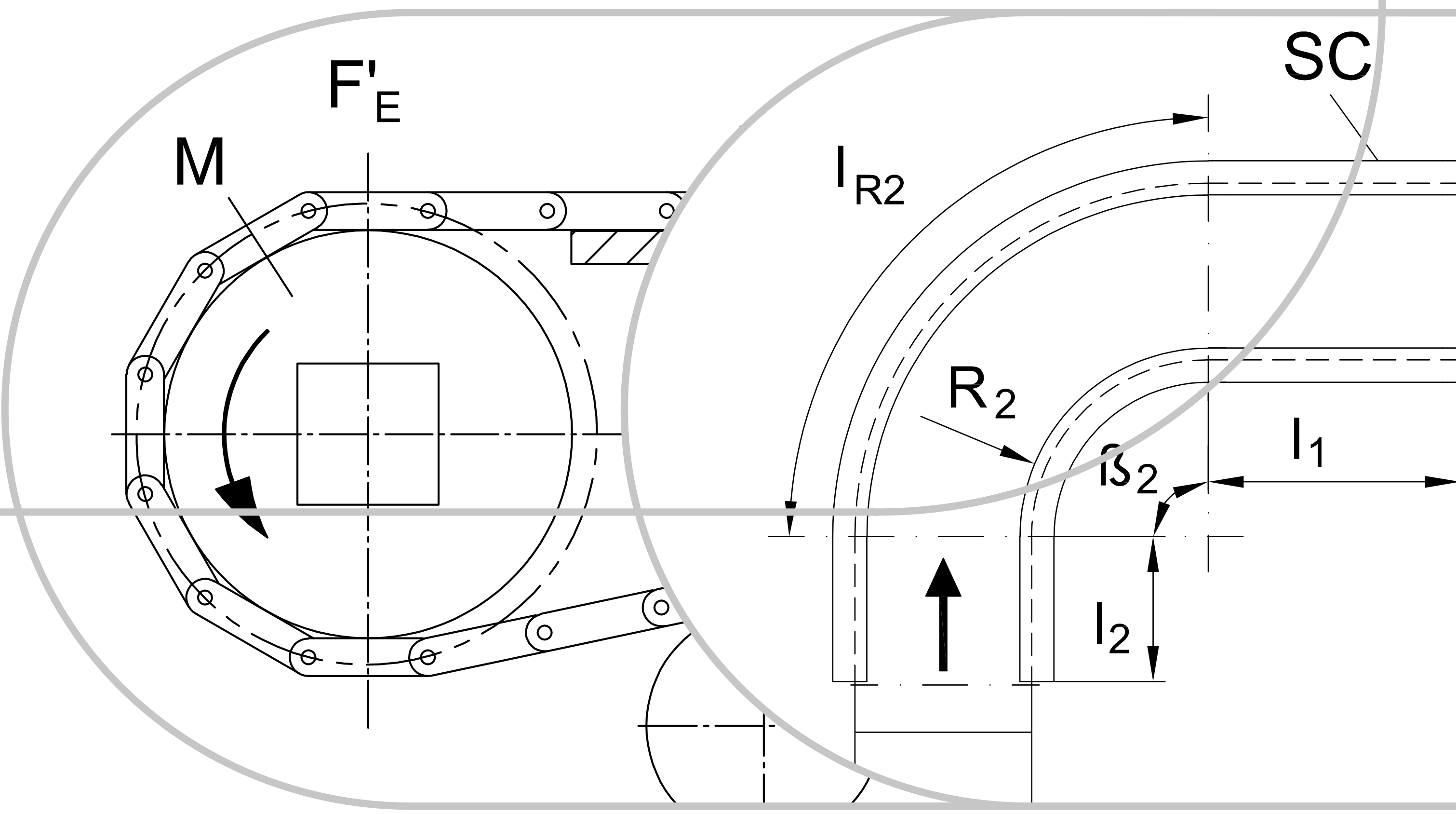
Habasit – Solutions in motion

HabasitLINK® Plastic Modular Belts Engineering Guide



⚠ WARNING

Habasit belts and chains are made of various plastics that WILL BURN if exposed to sparks, incendiaries, open flame or excessive heat. NEVER expose plastic belts and chains to a potential source of ignition. Flames resulting from burning plastics may emit TOXIC SMOKE and gasses as well as cause SERIOUS INJURIES and PROPERTY DAMAGE. See the Fire Hazard Data Sheet for additional information.

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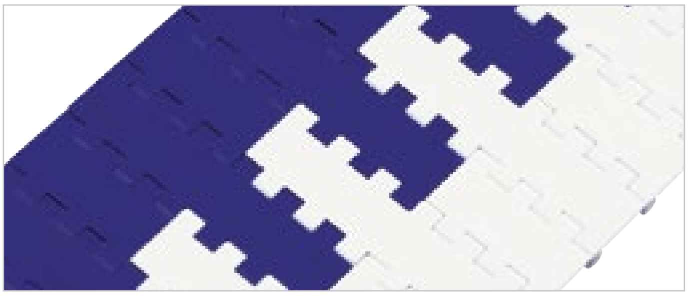
Modular belt features

"Bricklay" belt pattern
HabasitLINK® modular belts are made of modules molded from thermoplastic materials connected by solid plastic rods. The all-plastic design promotes long life and superior performance in many applications. In specific cases stainless steel rods can be offered, providing high belt stiffness. Multiple widths are achieved by using a "bricklay" pattern, which also provides high lateral and diagonal belt strength and stiffness.



"Bricklay" pattern

"Mold to width" belts
MTW belts are assembled with one module per row and provide a defined belt width. MTW belts are usually available in a range of belt widths and are not bricklayed.

HabasitLINK® belt styles and series
HabasitLINK® modular belts are available in various module pitches:

Series	Pitch	
M0800	08.0 mm / 0.3"	Micropitch belts for extra tight transfers
M1000	12.7 mm / 0.5"	Minipitch belts – easy to clean
M1100	12.7 mm / 0.5"	Minipitch belts for extra tight transfers
M1900	12.7 mm / 0.5"	Super high clean
M1200	12.7 mm / 0.5"	Minipitch belts for tight transfers
SM / CM605	12.7 mm / 0.5"	Minipitch belts for tight transfers
HDS605	12.7 mm / 0.5"	Minipitch belts for tight transfers
RS511 / 515	12.7 mm / 0.5"	Minipitch radius belts for tight transfers
106	19.1 mm / 0.75"	Belts for tight transfers
M2400	25.4 mm / 1.0"	M2400 Botting/container, corrugated and sphere applications
M2500	25.4 mm / 1.0"	General conveying
M2600	25.4 mm / 1.0"	Bottling, container and general heavy conveying
M2960	25.4 mm / 1.0"	Super high clean
IS / CT610	25.4 mm / 1.0"	Radius belts
ST / VT610	25.4 mm / 1.0"	General conveying
HDS610	25.4 mm / 1.0"	Easy to clean
208	05.4 mm / 1.0"	Straight belts
MB610	25.4 mm / 1.0"	Heavy duty
F50	27.9 mm / 1.1"	Large open area belts
PR612	30.5 mm / 1.2"	Radius belts
M3300	33.0 mm / 1.3"	Radius belts
M3800	38.1 mm / 1.5"	Heavy duty radius belts
SP / IS615	38.1 mm / 1.5"	Straight and radius belts
ST / VT615	38.1 mm / 1.5"	General conveying
CC40	44.5 mm / 1.75"	Straight belts
M5000	50.8 mm / 2.0"	Heavy duty
M5100	50.8 mm / 2.0"	Raised rib belt for pasteurizer
M5200	50.8 mm / 2.0"	Radius and spiral belts
M5400	55.9 mm / 2.2"	Roller Top
SP / SE / IS620	50.8 mm / 2.0"	Straight and radius belts
HDS620	50.8 mm / 2.0"	Easy to clean
HDU620	50.8 mm / 2.0"	Easy to clean
FF620	50.8 mm / 2.0"	Fluid flow belts
MB620	50.8 mm / 2.0"	Heavy duty
PR620	50.8 mm / 2.0"	Radius spiral belts
M6300	63.5 mm / 2.5"	Heavy duty
M6400	63.5 mm / 2.5"	Heavy duty conveying for extreme loads

Closed belt surface versus open area grid belts

- **FlatTop belts** are designed to provide a totally closed top surface (0% open area).

- **Flush Grid belts** are designed to permit maximum air and fluid flow through the belt, allowing more effective and efficient cooling or washing of the product during conveying. The following open area definitions are used (for individual figures see product data sheets).

  Open area (free flow): This is the effective area (%) of vertical openings in the belt. It is relevant for the flow rate through the belt (resistance to air and water flow).

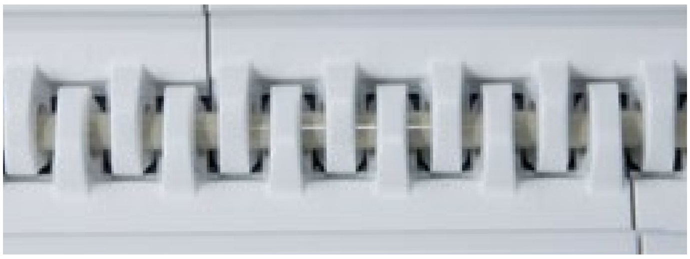
  Open contact area: This is the area of the belt (%) which is not in contact with any totally flat product conveyed on its surface. This figure is larger than the open area and relevant for air contact with the product surface for cooling operations.

You can find more detailed product information on www.habasit.com
or in our brochure "4178 – HabasitLINK® Plastic Modular Belts – Product Guide".

Modular belt features

M2620 Reverse side with closed hinges

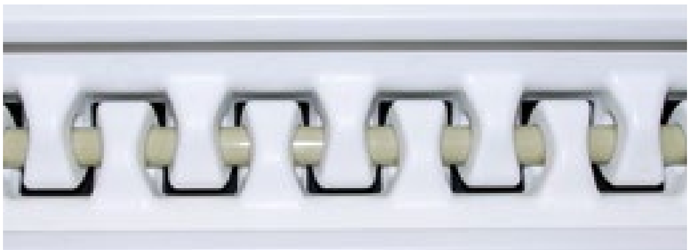
Closed hinge design
The closed hinge design for material handling and highly loaded non-food applications offers tightly closed hinges which provide the maximum possible load transmission and abrasion resistance.



M5010: Reverse side with open hinges

Oblong pivot hole

Open hinge design
For food applications where sanitation is critical, special link designs are used, which provide gaps between the links and thus allow access to the partially exposed hinge rod. The patented oblong rod holes, which improve accessibility, are offered in various styles. Sanitation is improved and the rods can be visually inspected without disassembling the belt. For the Flat Top open hinge design the hinge area opens as the belt travels over the sprockets to provide access from the top and bottom of the belt during sanitation.



M5060: Reverse side with dynamic open hinges

Dynamic open hinge design
The belt underside on certain belt types features the “dynamic open hinge“. Compared to the common open hinge, the scalloped hinge design creates an even bigger gap without weakening hinge strength. The gap width will also increase dynamically as the belt articulates around the conveyor’s sprockets, which eases the removal of debris. It is specifically designed to reduce cleaning time and costs and meets the highest HACCP requirements.

Product conformity
FDA (Food and Drug Administration)
HabasitLINK® is offered in materials which are in compliance with FDA, 21CFR part 170 – 199.

EU conformity
HabasitLINK® is offered in materials which are in compliance with EU Regulations.

USDA Meat & Poultry acceptance
Several HabasitLINK® belt designs are in compliance with USDA AMS Meat & Poultry requirements and NSF/ANSI/3-A 14159-3 standards. Certification is valid only when optional belt accessories like cleats, v-guides and scoops are also in compliance with the relevant standards.

USDA Dairy acceptance
Several HabasitLINK® PP belt designs are in compliance with USDA Dairy Equipment Guidelines and 3-A sanitary standard 20-xx. Certification is valid only when optional belt accessories like cleats, v-guides and scoops are also in compliance with the relevant standards.

Please consult the www.habasit.com/services/regulations website or contact Habasit for details.

The HabasitLINK® drive system
All HabasitLINK® belts are positively driven by injection-molded plastic sprockets or alternatively, machined sprockets.
Two configurations are used:
a) Double row of teeth in offset positions, allowing bi-directional drive
b) Single row of lug-type teeth also allowing bi-directional drive
Another advantage of most HabasitLINK® molded sprockets is the "open-window" design, which promotes sanitation across the full width of the conveyor shafts.

Habasit HyCLEAN sprockets have been developed to improve hygiene conditions and cleaning efficiency in food processing areas. This design permits 100% hinge exposure and accessibility for cleaning.

Various sizes are available as split sprockets.

Double row of teeth in offset positions

Double row of teeth in offset positions, HyCLEAN concept

Single row of lug-type teeth

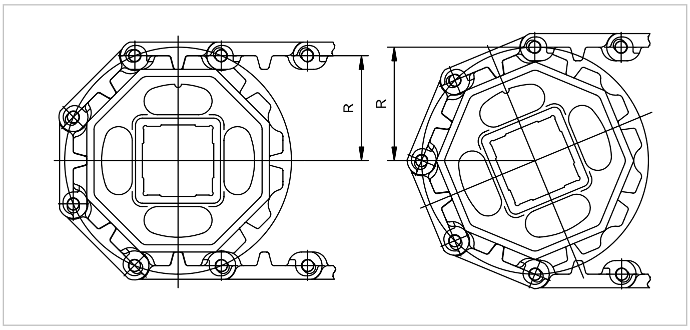


Figure 10: Sprocket engagement

The polygon effect (chordal action)
Module and chain links rotating around the pitch of the sprocket cause the linear belt speed to vary (Figs. 10 and 20). The pivot rod travels on the pitch diameter of the sprocket while the module moves through the smaller chordal radius causing a horizontal rise and fall of the module. This polygon effect is typical of all modular belt systems. The magnitude of speed variation depends on the number of sprocket teeth.

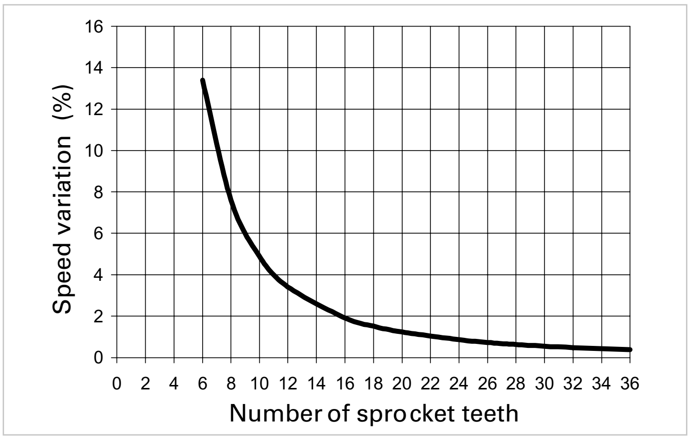
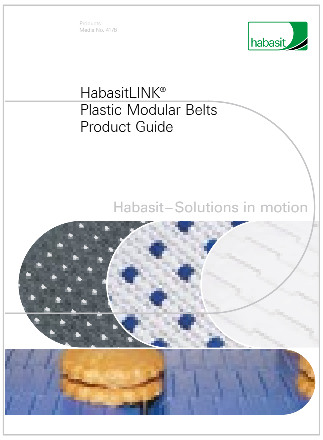


Figure 20: Polygon effect

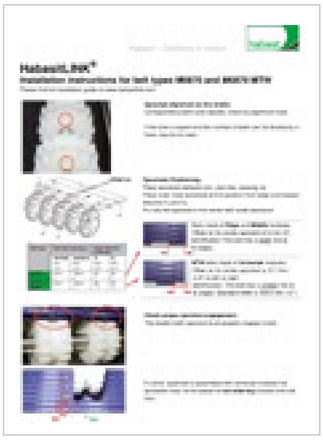
Product information on
Please visit our website for in-depth information on products and applications as well as for detailed technical data (product news, product series overview, information about accessories, product data sheets).

