight of the belt (WB). Information on how to calculate WB is contained in the appropriate product sections of this catalog.
- Determine the weight of product (WL) that will be loaded on one foot (or meter) of belt length. Product loading information is presented in the following sections.
- Determine the friction coefficient (fr) between the belt and support rails (see Figure 8 on the next page).
- Determine the friction coefficient (fc) between the belt and cage bars (see Figure 8 on the next page).
- Substitute the values into the equation and calculate.

Note: Radius Weight is recommended not to exceed the maximum turn-curve/spiral tension rating provided in the appropriate product specification sections of this catalog.

Example:

Assuming a radius to the tension link of 10 ft (3.05 m), and a combined weight of the belt plus load equal to 10 lb/ft (14.9 kg/m), with the rail and cage friction both at 0.2, we have:

RW = R x W x (fr / fc)
= 10 x 10 x (0.20 /0.20)
= 100 lb.

or = 3.05 x 14.9 x (0.20 /0.20) x 9.807
= 445 Newtons

Spiral Belt Selection & Engineering Calculations

Friction Coefficients (Used in Radius Weight Calculations)

[Figure 7]

Type of product	Stainless belt on UHMWPE	Acetal belt on UHMWPE	Acetal belt on Stainless
Clean/packaged	0.20	0.15	0.18
Breaded/flour-based	0.27	0.22	0.25
Greasy/fried, temp < 32°F (0°C)	0.30	0.25	0.28
Sticky/sugar-glazed	0.35	0.30	0.33

Product Spacing for Spiral/Turn-Curve Applications

The allowable product spacing per length of belt is the tension link radius divided by the inside turn radius (Figure 8).

The formula to determine correct product spacing is:

AS = (IR + BW) / IR

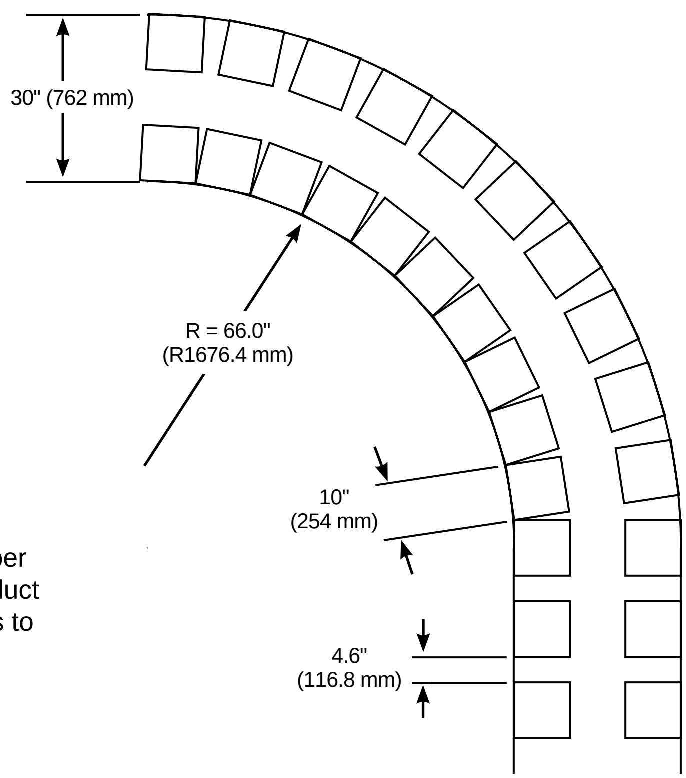
Where:
- **AS** = Allowable Spacing
- **IR** = Inside Turn Radius
- **BW** = Belt Width

Sample Spacing Calculation:
- **IR** = Inside Turn Radius = 66" (1676 mm)
- **BW** = Belt Width = 30" (762 mm)

Tension Link Radius
- = **IR + BW**
- = 66" (1676 mm) + 30" (762 mm)
- = 96" (2438 mm)

Allowable Spacing
- = 96" / 66" (2438 mm / 1676 mm)
- = 1.46

Allowable spacing is, therefore, one product length per 1.46 lengths of belt. In other words, 46% of the product length must be left between products in straight runs to prevent products from touching in a turn.



[Figure 8]

Round Product Spacing for Spiral Applications

The allowable round product spacing per length of belt is the tension link radius divided by the product center radius (Figure 9).

The formula to determine round product spacing is:

AS = (IR + BW) / (IR + PC)

Where:
- **AS** = Allowable Spacing
- **IR** = Inside Turn Radius
- **BW** = Belt Width
- **PC** = Product Center

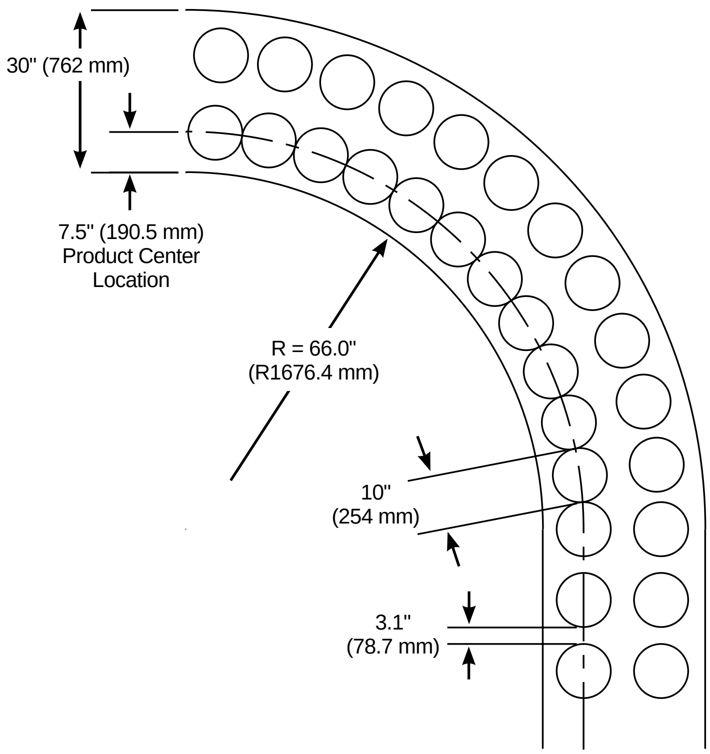
Sample Spacing Calculation:
- **IR** = Inside Turn Radius = 66" (1676 mm)
- **BW** = Belt Width = 30" (762 mm)
- **PC** = Product Center = 7.5" (191 mm)

Tension Link Radius
= **IR + BW**
= 66" (1676 mm) + 30" (762 mm)
= 96" (2438 mm)

Product Center Radius
= **IR + PC**
= 66" (1676 mm) + 7.5" (191 mm)
= 73.5" (1867 mm)

Allowable Round Product Spacing
= 96" / 73.5" (2438 mm + 1867 mm)
= 1.31

Allowable spacing is, therefore, one product length per 1.31 lengths of belt. In other words, 31% of the product length must be left between products in straight runs to prevent products from touching in a turn.



[Figure 9]

Spiral Belt Selection & Engineering Calculations

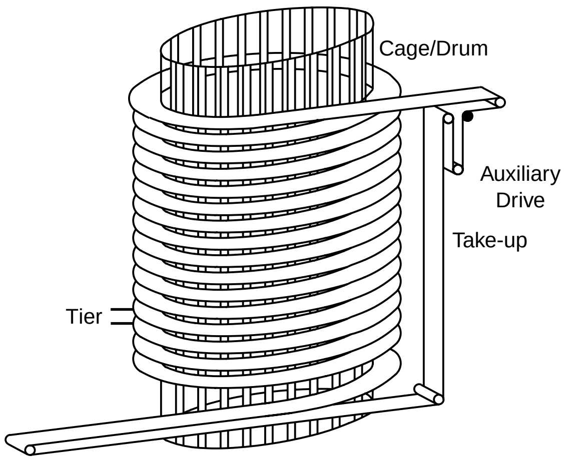
Tips to Reduce Belt Tension and Wear

- Clean product debris from the support rails.
- Clean ice and product debris from the belt, sprockets, and idlers.
- Monitor the effect of temperature on the coefficient of friction between the supports and the belt. Some 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 outside support rails to reduce friction between the belt and rails. See the “Cleaning & Lubricating” section for more information.
- Increase overdrive (if possible).
- Make sure all idler sprockets are free-turning and that shaft bearings are properly lubricated.
- Clean lubricants off the belt’s 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.
- Decrease belt speed.
- Most importantly, do not overload the belt beyond its specified rating.

NOTES

Installation of Spiral Belts

Preparation



Tier Pitch = Change in elevation over one revolution

Before installing a new spiral belt, the wear strips should be examined for excessive deterioration. These are located on the belt support rails and usually made from Ultra High Molecular Weight Polyethylene (UHMWPE). They should be clean, smooth, and free from embedded debris. Worn or contaminated wear strips should be replaced. Wear strips should also be examined to see that they are firmly seated on the rails and that their leading ends are firmly attached to the leading ends of the rails. The leading edge of all rails should be relieved or bent down to prevent catching of the belt as it comes onto the rails.

UHMWPE cage bar caps on the spiral cage should also be inspected. If the cage bar caps are heavily grooved or worn, they should be replaced. Make sure they are firmly attached to the cage bars. They should be clean and free from grease or oils that could reduce the driving friction of the drum. The cage bar caps should also have rounded or beveled edges where they meet the belt. This prevents the belt edge from catching on the corner of a cage bar cap and temporarily eliminating all overdrive.

An Advantage™ belt may be installed on cage bar systems with or without cage bar caps. Bare, stainless steel cage bars will typically increase the driving force against an Advantage™ belt's inside edge. Take care to eliminate any sharp corners or rough surfaces that might gouge or prematurely wear the belt. The cage bar surface finish should be smooth to the touch.

An Advantage™ belt can similarly be installed directly on steel support rails, without UHMWPE wear strips. When implementing this alternative, the spiral operator should insure that support rails are smooth and sharp corners eliminated. The spiral operator should also be aware that the friction coefficient for steel is higher than for UHMWPE, so total belt tension (radius weight) increases with this installation alternative. See the "Spiral Belt Selection & Engineering Calculations" section for more information on friction coefficients and radius weight calculations.

Next, check motor rotation in new systems and make sure the proper number of sprockets are on the take-up drive shaft. A short piece of belting can be used as a template to properly space these sprockets on the shaft (refer to belt assembly instructions for proper locations). This is also a good time to clean all construction and repair debris from the system enclosure. This will help prevent the possibility of the belt dragging metal filings and other sharp debris into the system during installation.

Finally, take a few minutes to plan the actual installation. Determine placement of the rolls of new belt, where you will feed them into the system, and how you will gather up the old belt (if you are removing it at the same time). Each spiral system is unique, so no standard plan will suffice; however, some general installation guidelines are provided in the next section.

Conveyor belting can be heavy and awkward to handle, elevating safety concerns during its installation. Safety is, therefore, the number one priority during installation of a new belt, so it is important to make sure all safety procedures are observed, including proper lockout and tagout procedures. Special care should be taken to know where everyone is prior to starting any machine.

Installation of a New Belt (Not a Replacement)

Always follow proper lockout / tagout procedures to ensure worker safety.

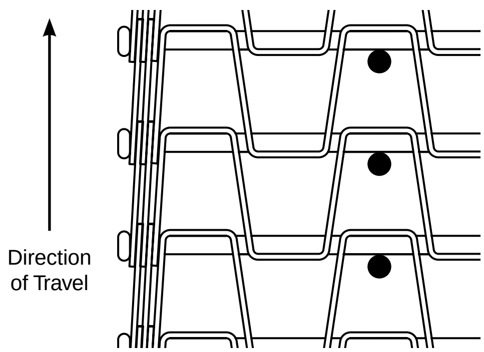
The new belt should be fed into the spiral system in the correct direction of travel. In an Omni-Flex® belt (Figure 10), the formed flat strip (picket) leads the rod. In Omni-Grid® (Figure 11) and Omni-Pro® belts (Figure 12), the link leads the rod with the link opening opposite the direction of travel. With these belts, the drive sprocket teeth come in direct contact with the rod, not the flat strip or link.

For Advantage™ belts (Figure 13), the rod leads the link with the link opening (the “legs” of the link) facing the direction of travel. This appears backward as compared to steel “Grid” belts; however, directional arrows molded into the Advantage™ links provide the correct visual orientation. On Advantage™ belts, drive sprocket teeth directly contact the link which is compressed solidly against the rod

● = drive sprocket location

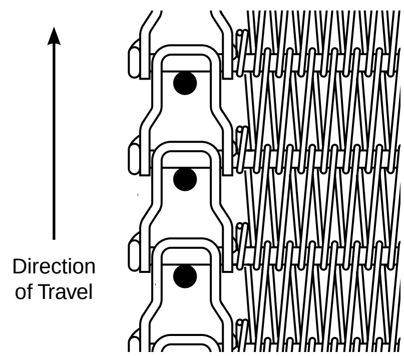
[Figure 10]

Omni-Flex®

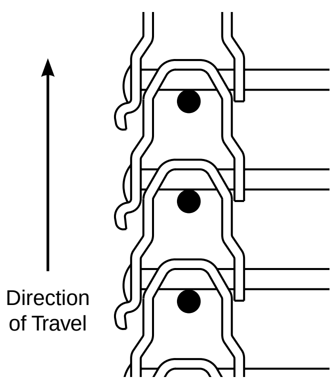


[Figure 11]

Omni-Grid®

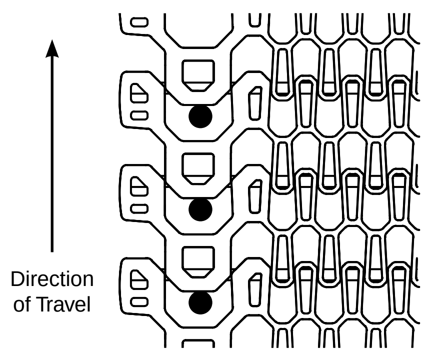


Omni-Pro®



[Figure 12]

Advantage™ Series*



[Figure 13]

** Includes Advantage™ 120 & Advantage™ 200*

Installation of Spiral Belts

New belts are most often installed by pulling the belt onto the support rails at the system in-feed. Once the belt is wrapped around the cage several times, the system can be energized and the drum used to help pull the belt through the system, providing the belt is held tightly against it. This can be accomplished by fastening a section of rope to the leading inside edge of the belt and pulling it tightly against the drum. Additionally, the take-up drive can sometimes be used to unwind the heavy rolls of new belt so they can be more easily fed into the system. The ability to utilize the take-up drive will be determined by the system layout and space for the rolls of new belt.

As the end of a belt roll approaches the feed-in point, the system is de-energized so the next new roll of belt may be spliced onto the succeeding roll (for splicing instructions, see the appropriate Technical Bulletin on belt assembly). Because the belt will continue running through the system for several feet after the system is stopped, it is advisable to know how much the drive will coast after the power is turned off. Otherwise, the end of the belt could run too far and delay installation.

Splicing During Installation

For an Omni-Flex® type belt, splices should always be made with the preformed buttonhead at the inside edge of the belt. The nut goes on the outside edge of the belt. Any excess thread should be trimmed off the rod and the rod and nut should be welded together. However, Omni-Grid® type belts require that both the button-head and nut be welded to the link. The rod also needs to be welded to the inside of the link at both edges of the belt. This prevents the possibility of one of the links (usually at the inside edge) from "tenting up." At this point, it is a good idea to file or grind these splices and welds smooth to prevent cutting of the cage bars.

An Advantage™ belt is easier to splice than a steel belt, as no welding is required. Follow the assembly instructions, making sure that the stainless steel rod is fully seated in the link by pushing it in at a slight angle with a screwdriver or assembly tool. When correctly seated, the end of the steel rod cannot be seen from the side of the link.

As the installation progresses, make sure the belt is not catching on any framework, baffles, or doors. On tall systems, ladders or other means of observing and guiding the belt must be employed as it gets higher and higher off the floor. Never stand on the support rails or the belt as this can damage the rail and/or belt, and it is unsafe. Be sure that the leading edge of the belt does not catch on the ends of wear strip sections as these can be pulled loose. Keep in mind that the leading edge of the new belt may turn up or down, and is far more likely to hang up than other areas of the belt.

Once the belt is completely pulled into the system, the leading edge is spliced to the trailing edge to make it endless. Prior to splicing, the leading edge should be checked for damage that may have occurred during installation. If there is any doubt about the condition of the leading edge, it is best to remove a few pitches. New belts normally lengthen out during the first few weeks of operation. On initial installation, adjust belt length so as to position the take-up weight just above center in the take-up tower.

Installation of a Replacement Belt

If a newly purchased belt is to serve as a replacement in an existing system and it has been determined that the wear strips on the cage bars and support rails do not require replacement, then the installation of the replacement belt is potentially less involved than installation on a completely new system or one requiring cage bar or support rail cover replacement. When only the belt is replaced, the new belt can be spliced to the old belt (assuming that the new belt is the same specification as the old) at a point just after the sprocket drive. The system can then be energized and stopped to remove the old and to pull on new sections of belt, continuing until the old belt is completely removed and final splice of the new belt is in place.

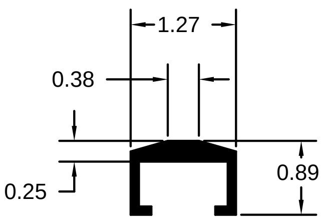
After Installation

Once the new belt is installed, there are several items that should be examined before the belt is cleaned and used for production. First, check the system carefully for catch points, especially along the outside edge of the belt. The in-feed and outrun are particularly vulnerable, as the belt will typically swing wide in these areas. Also check any flanges on enclosure doors for the potential to catch on the belt when the doors are closed. While inspecting the system, make sure that the flip-up detectors or product height detectors are not going to impinge on the belt. If there are any hold-down rails on the system, be sure there is 1/4" to 3/8" clearance between the belt and the rails. Next, check the location of the drive and idler sprockets. Be sure that they are centered in the belt or link opening and are locked down to the shaft. Any filler rolls should also be checked to ensure they are set in place and are the proper size to work with the sprockets.

After the system has been thoroughly checked for proper clearances, it should be energized to confirm it is running correctly. Start the system out at slow speed and continue to monitor the sprocket placement. Listen and observe for any indication of belt impingement on the framework or other parts of the system. Note the position of the take-up drive at start-up and watch whether it rises or falls as the system operates. A take-up roll that rises indicates reduction of belt tension. A take-up roll that falls indicates that belt tension is rising. The position of the take-up should quickly stabilize to a mid-position. Once the system has operated for a few complete turns, check the overdrive by following the procedure outlined in the Ashworth Technical Bulletin on this subject. Adjust the overdrive, if necessary, to achieve the lowest possible belt tension with the belt operating smoothly.

If possible, the system should be operated for up to 200 hours before final cleaning and product loading. This is particularly important for new systems utilizing a steel belt, as this will help the belt components polish each other and reduce the chances of excessive internal wear. See the “Cleaning & Lubricating” section for further information.

UHMWPE Cage Bar Cap Profiles



LSA0005
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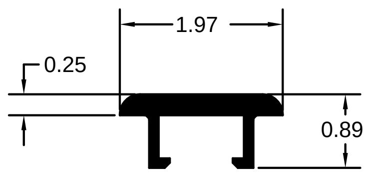
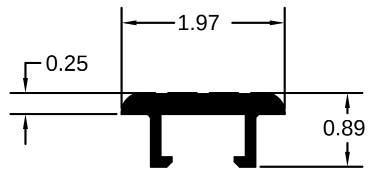
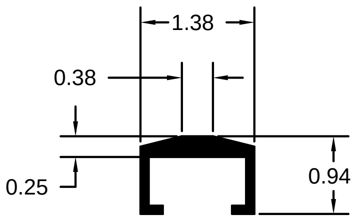


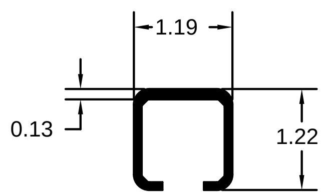
LSA0026
(FITS 1/2" X 1" BAR)



LSA0032
(FITS 1/2" X 1" BAR)



LSA0011
(FITS 9/16" x 1-1/8" BAR SIZE CHANNEL)



LSA0006
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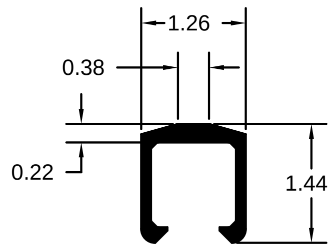

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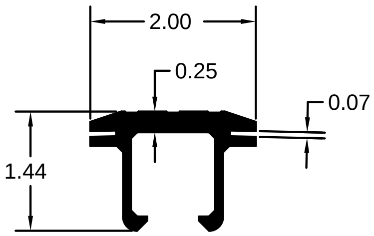

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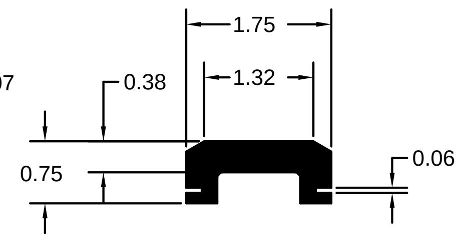

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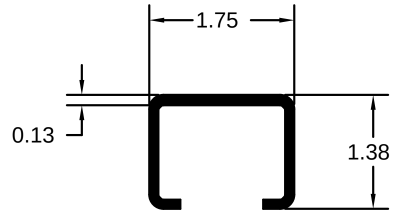

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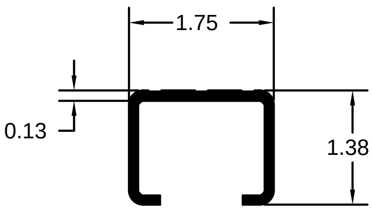

LSA0030
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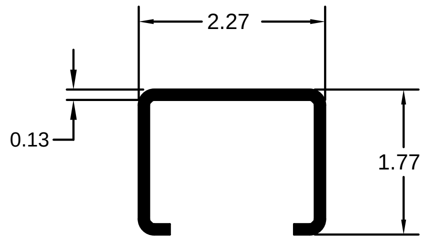
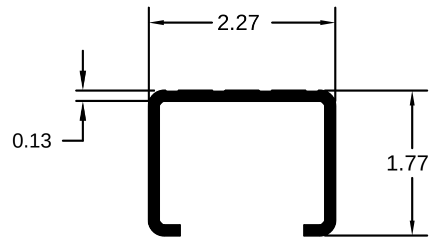
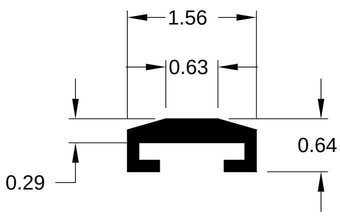


LSA0007
(FITS 1-1/2" x 2" TUBE)

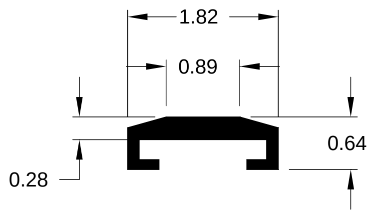


LSA0010
(FITS 1-1/2" x 2" TUBE)



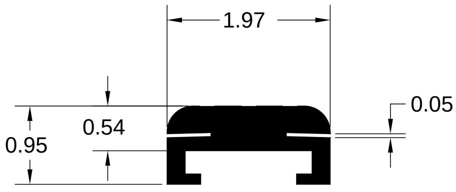
LSA0033

(FITS 3/16" X 1-1/4" BAR)



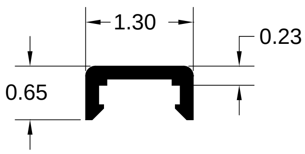
LSA0025

(FITS 3/16" X 1-1/2" Bar)



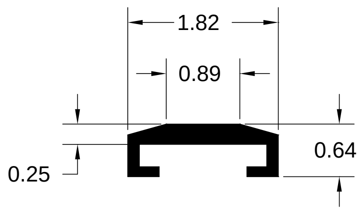
LSA0012

(FITS 1-1/2" x 1-1/2" x 1/4" TEE)



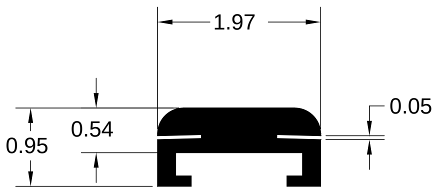
LSA0018

(FITS 1/4" X 1" BAR)



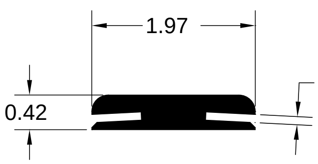
LSA0034

(FITS 1-1/2" x 1-1/2" x 1/4" TEE)



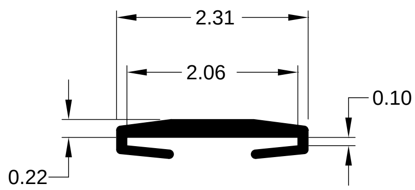
LSA0021

(FITS 1-1/2" x 1-1/2" x 1/4" TEE)



LSA0015

(FITS SHEET METAL CAGE)



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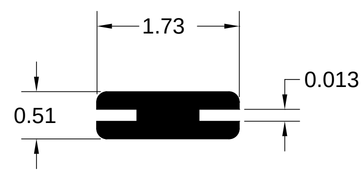

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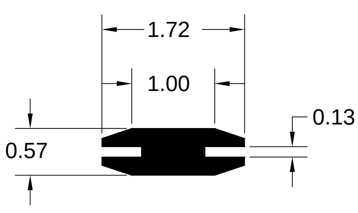
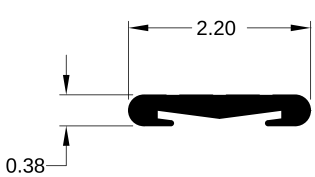
(FITS SHEET METAL CAGE)



LSA0023

(FITS SHEET METAL CAGE)

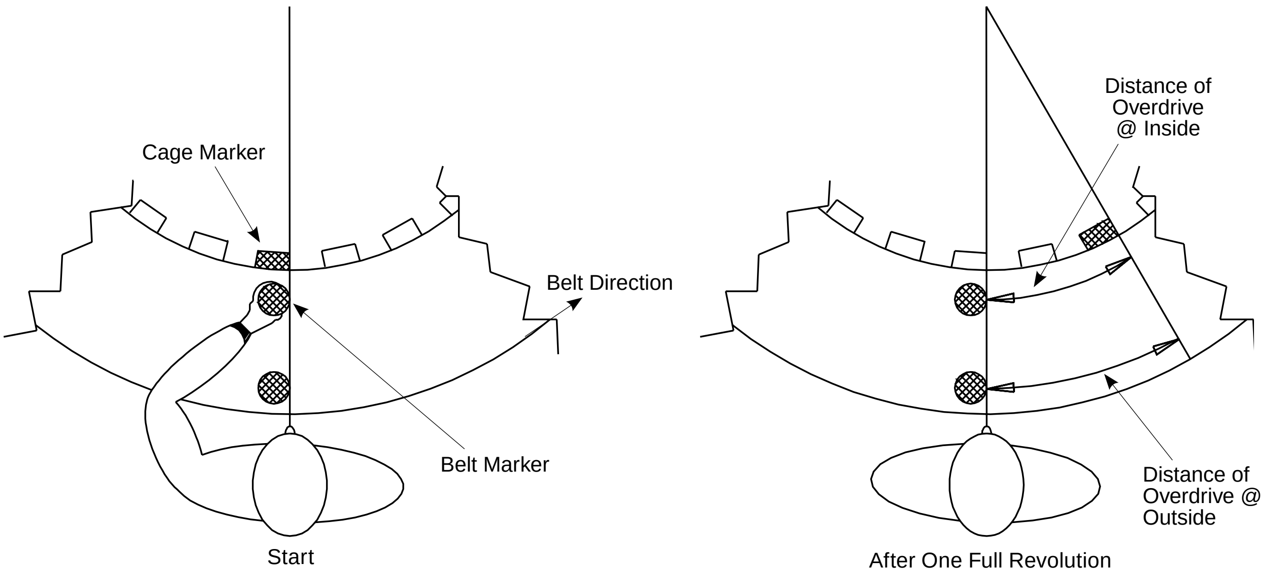


LSA0031

(FITS SHEET METAL CAGE)

Measuring Overdrive

Positive overdrive must exist for lotension spiral systems to operate properly. Overdrive is defined as the amount of slippage between the belt and the drum or cage. This means that the drum surface must move faster than the inside edge of the belt. If it doesn't or if the drum surface is moving slower than the belt, high tension develops within the system, likely resulting in belt damage or failure.



Measuring overdrive: **[Figure 14]**

- Stand facing the cage or drum as shown in Figure 14.
- Mark a cage bar or a spot on the drum so that it is easily identifiable.
- Place an object (belt marker) on the inside edge of the belt in line with the cage marker.
- After the object has made one complete revolution, immediately measure the distance between it and the cage marker along the inside edge of the belt.
- Divide this distance by the tier pitch (distance between two belts levels) to convert to the number of tiers for overdrive.

The formula to determine the number of tiers of overdrive is:

TO = MDI / TP

Where:

TO = Tiers of Overdrive
MDI = Measured Distance of Inside object
TP= Tier Pitch

Sample Overdrive Measurement Calculation:

MDI = Measured Distance of Inside object = 18" (457.2 mm)
TP = Tier Pitch = 6" (152.4)

Tiers of Overdrive

= 18" (457.2 mm) / 6" (152.4 mm)
= 3

Sometimes it is difficult to measure the distance moved of an inside object, especially if a wide belt is used.

Overdrive can also be measured at the outside of the edge of the belt, but this distance must be multiplied by the ratio of the inside radius divided by the outside radius. The following formula is used:

TO = (MDO / TP) x (IR / OR)

Where:

TO = Tiers of Overdrive
MDO = Measured Distance of Outside object
TP = Tier Pitch
IR = Inside Radius
BW = Belt Width
OR = Outside Radius, which equates to the Inside Radius plus the Belt Width

Sample Overdrive Measurement Calculation:

MDO = Measured Distance of Outside object = 26.5" (666.75 mm)
TP = Tier Pitch = 6" (152.4)
IR = Inside Radius = 79.2" (2011.68 mm)
BW = Belt Width = 36" (914.4 mm)
OR = Outside Radius which equates to the IR plus the BW = 115.2" (2926.08 mm)

MDO / TP
= 26.5" (666.75 mm) / 6" (152.4 mm)
= 4.375

IR / OR
= 79.2" (2011.68 mm) / 115.2" (2926.08 mm)
= 0.688

Tiers of Overdrive
= 4.375 x 0.688
= 3

$$\text{Number Tiers of Overdrive} = \frac{\text{Distance @ Inside}}{\text{Tier Pitch}}$$

OR

$$\text{Number Tiers of Overdrive} = \frac{\text{Distance @ Outside}}{\text{Tier Pitch}} \times \frac{\text{Inside Radius}}{\text{Outside Radius*}}$$

** Outside Radius = Inside Radius + Belt Width*

Measuring Overdrive

Setting Overdrive

Steel Belts:

- Allow a minimum of 2 to 4 tier pitches of overdrive in systems where a steel belt edge contacts a plastic cage surface.
- Allow a minimum of 1 to 2 tier pitches of overdrive in systems where a steel belt edge contacts a steel cage surface.

Advantage™ Belts:

- Allow a minimum of 3 to 5 tier pitches of overdrive in systems equipped with UHMWPE-capped cage bars.
- Allow a minimum of 2 to 4 tier pitches of overdrive in systems equipped with stainless steel cage bars or a stainless steel drum.

These minimums are Ashworth's recommended values. However, since every system is unique, the overdrive value may need to exceed recommended minimums and may be as high as equal to one full belt width.

If the belt continually jerks or surges during operation, reduce the overdrive setting until the belt surge stops. As a rule of thumb, correct tension on the belt is achieved when it is possible to pull the belt an inch from the cage with moderate hand force. Make a note of the motor current and take-up roll location for future reference.

Experience and testing has proven these ranges appropriate for producing the lowest possible belt tensions. An approximation of belt tension can be calculated by applying a formula that uses the radius of the system and the unit weight of the belt. This is referred to as radius weight and is discussed in the "Spiral Belt Selection & Engineering Calculations".

Cleaning & Lubricating

Ashworth Conveyor Belts are to be cleaned and sanitized using the following 7-Step Process.

Step 1: Dry Wipedown
Clean the conveyor belt and related equipment by removing large pieces of soil and food from the belt's surfaces. Also make sure compacted debris is removed from the sprockets, idler wheels and support rails (heretofore referred to as the belt's support system).

When cleaning the conveyor belt, work in a top-down, inside-edge-of-belt to outside-edge-of-belt pattern. All subsequent cleaning and sanitizing steps of this procedure are to be completed using this same pattern.

Step 2: Pre-Rinse
Pre-rinse the belt and support system with hot water heated to a temperature of 125°–130°F (52–54°C) and at a pressure of 150–300 psi (10–20 bar). Care is to be taken that floor drains are kept clear of debris to avoid pooling of water.

Step 3: Apply Detergent
Apply an appropriate foaming detergent mixture to the belt and support system at 150 psi (10 bar). The detergent foam can be allowed to remain on the belt for 10–15 minutes, but should not be allowed to dry, as dried chemical is often more difficult to completely remove and may support the growth of biofilms.

Step 4: Rinse & Inspect
Flood rinse the belt and support system with 40–60 psi (2.8–4.1 bar) water at 125°–130°F (52°–54°C). After the rinse, inspect the belt and support system components to ensure it is free of soils, water beads, hazes, films, and other residue. This inspection should be conducted using sight, touch, and smell.

Step 5: Pre-Op the Belt
Verify that all cleaning chemical is removed from the conveyor belt, sprockets, idlers, and support rails. It's recommended that pH testing be used as an aid in determining that the belt is free of the detergent. Run the conveyor belt slowly to help dry it and its supports, and remove any pooled water from the floor.

Step 6: Inspect & Release for Sanitizing
Re-inspect the belt and support system using sensory analysis to detect the presence of bacteria. Ashworth recommends adenosine triphosphate (ATP) testing be used to verify absence of bacteria. ATP is present in all animal, vegetable, yeast, and mold cells. Detection of ATP indicates contamination by at least one of these sources. Correct any noted deficiencies detected by ATP testing and re-lubricate the belt and support rails as directed by Ashworth. Release the belt for sanitizing.

Step 7: Sanitize the Belt
Apply the appropriate sanitizers at "no rinse" concentrations, following the manufacturer's recommendations. Run the belt as the sanitizer is applied in order to ensure that all parts of the belt and support system have been completely exposed to the chemical. Squeegee any sanitizer that has pooled on the floor into floor drains.

Important Cautionary Notes

1. Ashworth recommends that water pressure not exceed 300 psi (20.7 bar) at any stage of the cleaning process to avoid contamination resulting from overspray of water and chemicals.
2. A caustic wash may be necessary due to health or other safety requirements. We recommend that

caustic solutions not be left on the belt or used in any stronger concentrations than necessary to meet local regulations. Use of these products must strictly follow the manufacturer's directions.

Of special concern is the use of caustic or harsh chemicals on plastic belts, support rails, and cage bar caps. These chemicals can soften plastic materials which can lead to damage or failure of the belt and other components. Food processors should likewise be aware that chlorine-based cleaning products can also affect stainless steel and rubber components that are common to food processing equipment.

3. Conveyors and equipment that operate Ashworth conveyor belts can be large and often have exposed moving parts. When working around operating conveying equipment, workers must be aware of possible safety hazards and work within their company's safety guidelines to prevent personal injury.
4. It is sound practice to alternate appropriate sanitizers to prevent development of bacteria resistance to any one sanitizing agent and to prevent overgrowth by certain bacteria strains.

Clean the Support Rails

Cleaning support rails is important for two reasons: First, food debris and other soil do become entrapped between the closed contact area of the conveyor belt and the support rails. Second, cleaning the support rails reduces friction between the rails and the belt and, therefore, reduces system tension.

Because the support rails are not adequately cleaned by typical Clean-In-Place (CIP) methodology and because complete removal of the belt from the rails is usually not part of routine CIP procedures, alternative methods must sometimes be employed.

One such method is to attach clean, non-abrasive cleaning pads to the underside of the belt and then energize the system to pull the pads along the entire length of the support rails. Pads should be visually checked and replaced when they become ineffective at cleaning. Remove the pads before they reach drive sprockets. It should be noted that this method may not work in every application, and that it is not a substitute for removing the belt and thoroughly cleaning and sanitizing the support rails using the methodology presented in the previous section.

Lubricate the Belt

Stainless Steel Belts:

A light application of silicon or other food grade lubricant should be applied to the belt. This allows the belt to polish the wear surfaces and prevent galling. The lubricant also acts as a film to separate metal contact surfaces and minimize wear. On spiral systems, never lubricate the inside belt edge (where it contacts the cage) in order to maintain proper friction and drive.

Advantage™ Belts:

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 the belt material and the product. On spiral systems, never lubricate the inside belt edge (where it contacts the cage) in order to maintain proper friction and drive.

Suggested lubricants for both stainless steel and plastic belts:

- General Electric GE-SF-18-350
- Dow Corning 200 Fluid
- CLEARCO-SFG-350 Silicon Concentrate

All are acceptable to -60°F (-51°C) and are FDA compliant.

Application Method:

- The lubricant is generally fed from a drip reservoir onto a brush which contacts the belt's underside in the return path.
- Install and activate the lubricator for either a predetermined application interval or when the drive motor's current consumption indicates excessive belt tension.

Run-in the Belt

Steel Belts:

Just like a new car's engine that requires a break-in period to allow moving metallic parts to "wear-in," new steel conveyor belts also require a break-in period. During this process, microscopic peaks and valleys of the new belt's wear surfaces are gently abraded and filed to form a smooth, polished surface. A by-product of this process is the formation of small black particles, so-called "black specks," that look like household pepper. These can collect on the belt or conveyor surfaces and can fall on transported product.

For most steel belts, the optimal run-in period is 150–200 hours which varies somewhat based on belt type and its application. Typically, Omni-Flex® belts require a slightly longer run-in period and Omni-Grid® and Omni-Pro® belts require slightly less. During run-in, wash new belts with a mild dishwashing mixture and re-lubricate every 48 hours. After a successful run-in, the possibility of black speck generation is negligible.

Advantage™ Belts:

A run-in period is not normally required for Advantage™ belts. However, a thorough cleaning is recommended prior to beginning production.

The following measures will aid in the removal of any debris that is created during run-in:

- Install strong bar magnets at the terminal rolls or at the take-up. The addition of an air knife will assist in blowing the debris off the belt and onto the magnets.
- Ensure the belt is electrically grounded. The belt will carry a small static electrical charge generated from the friction between the belt and wear strips. This is particularly true for Advantage™ belts. If this charge is not dissipated, it will tend to hold the debris to the belt surface.
- Periodically wash the walls, floor and ceiling and other surrounding equipment to help eliminate the possibility of air born contamination of the belt and associated surfaces.
- Periodically measure and adjust belt tension to specified levels. Excess tension accelerates belt wear and increases the amount of contaminants on the belt and support rails, increasing friction. System tension may be reduced by increasing overdrive or by cleaning and lubricating the support rails (never lubricate the cage or the inside edge of the belt).

Troubleshooting Spiral Belts

High Tension

High tension occurs when the coefficient of friction between belt and support rails is higher than coefficient of friction between belt and cage. The estimated system tension is also called the “Radius Weight” of the system.

The formula for this calculation is:

Radius Weight = Radius x Weight x [f(rail) / f(cage)]

Where:

f = friction

Unequal friction conditions can dramatically alter the system’s tensions.

Example:

Assuming a radius to the tension link of 10 ft (3.05 m), and a combined weight of the belt plus load equal to 10 lb/ft (14.9 kg/m), with the rail and cage friction both at 0.2, the radius weight or tension equals 100 lb. (445 Newton’s).

The table below indicates changes in tension when coefficients of friction are altered.

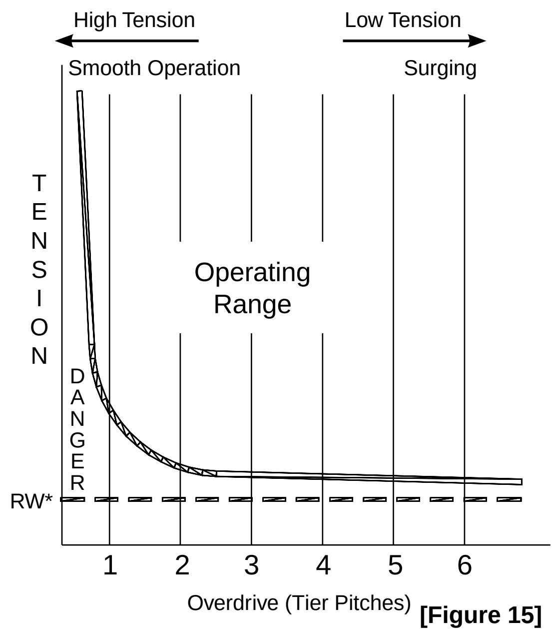
RAILS	CAGE	fr	fc	fr/fc	RW
Normal	Normal	0.2	0.2	1.0	100 (445 N)
Dirty	Normal	0.3	0.2	1.5	150 (667 N)
Normal	Oily	0.2	0.1	2.0	200 (890 N)
Dirty	Oily	0.3	0.1	3.0	300 (1334 N)
Oily	Oily	0.1	0.1	1.0	100 (445 N)
Oily	Normal	0.1	0.2	0.5	50 (222 N)

Changes in the frictional relationships, caused by oil and dirt, can have a beneficial or destructive influence on the belt and its chances for a long useful life.

Another common cause of high system tension is a lack of overdrive. Spiral operators, in an attempt to make the belt operate smoothly, will sometimes reduce the overdrive in the system. By doing so, they also create high belt tension. Often, a compromise between high tension and smoother operation of the system, and greater overdrive with its accompanying looping or surging, is required. In the case of severe or unacceptable surging, system overdrive should be reduced to the point where the belt surging just stops.

Figure 15 shows the effect of overdrive on tension.

By examining the surface of the cage bars, a good



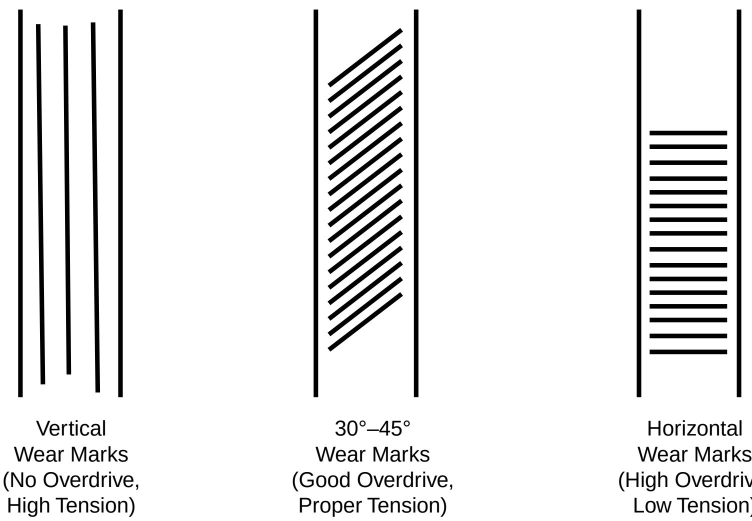
[Figure 15]

estimation of the overdrive can be made. If the wear marks on the cage bar wear strips are nearly vertical, the system has been operating with little or no overdrive, indicating high tension within the system. The marks are made when the same buttonhead remains on the same cage bar for a long period of time as it rises up or drops down the cage surface.

Wear marks that are 30°–45° to horizontal will indicate an overdrive in the range of 2 to 4 tier heights. In this case, the system is operating with the proper amount of tension.

Finally, nearly horizontal wear marks indicate a very high amount of overdrive. High overdrive is indicative of low tension in the system and is not harmful to the belt, even if it causes some surging. If this is not objectionable to the application, the overdrive should not be re-adjusted.

Figure 16 illustrates these markings.



[Figure 16]

Other possible causes of high tension within the system include:

- Hold-downs pinching the belt against the support rails
- Belt edge impinging on the conveyor structure
- Hard turning or frozen bearings on a terminal or in the take-up tower area
- Narrow area of the support structure squeezing the belt
- A twisted or crushed cage that has a smaller diameter at the mid-section of its height
- Cage diameter too small to allow continuous contact with the inside belt edge
- Damage to the belt that restricts its ability to collapse correctly around the drum or cage, inhibiting proper belt-to-cage contact and the drum's ability to efficiently drive the belt
- Damage to the belt that restricts its ability to flex on the terminals
- Missing cage bar caps, or wear strips missing from the belt supports
- Rods protruding inward and catching on the cage bars
- Loss of overdrive due to belt pitch elongation, causing higher belt speed with no increase in cage speed; this occurs when overdrive was at lower range of acceptability before stretch

Jerky Operation

Jerky operation can be caused by a number of potential problems, including:

- Surging caused by high overdrive
- Rod ends protruding in and hanging up on cage bars
- Stick-slip frictions caused by dirty or otherwise high friction wear surfaces
- Chordal action on the small sprocket at the cage drive
- Drive motor surging or pulsing

Dirty Systems

Process dirt and belt wear debris may contaminate product and reduce the useful life of the belt if the user does not practice proper cleaning. Cleaning practices and schedules are application specific. Reference Technical Bulletin TB-TC-002 for detailed discussion and recommendations.

Ice Build-Up and Damaged Overlays

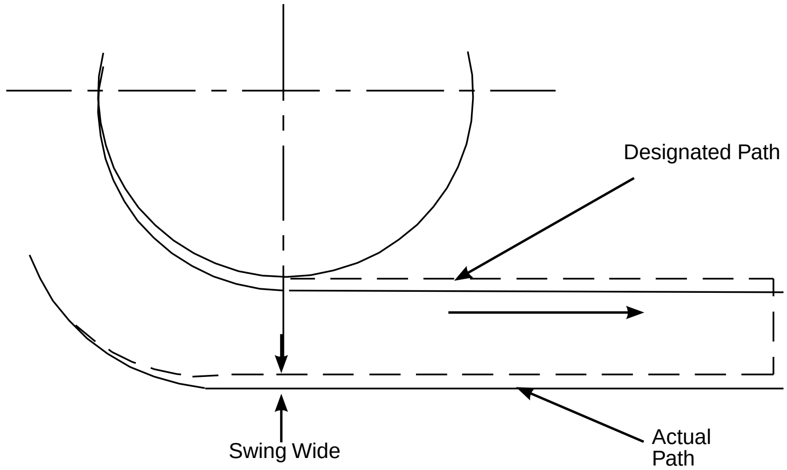
Ice build-up on terminals and support structures is a fairly evident problem but often hard to solve. The apparent solution is to defrost more often to reduce the formation of ice.

Tenting

Tenting is a symptom of too high tension within a lotension system. The solution is to reduce tension and/or to add hold down brackets.

Swing Wide

It is normal for a spiral belt to "swing wide" (Figure 17) as it exits the spiral cage, following a path that is offset but parallel to the normal tangent line to the cage. Ideally, the spiral and its out-feed should be designed to incorporate this effect. However, if the spiral design does not allow for the natural tendency of the belt to swing wide, the belt edge may come in contact with the spiral framework. In this case, the usual reaction of the spiral operator is to restrict the path of the belt from swinging wide, typically by use of rollers or shoe guides. This is not recommended as restraining the belt can have several adverse effects on its service life:

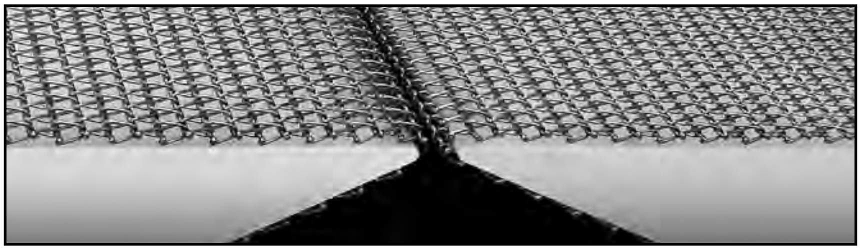


[Figure 17]

- The belt can wear through a shoe guide, allowing the edge to snag. This will eventually cause an increase in belt tension and damage the belt edge.
- Outside edge restraints can push individual rods inward. The rods can be held in this inward position by belt tension. There is then a potential for the projecting rods to catch on the vertical cage bar capping, causing damage to the belt, damage to the cage bar capping, and high belt tension.
- If the belt is pushed into a straight tangent path, the tension carried in the outside edge of the belt is shifted to the inside edge of the belt, resulting in a pronounced tendency for one edge of the belt to lead the other.

NOTES

Straight Running Belts: Positive Driven



Stainless steel and UHMWPE sprockets are readily available in stock

Cleatrac® System

Tightest Transfer
- Moves around the industry's smallest nose bar–down to 0.2" (5.1 mm)
- Minimize product damage, waste and operating costs.

Reduce Operating Costs
- Less expensive than chain-edge construction
- More durable than single-plane wire designs
- Longer belt life than pin roll drives

Available On Demand
- Stocked in standard widths
- Complete with sprockets, support bearings and filler rolls
- Shipped within 24 hours

Fatigue Resistant
- 2.5 times working strength of conventional Cleatrac
- Suited for long conveyors
- Unparalleled belt strength

Flat Wire

Proven Reliability
- Manufactured to the industries tightest tolerances to increase belt life and ensure smooth operation
- More than sixty-five years of customer satisfaction.

Easy to Clean
- Maximum open area for free air flow and water drainage

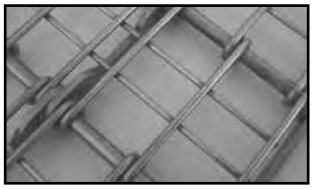
Optimize with Options
- Friction driven for optimal strength
- Sprocket driven for optimal tracking
- Available in standard or heavy duty
- EZ Transfer belt designed for efficient transfers between conveyors

PDCE

For Exacting Applications
- Uniform in pitch
- Straight tracking
- High tensile strength
- Durable under severe loads
- Longer belt life than pin roll drives

Application Options
- Choose from a variety of chain weights and strengths
- Customize with different conveyor meshes or plastic modules
- Available with guard edges, lifts and/or lane dividers

Design Assistance
- Ashworth's Belt Professionals stand ready to assist you in selecting the proper variations and options for your specific application



Eye-Link

Versatile Design
- Available in numerous configurations of pitch spacing, wire diameter, and mesh designs
- Options include cross flights, side plates, chain edges, and additional bar links for increased strength

Inherently Strong
- Extremely durable with tension ratings up to 260 lb. per link row
- Roller drive system engages the entire width of the belt, increasing tension capabilities and belt life

Precise Conveying
- Positively driven for true tracking
- Flat, even surface and rigid structure resisting side-to-side deflection delivers smooth product conveyance

Selection Guide:
Straight Running Belts

Specifications	Units	Flat Wire–FWA1 (Standard Duty)	Flat Wire–FWA2 (Standard Duty)	Flat Wire–FWA3 (Standard Duty)	Flat Wire–FWA4 (Standard Duty)	Flat Wire–FWA5 (Standard Duty)	Flat Wire–FWB1 (Standard Duty)
Material(s)		Stainless Steel, Carbon & Galvanized Steels, High Temperature Alloys					
Width Limits	in. (mm)	4.50 - 208 (114 - 5283)	4.50 - 204 (114 - 5182)	3.50 - 208 (90 - 5283)	3.50 - 204 (90 - 5182)		4.50 - 208 (114 - 5283)
Pitch	in. (mm)	1.07 (27.2)				0.54 (13.77)	1.07 (27.2)
Mesh Type	in. (mm)	Formed Pickets 1 x 1 (25.4 x 25.4)		Formed Pickets 0.5 x 1 (12.7 x 25.4)		Formed Pickets 0.5 x 0.5 (12.7 x 12.7)	Formed Pickets 1 x 1 (25.4 x 25.4)
Maximum Tension	lb/ft kg/m	350 (522)		500 (745)			420 (626)
Open Area	%	78		77	77	65	77
Edge Treatment		Clinched	Welded	Clinched	Welded		Clinched
Method of Drive		Positive/Sprockets					
Straight Run Applications							
Can Washing							◆
Cookers		◆	◆	◆	◆	◆	◆
Fertilizer Spreading							
Filling Lines							
Food Processing Conveyance							
Freezer Belt							
Fryer Belt							
General Conveyance		◆	◆	◆	◆	◆	◆
Incline Conveyors							
Industrial Dryers							
Industrial Washers		◆					◆
Large Product Transfer							
Lehr Oven Belt							
Oven/Baking Belt		◆	◆	◆	◆	◆	◆
Package Accumulation		◆	◆	◆	◆	◆	◆
Package Conveyance							
Pasteurizing Applications		◆	◆	◆	◆	◆	◆
Product Washing		◆	◆	◆	◆	◆	◆
Quench Tanks		◆	◆	◆	◆	◆	◆
Rubber Parts Handling		◆					
Small Product Transfer			◆	◆	◆	◆	
Veneer and Wood Drying							
Washers and Degreasers		◆	◆	◆	◆	◆	

Selection Guide:
Straight Running Belts

Specifications	Units	Flat Wire–FWB2 (Standard Duty)	Flat Wire–FWB3 (Standard Duty)	Flat Wire–FWB4 (Standard Duty)	Flat Wire–FWB5 (Standard Duty)	Flat Wire–FWC1 (Heavy Duty)	Flat Wire–FWC2 (Heavy Duty)
Material(s)		Stainless Steel, Carbon & Galvanized Steels, High Temperature Alloys					
Width Limits	in. (mm)	3.50 - 204 (90 - 5182)	3.50 - 208 (90 - 5283)	3.50 - 204 (90 - 5182)		4 - 204 (101.6 - 5182)	
Pitch	in. (mm)	1.07 (27.2)			0.54 (13.77)	1.08 (27.53)	1.08 (27.53)
Mesh Type	in. (mm)	Formed Pickets 1 x 1 (25.4 x 25.4)	Formed Pickets 0.5 x 1 (12.7 x 25.4)	Formed Pickets 0.5 x 1 (12.7 x 25.4)	Formed Pickets 0.5 x 0.5 (12.7 x 12.7)	Formed Pickets 1 x 1 (25.4 x 25.4)	Formed Pickets 0.5 x 1 (12.7 x 25.4)
Maximum Tension	lb/ft kg/m	350 (522)	600 (895)			1350 (2013)	1750 (2609)
Open Area	%	77	76	76	64	68	62
Edge Treatment		Welded	Clinched	Welded			
Method of Drive		Positive/Sprocket					
Straight Run Applications							
Can Washing							
Cookers		◆	◆	◆	◆	◆	◆
Fertilizer Spreading						◆	◆
Filling Lines							
Food Processing Conveyance							
Freezer Belt							
Fryer Belt							
General Conveyance		◆	◆	◆	◆	◆	◆
Incline Conveyors							
Industrial Dryers							
Industrial Washers		◆	◆	◆	◆	◆	◆
Large Product Transfer							
Lehr Oven Belt							
Oven/Baking Belt		◆	◆	◆	◆	◆	◆
Package Accumulation		◆	◆	◆	◆		
Package Conveyance						◆	◆
Pasteurizing Applications		◆	◆	◆			
Product Washing		◆	◆	◆	◆	◆	◆
Quench Tanks		◆	◆	◆	◆	◆	◆
Rubber Parts Handling							
Small Product Transfer							
Veneer and Wood Drying						◆	◆
Washers and Degreasers							

STRAIGHT BELT SELECTION

Selection Guide:
Straight Running Belts

Specifications	Units	Flat Wire–FWH3 (EZ Transfer)	Cleatrac	Positive Drive Chain Edge	Eye Link
Material(s)		Stainless Steel, Carbon & Galvanized Steels, High Temperature Alloys			
Width Limits	in. (mm)	4.80 - 178 (121.8 - 4521)	1.5 - 168 (38 - 4267)	Application Specific	2 - 236 (50 - 6000)
Pitch	in. (mm)	1.08 (27.53)	Mesh Dependent	Chain Dependent	1.18 (30), 1.97 (50), 2 (50.8), 2.95 (75)
Mesh Type		Formed Pickets 0.5 x 1 (12.7 x 25.4)	Balanced Weave	Unilateral, Balanced, Conventional or Compound Balanced Weave	Eye-link and Cross wire
Maximum Tension	lb/ft kg/m	780 (1161)	Up to 450 (670) Mesh Dependent	Dependent on Material and Belt Speed	Dependent Upon Chain Strength
Open Area	%	72	Mesh Dependent	Construction Dependent	Mesh Dependent
Edge Treatment		Welded	Welded	Welded, Washer Welded, Drilled and Cottered	Welded
Method of Drive		Positive/Sprocket	Sprockets	Positively Driven via Roller or Drag Chain	Positively Driven
Straight Run Applications					
Can Ovens / Washers					
Can Washing					
Cookers					◆
Fertilizer Spreading		◆			◆
Filling Lines				◆	◆
Food Processing Conveyance			◆		◆
Freezer Belt				◆	◆
Fryer Belt			◆	◆	
General Conveyance			◆	◆	◆
Incline Conveyors					◆
Industrial Dryers				◆	
Industrial Washers					◆
Lehr Oven Belt					
Oven/Baking Belt			◆		◆
Package Accumulation		◆		◆	◆
Package Conveyance			◆		
Pasteurizing Applications					◆
Product Washing					
Quench Tanks					
Rubber Parts Handling		◆		◆	
Small Product Transfer			◆		◆
Veneer and Wood Drying					◆
Washers and Degreasers				◆	

NOTES

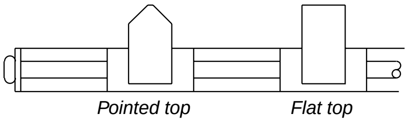
1-Inch Pitch
Flat Wire—Standard Duty—FWA1

Technical Specifications	Units	
Available Materials		Stainless, carbon, and galvanized steels
Rod Diameter	in. (mm)	12 gauge, 0.106 (2.7)
Picket Dimension	in. (mm)	0.375 high x 0.046 thick (9.5 x 1.2)
Nominal Mesh Opening	in. (mm)	1.00 x 1.00 (25.4 x 25.4)
Edge Treatment	in. (mm)	Clinched
Available Widths	in. (mm)	4.50–208.00 (114.3–5283.2)
Conveying Surface	in. (mm)	Full belt width minus 0.25 (6.4)
Longitudinal Pitch	in. (mm)	1.07 (27.2)
Weight	lb/ft² (kg/m²)	1.69 (8.3)
Open Area		78%
Maximum Allowable Tension	lb/ft (kg/m)	350 (522)
Maximum Temperature	°F (°C)	Galvanized: 240 (115) Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 12 (304.8) diameter flat-faced drum

Available Options

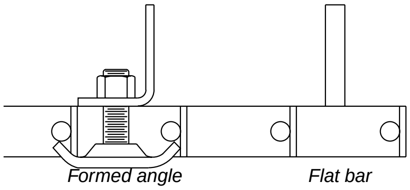
Pin-up Attachments
Pin-up attachments are flat wire strips that lift the product from the belt surface to prevent undesirable marking. They can also be used to keep the product from sliding on inclines or declines.