Product information brochures
HabasitLINK® plastic modular belts are produced to the highest standards. The range comprises more than 80 belt types, with new types constantly under development to ensure the most advanced offering at all times. For detailed product information about our plastic modular belts, please refer to our brochure "Habasit Plastic Modular Belts".

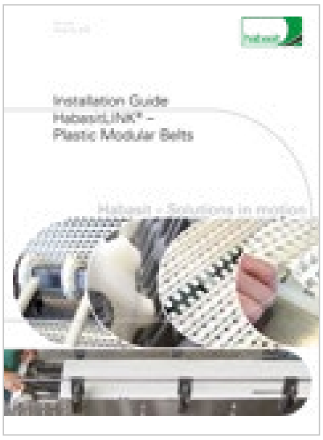


4178 – HabasitLINK® Plastic Modular Belts Product Guide

Belt installation information on www.habasit.com
You can get detailed information about belt installation from product-related installation flyers and the installation guide.



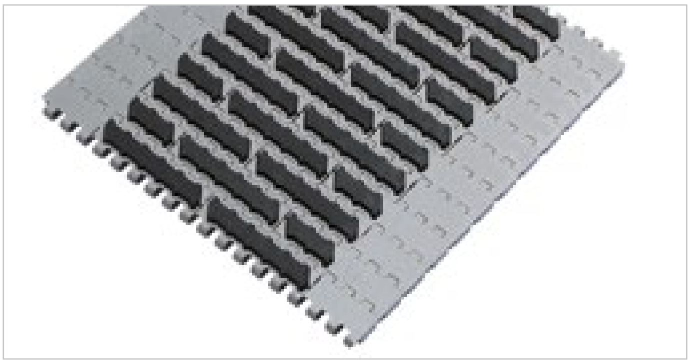
Installation Flyer



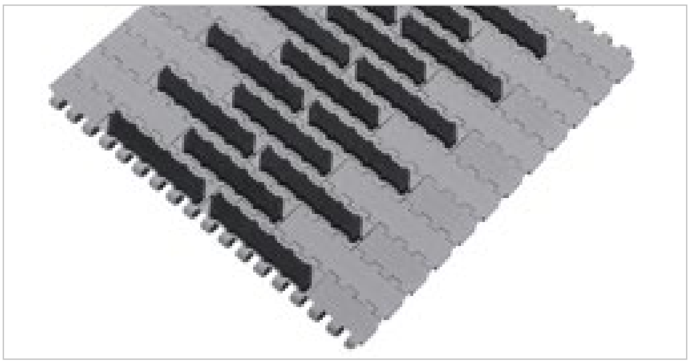
6001 – Installation Guide

GripTop belt pattern (configurations)

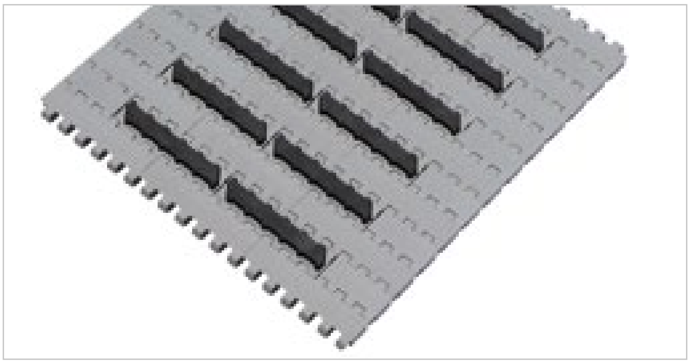
GripTop with straight indent
All belt modules except edge modules are provided with rubber top over the whole width. The standard indent is described in the table below.



GripTop with staggered indent
The belt is composed of rubber top modules with alternating widths on every second row. The standard indent is described in the table below.



GripTop alternating
It is possible to have a configuration with alternating GripTop rows. The distance between the GripTop rows corresponds to the belt pitch. The standard indent is described in the table below.



Belt type	Standard indent	
	mm	*inch*
M1200	50	*2"*
SM/CM605	50.8	*2"*
M2470	38	*1.5"*
M2520/M2533	50	*2"*
M2540	21	*0.83"*
M2544	35.5	*1.4"*
IS/CT610	76.2	*3"*
M2620	43	*1.7"*
M2670	50	*2"*
M3800	30	*1.18"*
SP615	76.2	*3"*
IS615	88.9	*3.5"*
M5000	75	*3"*
SP620	76.2	*3"*
IS620	88.9	*3.5"*

Conveyor design aspects
For modules made entirely of high friction (HF) material, the carry way wear strips are positioned so as not to be in contact with the high friction material.

Use a roller return on straight conveyor systems and in the straight sections of radius conveyors.

Radius return way wear strips through the curves are positioned so as not to be in contact with GripTop material.

Standard belt materials

Material	Code	Description	Density g/cm³	Temperature range
Polypropylene	PP	Thermoplastic material with a good price/performance ratio (material for most common conveying applications). Excellent chemical resistance to acids and alkalis. * High impacts below 10 °C *(50 °F)* must be avoided.	0.9	+5 °C to +105 °C (*) *+40 °F to +220 °F (*)*
Polyethylene	PE	Thermoplastic material well-suited for very low temperatures and / or high impact applications. Excellent chemical resistance to acids and alkalis. Not suitable for abrasive applications. * Below -40 °C *(-40 °F)*, thermal belt shrinkage requires a sprocket pitch diameter adaptation.	0.94	-70 °C to +65 °C (*) *-94 °F to +150 °F (*)*
Polyoxymethylene (Acetal)	POM	Thermoplastic material with high strength and a low coefficient of friction. Impact and cut resistant surface. Suitable for heavy duty applications and low temperatures. Good chemical resistance to oil and alkalis, but not suitable for long-term contact with high concentrations of acids and chlorine.	1.42	Wet conditions: -40 °C to +60 °C *-40 °F to +140 °F* Dry conditions: -40 °C to +93 °C *-40 °F to +200 °F*
Polyamide (Nylon)	PA	Thermoplastic material with high strength and abrasion resistance. Suitable for heavy duty applications in dry conditions and at elevated temperatures. The material is specially modified to keep its properties stable over a long time at elevated temperatures. Flammability UL 94 V2.	1.14	Wet conditions: not recommended Dry conditions: -46 °C to +130 °C (short-term +160 °C) *-50 °F to +266 °F* (short-term +320 °F)
Wear, Hydrolysis and Impact resistant material	WHI	Thermoplastic material with very good wear and impact resistance, good hydrolysis and chemical resistance. Low moisture absorption and suitable for direct food contact.	1.24	Wet condition -50 °C to +80 °C *-58 °F to +176 °F* Dry condition -50 °C to +110 °C *-58 °F to +230 °F*
Polybutylene-terephthalate	PBT	Thermoplastic material with good strength and low coefficient of friction. It is well suitable for conveying applications in the tobacco industry. No dimension changes due to water absorption.	1.30	Wet conditions: -40 °C to +50 °C *-40 °F to +122 °F* Dry conditions: -40 °C to +120 °C *-40 °F to +248 °F*

For detailed declarations on compliance by material and color, please contact Habasit.

Special belt materials

Material	Code	Description	Density g/cm³	Temperature range
Antistatic Polypropylene	PP +AS	Thermoplastic material with reduced electrical surface resistance to reduce dust accumulation and belt charge-up. * High impacts below 10 °C *(50 °F)* must be avoided.	0.9	+5 °C to +105 °C (*) *+40 °F to +220 °F (*)*
Detectable Polypropylene	PP +DE	Thermoplastic material with a special additive which makes the material easily detectable (by X-rays and metal detectors). Excellent chemical resistance to acids and alkalis. * High impacts below 10 °C *(50 °F)* must be avoided.	1.09	+5 °C to + 105 °C (*) *+40 °F to 220 °F (*)*
Electrically conductive Polypropylene	PP +EC	Thermoplastic material with low electrical surface and volume resistance. Electrical resistance meets DIN EN 61340 for ESD safety areas.	1.02	+5 °C to +105 °C *+40 °F to +220 °F*
Electrically conductive and flame retardant Polypropylene	PP +FC	Thermoplastic material with a combination of low electrical resistance and very good flame retardant properties. Burning behavior classified as Cfl-S1 according to DIN EN 13501, (comparable to former DIN 4102 B1). Halogen-free, conforms with RoHS. Electrical resistance meets DIN EN 61340 for ESD safety areas.	1.08	+5 °C to +80 °C *+40 °F to +176 °F*
Flame retardant Polypropylene	PP +FR	Flame retardant thermoplastic material for most common conveying applications with special demands for low flammability. Burning behavior classified as Cfl-S1 according to DIN EN 13501, (comparable to former DIN 4102 B1). Halogen-free, conforms with RoHS. * High impacts below 10 °C *(50 °F)* must be avoided.	1.05	+5 °C to +105 °C (*) *+40 °F to +220 °F (*)*
Submersible Polypropylene	PP +GH	Thermoplastic material with a density that allows the material to sink in water. Good chemical and hot water resistance, which permits continuous use in boiling water. Stabilized against oxidation and embrittlement. * High impacts below 10 °C *(50 °F)* must be avoided. For details on chemical resistance, please contact Habasit.	1.24	+ 5 °C to + 105 °C (*) *+40 °F to + 220 °F (*)*
Hot water resistant Polypropylene	PP +HW	Stabilized thermoplastic material with improved resistance against oxidation and embrittlement.	0.9	+ 5 °C to + 105 °C *+40 °F to + 220 °F*

For detailed declarations on compliance by material and color, please contact Habasit.

Special belt materials

Material	Code	Description	Density g/cm³	Temperature range
HabaGUARD® Polypropylene	PP +H15	Thermoplastic material containing an antimicrobial additive, with excellent chemical resistance to acids and alkalis.	0.9	+5 °C to +30 °C *+40 °F to +86 °F*
HabaGUARD® Polyethylene	PE +H15	Thermoplastic material containing an antimicrobial additive, well suited for low temperatures and high impact applications. Excellent chemical resistance against acids and alkalis.	0.94	-70 °C to +30 °C *-94 °F to +86 °F*
Detectable Polypropylene	PE +DE	Thermoplastic material with a special additive, which makes the material easily detectable (by X-rays and metal detectors). Suitable for low temperature and/or high impact applications. Excellent chemical resistance to acids and alkalis. * Below -40 °C (-40 °F), thermal belt shrinkage requires a sprocket pitch diameter adaptation.	1.15	-70 °C to +65 °C (*) *-94 °F to +150 °F (*)*
Antistatic Polyoxymethylene (Acetal)	POM +AS	Thermoplastic material with reduced electrical surface resistance to reduce dust accumulation and belt charge-up. Suitable for heavy duty applications and low temperatures. Material has high strength, a low coefficient of friction and a scratch-resistant surface.	1.42	Dry conditions: -40 °C to +93 °C *-40 °F to +200 °F*
Detectable Polyoxymethylene (Acetal)	POM +DE	Thermoplastic material with a special additive, which makes the material easily detectable (by X-rays and metal detectors). The material has good chemical resistance against oil and alkalis, but is not suitable for long-term contact with high concentrations of acids and chlorine.	1.67	Wet conditions: -40 °C to +60 °C *-40 °F to +140 °F* Dry conditions: -40 °C to +93 °C *-40 °F to +200 °F*
X-ray detectable Polyoxymethylene (Acetal)	POM +DX	Thermoplastic material with a special filler to make the material X-ray detectable.	–	Wet conditions: -40 °C to + 60 °C *-40 °F to + 140 °F* Dry conditions: -40 °C to + 93 °C *-40 °F to + 200 °F*
Electrically conductive Polyoxymethylene (Acetal)	POM +EC	Thermoplastic material with low electrical surface and volume resistance. Electrical resistance meets DIN EN 61340 for ESD safety areas. Material has high strength and a low coefficient of friction. Suitable for heavy duty applications and low temperatures.	1.42	Dry conditions: -40 °C to +93 °C *-40 °F to +200 °F*
Impact and cut resistant Polyoxymethylene (Acetal)	POM +IM	Thermoplastic material with an advanced impact and cut resistant surface. Suitable for meat cutting conveyors and high impact applications. Good chemical resistance to oil and alkalis, but not suitable for long-term contact with high concentrations of acids and chlorine.	1.42	Wet conditions: -40 °C to +60 °C *-40 °F to +140 °F* Dry conditions: -40 °C to +93 °C *-40 °F to +200 °F*

For detailed declarations on compliance by material and color, please contact Habasit.

Special belt materials

Material	Code	Description	Density g/cm^3	Temperature range
Fatigue resistant Polyoxymethylene (Acetal)	POM +JM	Thermoplastic material with high strength, a low coefficient of friction and improved fatigue resistance. Good chemical resistance to oil and alkalis, but not suitable for long-term contact with high concentrations of acids and chlorine.	1.42	Wet conditions: -40 °C to +60 °C *-40 °F to +140 °F* Dry conditions: -40 °C to +93 °C *-40 °F to +200 °F*
Low friction Polyoxamethylene (Acetal)	POM +LF	Thermoplastic material with high strength and a low coefficient of friction. Impact and cut resistant surface. Suitable for fast running applications. Good chemical resistance to oil and alkalis, but not suitable for long-term contact with high concentrations of acids and chlorine.	1.42	Wet conditions: -40 °C to +60 °C *-40 °F to +140 °F* Dry conditions: -40 °C to +93 °C *-40 °F to +200 °F*
Wear resistant Polyoxymethylene (Acetal)	POM +PK	Extra wear resistant thermoplastic material with high strength, a low coefficient of friction and very good fatigue resistance. Good chemical resistance to oil and alkalis, but not suitable for long-term contact with high concentrations of acids and chlorine.	1.42	Wet conditions: -40 °C to +60 °C *-40 °F to +140 °F* Dry conditions: -40 °C to +93 °C *-40 °F to +200 °F*
UV stabilized Polyoxymethylene (Acetal)	POM +UV	Thermoplastic material with improved resistance against UV radiation, especially for outdoor applications. The material has high strength and a low coefficient of friction. It is suitable for heavy duty applications and low temperatures.	1.42	Wet conditions: -40 °C to + 60 °C *-40 °F to + 140 °F* Dry conditions: -40 °C to + 93 °C *-40 °F to + 200 °F*

For detailed declarations on compliance by material and color, please contact Habasit.