Limits for Use:
- Maximum height above belt surface is 0.38" (9.5 mm)
- Belt must be supported so that the pin-up can pass through the return path



Lifts
Lift attachments keep the product from sliding on inclines or declines. The formed angle lift uses a flight clip to fasten it to the belt. The flat bar lift is welded to the belt.

Limits for Use:
- Maximum Lift Width: Belt Width: 0.5" (12.7 mm)
- Lift Thickness: Normal limits are no greater than 0.18" (4.8 mm) or smaller than 0.06" (1.52 mm)
- Lift Height: Check with Engineering if greater than 6" (152 mm)
- Minimum Lift Spacing: 2" (50.8 mm)
- Belt must be supported so that the lift can pass through the return path



Cast Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	6 (2.72)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	10 (4.54)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	13 (5.90)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	21 (9.53)	12.64 (321.1)	3.50 (88.9)	0.75 (19.1)	3.00 (76.2)
#12	37	21 (9.53)	12.64 (321.1)	5.00 (127.0)	3.00 (76.2)	4.50 (114.3)

Stainless Steel Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	7 (3.18)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	9 (4.08)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	12 (5.44)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	22 (9.97)	12.64 (321.1)	5.00 (127.0)	1.50 (38.1)	4.50 (114.3)

UHMWPE Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#4	13	1 (0.45)	4.53 (115.1)	3.90 (99.06)	1.00 (25.4)	2.19 (55.6)
#6	18	2 (0.91)	6.24 (158.5)	5.65 (143.5)	1.00 (25.4)	3.75 (95.25)
#8	23	3 (1.36)	7.96 (202.2)	7.39 (187.7)	1.00 (25.4)	4.94 (125.5)
#10	31	5.5 (2.49)	10.72 (272.3)	10.16 (258.1)	1.00 (25.4)	7.13 (181.1)
#12	37	8 (3.63)	12.68 (322.1)	12.22 (310.4)	1.00 (25.4)	8.84 (224.5)

UHMWPE material type components have a 150º F (66º C) maximum operating temperature.
13 through 31 tooth sprockets must have tooth height reduced to 3/8” (9.5 mm) for use with standard weight belts.
*Maximum bore size listed for UHMWPE material is based on 1/2” (12.7) of material above keyway.

1-Inch Pitch

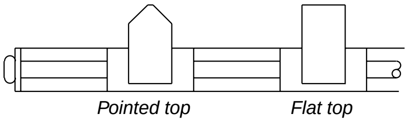
Flat Wire—Standard Duty—FWA2

Technical Specifications	Units	
Available Materials		Stainless, carbon, and galvanized steels
Rod Diameter	in. (mm)	12 gauge, 0.106 (2.7)
Picket Dimension		0.375 high x 0.046 thick (9.5 x 1.2)
Nominal Mesh Opening		1 x 1 (25.4 x 25.4)
Edge Treatment		Welded
Available Widths		4.50–204.00 (114.3–5181.6)
Conveying Surface		Full belt width minus 0.19 (4.8)
Longitudinal Pitch		1.07 (27.2)
Weight	lb/ft² (kg/m²)	1.69 (8.3)
Open Area		78%
Maximum Allowable Tension	lb/ft (kg/m)	350 (522)
Maximum Temperature	°F (°C)	Galvanized: 240 (115) Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 12 (304.8) diameter flat-faced drum

Available Options

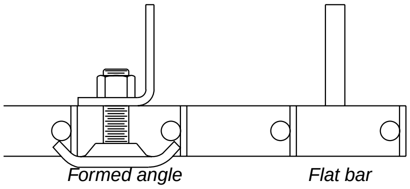
Pin-up Attachments
Pin-up attachments are flat wire strips that lift the product from the belt surface to prevent undesirable marking. They can also be used to keep the product from sliding on inclines or declines.

Limits for Use:
- Maximum height above belt surface is 0.38" (9.5 mm)
- Belt must be supported so that the pin-up can pass through the return path



Lifts
Lift attachments keep the product from sliding on inclines or declines. The formed angle lift uses a flight clip to fasten it to the belt. The flat bar lift is welded to the belt.

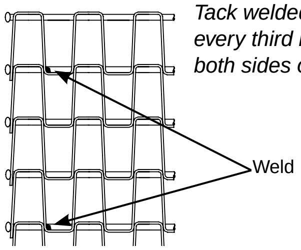
Limits for Use:
- Maximum Lift Width:
  Belt Width: 0.5" (12.7 mm)
- Lift Thickness: Normal limits are no greater than 0.18" (4.8 mm) or smaller than 0.06" (1.52 mm)
- Lift Height: Check with Engineering if greater than 6" (152 mm)
- Minimum Lift Spacing: 2" (50.8 mm)
- Belt must be supported so that the lift can pass through the return path



Tack Welding (available on welded-edge belts only)

This process prevents picket compression which results in a narrowing of the belt. This is related to high tension typically associated with belt widths of 60" (1524 mm) and greater. For belts less than 60" (1524 mm) wide, tack welding is a customer requested option. For belts 60" or wider, this option is standard, unless otherwise requested by the customer.

Normally, two tack welds per pitch are located in the second opening from each belt edge. For belt widths 60" (1524 mm) through 144" (3657.6 mm), belts are welded every third longitudinal pitch. For belt widths 144" (3657.6 mm) or greater, tack welds are placed at every longitudinal pitch.



Cast Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	6 (2.72)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	10 (4.54)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	13 (5.90)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	21 (9.53)	12.64 (321.1)	3.50 (88.9)	0.75 (19.1)	3.00 (76.2)
#12	37	21 (9.53)	12.64 (321.1)	5.00 (127.0)	3.00 (76.2)	4.50 (114.3)

Stainless Steel Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	7 (3.18)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	9 (4.08)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	12 (5.44)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	22 (9.97)	12.64 (321.1)	5.00 (127.0)	1.50 (38.1)	4.50 (114.3)

UHMWPE Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#4	13	1 (0.45)	4.53 (115.1)	3.90 (99.06)	1.00 (25.4)	2.19 (55.6)
#6	18	2 (0.91)	6.24 (158.5)	5.65 (143.5)	1.00 (25.4)	3.75 (95.25)
#8	23	3 (1.36)	7.96 (202.2)	7.39 (187.7)	1.00 (25.4)	4.94 (125.5)
#10	31	5.5 (2.49)	10.72 (272.3)	10.16 (258.1)	1.00 (25.4)	7.13 (181.1)
#12	37	8 (3.63)	12.68 (322.1)	12.22 (310.4)	1.00 (25.4)	8.84 (224.5)

UHMWPE material type components have a 150º F (66º C) maximum operating temperature.
13 through 31 tooth sprockets must have tooth height reduced to 3/8" (9.5 mm) for use with standard weight belts.
*Maximum bore size listed for UHMWPE material is based on 1/2" (12.7) of material above keyway.

1-Inch Pitch

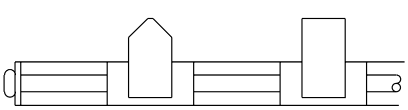
Flat Wire—Standard Duty—FWA3

Technical Specifications	Unit	
Available Materials		Stainless, carbon, and galvanized steels
Rod Diameter		12 gauge, 0.106 (2.7)
Picket Dimension		0.375 high x 0.046 thick (9.5 x 1.2)
Nominal Mesh Opening		0.50 x 1.00 (12.7 x 25.4)
Edge Treatment	in. (mm)	Clinched
Available Widths		3.50–208.00 (88.9–5283.2)
Conveying Surface		Full belt width minus 0.25 (6.4)
Longitudinal Pitch		1.07 (27.2)
Weight	lb/ft² (kg/m²)	2 (9.8)
Open Area		77%
Maximum Allowable Tension	lb/ft (kg/m)	500 (745)
Maximum Temperature	°F (°C)	Galvanized: 240 (115) Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 12 (304.8) diameter flat-faced drum

Available Options

Pin-up Attachments
Pin-up attachments are flat wire strips that lift the product from the belt surface to prevent undesirable marking. They can also be used to keep the product from sliding on inclines or declines.

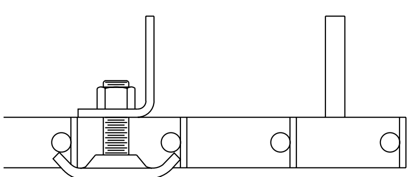
Limits for Use:
- Maximum height above belt surface is 0.38" (9.5 mm)
- Belt must be supported so that the pin-up can pass through the return path



Pointed top   *Flat top*

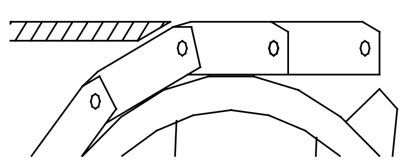
Lifts
Lift attachments keep the product from sliding on inclines or declines. The formed angle lift uses a flight clip to fasten it to the belt. The flat bar lift is welded to the belt.

Limits for Use:
- Maximum Lift Width:
  Belt Width: 0.5" (12.7 mm)
- Lift Thickness: Normal limits are no greater than 0.18" (4.8 mm) or smaller than 0.06" (1.52 mm)
- Lift Height: Check with Engineering if greater than 6" (152 mm)
- Minimum Lift Spacing: 2" (50.8 mm)
- Belt must be supported so that the lift can pass through the return path



Formed angle   *Flat bar*

Beveled Edges
Beveling the edge of the flat wire pickets facilitates product transfer by eliminating or reducing tippage of sharp edge cans or bottles. This option offers advantages on all transfer operations where the terminal roll or sprocket diameter is smaller than 10" (254 mm).



Beveled edge on top surface only

Cast Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	6 (2.72)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	10 (4.54)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	13 (5.90)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	21 (9.53)	12.64 (321.1)	3.50 (88.9)	0.75 (19.1)	3.00 (76.2)
#12	37	21 (9.53)	12.64 (321.1)	5.00 (127.0)	3.00 (76.2)	4.50 (114.3)

Stainless Steel Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	7 (3.18)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	9 (4.08)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	12 (5.44)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	22 (9.97)	12.64 (321.1)	5.00 (127.0)	1.50 (38.1)	4.50 (114.3)

UHMWPE Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Hub Width in. (mm)	Bore Max.* in. (mm)
#4	13	1 (0.45)	4.53 (115.1)	3.90 (99.06)	2.00 (50.8)	2.19 (55.6)
#6	18	2 (0.91)	6.24 (158.5)	5.65 (143.5)	2.00 (50.8)	3.75 (95.25)
#8	23	3 (1.36)	7.96 (202.2)	7.39 (187.7)	2.00 (50.8)	4.94 (125.5)
#10	31	5.5 (2.49)	10.72 (272.3)	10.16 (258.1)	2.00 (50.8)	7.13 (181.1)
#12	37	8 (3.63)	12.68 (322.1)	12.22 (310.4)	2.00 (50.8)	8.84 (224.5)

UHMWPE material type components have a 150º F (66º C) maximum operating temperature.
13 through 31 tooth sprockets must have tooth height reduced to 3/8” (9.5 mm) for use with standard weight belts.
*Maximum bore size listed for UHMWPE material is based on 1/2” (12.7) of material above keyway.

1-Inch Pitch

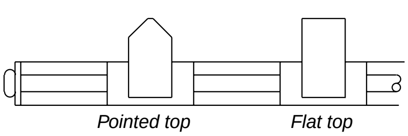
Flat Wire—Standard Duty—FWA4

Technical Specifications	Units	
Available Materials		Stainless, carbon, and galvanized steels
Rod Diameter		12 gauge, 0.106 (2.7)
Picket Dimension		0.375 high x 0.046 thick (9.5 x 1.2)
Nominal Mesh Opening		0.50 x 1.00 (12.7 x 25.4)
Edge Treatment	in. (mm)	Welded
Available Widths		3.50–204.00 (88.9–5181.6)
Conveying Surface		Full belt width minus 0.19 (4.8)
Longitudinal Pitch		1.07 (27.2)
Weight	lb/ft² (kg/m²)	2 (9.8)
Open Area		77%
Maximum Allowable Tension	lb/ft (kg/m)	500 (745)
Maximum Temperature	°F (°C)	Galvanized: 240 (115) Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 12 (304.8) diameter flat-faced drum

Available Options

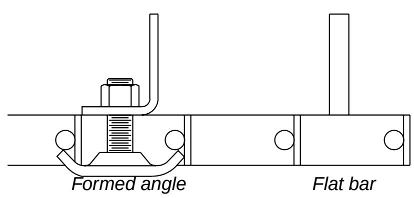
Pin-up Attachments
Pin-up attachments are flat wire strips that lift the product from the belt surface to prevent undesirable marking. They can also be used to keep the product from sliding on inclines or declines.

Limits for Use:
- Maximum height above belt surface is 0.38" (9.5 mm)
- Belt must be supported so that the pin-up can pass through the return path

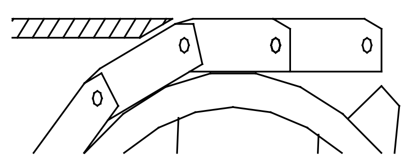


Lifts
Lift attachments keep the product from sliding on inclines or declines. The formed angle lift uses a flight clip to fasten it to the belt. The flat bar lift is welded to the belt.

Limits for Use:
- Maximum Lift Width: Belt Width: 0.5" (12.7 mm)
- Lift Thickness: Normal limits are no greater than 0.18" (4.8 mm) or smaller than 0.06" (1.52 mm)
- Lift Height: Check with Engineering if greater than 6" (152 mm)
- Minimum Lift Spacing: 2" (50.8 mm)
- Belt must be supported so that the lift can pass through the return path



Beveled Edges
Beveling the edge of the flat wire pickets facilitates product transfer by eliminating or reducing tippage of sharp edge cans or bottles. This option offers advantages on all transfer operations where the terminal roll or sprocket diameter is smaller than 10" (254 mm).



Beveled edge on top surface only

Cast Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	6 (2.72)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	10 (4.54)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	13 (5.90)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	21 (9.53)	12.64 (321.1)	3.50 (88.9)	0.75 (19.1)	3.00 (76.2)
#12	37	21 (9.53)	12.64 (321.1)	5.00 (127.0)	3.00 (76.2)	4.50 (114.3)

Stainless Steel Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	7 (3.18)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	9 (4.08)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	12 (5.44)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	22 (9.97)	12.64 (321.1)	5.00 (127.0)	1.50 (38.1)	4.50 (114.3)

UHMWPE Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#4	13	1 (0.45)	4.53 (115.1)	3.90 (99.06)	1.00 (25.4)	2.19 (55.6)
#6	18	2 (0.91)	6.24 (158.5)	5.65 (143.5)	1.00 (25.4)	3.75 (95.25)
#8	23	3 (1.36)	7.96 (202.2)	7.39 (187.7)	1.00 (25.4)	4.94 (125.5)
#10	31	5.5 (2.49)	10.72 (272.3)	10.16 (258.1)	1.00 (25.4)	7.13 (181.1)
#12	37	8 (3.63)	12.68 (322.1)	12.22 (310.4)	1.00 (25.4)	8.84 (224.5)

UHMWPE material type components have a 150º F (66º C) maximum operating temperature.
13 through 31 tooth sprockets must have tooth height reduced to 3/8” (9.5 mm) for use with standard weight belts.
*Maximum bore size listed for UHMWPE material is based on 1/2” (12.7) of material above keyway.

½-Inch Pitch

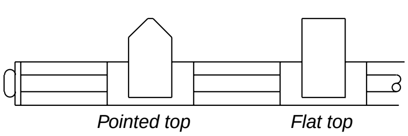
Flat Wire—Standard Duty—FWA5

Technical Specifications	Units	
Available Materials		Stainless, carbon, and galvanized steels
Rod Diameter	in. (mm)	12 gauge, 0.106 (2.7)
Picket Dimension		0.375 high x 0.046 thick (9.5 x 1.2)
Nominal Mesh Opening		0.50 x 0.50" (12.7 x 12.7)
Edge Treatment		Welded
Available Widths		3.50–204.00 (88.9–5181.6)
Conveying Surface		Full belt width minus 0.19 (4.8)
Longitudinal Pitch		0.54 (13.7)
Weight	lb/ft² (kg/m²)	3.03 (14.8)
Open Area		65%
Maximum Allowable Tension	lb/ft (kg/m)	500 (745)
Maximum Temperature	°F (°C)	Galvanized: 240 (115) Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 7.50 (190.5) diameter flat-faced drum

Available Options

Pin-up Attachments
Pin-up attachments are flat wire strips that lift the product from the belt surface to prevent undesirable marking. They can also be used to keep the product from sliding on inclines or declines.

Limits for Use:
- Maximum height above belt surface is 0.38" (9.5 mm)
- Belt must be supported so that the pin-up can pass through the return path



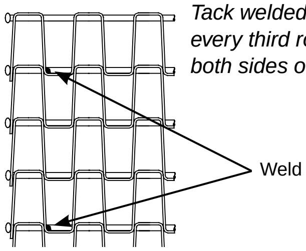
Lifts
Lift attachments keep the product from sliding on inclines or declines. The flat bar lift is welded to the belt.

Limits for Use:
- Maximum Lift Width: Belt Width: 0.5" (12.7 mm)
- Lift Thickness: Normal limits are no greater than 0.18" (4.8 mm) or smaller than 0.06" (1.52 mm)
- Lift Height: Check with Engineering if greater than 6" (152 mm)
- Minimum Lift Spacing: 2" (50.8 mm)
- Belt must be supported so that the lift can pass through the return path

Tack Welding (available on welded-edge belts only)

This process prevents picket compression, which results in a narrowing of the belt. This is related to high tension typically associated with belt widths of 60" (1524 mm) and greater. For belts less than 60" (1524 mm) wide, tack welding is a customer requested option. For belts 60" or wider, this option is standard, unless otherwise requested by the customer.

Normally, two tack welds per pitch are located in the second opening from each belt edge. For belt widths 60" (1524 mm) through 144" (3657.6 mm), belts are welded every third longitudinal pitch. For belt widths 144" (3657.6 mm) or greater, tack welds are placed at every longitudinal pitch.



Tack welded on every third rod on both sides of belt

Machined Cast Iron Dual Tooth Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	22	4 (1.81)	3.81 (96.8)	3.39 (86.1)	0.75 (19.1)	2.25 (57.2)
#6	38	12 (5.44)	6.56 (166.6)	6.17 (156.7)	0.75 (19.1)	4.00 (101.6)
#8	46	14 (6.35)	7.94 (201.7)	7.59 (192.8)	1.00 (25.4)	3.00 (76.2)
#10	62	19 (8.62)	10.70 (271.8)	10.32 (262.1)	1.25 (31.75)	4.00 (101.6)

Machined Stainless Steel Dual Tooth Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	22	4 (1.81)	3.81 (96.8)	3.39 (86.1)	0.75 (19.1)	2.25 (57.2)
#6	38	12 (5.44)	6.56 (166.6)	6.17 (156.7)	0.75 (19.1)	4.00 (101.6)

UHMWPE Single Tooth Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max* in. (mm)
#4	22	0.5 (0.23)	3.81 (96.8)	1.00 (25.4)	0.75 (19.1)	2.25 (57.2)
#6	38	1 (0.45)	6.56 (166.6)	1.00 (25.4)	0.75 (19.1)	4.00 (101.6)
#8	46	3 (1.36)	7.94 (201.7)	2.00 (50.8)	1.00 (25.4)	5.00 (127.0)

UHMWPE material type components have a 150º F (66º C) maximum operating temperature.
*Maximum bore size listed for UHMWPE material is based on 1/2 ” (12.7) of material above keyway.

½-Inch Pitch

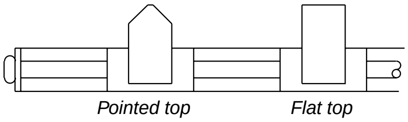
Flat Wire-Standard Duty-FWA5SC

Technical Specifications	Units	
Available Materials		Stainless or carbon steel
Rod Diameter	in. (mm)	12 gauge, 0.106 (2.7)
Picket Dimension	in. (mm)	0.375 high x 0.046 thick (9.5 x 1.2)
Nominal Mesh Opening	in. (mm)	0.50 x 0.50" (12.7 x 12.7)
Edge Treatment	in. (mm)	Welded
Available Widths	in. (mm)	3.50–208.00 (88.9–5283.2)
Conveying Surface	in. (mm)	Full belt width minus 0.19 (4.8)
Longitudinal Pitch	in. (mm)	0.54 (13.7)
Weight	lb/ft² (kg/m²)	3.03 (14.8)
Open Area		65%
Maximum Allowable Tension	lb/ft (kg/m)	500 (745)
Maximum Temperature	°F (°C)	Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 7.50 (190.5) diameter flat-faced drum

Available Options

Pin-up Attachments
Pin-up attachments are flat wire strips that lift the product from the belt surface to prevent undesirable marking. They can also be used to keep the product from sliding on inclines or declines.

Limits for Use:
- Maximum height above belt surface is 0.38" (9.5 mm)
- Belt must be supported so that the pin-up can pass through the return path



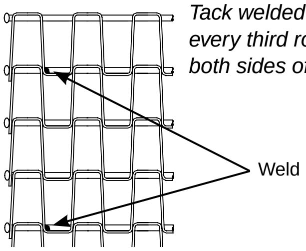
Lifts
Lift attachments keep the product from sliding on inclines or declines. The flat bar lift is welded to the belt.

Limits for Use:
- Maximum Lift Width:
  Belt Width: 0.5" (12.7 mm)
- Lift Thickness: Normal limits are no greater than 0.18" (4.8 mm) or smaller than 0.06" (1.52 mm)
- Lift Height: Check with Engineering if greater than 6" (152 mm)
- Minimum Lift Spacing: 2" (50.8 mm)
- Belt must be supported so that the lift can pass through the return path

Tack Welding (available on welded-edge belts only)

This process prevents picket compression, which results in a narrowing of the belt. This is related to high tension typically associated with belt widths of 60" (1524 mm) and greater. For belts less than 60" (1524 mm) wide, tack welding is a customer requested option. For belts 60" or wider, this option is standard, unless otherwise requested by the customer.

Normally, two tack welds per pitch are located in the second opening from each belt edge. For belt widths 60" (1524 mm) through 144" (3657.6 mm), belts are welded every third longitudinal pitch. For belt widths 144" (3657.6 mm) or greater, tack welds are placed at every longitudinal pitch.



Tack welded on every third rod on both sides of belt

Machined Steel or Stainless Tooth Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	22	4 (1.81)	3.81 (96.8)	2.0 (50.8)	0.75 (19.1)	2.25 (57.2)
#6	38	12 (5.44)	6.56 (166.6)	2.0 (50.8)	0.75 (19.1)	4.00 (101.6)

UHMWPE Single Tooth Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max* in. (mm)
#4	22	0.5 (0.23)	3.81 (96.8)	1.00 (25.4)	0.75 (19.1)	2.25 (57.2)
#6	38	1 (0.45)	6.56 (166.6)	1.00 (25.4)	0.75 (19.1)	4.00 (101.6)
#8	46	3 (1.36)	7.94 (201.7)	2.00 (50.8)	1.00 (25.4)	5.00 (127.0)

UHMWPE material type components have a 150º F (66º C) maximum operating temperature.
*Maximum bore size listed for UHMWPE material is based on 1/2 ” (12.7) of material above keyway.

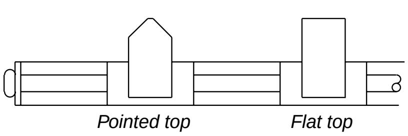
1-Inch Pitch
Flat Wire—Standard Duty—FWB1

Technical Specifications	Units	
Available Materials		Stainless, carbon, and galvanized steels
Rod Diameter	in. (mm)	11 gauge, 0.121 (3.1)
Picket Dimension		0.375 high x 0.046 thick (9.5 x 1.2)
Nominal Mesh Opening		1.00 x 1.00 (25.4 x 25.4)
Edge Treatment		Clinched
Available Widths		4.50–208.00 (114.3–5283.2)
Conveying Surface		Full belt width minus 0.25 (6.4)
Longitudinal Pitch		1.07 (27.2)
Weight	lb/ft² (kg/m²)	1.87 (9.1)
Open Area		77%
Maximum Allowable Tension	lb/ft (kg/m)	420 (626)
Maximum Temperature	°F (°C)	Galvanized: 240 (115) Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 12 (305) diameter flat-faced drum

Available Options

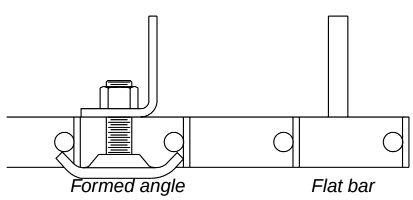
Pin-up Attachments
Pin-up attachments are flat wire strips that lift the product from the belt surface to prevent undesirable marking. They can also be used to keep the product from sliding on inclines or declines.

Limits for Use:
- Maximum height above belt surface is 0.38" (9.5 mm)
- Belt must be supported so that the pin-up can pass through the return path



Lifts
Lift attachments keep the product from sliding on inclines or declines. The formed angle lift uses a flight clip to fasten it to the belt. The flat bar lift is welded to the belt.

Limits for Use:
- Maximum Lift Width: Belt Width: 0.5" (12.7 mm)
- Lift Thickness: Normal limits are no greater than 0.18" (4.8 mm) or smaller than 0.06" (1.52 mm)
- Lift Height: Check with Engineering if greater than 6" (152 mm)
- Minimum Lift Spacing: 2" (50.8 mm)
- Belt must be supported so that the lift can pass through the return path



Cast Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	6 (2.72)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	10 (4.54)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	13 (5.90)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	21 (9.53)	12.64 (321.1)	3.50 (88.9)	0.75 (19.1)	3.00 (76.2)
#12	37	21 (9.53)	12.64 (321.1)	5.00 (127.0)	3.00 (76.2)	4.50 (114.3)

Stainless Steel Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	7 (3.18)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	9 (4.08)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	12 (5.44)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	22 (9.98)	12.64 (321.1)	5.00 (127.0)	1.50 (38.1)	4.50 (114.3)

UHMWPE Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#4	13	1 (0.45)	4.53 (115.1)	3.90 (99.06)	1.00 (25.4)	2.19 (55.6)
#6	18	2 (0.91)	6.24 (158.5)	5.65 (143.5)	1.00 (25.4)	3.75 (95.25)
#8	23	3 (1.36)	7.96 (202.2)	7.39 (187.7)	1.00 (25.4)	4.94 (125.5)
#10	31	5.5 (2.49)	10.72 (272.3)	10.16 (258.1)	1.00 (25.4)	7.13 (181.1)
#12	37	8 (3.63)	12.68 (322.1)	12.22 (310.4)	1.00 (25.4)	8.84 (224.5)

UHMWPE material type components have a 150º F (66º C) maximum operating temperature.
13 through 31 tooth sprockets must have tooth height reduced to 3/8” (9.5 mm) for use with standard weight belts.
*Maximum bore size listed for UHMWPE material is based on 1/2” (12.7) of material above keyway.

STRAIGHT PRODUCTS

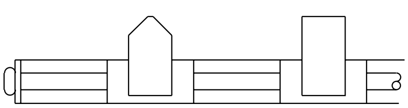
1-Inch Pitch
Flat Wire—Standard Duty—FWB2

Technical Specifications	Units	
Available Materials		Stainless, carbon, and galvanized steels
Rod Diameter	in. (mm)	11 gauge, 0.121 (3.1)
Picket Dimension		0.375 high x 0.046 thick (9.5 x 1.2)
Nominal Mesh Opening		1.00 x 1.00 (25.4 x 25.4)
Edge Treatment		Welded
Available Widths		4.50–204.00 (114.3–5181.6)
Conveying Surface		Full belt width minus 0.25 (6.4)
Longitudinal Pitch		1.07 (27.2)
Weight	lb/ft² (kg/m²)	1.82 (8.9)
Open Area		77%
Maximum Allowable Tension	lb/ft (kg/m)	420 (626)
Maximum Temperature	°F (°C)	Galvanized: 240 (115) Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 12 (304.8) diameter flat-faced drum

Available Options

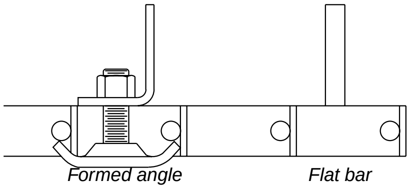
Pin-up Attachments
Pin-up attachments are flat wire strips that lift the product from the belt surface to prevent undesirable marking. They can also be used to keep the product from sliding on inclines or declines.

Limits for Use:
- Maximum height above belt surface is 0.38" (9.5 mm)
- Belt must be supported so that the pin-up can pass through the return path



Lifts
Lift attachments keep the product from sliding on inclines or declines. The formed angle lift uses a flight clip to fasten it to the belt. The flat bar lift is welded to the belt.

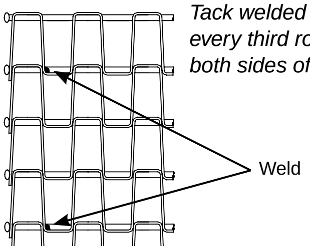
Limits for Use:
- Maximum Lift Width: Belt Width: 0.5" (12.7 mm)
- Lift Thickness: Normal limits are no greater than 0.18" (4.8 mm) or smaller than 0.06" (1.52 mm)
- Lift Height: Check with Engineering if greater than 6" (152 mm)
- Minimum Lift Spacing: 2" (50.8 mm)
- Belt must be supported so that the lift can pass through the return path



Tack Welding (available on welded-edge belts only)

This process prevents picket compression, which results in a narrowing of the belt. This is related to high tension typically associated with belt widths of 60" (1524 mm) and greater. For belts less than 60" (1524 mm) wide, tack welding is a customer requested option. For belts 60" or wider, this option is standard, unless otherwise requested by the customer.

Normally, two tack welds per pitch are located in the second opening from each belt edge. For belt widths 60" (1524 mm) through 144" (3657.6 mm), belts are welded every third longitudinal pitch. For belt widths 144" (3657.6 mm) or greater, tack welds are placed at every longitudinal pitch.



Tack welded on every third rod on both sides of belt

Cast Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	6 (2.72)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	10 (4.54)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	13 (5.90)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	21 (9.53)	12.64 (321.1)	3.50 (88.9)	0.75 (19.1)	3.00 (76.2)
#12	37	21 (9.53)	12.64 (321.1)	5.00 (127.0)	3.00 (76.2)	4.50 (114.3)

Stainless Steel Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	7 (3.18)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	9 (4.08)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	12 (5.44)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	22 (9.98)	12.64 (321.1)	5.00 (127.0)	1.50 (38.1)	4.50 (114.3)

UHMWPE Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#4	13	1 (0.45)	4.53 (115.1)	3.90 (99.06)	1.00 (25.4)	2.19 (55.6)
#6	18	2 (0.91)	6.24 (158.5)	5.65 (143.5)	1.00 (25.4)	3.75 (95.25)
#8	23	3 (1.36)	7.96 (202.2)	7.39 (187.7)	1.00 (25.4)	4.94 (125.5)
#10	31	5.5 (2.49)	10.72 (272.3)	10.16 (258.1)	1.00 (25.4)	7.13 (181.1)
#12	37	8 (3.63)	12.68 (322.1)	12.22 (310.4)	1.00 (25.4)	8.84 (224.5)

UHMWPE material type components have a 150º F (66º C) maximum operating temperature.
13 through 31 tooth sprockets must have tooth height reduced to 3/8" (9.5 mm) for use with standard weight belts.
*Maximum bore size listed for UHMWPE material is based on 1/2" (12.7) of material above keyway.

STRAIGHT PRODUCTS

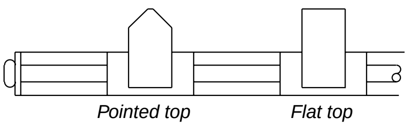
1-Inch Pitch
Flat Wire—Standard Duty—FWB3

Technical Specifications	Units	
Available Materials		Stainless, carbon, and galvanized steels
Rod Diameter	in. (mm)	11 gauge, 0.121 (3.1)
Picket Dimension		0.375 high x 0.046 thick (9.5 x 1.2)
Nominal Mesh Opening		0.5 x 1 (12.7 x 25.4)
Edge Treatment		Clinched
Available Widths		3.50–208.00 (88.9–5283.2)
Conveying Surface		Full belt width minus 0.25 (6.4)
Longitudinal Pitch		1.07 (27.2)
Weight	lb/ft² (kg/m²)	2.19 (10.71)
Open Area		76%
Maximum Allowable Tension	lb/ft (kg/m)	600 (895)
Maximum Temperature	°F (°C)	Galvanized: 240 (115) Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 12 (304.8) diameter flat-faced drum

Available Options

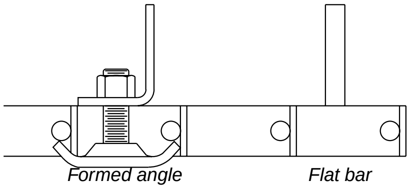
Pin-up Attachments
Pin-up attachments are flat wire strips that lift the product from the belt surface to prevent undesirable marking. They can also be used to keep the product from sliding on inclines or declines.

Limits for Use:
- Maximum height above belt surface is 0.38" (9.5 mm)
- Belt must be supported so that the pin-up can pass through the return path

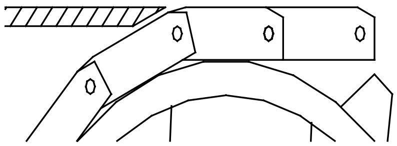


Lifts
Lift attachments keep the product from sliding on inclines or declines. The formed angle lift uses a flight clip to fasten it to the belt. The flat bar lift is welded to the belt.

Limits for Use:
- Maximum Lift Width: Belt Width: 0.5" (12.7 mm)
- Lift Thickness: Normal limits are no greater than 0.18" (4.8 mm) or smaller than 0.06" (1.52 mm)
- Lift Height: Check with Engineering if greater than 6" (152 mm)
- Minimum Lift Spacing: 2" (50.8 mm)
- Belt must be supported so that the lift can pass through the return path



Beveled Edges
Beveling the edge of the flat wire pickets facilitates product transfer by eliminating or reducing tippage of sharp edge cans or bottles. This option offers advantages on all transfer operations where the terminal roll or sprocket diameter is smaller than 10" (254 mm).



Beveled edge on top surface only

Cast Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	6 (2.72)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	10 (4.54)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	13 (5.90)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	21 (9.53)	12.64 (321.1)	3.50 (88.9)	0.75 (19.1)	3.00 (76.2)
#12	37	21 (9.53)	12.64 (321.1)	5.00 (127.0)	3.00 (76.2)	4.50 (114.3)

Stainless Steel Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	7 (3.18)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	9 (4.08)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	12 (5.44)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	22 (9.98)	12.64 (321.1)	5.00 (127.0)	1.50 (38.1)	4.50 (114.3)

UHMWPE Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#4	13	1 (0.45)	4.53 (115.1)	3.90 (99.06)	1.00 (25.4)	2.19 (55.6)
#6	18	2 (0.91)	6.24 (158.5)	5.65 (143.5)	1.00 (25.4)	3.75 (95.25)
#8	23	3 (1.36)	7.96 (202.2)	7.39 (187.7)	1.00 (25.4)	4.94 (125.5)
#10	31	5.5 (2.49)	10.72 (272.3)	10.16 (258.1)	1.00 (25.4)	7.13 (181.1)
#12	37	8 (3.63)	12.68 (322.1)	12.22 (310.4)	1.00 (25.4)	8.84 (224.5)

UHMWPE material type components have a 150º F (66º C) maximum operating temperature.
13 through 31 tooth sprockets must have tooth height reduced to 3/8" (9.5 mm) for use with standard weight belts.
*Maximum bore size listed for UHMWPE material is based on 1/2" (12.7) of material above keyway.

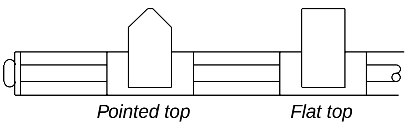
1-Inch Pitch
Flat Wire—Standard Duty—FWB4

Technical Specifications	Units	
Available Materials		Stainless, carbon, and galvanized steels, high temperature alloys
Rod Diameter	in. (mm)	11 gauge, 0.121 (3.1)
Picket Dimension		0.375 high x 0.046 thick (9.5 x 1.2)
Nominal Mesh Opening		0.5 x 1 (12.7 x 25.4)
Edge Treatment		Welded
Available Widths		3.50–204.00 (88.9–5181.6)
Conveying Surface		Full belt width minus 0.19 (4.8)
Longitudinal Pitch		1.07 (27.2)
Weight	lb/ft² (kg/m²)	2.19 (10.7)
Open Area		76%
Maximum Allowable Tension	lb/ft (kg/m)	600 (895)
Maximum Temperature	°F (°C)	Galvanized: 240 (115) Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 12 (304.8) diameter flat-faced drum

Available Options

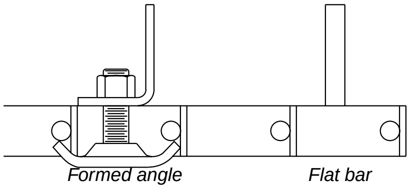
Pin-up Attachments
Pin-up attachments are flat wire strips that lift the product from the belt surface to prevent undesirable marking. They can also be used to keep the product from sliding on inclines or declines.

Limits for Use:
- Maximum height above belt surface is 0.38" (9.5 mm)
- Belt must be supported so that the pin-up can pass through the return path

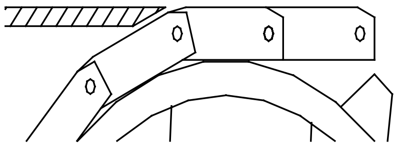


Lifts
Lift attachments keep the product from sliding on inclines or declines. The formed angle lift uses a flight clip to fasten it to the belt. The flat bar lift is welded to the belt.

Limits for Use:
- Maximum Lift Width: Belt Width: 0.5" (12.7 mm)
- Lift Thickness: Normal limits are no greater than 0.18" (4.8 mm) or smaller than 0.06" (1.52 mm)
- Lift Height: Check with Engineering if greater than 6" (152 mm)
- Minimum Lift Spacing: 2" (50.8 mm)
- Belt must be supported so that the lift can pass through the return path



Beveled Edges
Beveling the edge of the flat wire pickets facilitates product transfer by eliminating or reducing tippage of sharp edge cans or bottles. This option offers advantages on all transfer operations where the terminal roll or sprocket diameter is smaller than 10" (254 mm).



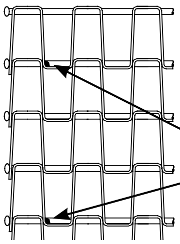
Beveled edge on top surface only

STRAIGHT PRODUCTS

Tack Welding (available on welded-edge belts only)

This process prevents picket compression, which results in a narrowing of the belt. This is related to high tension typically associated with belt widths of 60" (1524 mm) and greater. For belts less than 60" (1524 mm) wide, tack welding is a customer requested option. For belts 60" or wider, this option is standard, unless otherwise requested by the customer.

Normally, two tack welds per pitch are located in the second opening from each belt edge. For belt widths 60" (1524 mm) through 144" (3657.6 mm), belts are welded every third longitudinal pitch. For belt widths 144" (3657.6 mm) or greater, tack welds are placed at every longitudinal pitch.



Cast Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	6 (2.72)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	10 (4.54)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	13 (5.90)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	21 (9.53)	12.64 (321.1)	3.50 (88.9)	0.75 (19.1)	3.00 (76.2)
#12	37	21 (9.53)	12.64 (321.1)	5.00 (127.0)	3.00 (76.2)	4.50 (114.3)

Stainless Steel Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	7 (3.18)	4.47 (113.5)	3.98 (101.1)	0.75 (19.1)	2.63 (66.8)
#6	18	9 (4.08)	6.17 (156.7)	4.00 (101.6)	0.75 (19.1)	3.50 (88.9)
#8	23	12 (5.44)	7.89 (200.4)	5.00 (127.0)	0.75 (19.1)	4.50 (114.3)
#12	37	22 (9.98)	12.64 (321.1)	5.00 (127.0)	1.50 (38.1)	4.50 (114.3)

UHMWPE Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max.* in. (mm)
#4	13	1 (0.45)	4.53 (115.1)	3.90 (99.06)	1.00 (25.4)	2.19 (55.6)
#6	18	2 (0.91)	6.24 (158.5)	5.65 (143.5)	1.00 (25.4)	3.75 (95.25)
#8	23	3 (1.36)	7.96 (202.2)	7.39 (187.7)	1.00 (25.4)	4.94 (125.5)
#10	31	5.5 (2.49)	10.72 (272.3)	10.16 (258.1)	1.00 (25.4)	7.13 (181.1)
#12	37	8 (3.63)	12.68 (322.1)	12.22 (310.4)	1.00 (25.4)	8.84 (224.5)

UHMWPE material type components have a 150º F (66º C) maximum operating temperature.
13 through 31 tooth sprockets must have tooth height reduced to 3/8" (9.5 mm) for use with standard weight belts.
*Maximum bore size listed for UHMWPE material is based on 1/2" (12.7) of material above keyway.

½-Inch Pitch

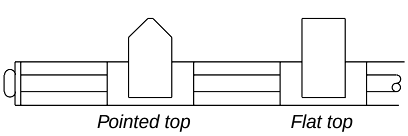
Flat Wire—Standard Duty—FWB5

Technical Specifications	Units	
Available Materials		Stainless, carbon, and galvanized steels
Rod Diameter	in. (mm)	11 gauge, 0.121 (3.1)
Picket Dimension		0.375 high x 0.046 thick (9.5 x 1.2)
Nominal Mesh Opening		0.5 x 0.5” (12.7 x 12.7)
Edge Treatment		Welded
Available Widths		3.50–204.00 (88.9–5181.6)
Conveying Surface		Full belt width minus 0.19 (4.8)
Longitudinal Pitch		0.54 (13.7)
Weight	lb/ft² (kg/m²)	3.18 (15.5)
Open Area		64%
Maximum Allowable Tension	lb/ft (kg/m)	600 (745)
Maximum Temperature	°F (°C)	Galvanized: 240 (115) Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 7.50 (190.5) diameter flat-faced drum

Available Options

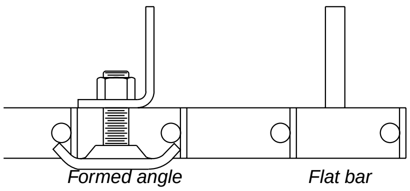
Pin-up Attachments
Pin-up attachments are flat wire strips that lift the product from the belt surface to prevent undesirable marking. They can also be used to keep the product from sliding on inclines or declines.

Limits for Use:
- Maximum height above belt surface is 0.38" (9.5 mm)
- Belt must be supported so that the pin-up can pass through the return path

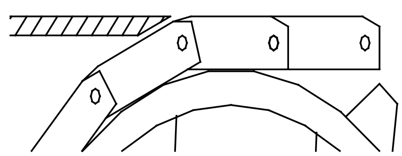


Lifts
Lift attachments keep the product from sliding on inclines or declines. The flat bar lift is welded to the belt.

Limits for Use:
- Maximum Lift Width: Belt Width: 0.5" (12.7 mm)
- Lift Thickness: Normal limits are no greater than 0.18" (4.8 mm) or smaller than 0.06" (1.52 mm)
- Lift Height: Check with Engineering if greater than 6" (152 mm)
- Minimum Lift Spacing: 2" (50.8 mm)
- Belt must be supported so that the lift can pass through the return path



Beveled Edges
Beveling the edge of the flat wire pickets facilitates product transfer by eliminating or reducing tippage of sharp edge cans or bottles. This option offers advantages on all transfer operations where the terminal roll or sprocket diameter is smaller than 10" (254 mm).

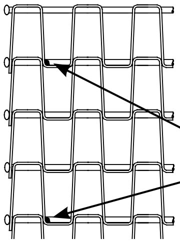


Beveled edge on top surface only

Tack Welding (available on welded-edge belts only)

This process prevents picket compression, which results in a narrowing of the belt. This is related to high tension typically associated with belt widths of 60" (1524 mm) and greater. For belts less than 60" (1524 mm) wide, tack welding is a customer requested option. For belts 60" or wider, this option is standard, unless otherwise requested by the customer.

Normally, two tack welds per pitch are located in the second opening from each belt edge. For belt widths 60" (1524 mm) through 144" (3657.6 mm), belts are welded every third longitudinal pitch. For belt widths 144" (3657.6 mm) or greater, tack welds are placed at every longitudinal pitch.



Machined Cast Iron Dual Tooth Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	22	6 (2.72)	3.81 (96.8)	3.39 (86.1)	0.75 (19.1)	2.25 (57.2)
#6	38	10 (4.54)	6.56 (166.6)	6.17 (156.7)	0.75 (19.1)	4.00 (101.6)
#8	46	13 (5.90)	7.94 (201.7)	7.59 (192.8)	1.00 (25.4)	3.00 (76.2)
#10	62	16 (7.26)	10.70 (271.8)	10.32 (262.1)	1.25 (31.75)	4.00 (101.6)

Machined Stainless Steel Dual Tooth Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	22	13 (5.90)	3.81 (96.8)	3.39 (86.1)	0.75 (19.1)	2.25 (57.2)
#6	38	18 (8.16)	6.56 (166.6)	6.17 (156.7)	0.75 (19.1)	4.00 (101.6)

UHMWPE Single Tooth Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max* in. (mm)
#4	22	0.5 (0.23)	3.81 (96.8)	3.39 (86.1)	0.75 (19.1)	2.25 (57.2)
#6	38	1 (0.45)	6.56 (166.6)	6.17 (156.7)	0.75 (19.1)	4.00 (101.6)
#8	46	3 (1.36)	7.94 (201.7)	7.55 (191.8)	1.00 (25.4)	5.00 (127.0)

UHMWPE material type components have a 150º F (66º C) maximum operating temperature.
*Maximum bore size listed for UHMWPE material is based on 1/2 ” (12.7) of material above keyway.

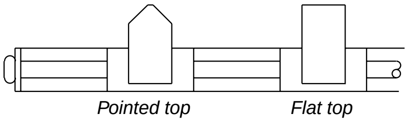
1-Inch Pitch
Flat Wire—Heavy Duty—FWC1

Technical Specifications	Units	
Available Materials		Stainless, carbon, and galvanized steels
Rod Diameter	in. (mm)	6 gauge, 0.192 (4.9)
Picket Dimension		0.500 high x 0.062 thick (12.7 x 1.6)
Nominal Mesh Opening		1.00 x 1.00” (25.4 x 25.4)
Edge Treatment		Welded
Available Widths		3.50–208.00 (88.9–5283.2)
Conveying Surface		Full belt width minus 0.25 (6.4)
Longitudinal Pitch		1.08 (27.4)
Weight	lb/ft² (kg/m²)	3.47 (16.9)
Open Area		68%
Maximum Allowable Tension	lb/ft (kg/m)	1350 (2013)
Maximum Temperature	°F (°C)	Galvanized: 240 (115) Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 12 (304.8) diameter flat-faced drum

Available Options

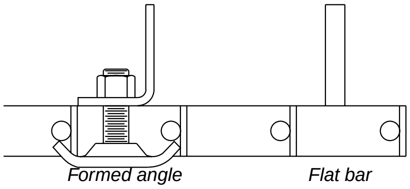
Pin-up Attachments
Pin-up attachments are flat wire strips that lift the product from the belt surface to prevent undesirable marking. They can also be used to keep the product from sliding on inclines or declines.

Limits for Use:
- Maximum height above belt surface is 0.38" (9.5 mm)
- Belt must be supported so that the pin-up can pass through the return path



Lifts
Lift attachments keep the product from sliding on inclines or declines. The formed angle lift uses a flight clip to fasten it to the belt. The flat bar lift is welded to the belt.

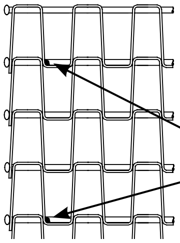
Limits for Use:
- Maximum Lift Width:
  Belt Width: 0.5" (12.7 mm)
- Lift Thickness: Normal limits are no greater than 0.18" (4.8 mm) or smaller than 0.06" (1.52 mm)
- Lift Height: Check with Engineering if greater than 6" (152 mm)
- Minimum Lift Spacing: 2" (50.8 mm)
- Belt must be supported so that the lift can pass through the return path



Tack Welding (available on welded-edge belts only)

This process prevents picket compression, which results in a narrowing of the belt. This is related to high tension typically associated with belt widths of 60" (1524 mm) and greater. For belts less than 60" (1524 mm) wide, tack welding is a customer requested option. For belts 60" or wider, this option is standard, unless otherwise requested by the customer.

Normally, two tack welds per pitch are located in the second opening from each belt edge. For belt widths 60" (1524 mm) through 144" (3657.6 mm), belts are welded every third longitudinal pitch. For belt widths 144" (3657.6 mm) or greater, tack welds are placed at every longitudinal pitch.



Tack welded on every third rod on both sides of belt

Cast Iron Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	6 (2.72)	4.53 (115.1)	3.91 (99.3)	0.75 (19.1)	2.63 (66.8)
#6	18	9 (4.08)	6.25 (158.8)	5.66 (143.8)	0.75 (19.1)	3.50 (88.9)
#8	23	12 (5.44)	7.97 (202.4)	7.41 (188.2)	1.00 (25.4)	4.50 (114.3)
#10	31	18 (8.16)	10.72 (272.3)	10.16 (258.1)	1.25 (31.8)	5.50 (139.7)

Stainless Steel Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	6 (2.72)	4.53 (115.1)	3.91 (99.3)	0.75 (19.1)	2.63 (66.8)
#6	18	9 (4.08)	6.25 (158.8)	5.66 (143.8)	0.75 (19.1)	3.50 (88.9)
#8	23	12 (5.44)	7.97 (202.4)	7.41 (188.2)	1.00 (25.4)	4.50 (114.3)

UHMWPE Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max* in. (mm)
#4	13	1 (0.45)	4.53 (115.1)	3.90 (99.1)	1.00 (25.4)	2.19 (55.6)
#6	18	2 (0.91)	6.24 (158.5)	5.65 (143.5)	1.00 (25.4)	3.75 (95.3)
#8	23	3 (1.36)	7.96 (202.2)	7.39 (187.7)	1.00 (25.4)	4.94 (125.5)
#10	31	5.5 (2.49)	10.72 (272.1)	10.16 (258.1)	1.00 (25.4)	7.13 (181.1)

UHMWPE material type components have a 150º F (66º C) maximum operating temperature.
*Maximum bore size listed for UHMWPE material is based on 1/2” (12.7) of material above keyway.

1-Inch Pitch

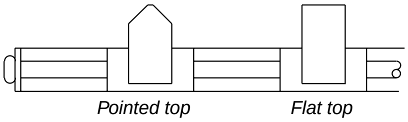
Flat Wire—Heavy Duty—FWC2

Technical Specifications	Units	
Available Materials		Stainless, carbon, and galvanized steels
Rod Diameter	in. (mm)	6 gauge, 0.192 (4.9)
Picket Dimension		0.500 high x 0.062 thick (12.7 x 1.6)
Nominal Mesh Opening		0.50 x 1.00" (12.7 x 25.4)
Edge Treatment		Welded
Available Widths		4.00–208.00 (101.6–5283.2)
Conveying Surface		Full belt width minus 0.25 (6.4)
Longitudinal Pitch		1.08 (27.4)
Weight	lb/ft² (kg/m²)	3.85 (18.8)
Open Area		62%
Maximum Allowable Tension	lb/ft (kg/m)	1750 (2609)
Maximum Temperature	°F (°C)	Galvanized: 240 (115) Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 12 (304.8) diameter flat-faced drum

Available Options

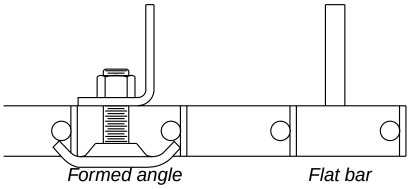
Pin-up Attachments
Pin-up attachments are flat wire strips that lift the product from the belt surface to prevent undesirable marking. They can also be used to keep the product from sliding on inclines or declines.

Limits for Use:
- Maximum height above belt surface is 0.38" (9.5 mm)
- Belt must be supported so that the pin-up can pass through the return path



Lifts
Lift attachments keep the product from sliding on inclines or declines. The formed angle lift uses a flight clip to fasten it to the belt. The flat bar lift is welded to the belt.

Limits for Use:
- Maximum Lift Width: Belt Width: 0.5" (12.7 mm)
- Lift Thickness: Normal limits are no greater than 0.18" (4.8 mm) or smaller than 0.06" (1.52 mm)
- Lift Height: Check with Engineering if greater than 6" (152 mm)
- Minimum Lift Spacing: 2" (50.8 mm)
- Belt must be supported so that the lift can pass through the return path

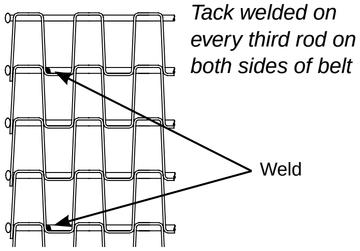


STRAIGHT PRODUCTS

Tack Welding (available on welded-edge belts only)

This process prevents picket compression, which results in a narrowing of the belt. This is related to high tension typically associated with belt widths of 60" (1524 mm) and greater. For belts less than 60" (1524 mm) wide, tack welding is a customer requested option. For belts 60" or wider, this option is standard, unless otherwise requested by the customer.

Normally, two tack welds per pitch are located in the second opening from each belt edge. For belt widths 60" (1524 mm) through 144" (3657.6 mm), belts are welded every third longitudinal pitch. For belt widths 144" (3657.6 mm) or greater, tack welds are placed at every longitudinal pitch.



Cast Iron Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	6 (2.72)	4.53 (115.1)	3.91 (99.3)	0.75 (19.1)	2.63 (66.8)
#6	18	9 (4.08)	6.25 (158.8)	5.66 (143.8)	0.75 (19.1)	3.50 (88.9)
#8	23	12 (5.44)	7.97 (202.4)	7.41 (188.2)	1.00 (25.4)	4.50 (114.3)
#10	31	18 (8.16)	10.72 (272.3)	10.16 (258.1)	1.25 (31.8)	5.50 (139.7)

Stainless Steel Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	6 (2.72)	4.53 (115.1)	3.91 (99.3)	0.75 (19.1)	2.63 (66.8)
#6	18	9 (4.08)	6.25 (158.8)	5.66 (143.8)	0.75 (19.1)	3.50 (88.9)
#8	23	12 (5.44)	7.97 (202.4)	7.41 (188.2)	1.00 (25.4)	4.50 (114.3)

UHMWPE Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max* in. (mm)
#4	13	1 (0.45)	4.53 (115.1)	3.90 (99.1)	1.00 (25.4)	2.19 (55.6)
#6	18	2 (0.91)	6.24 (158.5)	5.65 (143.5)	1.00 (25.4)	3.75 (95.3)
#8	23	3 (1.36)	7.96 (202.2)	7.39 (187.7)	1.00 (25.4)	4.94 (125.5)
#10	31	5.5 (2.49)	10.72 (272.1)	10.16 (258.1)	1.00 (25.4)	7.13 (181.1)

UHMWPE material type components have a 150° F (66° C) maximum operating temperature.
*Maximum bore size listed for UHMWPE material is based on 1/2” (12.7) of material above keyway.

▶▶ Flat Wire—Heavy Duty—FWC6 SB

Technical Specifications	Units	
Available Materials		Stainless, carbon, and galvanized steels
Rod Diameter	in. (mm)	6 gauge, 0.192 (4.9)
Picket Dimension		0.500 high x 0.062 thick (12.7 x 1.6)
Nominal Mesh Opening		0.50 x 0.50" (12.7 x 12.7)
Edge Treatment		Welded
Available Widths		4.00–208.00 (101.6–5283.2)
Conveying Surface		Full belt width minus 0.25 (6.4)
Longitudinal Pitch		1.08 (27.4)
Weight	lb/ft² (kg/m²)	5 (24.5)
Maximum Allowable Tension	lb/ft (kg/m)	1700 (2534)
Maximum Temperature	°F (°C)	Galvanized: 240 (115) Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 12 (305) diameter flat-faced drum

Notes

This belt is constructed with free-floating, mid-pitch rods that modify its nominally sized 0.5" x 0.5".

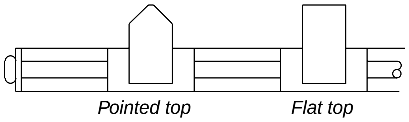
Available Options

Pin-up Attachments

Pin-up attachments are flat wire strips that lift the product from the belt surface to prevent undesirable marking. They can also be used to keep the product from sliding on inclines or declines.

Limits for Use:

- Maximum height above belt surface is 0.38" (9.5 mm)
- Belt must be supported so that the pin-up can pass through the return path

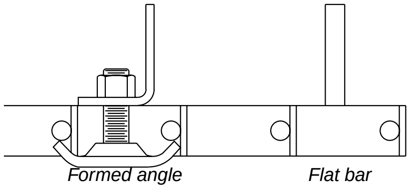


Lifts

Lift attachments keep the product from sliding on inclines or declines. The formed angle lift uses a flight clip to fasten it to the belt. The flat bar lift is welded to the belt.

Limits for Use:

- Maximum Lift Width: Belt Width: 0.5" (12.7 mm)
- Lift Thickness: Normal limits are no greater than 0.18" (4.8 mm) or smaller than 0.06" (1.52 mm)
- Lift Height: Check with Engineering if greater than 6" (152 mm)
- Minimum Lift Spacing: 2" (50.8 mm)
- Belt must be supported so that the lift can pass through the return path

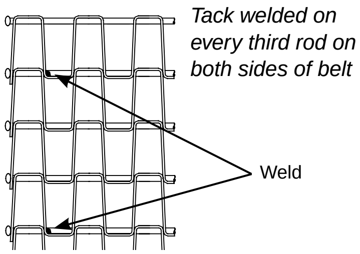


STRAIGHT PRODUCTS

Tack Welding (available on welded-edge belts only)

This process prevents picket compression, which results in a narrowing of the belt. This is related to high tension typically associated with belt widths of 60" (1524 mm) and greater. For belts less than 60" (1524 mm) wide, tack welding is a customer requested option. For belts 60" or wider, this option is standard, unless otherwise requested by the customer.

Normally, two tack welds per pitch are located in the second opening from each belt edge. For belt widths 60" (1524 mm) through 144" (3657.6 mm), belts are welded every third longitudinal pitch. For belt widths 144" (3657.6 mm) or greater, tack welds are placed at every longitudinal pitch.



Cast Iron Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	6 (2.72)	4.53 (115.1)	3.91 (99.3)	0.75 (19.1)	2.63 (66.8)
#6	18	9 (4.08)	6.25 (158.8)	5.66 (143.8)	0.75 (19.1)	3.50 (88.9)
#8	23	12 (5.44)	7.97 (202.4)	7.41 (188.2)	1.00 (25.4)	4.50 (114.3)
#10	31	18 (8.16)	10.72 (272.3)	10.16 (258.1)	1.25 (31.8)	5.50 (139.7)

Stainless Steel Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max in. (mm)
#4	13	6 (2.72)	4.53 (115.1)	3.91 (99.3)	0.75 (19.1)	2.63 (66.8)
#6	18	9 (4.08)	6.25 (158.8)	5.66 (143.8)	0.75 (19.1)	3.50 (88.9)
#8	23	12 (5.44)	7.97 (202.4)	7.41 (188.2)	1.00 (25.4)	4.50 (114.3)

UHMWPE Drive Sprockets

Nom. Size	Teeth	Weight lb. (kg)	Pitch Diameter in. (mm)	Hub Diameter in. (mm)	Bore Min. in. (mm)	Bore Max* in. (mm)
#4	13	1 (0.45)	4.53 (115.1)	3.90 (99.1)	1.00 (25.4)	2.19 (55.6)
#6	18	2 (0.91)	6.24 (158.5)	5.65 (143.5)	1.00 (25.4)	3.75 (95.3)
#8	23	3 (1.36)	7.96 (202.2)	7.39 (187.7)	1.00 (25.4)	4.94 (125.5)
#10	31	5.5 (2.49)	10.72 (272.1)	10.16 (258.1)	1.00 (25.4)	7.13 (181.1)

UHMWPE material type components have a 150° F (66° C) maximum operating temperature.
*Maximum bore size listed for UHMWPE material is based on 1/2” (12.7) of material above keyway.

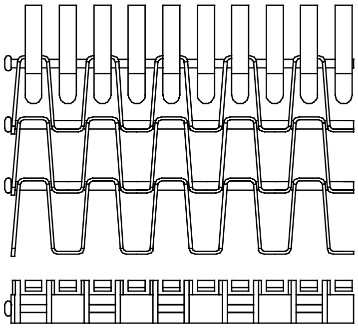
Flat Wire—EZ Transfer—FWH3

Technical Specifications	Units	
Available Materials		Stainless, carbon, and galvanized steels
Rod Diameter	in. (mm)	9 gauge, 0.15 (3.8)
Picket Dimension		3/4 x 0.054 thick (19.1 x 1.4)
Nominal Mesh Opening		0.50 x 1.00" (12.7 x 25.4)
Edge Treatment		Welded
Available Widths		4.80–178.00 (121.9–4521.2)
Conveying Surface		Full belt width minus 0.19 (4.8)
Longitudinal Pitch		1.08 (27.4)
Weight	lb/ft² (kg/m²)	4.38 (21.4)
Maximum Allowable Tension	lb/ft (kg/m)	780 (1163)
Maximum Temperature	°F (°C)	Galvanized: 240 (115) Carbon: 1000 (538) Stainless: 1100 (593)
Method of Drive	in. (mm)	Positively driven with matching sprockets or friction driven with a minimum 12 (304.8) diameter flat-faced drum

EZ Transfer Plate

The EZ Transfer Plate enables efficient transfers from the FWH3 belt to other conveyors.

Limits for Use:
- The belt's width must coincide with the width of the plate which is produced in standard modular widths.
- Proper clearance for the 0.75" (19.1 mm) thick belt and plate must also be observed.



Transfer plate fingers and belt

Width OA	No. of Loops	No. of Openings
4.80" (121.9 mm)	4	7
12.09" (307.1 mm)	10	19
24.31" (617.5 mm)	20	39
36.5" (927.1 mm)	30	59
48.72" (1237.5 mm)	40	79
60.91" (1547.1 mm)	50	99
73.09" (1856.5 mm)	60	119
85.34" (2167.6 mm)	70	139
97.5" (2476.5 mm)	80	159
109.72" (2786.9 mm)	90	179
121.63" (3089.4 mm)	100	199

Note: Manufacturing tolerances are above dimensions to the nearest 1/32" + zero–1/8.

Note: O.A. widths wider than shown = (No. loops–1) (1.22) + 1.136

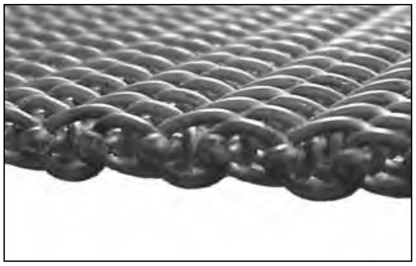
Note: Additional loop measurements can be calculated. Contact Ashworth Engineering for details.

▸▸ Cleatrac® Belt & Sprocket System

Technical Specifications	Units	
Available Materials		Stainless steel, carbon and galvanized steels, high temperature alloys
Available Widths	in. (mm)	1.50–168.00 (38.1–4267.2)
Conveying Surface	in. (mm)	Full belt width
Thickness (Mesh Dependent)	in. (mm)	0.16–0.35 (4.1–8.9)
Lateral Pitch (Mesh Dependent)	in. (mm)	0.20–0.67 (5.1–17.0)
Weight (Mesh Dependent)	lb/ft² (kg/m²)	0.67–1.58 (3.3–7.7)
Open Area (Mesh Dependent)		34–74%
Working Strength per Unit of Width	lb/ft (kg/m)	Up to 1100 (1640)
Maximum Temperature	°F (°C)	400 (204)
Minimum Temperature	°F (°C)	-40 (-40)
Construction		Balanced Weave
Method of Drive		Positively driven by a matching minimum diameter drive system consisting of sprockets, filler rolls and support bearings

Features

Welded Edge



Cleatrac® comes standard with welded edges (as shown above).

Fatigue Resistant Cleatrac

Fatigue Resistant Cleatrac (CTBFR) is Ashworth's newest offering in the Cleatrac Belt & Sprocket System family. Fatigue Resistant Cleatrac has up to 2.5 times the working strength of our normal Cleatrac belts, and can be used in applications requiring longer conveyor lengths and increased belt strength. Fatigue Resistant Cleatrac can improve belt life by reducing belt stretch and failure. Its suited for both freezer tunnel and fryer applications. Fatigue Resistant Cleatrac is only available in stainless steel.

Nose Roll Sizing

The minimum recommended nose roll diameter for the Cleatrac® belts is 0.63" (15.9 mm) for the CTB 30, 42, 48, and 60 mesh belts. Generally, use of nose rolls is not recommended with CTB 18 mesh belts.

Exception: If the application has a conveyor end-to-end distance of 10' (3 m) or less and the belt fits loosely around the conveyor, the minimum nose roll diameter may be decreased as follows:

Mesh	Minimum Diameter
CTB 18-16	1.00" (25.4 mm)
CTB 30-24	0.50" (12.7 mm)
CTB 42-36	0.38" (9.5 mm)
CTB 48-48	0.25" (6.4 mm)
CTB 60-48	0.25" (6.4 mm)
CTB 60-60	0.20" (5.1 mm)

STRAIGHT PRODUCTS

Cleatrac® Meshes

Mesh*	Thickness in. (mm)		Lateral Pitch in. (mm)		Weight lb/ft² (kg/m²)		Opening Size (approx.) in. (mm)		Working Strength per Unit of Belt lb/ft (kg/m)	
CTB 18-16-16	0.30	(7.6)	0.67	(17.0)	0.67	(3.3)	0.60 x 0.69	(15.2 x 17.5)	100	(149)
CTBFR 18-16-16	0.30	(7.6)	0.67	(17.0)	0.67	(3.3)	0.60 x 0.69	(15.2 x 17.5)	250	(370)
CTB 18-16-14	0.35	(8.9)	0.67	(17.0)	1.13	(5.5)	0.59 x 0.67	(15.0 x 17.0)	250	(372)
CTB 30-24-17	0.29	(7.4)	0.40	(10.2)	0.88	(4.3)	0.35 x 0.45	(8.9 x 11.4)	200	(298)
CTBFR 30-24-17	0.29	(7.4)	0.40	(10.2)	0.88	(4.3)	0.35 x 0.45	(8.9 x 11.4)	500	(745)
CTB 30-24-16	0.26	(6.6)	0.40	(10.2)	1.19	(5.8)	0.34 x 0.44	(8.6 x 11.2)	300	(446)
CTBFR 30-24-16	0.26	(6.6)	0.40	(10.2)	1.19	(5.8)	0.34 x 0.44	(8.6 x 11.2)	750	(1100)
CTB 42-36-17	0.24	(6.1)	0.29	(7.4)	1.35	(6.6)	0.23 x 0.28	(5.8 x 7.1)	325	(484)
CTBFR 42-36-17	0.24	(6.1)	0.29	(7.4)	1.35	(6.6)	0.23 x 0.28	(5.8 x 7.1)	810	(1200)
CTB 42-36-18	0.24	(6.1)	0.29	(7.4)	1.03	(5.0)	0.24 x 0.29	(6.1 x 7.4)	240	(357)
CTBFR 42-36-16	0.25	(6.2)	0.29	(7.4)	1.79	(8.8)	0.24 x 0.29	(6.1 x 7.4)	930	(1400)
CTB 48-48-17	0.24	(6.1)	0.25	(6.4)	1.57	(7.7)	0.20 x 0.20	(5.1 x 5.1)	450	(670)
CTBFR 48-48-17	0.24	(6.1)	0.25	(6.4)	1.57	(7.7)	0.20 x 0.20	(5.1 x 5.1)	1100	(1640)
CTB 60-48-1820	0.16	(4.1)	0.20	(5.1)	0.93	(4.5)	0.16 x 0.21	(4.1 x 5.3)	120	(179)
CTB 60-48-18	0.21	(5.3)	0.20	(5.1)	1.54	(7.5)	0.15 x 0.20	(3.8 x 5.1)	350	(521)
CTB 60-60-18	0.22	(5.6)	0.20	(5.1)	1.58	(7.7)	0.15 x 0.15	(3.8 x 3.8)	350	(521)

Stock belt length is 25 ft (7.62 m), widths vary per mesh. Contact Ashworth for details.

System Requirements

Application Notes

- UHMWPE material type components have a 150° F (66°C) maximum operating temperature.
- Molded Acetal material type components have a 180° F (82°C) maximum operating temperature.

Tunnel Freezers

Use with caution as ice and snow accumulates in mesh openings or on the drive components, prohibiting sprocket teeth engagement. Install a rotary brush, or similar cleaning method, near sprocket locations to minimize debris.

Soft Dough Products

Use with caution as debris may accumulate in mesh openings or on the drive components, prohibiting sprocket teeth engagement. Install a rotary brush, or similar cleaning method, near sprocket locations to minimize debris.

Elevated Temperatures

Thermal expansion of the belt width may adversely affect sprocket engagement with the belt openings. If this is evident when belt reaches application temperature, lock only the middle third of the sprockets onto the shaft so the outer sprockets can "float" along the shaft, allowing for thermal expansion and contraction of the belt. Keep in mind that the shaft will have to be kept clean to allow sprockets to "float." For flour-based products in elevated temperatures, arrange the drive configuration such that a shield prevents debris from accumulating on the shaft and drive components.

Multiple Belts Driven by Common Drive Shaft

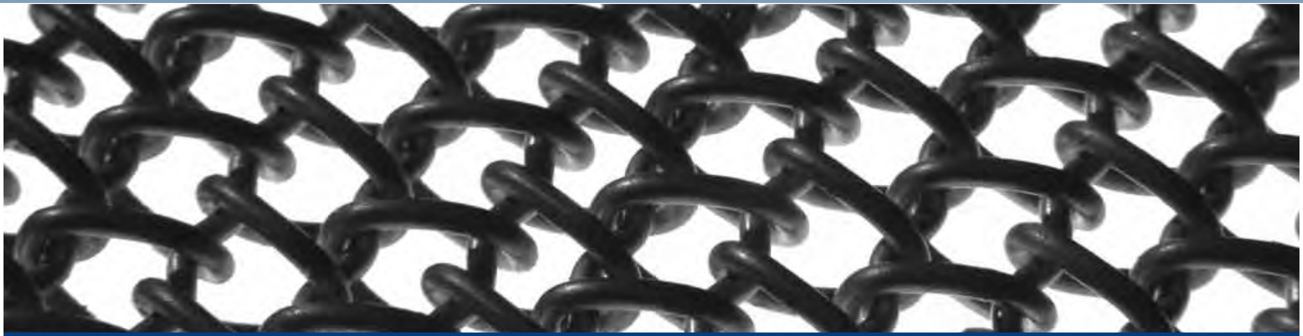
When two or more belts are driven on a common drive shaft and product alignment is critical, Ashworth Bros., Inc., must be notified at time the purchase order is generated so that the belts will be matched. Slight differences in belt pitch can affect the alignment of product over longer conveyor runs (typically 10ft (3m) or greater). Replacement belts for these applications require that the order reference previous purchase orders.

▶▶ Cleatrac® Belt & Sprocket System

Cleatrac® Sprockets

Sprocket No.	No. of Rows of Teeth	Flat-to-Flat in. (mm)	Sprocket Width in. (mm)	Min. Bore in. (mm)	Max. Bore in. (mm)	Stock Bore (UHMWPE) in. (mm)	Note
CTS 18-8	8	1.51 (38.4)	2.00 (50.8)	0.50 (12.7)	1.00 (25.4)	0.75 (19.1)	U
CTS 18-12	12	2.50 (63.5)	2.00 (50.8)	0.63 (16.0)	1.75 (44.5)	1.00 (25.4)	U
CTS 18-14	14	2.95 (74.9)	2.00 (50.8)	0.50 (12.7)	1.94 (49.3)	N/S	U/S
CTS 18-18	18	3.95 (100.3)	2.00 (50.8)	0.50 (12.7)	2.75 (69.9)	N/S	U/S
CTS 30-8*	8	0.94 (23.9)	1.20 (30.5)	0.50 (12.7)	0.50 (12.7)	N/S	U/S
CTS 30-12 ▲	12	1.60 (40.6)	1.20 (30.5)	0.75 (19.1)	1.00 (25.4)	0.75 (19.1)	U/S
CTS 30-14	14	1.91 (48.5)	1.50 (38.1)	0.50 (12.7)	1.25 (31.8)	N/S	U/S
CTS 30-16	16	2.23 (56.6)	1.20 (30.5)	0.50 (12.7)	1.38 (35.1)	N/S	U/S
CTS 30-18	18	2.58 (65.5)	1.20 (30.5)	0.50 (12.7)	1.69 (42.9)	N/S	U/S
CTS 30-20 ▲	20	2.89 (73.4)	1.20 (30.5)	0.75 (19.1)	1.88 (47.8)	1.00 (25.4)	S
CTS 30-24	24	3.52 (89.4)	1.20 (30.5)	0.50 (12.7)	2.25 (57.2)	N/S	U/S
CTS 30-26 ▲	26	3.84 (97.5)	1.20 (30.5)	0.75 (19.1)	2.50 (63.5)	N/S	S
CTS 42-12*	12	1.01 (25.7)	1.14 (29.0)	0.50 (12.7)	0.50 (12.7)	0.50 (12.7)	U
CTS 42-20	20	1.88 (47.8)	1.14 (29.0)	0.75 (19.1)	1.25 (31.8)	0.75 (19.1)	U
CTS 42-24 ▲	24	2.30 (58.4)	1.14 (29.0)	0.63 (16.0)	1.50 (38.1)	0.75 (19.1)	U/S
CTS 42-30	30	2.93 (74.4)	1.14 (29.0)	0.50 (12.7)	1.88 (47.8)	N/S	U/S
CTS 42-32	32	3.15 (80.0)	1.14 (29.0)	0.50 (12.7)	2.13 (54.1)	1.00 (25.4)	U
CTS 42-40	40	4.00 (101.6)	1.14 (29.0)	0.50 (12.7)	2.50 (63.5)	N/S	U/S
CTS 42-56	56	5.70 (144.8)	1.14 (29.0)	0.50 (12.7)	4.00 (101.6)	N/S	U/S
CTS 48-20	20	1.34 (34.0)	1.50 (38.1)	0.50 (12.7)	0.63 (16.0)	N/S	U/S
CTS 48-24	24	1.66 (42.2)	1.50 (38.1)	0.75 (19.1)	1.00 (25.4)	N/S	U/S
CTS 48-32 ▲	32	2.31 (58.7)	1.50 (38.1)	0.94 (23.9)	1.50 (38.1)	0.75 (19.1)	U/S
CTS 60-8**	8	0.43 (10.9)	1.00 (25.4)	0.20 (5.1)	0.25 (6.4)	0.20 (5.1)	U
CTS 60-12	12	0.77 (19.6)	1.00 (25.4)	0.50 (12.7)	0.50 (12.7)	0.50 (12.7)	U
CTS 60-24 ▲	24	1.74 (44.2)	1.00 (25.4)	0.75 (19.1)	1.00 (25.4)	0.75 (19.1)	U/S
CTS 60-42 ▲	42	3.16 (80.3)	1.00 (25.4)	1.00 (25.4)	2.13 (54.1)	1.00 (25.4)	U/S
CTS 60-54 ▲	54	4.09 (103.9)	1.00 (25.4)	1.00 (25.4)	2.75 (69.9)	1.00 (25.4)	U
CTS 60-82	82	6.32 (160.5)	1.00 (25.4)	1.00 (25.4)	4.50 (114.3)	N/S	U
CTS 6060-28 ▲	28	1.57 (39.9)	1.00 (25.4)	0.50 (12.7)	0.75 (19.1)	0.75 (19.1)	U/S
CTS 6060-40 ▲	40	2.34 (59.4)	1.40 (35.6)	0.75 (19.1)	1.63 (41.4)	1.00 (25.4)	U/S
CTS 6060-92	92	5.64 (143.3)	1.40 (35.6)	0.50 (12.7)	4.00 (101.6)	N/S	U/S

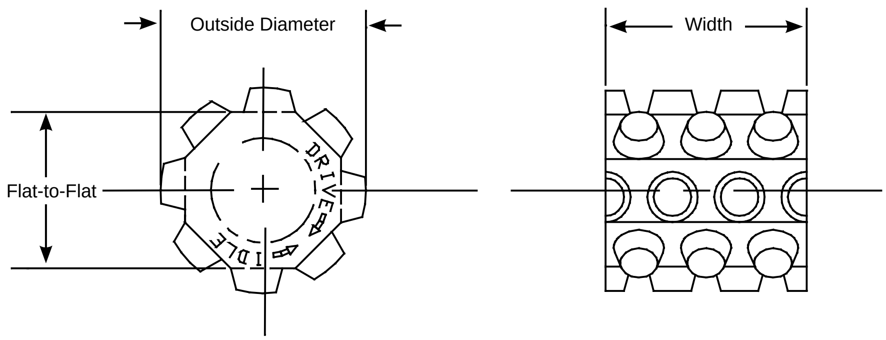
* Non-Standard keyway (1/8 in² [3 mm²]) used on 30-8, 42-12 sprockets with 5/8 in. (15.88 mm) bore.
** This is a non-driving component and is not available with a keyway.
N/S denotes sprockets that are not kept in stock.
U denotes UHMWPE.
S denotes stainless steel.
▲ Available in cast T303 stainless steel with a 11/16 in. dia. pilot bore.



Sprockets

Cleatrac® Sprockets (CTS)
Minimum diameter sprockets are designed to positively drive mesh. Positive drive provides true belt travel, and minimum terminal diameters allow close transfer of product onto and off the belt.

- All sprockets can be manufactured in UHMWPE and machined T303 stainless. Sprockets marked with a ▲ are available in cast T303 stainless steel.
- Molded acetal sprockets are available as CTS18-12, minimum bore diameter 15/16" and maximum bore of 1-1/8" and CTS60-24, minimum bore diameter of 3/4" and maximum bore of 1".
- American Standard keyways provided unless otherwise specified by the customer. Metric sizes are available.
- Maximum bore sizes listed are with keyway. For sprockets without keyway, add American Standard keyway depth to listed values.
- Plastic Cleatrac® sprockets are bored oversized to allow lateral movement on the shaft compensating for changes in belt width due to temperature. If tight bore tolerances are required, they must be specified at time of order.
- Set Screws are available upon request.



Number of Sprockets

The minimum number of sprockets per shaft (X) can be calculated based on the following formula:

X = Belt Width / (A + B)

Where:
A= Maximum allowable spacing between sprockets
B= Overall Sprocket Width

Fractional values should be rounded up to the next whole number.

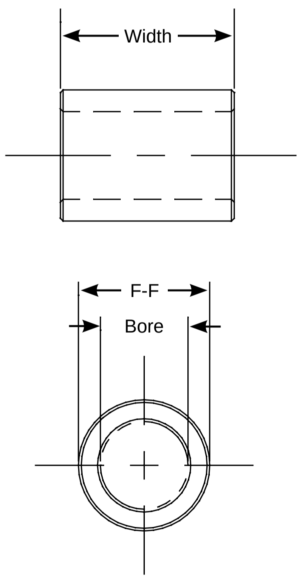
Mesh	A = Max. Spacing Between Sprockets in. (mm)	Minimum Spacing in. mm
CTB 18	5.00 (127.0)	0.67 (17.0)
CTB 30	3.25 (82.6)	0.40 (10.2)
CTB 42	3.50 (88.9)	0.28 (7.1)
CTB 48	3.25 (82.6)	0.25 (6.4)
CTB 60	3.00 (76.2)	0.20 (5.1)
CTB 6060	3.00 (76.2)	0.20 (5.1)

Cleatrac® Belt & Sprocket System

Cleatrac® Filler Rolls

Cleatrac® Filler Rolls (CTFR) provide mesh support between the sprockets. They are available in UHMWPE.

- Designation is CTFR, followed by the same numeric designation of the sprockets.
- Outside diameter is equal to dimension F-F of the sprocket. Bore must match that of the sprockets.
- Width is the same as the selected sprocket.
- There are no keyway or set screws in filler rolls.



Number of Filler Rolls

The number of filler rolls required can be calculated by following the steps below:

Step 1: A = B–1
Step 2: E = C–(B x D)
Step 3: F = E/A
Step 4: G = F/D
Step 5: G x A = H

Where:
A = number of gaps between sprockets
B = number of sprockets per shaft
C = overall belt width
D = overall sprocket width
E = open space
F = available space per gap
G = number of filler rolls per gap
H = total number of filler rolls required per shaft

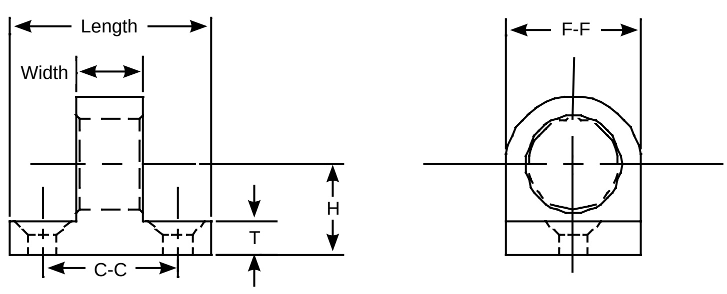
Filler Rolls and Stocked Diameters

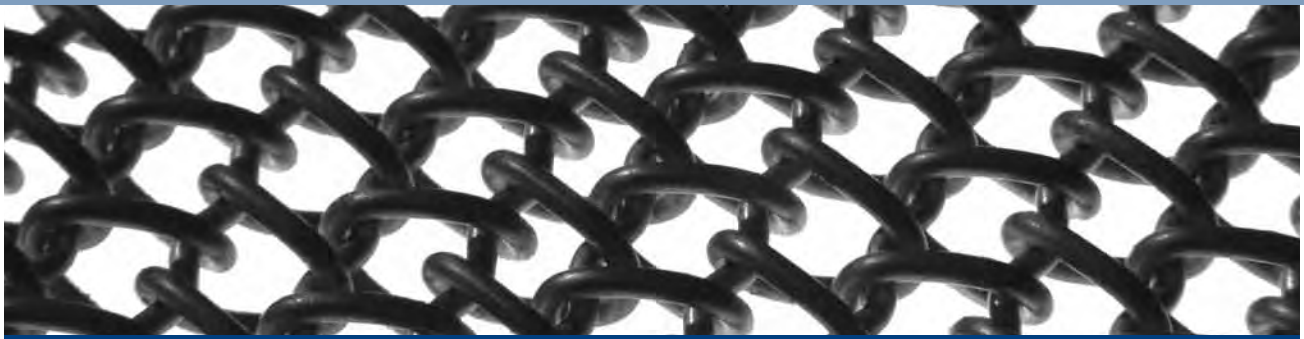
Filler Roll No. (CTFR)	F-F in. (mm) (Figure 20)	Stock Bore Diameter in. (mm) (Figure 20)	W in. (mm) (Figure 19)
18-8	1.51 (38.4)	1.00 (25.4)	2.00 (50.8)
18-12	2.50 (63.5)	N/S	2.00 (50.8)
30-8	0.94 (23.9)	N/S	1.20 (30.5)
30-12	1.61 (40.6)	1.00 (25.4)	1.20 (30.5)
30-20	2.89 (73.4)	N/S	1.20 (30.5)
42-12	1.01 (25.7)	0.50 (12.7)	1.14 (29.0)
42-20	1.88 (47.8)	0.75 (19.1)	1.14 (29.0)
42-24	2.30 (58.4)	1.00 (25.4)	1.14 (29.0)
48-20	1.34 (34.0)	N/S	1.50 (38.1)
48-32	2.30 (58.4)	N/S	1.50 (38.1)
60-8	0.43 (10.9)	0.20 (5.1)	1.00 (25.4)
60-12	0.77 (19.6)	0.50 (12.7)	1.00 (25.4)
60-24	1.74 (44.2)	.075 / 1.00 (.19 / 25.4)	1.00 (25.4)
6060-28	1.57 (39.9)	N/S	1.00 (25.4)
6060-40	2.34 (59.4)	N/S	1.40 (35.6)

Cleatrac® Support Bearings

Cleatrac® Support Bearings (CTSB) are used for intermediate shaft support when excessive shaft deflection will occur without their presence.

- Available in UHMWPE only
- Bore must match that of the sprockets
- Designation is CTSB, followed by the same numeric designation of the sprockets





Number of Support Bearings

The number of support bearings is a function of the shaft length and shaft diameter. It is determined by iteration starting with an assumed shaft diameter, typically the maximum bore of the subject sprockets. If the calculated shaft diameter is larger than the assumed diameter, the belt width is divided by 2 to mimic the insertion of a support bearing. If the calculated diameter is still larger than the assumed diameter, the belt width is divided by 3 to mimic the insertion of 2 support bearings. This procedure is continued until the assumed diameter is larger than the calculated diameter.

$d = B \times \{5.1/P \times [(C_b \times M)^2 + [(C_t \times T)^2]^{1/2}\}^{1/3}$

Where:
- B = 1 for solid shafts
- P = 6000 for a shaft with keyway
  = 8000 for a shaft without keyway

- C_b = Service Factor in Bending
- C_t = Service Factor in Torsion
- T = Torque in units of inch-lb.

- T = Belt Tension x 1/2 (Pitch Diameter of Sprockets)

$M = (W_r \times L)/8$

Where:
- W_r = Resultant weight in pounds of shaft, sprockets, belt, and belt tension
- $W_r = [R^2 + (BT)^2]^{1/2}$
- R = Weight in lb. of (Shaft + One Linear Foot of Belt + Load/Linear Foot)
- L = Length of shaft between bearings (in inches)

C_b	C_t	Type Loading
1.5	1.0	gradually applied
1.5–2.0	1.0–1.5	steady load
2.0–3.0	1.5–3.0	suddenly applied minor shock load; suddenly applied heavy shock load

Cleatrac® Support Bearings

Bearing No. (CTSB)	F-F in. (mm)	H in. (mm)	W in. (mm)	Base T in. (mm)	Base L in. (mm)	Flat Head Fasteners C-C in. (mm)	Screw Size in. (metric)
18-8	1.51 (38.4)	1.01 (25.7)	0.75 (19.1)	0.38 (9.7)	2.25 (57.2)	1.50 (38.1)	5/16 (M8)
18-12	2.50 (63.5)	1.50 (38.1)	0.75 (19.1)	0.50 (12.7)	2.25 (57.2)	1.50 (38.1)	5/16 (M8)
30-8	0.94 (23.9)	0.73 (18.5)	0.50 (12.7)	0.38 (9.7)	1.50 (38.1)	1.00 (25.4)	1/4 (M6)
30-12	1.61 (40.9)	1.06 (26.9)	0.75 (19.1)	0.38 (9.7)	2.25 (57.2)	1.50 (38.1)	5/16 (M8)
30-20	1.44 (36.6)	1.89 (48.0)	0.75 (19.1)	0.38 (9.7)	2.25 (57.2)	1.50 (38.1)	5/16 (M8)
42-12	1.01 (25.7)	0.76 (19.3)	0.50 (12.7)	0.38 (9.7)	1.50 (38.1)	1.00 (25.4)	1/4 (M6)
42-20	1.88 (47.8)	1.23 (31.2)	0.75 (19.1)	0.38 (9.7)	2.25 (57.2)	1.50 (38.1)	5/16 (M8)
42-24	2.30 (58.4)	1.45 (36.8)	0.75 (19.1)	0.38 (9.7)	2.25 (57.2)	1.50 (38.1)	5/16 (M8)
48-20	1.34 (34.0)	0.92 (23.4)	0.75 (19.1)	0.38 (9.7)	2.25 (57.2)	1.50 (38.1)	5/16 (M8)
48-32	2.30 (58.4)	1.45 (36.8)	0.75 (19.1)	0.38 (9.7)	2.25 (57.2)	1.50 (38.1)	5/16 (M8)
60-8*	0.43 (10.9)	0.84 (21.3)	0.50 (12.7)	0.38 (9.7)	1.50 (38.1)	1.00 (25.4)	No.10 (M5)
60-12	0.77 (19.6)	0.70 (17.8)	0.50 (12.7)	0.38 (9.7)	1.50 (38.1)	1.00 (25.4)	1/4 (M6)
60-24*	1.74 (44.2)	1.13 (28.7)	0.75 (19.1)	0.38 (9.7)	2.25 (57.2)	1.50 (38.1)	5/16 (M8)
6060-28	1.57 (39.9)	0.91 (23.1)	0.75 (19.1)	0.38 (9.7)	2.25 (57.2)	1.50 (38.1)	5/16 (M8)
6060-40	2.34 (59.4)	1.44 (36.6)	0.75 (19.1)	0.38 (9.7)	2.25 (57.2)	1.50 (38.1)	5/16 (M8)

* Cleatrac® support bearings carried in stock

Positive Drive Chain Edge (PDCE)

Technical Specifications	
Available Materials (Mesh and Connector Rods)	Stainless steel, carbon and galvanized steels, high temperature steel alloys
Minimum Width*	Defined by customer specified chain and mesh widths
Maximum Mesh Width*	No absolute maximum width; dependent on customer application and belt specifications
Conveying Surface	Equal to mesh width or inside guard edge dimension if guard edges are used
Weight	Dependent on mesh, rod, and chain weights
Allowable Tension	Defined by chain strength
Available Mesh Types	Balanced weave, compound balanced weave, or conventional weave
Turn Capability	Straight run only
Maximum Temperature	Dependent on chain type and material; see section on chains, described below
Method of Drive	Positive drive via matching chain and sprockets

Notes

** When specifying a PDCE belt, three dimensions are required; overall belt width, distance between chain centers, and maximum mesh width. Typically, only one of these dimensions is critical and the belt will be designed around that dimension. The other two are calculated based on the required belt construction. If the critical dimension is not given, Ashworth will use the chain centers dimension as the hold or critical dimension for manufacture of the belting.*

PDCE belt assemblies employing steel roller chains are widely used in conveyor applications because of uniformity of pitch, high tensile strength and relatively light weight. An almost unlimited variety of custom-designed PDCE belts are possible, combining the numerous types of mesh, chain, and cross supports (rods).

Chains

Roller Chains

Ashworth can incorporate almost any precision roller chain; such as RC50, C2060H, or C2082H. Chain types can be either single or double pitch, and double pitch chains can have either a standard or oversized roller.

Engineering Class Bushed Roller Chains are all-steel chains, appropriate for heavy-duty service and for difficult operating conditions. Heavy duty, long pitch oversized roller chains are also commercially available and may be incorporated in PDCE belts.

Drag Chains

Drag Chains are defined as any chain that does not have a roller. Pintle Chains fall into this class and have great durability and will handle medium loads at low speeds. Fabricated from malleable iron, they will operate satisfactorily at temperatures up to 600°F (316°C). For handling heavy loads, a high strength cast alloy is recommended. For severely corrosive conditions or temperatures in excess of 1050°F (566°C), several types of cast stainless steel alloys are available.

Detachable link chains are also available in either malleable iron or pressed steel. Positive drive conveyors employing detachable link chains are used in applications where light loads and slow speeds predominate. These chains must be well lubricated and are normally used where nonabrasive operating conditions exist.

Chain manufacturers' catalogs afford complete data, specifications, and types of attachments available for all types of chains that can be incorporated into Ashworth PDCE belts.

Mesh

A PDCE belt's mesh can be of any balanced weave, compound balanced weave, or conventional weave variety. However, the second count (SC) number is a function of cross support spacing, unless a special spiral* is used or the cross support is attached to the underside of the mesh. (for more information see the section on "Mesh Designation for Woven Wire Belts."

Meshes on PDCE belts can be manufactured in one of three ways:

- Thicker than normal mesh is woven to accommodate the cross supports, which are inserted through the spirals. The spirals are all of uniform size throughout the belt.
- Mesh is of standard thickness but is interspersed with special spirals* to accommodate large cross supports or when a very dense mesh is specified.
- Mesh is of standard thickness and is attached to the top of the cross supports (flat bars channels or angles).

** A special spiral is larger than a standard spiral and can be manufactured in various shapes such as oval, diamond, square, etc.*

Cross Supports

Rods

Rods are frequently used as cross supports. Their length is generally the same as the overall width of the belt. Rod edges are either welded, washer welded, brazed, washer brazed, or drilled and cottered as specified. Winged rods are used to hold the chain sideplates in place when pin-size rods are used with either riveted hollow pins or cottered chains, and are located on every chain pitch. When used as cross supports and engage the chain as pins, the standard size of the rods is as follows:

ANSI Number	Rod Diameter
RC35 and RC41	0.135" (3.4 mm)
RC40, C2040 & C2042	0.152" (3.9 mm)
RC50, C2050 & C2052	0.196" (5.0 mm)
RC60, C2060H & C2062H	0.230" (5.8 mm)
RC80, C2080H & C2082H	0.307" (7.8 mm)

Pipe/Rod

Rods can be inserted through any pipe or tubing which is commercially available and the combination is then inserted through the mesh. The pipe/tubing length is typically the same width as the mesh.

Turned-Down Rod

When the rod diameter is oversized for the chain according to the previous chart, the ends of the rods can be turned down to the standard pin diameter to engage the chain.

Channel or Angle

Any commercially-made or manufactured channel or angle available may be used as cross supports. These are normally plug-welded or brazed to the underside of mesh. In general, channel or angle cross supports are bolted to a chain attachment, but in some cases are welded to the chain sideplate.

Flat Bar

Any commercially made or manufactured flat bar available may be used as cross supports. The flat bar's length is determined by type of chain used and its attachment. The flat bar may be inserted through the mesh or attached to the underside of mesh as specified. When attached to the underside, the flat bar is plug-welded or brazed to the mesh through slots or holes in the flat bar. In general, the flat bar is bolted to the chain, but in some cases it is welded to the chain sideplate.

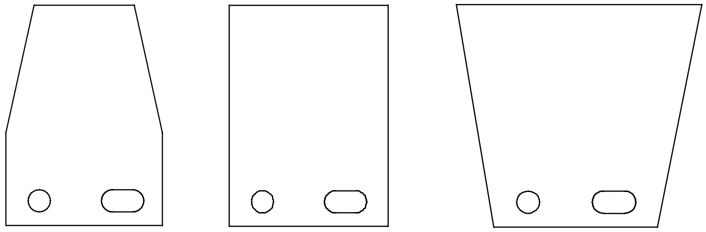
Positive Drive Chain Edge (PDCE)

Available Options

Guard Edges
Guard edges are located on the inside of the chain. Height above the belt surface and material is customer specified. Guard edges are usually used with round cross supports (rods, turned down rods, or pipe/rod) which are inserted through holes in the guard edge.

Guard edges are generally plates that may be offset, of interlocking design, or flat plates that are assembled in either a shingled or staggered arrangement. Plates can be square or rectangular and either flared or notched as required (Figure 18). Plates with double tabs may be used. The bottom tabs may be inserted through the mesh or the tabs may straddle the mesh and are welded or brazed to it. Whenever guard edges are specified, the inside guard edge (IGE) dimension should be specified by the customer.

Guard Edge Shapes:



Notched—Used to allow reverse bends | *Standard* | *Flared—Used to prevent gaps when traversing sprockets*

[Figure 18]

Flights (Lifts or Cleats)
Generally, flights are attached to the belt by welding or brazing them to the mesh and/or the guard edges (if applicable). The style, material, height, and spacing above the belt surface is customer specified. The length of the flight is usually the same as the mesh width but can be narrower if specified.

Usually, flights are produced from formed angle stock, although commercially available flat bar, keystock, cut sheet metal, or other customer specified shapes may be used. Angle types usually have slots or holes punched in the bottom to facilitate plug-welding to the mesh. It should be noted that flights are not meant to carry product up inclines but are just to prevent product slippage.

Wipers
Wiper attachments, typically fabricated from wire mesh, hang from the bottom surface of the belt to wipe debris from drip pans, trays, bins, etc. These attachments are typically attached to belt mesh with a straight or crimped connector rod. Mesh designation (if applicable), material, length below belt surface, width of wiper, and spacing are customer specified.

Belt Tension Calculations

$$T = (wLf_r + WLf_r + WH) \times C$$

Where:

T = Belt tension in lb. (Newtons) (Total Chain Pull)

w = Weight of belt in pounds per linear foot (kg per linear meter)

W = Belt weight + Product Weight in pounds per linear foot (kg per linear meter)

L = Length of Conveyor measured center to center of pulleys in feet (meters).

f_r = Friction factor between belt chain and belt supports (track) dimensionless.

H = Rise of incline conveyor in feet (meters),

(Positive if conveyor inclines, negative if it declines)

C = Force conversion factor

1.0 if Imperial

9.8 if Metric

Note: The reduction of chain pull due to weight of the conveyor belt going downhill on the return side usually can be neglected and is omitted from the inclined conveyor formula.

Friction Factor for Chains
f = 0.35 for drag chain, non-rotating rollers, or sliding on side plates on metal
f = 0.20 for drag chain, non-rotating rollers, or sliding on side plates on UHMWPE
f = 0.10 for chains moving on rollers

Increase above values by 50% when poorly lubricated.

Belt Tension Calculations (Cont.)

Maximum Single Strand Chain Pull
For 2 strand conveyor uniformly loaded, use 50% of total chain pull (T).
For 3 strand conveyor uniformly loaded, use 33% of total chain pull (T).
For 4 strand conveyor uniformly loaded, use 25% of total chain pull (T).

These values are for chains that are uniformly spaced across the width of the conveyor.

Ultimate Strength Required in Chain:
For speeds under 25 ft. per min: use 5 times maximum single strand chain pull.
For speeds 25 ft. to 50 ft. per min: use 6 times maximum single strand chain pull.
For speeds 50 ft. to 100 ft. per min: use 7 times maximum single strand chain pull.
For speeds over 100 ft. per min: use 8 times maximum single strand chain pull.

Above values are for normal operating conditions. For unusual conditions, such as in ovens, corrosive solutions, or handling abrasive materials, consult with an Ashworth Engineer.

Power Requirements

The power requirements of a speed reducing gear box or a reduction unit needed to transmit power to the conveyor are usually in terms of torque output at a specific speed. The following formula is used:

Torque Output (inch–lb.) =
Total Chain Pull x 1/2 (Pitch Diameter of Chain Edge Drive Sprocket)

Note: It is common practice to select a reduction unit whose output is substantially more than the theoretical requirements as determined by this formula. This is done to allow for high starting friction, lack of rigidity in the conveyor frame, poor lubrication, misalignment of parts, and non-uniform loading.

R.P.M. =

$$\frac{\text{Belt Speed (inch/min.)}}{\text{3.14 x Pitch Diameter of Chain Drive Sprockets}}$$

These formulas apply where direct drive is used from the reduction unit to the drive shaft of the chain edge sprockets.