Special belt materials

Material	Code	Description	Density g/cm³	Temperature range
Reinforced Polyamide (Nylon)	PA +GF	Reinforced thermoplastic material with high strength. Suitable for heavy conveying applications in dry conditions and at elevated temperatures. The material is specially modified to keep its properties stable over a long time at elevated temperatures.	1.35	Wet conditions: not recommended Dry conditions: -40 °C to +145 °C (short-term +175 °C) *-40 °F to +293 °F* *(short-term +347 °F)*
Reinforced Polyamide (Nylon)	PA +HT	Reinforced thermoplastic material with very high strength and toughness. Suitable for heavy conveying applications in dry conditions and at elevated temperatures. The material is specially modified to keep its properties stable over a long time at elevated temperatures.	1.37	Wet conditions: not recommended Dry conditions: -40 °C to +170 °C (short-term +200 °C) *-40 °F to +338 °F* *(short-term +392 °F)*
Reinforced non-stick Polyamide (Nylon)	PA +HN	Reinforced non-stick thermoplastic material with high strength. Suitable for heavy conveying applications in dry conditions and at elevated temperatures. The material is specially modified to keep its properties stable over a long time at elevated temperatures.	1.41	Wet conditions: not recommended Dry conditions: -40 °C to +170 °C (short-term +200 °C) *-40 °F to +338 °F* *(short-term +392 °F)*
Impact resistant Polyamide (Nylon)	PA +IM	Tough thermoplastic material with good strength and fatigue resistance. Suitable for heavy conveying applications with high impact loads. The belt properties and dimensions change with moisture absorption. The material can replace impact resistant acetal in impact intensive applications, but is more susceptible to cuts. In wet environments, dimensional changes need to be considered.	1.08	Wet conditions: -46 °C to +60 °C *-50 °F to +140 °F* Dry conditions: -46 °C to +80 °C *-50 °F to +176 °F*
Food contact approved, flame retardant Polyamide (Nylon)	PA+FRF	Thermoplastic material with good dimension stability, low moisture absorption and low flammability UL 94 V2. The material has a good strength and fatigue resistance.	1.06	Wet conditions: -46 °C to +60 °C *-51 °F to +140 °F* Dry conditions: -46 °C to +90 °C (short term 120°C) *-51 °F to +194 °F* *(short term 248°F)*

For detailed declarations on compliance by material and color, please contact Habasit.

Special belt materials

Material	Code	Description	Density g/cm³	Temperature range
Super high temperature	ST	Reinforced thermoplastic material with very good heat and hydrolysis resistance. Suitable for light conveying applications at elevated temperatures. The material is specially modified to keep its properties stable over a long time at elevated temperatures. Flammability UL 94 V0.	1.65	Wet conditions: on request Dry conditions: 0 °C to +200 °C (short-term +240 °C) *+32 °F to +392 °F* *(short-term +464 °F)*
Flame retardant Polybutylene-terephthalate	PBT +FR	Flame retardant thermoplastic material with excellent stiffness and hardness. Suitable for conveying applications with special demands for low-flammability. The material has good friction and wear properties and good dynamic long-term behavior. Flammability UL 94 V0.	1.47	Wet conditions: -40 °C to +60 °C *-40 °F to +140 °F* Dry conditions: -40 °C to +130 °C (short-term +150 °C) *-40 °F to + 266 °F* *(short-term + 302 °F)*
Thermoplastic elastomer	TPE +E10 +E11 +E30 +E40 +E41	Soft thermoplastic material with a hardness of 50 Shore A. High friction and good wear resistance.	0.90	- 40 °C to + 100 °C *- 40 °F to + 212 °F*
Thermoplastic elastomer	TPE +E14 +E44 +E45	Soft thermoplastic material with a hardness of 65 Shore A. High friction and very good wear resistance.	1.16	40 °C to + 60 °C *- 40 °F to + 140 °F*
Thermoplastic elastomer	TPE +E46	Soft thermoplastic material with a hardness of 88 Shore A. Reduced friction, high wear resistance	1.21	- 40 °C to + 60 °C *- 40 °F to + 140 °F*
Thermoplastic elastomer	TPE +E47	Heat resistant, soft thermoplastic material with a hardness of 58 Shore A.	1.21	- 40 °C to + 130 °C *- 40 °F to + 266 °F* Short term contacts up to 150 °C or 302 °F
Flame retardant thermoplastic elastomer	TPE +FR	Flame retardant soft thermoplastic material with a hardness of 50 shore A. The material has high friction values and good abrasion resistance. Suitable for conveying applications where a high grip between the belt and the product is required. Used for GripTop modules. Flammability UL 94 V0.	1.25	-40 °C to +60 °C *-40 °F to +140 °F*
Thermoplastic elastomer	TPV	Soft thermoplastic material with a hardness of 55 or 72 Shore A. The material has high friction values and good abrasion resistance. Suitable for conveying applications where a high grip between the belt and the product is required. Used for GripTop modules.	0.96	-40 °C to +71 °C *-40 °F to +160 °F*

For detailed declarations on compliance by material and color, please contact Habasit.

Materials for sprockets

Material	Code	Description	Temperature range
Polypropylene	PP	Thermoplastic material with excellent chemical resistance to acids, alkalis and hot water. Abrasion resistance not as good as with POM.	+5 °C to +105 °C *+40 °F to +220 °F*
Polyoxymethylene (Acetal)	POM	Lubricated thermoplastic material specially formulated for molded sprockets, with high strength and good abrasion resistance. Good chemical resistance to oil and alkalis, but not suitable for long-term contact with high concentrations of acids and chlorine.	Wet conditions: -40 °C to +60 °C *-40 °F to +140 °F* Dry conditions: -40 °C to +93 °C *-40 °F to +200 °F*
Polyamide	PA	Thermoplastic material for molded or machined sprockets with high strength and very good abrasion resistance. Suitable for heavy duty applications in dry conditions and at elevated temperatures. The material is specially modified to keep its properties stable over a long time at elevated temperatures.	Wet conditions: not recommended Dry conditions: -46 °C to +130 °C (short-term +160 °C) *-50 °F to +266 °F* *(short-term +320 °F)*
Thermoplastic Polyurethane	TPU	Tough thermoplastic material for molded or machined sprockets with very good abrasion resistance. Suitable for abrasive applications in wet or dry conditions with medium loads. The material is specially formulated to reduce teeth wear to a minimum.	-20 °C to +50 °C *-4 °F to +120 °F*
Super high temperature material	ST	Reinforced thermoplastic material with very good heat and hydrolysis resistance. Suitable for light conveying applications at elevated temperatures. The material is specially modified to keep its properties stable over a long time at elevated temperatures. Flammability UL 94 V0	Wet conditions: on request Dry conditions: 0 °C to +200 °C (short-term +240 °C) *-32 °F to +392 °F* *(short-term +464 °F)*
Ultra high molecular weight Polyethylene	PE40 (PE-UHMW)	Ultra high molecular weight material for machined sprockets. Good abrasion resistance and very good chemical resistance.	-70 °C to +50 °C *-94 °F to +120 °F*

Other materials on request. For detailed declarations on compliance by material and color, please contact Habasit.

Materials for wear strips

Material	Code	Description	Temperature range
Low friction ultra high molecular weight Polyethylene	TP40	High performing material for high speed and high load applications (high PxV limit). Compared to standard PE40 reduced friction, also minimized dusting and wear. Not suitable for abrasive conditions.	-70 °C to +65 °C *-94 °F to +150 °F*
Ultra high molecular weight Polyethylene	PE40 (PE-UHMW)	For heavy conveying applications (high loads); offers reduced wear and a longer lifetime. Not suitable for abrasive conditions.	-70 °C to +65 °C *-94 °F to +150 °F*
Cast Polyamide with incorporated Polymer and / or solid lubricating additives	PA6C+LF	Cast material with high molecular weight, high strength and very high wear resistance. Due to the incorporated lubricating additives the friction values are very low, and due to the high molecular weight the material is very tough and therefore very abrasion resistant. Suitable for heavy applications and high speeds. The material is hygroscopic (water adsorption should be taken into account).	-46 °C to +120 °C *-50 °F to +248 °F*

Other materials on request. For detailed declarations on compliance by material and color, please contact Habasit.

Material combinations

Materials
For standard materials for rods see the product data sheets. If no specific requirements are known, the standard rod materials will be delivered with each belt. Other material combinations are recommended for abrasive and other heavy duty applications.

Recommended module, rod, sprocket and support material combinations:

		HabasitLINK				HabiPLAST Belt support
		Modules	Rods	Sprockets		
				molded	machined	
Standard	General use	PP	PA	POM	POM	PE40 PE10+RC
	General use, wet	PP	POM	POM	POM	PE40 PE10+RC
	Chemical resistance	PP	PP	PP	PE40	PE40 PE10+RC
	Low to medium load, Impact, low temperature	PE	PE	POM	POM	PE40 TP40
	High load, dry	POM+LF	PA	PA	PA	TP40 PA6C+LF
	High load, wet	POM	PBT	POM	PA	PE40
	High speed, dry	POM+LF	PA	PA	PA	TP40
	High speed, lubricated	POM	PBT	POM	PA	PE40
	ESD (electrostatic dissipative)	POM+EC	PA	PA	PA	TP40+FE PE40+EC
Specifically for meat	General use, no - medium impact	PE POM	PE	POM	POM	PE40
	Cutting, low temperature	POM+IM POM+JM	PE	POM	POM	PE40
	Medium / High impact	PA+IM WHI	PE	POM	POM	PE40
Abrasive environment	Dry	PP	PA, Steel	PA, TPU	PA, PE40	PA6C+LF
	Dry, high load	POM	PA, Steel	PA, TPU	PA	PA6C+LF Steel
	Wet, up to 60 °C (140 °F)	PP	PBT, WHI, Steel	PA, TPU	PA, PE40	Steel
	Wet, up to 60 °C (140 °F), high load	POM	PBT, WHI, Steel	PA, TPU	PA	Steel
High temperatures	Dry, high load 93 °C (200 °F)	POM	PA	PA	PA+GF Steel	PA6C+LF
	Wet, 60 °C to 105 °C (140 °F to 220 °F)	PP	PP	PP	Steel	Steel
	Dry, high load up to 93 °C (200 °F)	POM	PA	PA	PA+GF	PA6C+LF
	Elevated temperatures up to 130 °C (266 °F)	PA	PA	PA	Steel	Steel
	Food contact and temperatures up to 145 °C (293 °F)	PA+GF	ST/Steel	ST	Steel	Steel
	Temperatures up to 170 °C (338 °F)	PA+HT	ST/Steel	ST	Steel	Steel
	Food contact and temperatures up to 200 °C (392 °F)	ST	ST/Steel	ST	Steel	Steel
Special	Fryer up to 205 °C	ST	ST/Steel	ST	Steel	Steel
	Microwave unfreezing -30 to 40 °C	PE	PE	POM	POM	PE40/Steel
	Microwave cooking up to 100 °C	PP	PP	POM	POM	PE40/Steel
	Microwave baking 140 - 160 °C	ST	ST	ST	Steel	Steel
Radius Belt	General use	POM	PA	POM	POM	PE40 PE10+RC
	General use, wet	POM	PBT	POM	PA	PE40 PE10+RC
	Low speed, low load	PP	PA	POM	POM	PE40 PE10+RC
	High speed, dry	POM+JM	PA	PA	PA	TP40, PA6C+LF
	High speed, wet or lubricated	POM+JM	PBT, WHI	PAPOM	PA	PE40, TP40
	High hygenic requirememts (strong, oxidizing cleaning agents)	PP	WHI	PP, WHI	PA40	TP40

The most suitable material combination will be selected depending on the specific application.

Rod retaining systems

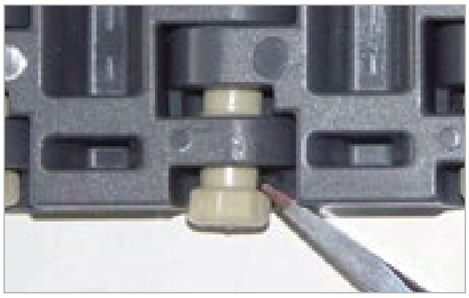
Details for rod assembly and dis assembly can be found on the installation flyer that are available for each type as download form our homepage. The following information provides a general understanding of the different rod retaining types that we have in place.

Snap Fit
Snap Fit rod retaining is used with a wide range of Habasit modular belts. The rod head is round and allows the rods to be inserted with a hammer. It can be extracted using a punch and hammer from the opposite side (secure the module edge to avoid link breakage) or using a special extraction tool available from Habasit, or a narrow side cutter. For open hinged belts, cut off the retainer ring for easy extraction.



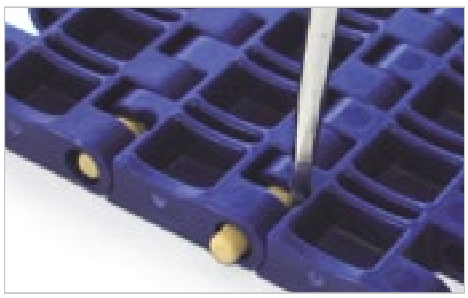


Smart Fit (standard, with rod head)
Smart Fit retaining is used for many product designs. The rod head is octagonal shaped. It allows easy assembly and disassembly using a simple screwdriver. Do not punch out rod with a hammer.

Smart Fit headless
Headless Smart Fit rods are used to make particularly strong belt edges. Disassembly is from underneath using a screwdriver, or with a punch and hammer from the opposite side.

Disassembly from belt edge useing a screw driver

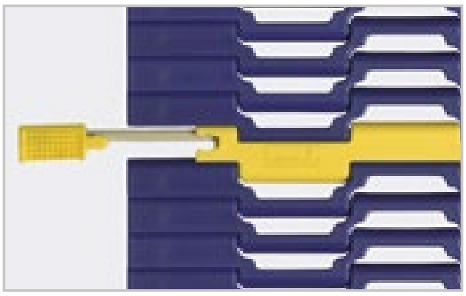

Rod retaining systems

Plug retained
Some belts are equipped with headless rods. Plugs are installed on both edges of the belt to retain the rods.

Disassembly by using screw drivers

Tapered pin
These are used to allow a tight radius for RS511 and 515 belts.

Habasit Saniclip
Available for certain belt types. Used for quick belt opening and closing.



Modular belt conveyor components

Evaluate the desired belt style	→	Refer to www.habasit.com
Evaluate the most suitable material	→	Refer to the tables of material properties from from page 10 to 18, and product data sheets
Evaluate the design concept	→	Refer to the design guide in this manual and draft the layout of your equipment
Calculate the belt tensile force, power requirements and shaft sizes	→	Refer to the LINK-SeleCalc belt strength calculation program

We advise using the LINK-SeleCalc program for belt evaluation and calculation.
Please contact your Habasit representative for installation and **register on https://selecalc.habasit.com/Default.aspx**

Sprocket compatibility

Belt code	Sprocket Series M0800	Sprocket Series M0863K02	Sprocket Series M1000	Sprocket Series M1100	Sprocket Series M1200	Sprocket Series M1900	Sprocket Series SM/CM605	Sprocket Series HDS605	Sprocket Series RS511/515	Sprocker Series 106	Sprocket Series M2400	Sprocket Series M2500	Sprocket Series M2500-C2	Sprocket Series M2600	Sprocket Series M2700	Sprocket Series M2900	Sprocket Series IS610	Sprocket Series ST/VT610	Sprocket Series HDS610	Sprocket Series 208	Sprocket Series MB610	Sprocket Series F51/52/53	Sprocket Series F54	Sprocket Series PR612	Sprocket Series M3300	Sprocket Series M3800	Sprocket Series SP/IS615	Sprocket Series ST/VT615	Sprocket Series CC40	Sprocket Series M5000	Sprocket Series M5000 HyCLEAN	Sprocket Series M5100	Sprocket Series M5200	Sprocket Series SP/SE/IS620	Sprocket Series HDS620	Sprocket Series HDU620	Sprocket Series FF620	Sprocket Series MB620	Sprocket Series PR620	Sprocket Series PR620SPS	Sprocket Series M5400	Sprocket Series M6300	Sprocket Series M6400
Series M0800 (excluding M0863K02)	●																																										
Series M0863K02		●																																									
Series M1000			●																																								
Series M1100				●																																							
Series M1200					●																																						
Series M1900						●																																					
Series SM/CM605							●																																				
Series HDS605								●																																			
Series RS511/515									●																																		
Series 106										●																																	
Series M2400											●																																
Series M2500 (excluding M2585 and M2586)												●																															
Belt types M2585/M2586												⊙	●																														
Series M2600														●																													
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Series IS/CT610																	●																										
Series ST/VT610																		●																									
Series HDS610																			●																								
Series 208																				●																							
Series MB610																					●																						
Series F51/F52/F53																						●																					
Series F54																							●																				
Series PR/RP612																								●																			
Series M3300																									●																		
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Series M5400																																									●		
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Series M6400																																											●

Recommended ● Possible to use ⊙
For detailed information please contact Habasit

Belt and sprocket evaluation

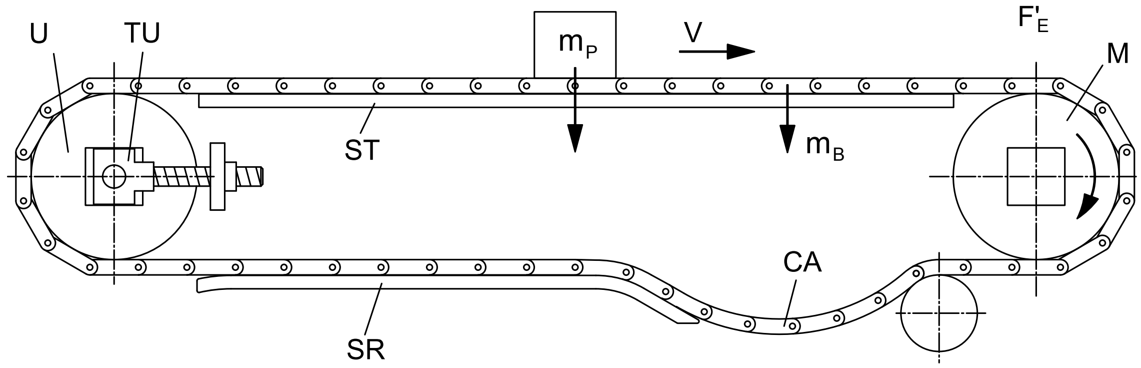


Figure 30

M **Driving shafts** can be square or round. Square shafts allow the sprockets to move easily on their shaft to follow the thermal expansion or contraction of the belt. In addition, square shafts allow higher transmission of torque. The center sprocket is usually fixed for tracking of the belt.

U **Idling shafts** can be equipped with sprockets, coated drums, steel rollers or plastic discs. The center sprocket is usually fixed for tracking of the belt. Alternative tracking methods are required if no sprockets are used.

ST **Slider supports on the transport side**, with parallel or V-shaped wear strips carry the moving belt and load.

SR **Belt support on the return way** can be equipped with rollers (for conveyors longer 4 m (12ft) preferred) or longitudinal wear strips (slider support).

CA **Catenary sag** is an unsupported length of belt after the drive sprockets. Its weight provides a small amount of tension to drive sprockets in order to engage the belt properly and absorb belt length variations due to thermal expansion, load changes, belt wear and belt tension. Long conveyors can be equipped with several pockets for catenary sags.

TU **Take-up device** for adjustment of the catenary sag, which may be screw type, gravity or pneumatic type.

F'_E **Effective tensile force (belt pull)** is calculated near the driving sprocket, where in most cases it reaches its maximum value during operation. It depends on the friction forces between the belt and the supports (ST) (SR) as well as friction against the accumulated load.

v **Belt speed:** Applications exceeding 50 m / min *(150 ft / min)* negatively affect the life expectancy of the belt. For speeds higher than 50 m / min always consult a Habasit specialist. Belt modules moving around a sprocket cause the belt speed to vary. The rod travels on the pitch diameter of the sprocket, while the middle of the module moves through the smaller chordal radius.
The **polygon effect** is also called **chordal action**. The amount of variation in speed depends exclusively on the diameter of the roller and number of sprocket teeth. The bigger the diameter or the higher the number of teeth, the smaller the speed variation.

m_P **Conveyed product weight** as expected to be distributed over the belt surface; calculated average load per m_2 *(ft_2)*.

m_B **Belt mass (weight)** is added to the product mass to calculate the friction force between the belt and the slider frame.

For a glossary of terms see page 74, Appendix.

Design guide
Horizontal conveyors – basic design

Conveyors using plastic modular belts must adhere to basic dimensional requirements. Along with the design guidelines presented in this manual, note also that all leading edges of the conveyor framework and wear strips must have a smooth radius. Screws and nuts must not be placed in the path of belt travel. Soft starts and stops are recommended for speeds above 15 m/min *(50 ft/min)* and in cases where the belt pull exceeds more than 50% of the admissible belt force. All conveyor layouts should be confirmed for acceptable belt pull levels using the LINK-SeleCalc program.

Modular belts typically change their length under varying operational conditions, including temperature, load and wear. The extra belt length is accommodated by providing an unsupported section of the return way for catenary sag (for calculation see page 63). To maximize its effectiveness, the first catenary sag should be positioned after the drive unit.

The design of the conveyor frame depends on the total belt length. In general the catenary sag(s) or a belt take up unit should be able to compensate approx. 1% – 3% (dependent on belt service interval) of the total belt length.

Short conveyors (maximum 2 m *(6 ft)*) (Fig. 40)
In this case belt support on the return side can be omitted. Observe the catenary sag height while the conveyor is running.

Medium length conveyors (2 to 4 m *(6 to 12 ft)*) (Fig. 50 and 55) Common design; the belt is supported by a slider frame (ST, SR) or wear strips/shoes (SB) on the return way. Rollers (R1) can be used as well. A catenary sag near the driving sprockets is sufficient for moderate temperature changes.

Long conveyors (over 4 m *(12 ft)*) (Fig. 60)
Longer lengths and greater temperature changes require more than one section for catenary sag. In this case vary the roller spacing (e.g. 1200/900/1200/900 ...).

Admissible speeds of long conveyors:

Length	Max. speed
Up to 15 m *(50 ft)*	50 m/min *(150 ft/min)*
15 – 25 m *(50 – 75 ft)*	30 m/min *(90 ft/min)*
Over 25 m *(75 ft)*	15 m/min *(45 ft/min)*

For speeds higher than 50 m/min *(150 ft/min)*, always consult a Habasit specialist.

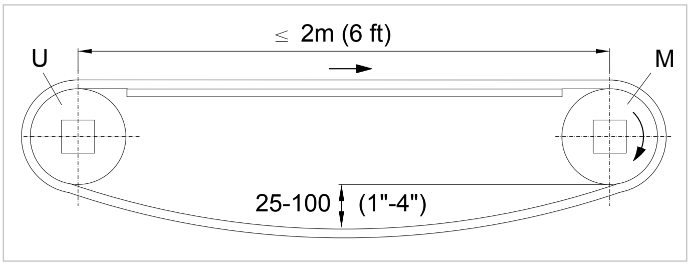


Figure 40

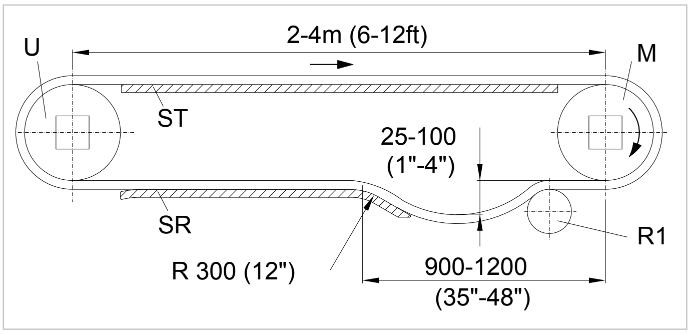


Figure 50

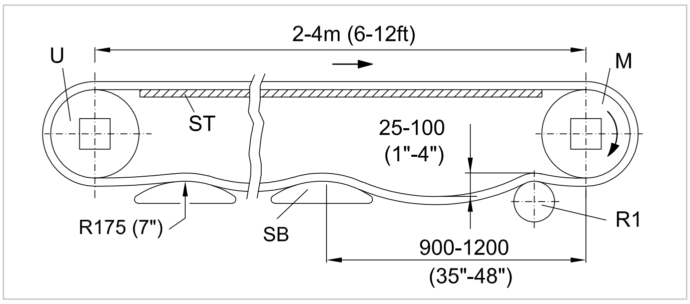


Figure 55

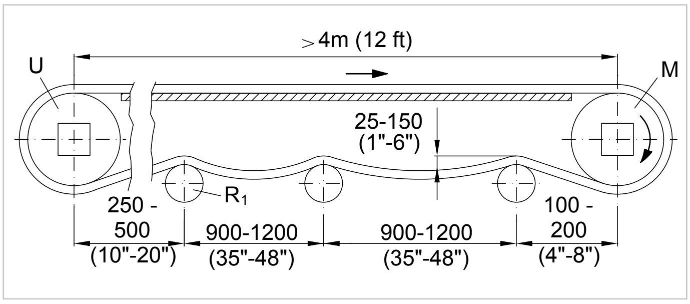


Figure 60

Design guide
Horizontal conveyors – basic design

Gravity take-up (Fig. 80)
If there is insufficient length for a catenary sag and/or for heavily loaded long belts and/or high speeds (over 50 m/min) and/or with frequent starts, the catenary sags may not sufficiently tension the belt to prevent sprockets from disengaging. In such cases gravity take-up (G) can be a solution.

The required gravity roller weight depends on the conveyor design. It must provide a small amount of belt tension at the position where the belt leaves the drive sprockets.

Gravity roller diameter
As a general rule, for belt pitches below *1.5*", a roller diameter (R_2 and R_3) of 100 mm *(4")* is required. For belts with pitches equal to or greater than *1.5*" a diameter of 150 mm *(6")* is recommended. For most belts the recommended diameter is indicated on the product data sheet.

Recommended tensioner weight for gravity rollers placed close to the drive sprockets:

Belt type	Tensioner weight per m *(ft)* belt width
For 0.3" belts	10 kg/m *(7 lb/ft)*
For 0.5" until 1" belts	15 kg/m *(10 lb/ft)*
For 1.3" until 2" belts	20 kg/m *(14 lb/ft)*
For 2.2" until 2.5" belts	25 kg/m *(17 lb/ft)*

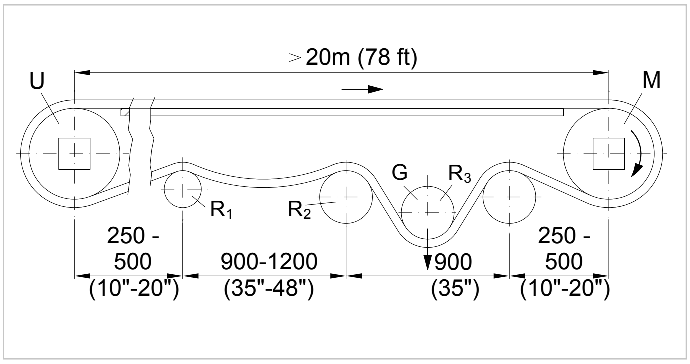


Figure 80

Roller supports
Roller return way supports are most often used for modular plastic belts. Rollers (R_1) can be made of heavy walled plastic, plastic covered steel, or steel. Plastic rollers are recommended when animal fats or vegetable oils are present. These two substances can cause the mill finish to be leached from steel rollers, leading to product contamination. Support roller have also an impact on the speed variation caused by the polygon effect. As bigger the diameter as smaller the impact. For smooth operation, the recommended minimum roller (R_1) diameter needs to be:
2" (50 mm) for a belt pitch less than *1*"
3" (76 mm) for a belt pitch from *1* to *1.5*"
4" (101 mm) for a belt pitch greater than *1.75*"
Multiply the diameter by 1.5 for curve-top belts

Caution: For safety reasons, adjustments to catenary sag or gravity take-up must be performed when the conveyor has stopped and the system controls have been securely locked out.

Adding or removing single module rows
Regardless of the return way design a conveyor builder chooses to use, it may be necessary to make length adjustments to the belt during initial installation or a break in operation. Removing rows of belt modules is required when the system can no longer accommodate excess belt. The addition of rows of belts may be required for cold temperature applications if provisions have not been made to counteract thermal contraction in belt length. Consult the chapter on effective belt length and width in the calculation section of this guide.

Design guide
Horizontal conveyors – basic design

Parallel shafts are essential for trouble-free straight conveying. Proper shaft alignment is confirmed by ensuring equal values for diagonal AD = BC (Fig. 90)

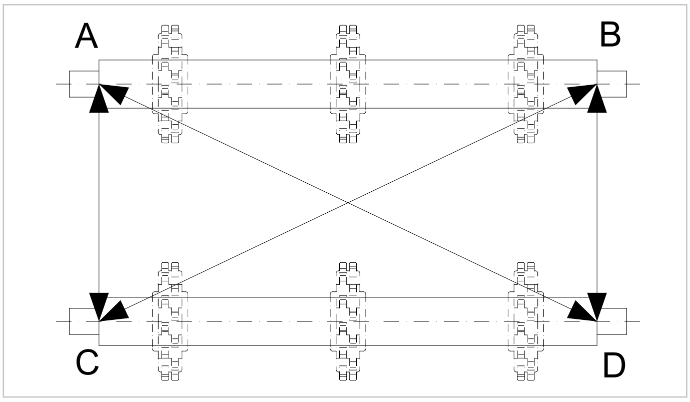


Figure 90

E = F (shaft must be horizontal). (Fig. 100)

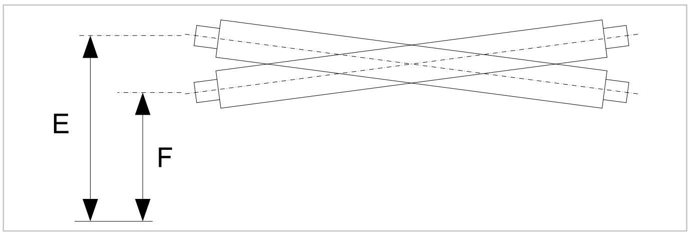


Figure 100

Tracking (Fig. 110)
The center-most locked sprocket on the drive and idle shaft must be located in the same lateral position A = B.

Exception: For the F50 Series the drive and idle sprockets are not placed in identical lateral shaft positions. Consult the Appendix, page 78.

Note: Intermediate idler shafts like those used on inclined “Z” conveyors should not use a locked center sprocket.

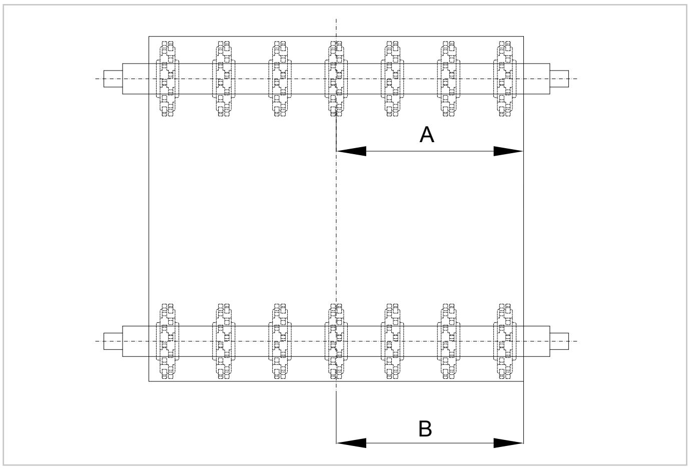


Figure 110

Tolerance on guiding profiles
Maintain a minimum gap between the belt and the guides. The tolerance on the outside belt edges to the guiding profile should not be above 2 to 3 mm (0.12"). (See figure 260 on page 33)

Design guide
Horizontal conveyors – drive concepts

Belt start and stop
For applications with a high belt velocity and/or high load it is recommended to install an electrically frequency converter for motor soft start and stop. For less stressful applications an electrically choke or a simple heavy cooling fan at electric motor tail shaft does improve the situation as well, optionally a clutch with soft torque transmission can be applied as well. These installations will preserve the belt and sprocket from shock loading and will increase their life time.