If additional speed reduction between the gear box and the conveyor drive shaft is used, then the requirements of the unit are as follows:

Torque Required =

$$\frac{\text{Torque (as calculated above) x Chain Edge Sprocket Speed}}{\text{Reduction Unit Output Speed}}$$

Horsepower requirements are calculated with the following formula:

Output H.P. of Reducer =

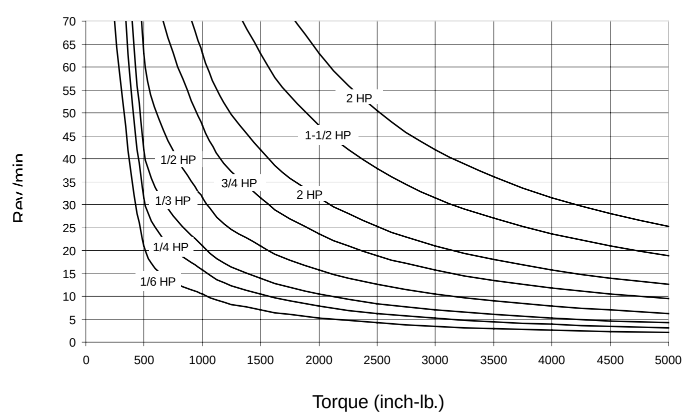
$$\frac{\text{Torque Required (inch–lb.) x Output R.P.M.}}{63{,}025}$$

Motor H.P. =
Output H.P. + losses in the speed reducer

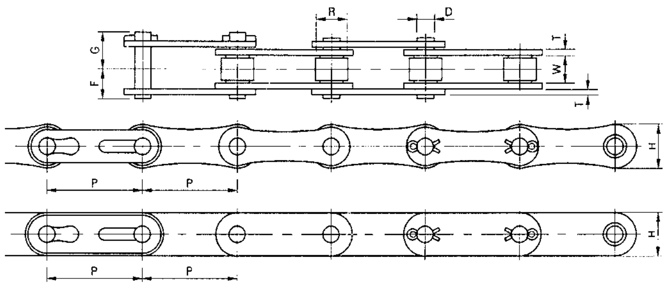
To select the proper size of the motor to drive a conveyor through a speed reducer, use the chart in Figure 19*

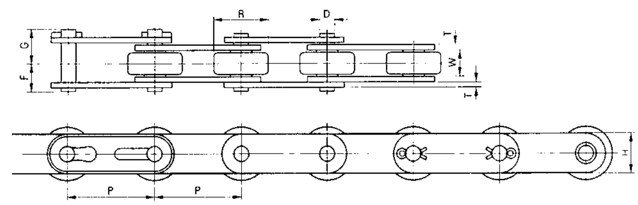
[Figure 19]

Motor HP Required for Torque and Speed Output of Reduction Unit



** The values in this chart are representative of commercial worm gear reduction units on the market, but they should be used as a guide only. Consult the recommendations of the manufacturer of the particular unit to be used in each installation.*



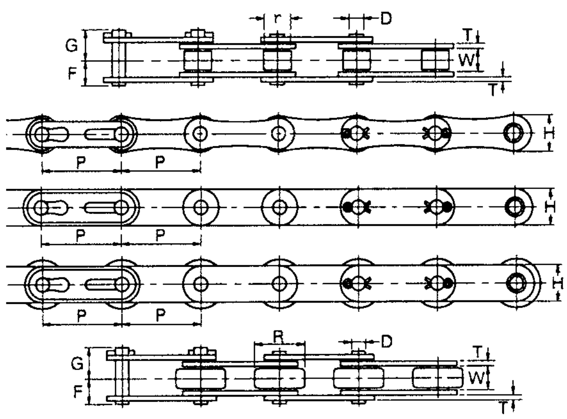


ANSI Double Pitch Roller Conveyor Chains C Type Standard Rollers

ANSI No.	Units	C2040	C2050	C2060H	C2080H
Pitch–P	in.	1.000	1.250	1.500	2.000
Roller Width–W		0.312	0.375	0.500	0.625
Roller Diameter–R		0.312	0.400	0.469	0.625
Plate Height–H		0.463	0.593	0.683	0.935
Plate Thickness–T		0.060	0.080	0.125	0.156
Pin Diameter–D		0.156	0.200	0.234	0.312
Overall Width–F		0.320	0.403	0.586	0.699
Overall Width–G		0.377	0.453	0.662	0.813
Average Weight Per Foot	lb.	0.340	0.560	1.010	1.670
Average Ultimate Strength		3,960	6,600	12,100	19,800
Finish		Carbon Steel			

ANSI Double Pitch Roller Conveyor Chains C Type Oversized Steel Rollers

ANSI No.	Units	C2042	C2052	C2062H	C2082H
Pitch–P	in.	1.000	1.250	1.500	2.000
Roller Width–W		0.312	0.375	0.500	0.625
Roller Diameter–R		0.625	0.750	0.875	1.125
Plate Height–H		0.463	0.593	0.683	0.935
Plate Thickness–T		0.060	0.080	0.125	0.156
Pin Diameter–D		0.156	0.200	0.234	0.312
Overall Width–F		0.320	0.403	0.586	0.699
Overall Width–G		0.377	0.453	0.662	0.813
Average Weight Per Foot	lb.	0.580	0.880	1.480	2.400
Average Ultimate Strength		3,960	6,600	12,100	19,800
Finish		Carbon Steel			

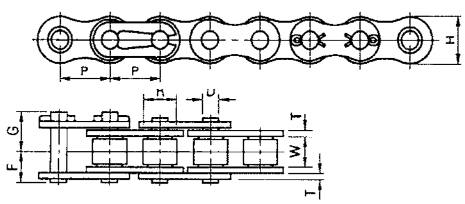


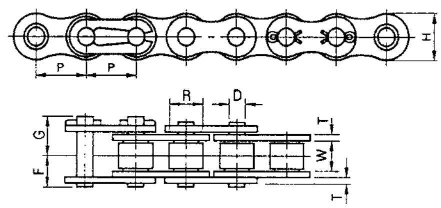
Nickel Plated ANSI Conveyor Chains C Type

ANSI No.	Units	C2042NP	C2052NP	C2062HNP	C2082HNP
Pitch–P	in.	1.000	1.250	1.500	2.000
Roller Width–W		0.312	0.375	0.500	0.625
Roller Diameter–R		0.625	0.750	0.875	1.125
Plate Height–H		0.463	0.593	0.683	0.935
Plate Thickness–T		0.060	0.080	0.125	0.156
P Diameter–D		0.156	0.200	0.234	0.312
Overall Width–F		0.320	0.403	0.586	0.699
Overall Width–G		0.377	0.453	0.662	0.813
Average Weight Per Foot	lb.	0.580	0.880	1.480	2.400
Average Ultimate Strength		3,700	6,100	11,880	20,900
Finish		Nickel Plated			

Nickel Plated ANSI Conveyor Chains C Type

ANSI No.	Units	C2040NP	C2050NP	C2060HNP	C2080HNP
Pitch–P	in.	1.000	1.250	1.500	2.000
Roller Width–W		0.312	0.375	0.500	0.625
Roller Diameter–r		0.312	0.400	0.469	0.625
Plate Height–H		0.463	0.593	0.683	0.935
Plate Thickness–T		0.060	0.080	0.125	0.156
Pin Diameter–D		0.156	0.200	0.234	0.312
Overall Width–F		0.320	0.403	0.586	0.699
Overall Width–G		0.377	0.453	0.662	0.813
Average Weight Per Foot	lb.	0.340	0.560	1.010	1.670
Average Ultimate Strength		3,700	6,100	11,880	20,900
Finish		Nickel Plated			



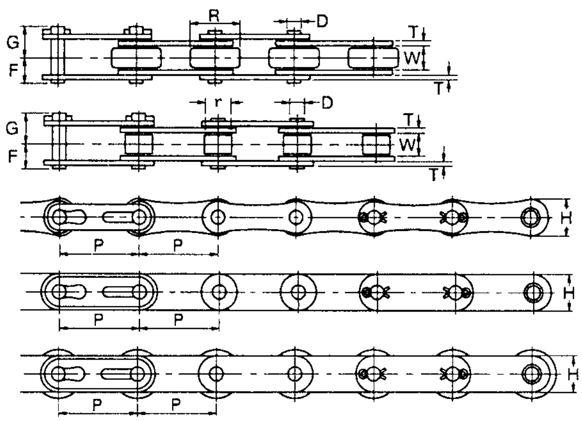


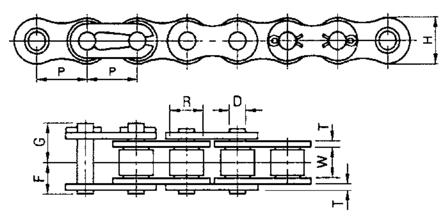
ANSI Standard Single Strand Chains

ANSI No.	Units	35	40	50	60	80
Pitch–P	in.	0.375	0.500	0.625	0.750	1.000
Roller Width–W		0.188	0.312	0.375	0.500	0.625
Roller Diameter–R		0.200	0.312	0.400	0.469	0.625
Plate Height–H		0.340	0.463	0.579	0.673	0.935
Plate Thickness–T		0.050	0.060	0.080	0.094	0.125
P Diameter–D		0.141	0.156	0.200	0.234	0.312
Overall Width–F		0.230	0.320	0.401	0.500	0.636
Overall Width–G		0.284	0.375	0.450	0.549	0.750
Average Weight Per Foot	lb.	0.240	0.420	0.710	0.970	1.680
Average Ultimate Strength		2,100	3,700	6,100	8,500	14,500
Finish		Carbon Steel				

Nickel Plated ANSI Single Strand Roller Chains

ANSI No.	Units	35NP	40NP	50NP	60NP	80NP
Pitch–P	in.	0.375	0.500	0.625	0.750	1.000
Roller Width–W		0.188	0.312	0.375	0.500	0.625
Roller Diameter–R		0.200	0.312	0.400	0.469	0.625
Plate Height–H		0.340	0.463	0.579	0.673	0.935
Plate Thickness–T		0.050	0.060	0.080	0.094	0.125
Pin Diameter–D		0.141	0.156	0.200	0.234	0.312
Overall Width–F		0.230	0.320	0.401	0.500	0.636
Overall Width–G		0.284	0.375	0.450	0.549	0.750
Average Weight Per Foot	lb.	0.240	0.420	0.71	0.970	1.680
Average Ultimate Strength		2,100	3,700	6,100	8,500	14,500
Finish		Nickel Plated				



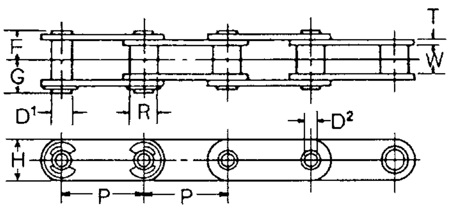


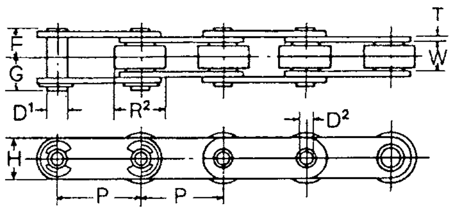
Stainless Steel ANSI Conveyor “304 Series” Chains

ANSI No.	Units	C2040SS	C2050SS	C2060HSS	C2080HSS
Pitch–P	in.	1.000	1.250	1.500	2.000
Roller Width–W		0.312	0.375	0.500	0.625
Roller Diameter–r		0.312	0.400	0.469	0.625
Plate Height–H		0.463	0.593	0.683	0.935
Plate Thickness–T		0.060	0.080	0.125	0.156
Pin Diameter–D		0.156	0.200	0.234	0.312
Overall Width–F		0.320	0.403	0.586	0.699
Overall Width–G		0.377	0.453	0.662	0.813
Average Weight Per Foot	lb.	0.340	0.560	1.010	1.670
Working Load		98	154	250	415
Finish		Stainless Steel			

Stainless Steel ANSI Single Strand “304 Series” Chains

Item No.	Units	35SS	40SS	50SS	60SS	80SS
Pitch–P	in.	0.375	0.500	0.625	0.750	1.000
Roller Width–W		0.188	0.312	0.375	0.500	0.625
Roller Diameter–R		0.200	0.312	0.400	0.469	0.625
Plate Height–H		0.340	0.463	0.579	0.673	0.935
Plate Thickness–T		0.050	0.060	0.080	0.094	0.125
P Diameter–D		0.141	0.156	0.200	0.234	0.312
Overall Width–F		0.230	0.320	0.401	0.500	0.636
Overall Width–G		0.284	0.375	0.450	0.549	0.750
Average Weight Per Foot	lb.	0.240	0.420	0.710	0.970	1.680
Working Load		59	98	154	231	397
Finish		Stainless Steel				



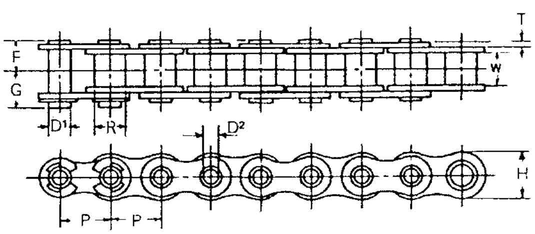


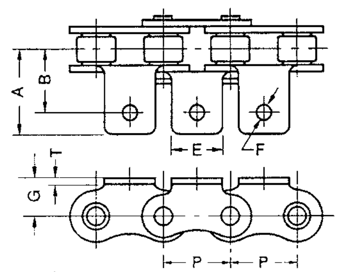
Specialty ANSI Extended Pitch Hollow Pin Chains

Item No.	Units	C2040 HP	C2050 HP	C2060 HP	C2080 HP
Pitch–P	in.	1.000	1.250	1.500	2.000
Bushing Width–W		0.312	0.375	0.500	0.625
Bushing Diameter–R		0.312	0.400	0.469	0.625
Plate Height–H		0.463	0.579	0.673	0.935
Plate Thickness–T		0.059	0.077	0.094	0.125
Pin Diameter–D1		0.223	0.286	0.331	0.449
Pin Inner Diameter–D2		0.157	0.202	0.237	0.316
Overall Width–F		0.319	0.394	0.492	0.638
Overall Width–G		0.358	0.453	0.547	0.695
Average Weight Per Foot	lb.	0.310	0.510	0.840	1.410
Average Ultimate Strength		2,700	4,500	6,100	11,400
Finish		Carbon Steel			

Specialty ANSI Extended Pitch Hollow Pin Chains

ANSI No.	Units	C2042HP	C2052HP	C2062HP	C2082HP
Pitch–P	in.	1.000	1.250	1.500	2.000
Roller Width–W		0.312	0.375	0.500	0.625
Roller Diameter–R		0.625	0.750	0.875	1.125
Plate Height–H		0.463	0.579	0.673	0.935
Plate Thickness–T		0.059	0.077	0.094	0.125
Pin Diameter–D		0.223	0.286	0.331	0.449
Pin Diameter–D2		0.157	0.202	0.237	0.316
Overall Width–F		0.319	0.394	0.492	0.638
Overall Width–G		0.358	0.453	0.547	0.695
Average Weight Per Foot	lb.	0.550	0.820	1.320	2.250
Average Ultimate Strength		2,700	4,500	6,100	11,400
Finish		Carbon Steel			





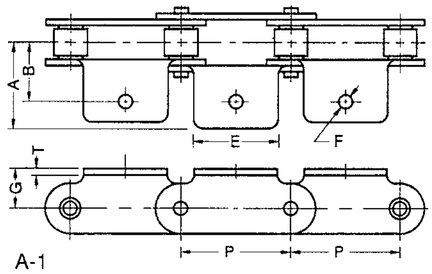
A-1

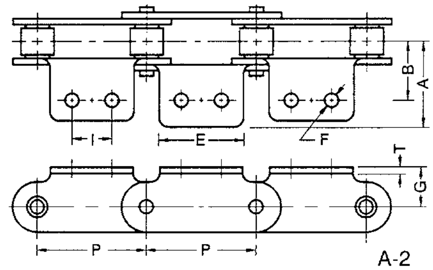
Specialty ANSI Single Strand Hollow Pin Chains

Item No.	Units	40 HP	50 HP	60 HP	80 HP
Pitch–P	in.	0.500	0.625	0.750	1.000
Bushing Width–W		0.312	0.375	0.500	0.625
Bushing Diameter–R		0.312	0.400	0.469	0.625
Plate Height–H		0.463	0.579	0.673	0.935
Plate Thickness–T		0.059	0.077	0.094	0.125
Pin Diameter–D		0.223	0.286	0.331	0.449
Pin Inner Diameter–D2		0.157	0.202	0.235	0.318
Overall Width–F		0.319	0.394	0.492	0.638
Overall Width–G		0.358	0.453	0.547	0.695
Average Weight Per Foot	lb.	0.360	0.580	0.860	1.480
Average Ultimate Strength		2,700	4,500	6,100	11,400
Finish		Carbon Steel			

ANSI Single Strand Chains with Attachments A-1

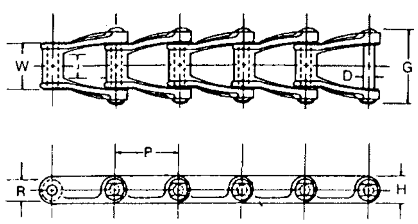
Item No.	Units	35	40	50	60	80
Pitch–P	in.	0.375	0.500	0.625	0.750	1.000
A		0.516	0.688	0.969	1.094	1.547
B		0.375	0.500	0.625	0.750	1.000
E		0.313	0.375	0.562	0.625	0.750
F		0.109	0.141	0.203	0.203	0.266
G		0.250	0.312	0.406	0.469	0.625
T		0.050	0.060	0.080	0.094	0.125
Average Ultimate Strength	lb.	2,100	3,700	6,100	8,500	14,500
Finish		Carbon Steel				

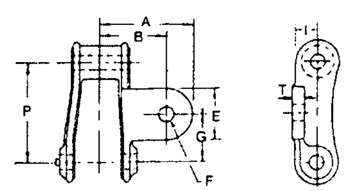




ANSI Double Pitch Roller Chains with Attachments A-1 & A-2

Item No. (Attachment)	Units	C2040 (A1)	C2042 (A2)	C2050 (A1)	C2052 (A2)	C2060H (A1)	C2062H (A2)	C2080H (A1)	C2082H (A2)
Pitch–P	in.	1.000		1.250		1.500		2.000	
A		0.742		0.945		1.203		1.516	
B		0.500		0.625		0.844		1.094	
E		0.750		1.000		1.125		1.500	
F		0.141		0.203		0.203		0.266	
G		0.359		0.437		0.578		0.750	
I		N/A	0.375	N/A	0.469	N/A	0.563	N/A	0.750
T		0.060		0.080		0.125		0.156	
Average Ultimate Strength	lb.	3,960		6,600		12,100		19,800	
Finish		Carbon Steel							





Engineering 400 Series Pintle Chains

Item No.	Units	442	452	455	462	488
Pitch–P	in.	1.375	1.506	1.630	1.634	2.609
Bearing Width–W		1.060	1.088	1.120	1.440	1.618
Bearing Diameter–R		0.560	0.690	0.620	0.720	0.880
Max. Sprocket Face–J		0.620	0.620	0.690	0.880	0.940
Pin Diameter–D		0.310	0.375	0.375	0.438	0.438
Plate Height–H		0.750	0.838	0.838	0.938	0.938
Overall Width Riveted–G		1.875	2.060	2.060	2.375	2.750
Average Weight Per Foot	lb.	1.400	2.000	1.900	2.500	2.900
Average Tensile Strength		6,000	7,000	7,300	8,800	11,000
Finish		Carbon Steel				

Engeerg 400 Series Ptle Chas with Attachments A-1

Item No.	Units	445 A-1(R)	445 A-1(L)
Pitch–P	in.	1.630	
A		1.594	
B		1.160	
E		0.880	
F		0.280	
G		0.750	
I		0.375	
T		0.188	
Average Ultimate Strength	lb.	6,000	
Finish		Carbon Steel	

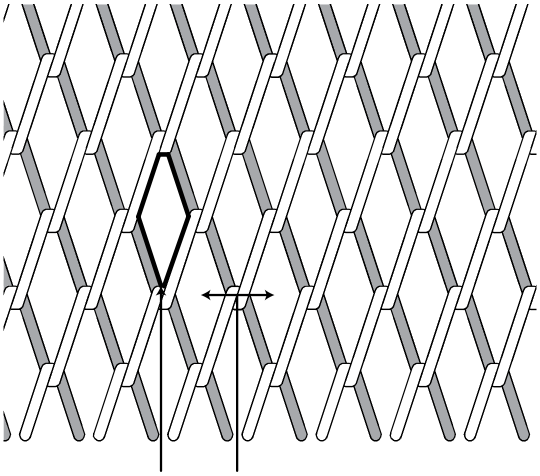
Conventional Weave Meshes

Mesh Designation	Approx. Mesh Center to Center in. (mm) A	Wire Diameter in. (mm)	Approx. Opening in. (mm) B	Weight lb/ft^2 (kg/m^2)
C5½-6-6	2 (50.8)	0.192 (4.88)	1.808 (45.92)	1.46 (7.13)
C5½-5½-8		0.162 (4.11)	1.838 (46.69)	1.04 (5.08)
C5½-5½-9		0.148 (3.76)	1.852 (47.04)	0.87 (4.25)
C5 ½-5½-10		0.135 (3.42)	1.865 (47.37)	0.71 (3.47)
C5½-5½-11		0.120 (3.05)	1.880 (47.75)	0.53 (2.59)
C6-10½-9	1½ (38.1)	0.148 (3.76)	1.352 (34.34)	1.41 (6.88)
C6 -10½-10		0.135 (3.42)	1.365 (34.67)	1.16 (5.66)
C6-10½-11		0.120 (3.05)	1.380 (35.05)	0.83 (4.05)
C6-10½ -12		0.105 (2.67)	1.395 (35.43)	0.64 (3.12)
C7-13-8	1¼ (31.75)	0.162 (4.11)	1.088 (27.64)	2.23 (10.89)
C7-13-9		0.148 (3.76)	1.102 (27.99)	1.87 (9.13)
C7-13-10		0.135 (3.42)	1.115 (28.32)	1.52 (7.42)
C7-13-11		0.120 (3.05)	1.130 (28.7)	1.12 (5.47)
C7-13-12		0.105 (2.67)	1.145 (29.08)	0.84 (4.10)
C10-14-6	1 (25.4)	0.192 (4.88)	0.808 (20.52)	3.92 (19.14)
C10-14-8		0.162 (4.11)	0.838 (21.29)	2.89 (14.11)
C10-14-9		0.148 (3.76)	0.852 (21.64)	2.34 (11.42)
C10-14-10		0.135 (3.42)	0.865 (21.97)	1.89 (9.23)
C10-15-11		0.120 (3.05)	0.880 (22.35)	1.40 (6.84)
C10-15-12		0.105 (2.67)	0.895 (22.73)	1.04 (5.08)
C11-16-9	7/8 (22.22)	0.148 (3.76)	0.727 (18.47)	2.96 (14.45)
C11-16-10		0.135 (3.42)	0.740 (18.80)	2.38 (11.62)
C11-16-11		0.120 (3.05)	0.755 (19.18)	1.73 (8.45)
C11-16-12		0.105 (2.67)	0.770 (19.56)	1.26 (6.15)
C11-16-14		0.08 (2.03)	0.795 (20.19)	0.73 (3.56)

Mesh Designation	Approx. Mesh Center to Center in. (mm) A	Wire Diameter in. (mm)	Approx. Opening in. (mm) B	Weight lb/ft^2 (kg/m^2)
C12-19-9	3/4 (19.05)	0.148 (3.76)	0.602 (15.29)	3.14 (15.33)
C12-19-10		0.135 (3.42)	0.615 (15.62)	2 .54 (12.4)
C12-19-11		0.120 (3.05)	0.630 (16.00)	1.90 (9.28)
C12-19-12		0.105 (2.67)	0.645 (16.38)	1.43 (6.98)
C12-19-14		0.080 (2.03)	0.670 (17.02)	0.83 (4.05)
C12-19-16		0.062 (1.57)	0.688 (17.48)	0.50 (2.44)
C16-24½ -10	5/8 (15.88)	0.135 (3.42)	0.490 (12.45)	3.38 (16.5)
C16-24-11		0.120 (3.05)	0.505 (12.83)	2.45 (11.96)
C16-24-12		0.105 (2.67)	0.520 (13.21)	1.81 (8.84)
C16-23½ -14		0.080 (2.03)	0.545 (13.84)	0.99 (4.83)
C16-23½-16		0.062 (1.57)	0.563 (14.30)	0.60 (2.93)
C16-22-18		0.048 (1.22)	0.577 (14.66)	0.34 (1.66)
C17-24-10	9/16 (14.29)	0.135 (3.42)	0.427 (10.85)	3.85 (18.8)
C17-24-11		0.120 (3.05)	0.442 (11.23)	2.80 (13.67)
C17-23-12		0.105 (2.67)	0.457 (11.61)	2.04 (9.96)
C17-23-14		0.080 (2.03)	0.482 (12.24)	1.08 (5.27)
C17-23-16		0.062 (1.57)	0.500 (12.70)	0.66 (3.22)
C17-22-18		0.048 (1.22)	0.514 (13.06)	0.38 (1.86)
C18-28-10	1/2 (12.7) 2 Mesh*	0.135 (3.42)	0.365 (9.27)	4.32 (21.09)
C18-28-11		0.120 (3.05)	0.380 (9.65)	3.14 (15.33)
C18-28-12		0.105 (2.67)	0.395 (10.03)	2.29 (11.18)
C18-28-14		0.080 (2.03)	0.420 (10.67)	1.17 (5.71)
C18-28-16		0.062 (1.57)	0.438 (11.13)	0.71 (3.47)
C18-28-18		0.048 (1.22)	0.452 (11.48)	0.41 (2.00)
C24-36½-12	3/8 (9.53)	0.105 (3.81)	0.270 (6.86)	3.10 (15.14)
C24-36½-14		0.080 (2.03)	0.295 (7.49)	1.66 (8.10)
C24-36½-16		0.062 (1.57)	0.313 (7.95)	1.00 (4.88)
C24-36½-18		0.048 (1.22)	0.327 (8.31)	0.57 (2.78)

*X Mesh denotes that there are X meshes per Inch

Conventional Weave Meshes				
Mesh Designation	Approx. Mesh Center to Center in. (mm) **A**	Wire Diameter in. (mm)	Approx. Opening in. (mm) **B**	Weight lb/ft² (kg/m²)
C28-43½-14	1/3 (8.4) 3 Mesh*	0.08 (2.03)	0.253 (6.43)	1.93 (9.42)
C28-43½-16		0.062 (1.57)	0.271 (6.88)	1.09 (5.32)
C28-43½-18		0.048 (1.22)	0.285 (7.24)	0.62 (3.03)
C36-59-15	1/4 (6.4) 4 Mesh*	0.072 (1.83)	0.178 (4.52)	1.94 (9.47)
C36-59-16		0.062 (1.57)	0.188 (4.78)	1.42 (6.93)
C36-59-17		0.054 1.37	0.196 (4.98)	1.05 (5.13)
C36-59-18		0.048 1.22	0.202 (5.13)	0.82 (4.00)
C36-59-19		0.041 1.04	0.209 (5.31)	0.61 (2.98)
C36-59-20		0.035 0.89	0.215 (5.46)	0.42 (2.05)
C48-66-16	1/5 (5.1) 5 Mesh*	0.062 1.57	0.138 (3.51)	1.74 (8.50)
C48-70-17		0.054 1.37	0.146 (3.71)	1.28 (6.25)
C48-69-18		0.048 1.22	0.152 (3.86)	0.98 (4.78)
C48-69-19		0.041 1.04	0.159 (4.04)	0.73 (3.56)
C48-68-20		0.035 0.89	0.165 (4.19)	0.47 (2.29)
C60-80-18	1/6 (4.2) 6 Mesh*	0.048 1.22	0.119 (3.02)	1.16 (5.66)
C60-80-19		0.041 1.04	0.126 (3.20)	0.85 (4.15)
C60-80-20		0.035 0.89	0.132 (3.35)	0.66 (3.22)
C60-78-21		0.032 0.81	0.135 (3.43)	0.51 (2.49)
C70-96-20	1/7 (3.6) 7 Mesh*	0.035 0.89	0.108 (2.74)	0.79 (3.86)
C70-95-21		0.032 0.81	0.111 (2.82)	0.66 (3.22)
C70-94-22		0.028 0.71	0.115 (2.92)	0.54 (2.64)
C72-128-19	1/8 (3.2) 8 Mesh*	0.041 1.04	0.084 (2.13)	1.25 (6.10)
C75-116-20		0.035 0.89	0.090 (2.29)	0.91 (4.44)
C75-116-22		0.028 0.71	0.097 (2.46)	0.61 (2.98)



*X Mesh denotes that there are X meshes per Inch

Eye Link Belts

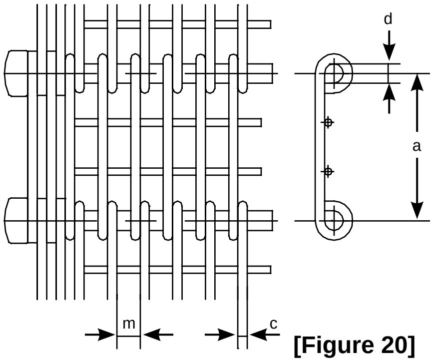
Technical Specifications	Units	
Available Materials		304 & 316 stainless steel, carbon, other materials available upon request
Longitudinal Pitch Lengths	in. (mm)	1.00 (25.4), 1.18 (30.0), 1.97 (50.0), 2.00 (50.8), 2.95 (75.0)
Eye Link Wire Diameters	in. (mm)	0.08 (2.0), 0.10 (2.5), 0.12 (3.0), 0.14 (3.5)
Cross Rod Diameters	in. (mm)	0.16 (4.0), 0.20 (5.0), 0.28 (7.0), 0.32 (8.0)
Available Widths	in. (mm)	2.0–244.0 (50.8–6197.6)
Conveying Surface	in. (mm)	Full belt width minus 0.32 (8.1)
Weight		Dependent upon construction—contact Ashworth Engineering
Maximum Allowable Tension		Dependent upon construction—contact Ashworth Engineering
Maximum Temperature (Material Dependent)	°F (°C)	Up to 752 (400)
Method of Drive		Positively driven

Mesh Designations

Mesh configurations for Eye-Link belts are designated as in the following example (Figure 20):

a x m/c–d
50 x 10/2.5–5

Where:
50 = Belt's longitudinal pitch in mm
10 = Distance between eye links in mm
2.5 = Eye link wire diameter in mm
5 = Cross rod diameter in mm



[Figure 20]

Pitch (a)	Belt Description (m = Mesh Gap)	Eye Link Dim. (c) mm (in.)	Rod Dia. (d) mm (in.)
25.4 (1.0)	25.4 x m / 2.0–5	2.0 (0.080)	5 (0.196)
30 (1.18)	30 x m / 2.0–4	2.0 (0.080)	4 (0.158)
50 (1.97)	50 x m / 2.0–5	2.0 (0.080)	5 (0.196)
	50 x m / 2.5–5	2.5 (0.098)	5 (0.196)
	50 x m / 2.0–7	2.0 (0.080)	7 (0.276)
	50 x m / 2.5–7	2.5 (0.098)	7 (0.276)
	50 x m / 3.0–7	3.0 (0.120)	7 (0.276)
	50 x m / 3.5–7	3.5 (0.135)	7 (0.276)
	50 x m / 2.5–8	2.5 (0.098)	8 (0.307)
50.8 (2.0)	50.8 x m / 2.0–8	2.0 (0.080)	8 (0.307)
	50.8 x m / 2.5–8	2.5 (0.098)	8 (0.307)
	50.8 x m / 3.0–8	3.0 (0.120)	8 (0.307)
75 (2.95)	75 x m / 2.5–5	2.5 (0.098)	5 (0.196)
	75 x m / 2.5–7	2.5 (0.098)	7 (0.276)

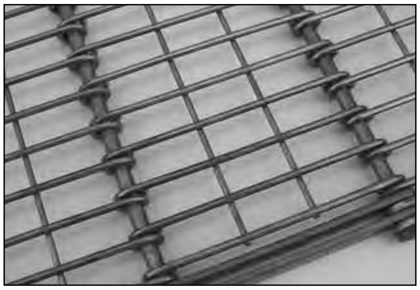
Mesh Gaps

Wire Diameter	Min. Mesh Gap	Max. Recommended Mesh Gap
2.0 mm (0.08 in)	2.3 mm (0.10 in)	26 mm (1.02 in)
2.5 mm (0.10 in)	2.8 mm (0.11 in)	26 mm (1.02 in)
3.0 mm (0.12 in)	3.3 mm (0.13 in)	26 mm (1.02 in)
3.5 mm (0.14 in)	3.8 mm (0.15 in)	26 mm (1.02 in)

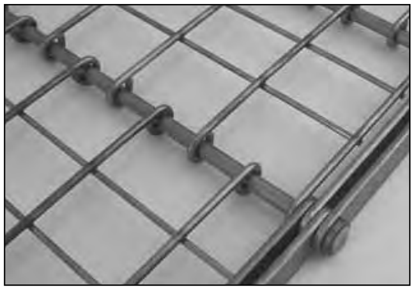
Available Options

Designs

Eye-Link belts are available in either EU (standard) or US designs, the construction of which is based on the placement of the eye links throughout the belt. In the US design, the eye-link ends are equally spaced apart; whereas in the EU design, the eye links are placed so the ends are in direct contact with one another. EU design belts display a more closed grid pattern, while the US design is more open, as in the following photographs.



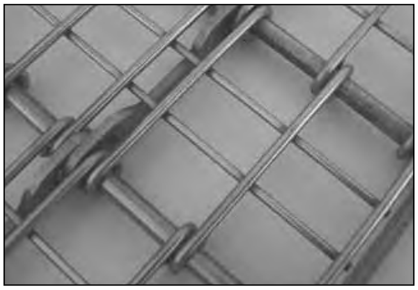
Eye-Link EU design



Eye-Link US design

Eye-Link Plus

Eye-Link Plus belts are constructed with specially designed internal bar links that have slotted holes and are cut to allow the belt's cross wires to pass unimpeded across the width of the module. This design adds strength to the belt while enabling excellent cleanability. Eye-Link Plus belts are only available in 50 mm pitch, but can be manufactured in either EU or US eye link patterns as shown in the accompanying photographs.



Eye-Link EU-Plus design

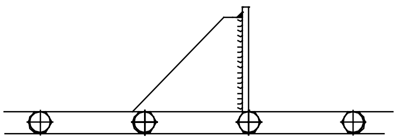
Eye-Link US-Plus design

Loose Chain & Chain Edges

All Eye-Link belts can be fitted with either loose chain made from bar links or with chain edges to suit customer specifications.

Cross Flights

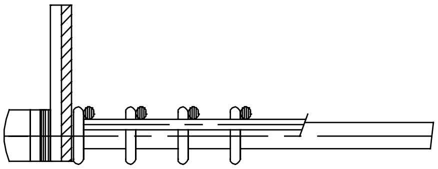
Cross flights (Figure 21) prevent product from sliding or rolling down the belt when operated on an incline/decline. Typical construction includes a support plate along each belt edge, with a flat bar welded onto the edge of the plate, almost extending across the full width of the belt.



[Figure 21]

Side Plates

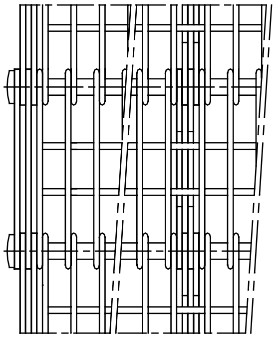
Side plates (Figure 22) prevent product from falling off the edges of the belt. Standard construction is a plate extending 41 mm (1.61"), 51 mm (2.01"), or 61 mm (2.4") above the belt's surface. Non-standard side plates are possible from 10 mm (0.39") up to 200 mm (7.87") and are manufactured per order. Side plates replace one bar link at the belt edge.



[Figure 22]

Bar Links

Bar links (Figure 23) provide tension carrying capacity. They also prevent excessive cross rod and module deflection. Additional bar links may be added to strengthen the belt. The belt should be supported under the bar links only. For Eye-Link Plus, the inner bar links are cut out in the middle to provide room for a continuous module. All bar links are fitted with slotted holes for easy cleaning.



[Figure 23]

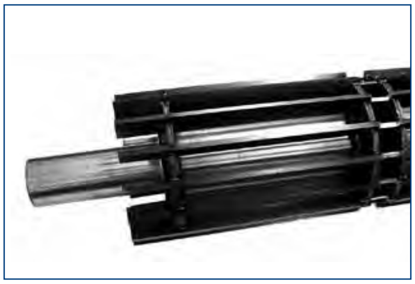
Sprockets

Eye-Link belts are positively driven with sprockets situated across the width of the belt. Sprockets should be positioned at a 15 mm (0.59") offset next to the bar link rows at both sides. For all Eye-Link belts, 8 or 12 tooth sprockets are standard. Sprockets can be produced from carbon steel, stainless steel and UHMWPE. The number of teeth can vary from 8 to 30 teeth.

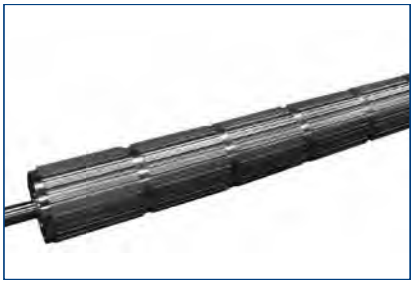
For wide belts, the use of sprocketed drums or pulleys is recommended based on the maximum allowable deflection of the drum. For use of Eye-Link belts in environments where formation of ice is possible, a special ice-free sprocket is available to prevent ice build-up. For wide belts in an ice-containing environment, a cage drum is typically used.

Pitch	No. of Teeth	Pitch Dia.
25.4 mm	8	65.33 mm (2.57 inch)
	12	97.09 mm (3.82 inch)
30 mm	8	78.39 mm (3.09 inch)
	12	115.91 mm (4.56 inch)
50 mm	8	130.66 mm (5.14 inch)
	12	193.19 mm (7.61 inch)
50.8 mm	8	132.75 mm (5.23 inch)
	12	196.28 mm (7.73 inch)
75 mm	8	195.98 mm (7.72 inch)
	12	289.78 mm (11.41 inch)

Laser Cut Disk Pulley



Cage Drums



Tube Drum

Wear Strip Material & Placement

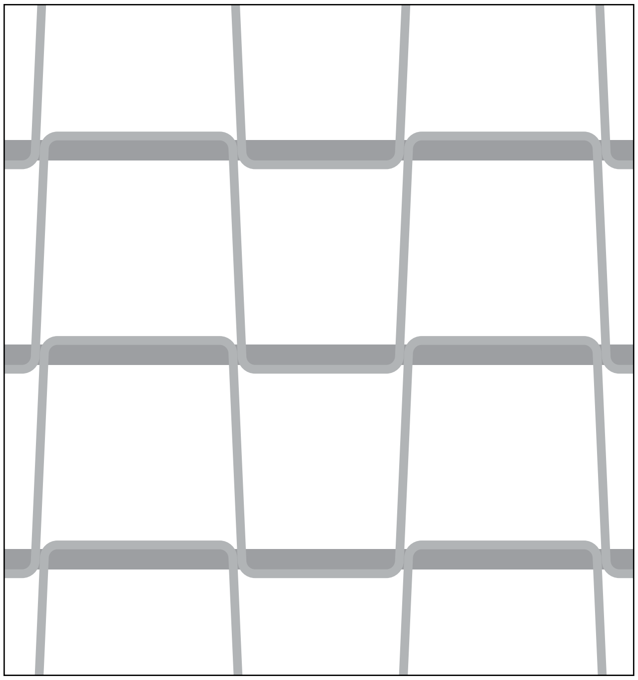
The recommended belt supports for Eye-Link belts operated at temperatures from -40°F (-40°C) to 140°F (60°C) are UHMWPE strips placed underneath the bar links. The strips should be at least 0.59" (15 mm) wider than the total width of one bar link packet.

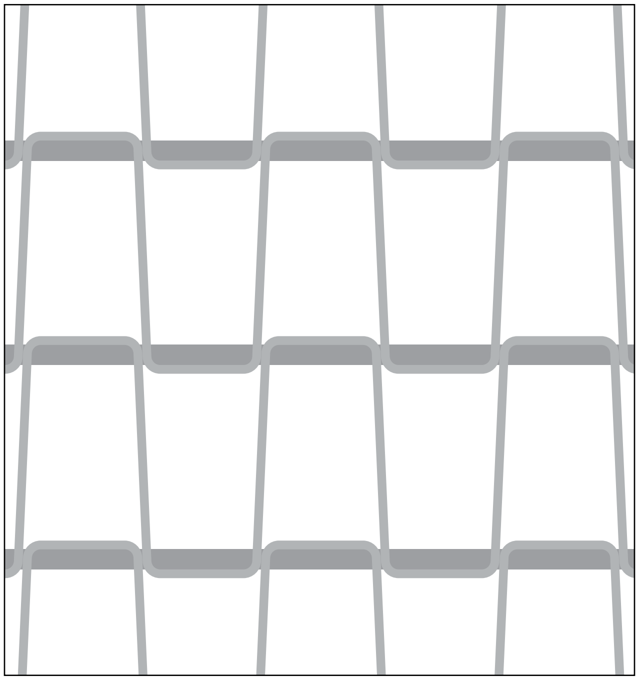
For temperatures over 140°F (60°C), the recommended material is Inoxyda (glide bronze) for non-food applications and stainless steel for food applications.

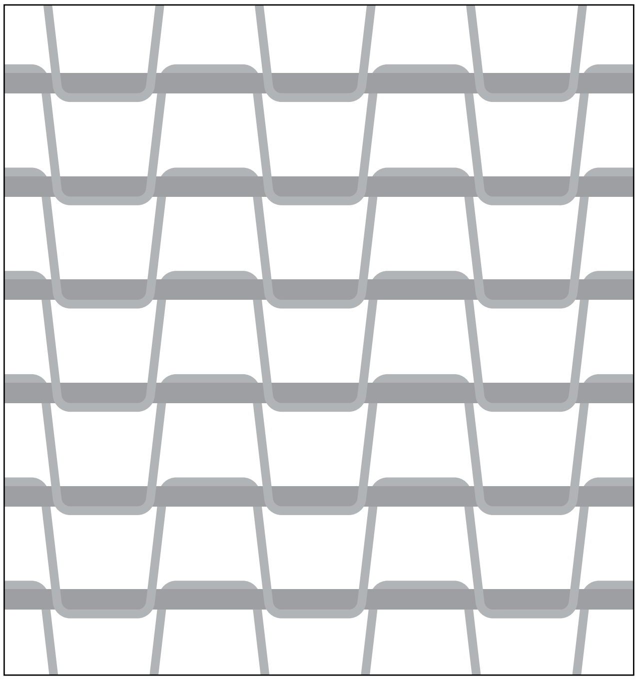
System Requirements

- Eye-Link belts do not normally need a tension unit. Preferably, there is a catenary sag over the return rollers.
- Reverse bends should be avoided, as this will damage the eye links.
- Heavy products must not fall on the belt as this could damage the eye links and cross wires.
- The drive and return drum should be placed 0.08" (2 mm) higher then the support strips.
- All drums and rollers must be parallel to each other.
- The support bed must be horizontal to ensure correct tracking of the belt.
- The maximum recommended belt speed is 60 ft/min. (20 m/min) depending on belt width, load, and system layout.

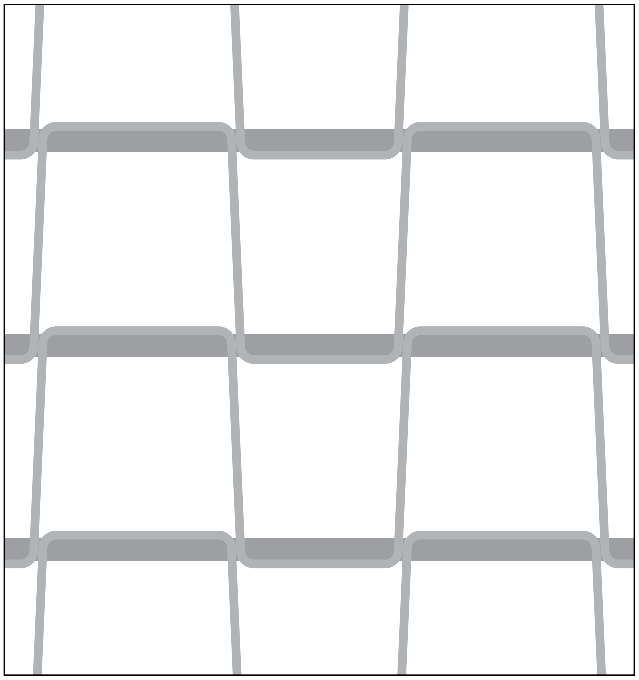
Mesh Diagrams - Flat Wire


Flat Wire A1/A2

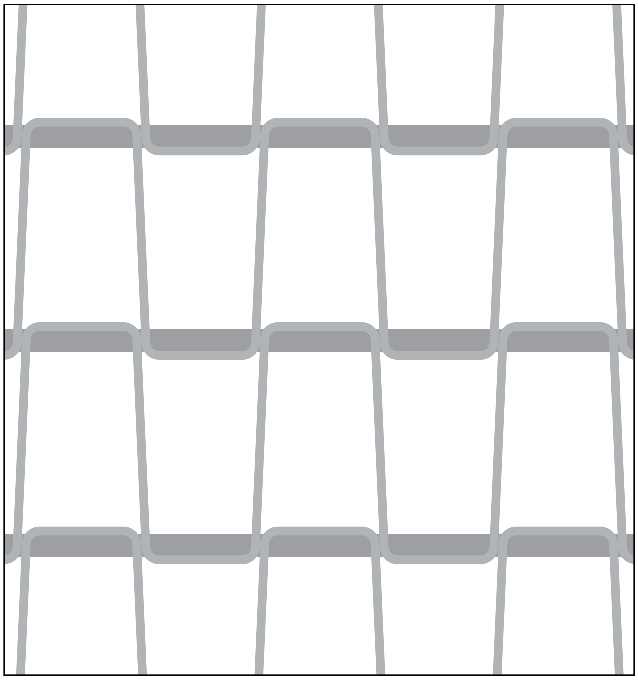

Flat Wire A3/A4


Flat Wire A5

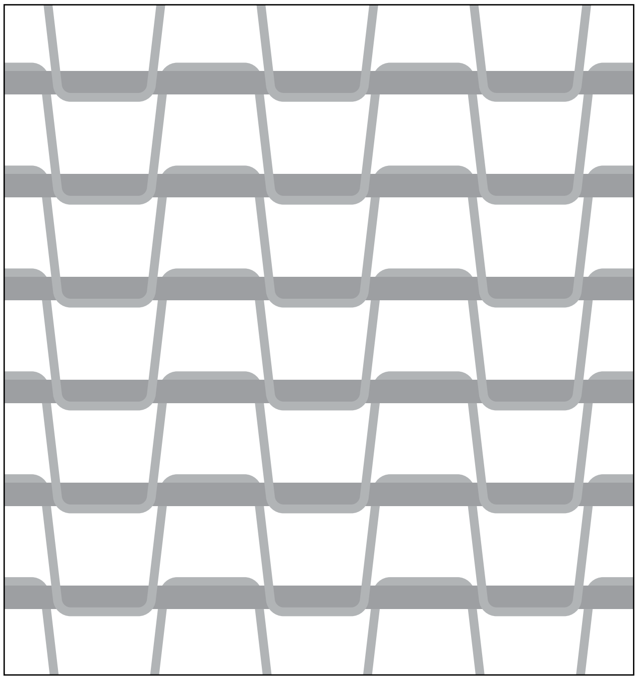
Mesh Diagrams - Flat Wire



Flat Wire B1/B2

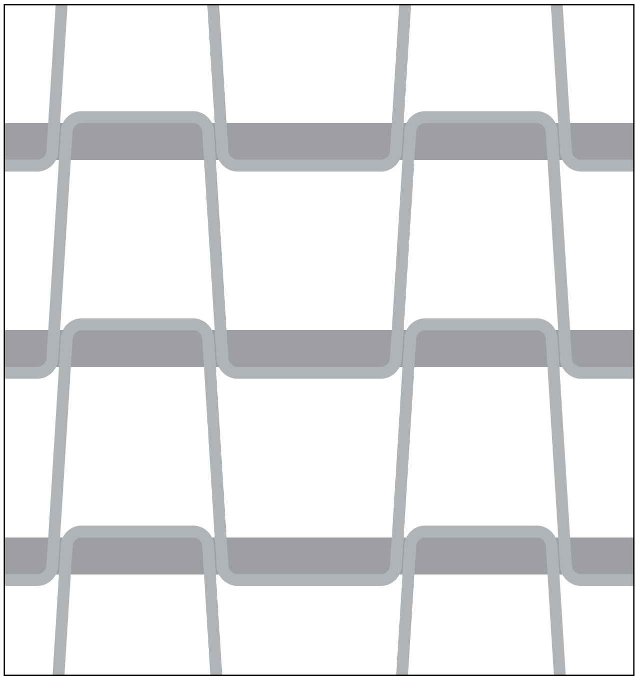


Flat Wire B3/B4

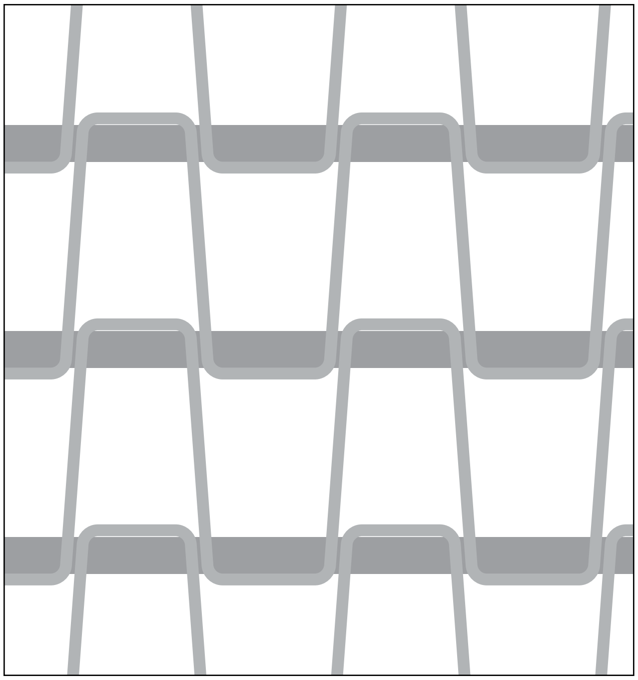


Flat Wire B5

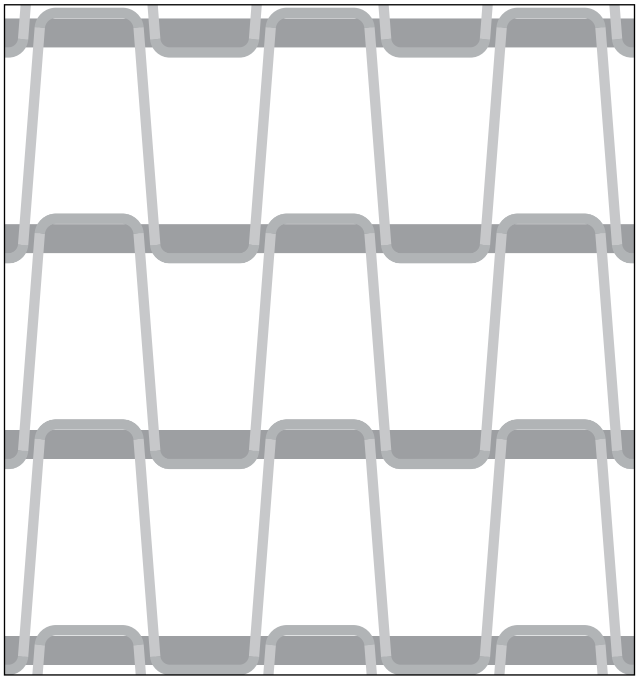
Mesh Diagrams - Flat Wire



Flat Wire C1

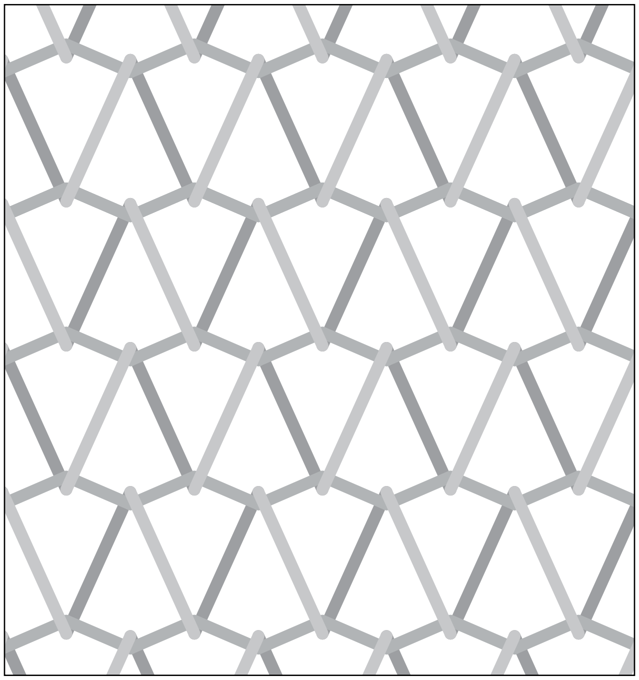


Flat Wire C2

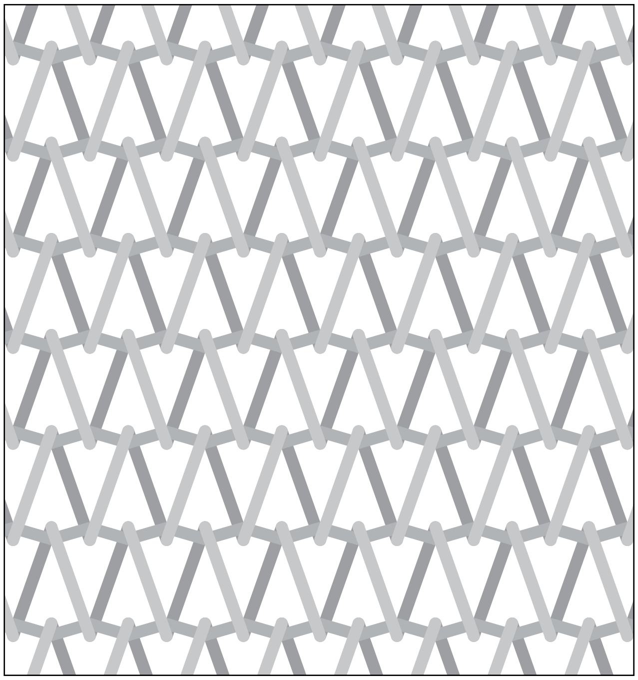


Flat Wire H3

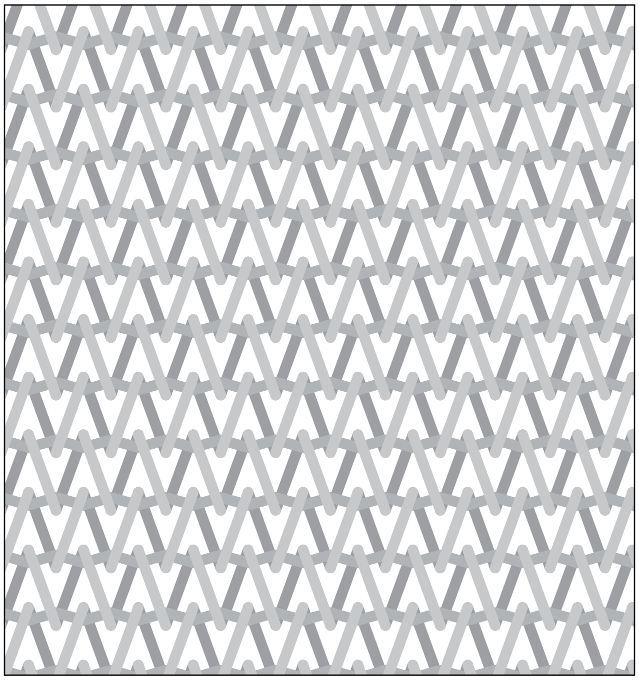
Mesh Diagrams–Cleatrac®



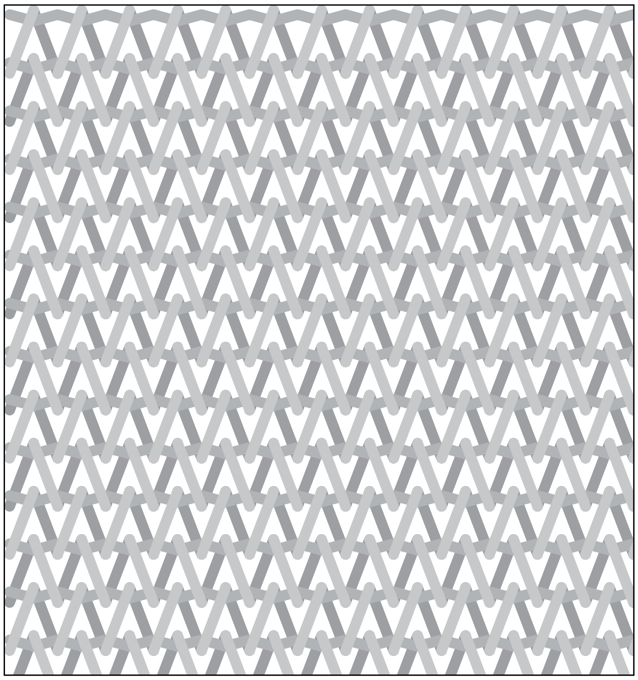
CTB18-16-16



CTB30-24-16

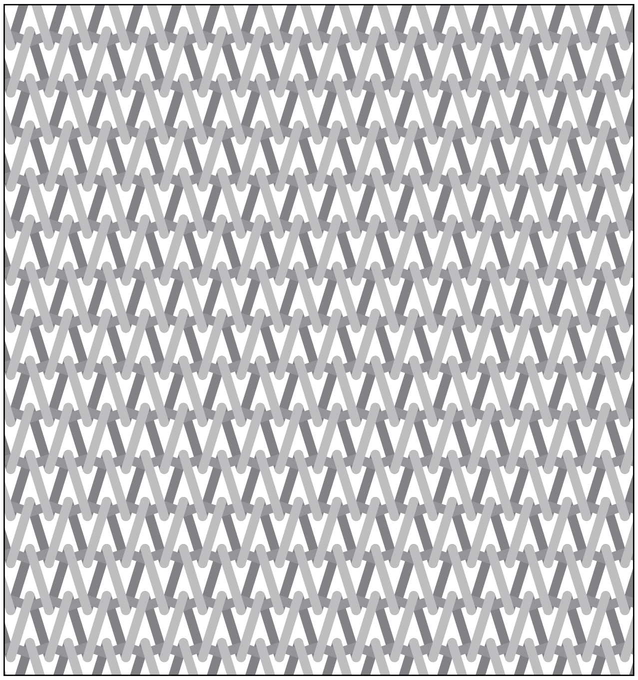


CTB42-36-17

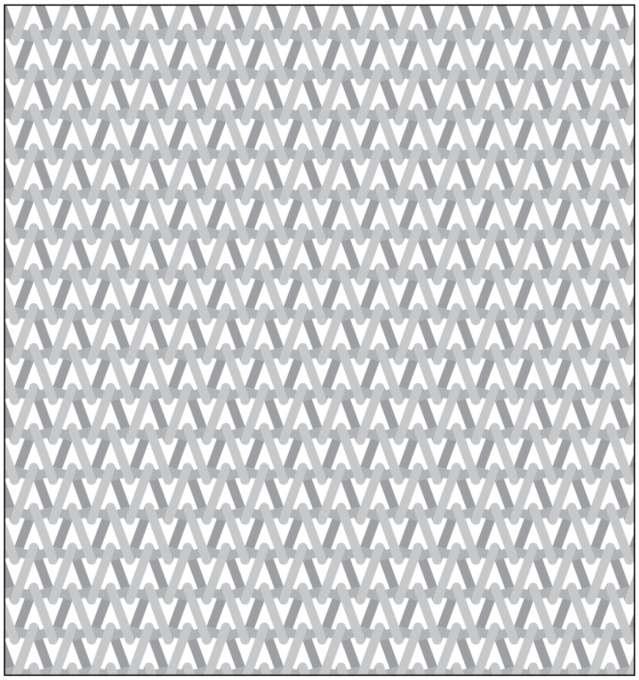


CTB48-48-17

Mesh Diagrams - Cleatrac®



CTB60-48-18



CTB60-60-18

NOTES

Positive Driven: Straight-Running Belt Selection & Engineering Calculations

Belt Tension Calculation for Straight-Running Belts
The belt tension calculation formula for straight-running belts is different from that for spiral or turn-curve belts, as there is no system radius (R) factor to be considered. Although the tension calculation formula is basically the same for all straight-running belts, there is considerable variation in the belt support options and, therefore, in the coefficient of friction (fr). The general belt tension calculation formula for straight-running belts is:

T = (wLfr + WLfr + WH) x C

Where:
T = Belt tension in lb. (Newtons)
w = Weight of the belt in lb. per linear foot (kg per linear m)
W = Belt Weight + Product Weight in lb. per linear foot (kg per linear m)
L = Full length of conveyor, measured from center to center of the pulleys in feet (meters)
fr = Coefficient of Friction between the belt and belt supports
H = Rise of incline conveyor in feet (meters), (+ if incline,–if decline)
C = Force conversion factor
Imperial: 1.0
Metric: 9.8

Woven Wire Belts (Including Baking Bands)
In calculating the tension ratings for woven wire belts, including Ashworth Baking Bands, the general formula for calculating tension for straight-running belts is used, except that the WH coefficient is typically not relevant (equals 0) as these belts generally are not operated on inclines/declines.