- **Uni-directional drive (Fig. 120)**
  One motor (M) at the conveyor end, pull action (driving sprockets are pulling the belt). Catenary sag (CA) only required at the drive end.

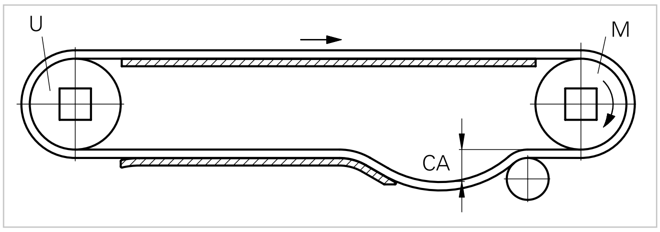


Figure 120

- **Lower head drive (Fig. 130)**
  For tight transfers with a nosebar or with small idling rollers the motor with the drive shaft can be arranged as illustrated. Catenary sag length must be approx. two times the belt in the drive configuration, transfer roller to snub roller. The angle of belt wrap at the sprockets must be approx. 200°. For further nosebar configurations see also page 56. For an optimized belt engagement the distance A must be approx. 1.5 times the belt thickness. The belt must not get squeezed betwen sprockets and roller.

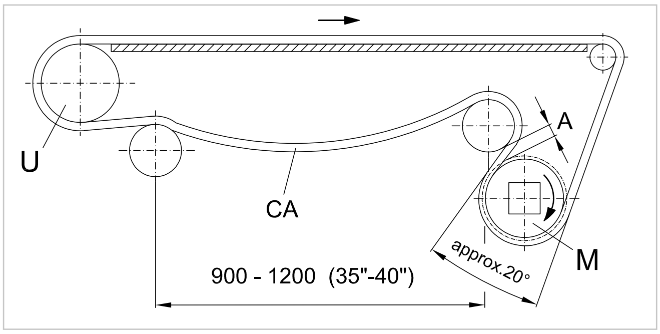


Figure 130

- **Bi-directional drive (no Fig.)**
  Two motors (M), one at each conveyor end. Only one motor is pulling, the other motor remains disengaged (clutch). Catenary sag (CA) at both conveyor ends.

- **Bi-directional center drive (Fig. 140)**
  Only one motor (M) is placed approx. in the middle of the belt return path. At the drive sprockets the angle of belt wrap must be approx. 200°. For an optimized belt engagement the distance A must be approx. 1.5 times the belt thickness. The belt must not get squeezed betwen sprockets and roller. For short conveyors, the belt return path can be designed longer by adding additional rollers below the transfer roller, or gravity take-up rollers may be used for positive sprocket engagement. Center drives are not recommended for radius applications.

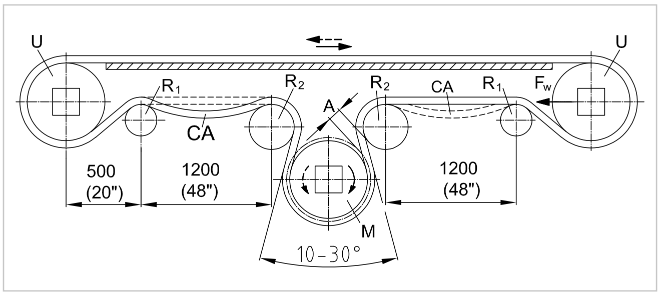


Figure 140

Since the driving force is applied on the return way of the belt, the shaft load will be two times the calculated belt pull:

$F_W = 2 \cdot F'_E$ (see also calculation guide page 58).

Bi-directional conveyor and pusher drive (push/pull action) (Fig. 150)
It is possible to apply one head drive motor for bi-directional reversible driving. Push-pull drives are recommended for short, slow and lightly loaded applications only.

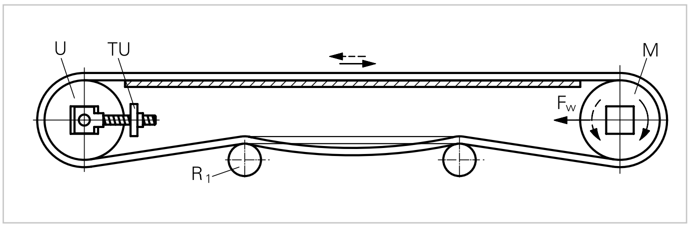


Figure 150

For reverse driving (push action = pusher drive), a screw type take-up (TU), or a spring or pneumatic tensioning device with 110% pretension of the expected belt load is recommended. The shaft load will increase to:

$F_W = 2.2 \cdot F'_E$ (see also calculation guide page 58).

Idle shaft pretension is equal F_W

In case of a bi-directional pusher drive with tensioning device, the shaft load can increase to:

$F_W = 3.2 \cdot F'_E$ (see also calculation guide page 58).

Design guide
Elevating conveyors

For the design of elevating conveyors, the following basic rules have to be considered:

M **The driving shaft** must be located at the top end of the conveyor or in a center-driven design.

ST **Slider supports** on the transport side with parallel, serpentine or chevron wear strips.

SR **Slider supports** are preferred. For the majority of elevating conveyor applications, flights and / or side guards are used. In these cases belt edge slider supports are necessary.

SF Belts with flights wider than 600 mm *(24")* have to be carried in the middle by a slider support strip (parallel or serpentine). (Figs. 155, 160, section X – X).

CA **Catenary sags** follow the same working principle as for horizontal belts, but in most cases are positioned at the lower end of the belt (see also page 28).

SH **Hold-down support shoes** are placed at the belt indents and for most belts the radius must be ≥ 150 mm *(6")*. Exceptions are:
HDS620; HDSVT620; HDSEZR620 → 250 mm *(10")*
HDSCT620 → 300 mm *(12")*
ST620; FF620; FF620-MC → 203 mm *(8")*
FF620-WR → 250 mm *(10")*
The radius should, however, be selected to be the largest possible. For belts equipped with side guards, the minimum shoe radius (backbending radius) has to be 250 mm *(10")*. Fluid flow requires a 609 mm *(24")* radius. Recommended minimum indents are 25 mm *(1")* for belts up to 300 mm *(12")* width, 42 mm *(1.5")* up to 450 mm *(18")* width, and 50 mm *(2")* for wider belts. For standard indents consult the product data sheets.

TU Since with inclined conveyors the catenary sag (**CA**) may be close to the floor, it is recommended to install a **screw or spring type take-up** belt tensioner (**TU**) at the lower conveyor end (idle shaft **U**). More information on the minimum roller diameter and backbending radius (hold-down and support shoes) is in the Appendix.

Example of a straight inclined conveyor (Fig. 155)

l_C 900 mm to 1200 mm *(35" to 48")*

SR For flighted belts the slider support on the return way can be equipped with wear strips at the belt edges (see Fig. 160 below, section X – X).

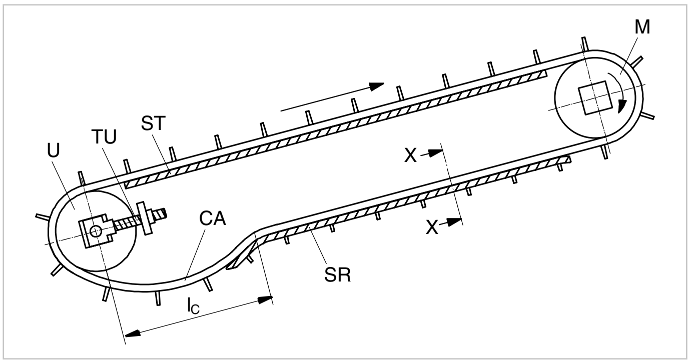


Figure 155

Example of a straight declined conveyor (Fig. 157)

α If the tangent of the decline angle **α** is larger than the coefficient of friction between belt and support the motor might be placed at upper side.

TU In order to compensate the belt elongation place a dynamic spring or cylinder loaded live roller at lower end. In case there is not sufficient space a gravity roller (Fig. 80) in return way close to idle shaft U can be used as well. But consider travel distance for the gravity roller.

SR For flighted belts the slider support on the return way can be equipped with wear strips at belt edges (see Fig. 160 below, section X-X).

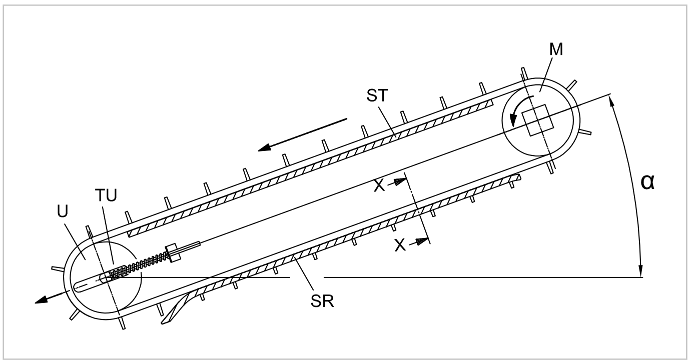


Figure 157

Example of inclined conveyor with horizontal end sections (Fig. 160)

l_C 900 mm to 1200 mm *(35" to 48")*
If the length of the horizontal section is longer than 1200 mm *(48")*, slider supports are recommended.

SR For flighted belts the slider support on the return way can be equipped with wear strips at the belt edges (see section X – X).

U Consider using wheels, a drum or scroll on the idle if the system is submerged in water or if debris is expected to be present between the belt and the sprockets.

UT To reduce system loading, excessive belt or carry way wear, Habasit recommends the use of sprockets, wheels or rollers at the upper transition point. If sprockets are used, all sprockets should float laterally on the shaft.

All transfer chutes, framework and drip pans must be clear of flights and sideguards. Internal rollers, shoes or wheels have a minimum diameter of 75 mm *(3")*.

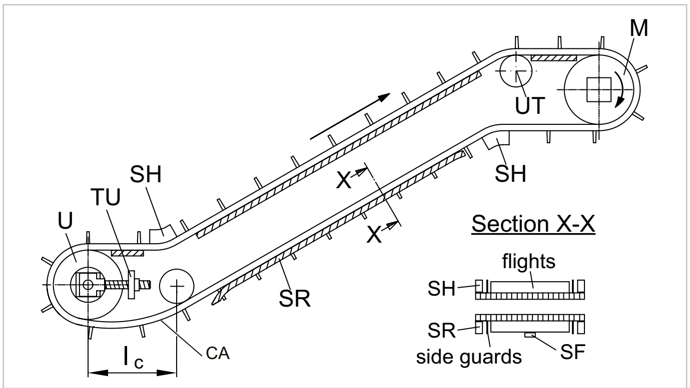


Figure 160

Backbending on elevators (Z-conveyors)
Elevators are usually equipped with flights. Therefore for backbending of Z-conveyors hold-down shoes (SH) or rollers are used at the belt edge only. A hold-down device in the center of the belt, acting from the top, is only possible by leaving a gap in the center of the flight row. In most cases this is not possible or not desirable. The belt tension creates lateral bending forces in the backbending area. Depending on the load and the stiffness of the belt, wide belts tend to buckle. Here are some solutions and recommendations:

a) Z-conveyors (Fig. 170)
The applicable belt width without hold-down device in the middle of the belt is limited. The limits depend on the following criteria:

- Length of belt before backbending
- Load on belt before backbending
- Type of belt (belt thickness, module length, lateral belt stiffness)
- Inclination angle α

Precise calculation of the allowable belt width is very complex. Therefore a simplified general rule for dimensioning and design of the conveyor frame is provided (see the table opposite).

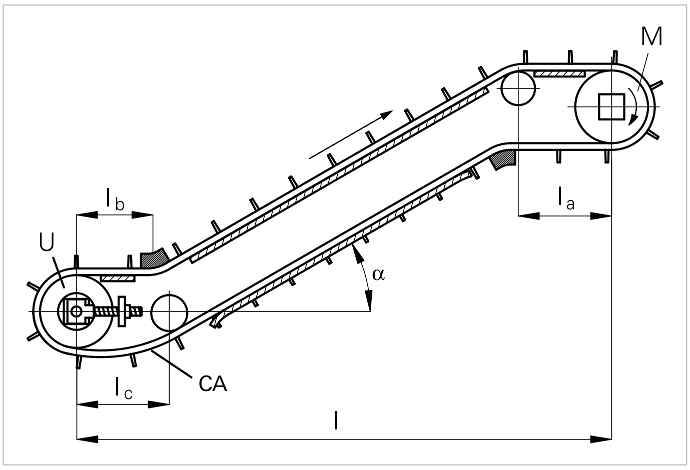


Figure 170

Keep section l_b as short as possible. Long straight section l_b will increase the forces in hold-down devices. For higher speeds please contact your Habasit representative.

b) Z-conveyors with center hold-down devices (Figs. 180 and 190)
Hold-down devices are available for *1*" and *2*" belts (see also the product data sheet).
For belts wider as specified in the table admissible belt deflection need minimum one track of hold down devices in the center. For wide belts larger than 2 m *(80")*, two tracks of hold-down devices, positioned at 1/3 and 2/3 of the belt width, are recommended.
For guides use steel strips. Min. backbending radius R = 500 mm *(20")*.

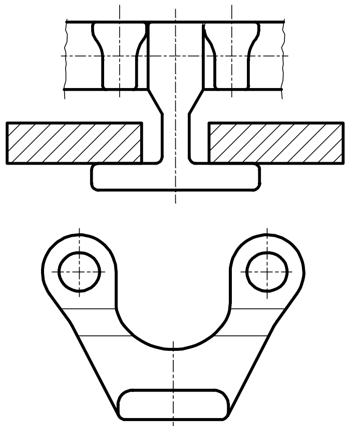


Figure 180

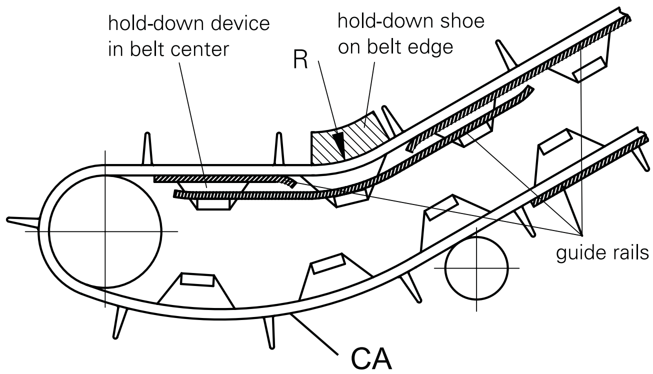


Figure 190

Admissible belt deflection

The following table considers an admissible deflection of 1% of max. belt width b_0 for POM and PP belts and 2% for PE belts:

Max belt width b_0 mm *(inch)* for speeds < 30 m/min	*2*" until *2.5*" belts		*1*" until *1.5*" belts				*0.5*" belts	
			M2520 and *1.5*" belts		Other *1*" belts			
Belt load	< 50%	50–100%	< 50%	50–100%	< 50%	50–100%	< 50%	50–100%
For inclination α < 50°								
l_b ≤ 800 mm *(32")* (possibly self-adjusting belt tensioner needed!)	1500 *59*	1000 *39*	1200 *47*	800 *32*	800 *32*	600 *24*	700 *28*	500 *20*
l_b = 800 to 2000 mm *(32" to 78")* (longer sect. l_b not recommended)	1200 *47*	800 *32*	1000 *39*	600 *24*	600 *24*	500 *16*	550 *22*	400 *16*
For inclination α ≥ 50°								
l_b ≤ 800 mm *(32")* (possibly self-adjusting belt tensioner needed!) (longer sect. l_b not recommended)	1050 *41*	700 *28*	850 *33*	550 *22*	550 *22*	400 *16*	500 *20*	350 *14*

Catenary sags for elevators

For proper engagement of the sprockets on the drive shaft (drive at discharge end), the belt must be kept under tension when it leaves the sprocket to the return side (back-tension). This can be achieved by a catenary sag of 900 to 1200 mm *(35" to 50")* in length. The position of the catenary sag depends on the inclination angle α, the friction value between the belt and return base, and the length of the horizontal sections.