Typical (fr) values used in woven wire belt applications are:

Types of Support	Coefficient of Friction (fr) value
Free-turning rollers	0.10
Stainless steel	0.40
Carbon (mild) steel:	
With temperature to 1000°F (538°C)	0.35
Between 1001 and 1200°F (538–649°C)	0.37
Between 1201 and 1400°F (649–760°C)	0.40
Between 1401 and 1600°F (760–871°C)	0.44

Once belt tension is calculated, the following formula is used to determine how much torque is required to adequately drive the belt and its product load:

Torque Requirement (in units of Inch Pounds) = Belt Tension (T) x ½ Drum or Pulley Diameter in inches

Positive Drive Chain Edge (PDCE) Belts

The general formula is used, including the WH coefficient, as these belts are frequently used in incline/decline applications. However, in calculating WH, the reduction of chain pull due to the weight of the conveyor going downhill on the return side can be ignored and is omitted from the inclined conveyor formula.

The following coefficients of friction (fr) for chains and typical supports are:

Type of Chain/Supports	Coefficient of Friction (fr) value
Drag chain, with non-rotating rollers or sliding on side plates on metal supports	0.35
Drag Chain, with non-rotating rollers or sliding on side plates on UHMWPE supports	0.20
Chains moving on rollers	0.10

Note: If the application is poorly lubricated, the above fr values should be increased by 50%.

Once the tension calculation is completed for the PDCE belt, the chain must be checked to see if it can handle the tension. This is done by comparing calculated T values to the load rating on the chain using the following conversions:

Calculated Single Strand Chain Pull:
- For 2 Strand Conveyor uniformly loaded: use 50% of total chain pull or T/2
- For 3 Strand Conveyor uniformly loaded: use 33.3% of total chain pull T/3
- For 4 Strand Conveyor uniformly loaded: use 25% of total chain pull T/4

Note: These values are for chains uniformly spaced across the width of the conveyor.

Ultimate Strength Required in Chain:
- For speeds less than 25' per minute: use 5 times maximum single strand chain pull
- For speeds less than 25' to 50' per minute: use 6 times maximum single strand chain pull
- For speeds less than 50' to 100' per minute: use 7 times maximum single strand chain pull
- For speeds greater than 100' per minute: use 8 times maximum single strand chain pull

Note: These values are for normal operating conditions. For unusual conditions, such as in ovens, corrosive solutions, or handling abrasive materials consult with Ashworth Engineering.

Type of Chain/Supports	Coefficient of Friction (fr) value
Clean and/or packaged product	0.20
Breaded or flour-based product	0.27
Greasy, fried product below 32°F (0°C)	0.30
Sticky, glazed or, sugar-based product	0.35

Straight-Running Belt Selection & Engineering Calculations

Flat Wire Belts

Tension is calculated using the general formula previously provided with appropriate *fr* values, based on the support materials used. Appropriate *fr* values for flat wire belts include those for mild steel listed in the preceding section, as well as the following values for UHMWPE supports:

The quantity of required drive sprockets is then calculated based on the calculated tension on the belt and the belt speed. *In no case should sprocket spacing exceed 6" (152.4 mm) across the width of the belt.*

The number of sprockets required is calculated by dividing the calculated tension (T) by either 50 or 35, depending on whether the belt is standard weight or heavy duty. This result is then compared to the result of dividing the belt width by 6. The higher of the two results is the correct number of sprockets to be used. This calculation is illustrated in the following example:

A FWC2 (heavy duty) flat wire belt is 36" (914.4 mm) wide, and has a calculated tension (T) of 450 lb. (204.5 kg).

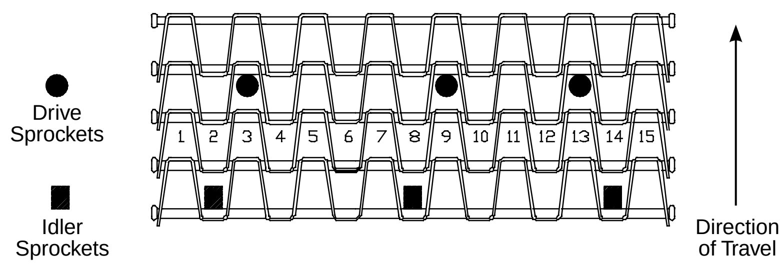
1. 450 (T) /50 (tension carried by a heavy duty sprocket) = 9 sprockets
2. 36 (belt width)/6 (maximum spacing of sprockets in inches) = 6 sprockets
3. 9 > 6, so 9 sprockets should be used.

This calculation is moderated by belt speed; the greater the speed of the belt, the greater the number of sprockets required. The following table provides modified sprocket quantities based on the speed of the belt, where:

BS = Belt Speed in feet per minute (meters per minute)
BT = Belt Tension at the drive shaft in lb. (kg)

Belt Type	**BS<20 fpm (BS<6.1 mpm)**	**BS≥20 fpm BS≥6.1 mpm**
Standard Weight Flat Wire	BT/50 (BT/22.7)	BT/35 (BT/15.9)
Heavy Duty Flat Wire	BT/100 (BT/45.4)	BT/50 (BT/22.7)

Proper location and placement of the sprockets is important as it results in smoother belt operation, reduced wear on the sprockets and on the belt. Sprocket teeth should always drive against the round connector rod. Space sprockets evenly along drive and idler shafts, ensuring that the outside drive sprockets are located in the odd numbered openings beginning with the third opening in on each belt edge. Idler sprockets are located in even numbered mesh openings beginning with the 2nd opening in on each belt edge.



[Figure 24]

To ensure that each drive sprocket tooth contacts the round connecting rod and shares in its part of the load, the hubs of all sprockets located on the same shaft should face the same direction. For those sprockets without hubs, the sprocket sides with the Ashworth logo, lettering, or directional arrows should face the same direction.

Figure 24 illustrates correct placement of drive and idler sprockets.

Note: Sprockets provide positive drive to flat wire belts. They will also help keep the belt properly aligned. However, sprockets cannot be expected to control excessive alignment and control issues. The ability of a belt to run in a straight and controlled manner is a function of the quality of the belt, correct conveyor or equipment design, and proper belt installation.

Driving Drum (Terminal Roll) Diameter Calculation for Friction-Driven Belts

Woven Wire Belts

Woven wire belts must be driven by terminal rolls or drums of adequate size in order to avoid damage to the belt. If the driving drum is less than the calculated minimum, the belt will hinge on the spirals, causing them to bend. The bending essentially flattens the spirals and elongates the pitch. This elongation typically is not uniform across the belt's width. The resulting problems may include mesh distortion, metal fatigue, and belt tracking issues.

To calculate the minimum drum diameter for balanced weave belts, divide 180 by the second count (SC) number in the mesh count designation. For example, a B48-24-16 mesh has a SC of 24, so the calculation would be 180/24 = 7.5. The minimum drum diameter would be 7.5 inches.

For baking bands or other woven wire belts utilizing compound balanced weave construction, the diameter of the terminal rolls or drum is determined by making the following calculations: First, divide the second count number by the CB number. Then, divide 180 by this result to arrive at the correct minimum drum diameter.

For example, consider the CB5 Baking Band® with a mesh designation of CB5-27-84-1416F. First divide 84 by 5, arriving at the result, 16.8. Then divide 180 by 16.8, which equates to 10.71" (272.14 mm). This is the minimum driving drum diameter calculated in inches (or mm).

Flat Wire Belts

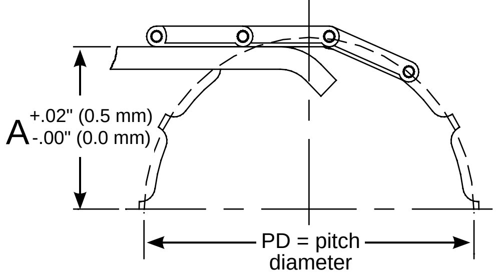
In the majority of cases, flat wire belts are sprocket driven. However, in the case of heavy loads and long belt lengths, flat wire belts may also be friction driven. Under these conditions, a lagged drum (one covered in urethane to increase the friction between the drum and the belt) is often used. The drum should be flat-faced (not crowned) and be a minimum of 12" (304.8 mm) in diameter for 1" (25.4 mm) pitch belts and 7.5" (190.5 mm) in diameter for 1/2" (12.7 mm) pitch belts.

Wear Strip Placement Calculation

In most cases, wear strips for straight-running belts are positioned according to the formula at right.

This formula is a general guideline and does not take into consideration belts traveling at speeds greater than 75 ft/min. (23 m/minute). For high speed applications, Ashworth recommends increasing the height of “A” (Figure 25) and shortening the wear strips as much as one belt pitch in length.

[Figure 25]



A = ½ x (PD – BT)

Where:
A = Calculated Height
PD = Sprocket Pitch Diameter
BT = Belt Thickness

Troubleshooting—Flat Wire Belts

Tracking Problems
If a flat wire belt is not tracking properly, it could be the result of one or more of the following problems:
- Misalignment of the snub rolls
- Physical damage to the belt
- Belt is contacting the structure of the equipment where it is installed
- Belt is subjected to uneven heating
- Belt is carrying an unbalanced product load

If the belt is friction driven, additional possible causes of poor tracking include:
- Misalignment of terminal rolls; usually the case if the belt edges exhibit unequal sag near the drive drum
- Undersized terminal rolls which can cause the belt to bend and stretch irregularly

Increase in Belt Length
In certain situations, there may be a noticeable lengthening of the belt, leading to tracking and drive issues. In addition to the case listed above where the terminal drum has been undersized, belts can increase in length due to:
- Excessive system tension being applied to the belt, causing the belt to prematurely wear and stretch
- Newness of the belt; after initial installation, it is normal to experience elongation of the belt of up to 0.2% in total belt length
- The belt is old and has elongated due to wear

Surging
Surging of flat wire belts can be caused by a number of factors, including:
- Faulty power transmission components; gear boxes, couplings, and motors, including silicon controlled rectifier units
- Inconsistent belt support material; whereby higher levels of friction are caused by different types of supports; different types of supports should not be mixed in a single system
- Over-torqueing of the drive shaft and/or too much tension in the system
- Overcoming the initial inertia of the system may cause the belt to surge upon start-up; this is normal to a certain degree and may not be an indication of a problem

Binding of the Belt & Sprockets
The most common cause of binding of the sprocket teeth with the belt is due to incorrect size selection of the sprockets. Other possible causes include:
- Improper sprocket tooth alignment; this may be corrected by making sure the recommended key seat is used over the entire belt width and/or by making sure that the sprocket hubs all face in the same direction
- Too little catenary sag has been built into the belt; this can be corrected by either adding more belt length or a stripper bar to the system

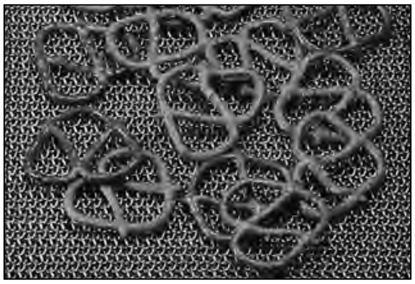
Belt Jumps the Sprockets
This problem is likely due to one of the following:
- Incorrectly sized sprockets
- Misaligned take-up, causing unequal force to be applied along the width of the shaft
- The belt length is too long; this allows the belt to ride up and out of the grip of the sprocket teeth

Straight Running Belts:
Friction Driven

Baking Bands

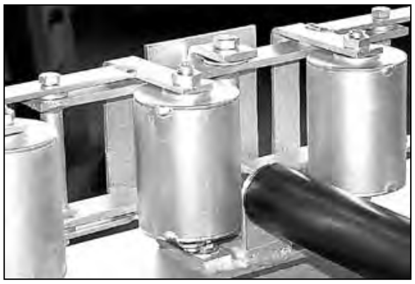
Over 45 Years of Baking Success
- Invented by Ashworth and proudly manufactured in the USA since 1963
- Preferred marking pattern
- Stable product support
- Industry standard

High Quality & Performance
- Still inspected with 22 quality checkpoints to guarantee true tracking and a long operating life
- Dense mesh provides even heating across the entire belt width
- Excellent relief of cooking gasses



Balanced Weave

The Most Versatile Belt
- Ideal for products that are small or need a lot of support
- Precision manufactured to minimize belt stretch and increase belt life
- Variable mesh openings to meet application requirements
- True tracking
- Uniform flat conveying surface
- Resistant to distortion
- Ideal strength-to-weight ratio
- Minimal maintenance



Control Rolls

Preserve True Tracking
- Ensure belt alignment during changing conditions or production mishaps
- Ensure product alignment

Ashworth True Tracking Guarantee
- Requires purchase of Ashworth Controls and Ashworth Supervised Installation

Lehr Belts

For High Temp Oven Applications
- Locked-in spiral construction
- Factory tested for true tracking
- Spirals and connector rods eliminate almost all hinge wear and belt elongation issues

Stable and Smooth Transfers
- Reduced belt vibration—improved crimp profile forms the smoothest hinge, eliminating harmonic vibration
- Flat surface provides stable support

Selection Guide:
Straight Running Belts

Specifications	Units	CB5 Baking Band	Woven Wire	Lehr Belt
Material(s)		Stainless Steel, Carbon & Galvanized Steels, High Temperature Alloys		
Width Limits	in. (mm)	Up to 144 (3658)	Up to 216 (5486)	1 - 216 (25.4 - 5486)
Pitch	in. (mm)	0.44 (11.2)	Mesh Dependent	0.33 (8.5) Lateral 0.60 (15.24) Longitudinal
Mesh Type		Compound Balanced Weave	Unilateral, Balanced, Conventional or Compound Balanced Weave	Balanced Weave
Maximum Tension	lb/ft kg/m	Dependent on Material and Temperature	Mesh Dependent	Dependent on Material and Temperature
Open Area	%	Minimal	Mesh Dependent	47
Edge Treatment		Welded		
Method of Drive		Friction/Drums		
Straight Run Applications				
Can Ovens / Washers				
Can Washing				
Cookers				
Fertilizer Spreading				
Filling Lines				
Food Processing Conveyance			◆	
Freezer Belt				
Fryer Belt			◆	
General Conveyance			◆	
Incline Conveyors				
Industrial Dryers				
Industrial Washers			◆	
Lehr Oven Belt				◆
Oven/Baking Belt		◆	◆	◆
Package Accumulation				
Package Conveyance				
Pasteurizing Applications				
Product Washing			◆	
Quench Tanks			◆	
Rubber Parts Handling				
Small Product Transfer			◆	
Veneer and Wood Drying				
Washers and Degreasers				

STRAIGHT BELT SELECTION

Performance Guarantee

For the Proper Tracking of Compound Balanced Weave and Balanced Weave Belting

Ashworth manufactures woven wire baking bands using the industry's highest standards and tightest tolerances.

All baking bands are tracked in-house prior to shipment the exact same way that we recommend the bands be installed in the field.

Our Model One Control Rolls are installed on the conveyor at a distance of two to three times the width of the belt from the terminal roll.

The belt is mapped for true tracking and then split into manageable sections of either 25 or 50-foot lengths. The belt sections are sequentially numbered and rolled with the bake side out.

On-Site Belt Installation

The belt must be installed in the sequential order that it was tested at the factory.

The belt can be installed at either the discharge or the in-feed of your conveyor/oven, but when installing the belt into the discharge the belt must be fed off the BOTTOM of each roll into the return path of the conveyor/oven at the discharge. Conversely, when installing the belt into the in-feed, the belt must be fed off the TOP of each roll. Failure to install the belt sections in this manner will cause the belt to "bow" or "dog-leg" at the splice joints and develop excessive waver.

Your Guarantee for Exceptional Performance and Minimum Production Interruption

Ashworth guarantees that our CB5 Baking Band® to track with a total waver not to exceed 1⁄4-inch at either terminal end, and balanced weave belts with more open meshes to track with a total waver not to exceed 3⁄8-inch, under the following conditions:

1. Ashworth's Model One control rolls are properly installed at a distance equal to two to three times the belt width prior to each terminal roll. Ashworth guarantees the total waver not to exceed 1⁄2-inch at either terminal end when Model Two controls are properly installed.
2. The belt sections are installed in sequential order as marked, and verified by an Ashworth Factory Service Technician before running the belt.
3. Tracking adjustments are completed and verified by an Ashworth Factory Service Technician.

Baking Bands

Technical Specifications	Units	
Available Materials (Mesh and Connector Rods)		Stainless steel, carbon steels
Minimum Width		3 lateral pitches + 4 spiral wire diameters
Maximum Width	in. (mm)	144.00 (3657.6)
Conveying Surface		Full belt width
Thickness (Mesh Dependent)		See mesh designation table
Weight (Mesh Dependent)		See mesh designation table
Lateral Pitch (Mesh Dependent)		See mesh designation table
Opening Size (Mesh Dependent)		See mesh designation table
Maximum Temperature	°F (°C)	Carbon steel—Up to 1000 (538)
Method of Drive		Friction driven on flat-faced drums or terminal rolls

Mesh Designation

Mesh choice depends on the baking requirements of the product. Your selection should consider product support, heat exposure, and the belt strength required for the oven design.

Terminal Rolls / Drum Diameter

For baking bands utilizing compound balance weave construction, the diameter of the terminal rolls or drum is determined by making the following calculations: divide the second number by the CB number; 180 is then divided by this result to arrive at the correct minimum drum diameter.

For example, considering mesh type CB5-27-84-1416F (CB5 Baking Band®), first divide 84 by 5, arriving at 16.8. Then divide 180 by 16.8, which equates to 10.71" (272.14 mm) This is the minimal driving drum diameter calculated in inches (or mm).

Controls

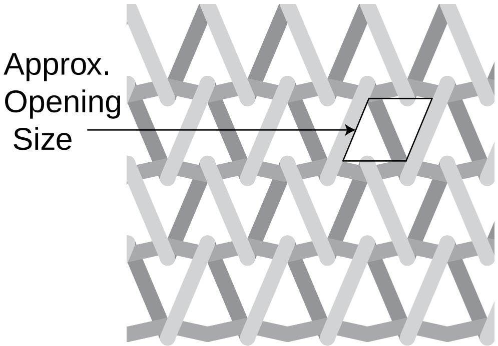
Ashworth recommends use of Ashworth Model #1 or Model #2 Control Systems to prevent the belt from contacting oven framework and to keep the belt centered on the terminal drums.

Wire Options

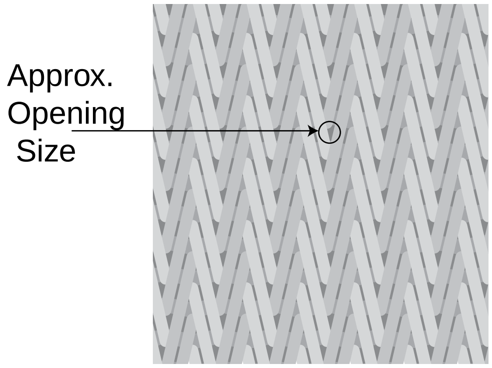
Baking bands are typically manufactured from annealed high carbon steel round wire in standard gauge sizes. Stainless steel and other steel alloys can be used if required.

Flattened Wire (F) can be specified for the conveying surface if needed. Additionally, Precision Ground Light Weight (PGLW) can also be specified. This process results in the flattest baking surface and is attained by precision grinding of the surface after the baking band has been manufactured. This option is limited to carbon steel bands 54" (1370 mm) or less in width.

Woven Baking Band
(Figure 26)



Compound Balance Weave Baking Band
(Figure 27)



Woven Baking Bands (Crimped)

Mesh Designation	Wire Diameter in. (mm)	Approximate Opening Size in. (mm) **Figure 26**	Weight lb/ft² (kg/m²)
B48-38-15	0.072 (1.83)	0.18 x 0.24 (4.6 x 6.1)	2.80 (13.7)
B48-48-16	0.062 (1.57)	0.18 x 0.19 (4.7 x 4.8)	2.30 (11.2)
B60-36-14 PGLW	0.080 (2.03)	0.12 x 0.25 (3.0 x 6.4)	3.54 (17.3)
B60-36-16 PGLW	0.062 (1.57)	0.14 x 0.27 (3.6 x 6.9)	2.12 (10.3)
B72-72-18	0.047 (1.19)	0.12 x 0.12 (2.9 x 2.9)	2.05 (10.0)
B84-20-1416	0.080/0.066 (2.03-1.67)*	0.08 x 0.52 (2.0 x 13.2)	2.80 (13.7)
B102-24-1418	0.080/0.047 (2.03-1.19)*	0.07 x 0.42 (1.8 x 10.7)	2.20 (10.7)
U66-48-1718 PGLW	0.054/0.047 (1.37/1.19)*	0.13 x 0.20 (3.3 x 5.1)	1.69 (8.3)
B66-48-1718F	0.054/0.047 (1.37/1.19)*	0.13X0.20 (3.3 x 5.1)	1.69 (8.3)

Compound Balance Weave Baking Bands

Mesh Designation	Type of Connector	Wire Diameter in. (mm)	Approximate Opening Size in. (mm) **Figure 27**	Weight lb/ft² (kg/m²)
CB3-22-58-12	Straight	0.105 (2.7)	0.08 (2.0)	7.95 (38.9)
CB3-30-72-14	Crimped	0.080 (2.0)	0.062 (1.6)	6.00 (29.6)
CB3-36-76-14	Crimped	0.080 (2.0)	0.054 (1.4)	3.76 (18.4)
CB3-42-72-1416	Crimped	0.080/.062 (2.0-1.6)*	0.052 (1.3)	4.85 (23.7)
CB3-56-120-18	Straight	0.047 (1.2)	0.041 (1.0)	3.90 (19.1)
CB3-58-140-19	Straight	0.041 (1.0)	0.032 (0.8)	3.45 (16.9)
CB3-60-139-19F**	Crimped	0.041/0.041x0.035* (1.0-1.0x0.9)	0.028 (0.7)	2.85 (13.9)
CB3-84-176-2022	Crimped	0.035/.028 (0.9/0.7)*	0.018 (0.5)	2.40 (11.7)
CB3-84-200-22	Crimped	0.028 (0.7)	0.018 (0.5)	2.40 (11.7)
CB5-27-84-1416F**	Crimped	0.080/0.063x0.047* (2.0/1.6x1.2)	0.050 (1.3)	4.20 (20.6)
MCB5-27-84-1516F**	Crimped	0.072/0.063x0.047* (1.8-1.6x1.2)	0.058 (1.5)	3.35 (16.4)
CB5-36-120-18	Crimped	0.035 (0.9)	0.017 (0.4)	3.82 (18.7)

*Connecting wire diameter/Spiral wire diameter
** Flattened Wire

CB5 Baking Band®

Technical Specifications	Units	
Material	in. (mm)	14 and 16 gauge (0.080 or 0.062 [2.0 or 1.6]) stainless or high carbon steel wire
Minimum Width		1.58 (40.1)
Maximum Width		144.00 (3657.6)
Longitudinal Pitch		0.14 (3.6)
Belt Strength	lb/ft (kg/m)	3100 (4600) of belt width, based on high carbon steel at 70°F (21°C)
Conveying Surface		Overall Belt Width(0.5 one lateral pitch + 3 spiral wire diameters)
Mesh Type		Compound balance weave with 5 connectors per spiral
Mesh Designation		CB5-27-84-1416F (standard)
Open Area		Minimal
Edge Treatment		Welded
Method of Drive		Friction driven on flat faced terminal rolls
Minimum Terminal Roll Diameter	in. (mm)	10.75 (273.1)
Maximum Temperature	°F (°C)	Carbon steel: Up to 1000 (538) Stainless steel: Up to 2050 (1121)

Available Options

Wire
Baking bands are typically manufactured from annealed high carbon steel round wire in standard gauge sizes. Stainless steel and other steel alloys can be used if required.

Flattened Wire (F) can be specified for the conveying surface if needed. Additionally, Precision Ground Light Weight (PGLW) can also be specified. This process results in the flattest baking surface and is attained by precision grinding of the surface after the baking band has been manufacturer. This option is limited to carbon steel bands 54" (1370 mm) or less in width.

Controls
Ashworth recommends use of Ashworth Model #1 or Model #2 Control System to prevent the belt from contacting oven framework and to keep the belt centered on the terminal drums.

MCB5 27-84-1516F
This is a lighter weight version of the original CB5 Baking Band®. By using a higher gauge crimp connector, the band's weight is reduced by approximately 20% compared to the standard CB5-27-84-1416F. This band is known as the CB5 Metric, where "Metric" is designated by the "M" in the mesh designation.

CB3 Tortilla Band®

Technical Specifications	Units	
Material	in. (mm)	14 gauge (0.080 [2.0]) stainless or high carbon steel wire
Minimum Width		1.28 (32.5)
Maximum Width		144 (3658)
Longitudinal Pitch		0.17 (4.2)
Belt Strength	lb/ft (kg/m)	3500 (5200) of belt width, based on high carbon steel at 70 (21)
Conveying Surface		Overall belt width (0.5 one lateral pitch + 3 spiral wire diameters)
Mesh Type		Compound balance weave with 3 connectors per spiral
Open Area		Minimal
Edge Treatment		Welded
Method of Drive		Friction driven on flat faced terminal rolls
Minimum Terminal Roll Diameter	in. (mm)	6.0 (152.4)
Maximum Temperature	°F (°C)	Carbon steel—Up to 1000 (538) Stainless steel—Up to 2050 (1121)

Notes

The CB3 baking band is a flexible baking band that can easily traverse 6" terminal rolls most commonly used in tortilla ovens.

Available Options

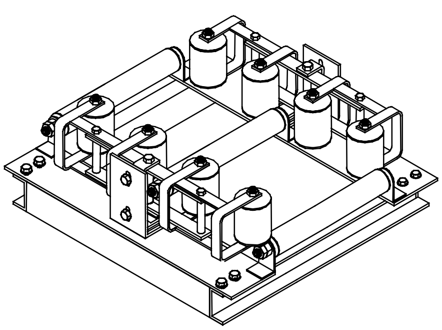
Wire
Baking bands are typically manufactured from annealed high carbon steel round wire in standard gauge sizes. Stainless steel and other steel alloys can be used if required.

Flattened Wire (F) can be specified for the conveying surface if needed. Additionally, Precision Ground Light Weight (PGLW) can also be specified. This process results in the flattest baking surface and is attained by precision grinding of the surface after the baking band has been manufacturer. This option is limited to carbon steel bands 54" (1370 mm) or less in width.

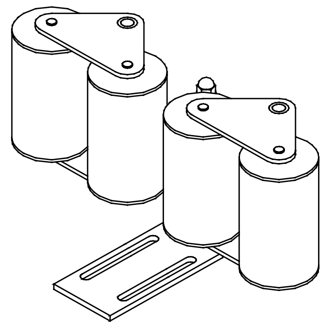
Controls
Ashworth recommends use of Ashworth Model #1 or Model #2 Control System to prevent the belt from contacting oven framework and to keep the belt centered on the terminal drums.

Control Systems

Technical Specifications		
	Model # 1 Controls (Recommended)	Model # 2 Controls
Number Horizontal Rolls	3, plus base frame	None
Number of Vertical Rolls	4	4
Vertical Rolls Contact Surface	18.00 (457.2)	10.50 (266.7)
Belt Width Limit	60.00 (1525)	N/A
Wear Point Adjustability	Guide rolls vertically adjust to new wear point	Guide rolls vertically adjust to new wear point
Bearings	Choice of carbon steel or carbide Zero Wear (ZW)	Choice of carbon steel or carbide Zero Wear (ZW)
Units Required per System	2	4
Mesh Suitability	All woven wire mesh belts	All woven wire mesh belts



Model # 1 controls



Model # 2 controls

Available Options

Ashworth Controls are available with customer specified carbon steel or carbide Zero Wear (ZW) bearings. The featured merits of each type are listed below.

Carbon Steel
- For temperatures of up to 350°F (177°C)
- Working environment should be non-corrosive
- Requires regular lubrication

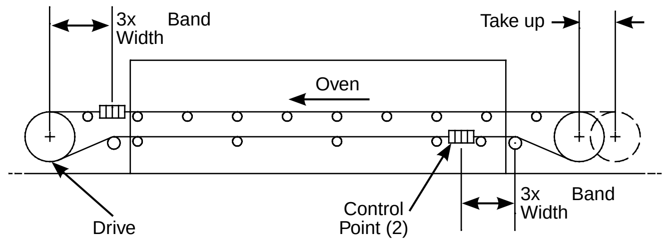
Carbide ZW
- For temperatures of up to 1000°F (538°C)
- Belt sustains minimal wear at elevated temperatures
- Does not require lubrication
- Manufactured from very hard material and can shatter if subjected to a sharp blow

Location of Controls

Locate the controls three band widths prior to the terminal drums. If the system utilizes a snub roll with a significant arc of band contact (>45°), locate the control system three band widths prior to that roll.

On conveyors with a length to width ratio less than 9, but greater than 6 band widths, divide the conveyor length by 3 to determine the best control locations.

Avoid locating the controls closer than two band widths from a terminal drum. At this point, the force to move the band becomes high, reducing the life of the controls. A higher force to move the band also results in high pressure on the band edge, which can lead to weld failure. Locating the control system too far from the terminal rolls will decrease the effectiveness of the controls.



Control Clearance

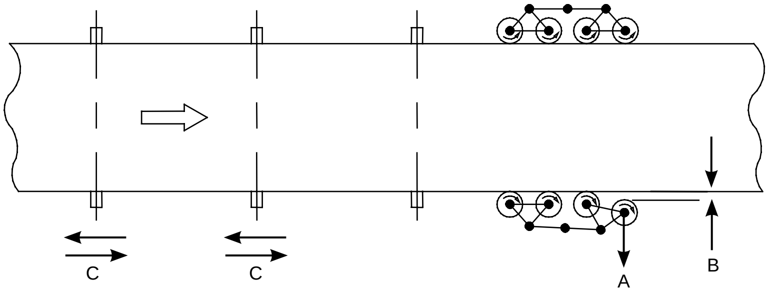
A well-tracked band will have only light contact with the controls, alternating in a slow cycle from one side to the other.

Set control clearance as follows:

A. Gently pull on one end of the frame containing four vertical rolls so that one roll is pulled away from the belt edge and the belt is in contact with the remaining seven rolls.

B. Adjust the controls so that the gap between the belt edge and the roll is 0.36" to 0.63" (10 mm to 16 mm).

C. Skew upstream support rolls to balance contact between both controls.



Lubrication

Bearings

Ball bearings used in Ashworth carbon steel controls are of an open variety, allowing direct lubrication by a spray lubricant suitable for the environment. Vertical roll faces have a hole at their lower end to allow access to the top of the bottom bearing. ZW bearings do not require lubrication.

Pivot Points

All pivot points should be lubricated periodically with suitable oil. The lubricant should be selected with the product in mind. Lack of lubrication can result in seized pivot points, which will not allow the controls to properly divide any lateral band thrust among the four rolls.

Application Notes

Ashworth Control Systems are not intended as guides to force the belt into position. Although they do limit band side movement at the terminals, the controls function primarily as sensing devices to indicate problems as they occur. During normal operation, controls should exert minimal force to maintain a straight belt path.

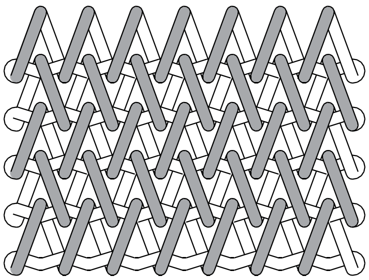
The rolls on Ashworth Control Systems are hollow. These should not be replaced with solid rolls. Solid rolls are heavier and require increased contact force to rotate them. This increased force could damage the edges of the belt and could allow severe tracking problems to go undetected until irreversible belt and/or frame damage occurs.

Balanced Weave Conveyor Belts

Technical Specifications	Units	
Material		Stainless, carbon, and galvanized steels, high temperature alloys
Minimum Width		Dependent on lateral pitch of mesh—see table below
Maximum Width	in. (mm)	216.00 (5486.4)
Weight		Dependent on mesh count and wire gauge
Allowable Tension		Dependent on mesh count and wire gauge
Conveying Surface		Full belt width
Opening Size (Based on mesh count)		Maximum recommended opening is 75% of minimum product size
Method of Drive		Friction driven on flat-faced drums or terminal rolls; minimum drum diameter is 180 divided by the second count/CB number, if applicable
Maximum Temperature	°F (°C)	Carbon steel: 1000 (538) Stainless steel: 2050 (1121) Inconel® 601: 2200 (1204)

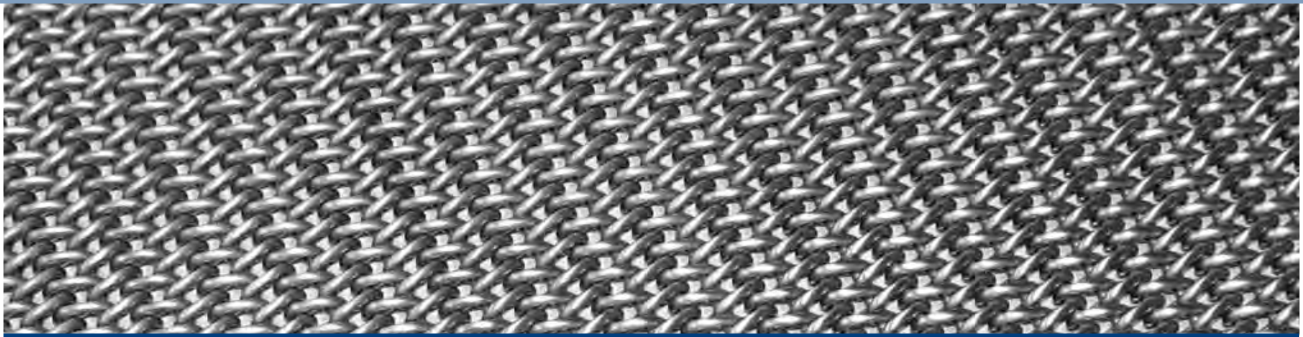
Available Options

Balanced Weave belts are composed of right and left-hand spirals joined by a single crimped connector per spiral row. Edges of the belt are welded. Mesh choice is nearly unlimited and is dependent upon requirements of the application, including product weight and support requirements, as well as process temperature. These belts are less dense than Compound Balanced weave belts.



Minimum Belt Widths

Lateral Pitch of Mesh	Minimum Belt Width in. (mm)
12	3.00 (76.2)
18	2.00 (50.8)
24	1.50 (38.1)
30	1.20 (30.5)
36	1.00 (25.4)
42	0.88 (22.4)
48	0.75 (19.1)
60	0.60 (15.2)
66	0.55 (14.0)
72	0.50 (12.7)
84	0.43 (10.9)
96	0.38 (9.7)
102	0.35 (8.9)
144	0.25 (6.4)



Balanced Weave Mesh—Possible Combinations

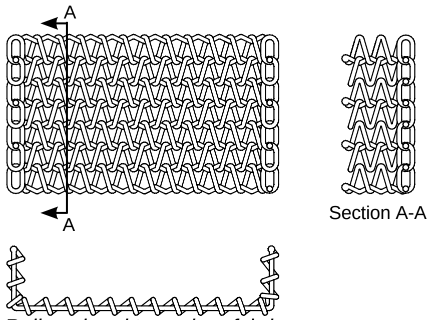
The following table represents standard mesh combination possibilities that can be used to construct balanced weave belts. Additional combinations of spirals and connectors are also possible. Contact Ashworth Engineering for design assistance with Balanced Weave belts.

First Count No. of Spirals per 12" of Belt	Spiral Wire Gauge Options	Second Count No. of Connectors per 12" of Belt	Connector Wire Gauge Options
12	4 to 14	7 to 12	4 to 14
18	10 to 14	12 to 17	10 to 14
24	12 to 17	12 to 27	12 to 16
30	10 to 18	14 to 30	10 to 18
36	10 to 20	10 to 38	8 to 19
42	12 to 20	12 to 41	10 to 18
48	12 to 18	24 to 57	8 to 18
60	12 to 20	20 to 62	14 to 20
66	18	48	17
72	16 to 20	24 to 75	13 to 20
84	16 to 24	20 to 84	14 to 24
96	18 to 20	73 to 96	18 to 20
102	18 to 20	24 to 78	14 to 18
144	22	96 to 105	20

Guard Edges

Guard edges can be fabricated for balanced weave belts via two primary methods: relieved and turned-up mesh or relieved and reinforced turned-up fabric.

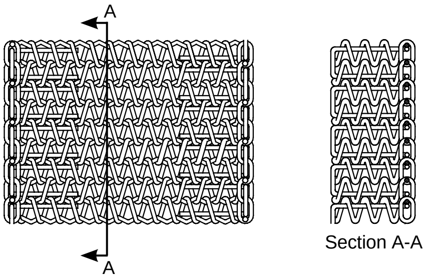
Relieved & Turned-Up
With relieved and turned-up mesh(Figure 28), the guard edge is formed by turning up the belt edges from the carrying surface and omitting connectors at prescribed spacing to provide flexibility.



Relieved and turned-up fabric

[Figure 28]

Relieved & Reinforced Turned-Up
Guard edges produced via relieved and reinforced turned-up mesh (Figure 29) are similar to relieved and turned-up edge, but with the addition of hairpin reinforcements that are inserted into the disconnected spirals.



Relieved and reinforced turned-up fabric

[Figure 29]

Controls

Ashworth recommends use of either Ashworth Model #1 or Model #2 Control Systems with most balanced weave belts to prevent the belt from coming in contact with the conveyor or oven framework and to keep the belt centered on the terminal drums.

Balance Weave Specifications			
Mesh Designation	Weight lb/ft² (kg/m²)	Wire Diameter in. (mm)	Approximate Opening Area in. (mm)
B 12-8-¼	7.25 (35.40)	0.250 (6.35)	0.75x1.25 (19.05x31.75)
B 12-7-4	5.87 (28.66)	0.225 (5.72)	0.78x1.49 (19.81x37.85)
B 12-8-4	6.25 (30.52)	0.225 (5.72)	0.78x1.28 (19.81x32.51)
B 12-8-6	4.34 (21.19)	0.192 (4.88)	0.81x1.31 (20.57x33.27)
B 12-11-6	5.05 (24.66)	0.192 (4.88)	0.81x0.90 (20.57x22.86)
B 12-12-6	5.34 (26.07)	0.192 (4.88)	0.81x0.81 (20.57x20.57)
B 12-6-8	2.65 (12.94)	0.162 (4.11)	0.84x1.84 (21.34x46.74)
B 12-8-68	3.25 (15.87)	0.192/0.162 (4.88/4.12)	0.84x1.31 (21.34x33.27)
B 12-10-8	3.29 (16.06)	0.162 (4.11)	0.84x1.04 (21.34x26.42)
B 12-11-68	3.87 (18.89)	0.192/162 (4.88/4.12)	0.84x0.90 (21.34x22.86)
B 12-10-9	2.57 (12.55)	0.148 (3.76)	0.85x1.05 (21.59x26.67)
B 12-11-9	2.72 (13.28)	0.148 (3.76)	0.85x0.94 (21.59x23.88)
B 12-11-69	3.29 (16.06)	0.192/0.148 (4.88/3.76)	0.85x0.90 (21.59x22.86)
B 12-12-9	2.95 (14.40)	0.148 (3.76)	0.85x0.85 (21.59x21.59)
B 12-13-9	3.01 (14.70)	0.148 (3.76)	0.85x0.77 (21.59x19.56)
B-12-8-610	2.50 (12.21)	0.192/0.135 (4.88/.343)	0.87x1.31 (22.10x33.27)
B 12-9 ½-10	2.13 (10.40)	0.135 (3.43)	0.87x1.13 (22.10x28.70)
B 12-10-810	2.45 (11.96)	0.162/0.135 (4.12/.343)	0.87x1.04 (22.10x26.42)
B 12-12-10	2.40 (11.72)	0.135 (3.43)	0.87x0.87 (22.10x22.10)
B 12-10-11	1.69 (8.25)	0.120 (3.05)	0.88x1.08 (22.35x27.43)
B 12-9½-12	1.19 (5.81)	0.105 (2.67)	0.89x1.16 (22.61x29.46)
B 12-10-12	1.24 (6.05)	0.105 (2.67)	0.89x1.09 (22.61x27.69)
B 12-15-12	1.55 (7.57)	0.105 (2.67)	0.89x0.69 (22.61x17.53)
B 12-10-1214	0.85 (4.15)	0.105/0.080 (2.67/2.03)	0.92x1.09 (23.37x27.69)
B 12-11-14	0.73 (3.56)	0.080 (2.03)	0.92x1.01 (23.37x25.65)
B 12-15-1214	1.07 (5.22)	0.105/0.080 (2.67/2.03)	0.92x0.69 (23.37x17.53)
B 12-12-16	0.45 (2.20)	0.062 (1.57)	0.94x0.94 (23.88x23.88)
B 18-10-4	8.73 (42.62)	0.225 (5.72)	0.44x0.97 (11.18x24.64)
B 18-11-46	6.82 (33.30)	0.225/0.192 (5.72/4.88)	0.48x0.87 (12.19x22.10)

Balance Weave Specifications (cont.)							
Mesh Designation	Weight lb/ft² (kg/m²)		Wire Diameter in. (mm)		Approximate Opening Area in. (mm)		
B 18-11-6	6.45	(31.49)	0.192	(4.88)	0.48x0.90	(12.19x22.86)	
B 18-12-8	4.41	(21.53)	0.162	(4.11)	0.51x0.84	(12.95x21.34)	
B 18-18-8	5.53	(27)	0.162	(4.11)	0.51x0.51	(12.95x12.95)	
B 18-10-9	3.44	(16.8)	0.148	(3.76)	0.52x1.05	(13.21x26.67)	
B 18-18-9	4.39	(21.43)	0.148	(3.76)	0.52x0.52	(13.21x13.21)	
B 18-9-810	3.10	(15.14)	0.162/0.135	(4.12/.343)	0.53x1.17	(13.46x29.72)	
B 18-10-10	2.85	(13.91)	0.135	(3.43)	0.53x1.07	(13.46x27.18)	
B 18-12-610	3.60	(17.58)	0.192/0.135	(4.88/.343)	0.53x0.81	(13.46x20.57)	
B 18-16-10	3.39	(16.55)	0.135	(3.43)	0.53x0.62	(13.46x15.75)	
B 18-17-810	3.96	(19.33)	0.162/0.135	(4.12/.343)	0.53x0.54	(13.46x13.72)	
B 18-17-10	3.50	(17.09)	0.135	(3.43)	0.53x0.57	(13.46x14.48)	
B 18-10-11	2.30	(11.23)	0.120	(3.05)	0.55x1.08	(13.97x27.43)	
B 18-18-11	3.01	(14.7)	0.120	(3.05)	0.55x0.55	(13.97x13.97)	
B 18-10-12	1.70	(8.3)	0.105	(2.67)	0.56x1.09	(14.22x27.69)	
B 18-12-1012	2.18	(10.64)	0.135/0.105	(3.43/2.67)	0.56x0.87	(14.22x22.10)	
B 36-10-10	5.75	(28.07)	0.135	(3.43)	0.20x1.07	(5.08x27.18)	
B 36-20¼-10	10.44	(50.97)	0.250/0.135	(6.35/.343)	0.20x0.35	(5.08x8.89)	
B 36-20-810	6.42	(31.35)	0.162/0.135	(4.12/.343)	0.20x0.44	(5.08x11.18)	
B 36-20-10	6.15	(30.03)	0.135	(3.43)	0.20x0.47	(5.08x11.94)	
B 36-20-11	5.13	(25.05)	0.120	(3.05)	0.21x0.48	(5.33x12.19)	
B 36-8-912	3.13	(15.28)	0.148/0.105	(3.76/2.67)	0.23x1.35	(5.84x34.29)	
B 36-15-1012	3.73	(18.21)	0.135/0.105	(3.43/2.67)	0.23x0.67	(5.84x17.02)	
B 36-18-1012	4.06	(19.82)	0.135/0.105	(3.43/2.67)	0.23x0.53	(5.84x13.46)	
B 36-20-1012	4.25	(20.75)	0.135/0.105	(3.43/2.67)	0.23x0.47	(5.84x11.94)	
B 36-20-1112	4.10	(20.02)	0.120/0.105	(3.05/2.67)	0.23x0.48	(5.84x12.19)	
B 36-20-12	3.80	(18.55)	0.105	(2.67)	0.23x0.49	(5.84x12.45)	
B 36-28-12	5.17	(25.24)	0.105	(2.67)	0.23x0.32	(5.84x8.13)	
B 36-30-1113	3.98	(19.43)	0.120/0.092	(3.05/2.34)	0.24x0.28	(6.10x7.11)	
B 36-20-1214	2.15	(10.5)	0.105/0.080	(2.67/2.03)	0.25x0.49	(6.35x12.45)	

Balance Weave Specifications

Mesh Designation	Weight lb/ft² (kg/m²)	Wire Diameter in. (mm)	Approximate Opening Area in. (mm)
B 36-24-14	2.25 (10.99)	0.080 (2.03)	0.25x0.42 (6.35x10.67)
B 36-30-1214	2.76 (13.48)	0.105/0.080 (2.67/2.03)	0.25x0.30 (6.35x7.62)
B 36-34-14	2.58 (12.60)	0.080 (2.03)	0.25x0.27 (6.35x6.86)
B 36-38-14	2.95 (14.40)	0.080 (2.03)	0.25x0.24 (6.35x6.10)
B 36-41-14	3.00 (14.65)	0.080 (2.03)	0.25x0.21 (6.35x5.33)
B 36-51-14	3.38 (16.50)	0.080 (2.03)	0.25x0.16 (6.35x4.06)
B 36-24-15	1.71 (8.35)	0.072 (1.83)	0.26x0.43 (6.60x10.92)
B 36-34-15	2.15 (10.50)	0.072 (1.83)	0.26x0.28 (6.60x7.11)
B 36-30-16	1.44 (7.03)	0.062 (1.57)	0.27x0.33 (6.86x8.38)
B 36-32-16	1.50 (7.32)	0.062 (1.57)	0.27x0.31 (6.86x7.87)
B 36-34-1416	1.80 (8.79)	0.080/0.062 (2.03/1.57)	0.27x0.27 (6.86x6.86)
B 36-35-16	1.44 (7.03)	0.062 (1.57)	0.27x0.28 (6.86x7.11)
B 36-38-16	1.60 (7.81)	0.062 (1.57)	0.27x0.25 (6.86x6.35)
B 36-31-17	1.09 (5.32)	0.054 (1.37)	0.28x0.33 (7.11x8.38)
B 36-30-18	0.82 (4.00)	0.048 (1.22)	0.29x0.35 (7.37x8.89)
B 36-32-1618	1.00 (4.88)	0.062/0.048 (1.57/1.22)	0.29x0.31 (7.37x7.87)
B 36-36-18	0.89 (4.35)	0.048 (1.22)	0.29x0.29 (7.37x7.37)
B 36-32-19	0.64 (3.12)	0.041 (1.04)	0.29x0.33 (7.37x8.38)
B 36-32-20	0.46 (2.25)	0.035 (0.89)	0.31x0.34 (7.87x8.64)
B 42-18-1011	5.68 (27.73)	0.135/0.120 (3.43/3.05)	0.17x0.53 (4.32x13.46)
B 42-16-1012	4.45 (21.73)	0.135/0.105 (3.43/2.67)	0.18x0.62 (4.57x15.75)
B 42-18-1012	4.63 (22.61)	0.135/0.105 (3.43/2.67)	0.18x0.53 (4.57x13.46)
B 42-18-12	4.35 (21.24)	0.105 (2.67)	0.18x0.56 (4.57x14.22)
B 42-20-1012	5.10 (24.90)	0.135/0.105 (3.43/2.67)	0.18x0.47 (4.57x11.94)
B 42-24-12	4.74 (23.14)	0.105 (2.67)	0.18x0.40 (4.57x10.16)
B 42-30-1012	5.92 (28.90)	0.135/0.105 (3.43/2.67)	0.18x0.27 (4.57x6.86)
B 42-30-12	4.97 (24.27)	0.105 (2.67)	0.18x0.30 (4.57x7.62)
B 42-18-14	2.25 (10.99)	0.080 (2.03)	0.21x0.59 (5.33x14.99)
B 42-24-14	2.63 (12.84)	0.080 (2.03)	0.21x0.42 (5.33x10.67)

Balance Weave Specifications (cont.)

Mesh Designation	Weight lb/ft² (kg/m²)	Wire Diameter in. (mm)	Approximate Opening Area in. (mm)
B 42-27-1214	3.29 (16.06)	0.105/0.080 (2.67/2.03)	0.21x0.34 (5.33x8.64)
B 42-27-14	2.65 (12.94)	0.080 (2.03)	0.21x0.36 (5.33x9.14)
B 42-35-14	3.13 (15.28)	0.080 (2.03)	0.21x0.26 (5.33x6.60)
B 42-41-14	3.23 (15.77)	0.080 (2.03)	0.21x0.22 (5.33x5.59)
B 42-27-15	2.00 (9.76)	0.072 (1.83)	0.22x0.37 (5.59x9.40)
B 42-36-1415	2.59 (12.65)	0.080/0.072 (2.03/1.83)	0.22x0.25 (5.59x6.35)
B 42-41-15	2.68 (13.08)	0.072 (1.83)	0.22x0.22 (5.59x5.59)
B 42-24-16	1.55 (7.57)	0.062 (1.57)	0.22x0.44 (5.59x11.18)
B 42-27-1416	1.94 (9.47)	0.080/0.062 (2.03/1.57)	0.22x0.36 (5.59x9.14)
B 42-27-16	1.68 (8.20)	0.062 (1.57)	0.22x0.38 (5.59x9.65)
B 42-36-16	1.81 (8.84)	0.062 (1.57)	0.22x0.27 (5.59x6.86)
B 42-38-16	1.90 (9.28)	0.062 (1.57)	0.22x0.25 (5.59x6.35)
B 42-40-1416	2.25 (10.99)	0.080/0.062 (2.03/1.57)	0.22x0.22 (5.59x5.59)
B 42-43-16	1.94 (9.47)	0.062 (1.57)	0.22x0.22 (5.59x5.59)
B 42-38-17	1.37 (6.69)	0.054 (1.37)	0.23x0.26 (5.84x6.60)
B 42-37-18	1.03 (5.03)	0.048 (1.22)	0.24x0.27 (6.10x6.86)
B 48-26-14	3.18 (15.53)	0.080 (2.03)	0.17x0.38 (4.32x9.65)
B 48-38-14	3.46 (16.89)	0.080 (2.03)	0.17x0.24 (4.32x6.10)
B 48-41-14	3.52 (17.19)	0.080 (2.03)	0.17x0.22 (4.32x5.59)
B 48-47-14	4.25 (20.75)	0.080 (2.03)	0.17x0.18 (4.32x4.57)
B 48-26-15	2.25 (10.99)	0.072 (1.83)	0.18x0.39 (4.57x9.91)
B 48-38-15	2.84 (13.87)	0.072 (1.83)	0.18x0.24 (4.57x6.10)
B 48-32-16	1.75 (8.54)	0.062 (1.57)	0.19x0.31 (4.83x7.87)
B 48-36-16	1.83 (8.93)	0.062 (1.57)	0.19x0.27 (4.83x6.86)
B 48-48-16	2.45 (11.96)	0.062 (1.57)	0.19x0.19 (4.83x4.83)
B 48-51-16	2.50 (12.21)	0.062 (1.57)	0.19x0.17 (4.83x4.32)
B 48-55-16	2.56 (12.5)	0.062 (1.57)	0.19x0.16 (4.83x4.06)
B 48-48-17	1.65 (8.06)	0.054 (1.37)	0.20x0.20 (5.08x5.08)
B 48-53-17	1.83 (8.93)	0.054 (1.37)	0.20x0.17 (5.08x4.32)

Balance Weave Specifications (cont.)							
Mesh Designation	Weight lb/ft² (kg/m²)		Wire Diameter in. (mm)		Approximate Opening Area in. (mm)		
B 48-24-18	0.91	(4.44)	0.048	(1.22)	0.20x0.45	(5.08x11.43)	
B 48-36-18	1.03	(5.03)	0.048	(1.22)	0.20x0.29	(5.08x7.37)	
B 48-49-18	1.21	(5.91)	0.048	(1.22)	0.20x0.20	(5.08x5.08)	
B 48-52-18	1.26	(6.15)	0.048	(1.22)	0.20x0.18	(5.08x4.57)	
B 48-50-19	0.94	(4.59)	0.041	(1.04)	0.21x0.20	(5.33x5.08)	
B 48-44-20	0.56	(2.73)	0.035	(0.89)	0.22x0.24	(5.59x6.10)	
B 48-48-20	0.61	(2.98)	0.035	(0.89)	0.22x0.22	(5.59x5.59)	
B 48-51-1820	0.92	(4.49)	0.048/0.035	(1.22/0.89)	0.22x0.20	(5.59x5.08)	
B 48-55-20	0.66	(3.22)	0.035	(0.89)	0.22x0.19	(5.59x4.83)	
B 48-44-21	0.48	(2.34)	0.032	(0.81)	0.22x0.24	(5.59x6.10)	
B 48-44-22	0.38	(1.86)	0.029	(0.74)	0.22x0.24	(5.59x6.10)	
B 58-21-1214	3.64	(17.77)	0.105/0.080	(2.67/2.03)	0.13x0.47	(3.3x11.94)	
B 60-22-14	3.25	(15.87)	0.080	(2.03)	0.12x0.47	(3.05x11.94)	
B 60-24-1214	3.72	(18.16)	0.105/0.080	(2.67/2.03)	0.12x0.40	(3.05x10.16)	
B 60-38-1214	5.21	(25.44)	0.105/0.080	(2.67/2.03)	0.12x0.21	(3.05x5.33)	
B 60-38-14	4.10	(20.02)	0.080	(2.03)	0.12x0.24	(3.05x6.10)	
B 60-40-1214	4.57	(22.31)	0.105/0.080	(2.67/2.03)	0.12x0.19	(3.05x4.83)	
B 60-48-14	4.31	(21.04)	0.080	(2.03)	0.12x0.17	(3.05x4.32)	
B 60-60-14	5.12	(25.00)	0.080	(2.03)	0.12x0.12	(3.05x3.05)	
B 60-38-15	3.18	(15.53)	0.072	(1.83)	0.13x0.24	(3.3x6.10)	
B 60-42-15	3.29	(16.06)	0.072	(1.83)	0.13x0.22	(3.3x5.59)	
B 60-46-15	3.55	(17.33)	0.072	(1.83)	0.13x0.19	(3.3x4.83)	
B 60-26-1416	2.13	(10.40)	0.080/0.062	(2.03/1.57)	0.14x0.63	(3.56x16)	
B 60-36-16	2.12	(10.35)	0.062	(1.57)	0.14x0.27	(3.56x6.86)	
B 60-38-16	2.28	(11.13)	0.062	(1.57)	0.14x0.24	(3.56x6.10)	
B 60-42-16	2.49	(12.16)	0.062	(1.57)	0.14x0.22	(3.56x5.59)	
B 60-46-1416	3.04	(14.84)	0.080/0.062	(2.03/1.57)	0.14x0.18	(3.56x4.57)	
B 60-48-1316	3.43	(16.75)	0.092/0.062	(2.34/1.57)	0.14x0.16	(3.56x4.06)	
B 60-48-16	2.68	(13.08)	0.062	(1.57)	0.14x0.19	(3.56x4.83)	

Balance Weave Specifications (cont.)			
Mesh Designation	Weight lb/ft² (kg/m²)	Wire Diameter in. (mm)	Approximate Opening Area in. (mm)
B 60-52-16	2.75 (13.43)	0.062 (1.57)	0.14x0.17 (3.56x4.32)
B 60-55-1416	3.22 (15.72)	0.080/0.062 (2.03/1.57)	0.14x0.14 (3.56x3.56)
B 60-55-16	2.82 (13.77)	0.062 (1.57)	0.14x0.16 (3.56x4.06)
B 60-37-18	1.30 (6.35)	0.048 (1.22)	0.15x0.27 (3.81x6.86)
B 60-52-18	1.50 (7.32)	0.048 (1.22)	0.15x0.18 (3.81x4.57)
B 60-60-18	1.60 (7.81)	0.048 (1.22)	0.15x0.15 (3.81x3.81)
B 60-62-18	1.65 (8.06)	0.048 (1.22)	0.15x0.15 (3.81x3.81)
B 60-60-19	1.13 (5.52)	0.041 (1.04)	0.16x0.16 (4.06x4.06)
B 60-55-22	0.47 (2.29)	0.029 (0.74)	0.17x0.19 (4.32x4.83)
B 60-54-23	0.37 (1.81)	0.026 (0.66)	0.18x0.2 (4.57x5.08)
B 72-60-15	4.68 (22.85)	0.072 (1.83)	0.09x0.13 (2.29x3.3)
B 72-24-16	2.35 (11.47)	0.062 (1.57)	0.1x0.44 (2.54x11.18)
B 72-48-16	2.83 (13.82)	0.062 (1.57)	0.1x0.19 (2.54x4.83)
B 72-55-16	3.32 (16.21)	0.062 (1.57)	0.1x0.16 (2.54x4.06)
B 72-56-16	3.40 (16.6)	0.062 (1.57)	0.1x0.15 (2.54x3.81)
B 72-57-1516	3.58 (17.48)	0.072/0.062 (1.83/1.57)	0.1x0.15 (2.54x3.81)
B 72-60-16	3.52 (17.19)	0.062 (1.57)	0.1x0.14 (2.54x3.56)
B 72-62-1416	4.38 (21.39)	0.080/0.062 (2.03/1.57)	0.1x0.11 (2.54x2.79)
B 72-64-1416	4.43 (21.63)	0.080/0.062 (2.03/1.57)	0.1x0.11 (2.54x2.79)
B 72-68-16	3.76 (18.36)	0.620 (15.75)	0.1x0.11 (2.54x2.79)
B 72-70-1316	4.77 (23.29)	0.092/0.062 (2.34/1.57)	0.1x0.08 (2.54x2.03)
B 72-72-16	3.80 (18.55)	0.062 (1.57)	0.1x0.1 (2.54x2.54)
B 72-52-17	2.37 (11.57)	0.054 (1.37)	0.11x0.18 (2.79x4.57)
B 72-60-17	2.50 (12.21)	0.054 (1.37)	0.11x0.15 (2.79x3.81)
B 72-80-17	2.84 (13.87)	0.054 (1.37)	0.11x0.1 (2.79x2.54)
B 72-57-18	1.78 (8.69)	0.048 (1.22)	0.12x0.16 (3.05x4.06)
B 72-68-18	1.83 (8.93)	0.048 (1.22)	0.12x0.13 (3.05x3.3)
B 72-72-18	2.01 (9.81)	0.048 (1.22)	0.12x0.12 (3.05x3.05)
B 72-75-18	2.03 (9.91)	0.048 (1.22)	0.12x0.11 (3.05x2.79)

Balance Weave Specifications (cont.)			
Mesh Designation	Weight lb/ft² (kg/m²)	Wire Diameter in. (mm)	Approximate Opening Area in. (mm)
B 72-72-19	1.51 (7.37)	0.041 (1.04)	0.13x0.13 (3.30x3.30)
B 72-62-20	0.84 (4.10)	0.035 (0.89)	0.13x0.16 (3.30x4.06)
B 72-68-20	0.93 (4.54)	0.035 (0.89)	0.13x0.14 (3.30x3.56)
B 72-72-20	1.00 (4.88)	0.035 (0.89)	0.13x0.13 (3.30x3.30)
B 72-68-21	0.86 (4.20)	0.032 (0.81)	0.13x0.15 (3.30x3.81)
B 72-48-22	0.49 (2.39)	0.029 (0.74)	0.14x0.22 (3.56x5.59)
B 72-62-2022	0.69 (3.37)	0.029 (0.74)	0.14x0.16 (3.56x4.06)
B 72-70-22	0.57 (2.78)	0.029 (0.74)	0.14x0.14 (3.56x3.56)
B 84-84-17	3.42 (16.70)	0.054 (1.37)	0.09x0.09 (2.29x2.29)
B 84-60-18	1.95 (9.52)	0.048 (1.22)	0.10x0.15 (2.54x3.81)
B 84-84-18	2.47 (12.06)	0.048 (1.22)	0.10x0.10 (2.54x2.54)
B 84-84-19	1.67 (8.15)	0.041 (1.04)	0.10x0.10 (2.54x2.54)
B 84-60-20	0.94 (4.59)	0.035 (0.89)	0.11x0.17 (2.79x4.32)
B 84-84-20	1.20 (5.86)	0.035 (0.89)	0.11x0.11 (2.79x2.79)
B 84-78-2021	1.06 (5.18)	0.032 (0.81)	0.11x0.12 (2.79x3.05)
B 84-84-21	0.93 (4.54)	0.032 (0.81)	0.11x0.11 (2.79x2.79)
B 84-81-22	0.74 (3.61)	0.029 (0.74)	0.11x0.12 (2.79x3.05)
B 84-84-22	0.76 (3.71)	0.029 (0.74)	0.11x0.11 (2.79x2.79)
B 96-84-20	1.24 (6.05)	0.035 (0.89)	0.09x0.11 (2.29x2.79)
B 96-84-21	1.09 (5.32)	0.032 (0.81)	0.09x0.11 (2.29x2.79)
B 96-48-22	0.76 (3.71)	0.029 (0.74)	0.10x0.22 (2.54x5.59)
B 96-84-22	0.91 (4.44)	0.029 (0.74)	0.10x0.11 (2.54x2.79)
B 100-156-22	1.23 (6.01)	0.029 (0.74)	0.09x0.05 (2.29x1.27)
B 144-89-2022	1.15 (5.61)	0.035/0.029 (0.89/0.74)	0.05x0.10 (1.27x2.54)
B 144-96-2022	1.27 (6.20)	0.035/0.029 (0.89/0.75)	0.05x0.09 (1.27x2.29)
B 144-105-2022	1.55 (7.57)	0.035/0.029 (0.89/0.76)	0.05x0.08 (1.27x2.03)

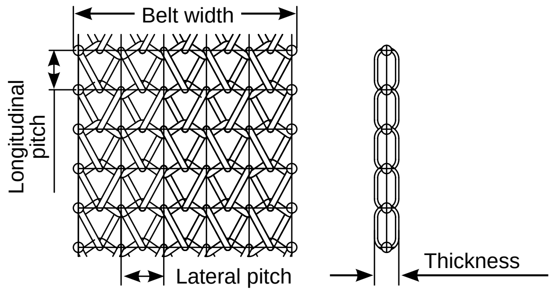
NOTES

WG Woven Wire

WG Balanced Weave	Units	
Material		Stainless steel, carbon, and galvanized steels, high temperature steel alloys
Minimum Width	mm (in)	40.6 (1.60)
Maximum Width		5486.4 (216.00)
Edge Treatment		Welded edges
Weight		Dependent on mesh count and wire gauge—see table
Maximum Allowable Tension		Dependent on mesh count and wire gauge—see table
Conveying Surface		Full belt width (1/2 of one lateral pitch + 3 spiral diameters)
Opening Size		40–70% depending on mesh count and wire size
Method of Drive		Friction driven on flat-faced drums or terminal rolls
Maximum Temperature	°C (°F)	Up to 1100 (2012) dependent upon material

Available Options

WG Balanced Weave belts are composed of right and left-hand spirals joined by a connector rod. Edges are welded. The mesh choice for WG belts is nearly unlimited and is dependent upon requirements of the application, including product weight and support requirements, as well as process temperature.



Mesh Designation

Due to their European heritage, WG belts are designated differently than woven wire belts manufactured by Ashworth in the US. Meshes for WG belts are designated as in the following example:

WG 4.4/5 – 1.4 x 0.7 – 1.2

Where:

W = Woven wire
G = Welded edges
4.4 = Nominal longitudinal pitch of the belt in mm
5 = Lateral pitch of the belt in mm
1.4 x 0.7 = Size of the spiral wire diameter in mm; in this case the wire is flattened, so two dimensions are used

1.2 = Cross wire diameter in mm

Driving/Return Drum Diameters

Driving drums should be of sufficient diameter so as not to bend the belt's mesh, a situation that could result in irregular elongation of the belt's pitch. This can cause belt driving and control problems and irreparably damage the belt.

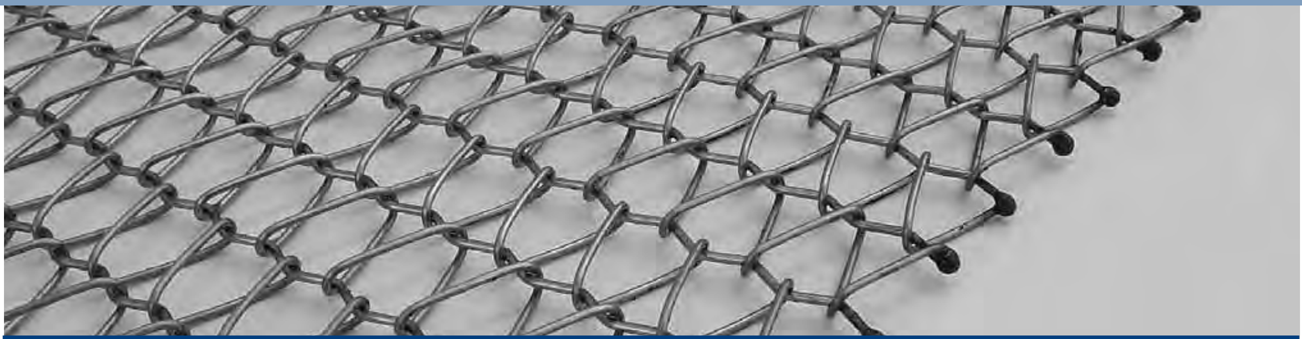
Drums should be sized according to the following guidelines:

Driving Drum:

Diameter = Minimum of 20 times the belt's longitudinal pitch

Return Drum:

Diameter = Minimum of 10 times the belt's longitudinal pitch

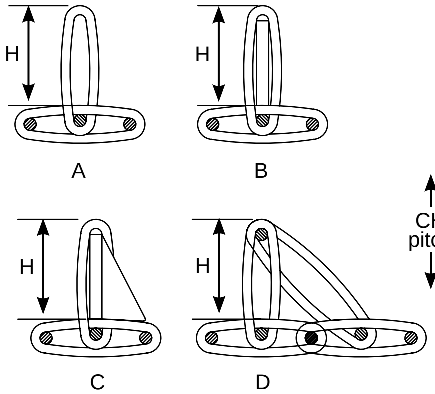


Standard Balance Weave Meshes

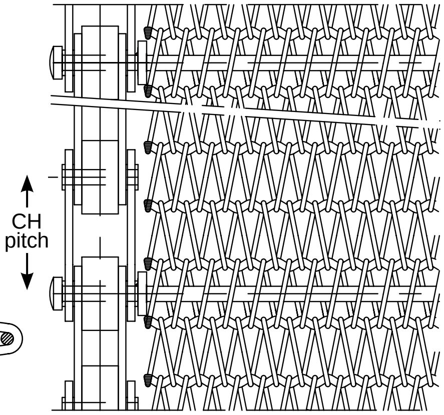
Mesh Type	Nom. Long. Pitch mm (in.)	Nom. Lat. Pitch mm (in.)	Nom. Belt (Spiral) Thickness mm (in.)	Belt Weight kg/m² (lb/ft²)	Allowable Tension per Belt Width kN/m (lb/ft)
WG 4.4/4.4–1.4 x 0.7–1.2	5.4 (0.21)	4.4 (0.17)	4.1 (0.16)	10.2 (2.09)	22.0 (1507.48)
WG 4.4/4.4–1.4–1.4	5.2 (0.20)	4.4 (0.17)	5.9 (0.23)	17.0 (3.48)	35.0 (2398.26)
WG 4.5/3.1–1–1.2	4.1 (0.16)	3.0 (0.12)	4.6 (0.18)	10.9 (2.23)	25.0 (1713.04)
WG 5.1/4.2–1.6–1.6	4.9 (0.19)	4.2 (0.17)	6.4 (0.25)	22.5 (4.61)	48.0 (3289.04)
WG 6.0/6.2–1.2–1.6	6.4 (0.25)	6.2 (0.24)	5.7 (0.22)	8.9 (1.82)	18.0 (1233.39)
WG 8.5/6.4–1.6–1.6	9.1 (0.36)	6.4 (0.25)	7.3 (0.29)	11.5 (2.36)	31.0 (2124.17)
WG 10.0/6.5–1.2–2.0	9.9 (0.39)	6.5 (0.26)	6.2 (0.24)	7.4 (1.52)	17.0 (1164.87)
WG 10.0/6.5–1.4 x 1–2.0	9.9 (0.39)	6.5 (0.26)	5.7 (0.22)	8.7 (1.78)	22.0 (1507.48)
WG 10.0/10–2–2.5	12.2 (0.48)	10.0 (0.39)	8.9 (0.35)	14.4 (2.95)	31.0 (2124.17)
WG 12.0/12–3 x 2–3.0	14.8 (0.58)	12.0 (0.47)	10.3 (0.41)	22.0 (4.51)	50.0 (3426.09)
WG 13.5/8.4–2–2.5	14.0 (0.55)	8.4 (0.33)	10.8 (0.43)	13.7 (2.81)	37.0 (2535.31)
WG 13.5/8.4–3 x 1.5–3.1	12.9 (0.51)	8.4 (0.33)	8.6 (0.34)	21.5 (4.40)	54.0 (3700.18)
WG 15.0/15–2.5–2.8	16.7 (0.66)	15.0 (0.59)	10.8 (0.43)	12.9 (2.64)	33.0 (2261.22)
WG 16.0/6.35–1.2–1.6	15.3 (0.60)	6.4 (0.25)	6.3 (0.25)	5.0 (1.02)	18.0 (1233.39)
WG 16.8/8.4–2.6–3.1	15.9 (0.63)	8.4 (0.33)	11.8 (0.46)	22.0 (4.51)	63.0 (4316.87)
WG 19.1/9.5–1.1–1.4	19.2 (0.76)	9.5 (0.37)	6.8 (0.27)	2.7 (0.55)	10.0 (685.22)
WG 20.0/15–2.5–3.5	18.3 (0.72)	15.0 (0.59)	12.2 (0.48)	12.8 (2.62)	33.0 (2261.22)

Available Options

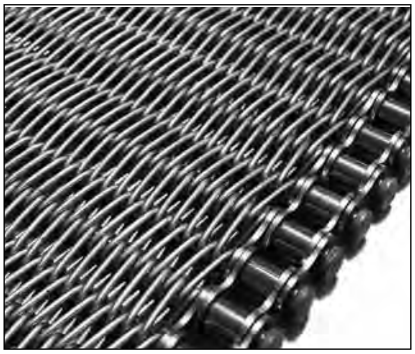
WG belts can be manufactured with flights (Figure 30) (dimensions available upon request) or as positive drive chain edge belts (Figure 31). Standard chains are hollow pin, in 0.5″ (12.7 mm), 0.63″ (15.9 mm) or 1″ (25.4 mm) pitch.



[Figure 30]



[Figure 31]



Lehr Belts

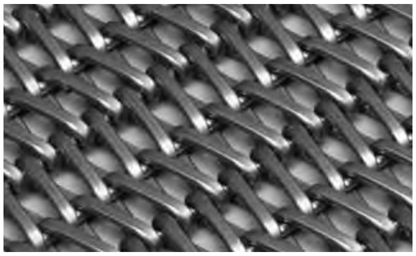
Technical Specifications	Units	
Material		3% and 5% chrome steel, stainless steel, carbon steels, high temperature steel alloys
Minimum Width	in. (mm)	1.00 (25.4)
Maximum Width	in. (mm)	216.00 (5486.4)
Lateral Pitch	in. (mm)	0.33 (8.5)
Thickness	in. (mm)	0.31 (7.9)
Working Strength per unit of width (Material Dependent)	lb/ft (kg/m)	2100 lb/ft (3132) based on 3% chromium steel at 70°F (21°C)
Weight	lb/ft² (kg/m²)	3.49 (17.1)
Conveying Surface		Full belt width
Mesh Designation		B36-20-12 or B36-20-1012F (optional)
Opening Size	in. (mm)	0.21 x 0.47 (5.3 x 11.9)
Method of Drive		Friction driven on flat-faced drums or terminal rolls; minimum drum diameter equates to 180 divided by the second count number Example: 180 / 20 = 9 (229)
Maximum Temperature	°F (°C)	Carbon steel: 1000 (538), 3% Chrome steel: 1300 (704), Stainless steel: 2050 (1121), Inconel® 601: 2200 (1204)

Belt Construction

Lehr Belts are of balanced weave wire construction, consisting of alternating right and left-hand flattened spirals seated in crimped connector rods. The belt's edges are welded.

Controls

Ashworth recommends use of Ashworth Model #1 or Model #2 Control Systems to prevent the belt from contacting oven framework and to keep the belt centered on the terminal drums.



Mesh Options

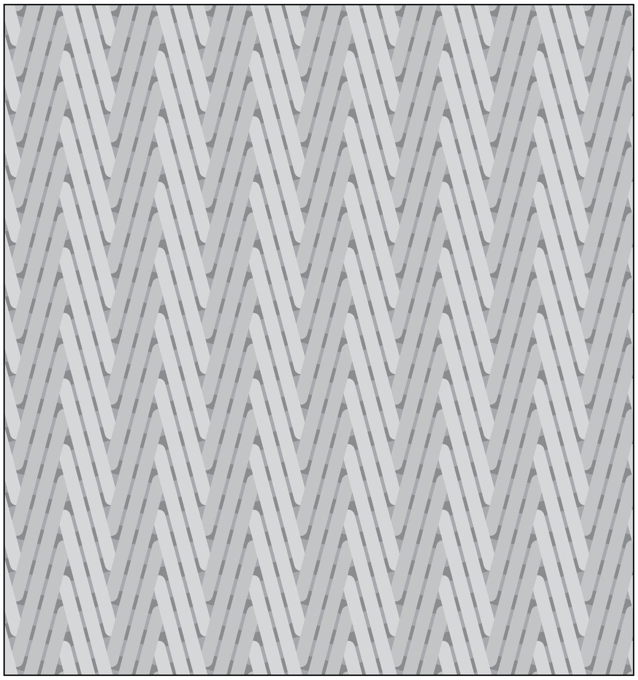
Mesh Designation	Thickness in. (mm)		Lateral Pitch in. (mm)		Weight lb/ft² (kg/m²)		Opening Size (approx.) in. (mm)		Working Strength* lb/ft (kg/m)	
B36-20-1012F	0.34	(8.64)	0.33	(8.5)	4.59	(22.41)	0.23 x 0.47	(5.8 x 11.9)	2500	(3720)
B36-20-12	0.13	(7.14)	0.33	(8.5)	3.49	(17.08)	0.21 x 0.47	(5.3 x 11.9)	2100	(3132)

* Based on 3% chrome steel at 70°F (21°C). All belt ratings are factored for working temperature and material type.

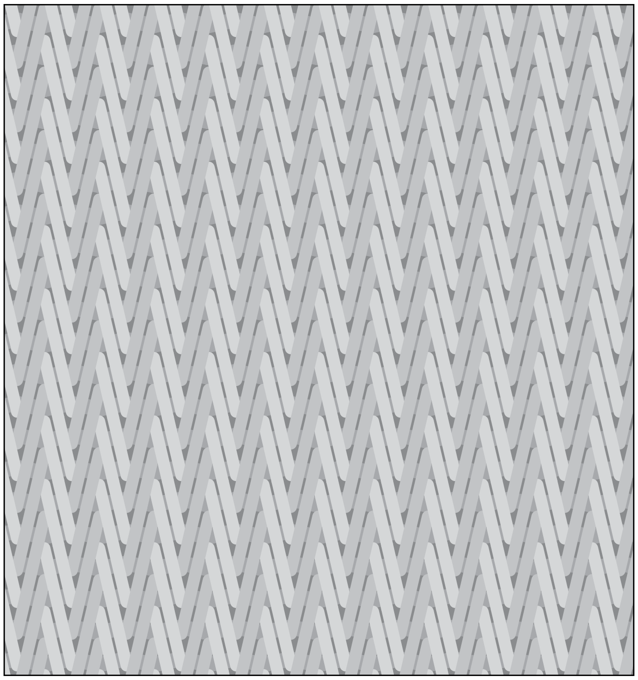
STRAIGHT PRODUCTS

NOTES

Mesh Diagrams - Baking Bands

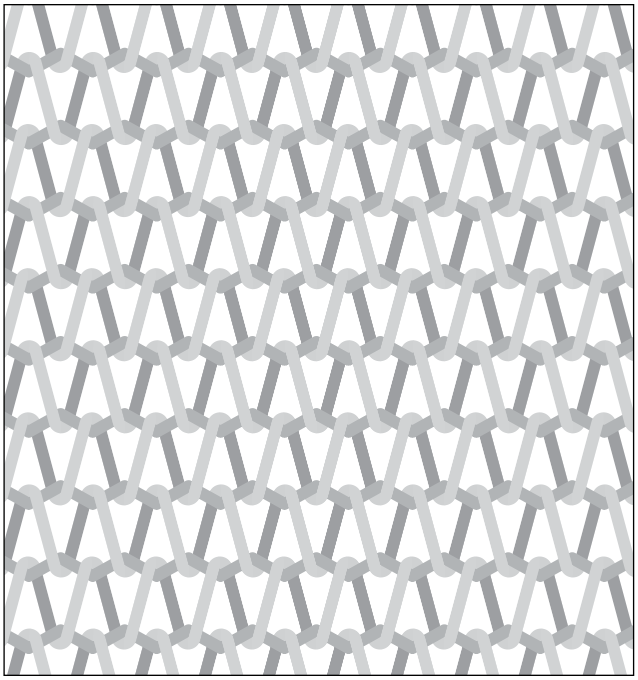


CB5 Baking Band®

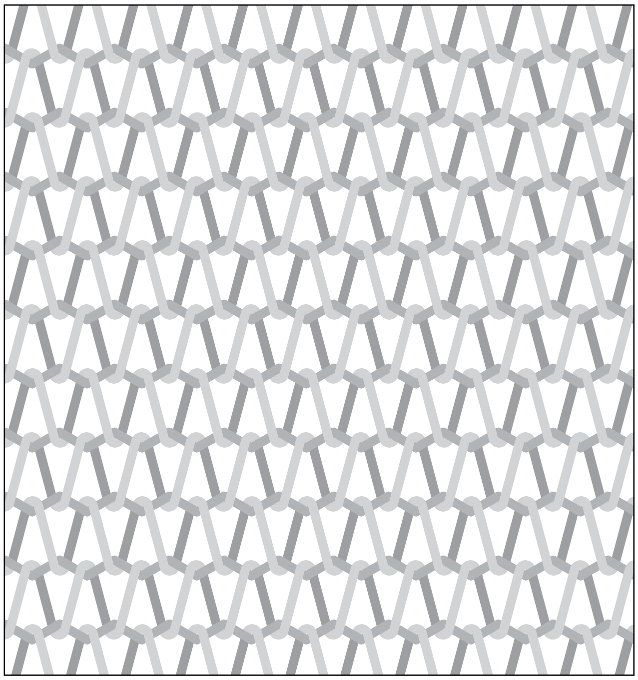


CB3 Baking Band

Mesh Diagrams - Balanced Weave

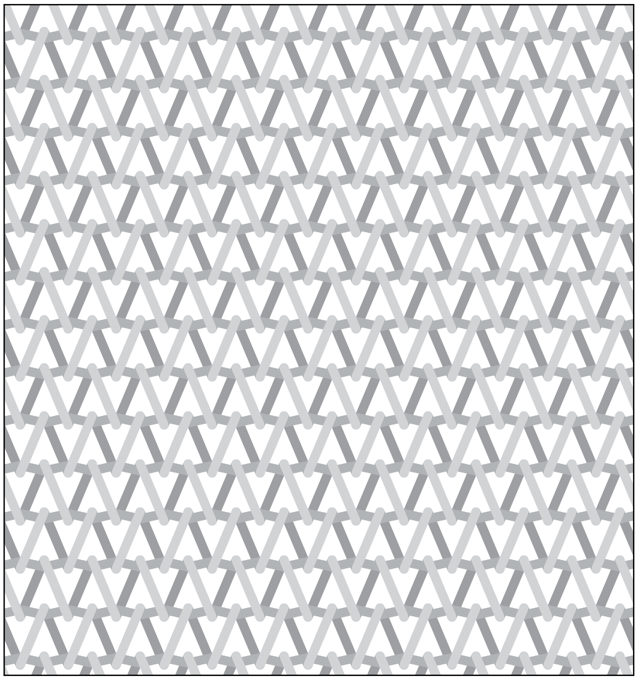


B36-32-16

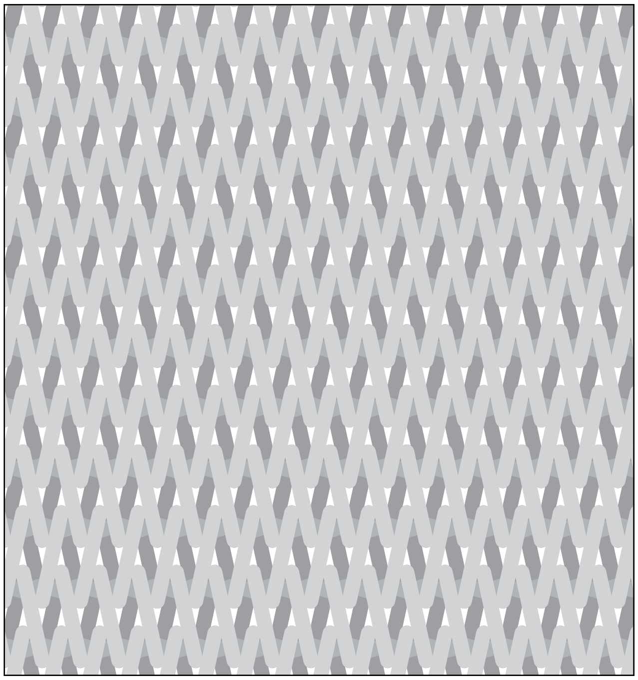


B42-36-18

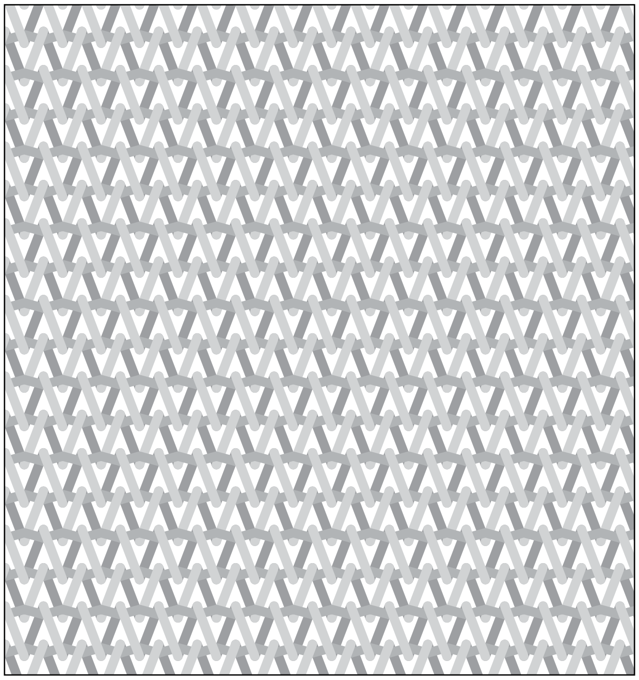
Mesh Diagrams - Balanced Weave



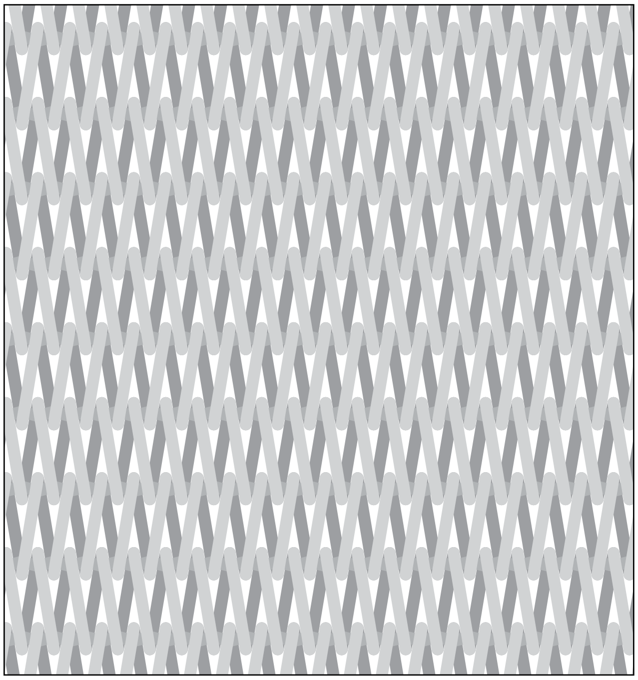
B48-48-18



B60-38-14

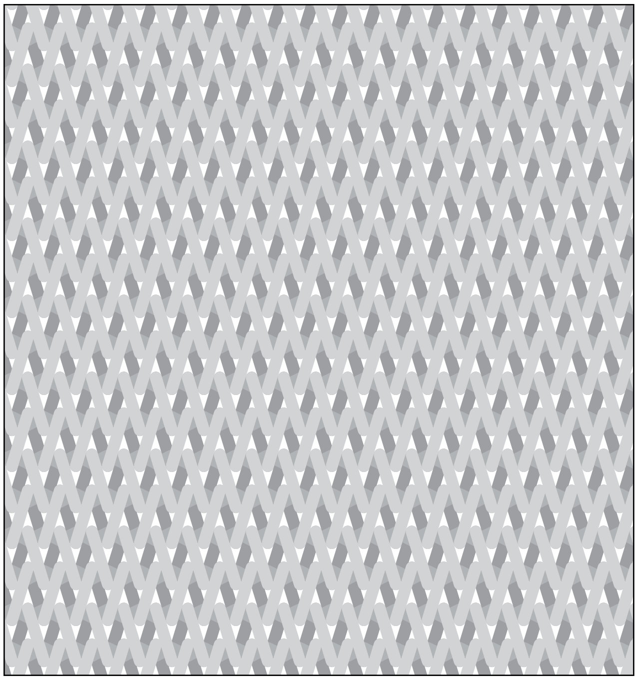


B60-60-18

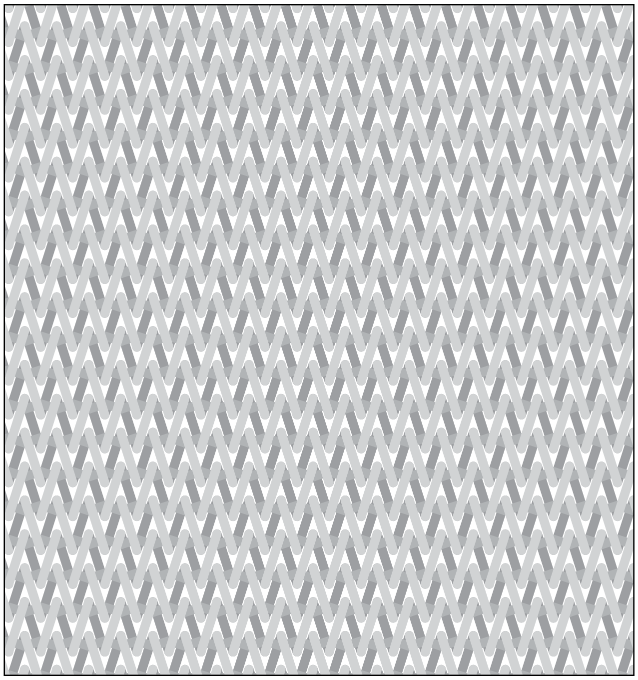


B72-32-16

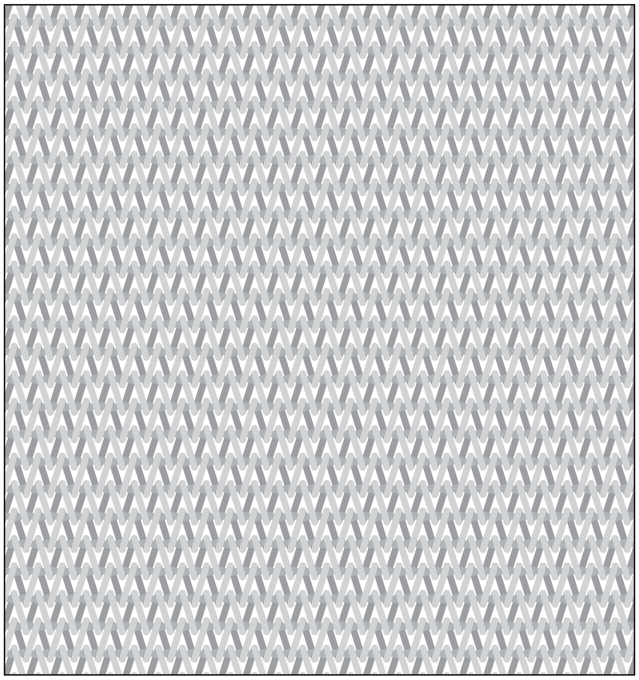
Mesh Diagram - Balanced Weave



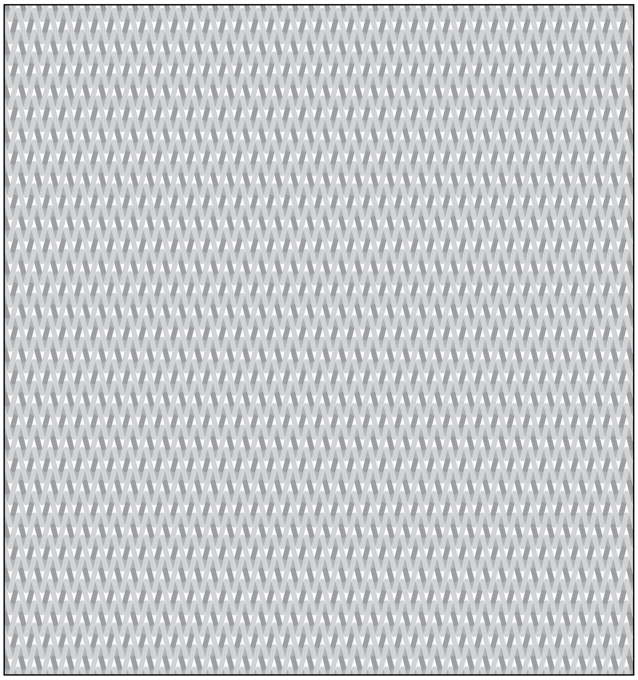
B72-60-16



B72-68-18

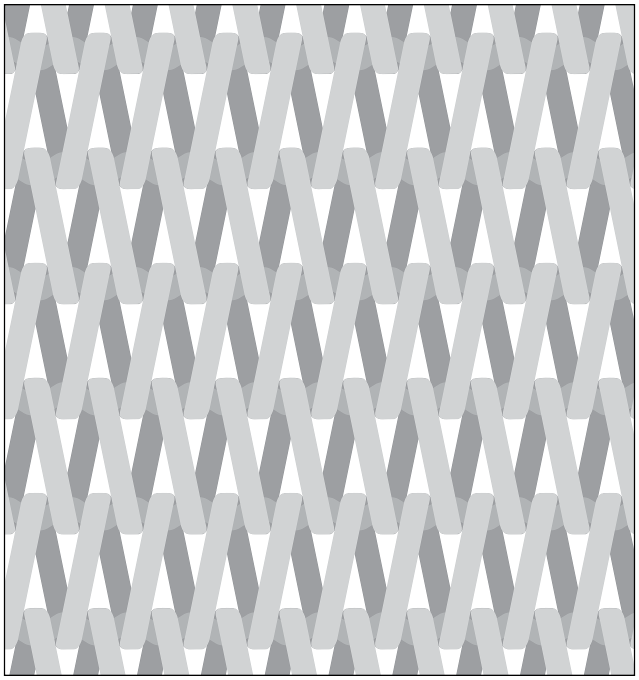


B96-84-20

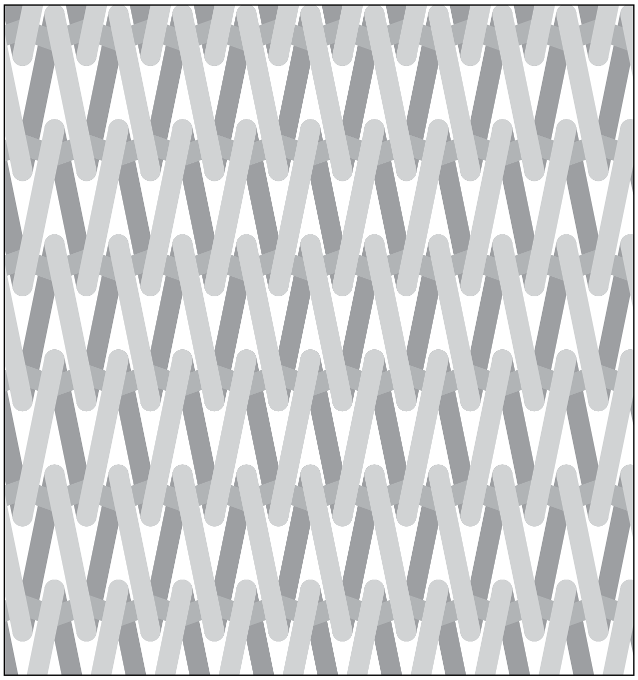


B144-105-2022

Mesh Diagram - Lehr



True Seat Lehr (B36-20-12F)



B36-20-12

Friction Driven:
Straight-Running Belt Selection & Engineering Calculations

Belt Tension Calculation for Straight-Running Belts

The belt tension calculation formula for straight-running belts is different from that for spiral or turn-curve belts, as there is no system radius (R) factor to be considered. Although the tension calculation formula is basically the same for all straight-running belts, there is considerable variation in the belt support options and, therefore, in the coefficient of friction (fr). The general belt tension calculation formula for straight-running belts is:

T = (wLfr + WLfr + WH) x C

Where:
T = Belt tension in lb. (Newtons)
w = Weight of the belt in lb. per linear foot (kg per linear m)
W = Belt Weight + Product Weight in lb. per linear foot (kg per linear m)
L = Full length of conveyor, measured from center to center of the pulleys in feet (meters)
fr = Coefficient of Friction between the belt and belt supports
H = Rise of incline conveyor in feet (meters), (+ if incline,–if decline)
C = Force conversion factor
Imperial: 1.0
Metric: 9.8

Woven Wire Belts (Including Baking Bands)

In calculating the tension ratings for woven wire belts, including Ashworth Baking Bands, the general formula for calculating tension for straight-running belts is used, except that the WH coefficient is typically not relevant (equals 0) as these belts generally are not operated on inclines/declines.

Typical (fr) values used in woven wire belt applications are:

Types of Support	Coefficient of Friction (fr) value
Free-turning rollers	0.10
Stainless steel	0.40
Carbon (mild) steel:	
With temperature to 1000°F (538°C)	0.35
Between 1001 and 1200°F (538–649°C)	0.37
Between 1201 and 1400°F (649–760°C)	0.40
Between 1401 and 1600°F (760–871°C)	0.44

Once belt tension is calculated, the following formula is used to determine how much torque is required to adequately drive the belt and its product load:

Torque Requirement (in units of Inch Pounds) = Belt Tension (T) x ½ Drum or Pulley Diameter in inches

Mesh Designation for Woven Wire Belts

All woven wire belts manufactured by Ashworth are designated by mesh nomenclature as indicated below. Exceptions to this designation are WG belts that are European specifications.

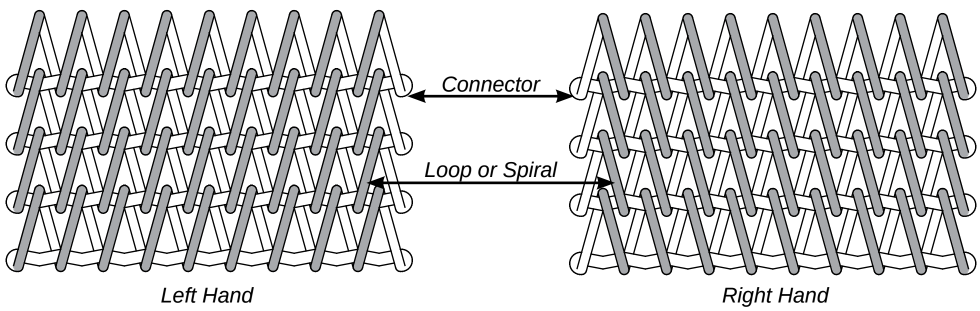
The woven wire mesh designation is a series of up to 12 letters and numbers as indicated in the example:

AAA-XX-YY-ZZFF b

- b — If present, indicates the type of surface treatment (e.g., Flat Wire or Precision Ground)
- ZZFF — Wire gauge
- YY — The number of connectors (connecting rods) per 12" (305 mm) of belt length
- XX — The number of loops (spirals) per 12" (305 mm) of belt width
- AAA — Type of weave: **U**nilateral, **B**alanced, **C**onventional, **C**ompound **B**alanced (**CB**) or Cleatrac® (**CTB**)

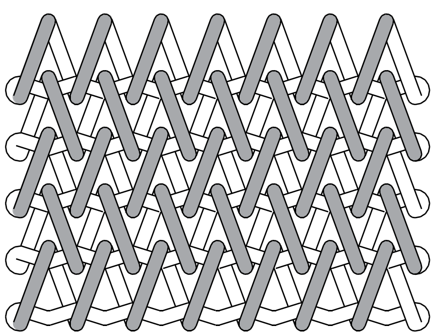
Type of Weave

U: Unilateral weave belts contain *either* right or left-hand spirals (but not both) joined by a single crimped connector. (Figure 32)

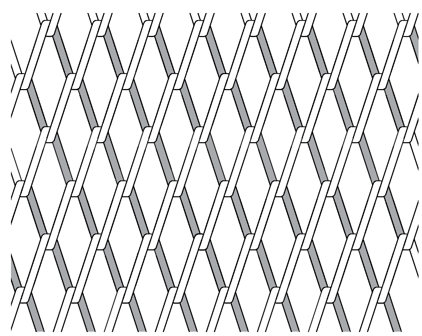


[Figure 32]

B: Balanced weave belts utilize alternating right and left-hand spirals joined with a single crimped connector per spiral row. (Figure 33)



[Figure 33]

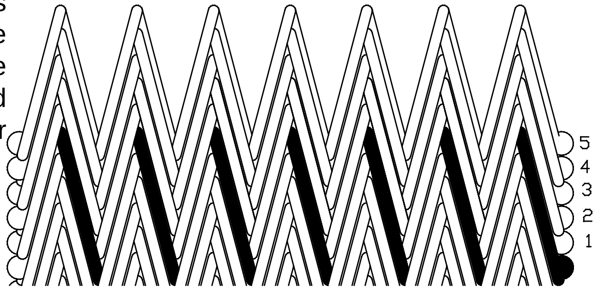


[Figure 34]

C: Conventional weave belts are made up of spirals of all one hand weave with each spiral turned into the preceding one, forming a continuous fabric. (Figure 34)

CTB: Designates Ashworth Cleatrac® Belt and Sprocket System. “CT” indicates Cleatrac® belt and “B” indicates that it is of balanced weave construction. Cleatrac® woven meshes are balanced weave meshes manufactured to tighter specifications to ensure prompter engagement with the sprockets.

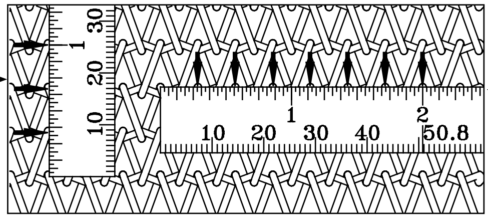
CB: Compound Balanced Weave belts consist of a tight nesting of right and left hand spirals which provide a smooth, dense surface and the smallest mesh opening obtainable with any woven belt construction. The mesh designation for Compound Balanced Weave indicates one of four different series designated CB2, CB3, CB4, or CB5. The number following the letters CB specifies the number of connectors that must be inserted to make the belt endless or, conversely, removed to disassemble the belt. Figure 35 depicts a CB5 mesh with the numbered connectors being needed for to complete assembly or disassembly of the belt.



[Figure 35]

Numerical Mesh Counts

Connectors:
The diagram indicates there are 3 connectors per inch (25.4 mm), so the connector count (YY) would be 36 (3 connectors x 12). As indicated in the diagram, the initial connector where the end of the ruler is placed is not counted.



[Figure 36]

Loops:
There are 7 loops per 2" (50.8 mm), so the loop count (XX) would be 42 (7 loops x 6). Care should be taken to count complete loops. A complete loop starts at one connector, encircles the next connector, and returns to the original connector.

Woven wire mesh counts are designated by three sets of numbers that follow the weave type prefix.

First Count: the first set of numbers after the weave type prefix is the mesh lateral pitch or loop count, and this number indicates the number of loops in a spiral measured in 12 inches of belt length. Figure 36 illustrates a balanced weave mesh with a 42 first count.

Second Count: the second set of numbers is the mesh longitudinal pitch, and this number indicates the number of connector or spirals measured in 12 inches of belt length. Figure 33 illustrates a balanced weave mesh with a 36 second or middle count.

Third count: the third set of numbers represents the wire gauge of the connector and spiral components per the American Steel and Wire Co. gauge sizes. Both components are made of the same gauge when one size is given. Many constructions are fabricated with a heavier gauge connector to increase belt strength. With these meshes, the first number or pair of numbers designates the gauge of the connector; the last number or pair of numbers designates the gauge of the spiral.

Surface Treatment

b: In certain cases a suffix will be added to the basic mesh designation. There are two possible suffixes:

F: Indicates that **F**lattened wire is used in construction of the spirals.

PGLW: **P**recision **G**round **L**ight **W**eight indicates that the surface of an open mesh band is flattened by precision grinding the surface after manufacture. This feature is limited to carbon steel belts 54" or less in width.

Baking Band Installation & Tracking

Proper Installation of Baking Bands

Proper installation of baking bands is essential to long life and low maintenance. To install the belt it can be either pulled into the oven attached to the old belt or using a rope and bridle system. When manufactured, the belt is tested for waver in lengths up to 200 feet. The belt is then broken into either 25 or 50 foot rolls and tagged in sequence. Each roll of belt must be installed in sequence in acordance with the numbered tags attached to each belt. **If the rolls are installed in the oven out of sequence, the belt will not track properly and will be permanently damaged.**

The installation begins with aligning the terminal rolls to be level, parallel to each other and perpendicular to the oven centerline. Failure to complete this crucial step will shorten the belt life and require constant monitoring of the system. With both terminal rolls aligned, position all snub rolls to be parallel to the terminal rolls and insure they are level using the terminal rolls as reference. These rolls are very important and can permanently damage the band in a short time if improperly adjusted. Sometimes a “steering roll” is used for the rolls nearest the terminal rolls. While they can have a significant influence on the side travel of the band, they must not be used for this purpose. When trying to control side travel with a snub roll, non-uniform tension is applied and uneven sag across the belt width results. It is recommended once the terminal and snub rolls are aligned, they are not moved out of parallel.

Roller supports are recommended on both the loaded and return path and they should be mounted with external bearings. External bearings allow for adjustment of the rollers to tune the bet path through the oven. Of course, the support rollers should be level and free turning. Tracking of the band is very simple if sufficient adjustment is available. Actual tracking of the band should be performed under production conditions.

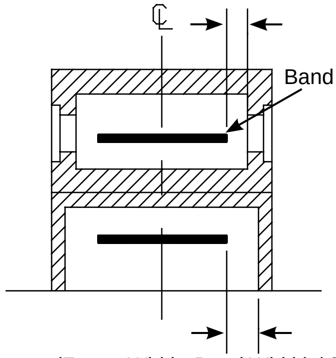
Tracking

Determining the Band’s Path
Start the band at low speed. The band path will stabilize after three or four cycles. Position observers at essential locations to insure the band is not damaged during these first cycles.

To adjust the band’s path, adjust only the support rolls by skewing them in the horizontal plane. ***Do not*** skew or cock the terminals or other major rolls to track the band. Alignment of the terminal drums and other major rolls ensures equal tension across the bandwidth, and moving the supports does not affect this balance. Ideally, the band center line will also be the oven centerline.

To determine the correct band placement (Figure 37) on the load path, first measure the oven chamber width, subtract the band width, and divide by two. This value is the desired distance between the band edge and the oven wall through the load path.

For the band’s return path, measure the oven frame width and subtract the band’s width. Half of this value is the desired distance between the band edge and the oven wall through the return path. In aligning the band through the oven, measure band position every 10' to 15' (3 m to 4 m).



[Figure 37]

Band tracking will change as the oven is brought up to temperature. Start tracking while the band is cold and make adjustments to the rollers until it is running straight. Then, heat the band. Make the final adjustments to the rollers when the band is at baking temperature. Additional tracking adjustments may be needed when product is introduced.

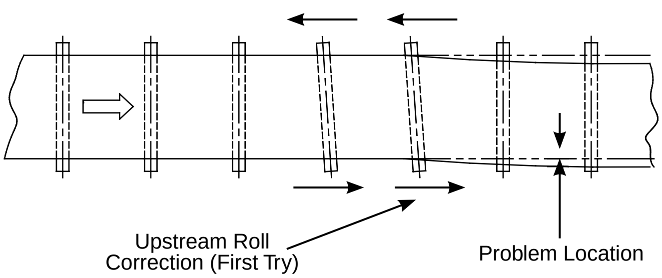
Adjusting the Roller Supports
A roller that is exactly perpendicular to the band’s path exerts no lateral influence on the band, because a band

approaching a free turning roll will attempt to leave that roll at 90° to its axis. Therefore, to change the direction of the band, the sides of the rollers must be adjusted forward or back so that they are no longer perpendicular to the band (move the rollers as if steering a bicycle).

Keep in mind that the surface of the belt that will carry product will move in the opposite direction of the belt as it goes through its return path. After each adjustment, the band will take about three cycles to re-stabilize. It is advisable to make tracking corrections several band widths before the trouble spot (Figure 38). Moving several rollers a small amount is recommended over moving one roller a greater amount.

While making adjustments, keep in mind that expansion of the oven frame may bind a roller at baking temperature. Rollers with frozen bearings have the opposite effect as the free turning roll. Consider the direction of oven expansion when setting roller positions.

Ovens with Lateral Skid Bars in Place of Rollers
Skid bars have the opposite effect on band direction as compared to free turning rollers. Since lateral skid bars have no adjustment, the use of controls systems is necessary because they provide the only available method to keep the band in position.



[Figure 38]

Conditioning After Installation & Alignment

Most mesh belts are woven with carbon steel wire. The wire is received from the manufacturer with a protective coating of oil. An emulsifiable lubricant is used during the forming of the spirals. Welding of the band edges burns off the oil and lubricants in this area. Band oven oil or vegetable oil is applied to the belt after welding as a rust preventative prior to shipping and/or storage. After the band is installed and aligned, the oils that were applied during manufacture of the band should be burned off prior to placing the band into production. These oils are normally burned off when the oven is operated at several hundred degrees Fahrenheit (or Celsius). “Burn off” may last up to an hour depending on the amount of oil on the band and the oven temperature. During this procedure, ensure that all exhaust fans are turned on and all employees are notified of the burn off taking place, as considerable amounts of smoke may be generated.

A heavy board wrapped in multiple layers of clean cloth and laid across the band can be used at the discharge end of the oven to wipe off the band surface. This board can be applied anytime during burn off depending on whether the customer prefers to burn or wipe off the majority of the oil. Maximum effectiveness of the wiping action occurs when the board is rotated periodically to expose a clean surface. When the cloth remains clean during continued running, the band is sufficiently clean to begin production. It is not necessary to re-oil the band before baking.

CAUTION: If the oven is equipped with a band brush, it is suggested that it not be used during burn off to avoid gumming the bristles with oil.

Baking Band Tracking, Conditioning, & Inspection

Inspection
The baking band, oven, and other associated components should be inspected at regular intervals for correct operation and possible equipment or processing defects according to the following checklist:

Band
- ☐ Contains no product debris
- ☐ Equal tension across its full width
- ☐ Equal edge sag on both sides of the band
- ☐ No broken welds
- ☐ No curl along belt edges
- ☐ No broken wires
- ☐ Not out of crimp
- ☐ Not discolored
- ☐ Product load is evenly distributed

Oven
- ☐ Produces equal heat distribution across full belt width
- ☐ All vents are operating properly to prevent "zonal" heat build-up
- ☐ All oven doors are shut; if doors must be opened, open an equal number of doors on both sides of oven

Band Path
- ☐ No obstructions
- ☐ Not contacting framework
- ☐ Not overhanging any rollers
- ☐ Not passing under any rollers
- ☐ Does not waver through oven
- ☐ Does not waver at terminal drums
- ☐ Light contact with the controls
- ☐ All limit switches are properly located
- ☐ Cleaning brush is not binding

Terminals & Major Rolls
- ☐ "Flat-faced" (not crowned)
- ☐ Parallel to each other and perpendicular to the belt
- ☐ No build-up of product debris
- ☐ Shaft is not broken
- ☐ No objects between belt and drum

Control Systems
- ☐ Free turning
- ☐ Bearings are in good condition
- ☐ Bearings have been lubricated (if applicable)
- ☐ Roll faces are in good condition
- ☐ Rolls are free-pivoting
- ☐ Proper clearance exists between controls and belt
- ☐ Controls are located in the proper location

Roller Supports
- ☐ Free turning
- ☐ Exhibit concentric rotation
- ☐ No flat spots
- ☐ Shaft is not broken
- ☐ Properly adjusted
- ☐ Level

Take-Up
- ☐ Air pressure setting is correct
- ☐ Equal air pressure in both cylinders
- ☐ Adequate free travel
- ☐ Equal travel on both sides
- ☐ Tracks are clean

Slider Supports
- ☐ Level
- ☐ Securely fastened to the frame
- ☐ Smooth transition between joints
- ☐ Not warped or damaged
- ☐ No product debris

Baking Band Cleaning

Regular Inspection, Maintenance, & Cleaning
The key to maintaining a clean band is to prevent the build-up of deposits so that they can be easily removed. This is only accomplished by establishing the cleaning techniques and intervals at an early stage. It should then become part of the routine maintenance program.