If the inclination angle exceeds a certain value, the belt will slip on its base downwards towards the lower end. In this case the catenary sag needs to be installed at the lower belt end. This is the case for most inclined conveyors. It is possible to specifically calculate this critical point for every conveyor design. In most cases it may be sufficient to follow the rules below.

Catenary sag on the lower conveyor end

Condition A: Ic ≥ 900 mm *(35")* and la ≤ 900 mm *(35")* (must always be fulfilled)

Condition B:

Friction value μ_G	< 0.15	0.15–0.2	0.2–0.3
angle α	> 12°	> 16°	> 20°

In cases where l_c < 900 mm *(35")*, or the above conditions for inclination α cannot be maintained, no catenary sag on the lower end is recommended. In this case maintain la ≥ 900 mm *(35")* and place the catenary sag on the upper end.
For all other cases please contact your Habasit representative.

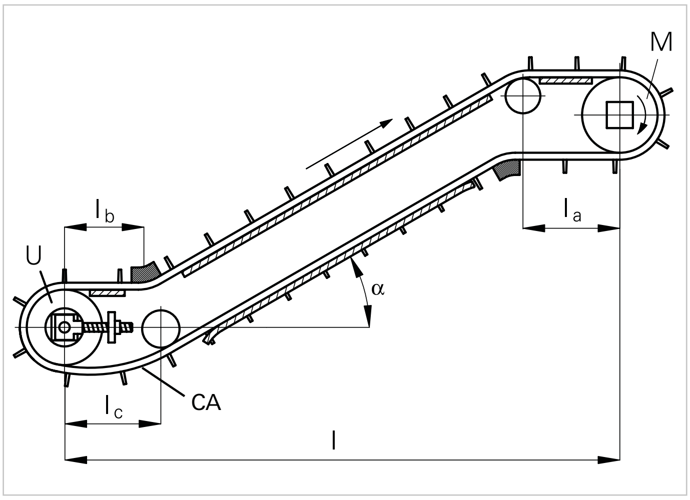


Figure 170: Standard concept: catenary sag on lower end

Elevators without catenary sag (Fig. 200)

On Z-conveyors catenary sags may not be accepted either on the upper or lower horizontal belt section. This may be due to lack of space under the bottom conveyor end, or if the horizontal sections are too short.

A tensioning device with fixed adjustment to the belt length is not acceptable, since wear and temperature variations cause the belt length to change. It is strongly recommended to use a self-adjusting tensioner device. This can be a soft spring type, gas-loaded spring, or pneumatic tensioner type.

The optimal layout of the spring or pneumatic cylinder depends on the belt type, conveyor width and temperature conditions. The minimum free movement of the tensioner must be at least 20% more than the calculated belt elongation between the lowest and highest process temperatures. Belt elongation due to abrasion should also be considered.

The force should be as low as possible, but high enough to overcome any friction forces on the belt on its return way, to straighten it and engage the sprockets safely. As a general rule the following tensioner force is recommended:

Belt type	Tensioner force per m *(ft)* of belt width
0.5" and 1" belts	150 N *(10 lbf)*
1.5" and 2" belts	300 N *(20 lbf)*
2.5" belts	350 N *(23 lbf)*

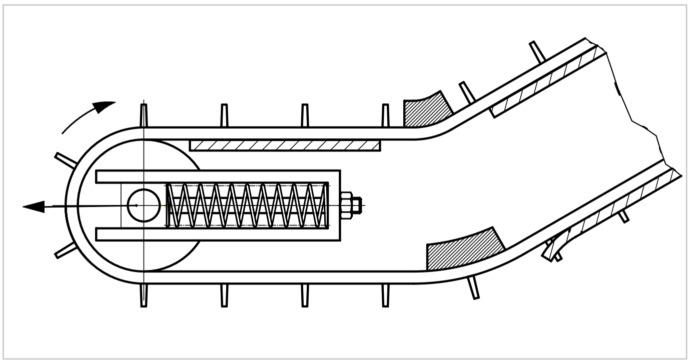


Figure 200

Design guide
Elevating conveyors / Roller top

Special case decline (Fig. 210)
For configuration with a decline transport and minus torque result (using LINK-SeleCalc) the drive motor can be placed at the upper end. A take-up unit providing slight dynamic tension at the tail shaft ensures proper belt operation with and without load.

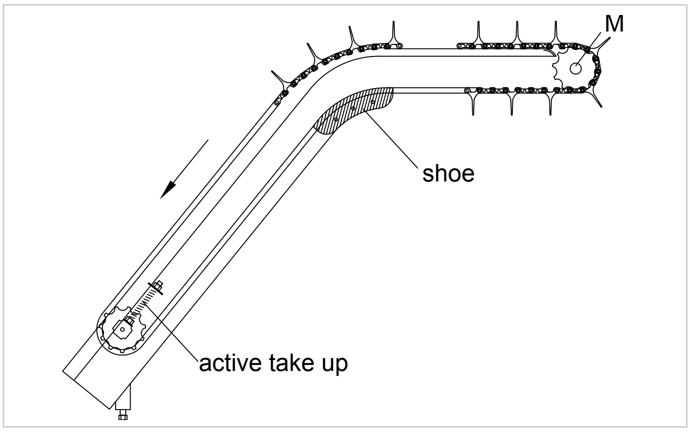


Figure 210

Roller top and low back pressure (LBP) belts
Roller top belts are available as a wide selection of straight and radius belts. Certain roller top belts have a standard roller top pattern (consult the product data sheet), others are designed to specific application requirements. Rollers can be configured into a belt using the retractable flight to provide product elevation and accumulation, all with one belt. When considering the use of a roller belt:

- Lateral roller spacing needs to provide room for sprocket engagement areas.
- The carry way support rails are positioned:
  - between the rollers for accumulation applications
  - underneath the rollers for accelerating the product along the belt surface
- Use shoes or wheels in the return way portion of straight and radius conveyors.
- Radius return way rails through curves are positioned to be in contact only with the plastic portion of the belt.

Design guide
Radius belts

The following information applies to all radius belts with the exception of tight radius belts RS511 and RS515. For these belts please contact Habasit application support for specific guidelines.

Basics (Fig. 235)
Radius belts create pressure against the guide on the inner side of the curve. At the same time they tend to lift off from the support on the curve outside. This tendency increases with rising tension, increasing speed, and increasing angle. Therefore the design of radius belts requires special attention to the following rules.

R The minimum inner curve radius R is defined by the collapse factor Q of a particular radius belt:

$R_{min} = Q \cdot b_0$

Q depends on the belt width, see the product data sheet.
For optimal running conditions, design the curves R of the conveyor near to the minimum radius.
Deviations of more than +0.3 of the collapse factor can lead to undesirable belt vibrations. Never go below the indicated collapse factor.

l_0 Proper tensioning of the belt in operation requires a catenary sag. For this reason the belt section l_0 behind the driving motor must be straight for a length of preferably 1.5 x belt width ($1.5 \cdot b_0$) with a minimum length of 1 m *(3 ft.)*. Place the longer straight section behind the driving motor instead of near the idling shaft to lower the belt forces in the curves. For different requirements please contact your Habasit representative.

l_1 A minimum straight section of 2 x belt width ($2 \cdot b_0$) is recommended between turns in opposite directions. An absolute minimum straight length of 1.5 x belt width is required. There is no minimum straight length between curves in the same direction.

l_2 At the belt end, near the idling shaft, a minimum straight length of 1.5 x belt width ($1.5 \cdot b_0$) is required.

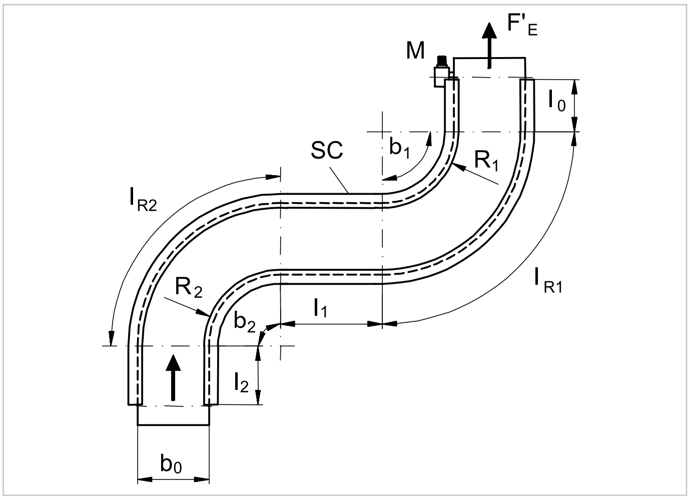


Figure 235

Direction of movement (Fig. 240)
Most Habasit radius belts are bi-directional. Exceptions are RS511, RS515, PR612 and PR620 belts that have a recommended direction of travel. For radius belts with one curve and for spirals, Habasit recommends installing the belts with the rod heads on the outside of the curve. For belt width 600 mm or wider and / or conveyor with more than one curve, rods installed from both belt edges are recommended. For further installation instructions please consult the installation guidelines.

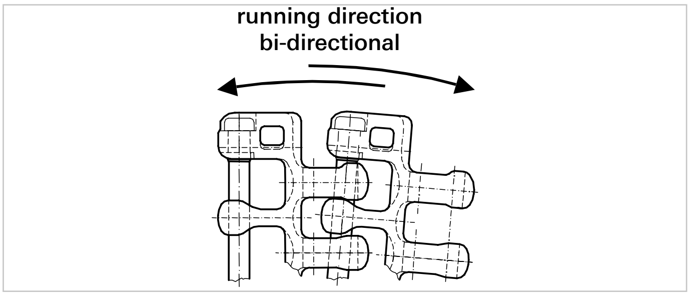


Figure 240

Design guide
Radius belts

Belt guides

Radius belts running around curves produce axial tension against the inner guide rail of the curve. Since conveyors usually cannot be built with very high geometrical accuracy, the belt may tend to flip at high loads or angles > 90°. The inner edge of the belt may move upwards due to axial tension against the guide rail and slip off. For this reason hold-down edge guides must be used for the inside and outside guides of a curve. If the product is larger than the belt width or if side transfer over the belt edge is required, hold-down modules or side tabs are used instead of hold-down guides. For availability see the product data sheets.

Standard application (hold-down wear strips) (Fig. 250)

If no side transfer is required, L-shaped hold-down edge guides can be used. For safety reasons (danger of injuries at the end of the profile) it is advisable to apply this profile uninterrupted over the complete belt length. The material used for edge guides needs to be low friction in contact with the particular belt material. Generally, PE-UHMW is recommended. On the return way, hold-down tabs are needed as well. An economic solution is shown on the illustration opposite (Fig. 260). For belts wider than 600 mm, hold-down edge guides or two hold-down tabs near the edges should be used.

Tolerance on guiding profiles

Maintain the minimum gap between the belt and the guides. While the radius belt is running in the curve section, lateral tolerance to the inner guiding profile will turn to zero. **The tolerance on the outside belt edge to the guiding profile should not be above the indicated figure of 2 to 3 mm *(0.12")*.**

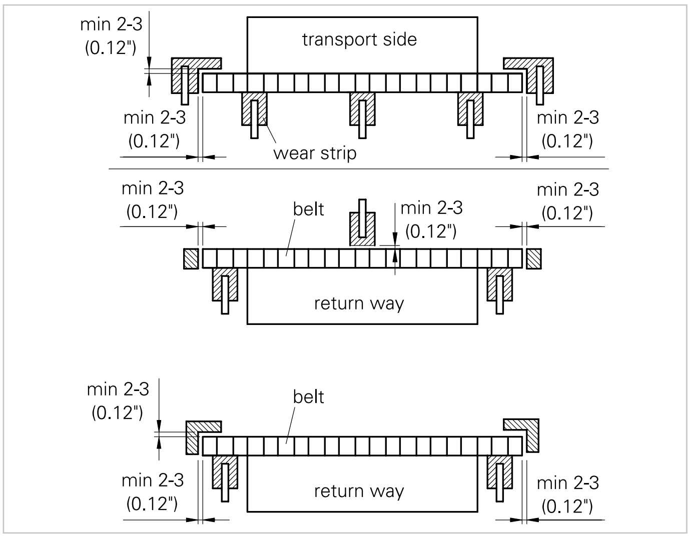


Figure 250: Hold-down guides for a belt with flights. Belts without flights follow the same design.

Belts for protruding products (Figs. 260, 280 and 290)

Belts with hold-down tabs, side tabs or a raised deck can be used for all applications where products must be moved transversally across the belt edge (side transfer) and in cases where the product is wider than the belt itself. For applications with side guards, belts with hold-down tabs may be possible (see the product data sheet); belts with side tabs or a raised deck are not applicable.

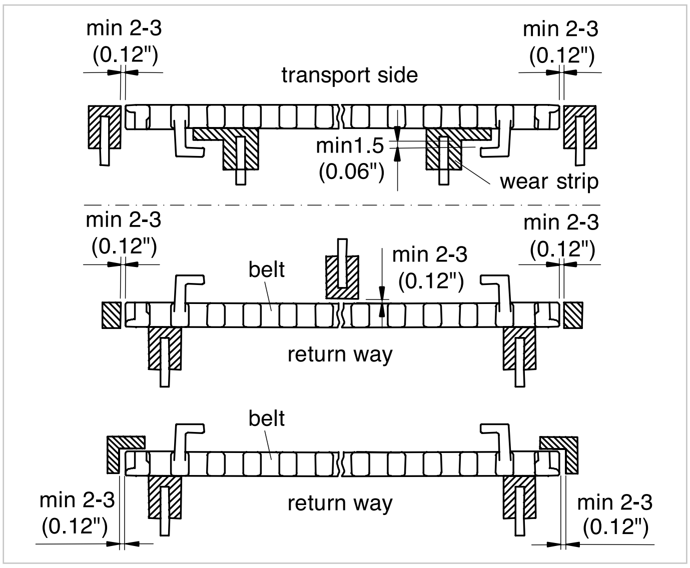


Figure 260

Combinations

Depending on the requirements, it is possible to combine the wear strip hold-down profile on the inside radius and hold-down tab modules on the outside radius.

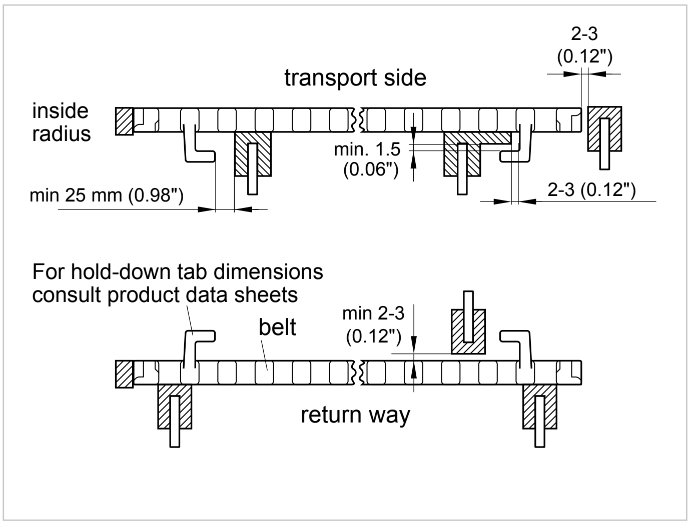


Figure 270

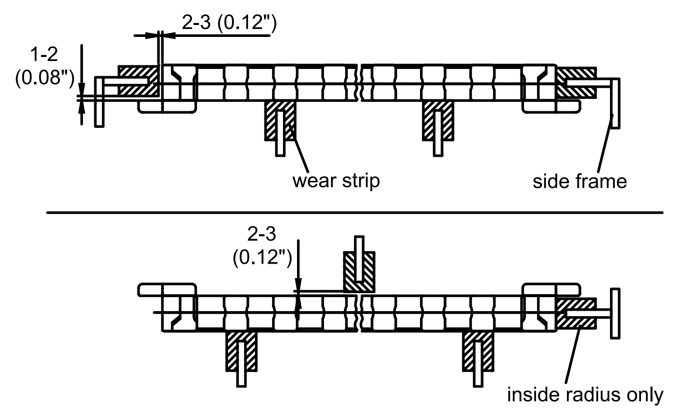


Figure 280 M3843-V00

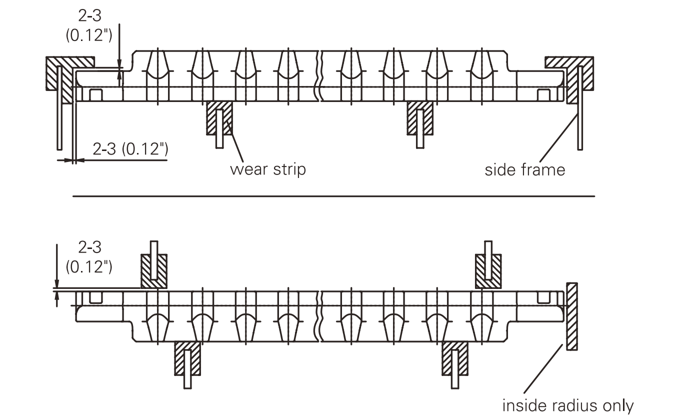


Figure 290 M3892

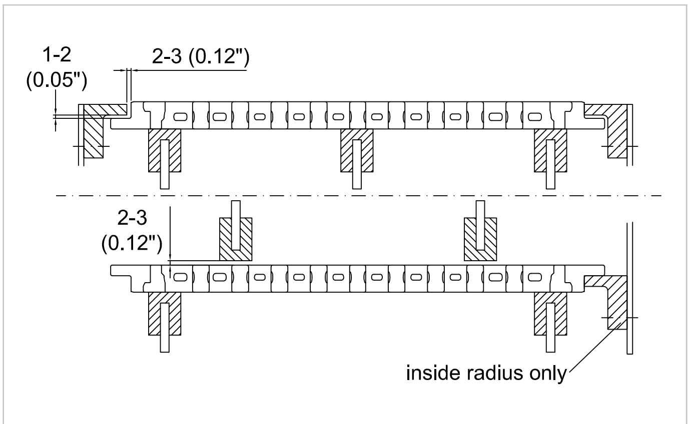


Figure 295 M2544

Note

The primary function of the hold-down or side tabs is to act as a safety device that prevents the belt from lifting at the outside and inside of the curve when conditions cause the allowable belt pulls to be exceeded. In general, they should not be used for radial guidance or to guide the belt on its carry or return way.

High speed applications

For speeds > 40 m/min Habasit recommends using lubricated low friction materials for radius inside guides. See table "Material Combination" on page 18.

Design aspects for reducing belt tension

Simple modifications to conveyor design can have a dramatic affect on reducing belt tension. Consideration should be given to the following:

- Minimize the length of the first straight section before the curve. A shorter straight section before the first curve can significantly reduce the load forces on the belt through the curve.
- Reduce the angle of the curves.
- Use an inside turn radius equal to the recommended minimum for the chosen belt series and width.
- Use the inside belt edge to guide the belt through the turn. Never use the belt hold-down tab feature.
- Use a roller return in all straight sections.
- Use a lubricated wear strip material on the inside radius (check food approval).

NOTE: A lubricated wear strip should not be used when operating temperatures are below 5° C *(50° F)*; or where dust, flour or grit is present.

- Increase the conveyor operating speed to reduce belt load while maintaining the required throughput. Be cautious since higher speed causes heat generation thereby increasing friction and accelerated wear.
- Split long, multi-turn systems into two or more conveyors, each with a separate belt and drive system.
- Use multiple belt strands instead of one wide belt. This may not be an acceptable alternative if product orientation is critical.
- Lubricate the wear strip. A food grade silicone lubricant can be effective in reducing belt pull. However, note that lubricants can attract environmental contaminants that increase friction and sanitation concerns.

Design guide
Spiral conveyors

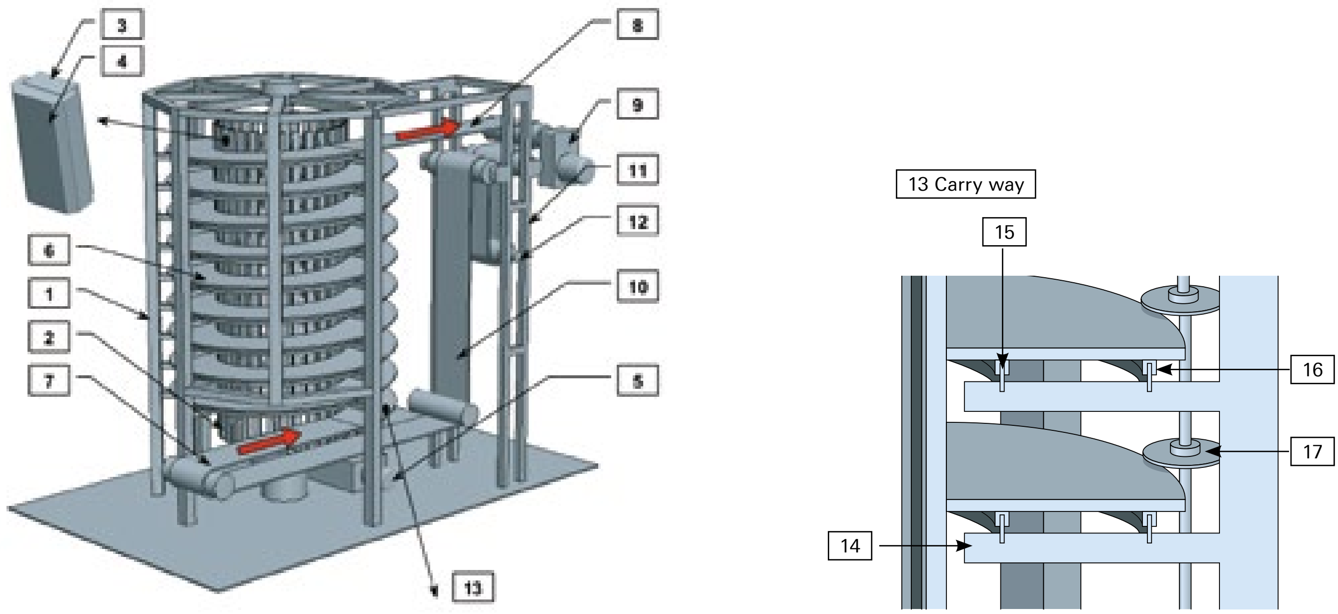
Habasit radius belts are very suitable for applications with spiral conveyors. The most typical processes are proofing, drying, cooling and freezing. Spiral conveyors permit processing within a reduced space, and make use of the available height of the building. Spiral conveyors are very specialized equipment and require particular application know-how.

The following illustration and explanations offer a general overview of the design principles of spiral conveyors. For design recommendations please contact one of Habasit's spiral specialists.

Compared to steel, plastic modular belts offer the following advantages:

- Less sticking of conveyed goods
- Lower belt weight, lighter construction
- Reduced coefficient of friction between belt and cage
- Lower power consumption
- Better cleaning, no blackening
- Less ice formation
- Lower maintenance costs

Side view of a typical spiral conveyor



1 Structure assembled with columns and beams
2 Drum or cage
3 Cage bars
4 Cage bar cap (Fig. 520)
5 Drum drive (or cage drive or primary drive)
6 Radius belt
7 In-run
8 Out-run
9 Belt drive (Take-up drive)
10 Return path
11 Take-up and Take-up tower
12 Dancer roller
13 Carry way
14 Beam
15 Wear strip support
16 Wear strip
17 Flip-up detection devices

For up-going spirals it is recommended to use belt flip-up sensors on the outer belt edge to monitor the proper belt function. Hold down rails are generally recommended at the inner belt edge for down-going spirals.

Spirals must be cleaned regularly in order to provide proper functioning.

Please contact Habasit for further information.

Design guide
Sprocket evaluation

Dimensional requirements for installation
The A1 and A0 values are indicated for lab measured belt pitch distance.

General note: For sprockets with teeth >36 the admissble strengts is reduced.

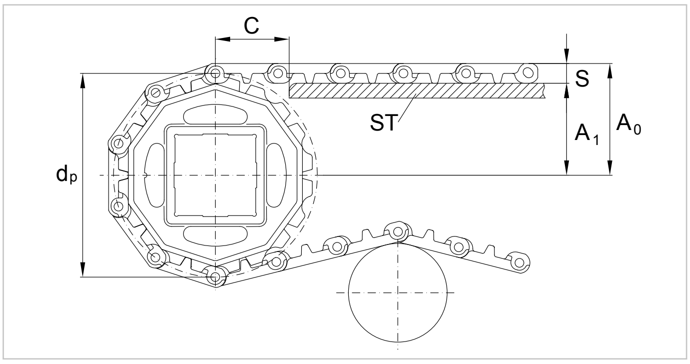


Figure 300

Belt pitch, sprocket type	Number of teeth	Polygon effect	Pitch Ø dp		A1 +1 mm/ -0 mm (effective)		A0 +1 mm/ -0 mm (effective)													
			mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*
0.3"							M0870 /73/76		M0863 M0863K03											
M08S18	18	1.50%	46.5	*1.83*	21	*0,83*	27	*1,06*	28,1	1,11										
M08S24	24	0.90%	61.8	*2.43*	28,8	*1,13*	34,8	*1,37*	35,9	1,41										
M08S34	34	0.40%	87.5	*3.44*	42	*1,65*	47,9	*1,89*	49	1,93										
M08S36	36	0.40%	92.6	*3.65*	44,5	*1,75*	50,5	*1,99*	51,6	2,03										
0.3" K02							M0863K02													
M08S18	18	1.50%	46.5	*1.83*	21	*0,83*	28,1	*1,11*												
M08S	24	0.90%	61.8	*2.43*	28,8	*1,13*	35,9	*1,41*												
0.5"							M1065													
M10S10	10	4.90%	41,1	*1,62*	17,5	*0,69*	25,5	*1,00*												
M10S12	12	3.40%	49,1	*1,93*	21,5	*0,85*	29,5	*1,16*												
M10S15	15	2.20%	61,1	*2,40*	27,7	*1,09*	35,7	*1,41*												
M10S20	20	1.20%	81,2	*3,20*	37,9	*1,49*	45,9	*1,81*												
M10S24	24	0.90%	97,3	*3,82*	46,1	*1,81*	54,1	*2,13*												
M10S28	28	0.60%	113,4	*4,47*	54,2	*2,13*	62,2	*2,45*												
M10S36	36	0.40%	145,7	*5,74*	70,7	*2,78*	78,7	*3,10*												
0.5"							M1185													
M11S12	12	3.40%	49.8	*1.96*	22,2	*0,87*	29,2	*1,15*												
M11S14	14	2.50%	58	*2.28*	26,4	*1,04*	33,4	*1,31*												
M11S17	17	1.70%	70.2	*2.76*	32,6	*1,28*	39,6	*1,56*												
M11S19	19	1.40%	78.4	*3.09*	36,8	*1,45*	43,8	*1,72*												
M11S24	24	0.90%	98.8	*3.89*	47,2	*1,86*	54,2	*2,13*												
M11S36	36	0.40%	148	*5.83*	72,3	*2,85*	79,3	*3,12*												
0.5"							M1220 M1230 / 33		M1220 GT		M1220 HG		M1234		M1280		M1250			
M12S10	10	4.90%	41.2	*1.62*	16,8	*0,66*	26,8	*1,06*	29,3	*1,15*	28,8	*1,13*	28,3	*1,11*	25,5	1,00	27,7	1,09		
M12S12	12	3.40%	49.6	*1.95*	21,1	*0,83*	31,1	*1,22*	33,6	*1,32*	33,1	*1,30*	32,6	*1,28*	30	1,17	32,0	1,26		
M12S15	15	2.20%	62.4	*2.46*	27,6	*1,09*	37,6	*1,48*	40,1	*1,58*	39,6	*1,6*	39,1	*1,5*	36,3	1,43	38,5	1,51		
M12S19	19	1.40%	78.7	*3.1*	35,9	*1,41*	45,9	*1,81*	48,4	*1,91*	47,9	*1,89*	47,4	*1,87*	44,60	1,76	46,8	1,84		
M12S24	24	0.90%	99.2	*3.91*	46,4	*1,83*	56,4	*2,22*	58,9	*2,32*	58,4	*2,30*	57,9	*2,28*	55,1	2,17	57,3	2,25		
M12S28	28	0.60%	116.5	*4.59*	55,2	*2,17*	65,2	*2,57*	67,7	*2,67*	67,2	*2,65*	66,7	*2,63*	63,90	2,52	66,1	2,60		
M12S32	32	0.50%	133	*5.24*	64	*2,50*	74	*2,90*	76,1	*3,00*	75,6	*2,98*	75,1	*2,96*	72,3	2,85	74,5	2,93		
M12S36	36	0.40%	149.8	*5.9*	72,2	*2,84*	82,2	*3,24*	84,7	*3,33*	84,2	*3,31*	83,7	*3,30*	80,9	3,19	83,1	3,27		