Bands that are used to bake sweet goods require close monitoring and periodic cleaning. Brushing is seldom adequate to remove debris. Left unchecked, shortening, sugar, and other product debris fill the voids in the mesh, form solid deposits, and begin to exert pressure on the spiral wires from the inside out. This bending force on the spiral wires as the mesh flexes around the terminal drums is unnatural and results in fatigue breaks. Broken wires then encounter the take-off blade, often resulting in blade damage or, worse, product contamination.

If the products leave debris in the band, it is important to ascertain the rate of build up so that an appropriate cleaning interval can be established. Hard products such as crackers or dog biscuits seldom pose problems. The rotating brush usually supplied by the oven builder will keep the mesh clear of any product debris. Inspection and cleaning at regular intervals is the key to long band life.

Removing Solid Deposits
The most efficient cleaning procedure to remove deposits in the band is to raise the temperature of the baking band to about 800°–900°F (400°–480°C) and carbonize the debris, allowing it to break up and fall out. Since most ovens do not operate at these temperatures, auxiliary burners can be added at a convenient location to provide even heat distribution over the entire moving bandwidth.

It is important to monitor the band temperature. A temperature of 900°F (480°C) produces a very dark color in carbon steel, which is barely visible in poor light. If the band becomes a dark or dull cherry red, the band temperature is far too high. *Use the lowest temperature that works for your product.* Higher temperatures will damage the band and increase the danger of fire.

Removing Soft Accumulation
Soft accumulation can be removed by cleaning the band with an industrial cleaning agent. Provisions for drains must be made for this method of cleaning.   After cleaning, use sufficient heat to completely dry the band. After cleaning, the band must be oiled to prevent corrosion.

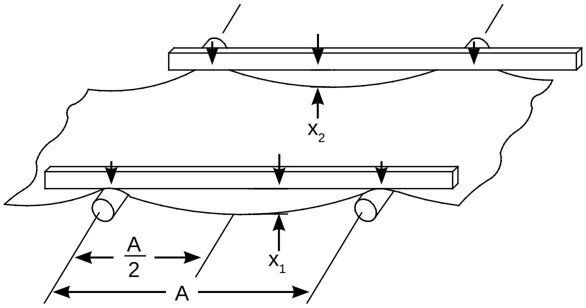
CAUTION: DO NOT APPLY WATER TO A BAND AT HIGH TEMPERATURES,
AS IRREPARABLE DISTORTION COULD OCCUR.

Troubleshooting—Baking Bands

Unequal Edge Sag—Ashworth recommends that the difference in sag between a baking band's two edges be no greater than 0.03" (0.79 mm).

Causes of unequal edge sag include:
• Unequal tension across the band width
• Conveyor misalignment
• Temperature variation across the band width

Correcting a Stretched Edge
Once a band becomes elongated on one edge, little can be done unless it is caught early. A quick fix while awaiting a new band is to flip alternating sections of the belt to equalize the elongation.



If successful, it is only temporary as it results in a belt with loose edges and a tight middle. Finding and correcting the cause of the problem and then replacing the band is the most economical long-term solution.

Excessive Side Pressure
During normal operation, controls should exert zero or minimal force to maintain a straight belt path. If the belt tends to run against one set of controls, grip the top of the rotating vertical roll with your thumb and forefinger and try to stop it. If the roll cannot be stopped from rotating with finger pressure, then the belt is not tracking correctly and should be inspected to find the source of the problem.

Possible causes include, but are not limited to:
• Binding or frozen rollers and/or supports
• Broken shaft on a roller support, snub roll, or bend roll
• Damaged slider rails
• Cocked terminal roll, snub roll, or bend roll

Band Vibration
Excessive vibration of oven bands is a rare problem but, when it occurs, the cause and cure are seldom obvious. The most frequent symptom of excessive vibration is the disorientation of product to the point of it spilling off the band edge, creating the opportunity for oven fires.

Band Related Vibration Factors:

Band Weight
Greater band weight generally equates to a lower fundamental frequency of vibration, which means that, all else being equal, a heavier band is less likely to cause excessive vibration than a lighter band.

Spiral Pitch & Shape
The longer the spiral pitch, the greater the possibility of excessive vibration. The smooth, compact surfaces of the Compound Balanced Weave meshes are very conducive to reducing vibration. For even less vibration, operate a Precision Ground Light Weight (PGLW) belt with the smooth side down. Balanced Weave mesh with an ordinary oval spirals could be a vibration producer; the flatter and more compact the surface, the less probability of excessive vibration.

Non-Uniform Band Tension & Wear
When one band edge is loose in comparison to the other, there is usually one zone across the band width that will result in excessive vibration. In addition, this condition will cause a sag in one side of the belt, allowing the product to slide downhill, causing spillage from the belt.

Oven Related Vibration Factors:

Vibrating Framework & Unbalanced Equipment
These vibrations are readily apparent by their low frequency. Only severe cases would affect the band itself.

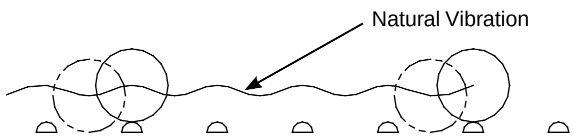
Belt Drive
Avoid long pitch chains on small diameter sprockets. Speed change from the chain chordal action would produce a band surging motion.

Support Roll Spacing
Evenly spaced support rolls, where the center-to-center distance between rolls and the spiral pitch are multiples of each other, will produce vibrations.

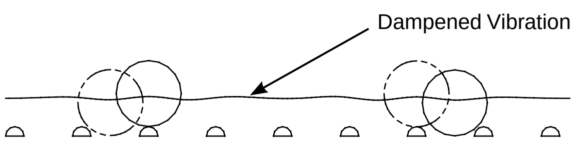
This phenomenon can best be described by analogy. Assume a car with a wheelbase of 4' (1.22 m) is traveling a section of road, which has speed bumps on 1' (0.3 m) centers.

As the car travels, the wheels will always be either on top of the speed bumps or between them; therefore the driver will experience a rise and fall relative to the ground (or achieve a natural vibration—Figure 39). If the driver is not wearing a seat belt and the forward speed is great enough, he may be thrown from the vehicle. The same is true of conveyor belts. To prevent product from being thrown from a belt (dampened vibration—Figure 40), the support rolls (the speed bumps) need to spread out to dampen the natural frequency of the belt.

As with the car, the distance between the support rolls should not be divisible by the belt pitch. This prevents the spirals from being either up or down at the same relative time, thus dampening the vibration.



[Figure 39]



[Figure 40]

Friction Drag
Support bars, non-rotating rollers, or badly tracking bands contacting the oven's frame can produce vibration. A significant difference between static and dynamic coefficients of friction can produce "stick/slip," resulting in surging and vibration.

Eccentric Rolls
Long-term wear or build-up of product forms eccentric rolls which are recognized as a primary source of band vibration.

Small Support Roll Diameters
Small support roll diameters coupled with the specific pitch and shape of the spiral can be another source of vibration.

Troubleshooting—Baking Bands

Operating Related Vibration Factors:
The opportunity to vary operating factors to solve vibration issues is often limited by the oven settings required for the product.

Band Speed
Band speed determines the frequency of both band and roll induced disturbing forces. Sometimes a change in speed will sufficiently reduce vibration to acceptable levels. However, there is also the possibility the vibration may merely move to another location.

Take-Up Tension
Take-up tension will affect the vibration frequency. Varying the tension may help but, as with speed, the vibration may move elsewhere in the band.

Oven Temperature
Temperature should not affect the band other than by altering band tension or friction characteristics.

Band Tracking
Band tracking is a reflection of the condition and alignment of the terminal drums, all major and minor rolls, belt supports, and the take-up.

"Hot Spots" on the Band
Possible causes of hot spots on a baking band include:
- Oven burners that fail to supply even heat across the entire band width.
- Air circulation within the oven is not adequate.
- Product configuration on the band is uneven (products serve as insulation).
- Burners under the band (example: pre-heat burners in the return path) may cause heat to build up under the band. This heat can only escape where product is not on the band, which is often only along the band's edges. This will heat the band's edges more because the product is effectively insulating the rest of the band.

Efforts to cool the edges of a baking band with water can result in irreparable band damage. Ashworth does not recommend this practice. The normal quenching procedure involves the use of oil, as oil allows some control over the cooling rate. Quenching with water is most severe and will produce stress fractures within the grain boundaries of the material. Once these fractures are created, any side pressure on the band may cause the band to fracture (crack) along the quenched zone. Build-up of the product on any support roll that causes the band to flex may also lead to broken wires in the area of the quench. Instead of quenching the band, determine the cause of the hot spots and work to remedy the situation.

Design/Data Sheets

Design Assistance
Ashworth's experts are available to assist you in evaluating a new spiral or conveyor application as well as to recommend a new belt for your specific criteria. As an Ashworth customer, you will always be up-to-date on the latest belt technologies available improve production and lower operational costs.

For further information or to consult with an Ashworth Application Specialist, contact us at:
Toll-Free Phone: 800-682-4594
Phone: 540-662-3494
E-mail: ashworth@ashworth.com

Submitting Data Sheets
To submit a data sheet online, go to www.ashworth.com, click on "Submit a Design/Data Sheet," and complete the online form.

Ashworth

Ashworth Bros., Inc.

450 Armour Dale, Winchester, VA 22601
Phone: 540-662-3494 or 800-682-4594 Fax: 540-662-3150 or 800-532-1730 www.ashworth.com

Ashworth Inquiry No.: ____________

DATA SHEET
STRAIGHT-RUN CONVEYORS

Company: ____________ Date: ____________
Address: ____________
City: ____________ State: ____________ Zip: ____________
Contact Name: ____________ Title: ____________
Phone: ____________ Fax: ____________
Email: ____________
End User & Location: ____________

☐ **Price Quote Only** (complete section 1 only)
☐ **Recommendation** (complete all four sections)

1. BELT SPECIFICATIONS
Specify units of measure.

Type of belt: ☐ Woven Wire ☐ Cleatrac® ☐ Flat wire ☐ PDCE (Positive Drive Chain Edge)
☐ Prestoflex® ☐ Eye-Link ☐ Advantage ☐ Other (specify): ____________
☐ Recommend ☐ Omni-Grid® ☐ ☐

No. of belts: ____________ Length of each: ____________ Mesh Width: ____________
Mesh Designation: ____________ -or- Max. Opening: ____________ Material: ____________
Options (check all that apply):
☐ Guard Edge Plates (mat'l, gauge, height, type): ____________
☐ Lifts/Flights (mat'l, gauge, height, type, spacing): ____________
☐ Other (such as pin-ups; describe): ____________

For PDCE: Specify critical dimension: ☐ Mesh ☐ Chain centers ☐ Overall
Chain Type: ____________ Chain Material: ____________ Chain Centers: ____________ Overall width: ____________
Cross Supports: ☐ Round Rod ☐ Turned down rod ☐ Pipe/Rod ☐ Flat bar ☐ Other (describe): ____________
Size, material, spacing: ____________
Edge finish: ☐ Washer welded ☐ Drilled & Cottered ☐ Welded ☐ Other (describe): ____________

2. APPLICATION
Specify units of measure.

Product: ____________ **Process:** ____________
Max. load: ____________ lbs./lin. ft. ____________ kg./lin. M. Max. Temperature: ____________ Min. Temp.: ____________
Min. size: ____________ Temperature Gradient (if applicable): ____________
Shape: ____________ Max. Speed: ____________ ☐ Constant ☐ Variable
Projection: ____________ Corrosives or Other Conditions: ____________
Type of loading: ____________

3. CONVEYOR DETAILS
Specify units of measure.

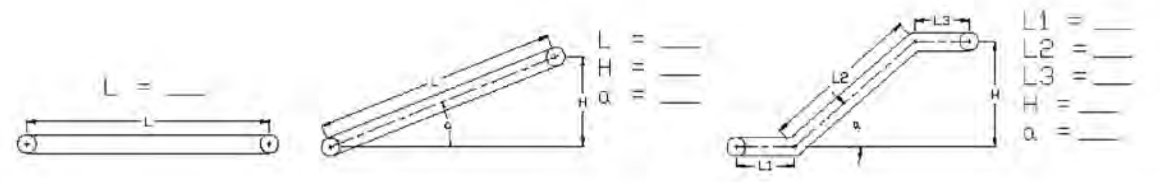
Drive Location: ____________ Drum/Sprocket Diameter: ____________
Take-Up (type, location): ____________
Belt Supports (non-PDCE): Load Path: ____________ Return Path: ____________
For PDCE:
Chain Supports: Load Path: ____________ Return Path: ____________
Supported under mesh? Load path: ☐ No ☐ Yes Return path: ☐ No ☐ Yes Material: ____________
Is a filler roll used? ☐ No ☐ Yes: Diameter: ____________
Is there a reverse bend? ☐ No ☐ Yes: Radius: ____________

4. CLEANING & SANITATION

How often is belt cleaned? ____________ Brush ☐ CIP ☐ Hand cleaned ☐
How are support rails cleaned? ____________ Are rails ragged with lubrication: ☐ No ☐ Yes
Type of lubrication used on rails: ____________
How often drive drum or sprockets inspected: ____________
Cleaning chemicals used: ____________ Sanitizers used: ____________
Cleaning water temperature (if applicable): ____________

Remarks:

Sketch: Please provide dimensions on appropriate layout (include units):



Guidelines for Proper Operation of Ashworth Belting

Analysis of service requirements of the particular application is required to determine the best belt design and material selection for optimum performance. Correct belt selection means longer life and lower maintenance. Belt performance is directly related to the condition, setup, and maintenance of the conveyor. For this reason, we send our Service Technicians all over the world to supervise installations. The value of this service is well recognized. This document is to be used as a guide only and is not intended to replace our trained and skilled personnel.

NOTE: Use proper safety equipment, including face and eye protection, as mandated by your company's safety policy.

CAUTION: Due to the large openings in some of the belts there is a risk that operators' fingers or clothing may become caught in belt. Appropriate guards and safeties need to be considered.

STRAIGHT-RUN CONVEYORS

TENSION CALCULATIONS

In making belt selections or determining whether the selected belt is suitable for the application, we must determine the tension. For positive-drive conveyors operating at less than 1000°F, the tension in the belt is typically highest at the drive. Consequently, the tension is zero just after the belt leaves the drive sprockets.

After the belt leaves the drive, the tension increases along the return path and on the load path. The amount of tension that is built-up through the conveyor paths can be estimated from the formulas below. Ashworth recommends that only minimal additional tension be added to the belt in the take-up. Typically, a catenary sag is sufficient to provide enough initial tension in order for the belt to operate. The formulas below are based on the assumption that minimal force has been added in the take-up.

Tension of Simple Flat Conveyors:

For simple conveyors with a discharge end drive operating at room temperature, belt tension can be calculated from the following formula:

$$T = wLf_r + WLf_l$$

Where: T = Belt Tension, lb/ft of belt width. (Newtons/m of belt width)

w = Belt Weight, lb/ft^2 (kg/m^2)

W = Weight of Product AND Belt, lb/ft^2 (kg/m^2)

L = Conveyor Length (center to center of pulleys), feet (meters)

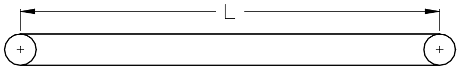
f_l = Coefficient of Friction between the belt and belt supports on the load path (dimensionless)

f_r = Coefficient of Friction between the belt and belt supports on the return path (dimensionless)

If using Metric units, multiply resultant by 9.8 to convert to Newtons.

Example—Straight-Run Conveyor:

Assume a 100 foot long, level conveyor with drive on the discharge end. Process is cooling pastries at room temperature. Load is 5.0 lb/ft² on UHMWPE-capped belt support rails. Selected belt type is a 48 inch wide true ½ x ½ Flat Wire.



$$T = wLf_r + WLf_l$$

- **T** = Belt Tension, lb/ft of belt width. (Newtons/m of belt width)
- **w** = belt weight of an Ashworth A5 = 3.03 lb/ft²
- **L** = conveyor length = 100 feet
- f_r = friction between belt and supports on return path = 0.35
- **W** = total weight of belt and product = 3.03 + 5.0 = 8.03 lb/ft²
- f_l = friction between belt and supports on load path = 0.35

T = 3.03 (100) 0.35 + 8.03 (100) 0.35

= **387.1 lb/foot of width**

From the Flat Wire Technical Bulletin, the allowable Tension for an A5 is 500 lb. foot of width; therefore, **Selected belt is strong enough.**

Total Belt Tension:

To determine the total tension at the drive in order to size drive components, multiply the resultant tension by the belt width in feet:

$$T_t = T \times BW$$

Where: BW = Belt Width, ft. (meters)

In the preceding example, for a 48" wide belt,

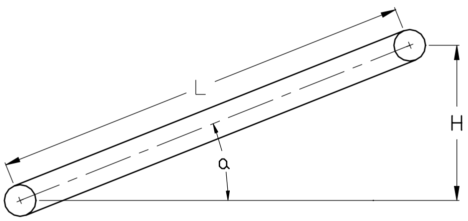
T_t = 387.1 x 4.0 = 1548.4 lb/linear foot

Tension of Simple Incline Conveyors:

For simple incline conveyors with a discharge end drive operating at room temperature, belt tension can be calculated as before but an allowance for pulling the belt up the incline must be added. Note: The reduction of tension due to the weight of the conveyor belt going downhill on the return side usually can be neglected and is omitted from the inclined conveyor formula. The formula changes to:

$$T = wLf_r + WLf_l + WH$$

Where: H = Rise of incline conveyor, feet (meters)



Example—Incline Conveyor:

From the previous example, assume the conveyor had a four foot rise.

T = wLfr + WLfl + WH

H = Incline = 4.0 ft.

T = 3.03 (100) 0.35 + 8.03 (100) 0.35 + (8.03)(4)

= 419.2 lb/foot of width

Tension of Conveyors with Multiple Segments

To obtain the tension for more complex conveyor layouts, such as shown below, the tension in each segment on both the load and return paths must be summed together:

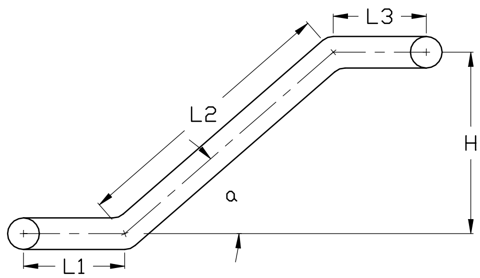
$$T = (wL_{r1}f_{r1} + wL_{r2}f_{r2} + wL_{r3}f_{r3}) + (WL_1f_1 + WL_2f_2 + WL_3f_3) + WH$$

Where: L_{r1} = length of segment 1 on return path… etc.

f_{r1} = friction of segment 1 on return path… etc.

L_1 = length of segment 1 on load path… etc.

f_1 = friction of segment 1 on load path… etc.



If the belt support material is the same for all segments, the formula reduces to:

$$T = wf(L_{r1} + L_{r2} + L_{r2}) + Wf(L_1 + L_2 + L_2) + WH$$

Tension of Accumulating Conveyors

Belt tension in an accumulating conveyor is equal to the tension in the system plus the additional tension created when the belt slips under the product.

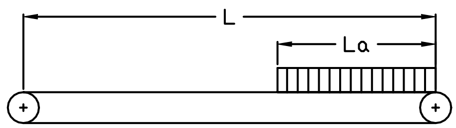
$$T_a = T + W_l L_a f_p$$

Where: T_a = Belt tension of an accumulating conveyor, lb/ft of belt width. (Newtons/m of belt width)

W_l = Weight of product, lb/ft² (kg/m²)

L_a = Length of accumulation, ft. (m)

f_p = Coefficient of friction between belt and product (dimensionless)



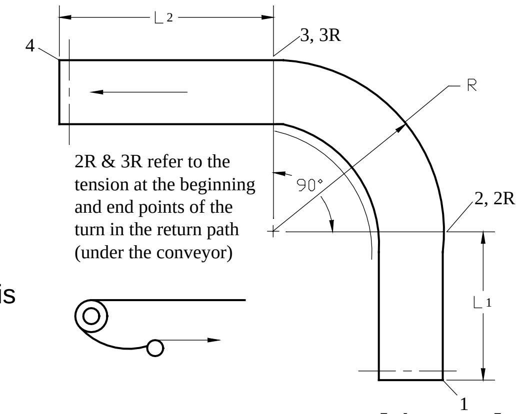
If using Metric units, multiply resultant tension by 9.8 to convert to Newtons.

Turn Curve Calculations

Turn curve belts allow for complex conveyor layouts with a single belt, thereby eliminating the need for transfers while maintaining product orientation. Ashworth turn curve belts include the Omni-Pro®, Advantage™, Omni-Grid®, and Omni-Flex® families of belts.

Typically, the inside edge of a belt collapses when entering a turn while the outside edge remains at a constant pitch. As a result, all of the belt tension is concentrated on the outside belt edge. Since the load is not shared across the belt width, the allowable tension is generally quite lower than in a straight-run condition.

However, in a turn curve application, the tension in the belt is concentrated at a single point through the turn.



[Figure 41]

Radial pressure of the belt against a fixed turn rail (see Figure 41) creates considerable belt tension due to sliding friction.

The key to maintaining low tension is making the inside radius as small as allowable for the given belt type, and providing a low friction material on the inside rail.

Inside turn rails provide an acceptable and common means of retaining turn curve belts in a curved path. To reduce wear and friction to acceptable levels, a replaceable wear strip should be used. The material must have resiliency and good abrasion resistance. The lowest possible friction between belt edge and wear strip is desirable and provision should be made for lubrication wherever feasible. A minimal amount of lubricant, compatible with the product and process, is all that is required. A commonly used material is Ultra High Molecular Weight Polyethylene (UHMWPE).

The drag created by sliding friction in a turn can be greatly reduced by the use of a rotating wheel or Ashworth powered turn Edge Drive unit (refer to Technical Product Bulletin “052 Edge Drives” for further information). Increased load carrying capacity and longer belt life are two important benefits.

Turn Ratio

In designing turn curve applications, the Turn Ratio (TR) is critical. The minimum turn ratio of each belt is used to determine the minimum inside turn radius. Consult Product Technical Bulletins to obtain the minimum turn ratio of specific belts.

$$IR = TR \times BW$$

Where: **IR** = Inside Radius of turn

TR = Turn Ratio

BW = Belt Width

Turn Curve Tension Limitations

All of the basic Ashworth turn curve belts (Omni-Pro®, Omni-Grid®, Omni-Flex®, Small Radius Omni-Grid®, Small Radius Omni-Flex®, Reduced Radius Omni-Grid®, and Advantage™ Series) collapse on the inside edge to negotiate a turn. This places the full belt tension on the outside edge, or on the middle links in the case of the Small Radius belts. The Space Saver Omni-Grid® belts do not collapse on the inside belt edge but expand on the outside belt edge to negotiate a turn. In this case, the tension is concentrated on the second row of links. For all belts, this concentrated stress, if excessive, can cause fatigue failure of the belt components. This is the principal limitation of these belts, as the critical stress is considerably below the actual belt strength in the straight condition.

Tension Calculations—Turns

For a fixed inside rail, tension increases through a turn. This increase is calculated from by the following formula:

$$T_2 = T_1(a) + b(f_s)(R)(W_b + W_1)$$

Where: T_2 = Tension at the turn exit, lb. (N)

T_1 = Tension at the turn entrance in lb. (N)

a = Turn factor (see below)

b = Turn factor (see below)

f_s = Coefficient of friction between belt and belt supports

R = Radius of turn to the tension link*, feet (M)

W_b = weight of belt, lb/linear ft. (kg/M)

W_1 = weight of product load, lb/linear ft. (kg/M)

If using Metric units (kg, M, etc.) multiply resultant tension x 9.8 to convert to Newtons.

*Refer to Product Technical Bulletin on specific belt; R is usually the radius to the outside edge of the belt.

Turn Factors

Turn factors a and b can be calculated from the following formulas.

$$a = e^{\theta fr}$$

$$b = (a - 1)/f_r$$

Where: **e** = 2.718 (Napierian log base)

θ = Angle of turn in radians (degrees/57.3)

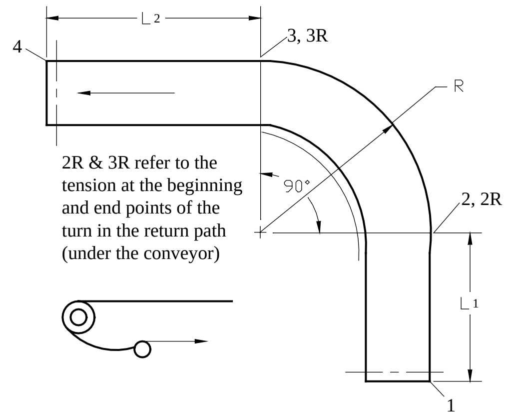
fr = Coefficient of friction for the inside turn rail surface

Turn Factors

Degree of Turn	Inside Turn Rail Coefficient of Friction, fr					
	0.15		0.20		0.25	
	a	b	a	b	a	b
10	1.03	0.20	1.04	0.20	1.04	0.16
15	1.04	0.27	1.05	0.27	1.07	0.27
20	1.05	0.33	1.07	0.35	1.09	0.36
30	1.08	0.53	1.11	0.55	1.14	0.56
40	1.11	0.73	1.15	0.75	1.19	0.77
50	1.13	0.87	1.17	0.85	1.22	0.88
60	1.14	0.93	1.19	0.95	1.24	0.96
70	1.20	1.33	1.28	1.38	1.36	1.43
80	1.23	1.53	1.32	1.61	1.42	1.67
90	1.27	1.80	1.37	1.85	1.48	1.92
100	1.30	2.00	1.42	2.09	1.55	2.19
110	1.33	2.20	1.47	2.34	1.62	2.46
120	1.37	2.46	1.52	2.60	1.69	2.76
130	1.41	2.73	1.57	2.87	1.76	3.05
140	1.44	2.93	1.63	3.15	1.84	3.36
150	1.48	3.21	1.69	3.44	1.92	3.70
160	1.52	3.47	1.75	3.75	2.02	4.08
170	1.56	3.73	1.81	4.06	2.10	4.40
180	1.60	4.00	1.88	4.38	2.19	4.76
190	1.64	4.27	1.94	4.70	2.28	5.12
200	1.69	4.60	2.01	5.05	2.39	5.66

Example: 90-degree Turn Conveyor

Assume belt is driven on the discharge end and employs a catenary sag take-up. The recommended length of the catenary sag is 18 inches (450 mm); therefore the initial tension is equal to:



$$T_i = 1.5 \times W_b$$

The tension at each point along the conveyor is calculated as follows:

$$T_{3R} = T_i + L_2 (f_r)(W_b)$$

$$T_{2R} = a(T_{3R}) + b(f_r)(R)(W_b)$$

$$T_1 = T_{2R} + L_1(f_r)(W_b)$$

$$T_2 = T_1 + L_1(f_s)(W_b + W_1)$$

$$T_3 = a(T_2) + b(f_s)(R)(W_b + W_1)$$

$$T_4 = T_3 + L_2(f_s)(W_b + W_1)$$

T_4 is the belt tension in lb. (N) at the drive sprockets.

Turns—Other Options

In the first layout calculations, it is clear that fixed rail turns dramatically increase belt tension. Note that in the formula for turn factor formula, "a" is a multiplier of the tension entering the turn (T_1) and that "a" increases with the angle of turn and the coefficient of friction of the inside rail. In planning the layout, try to minimize the number and angle of the turns in order to keep the belt tension down. Keep the layout as simple as possible.

There are other options to fixed rail turns. For instance, if a full diameter, free-rotating turn wheel replaces the fixed inside rail, the tension gain will be considerably reduced. Powering this wheel will offer an even greater improvement. The inside belt support can be incorporated into the wheel to increase its efficiency still further. The following cases illustrate the most practical possibilities. The tension formula is revised accordingly, showing the effect of exit belt tension.

1) **Idler Inside Rail/Stationary Supports** (see Figure 42)

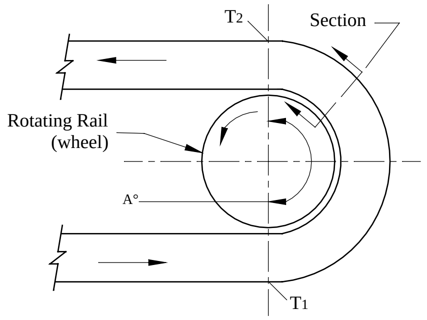
$$T_2 = T_1 + f_s(R)(W_b + W_1)(\theta)$$

Where: θ = A°/ 57.3

(2) **Drive Inside Rail/Stationary Supports** (see Figure 42)

$$T_2 = T_1 + b(f_s)(R)(W_b + W_1)/a$$

If the wheel is driven, a higher f_r is of some benefit. Factors a and b will be increased, producing a lower T_2.



[Figure 42]

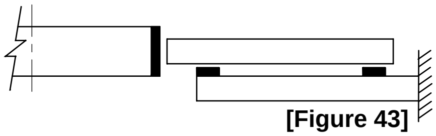
(3) **Idler Inside Rail and Inside Support/Stationary Outside Support** (see Figure 43)

$$T_2 = [T_1 + f_s(R)(W_b + W_1)/2](\theta)$$

Where: θ = A°/ 57.3

(4) **Drive Inside Rail and Inside Support/Stationary Outside Support** (see Figure 44)

$$T_2 = [T_1 + f_s(R)(W_b + W_1)(f_r - f_s)/2]/a$$

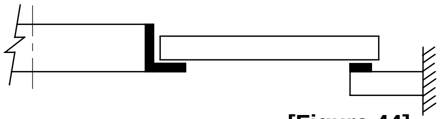


[Figure 43]

(5) **Idler Inside Rail and Supports** (see Figure 45)

$$T_2 = T_1$$

Add bearing friction and initial force to overcome inertia.



[Figure 44]

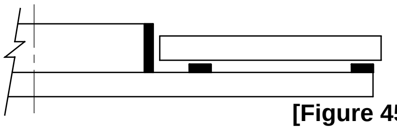
(6) **Drive Inside Rail and Supports** (see Figure 45)

$$T_2 = T_1 - b(f_s)(R)(W_b + W_1)/a$$

(7) **Edge Drives**

(see Product Technical Bulletin "052 Edge Drives")

$$T_2 = [T_1 + f_s(R)(W_b + W_1)(f_r - f_s)/2]/a$$



[Figure 45]

Comments:

The benefits afforded by formula #4 can also be provided by Ashworth Edge Drive Units without the space consumption of a full diameter turn wheel on the inside of a turn. A high friction urethane lugged chain, operating in a horizontal plane, powers the inside edge of the belt through the turn. Consult Ashworth for more details.

Turn wheels, which include the belt support bed such as in options 5 and 6 above, can be impractical for wide belts. The transition between straight runs and the turns can be a problem. Option 2 is a more practical choice.

Illustration of Turn Option Benefits:

If we consider a typical case with the following given factors;

$T_1 = 100$

$f_s = 0.2$

$f_r = 0.2$

$R = 6$

$W_b + W_1 = 10$

Angle A = 180°(θ = 3.14)

a = 1.88

b = 4.38

For a fixed rail turn, $T_2 = 241$

Applying the same values to the given options, you can see the effect on T_2.

Option (1). $T_2 = 138$

Option (2) $T_2 = 128$

Option (3) $T_2 = 333$

Option (4) $T_2 = 50$

Option (5) $T_2 = 100$

Option (6) $T_2 = 72$

Option (7) $T_2 = 54$

All of the turn wheel options offer some improvement over the fixed rail design. If, in analyzing your layout, the tensions calculated begin to approach or exceed the limitations for the belt to be used, consider the most appropriate option. The alternative is to divide the layout into several independent conveyor sections.

Drive Calculations

Torque at Drive Shaft

The running torque at the drive can be determined for the following formula. This makes no allowance for start-up under load.

$$TQ = T \times PD/2$$

Where:

TQ = Torque, in inch-pounds (N/m)

T = Total Belt Tension, lb. (N)

PD = Pitch Diameter of drive sprockets, in. (m)

Example:

The running torque required at the conveyor drive in the previous example, where the belt tension (T) equals 387.1 lb/foot of width, belt width equals 48 inches and selected sprocket has a pitch diameter of 6.563 inches

TQ = (387.1)(48/12) x 6.563/2 = 5081 inch-pounds of torque

Horsepower Requirements

The suggested horsepower is based on the formula below. A safety factor should be used to allow for transmission losses, start up, loads, etc.

$$HP = T \times S/33{,}000$$

Where: HP = Horsepower

T = Total Belt Tension, lb.

S = Belt speed, ft./min.

Example:

To calculate the horsepower required to drive the conveyor in the previous example, where the belt tension (T) equals 387.1 lb/foot of width, belt width equals 48 inches and belt speed (S) is 50 fpm, would be:

HP = (387.1)(48/12) x 50 / 33,000 = 2.35 horsepower

Drive Shaft Calculations

Shaft Diameter for Combined Torsional & Bending Load

To determine the recommended minimum diameter of the drive shaft, use the following formula. More accurate results are obtained by using the trial and error method.

$$D = B \times \{5.1/P \times [(C_b \times M)^2 + (C_t \times Tq)^2]^{1/2}\}^{1/3}$$

Where:

D = Recommended minimum shaft diameter (inches)

B = Constant; use 1 for solid shafts; or (1 / [1 – K4])1/3 for hollow shafts, where K = (shaft ID/shaft OD)

P = Constant; use 6000 for a shaft with keyway or 8000 for shafts without keyways

C_b = Service Factor in Bending—See table

C_t = Service Factor in Torsion—See table

Tq = Torque (inch-pounds)

M = $(W_r \times L)/ 8$

W_r = $(R^2 + T^2)^{1/2}$

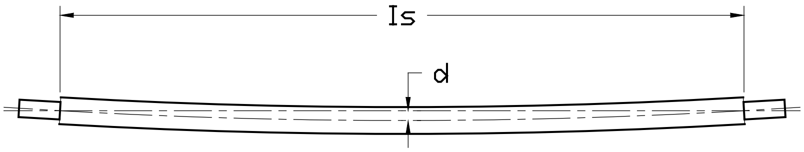
R = Weight of [Shaft + Sprockets + One Linear Foot of Belt + Load/Linear Foot) (lb.)

L = Length of Shaft (in.)

Service Factors		
C_b	C_t	Type Load
1.5	1.0	gradually applied on steady load
1.5–2.0	1.0–1.5	suddenly applied minor shock load *
2.0–3.0	1.5–3.0	suddenly applied heavy shock load
* most commonly used		

Deflection of Drive Shaft

The maximum recommended deflection of the drive shaft is 0.1 inch (2.5 mm).



When only two outer bearings are used:

$$D = \frac{5 \times F_1 \times l_s^3}{384 \times E \times I}$$

When a center bearing is used:

$$D = \frac{F_1 \times l_s^3}{2960 \times E \times I}$$

Where:

D = Deflection, inch (mm)

F_1 = Shearing force on the shaft, lbf (N)

$F_1 = \sqrt{T_2 + (w_s \times l_1 \times c)^2}$

T = Total Belt Tension at the shaft, lbf (N)

w_s = Weight of shaft, lb/ft (kg/m)

l_1 = Shaft length, ft (m)

l_s = distance between shaft bearings, inch (mm)

E = Modulus of elasticity of shaft material

Steel: $E = 2.95 \times 10^7$ lbf/inch^2

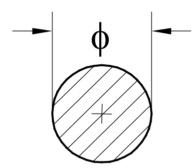
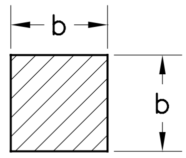
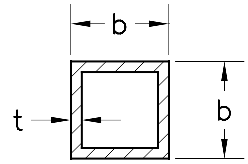
$= 2.1 \times 10^5$ N/mm^2

I = Moment of Inertia of drive shaft, inch^4 (mm^4)

C = Force conversion factor

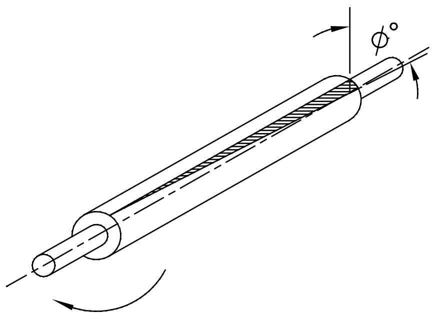
Imperial: 1.0

Metric: 9.8

Shaft Dimension in. (mm)	Moment of Inertia
	$I = \pi x \Phi^4/64$
	$I = b^4/12$
	$I = [b^4-(b-2t)^4]/12$

Torsion of Drive Shaft

The maximum recommended torsion of the drive shaft is based on the following formulas:
($0.5 \times l_s$ (inch)/39.37 – Imperial) or ($0.5 \times l_s$ (mm)/1000 – Metric).



$$\Phi° = \frac{180 \times T \times d_o \times l_s}{2\pi \times G \times I_t}$$

Where:

$\Phi°$ = Torsion angle

T = Total Belt Tension at the shaft, lbf (N)

d_o = Pitch diameter of drive sprockets, inch (mm)

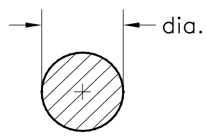
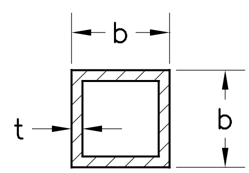
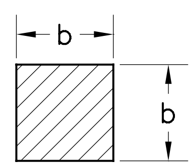
l_s = distance between shaft bearings, inch (mm)

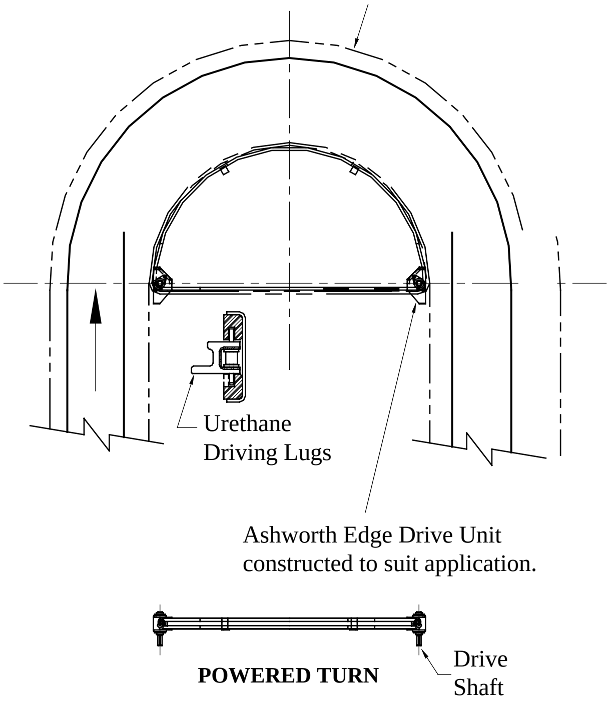
G = Modulus of shear of shaft material

Steel: $G = 11.6 \times 10^6$ lbf/inch^2

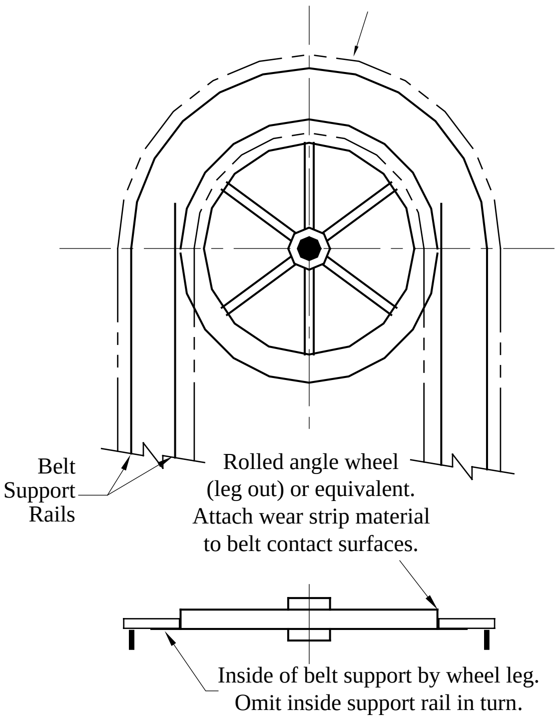
$= 81.6 \times 10^3$ N/mm^2

I_t = Inertia force for drive shaft, inch^4 (mm^4)

Shaft Dimension in. (mm)	Inertial Force
	$I_t = 0.1 \times (dia)^4$
	$I_t = t \times b^3$
	$I_t \approx 0.141 \times b^4$



ASHWORTH EDGE DRIVE UNIT



IDLER OR DRIVEN TURN WHEEL

Support Structure

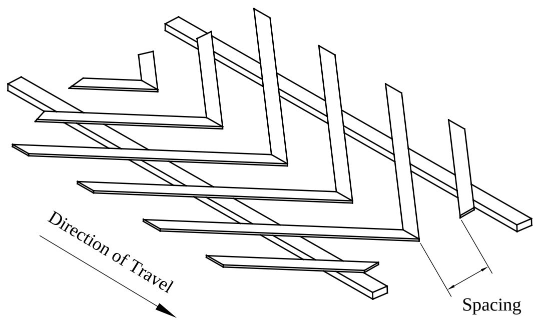
For optimum operation, it is of great importance that the belt has the correct support structure. The conveyor has to be level for even wear on the belt and support structure. An oblique conveyor will reduce the life of the belt and support structure due to expedient wear. The design of the support structure, i.e., the choice and placement of the wear strips, must consider the following factors:

- Belt type
- Load
- Horizontal or inclining conveyor
- Temperature conditions

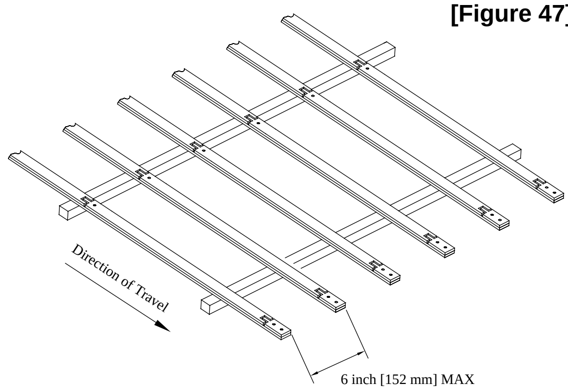
Support structure should extend beyond belt edge for best support.

Typical Support Structures:

[Figure 46]



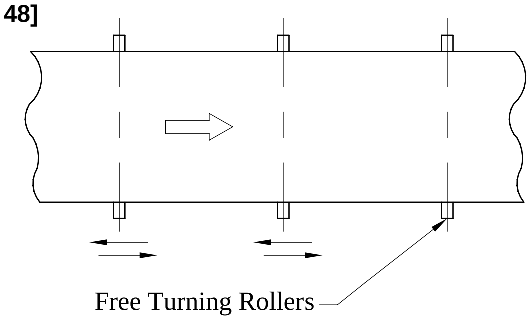
[Figure 47]



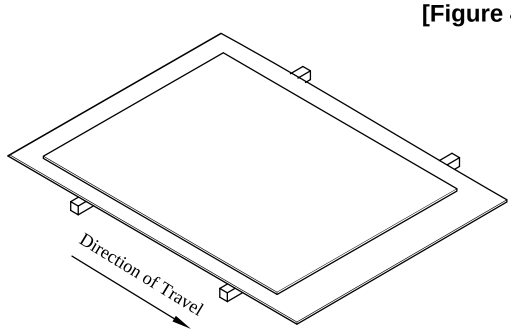
Herringbone rails: Ashworth recommended. (Figure 46). Flat wear strips in a "V" configuration with the point of the "V" pointing in the direction of travel. Low friction wear strip material preferred to minimize belt wear. Recommended spacing between rails of 4–12" depending on belt type, load, and other factors. This configuration distributes the wear over the entire belt width.

Longitudinal Rails: (Figure 47) Flat wear strips the full length of the conveyor, parallel to each other and perpendicular to the terminal shafts. Low friction wear strip material preferred to minimize belt wear. Recommended spacing between rails of 4–12" depending on belt type, load, and other factors. This configuration does not distribute wear over the full width of the belt.

[Figure 48]



[Figure 49]

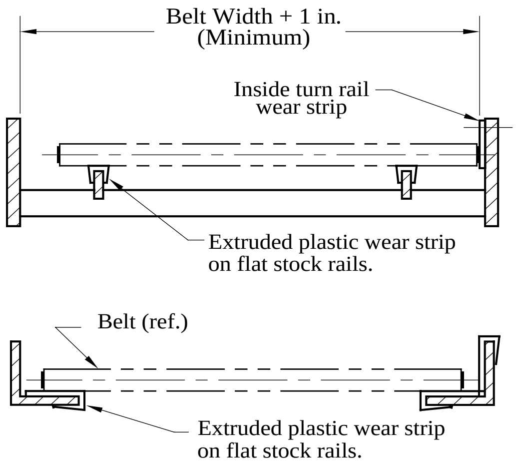


Free Turning Rollers: Ashworth recommended. (Figure 48) Roller supports minimize wear on the belt, reduce belt tension, and aid in the tracking of friction-driven belts.

Slider bed: (Figure 49) A slider rail bed of low friction material will, in most cases, afford the best means of providing belt support as it fully supports the belt.

Many excellent **Belt Support Materials** are available. The most commonly used Ultra High Molecular Weight Polyethylene (UHMWPE). UHMWPE is available in numerous shapes and sizes. Special extruded shapes are available in continuous coil lengths for ease of assembly.

For applications that experience **Temperature Fluctuations**, the wear strips should be attached in such a manner as to allow expansion and contraction with temperature. In other words, they should be secured at one end only.



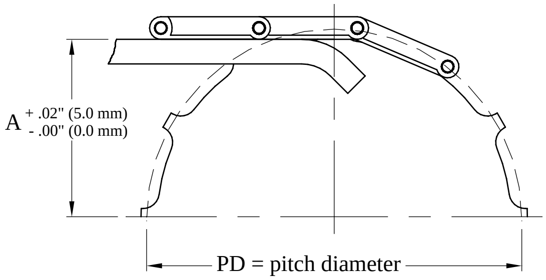
TYPICAL SUPPORT RAIL
AND RETAINING RAIL CONSTRUCTION

As a rule, support rails are required at a maximum 18 inches apart on the load side and 24 inches apart on the return side. Rollers may also be used. For light loads, the support rails may be placed further apart—consult Ashworth Engineering for you particular application.

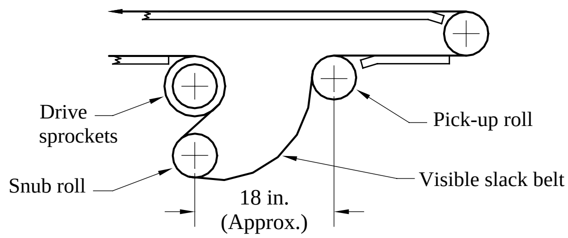
Slider Bed: A slider rail bed of low friction material will, in most cases, afford the best means of providing belt support. Many excellent materials are available, such as Ultra High Molecular Weight Polyethylene (UHMWPE). Special extruded shapes in continuous coil lengths are available for ease of assembly. In most cases, a roller bed of good quality can be used in straight runs, but is generally impractical for turns. Inclines and declines in a belt path should be located in the straight runs and several feet from any turn wherever possible. On inclines where turns are required, accepted practice is to use hold down rails over the belt edges.

Free Turning Rollers: Ashworth recommended. Most oven bands are supported by free turning, horizontally adjustable rollers with externally mounted bearings. Locate bearings outside the oven to provide for adjustments when the band is at baking temperature. Roller supports minimize wear on the band, account for lower tension to overcome friction in the system, and aid in band tracking. For new installations, align all roller supports perpendicular to the oven centerline. If a replacement band is being installed, there is no need to align supports perpendicular to the centerline unless the previous band was severely mistracking. The new band will likely assume the same general path of the old band and tracking adjustments can start from that point.

Wearstrip Placement

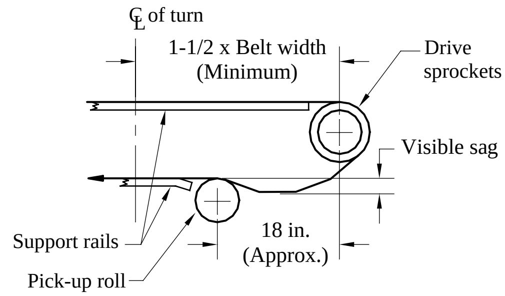


A = ½ x PD – ½ Belt Thickness



RETURN RUN OR CHARGE END DRIVE

- Wear strip placement varies with belts. Reference the Technical Bulletin on the desired belt for more information.
- The values stated are only a guideline; they do not take into account the influence of speed. At speeds above 75 ft/min (23 m/min) Ashworth recommends to increase distance A and shortening the wear strips as much as one-belt pitch in length.



DISCHARGE TERMINAL DRIVE

DRIVE

Belts are designed for either *positive* or *friction* drives.

*Positive drive*s propel the belts by means of Ashworth sprockets which are designed to engage the fully extended belt. For this reason, the drive sprocket cannot be located immediately adjacent to a turn exit where the links are partially closed. A straight run not less than 1-1/2 times the belt width must be provided to allow the pitch to return to the full extended position. The location of the drive is important and can be critical. Complicated layouts, long conveyors, and heavy loading will certainly require multiple drives. To avoid excessive belt stress in case of a malfunction, a drive safety device such as a torque limiter is recommended.

Friction Drives works by frictional contact between the drive drum and the belt. Typical belts used in this application can be balanced weave, compound balanced weave, and flat wire. Terminal drums must be large enough to ensure good contact and maximum flexibility as the belt travels around the drum. These drums are typically several inches wider than the belt. Each drum must be level, parallel to each other, and perpendicular to the centerline of the conveyor. They must also be clean with no product build-up on the surface. Sometimes drums are lagged with urethane or other high friction material to increase friction between belt and drum. Tracking is important to stabilize belt waver.

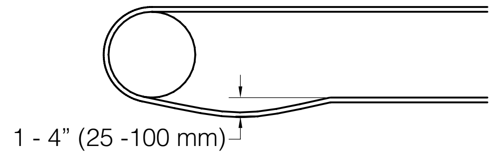
Adjustment Of Belt Length (Take-Up)

Automatic adjustment of the belt length is obtained by providing a catenary sag take-up on the belt return path. Use of a catenary sag (length of unsupported belt) following the sprockets ensures the automatic adjustment of belt length. The catenary sag will serve to absorb the elastic expansion under load, thermal expansion, and the long-term elongation of the belt.

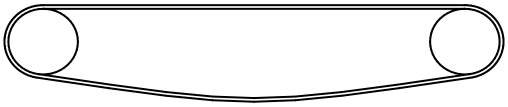
For standard applications, a catenary take-up is placed immediately following the drive sprockets. For applications at elevated temperatures, the expansion of the belt should be calculated first to determine whether sufficient space is available.

Belts Running in One Direction (Uni-directional)

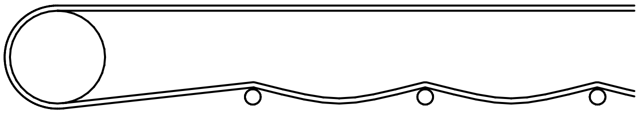
- For conveyors operating within uniform operating conditions catenary sag is only necessary on the first 18 inches (457 mm) after the drive sprockets.



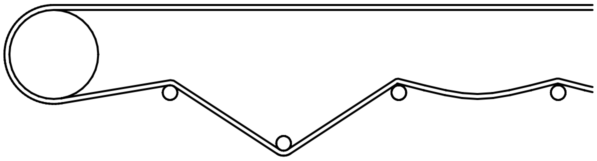
- For short conveyors under 6 feet (1.8 m) the belt can hang freely between the drive and idler terminals.



- For long conveyors over 6 feet (1.8 m) with large temperature changes (50°F [10°C] or greater) the catenary sag should be distributed over longer sections; i.e., support the belt in the return with rollers to distribute the sag over the length of the belt.



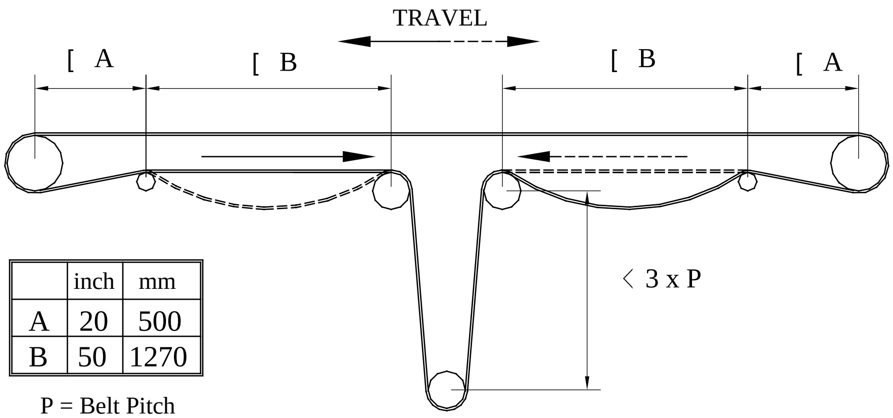
- Alternatively, for long belts and with high temperature variations (50°F [10°C] or greater) a roller can be mounted free hanging in the return path allowing its weight to take-up the slack belt.



Belt Running In Both Directions (Bi-Directional)

Belt take-up can be a source of excessive belt stress. For this reason, where conditions permit, we recommend the use of an unsupported span of belt approximately 18 inches long immediately following the drive, in which the belt loop hangs free with sag of 2 inches or more. If a fixed mechanical take-up is used to facilitate control of excess slack, sag must be visible in the free loop of belt following the drive sprockets. Where other take-up arrangements are necessary, a minimum weight, gravity controlled type is recommended.

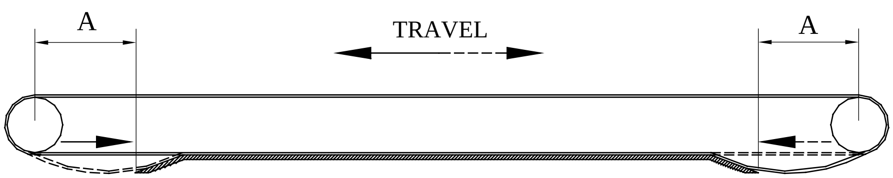
Adjustment of belt running in both directions can be made with either pull/pull or push/pull systems.



	inch	mm
A	20	500
B	50	1270

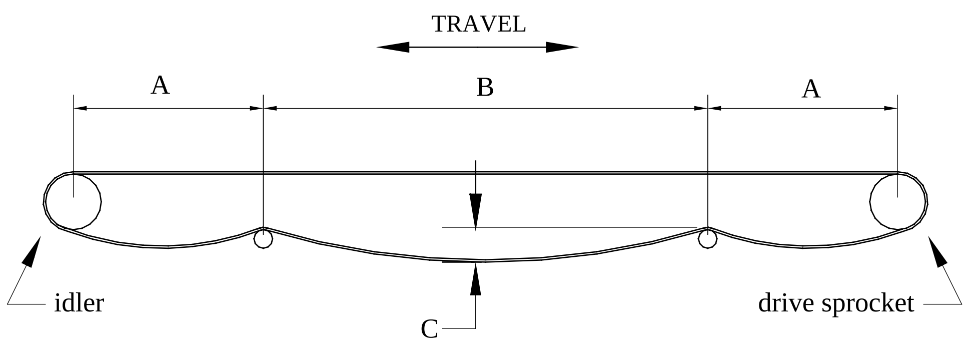
P = Belt Pitch

This pull/pull system requires only one reversible motor.



	inch	mm
A	24	600

This conveyor requires 2 motors (one each end). This construction requires that the motors can be disconnected.



	inch	mm
A	18-24	450-600
B	100-120	2540-3048
C	0.5-1.5	13-38

This pull/pull system requires only one pole-changeable motor. The system is only suitable for short conveyors with small loads. For correct working of the system the load on the belt in the catenary should be approximately 1.3 times higher than the load in the upper belt path. See calculations for catenary sag. The load from the catenary sag must be considered when dimensioning the drive shaft.

Sprockets

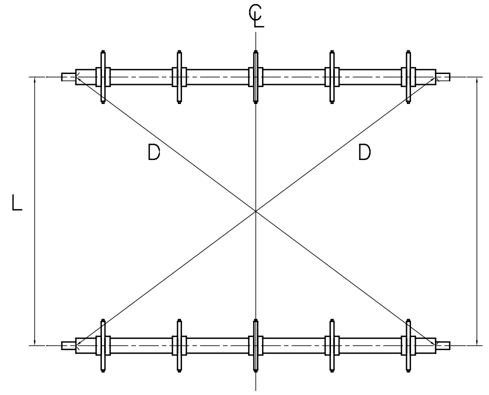
- The basic requirements for belt conveyors are to ensure an evenly distributed load on the belt and support structure, that the belt has the necessary strength, and the placement of the sprockets is correct.
- When constructing a belt conveyor, it is important to allow for adjustment. By using adjustable bearings at the drive end as well as the idler end, it is easy to allow for adjustment.

Note: The use of setscrews in plastic sprockets may cause breaks in the sprockets if the setscrews are over tightened.

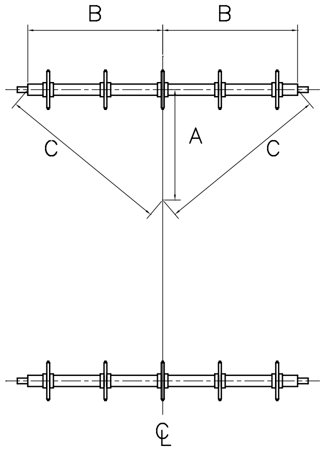
Alignment Of Sprockets

Shafts

Proper alignment of the sprocket shafts is critical for smooth operation. The conveyor must be absolutely level and the shafts must be perpendicular to the centerline of the conveyor. The following methods are acceptable for aligning the drive and idle shafts.



The distance L must be the same at both sides and the length of the two diagonals D must be equal.

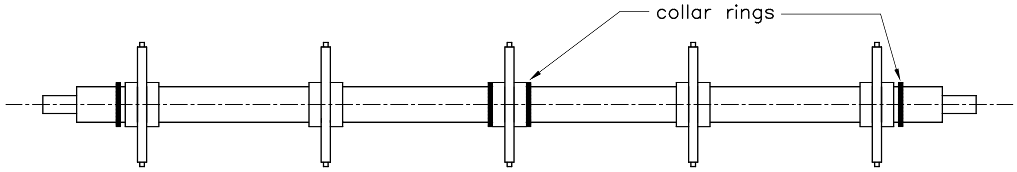


This method is normally used on long conveyors. You choose the measure of A and B as you like. The point is that the size of the two C–meausres are equal.
Note: The centerline must be very accurate. The alignment of sprockets must be performed on both the drive and idle shafts.

Mounting Of Sprockets

Sprockets with a Round Bore

Round bore sprockets are recommended for conveyors with constant ambient temperature and for conveyors with light loading. Sprockets with keyways are used at the drive end and, when sprockets are positioned, the center sprocket is fixed axially with either set screws or collar rings.



Sprockets with a Square Bore

Square bore sprockets are recommended for conveyors with a working temperature different from the surrounding temperature and for conveyors with high tension. Mount the sprockets on the shaft and fix the center sprockets with collar rings to prevent axial movement and ensure even pull.

Determining Number Of Sprockets

The number of sprockets for the belt depends on the load on the belt and the temperature under which the belt is operating.

Ashworth Bros. recommends a minimum of one (1) sprocket per 6 inches (152.4 mm) of belt width for plastic and flatwire type belts. Omni-Grid® and Omni-Pro® Belts typically require only two sprockets per driveshaft.

- For Flat wire belts positively driven with sprockets or a waffle roll (a continuous belt-width toothed member, available via special order), overall diameters will range from 4-1/8 inches (104.8 mm) to 14-11/16 (373.1 mm). The quantity is determined for belt tension, but there is a maximum spacing of 6 inches (152 mm).

  Location—Sprocket should be place in odd numbered openings, ensuring outside sprockets are located in the third openings from each belt edge. This assists the belt in resisting fatigue fractures by providing two load-carrying legs.

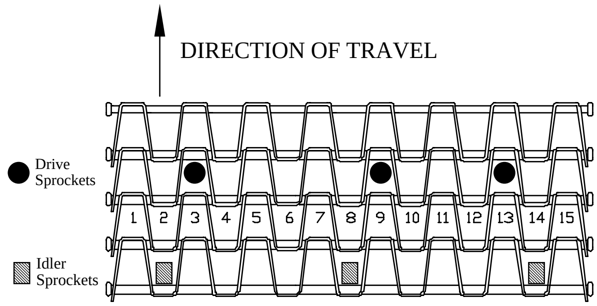
  Hubs—Must be oriented in the same direction to keep teeth perfectly lined up and distribute stress evenly across the belt width. Idlers should be placed in even numbered openings, ensuring that outside sprockets are located in the second openings from each belt edge.

The required number of sprockets for the belt is determined as follows:

Minimum number of sprockets per shaft is calculated by dividing the belt width by sum of maximum sprocket spacing and sprocket width. Round calculated number up to nearest whole number.

Example for a metal belt with a width of 26 inches:
Minimum number of sprockets per shaft = belt width/(max spacing number of sprockets)
26 inch wide belt (660.4 mm)/6 inch = 4.33 sprockets*

- Always round up to the next highest whole number
- A minimum of 5 sprockets is required for both the drive and idler shafts.



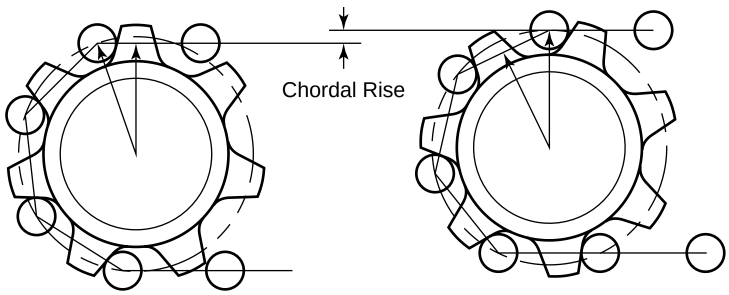
Metric
Number of sprockets = 660.4 mm/152.4 mm = 4.33 sprockets

- Always round up to the next highest whole number
- A minimum of 5 sprockets is required for both the drive and idler shafts.

  Cleatrac® belts are an exception to this rule. Please see Technical Product Bulletin “033 Cleatrac® Belt and Drive System” for Cleatrac® sprocket calculations.

Chordal Action

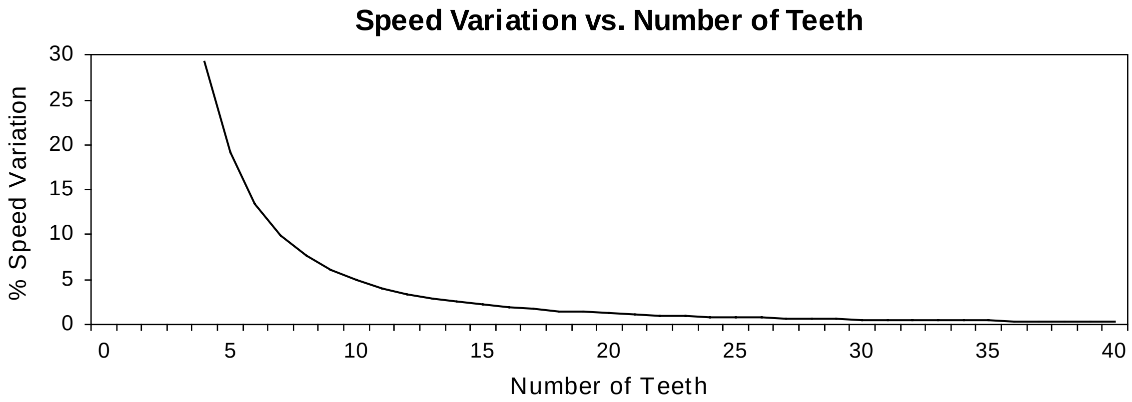
Sprocket driven conveyor belts will experience variation in linear speed as the sprocket drives the belt. Because belts hinge or rotate about the set pitch of the belt they can only bend about the rods or pitch points. This creates a variation in the radius of engagement between the tangent and chord positions. This phenomenon is referred to as chordal action.



When the sprockets are rotating at a constant speed, the belt speed is not steady due to change in engagement radius (chordal rise). Chordal action varies based on the number of teeth on the sprockets.

This variation in speed is calculated as following:

Chordal Action (ratio of speed change) = 1 – cos(180°/N)
Where N equals the number of teeth on the sprocket



When the values for chordal action are graphed it becomes clear that, as the number of teeth are increased on the sprocket, the resulting chordal action or variation in belt speed is reduced dramatically. As noted in the graph above, the speed variation drops to around 4% when an 11-tooth sprocket is used. A speed variation of this amount is seldom noticeable, which is why Ashworth recommends the selected sprocket for any of our belt types have no less than 11 sprocket teeth.

Sprocket Material Selection

Ashworth recommends using plastic (UHMWPE) sprockets on the majority of conveyor applications. Plastic sprockets are recommended since they wear extremely well and operate quieter than metal sprockets. However, in applications operating above 150 °F (65°C), metal sprockets are preferred as the plastic will deform and wear faster at elevated temperatures.

Metal sprockets are recommended for applications where elevated temperatures are present, when the product being conveyed is abrasive, or when the belt is being operated at very high tensions. Stainless steel is the material of choice for wet or food applications. For dry applications or the general conveying of non-food or packaged products, cast iron or fully machined plain steel sprockets can be used.

Filler Rolls

Ashworth recommends filler rolls be used on shafts where only drive sprockets are used; i.e., Omni-Pro®, Advantage™ , and Omni-Grid®. The filler (or support) rolls are required to keep the belt from deflecting across its width. The maximum diameter for the filler rolls depends on the size of the sprockets being used. The diameter required for the filler rolls can be calculated knowing the pitch diameter of the chosen sprockets.

Max. Dia. = PD x cosine(180/#) – MT

Max. Dia.	= maximum diameter for the filler rolls
PD	= Pitch diameter of sprocket
#	= Number of teeth on the sprocket
MT	= Mesh (Belt) thickness

Mesh thickness for Omni-Pro® and Omni-Grid® belts can be estimated by adding the cross rod diameter plus two times the diameter of the mesh overlay.

Catenary Sag (Vertical Distance from Top to Bottom of Belt Arch)

A free hanging conveyor belt will form a belt arch between two supports. Knowing the amount of belt in the arch and load from the belt is important in determining both load at the sprockets and the required belt length.

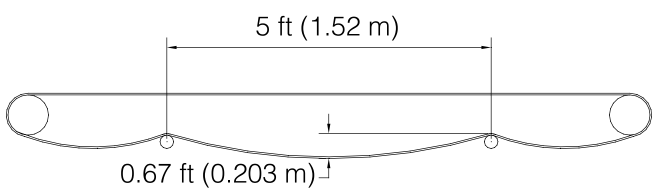
L = Length of belt in arch–ft (m)
F = Tension from the belt arch, lbf/ft (N/m) of belt width
D = Distance between supports–ft (m)
w = Belt weight–lb/ft² (kg/m²)
S = Catenary sag–ft (m)
C = Force conversion factor
Imperial: 1.0
Metric: 9.8

Length of belt arch

$$L \approx [(2.66 \times S^2) / D] + D$$

Example: Catenary Sag

W: 1.5 lb/ft² (7.5 kg/m²)



Length of belt arch:

$$L \approx [(2.66 \times S^2) / D] + D$$

Imperial: $L = [(2.66 \times .67^2) / 5] + 5 = 5.24 \text{ ft}$

Metric: $L = [(2.66 \times .203^2) / 1.52] + 1.52 = 1.6 \text{ m}$

Load from belt arch:

$$F = (D^2 \times W \times C) / (8 \times S)$$

Imperial: $F = (5^2 \times 1.5 \times 1) / (8 \times .67) = 7$ **lbf/ft**

Metric: $F = (1.52^2 \times 7.5 \times 9.8) / (8 \times .203) = 104.6$ **N/m**

Expansion/Contraction Of The Belt

Expansion/contraction of the belt may occur at operating conditions where the belt is exposed to changes in temperature. Such changes in the belt width and belt length must be taken into consideration when the conveyor is constructed.

ΔL = length or width expansion–inch (mm)
L = length or width of belt at temperature T_1–ft (m)
T_2 = working temperature °F (°C)
T_1 = surrounding temperature °F (°C)
ρ = expansion coefficient–see table

Expansion coefficients (ρ):

Belt Material	inch /(ft x °F)	mm/(m x °C)
Acetal	6.00E-4	0.12
High Carbon Steel	0.76E-4	0.012
Stainless Steel T304/T316	1.19E-4	0.018

The change in dimensions can be calculated as follows:

$$\Delta L = L \times \rho \times (T_2 - T_1)$$

Example: Expansion/Contraction of the Belt

An example belt application would be: A belt 3 feet (0.91 m) wide, conveyor length 25 ft (7.62 m), ambient temperature +72°F (+22°C), operating temperature +150°F (+65°C)

Expansion in width:

Imperial: $\Delta L = 3 \times 0.001 \times (150–72)$
$\Delta L = 0.23$ inch

Metric: $\Delta L = 0.91 \times 0.15 \times (65–22)$
$\Delta L = 5.8$ mm

Expansion in length:

Imperial: $\Delta L = 25 \times 0.001 \times (150–72)$
$\Delta L = 1.95$ inch

Metric: $\Delta L = 7.62 \times 0.15 \times (65–22)$
$\Delta L = 49.5$ mm

Friction Coefficients

Friction coefficient between Belt and Wear Strips, Metal Belts

Belt Material	Type of Belt Support	f
Stainless Steel or High Carbon	Free Turning Rollers	0.10
	UHMWPE with clean or packaged product	0.20
	UHMWPE with breaded or flour based product	0.27
	UHMWPE with greasy, fried product	0.30
	UHMWPE with sticky, glazed, sugar based product	0.35
Stainless Steel	Mild Steel with temperatures up to 1000°F (538°C)	0.35
	Stainless Steel (not recommended with metal belts)	0.40
High Carbon	Mild Steel with temperatures up to 1000°F (538°C)	0.40
	Stainless Steel (not recommended with metal belts)	0.35

Friction coefficient between Belt and Wear Strips, Plastic Belts

		Wear Strip Material	
Belt Material	Lubrication	Stainless Steel	Polyethylene
Polypropylene	Dry	0.28	0.15
	Water	0.26	0.13
Polyethylene	Dry	0.16	0.32
	Water	0.14	0.30
Delrin—Acetal	Dry	0.30	0.24
	Water	0.23	0.20
Anti-static/Low Friction—Acetal	Dry	0.24	0.19
	Water	0.17	0.15
Super Low Friction—Acetal	Dry	0.20	0.18
	Water	0.15	0.10

Values will be 0.1 to 0.2 higher at the starting moment.

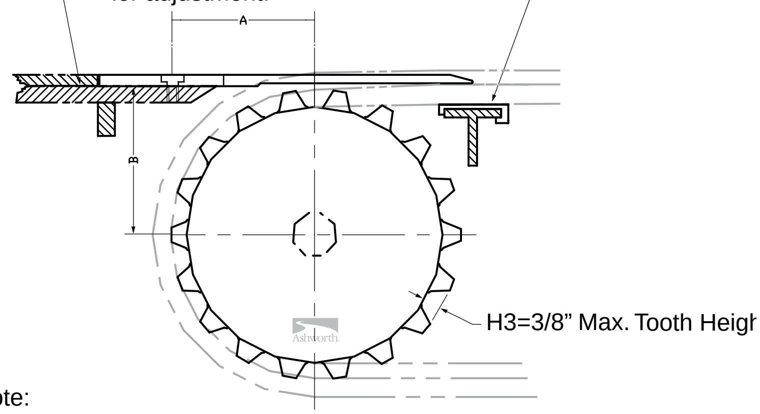
Friction coefficient between Belt and Product

	Product Material				
Belt Material	Lubrication	Glass*	Metal	Plastic	Cardboard
PP	Dry	0.19	0.32	0.17	0.22
	Water	0.17	0.30	0.15	---
PE	Dry	0.10	0.13	0.10	0.15
	Water	0.09	0.11	0.09	---
D-Acetal	Dry	0.18	0.24	0.22	0.27
	Water	0.16	0.21	0.19	---
AS/LF–Acetal	Dry	0.15	0.20	0.18	0.21
	Water	0.12	0.18	0.16	---
SLF-Acetal	Dry	0.12	0.15	0.15	0.19
	Water	0.10	0.14	0.14	---

Values will be 0.1 to 0.2 higher at the starting moment.

* Do not use plastic modules if broken glass comes on the conveyor.

Location of Finger/Transfer Plates



Note:
1. Operate belt and track belt before installing transfer plates.
2. At terminals where the transfer plate is used, sprocket teeth must be reduced to 3/8" overall height for H3 EZ transfer.
3. Return support rails must have a 1" minimum width to insure that pickets do not straddle the rails.
4. Belt has a definite top and bottom and cannot be inverted.

H3 EZ TRANSFER

Sprocket Type	A Dim.		B Dim.	
	in.	mm	in.	mm
#6-18 Tooth	3-1/8 to 3-3/8	79.4 to 85.7	3-5/8	84.1
#8-23 Tooth	3-5/16 to 3-7/16	84.1 to 87.3	4-1/4	108

The diagram shown is to be used as a guide in the placement fingerplates to provide the smoothest possible transfer from the belt to the fingerplate.

The main consideration will be proper clearance for the belt and mounting of the fingerplate because the plates are produced in standard modular sizes. The belt widths must be in intervals coincidental with the finger spacing. Contact Ashworth Engineering for other options specific for your application and system design.

This belt is used with sprockets to insure proper alignment with transfer plate fingers.

NOTES

Corrosion Resistance

Corrosion may occur should the belt be subjected to certain chemicals. The corrosion resistance of the conveyor and belt materials to a number of pure liquids is shown in the table below. Note that the concentration and temperature of the liquid in most cases are decisive as to whether or not the material is resistant.

Use this table as a guide. Other liquid solutions besides those listed, as well as mixed solutions, may attack the conveyor and belt materials. Chemicals can affect the weight, strength, color, dimensions, flexibility, and surface appearance of plastics. The basic interactions that cause these changes are (1) chemical attack on the polymer chain; (2) physical change, including absorption of solvents, resulting in the softening and swelling of the plastic, or dissolution of the plastic in a solvent; (3) stress cracking from the interaction of the "stress-cracking agent" with molded-in or external stresses.

The reactive combination of compounds of two or more classes may cause an undesirable chemical effect. Other factors affecting chemical resistance include: temperature, pressure, internal or external stresses, and length of exposure to and concentration of the chemical. As temperature increases, resistance to attack decreases.

In general, plastic belts are not resistant to liquids with a pH-value lower than 4.5 or higher than 9.0. Cleaning with strong detergents should be avoided. Metal belts are not resistant to liquids with a pH-value lower than 6 or higher than 13.

Corrosion Resistance

Chemical Name	Martensitic/Ferritic stainless steel	Austenitic stainless steel	D, LF, SLF, AS	PP	PE	GR	AS	PVDF	PC	PA6 PA66
Acetic Ether			-	**	**		**			-
Acetone 10%	**	**	**	**	**	**	**	**	-	*
Alcohol	**	**	**	**	**	**	**			*
Aluminum Chloride		-	**	**	**	*	**	**	**	
Aluminum Fluoride			**	**				**		
Aluminum Hydroxide			**	**			**	**		*
Aluminum Nitrate	**	**	**	**				**		
Aluminum Sulfate	-	**	**	**			**	**		
Ammonia	**	**	-	**	**	*	**	*	-	*
Aniline	**	**	**	**	*	*	**	**		**
Arcenic Acid	**	**		**	**		**			
Benzene	**	**	**	*	-	*	-			
Benzoic Acid		**	*	**	**		**	**		*
Borax	**	**	*	**	**		**			
Boric Acid		**	**	**	**	*	**	**		*
Brake Fluid			**	**			**			
Bromic Acid			-	-	-	-	-	**		-
Bromine	-	-	-	-	-		-	**		-
Butyl Acetate			**	-	-	**	-	**		**
Butyric Acid	*	**	**	**			-	-		*
Carbon Dioxide	**	**	**	**	**	**	**	**		**
Carbon Disulfide	**	**	**	*	*	**	-	**	-	
Carbon Tetrachloride	**	**	*	-	-		-	**	-	
Chlorine Water	*	*	-	**	-	-	-	**	*	-
Chlorobenzene	-	**	*	-	-	**	*	**	-	
Chloroform	**	**	-	-	-	-	*	**	-	**
Chloromethyl	**	**		-	-		-			
Chloromethylene	**	**		*	-		-	**		
Chromic Acid 50%	-	*	-	**	**		*			-
Citric Acid	*	**	*	**	**	*	**	**	**	**
Cresol	**	**		**			*			-
Crude Oil	**	**	**	**	*	**	*	**		**
Cyclohexane			**	-	-		**	**		
Cyclohexanol			**	*	-		**	**		*
Cyclohexanone			**	*			*	**		*
Dextrin				**	**		**			
Diethyl Ether			*	*			-			
Dimethylamine				**	*		**	-		**
Ethyl Acetate			**	**	-		*			**
Ethyl Ether	**	**	**	-	-		-			**
Ferric Chloride	-	-	*	**	**	-	**	**	*	
Ferric Nitrate	**	**		**	**			**		
Ferric Sulfate	**	**		**	**		**	**		
Formaldehyde	**	**	**	**	*	**	**	**	*	**
Formic Acid	-	*	-	**	**		*	**		*
Fuel Oil			*	*	*		*			
Glycerin	**	**	**	**	**		**	**	*	**
Hydrobromic Acid 50%			-	**	**					

Test Temperature: + 73 °F (+23 °C) ** = Excellent Resistance * = Satisfactory Resistance –= Unsatisfactory Resistance

Corrosion Resistance (Continued)

Chemical Name	Martensitic/Ferritic stainless steel	Austenitic stainless steel	D, LF, SLF, AS	PP	PE	GR	AS	PVDF	PC	PA6 PA66
Hydrochloric Acid 10%	-	*	-	**	**	-	**	**	**	**
Hydrofluoric Acid	-	-	-	**	**	-	**	**	-	
Fuel Oil			*	*	*		*			
Glycerin	**	**	**	**	**		**	**	*	**
Hydrobromic Acid 50%			-	**	**					
Hydrochloric Acid 10%	-	*	-	**	**	-	**	**	**	**
Hydrofluoric Acid	-	-	-	**	**	-	**	**	-	
Hydrogen Fluoride			-	**				**		
Hydrogen Peroxide	**	**	*	*	**	*	*	**	*	*
Hydrogen Sulfide 2%	*	**	-	**	**	**	**	**	**	
Iodine (dry)	**	**	-	*	-	-	-	**		-
Iodine (fluid)	-	*	-	-	-	-	-	**	**	-
Lactic Acid 10%	*	*	**	**	**	**	**	**	**	*
Linseed Oil	**	**	**	**	**		**	**		**
Lubricating Oil	**	**	**	**	*		*			**
Hydrogen Fluoride			-	**				**		
Hydrogen Peroxide	**	**	*	*	**	*	*	**	*	*
Hydrogen Sulfide 2%	*	**	-	**	**	**	**	**	**	
Iodine (dry)	**	**	-	*	-	-	-	**		-
Iodine (fluid)	-	*	-	-	-	-	-	**	**	-
Lactic Acid 10%	*	*	**	**	**	**	**	**	**	*
Linseed Oil	**	**	**	**	**		**	**		**
Lubricating Oil	**	**	**	**	*		*			**
Malic Acid	**	**		*			**	**		*
Mercury Chloride 5%	-	**	**	**	**	-		**	**	**
Mercury Cyanide	-	*		**	**					
Mercury Nitrate	**	**		**	**			**		
Monochloroacetic Acid	-	*		**			**			
Motor Oil	**	**	**			**	*	**		**
Nitric Acid 10%	*	**	-	*	*	-	-	**	*	-
Nitrobenzene			*	*	-	*	**	**	-	*
Oleic Acid			**	**	*	**	*	**	**	**
Oxalic Acid 10%	*	*	-	**	**	*	**	**	**	
Ozone			-	-	*	-	*	**	**	*
Palmitic Acid 10%			**	**			**			**
Palmitic Acid 70%			**	**			**			**
Perchloric Acid 10%				**	**		**			
Perchloric Acid 70%				**						
Perchloroethylene			**	-			-			-
Petrol	**	**	**		**	**	-			
Petroleum	**	**	**	*	**	**	*	**	-	**
Phenol 10%	-	*	*	**	**	-	**	**	-	-
Phosphoric Acid 30%	-	**	-	**	**	-	**	**	**	**
Phosphoric Acid 85%	-	*	-	**	**	-	*	**	-	**
Silver Nitrate	*	**		**	**		**	**		
Stearic Acid	**	**	**				*			**
Succinic Acid				**			**			
Sulfur	*	*	**	-			**	**		**

Test Temperature: + 73 °F (+23 °C) ** = Excellent Resistance * = Satisfactory Resistance –= Unsatisfactory Resistance

Corrosion Resistance (Continued)

Chemical Name	Martensitic/Ferritic stainless steel	Austenitic stainless steel	D, LF, SLF, AS	PP	PE	GR	AS	PVDF	PC	PA6 / PA66
Sulfur Chloride	*	**		-				**		
Sulfur Dioxide	-	*	-	*	**	-		*	*	*
Sulfuric Acid 60%	-	-	-	**	*	-		**	-	-
Sulphurous Acid	-	*	-	**	**		**	*		
Tannic Acid (Tannin)	*	*		**	**		*	**		
Tartaric Acid	*	**	*	**				**		*
Toluene	**	**	**		-	**	-	**	-	**
Tomato Juice				**	**		**			
Trichlroacetic Acid		*	-	**			**			
Turpentine				*	-					**
Vegetable Oil	**	**		*	*					**
Vinegar	*	**	-	**	**		**			-
Zinc Chloride	*	*	**	**	**		**	**		*

Test Temperature: + 73 °F (+23 °C) ** = Excellent Resistance * = Satisfactory Resistance –= Unsatisfactory Resistance

Thermal Characteristics For Steel And Plastic

Recommended Temperature Range

	Temperature Range	
	°F	°C
Austenitic stainless steel	- 94 to + 806	- 70 to + 430
Martensitic/ferritic stainless steel	- 94 to + 806	- 70 to + 430
Special hardened steel	- 94 to + 806	- 70 to + 430
Acetal (D, LF, SLF)	- 40 to + 194	- 40 to + 90
Polypropylene (PP)	+ 33 to + 219	+ 1 to + 104
Polyethylene (PE)	- 58 to + 176	- 50 to + 80
Glass reinforced polyester (GR)	- 40 to + 257	- 40 to + 125
Antistatic material (AS)	- 40 to + 194	- 40 to + 90
Polycarbonate (PC)	- 4 to + 266	- 20 to + 130
Polyamide (PA66)	- 40 to + 284	- 40 to + 140
Flame retardant polyamide (FR)	+ 33 to + 219	+ 1 to + 104
Polyethersulfon (PESU)	+65 to + 390	+20 to + 200
Polyvinylidenflouride (PVDF)	- 40 to + 212	- 40 to + 100

Glossary of Terms

A5SC Flat Wire Belt: Designed for the can industry by Ashworth. Its special construction allows it to run under inverted cans, without pinching and upsetting them, which can occur at the discharge of the dryer section in a can washer, where the cans transfer onto the take-away conveyor.

Advantage™ Belts: Hybrid belts comprised of acetal links connected by stainless steel rods. Rods are designed to easily snap in/out for quick replacement and maintenance. First and only NSF certified and USDA accepted plastic belting.

Auxiliary Drive: The sprocket drive that sets the belt speed. This normally is located at the discharge of a spiral conveyor just before the take-up. (See also *Take-up*)

Baking Band: The tightly woven wire mesh of Ashworth's Baking Bands provides uniform heat distribution along with excellent air circulation and product support for all but the most fluid of doughs. The density of the band maintains even heating for a consistent bottom bake across the entire width of the belt.

Balanced Weave: A woven mesh consisting of alternating right and left-hand spirals joined by crimped connecting rods to form a continuous belt. In some meshes, straight connecting rods are used.

Bar Capping: Wear strips, typically UHMWPE, installed on the cage bars.

Bar Links: Links typically used on Omni-Flex® belts that determine the strength of the belt. The bar links are assembled in a “shingled” configuration to allow the links to nest as the inside belt edge collapses in a turn.

Belt: A complete product consisting of a skeleton with or without mesh and attachments suitable for flexing around pulleys, sprockets or drive rolls used primarily as a means of conveyance. Also called a "band" (in the baking industry), or a "mat" (in the can making industry).

Belt Supports: Structure on which the belt rides. Typical belt supports are UHMWPE and metal rails which can be arranged in a herringbone pattern or arranged horizontally in the direction of belt travel.

Belt Trackers (Control Rolls): Devices used to guide the belt’s path. Control rolls are placed 1.5 x belt width from terminals.

Brazed Edge or Soldered Edge: An edge finish completed by brazing or soldering only.

Burrs: Metal protrusions on metal parts due to dull tooling, improperly punched, or cut parts of the belt.

Cage: Large cylindrical shaped core of a spiral system. The system’s main driving component. (See also *Drum*.)

Cage Bars: The vertical members that form the driving surface of the cage or drum in a lotension spiral system.

Catenary: Unsupported section of belt, typically immediately following drive sprockets, which accumulate belt and acts as a weighted take-up.

Cantilever: Horizontal structural member on which the belt supports are mounted with one end attached to the support columns and the other end free. Typically found on lotension systems.

Center Link Position: Distance between inside edge of belt and centerline of center link in small radius belts.

Chain Driven Belts: A belt construction which provides positive traction by incorporating two or more rows of chain attached to cross rods or flatbar. Chains commonly used for this purpose include attachment, engineering, pintle, or roller.

Chordal Action: Variation in speed or surging of the belt caused by the acceleration and deceleration of the belt as it goes around the sprocket. Also known as *Pitch Line Rise and Fall*.

Christmas Tree: Condition due to high tension. The inside edge of the belt rises up off the belt supports. The belt may get caught between the drum and inside belt supports. (See *Reverse Christmas Tree*.)

Cleatrac® Belting (CTB): Precision balanced weave wire mesh consisting of alternating right and left-hand spirals joined by crimped connecting rods, driven by matching sprockets.

Column: The structural member that forms the main support for the entire spiral system and is located circumferentially around the system.

Compound Balanced Weave: A mesh consisting of alternating right and left-hand spirals nested together and joined by three or more crimped connecting rods. In some meshes, straight connecting rods are used.

Compressed Spiral Edges: An edge finish in which the outer turns of the spirals are compressed to a specified distance.

Connector Rod: A wire or rod of any shape (usually round), either straight or crimped, used for joining belt components.

Conventional Weave: A mesh consisting of a series of either all right or all left-hand spirals, each turned into the preceding spiral to form a continuous belt. (For basic types, see *Uni-Directional* and *Sectional Weave*.)

Crimped Connectors: Round wire formed into peaks and valleys to house spirals. The design pre-seats and stabilizes spirals to reduce break-in stretch and prevent lateral spiral movement.

Cross Over: Length of straight running belt between centers of two cages on a two cage/one belt system.

Dancer Roll: Weighted roll at the bottom of a take-up loop.

Dirty Systems: Process dirt and belt wear debris may contaminate product, increase system friction, and accelerate belt wear, thus reducing the useful life of the belt if the user does not practice proper cleaning. Cleaning practices and schedules are application specific.

Dividers: Devices used to separate a belt into longitudinal product lanes. These can be created with woven wire designs or plate attachments.

Double Balanced Weave: A mesh consisting of pairs of interlaced right and left-hand spirals joined by crimped or straight rod connectors so that the pairs of spirals are interspaced by the adjacent spirals.

Double Rod Reinforced Weave (Dual or Duplex Weave): A mesh consisting of pairs of either all right-hand or all left-hand spirals, each pair being turned into the preceding pair, and reinforced with a rod through the hinging point of the spirals.

Double Weave (Duplex) Edges: Edge construction of double weave design extending in from both edges to a specific distance.

Down Cage: A spiral system where the belt travels from top to bottom. (See also *Up Cage*.)

Drum: Large cylindrical shaped core of a spiral system. The system's main driving component. (See also *Cage*.)

Drum Diameter: Diameter of the drum or cage.

Edge Drives: Designed to reduce tension to acceptable levels in applications where long belts pass through a series of turns and straight runs, often resulting in tension levels which exceed recommended limits.

Elevated Temperatures: Thermal expansion of the belt width may adversely affect sprocket engagement with the belt openings.

Elongated Spiral Edge: A retaining edge fabricated by adding elongated spirals to the turned-up connectors or rod reinforcements.

End Lock: Rod cap with locking lip inserted into the module along both edges of the belt to secure rod position.

ExactaStack™: Self-stacking belt available in all widths, tier heights, and mesh configurations for both spliced-in sections and complete belt replacements. No system drive modifications required.

Extended Sidebar Chain: A retaining edge provided by special attachments on the chain.

EZ Transfer Finger Plate: Eliminates the need for transfer dead plates at terminal discharges as the tines of the plates fill the space between the raised leg pickets or modules.

Fatigue Resistant Cleatrac: Provides up to 2.5 times the working strength of our standard Cleatrac belts. Fatigue Resistant Cleatrac belting can be used in applications requiring longer conveyor lengths and increased belt strength.

Filled Edges: Short lengths of wire (any shape) affixed between connectors.

Filler Rod: A rod of any shape (usually round) inserted through a spiral or spirals to fill the mesh. These rods do not connect spirals or belt components.

Flat Bar: A commercially available or manufacturable flat bar used as cross supports to connect chain. Occasionally, flat bar is inserted through mesh to act as a filler bar or assembled under the mesh with the mesh welded to the flat bar.

Flat Wire Belt: Continuous assembly of flat wire pickets connected by a straight round connector inserted through positioned holes.

Flights (Lifts, Cleats): Devices attached across the width of the belt at prescribed intervals to prevent the product from sliding on the inclines and declines. These may be fabricated from woven wire spirals and formed or unformed sheet metal.

Flip-up: Condition due to high tension. The outside edge of the belt rises up off the belt supports. The belt may get caught between the drum and inside belt support. Also called Reverse Christmas Tree. (See *Christmas Tree*.)

Flip-up Detection: Electrical or mechanical/electrical device(s) that detect a edge flip-up condition.

Guard Edge Plate: Plates assembled between links and mesh to prevent product from falling off belt. Guard edge plates are tack welded to links as needed to secure position.

Herringbone: Arrangement of support rails in a "V-shape". Tip of "V" points in direction of belt travel. Provides even distribution of wear and helps keep the belt centered in its path.

High Tension: Tension reaching or exceeding the capabilities of the belt. Can result from system layout, high coefficient of friction between belt and product (dirty system), or product loading.

Hold Downs: Members that limit the amount the belt edges can rise in a Christmas Tree or flip-up condition.

In-Run: The length of belt from the load point to point tangent to the cage of a spiral system or turn of a fixed turn conveyor. Also known as in-feed.

Inside Radius: The distance from the rotational axis (center) of the drum to the driving surface of the drum.

Inside Turn Radius: Turn radius measured to the inside edge of the belt.

Integral Guard Edge: Inside leg link raised to prevent product from falling off belt. Integral guard edge links offer improved cleanup and sanitation over guard edge plates.

Interlocking Plate: A retaining edge consisting of a series of formed plates which "interlock" with each other to form a guard edge.

Interlocking Looped Edge: A retaining edge formed by extending ends of straight wire connectors or reinforcing wires into interlocking loop design at prescribed angles to the belt.

Internal Pigtails: Secures the rod position within the overlay spirals. They are recommended for applications with a soft or wet product. Internal pigtails may be added to any Omni-Tough® overlay at the time of fabrication. Minimum belt width for this feature is 12" (305 mm) nominal.

Interwoven Weave: A mesh consisting of two conventional weaves in which one is woven into the other and sometimes reinforced by straight rods through the hinging points of the spirals.

Knuckled Edge: An edge finish which is complete without welding. The edge is finished by bending back the ends of the spirals to form a loop, generally permitting each individual spiral to flex as a single link in the belt.

Knuckled and Welded Edge: An edge finish which is knuckled with ends of the wire forming the knuckle loop, and tack welded or brazed to the spiral to prevent opening of loops.

Ladder Edge: An edge finish formed by extending reinforcing wires or connectors beyond the spiral finish and creating an edge in the appearance of ladder chain.

Ladder Edge, Welded: An edge finish similar to Ladder Edge with loops tack welded or brazed.

Lane Dividers: Detachable or non-detachable plates assembled into the belt's width to create product lanes. Spiral wire lane dividers also available.

Lehr Mesh: A balanced weave wire mesh consisting of alternating right and left-hand flattened spirals fully seated into specifically formed crimped connector rods—commonly used in glass processing systems.

Limit Switches: Switches installed to sound an alarm or stop the system if the position of the take-up roll goes too high or too low. They can detect high tension and prevent some jams.

Loop: One complete turn within a spiral.

Looped Edge (Wicket): A retaining edge formed by extending pairs of connectors or rod reinforcements, and turning.

Main Drive: The motor, reducer, and other power transmission devices that turn the cage or drum of a spiral system. Also known as the cage drive.

Mesh: Woven wire surface on which the product rests.

Mesh Designation (Flat Wire): Flat wire belts are constructed in specific mesh designations or opening sizes, such as 1x1, 1/2x1, 1/2x1/2, with other modifications which may vary according to belt width.

Mesh Designation (Woven): Woven mesh is designated with a letter (**B**alanced,**C**onventional,**U**nilateral) and three numbers to describe mesh construction.

Mobius: Technique where return path is arranged to make the belt turn itself over each successive pass through the system.

Multi-Strand Weave: A mesh consisting of alternating right and left-hand double spirals (side by side as single units) joined by straight connecting rods.

Nose Roll: Machined radius plate or roller, plastic or metal, located at the conveyor terminals which the belt wraps around, allowing a close transfer.

Omni-Grid®: Omni-Grid® belts are precision crafted from premium quality stainless steel to exacting standards. The finish is smooth and burr-free for quick and easy cleaning, maximizing production. Available in a variety of configurations to negotiate tight turn radii.

Offset Guard Edge: A retaining edge similar to the Shingle type except having a formed vertical step in each place.

Omni-Flex®: A turn-curve belt based off Ashworth's basic flatwire belt. Flat wire pickets are manufactured with slots, rather than holes, in order to allow the pickets to collapse and expand longitudinally. This allows the belt to negotiate spirals and turns. Each rod is secured via buttonhead welds, and belt strength can be increased by adding single or double bar links to the outside edge of the belt.

Omni-Pro®: Turn-curve belt with metal links and rods and assembled with a zero tension, 360 buttonless welds, capable of accommodating turns in a conveyor system. Wire mesh overlays are available for greater product support. They can also be used in straight-run applications.

Omni-Tough®: An overlay with a flat surface made from high tensile strength spring stainless steel wire with a high resilience to impact. Omni-Tough® is available in most mesh configurations.

Opening: Open space on the carrying surface of the mesh between wires.

Opening—Lateral: The nominal inside distance between parallel wires, measured along a line perpendicular to the angle of weave to the nearest intersecting wire whether in the same or adjacent spiral. (This definition does not apply to *Compound Balanced Weave*.)

Opening—Longitudinal: The nominal inside distance along the angle of weave measured between the connectors of the spirals. (This definition does not apply to *Compound Balanced Weave*.)

Out-Run: Length of belt from the point tangent to the cage or turn to discharge of the product. Also known as out-feed.

Overdrive: The amount of slippage between the belt and the drum or cage in a spiral system.

PDCE: Positive Drive Chain Edge. Totally customisable metal belting with good uniformity of pitch, high tensile strength with a relatively light belt/chain weight, and good durability under severe loads.

Picket: A continuous corrugation of flat strip with prepositioned holes. Applicable to flat wire belts.

Pitch Line Rise and Fall: Also known as *Chordal Action*.

Prestoflex®: Plastic belting with a connectorless construction made up of plastic modules, which snap or unsnap together for quick and uncomplicated repairs.

Plastic Modular Belt: Plastic modules assembled with adjacent modules using a round stainless steel rod inserted through the modules.

Radius Weight: Simplified formula for estimating belt tension while in contact with the drum in a spiral system. It is another term used to describe the system tension.

Reduced Radius Omni-Grid®: Smallest turn belt radius available with no center link assembled into the belt.

Reinforcing Rod: A rod of any shape (usually round) inserted through the bends of the spirals for the purpose of strengthening the fabric. It does not join spirals or serve as a connector.

Relieved and Reinforced Turned-up Fabric: A retaining edge similar to a relieved turned-up mesh except that hairpin reinforcements are inserted in the disconnected spirals.

Relieved Turned-up Fabric: A retaining edge similar to a turned-up mesh edge providing flexibility by the omission of connectors or rod reinforcements in the turned-up portion of the mesh at prescribed spacing.

Return Path: The path the belt takes in moving from the discharge back to the in-feed.

Rod Looped Edge: An edge finish similar to the *Ladder Edge* except that reinforcing wires or connectors are extended and knuckled on themselves.

Rod Reinforced Weave: Mesh constructed in the same manner as *Conventional Weave*, and reinforced by insertion of a rod through the hinging point of the spirals.

Round Wire Sizes: Round wire sizes generally referred to are the nearest American Steel and Wire or Washburn & Moen gauge number with its decimal equivalent and supplied within the standard wire tolerances of wire manufacturers.

Sectional Weave: A mesh consisting of alternating sections of right and left conventional weave usually joined by means of straight or crimped wires.

Shingle Style Guard Edge: A retaining edge consisting of overlapping flat plates with one edge of the plate on the outside of the preceding plate and the other edge on the inside.

Side Travel: The continuous movement of a belt in a direction either right or left of the centerline of the conveyor. (See *Waver*.)

Small Radius Omni-Grid® (3/4" & 1"): Belt consists of an assembly of rods and links. A center row of heavy duty non-collapsing links forms two product lanes: for 3/4" pitch belts there are standard links on inside and outside belt edges; for 1" pitch belts there are standard collapsing links on inside edge with 1.75" (44.5 mm) pitch collapsing links on the outside edge. All belts are double welded.

Space Saver Omni-Grid® (1"): Belt consists of an assembly of rods and links. A dual row of heavy duty, non-collapsing links are used on the inside edge and a long pitch-expanding link is used on the outside edge.

Sprockets: Used to drive positive-drive belts. These sprockets are generally cast from carbon, stainless steel, or machined UHMWPE and are finished in sizes suitable for application.

Staggered Style Guard Edges: A retaining edge consisting of alternating overlapped inside and outside flat plates.

Stress Corrosion Cracking: The fracture of a metal in a corrosive environment. Austenitic stainless steel belts are susceptible to this phenomenon under certain conditions.

Strip Sizes: Strip sizes for flat wire and Omni-Flex® are generally supplied in dimensions within the accepted tolerances of flat wire manufacturers. Strip sizes also designate the height and thickness of a flat wire strip.

Stripper Bar: Plain rod mounted between the underside of the sprocket and the belt to help disengage the belt from the sprocket as the belt begins its return run.

Super Small Radius Omni-Grid® (SSOG): Lotension belt with an inside turn radius equal to 0.8 times the belt width. SSOG has the industry's smallest turn radius for spiral and turn curve applications. Maximizes utilization of available floor space, and can turn either left or right, pivoting about a center link

Surge: A loping or jerky operation of the belt due to too much overdrive, varying coefficients of friction of belt supports, and drive problems.

Swing Wide: The occasional tendency of a belt to swing outward in an area prior to or upon leaving a turn or the drum.

Tack Weld: This process prevents picket compression or narrowing associated with high belt tension. Typically associated with flat wire belts 60" (1524 mm) or greater.

Take-Up: The area of the system where variations in belt length are accommodated or “taken up”.

Take-Up Drive: A name often given to the system sprocket drive. This drive sets the belt speed and dwell time for the system and is located just before the take-up.

Take-Up Tower: The structure or area where the take-up, take-up drive, limit switches, and dancer roll are located in a spiral.

Tensile Stress: This can result from the fabrication of the material or applied stresses to the material in operation. Most commonly caused from high tension in the system.

Tension Drive: Also known as *Take-Up Drive* or *Auxiliary Drive*.

Tension Link: Outermost link in a spiral/turn-curve belt to which all system tension is transferred in a spiral application.

Tension Switches: Switches installed to sound an alarm or stop the system if the position of the take-up roll goes too high or too low. Limit switches can detect high tension and prevent some jam-ups.

Tier: A 360° element of the spiral, either ascending or descending one level.

Tier Height: The vertical distance from one belt level on the drum to the next higher or lower level. This is a measurement of distance. Also known as *Tier Pitch* or *Tier Spacing*.

Tier Pitch: Also known as *Tier Height*.

Tier Spacing: Also known as *Tier Height*.

ToughMat®: PTFE Coated fiberglass or Kevlar® mat for IBO/OBO ovens and dryers.

Trigger Lock: Flexible clip molded into the ends of plastic modules to secure rod position.

Tungsten Mesh: Conventional weave wire mesh consisting of only left-hand spirals, wound one into the next so as to form a continuous fabric. Special material allows for use in temperature up to 3632°F (2000°C).

Turn Ratio: The ratio of inside turn radius to the belt width.

Turn-up Guard Edge: A retaining edge formed by extending individual connectors or rod reinforcements, and turning them up at prescribed angles and spacings.

Turned-up Fabric: A retaining edge formed by turning up a portion of the belt at a prescribed angle to the carrying surface.

Turning Radius: The radius around which a belt may be flexed. It is commonly referred to as Inside *Turning Radius* and is established by the nesting of links or pickets at the inside edge of the turn and by the belt width.

Uni-Directional Weave: A conventional weave mesh in which all spirals are of the same weave, either right or left. Also known as *One-Directional weave*.

Up Cage: A spiral system where the belt travels from bottom to top. (See also *Down Cage*.)

Waver: The inherent deviation from a straight line along the mesh edges. (See also *Side Travel*.)

Wear Edges: An additional feature extended beyond the edge of the belt to act as a buffer.

Welded Edge: An edge finish on a woven belt completed by welding only.

Welded Knuckled Edge: An edge finish that is knuckled, and the knuckles completely filled by welding or brazing.

WG Woven Wire: WG belts are constructed with alternating right- and left-hand spirals joined by a crimped connector. European Standard.

Appendix A:
Wire Selection Guide

GUIDE FOR SELECTION OF WIRE ANALYSIS FOR ASHWORTH METAL BELTS		
Trade Name	Maximum Operating Temp. °F	Description and Application
Plain Steel Low Carbon C1008	600	Used in dry atmosphere for light and moderated loads, where no severe wear is expected, and in low temperature ovens.
Galvanized C1008 C1040	350	For damp or mildly corrosive atmospheres and non-caustic washing operations. Furnished in low carbon for moderate loads and in high carbon for heavy loads.
High Carbon C1040 C1065	1050	Used in dry atmospheres for heavy loads, where severe wear is expected, and in moderate temperature furnaces, as for glass annealing, metal tempering bluing, etc.
6150 Alloy Mayari 'R*	1100	These two alloys, although varying in their chemical composition, have qualities superior to high carbon steel for Lehr belt applications at the glass annealing temperature range.
3% Chrome	1300	For temperatures above 1000°F up to 1300°F, with substantially better oxidation resistance, surface and structural stability than 1% Chrome plus a gain in strength.
17% Chrome T430	1400	For resistance to corrosion from atmosphere, fresh water, steam, food, dairy products, nitric acid and other oxidizing solutions. Type 430 has greater corrosion resistance than Type 410 and does not embrittle as readily. Although it resists progressive scaling up to 1400°F it is not commonly used in high temperature work except where sulphurous gases are present, because of its serious loss of strength above 1100°F.
18-8 T304	1500	Type 304 affords greater resistance to corrosion than Type 430 especially for marine and industrial atmospheres, polluted water, high temperature steam, food, dairy products, organic chemicals, and non-oxidizing for reducing solutions. Although it resists progressive scaling up to 1500°F, it is no commonly used in high temperature applications because it is subject to carbide precipitation and embrittlement in the 800-1500°F temperature range. For the 800-1500°F-temperature range refer to data tabulated for Type 347.
18-12 Mo T316	1500	The addition of Molybdenum (Mo) to the basic 18-8 analysis provides for greater resistance to the same chemical compounds, which are moderately corrosive to Type 304. Type 316 is particularly effective in resisting corrosion from sulfuric acid compounds. It also resists pitting corrosion that occurs in the 18-8 type with acetic and phosphoric acids, chlorides, bromides and iodides. Muriatic or hydrochloric acids will attack Type 316 and Type 304. Nitric acid, however, will attack Type 316 more readily than Type 304. For high temperature applications, Type 347 is preferred. Refer to data tabulated for Type 347.
25-20 Si T-314	2050	This alloy has been very extensively used in high temperature belt applications up to 2050°F, because of its high strength, good resistance to oxidation and moderate cost. Type 314 is widely used in copper brazing work and for sintering of powdered metals. Its high silicon content greatly increases its resistance to oxidation and carburization. Because of its moderately high carbon content, when operated for prolonged periods in the 800-1500°F, range this alloy is subject to carbide precipitation at the grain boundaries with consequent possible embrittlement and inter-granular corrosion. Carbides, when formed are readily re-dissolved by bringing the belt temperature above 1950°F, holding this temperature for at least one hour, followed by a rapid air quench.
35-19	2050	In oxidizing atmospheres below 1950°F, and under cyclic heating conditions, Alloy 35-19 because of its high nickel content is preferred to Type 314. 35-19 develops a scale that is much more adherent to the base metal than is the case with Type 314 and has greater strength, less elongation and less carbide embrittlement than Type 314. The 35Ni-19 Cr Alloy has good resistance to thermal shock.
35-19 Cb	2050	This Alloy is similar to 35-19 with Columbium added as a stabilizing agent to prevent the precipitation of carbides. In addition, it also has higher Silicon content than that of 35-19, which improves its resistance to oxidation and carburization. Recommended where there is extended exposure in the 1200° to 1700°F range and where the maximum temperature does not exceed 2050°F. It has good resistance to carburizing and carbonitriding at temperatures up to 1750°F.

*Mayari'R is a registered Trademark of Bethlehem Steel Corporation., Inc.

GUIDE FOR SELECTION OF WIRE ANALYSIS FOR ASHWORTH METAL BELTS

Trade Name	Maximum Operating Temp. °F	Description and Application
Inconel* Alloy #600	2150	This standard Inconel has been appreciably improved chemically. Tests show much better scaling resistance in cyclic heating applications in an oxidizing atmosphere than the earlier Inconel analysis. In sulfur-free atmospheres, it may be used up to 2100°F. In sulphurous atmospheres, its use is limited to 1500°F oxidizing and 1000°F reducing. It has greater strength than Type 314 or 35-19 above 1800°F. Inconel has good resistance to inter-granular deterioration at high temperatures and its resistance to ammonia, nitrogen and hydrogen make it useful in nitriding work. It has good resistance to molten aluminum brazing flux.
Inconel* Alloy #604	2200	This new alloy is basically a Columbium (Cb) stabilized type of standard Inconel, free from the brittleness and loss of ductility caused by carbide precipitation. With a 78% nickel content, much greater than the 40% minimum required for elimination of sigma phase formation, it will not embrittle from this cause. It is particularly suitable for carburizing atmospheres and in installations where the belt is subject to alternate slightly reducing and slightly oxidizing conditions.
80-20 Cb	2100	This high Nickel alloy has been extensively used for many years providing good belt life at elevated temperatures. 80-20 Cb (Columbium) has excellent oxidation resistance and high strength properties for the recommended operating temperature range. The addition of Columbium as a stabilizing element renders this Alloy resistant to the so-called green rot phenomenon, which may occur, in the 1600-1900°F-temperature range. Such a condition would be encountered where the Chromium while reducing to nickel.
Hastelloy* Alloy X	2200	Exceptional strength and oxidation resistance up to 2200°F is a characteristic of this Alloy. It forms a tightly adherent oxide scale, which does not spall at high temperatures. Also has unusual resistance to reducing and neutral atmospheres. High cost has limited its use for mesh belt applications.
Tophet 30*	2200	This alloy is a 70% nickel and 30% Chrome alloy, which has food oxidation resistance in both oxidizing and exothermic atmospheres at temperatures in excess of 2150°F.

* Inconel is a registered Trademark of INCO Alloys International.
Hastelloy is a registered Trademark of Haynes International, Inc. Tophet is a registered Trademark of CRS Holdings, Inc

It is to be noted that strength is only one factor in the selection of mesh and alloy for any high temperature application. Strength values reported by various reliable research laboratories show considerable variation, and analyses of mesh belt applications in the field, under presumably identical conditions, often show a wide variation in useful life. Allowances must by made for commercial variations in chemical composition and mechanical properties of wire, different types of mesh construction, type of corrosion, influence of atmosphere, time at the critical temperature, thermal shock, mechanical abuse, non-uniform loading, pulley sizes and various other conditions. No specific factors can be given for these variables. The data tabulated can serve as a valuable guide.

Appendix B:
Common Conversion Formulas

US Customary Units	Multiply by	Metric (SI)	Multiply by	US Customary Units
		Length		
Inches	25.4	Millimeters	0.039	Inches
Feet	0.305	Meters	3.281	Feet
		Area		
Square Feet	0.093	Square Meters	10.764	Square Feet
		Weight		
Pound	0.454	Kilograms	2.205	Pound
		Tension		
lb/ft	1.488	kg/m	0.672	lb/ft
		Temperature		
	Formula		Formula	
Fahrenheit	(°F - 32)/1.8	Celsius	(°C*1.8)+32	Fahrenheit

NOTES

Conveyor Belt Product Catalog - Volume II

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