Design guide
Sprocket evaluation

Belt pitch, sprocket type	Number of teeth	Polygon effect	Pitch Ø dp		A1 +1 mm/ -0 mm (effective)		A0 +1 mm/ -0 mm (effective)														
			mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*
0.5"							**M1960**													
M19S10-CS	10	4,90 %	41,3	*1,62*	17,8	*0,70*	25,8	*1,02*												
M19S12-CS	12	3,40 %	49,3	*1,94*	21,9	*0,86*	29,9	*1,18*												
M19S15-CS	15	2,20 %	61,3	*2,41*	28,0	*1,10*	36,0	*1,41*												
M19S19-CS	19	1,40 %	77,5	*3,05*	36,2	*1,43*	44,2	*1,74*												
M19S24-CS	24	0,90 %	97,7	*3,85*	46,2	*1,82*	54,2	*2,13*												
M19S28-CS	28	0,60 %	113,9	*4,48*	54,7	*2,15*	62,7	*2,47*												
M19S32-CS	32	0,50 %	130,1	*5,12*	62,9	*2,48*	70,9	*2,79*												
M19S36-CS	36	0,40 %	146,3	*5,76*	71,2	*2,80*	79,2	*3,11*												
0.5"							**SM605**		**CM605**											
70512M	12	3.60%	48	*1.9*	20	*0.8*	28	*1.1*	29	*1.14*										
70515M	15	2.20%	61	*2.4*	27	*1.05*	34	*1.35*	35	*1.39*										
70519	19	1.40%	77	*3.02*	35	*1.37*	42	*1.67*	43	*1.71*										
70524M	24	0.90%	99	*3.9*	46	*1.8*	53	*2.1*	54	*2.14*										
70528	28	0.70%	114	*4.47*	53	*2.09*	61	*2.39*	62	*2.43*										
70536M	36	0.40%	147	*5.8*	70	*2.75*	77	*3.05*	78	*3.09*										
0.5"							**HDS605 FT HDS605 TT**													
HDS70512	12	3.50%	49	*1.93*	20	*0.79*	28	*1.1*												
HDS70515	15	2.20%	61	*2.4*	26	*1.02*	34	*1.33*												
HDS70520	20	1.30%	81	*3.2*	36	*1.42*	44	*1.73*												
HDS70536	36	0.40%	146	*5.74*	68	*2.69*	76	*3*												
0.75"							**106 FT / 10%/22%**		**106 RT**											
SB106PEU7	7	9.90%	44	*1.73*	18	*0.7*	26	*1.03*	27.5	*1.09*										
SB106PEU10	10	4.90%	62	*2.43*	27	*1.05*	35	*1.38*	36.5	*1.44*										
SB106PEU14	14	2.50%	86	*3.37*	39	*1.52*	47	*1.85*	48.5	*1.91*										
SB106PEU16	16	2.00%	98	*3.84*	44	*1.75*	53	*2.08*	54.5	*2.14*										
SB106PEU24	24	0.90%	146	*5.75*	69	*2.71*	77	*3.04*	78.5	*3.1*										
SB106PEU25	25	0.80%	152	*5.98*	72	*2.82*	80	*3.15*	81.5	*3.21*										
1"							**M2420 M2470/72 M2480**		**M2470 GT**		**M2423**									
M24S12	12	3.40%	99.5	*3.92*	46,5	*1,83*	55,2	*2,17*	58,7	*2,31*	56,4	2,22								
M24S15	15	2.20%	123.9	*4.88*	58,9	*2,32*	67,6	*2,66*	71,1	*2,80*	68,8	2,71								
M24S18	18	1.50%	148.3	*5.84*	71,3	*2,81*	80,0	*3,15*	83,5	*3,29*	81,2	3,20								
M24S20	20	1.20%	164.6	*6.48*	79,6	*3,13*	88,3	*3,48*	91,8	*3,61*	89,5	3,52								
M24S21	21	1,10 %	172,8	*6,80*	83,7	*3,30*	92,4	*3,64*	95,9	*3,78*	93,6	3,69								
1"							**M2510 / 11 M2516**		**M2514**		**M2520 M2533**		**M2520 RT M2533 RT**		**M2520/ 33 GT**		**M2531**		**M2527**	
M25S07	7	9.90%	59.4	*2.34*	25,5	*1,00*	36,5	*1,44*	38,5	*1,52*	35,5	*1,40*	39,5	*1,56*	39,5	*1,56*	41,5	*1,6*	40,3	*1,59*
M25S08	8	7.60%	66.7	*2.63*	29,3	*1,15*	40,3	*1,59*	42,3	*1,67*	39,3	*1,55*	43,3	*1,70*	43,3	*1,70*	45,3	*1,78*	44,1	*1,7*
M25S10	10	4.90%	82.5	*3.25*	37,3	*1,47*	48,3	*1,90*	50,3	*1,98*	47,3	*1,86*	51,3	*2,02*	51,3	*2,02*	53,3	*2,10*	52,1	*2,05*
M25S12	12	3.40%	98.5	*3.88*	45,4	*1,79*	56,4	*2,22*	58,4	*2,30*	55,4	*2,18*	59,4	*2,34*	59,4	*2,34*	61,4	*2,42*	60,2	*2,37*
M25S15	15	2.20%	122.7	*4.83*	57,8	*2,28*	68,8	*2,71*	70,8	*2,79*	67,8	*2,67*	71,8	*2,83*	71,8	*2,83*	73,8	*2,91*	72,6	*2,9*
M25S16	16	1.90%	130.7	*5.15*	61,9	*2,44*	72,9	*2,87*	74,9	*2,95*	71,9	*2,83*	75,9	*2,99*	75,9	*2,99*	77,9	*3,07*	76,7	*3,02*
M25S18	18	1.50%	146.9	*5.78*	70,1	*2,76*	81,1	*3,19*	83,1	*3,27*	80,1	*3,15*	84,1	*3,31*	84,1	*3,31*	86,1	*3,39*	84,9	*3,34*
M25S20	20	1.20%	163	*6.42*	78,3	*3,08*	89,3	*3,52*	91,3	*3,59*	88,3	*3,48*	92,3	*3,63*	92,3	*3,63*	94,3	*3,71*	93,1	*3,67*
M25S21	21	1.10%	171.1	*6.74*	82,5	*3,25*	93,5	*3,7*	95,5	*3,76*	92,5	*3,64*	96,5	*3,80*	96,5	*3,80*	98,5	*3,9*	97,3	*3,83*

Design guide
Sprocket evaluation

Belt pitch, sprocket type	Number of teeth	Polygon effect	Pitch Ø dp		A1 +1 mm/ -0 mm (effective)		A0 +1 mm/ -0 mm (effective)													
			mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
1" ST							M2520 ST M2533 ST													
M25S10	10	4.90%	83,8	3,30	38,0	1,50	48,0	1,89												
M25S12	12	3.40%	100,0	3,94	46,3	1,82	56,3	2,22												
M25S18	18	1.50%	149,2	5,87	71,4	2,81	81,4	3,20												
M25S20	20	1.20%	165,6	6,52	79,7	3,14	89,7	3,53												
1" Radius							M2540		M2540 RT		M2540 GT		M2544		M2544 GT					
M25S07	7	9.90%	59.4	2.34												1,69				
M25S08	8	7.60%	66.7	2.63	29,3	1,15	40,3	1,59	42,1	1,66	45,1	1,78	42,0	1,65	46,8	1,84				
M25S10	10	4.90%	82.5	3.25	37,3	1,47	48,3	1,90	50,1	1,97	53,1	2,09	50	1,97	54,8	2,16				
M25S12	12	3.40%	98.6	3.88	45,4	1,79	56,4	2,22	58,2	2,29	61,2	2,41	58	2,29	62,9	2,48				
M25S15	15	2.20%	122.7	4.83	57,8	2,28	68,8	2,71	70,6	2,78	73,6	2,90	70,5	2,78	75,3	2,96				
M25S16	16	1.90%	130.8	5.15	61,9	2,44	72,9	2,87	74,7	2,94	77,7	3	74,6	2,94	79,4	3,13				
M25S18	18	1.50%	146.9	5.78	70,1	2,76	81,1	3,19	82,9	3,3	85,9	3,38	82,8	3,26	87,6	3,45				
M25S20	20	1.20%	163	6.42	78,3	3,08	89,3	3,52	91,1	3,59	94,1	3,70	91,0	3,58	95,8	3,77				
M25S21	21	1.10%	171.1	6.74	82,5	3,25	93,5	3,7	95,3	3,75	98,3	3,87	95,2	3,75	100	3,94				
1"							M2585-PO M2585-SO		M2586											
M25S07-C2	7	9.90%	59.6	2.35	25,2	0,99	36,2	1,43	42,2	1,66										
M25S08-C2	8	7.60%	67.7	2.67	29,3	1,15	40,3	1,59	46,3	1,82										
M25S10-C2	10	4.90%	83.8	3.3	37,5	1,48	48,5	1,91	54,5	2,15										
M25S12-C2	12	3.40%	100	3.94	45,8	1,80	56,8	2,24	62,8	2,47										
M25S15-C2	15	2.20%	124.5	4.9	58,3	2,30	69,3	2,73	75,3	2,96										
M25S16-C2	16	1.90%	132.8	5.23	62,5	2,46	73,5	2,89	79,5	3,13										
M25S18-C2	18	1.50%	149.1	5.87	70,8	2,79	81,8	3,22	87,8	3,46										
M25S20-C2	20	1.20%	165.5	6.52	79,2	3,12	90,2	3,55	96,2	3,79										
M25S21-C2	21	1.10%	173.7	6.84	83,4	3,28	94,4	3,72	100,4	3,95										
1"							M2620/70		M2620 GT		M2670 GT		M2620 RT		M2623					
M26S12	12	3.40%	99.1	3.9	44,5	1,75	57,2	2,3	59,7	2,35	61,2	2,41	71,7	2,82	58,4	2,30				
M26S13	13	2.90%	107.2	4.22	48,6	1,91	61	2,41	63,8	2,51	65	2,57	75,8	2,98	62,5	2,46				
M26S14	14	2.50%	115.3	4.54	52,7	2,07	65	2,57	67,9	2,67	69	2,73	79,9	3,15	66,6	2,62				
M26S15	15	2.20%	123.4	4.86	55,4	2,18	68,1	2,68	70,6	2,78	72,1	2,84	82,6	3,25	69,3	2,73				
M26S16	16	1.90%	131.5	5.18	61,0	2,40	73,7	2,90	76,2	3,00	77,7	3,06	88,2	3,47	74,9	2,95				
M26S17	17	1.70%	139.6	5.5	65,1	2,56	77,8	3,06	80,3	3,16	81,8	3,22	92,3	3,63	79,0	3,11				
M26S18	18	1.50%	147.7	5.81	69,3	2,73	82,0	3,23	84,5	3,33	86,0	3,39	96,5	3,80	83,2	3,28				
M26S19	19	1.40%	155.8	6.13	73,4	2,89	86,1	3,39	88,6	3,49	90,1	3,55	100,6	3,96	87,3	3,44				
M26S20	20	1.20%	164	6.46	77,3	3,04	90,0	3,54	92,5	3,64	94,0	3,70	104,5	4,11	91,2	3,59				
M26S21	21	1.10%	172.1	6.78	81,7	3,22	94,4	3,72	96,9	3,81	98,4	3,87	108,9	4,29	95,6	3,76				
M26S22	22	1.00%	180.2	7.09	85,9	3,38	98,6	3,88	101,1	3,98	102,6	4,04	113,1	4,45	99,8	3,93				
M26S23	23	0.90%	188.4	7.42	90,0	3,54	102,7	4,04	105,2	4,14	106,7	4,20	117,2	4,61	103,9	4,09				

Design guide
Sprocket evaluation

Belt pitch, sprocket type	Number of teeth	Polygon effect	Pitch Ø dp		A1 +1 mm/ -0 mm (effective)		A0 +1 mm/ -0 mm (effective)													
			mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*
1" Radius							M2791													
M27S12	12	3.40 %	98.7	*3.89*	44,3	*1,74*	57,0	*2,24*												
M27S18	18	1.60 %	147.1	*5.79*	69,0	*2,72*	81,7	*3,22*												
1"							M2960													
M29S10	10	4,90 %	83,5	*3,29*	37,6	*1,48*	48,6	*1,91*												
M29S12	12	3,40 %	99,7	*3,92*	45,8	*1,80*	56,8	*2,24*												
M29S15	15	2,20 %	124,1	*4,89*	58,3	*2,29*	69,3	*2,73*												
M29S18	18	1,50 %	148,6	*5,85*	70,8	*2,79*	81,8	*3,22*												
M29S20	20	1,20 %	164,9	*6,49*	79,1	*3,11*	90,1	*3,55*												
M29S24	24	0,90 %	197,7	*7,78*	95,8	*3,77*	106,8	*4,21*												
M29S28	28	0,60 %	230,4	*9,07*	112,5	*4,43*	123,5	*4,86*												
71007M	7	9.80 %	59	*2.31*	24	*0.95*	35	*1.36*												
71009M	9	6.10 %	74	*2.92*	32	*1.25*	42	*1.66*												
71012M	12	3.50 %	98	*3.87*	44	*1.73*	54	*2.14*												
71015M	15	2.20 %	122	*4.81*	56	*2.2*	66	*2.61*												
SP71018	18	1.60 %	147	*5.8*	68	*2.69*	79	*3.1*												
SP71019	19	1.30 %	162	*6.38*	72	*2.83*	82	*3.24*												
SP71030	30	0.60 %	242	*9.54*	116	*4.56*	126	*4.97*												
1"							HDS610 FT		HDS610 CVT											
HDS71007	7	9.80 %	59	*2.3*	24	*0.95*	35	*1.36*	36	*1.43*										
HDS71009	9	6.10 %	74	*2.92*	32	*1.26*	42	*1.67*	44	*1.74*										
HDS71012	12	3.50 %	98	*3.86*	44	*1.73*	54	*2.14*	56	*2.21*										
HDS71015	15	2.20 %	122	*4.81*	56	*2.2*	66	*2.61*	68	*2.68*										
HDS71018	18	1.60 %	146	*5.76*	68	*2.67*	78	*3.08*	80	*3.15*										
1"							208 FT 208 35 %		208 RR											
SB208PEU6	6	13.30 %	51	*2*	21	*0.83*	30	*1.18*	35.3	*1.39*										
SB208PEU9	9	6.10 %	74	*2.92*	33	*1.29*	42	*1.64*	47.3	*1.85*										
SB208PEU10	10	5.00 %	82	*3.24*	37	*1.45*	46	*1.8*	51.3	*2.01*										
SB208PEU12	12	3.50 %	98	*3.86*	45	*1.76*	56	*2.2*	61.3	*2.41*										
SB208PEU18	18	1.60 %	146	*5.76*	69	*2.71*	78	*3.06*	83.3	*3.27*										
SB208PEU19	19	1.40 %	154	*6.08*	73	*2.87*	82	*3.22*	87.3	*3.43*										
SB208PEU20	20	1.30 %	162	*6.39*	77	*3.03*	86	*3.38*	91.3	*3.59*										
1"							MB610													
MB71012	12	3.50 %	98	*3.86*	43	*1.68*	55	*2.18*												
MB71016	16	2.00 %	130	*5.12*	59	*2.31*	71	*2.81*												
MB71018	18	1.60 %	146	*5.76*	67	*2.63*	80	*3.13*												
MB71021	21	1.20 %	170	*6.71*	79	*3.1*	91	*3.6*												
MB71031	31	0.60 %	251	*9.89*	119	*4.69*	132	*5.19*												
1" Radius							IS610		CT610		IS610 GT									
71007M	7	9.80 %	59	*2.31*	25	*0.87*	34	*1.34*	36	*1.43*	37.3	*1.48*								
71009M	9	6.10 %	74	*2.92*	32	*1.27*	42	*1.65*	44	*1.74*	45.3	*1.79*								
71012M	12	3.50 %	98	*3.87*	44	*1.75*	54	*2.12*	56	*2.21*	57.3	*2.26*								
71015M	15	2.20 %	122	*4.81*	56	*2.22*	66	*2.59*	68	*2.68*	69.3	*2.73*								
SP71018	18	1.60 %	147	*5.8*	69	*2.71*	78	*3.09*	81	*3.18*	81.3	3.23								
SP71019	19	1.40 %	154	*6.08*	72	*2.85*	82	*3.23*	84	*3.32*	85.3	3.37								
SP71030	30	0.60 %	242	*9.54*	116	*4.58*	126	*4.96*	128	*5.05*	129.3	5.1								

Design guide
Sprocket evaluation

Belt pitch, sprocket type	Number of teeth	Polygon effect	Pitch Ø dp		A1 +1 mm/ -0 mm (effective)		A0 +1 mm/ -0 mm (effective)															
			mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*
1.1"							F51 / F52 smart fit		F53 smart fit													
571107	7	10.40%	63	*2.5*	26	*1.03*	37	*1.47*	47	*1.7*												
571108	8	7.90%	72	*2.82*	30	*1.19*	41	*1.63*	51	*1.86*												
571109	9	6.30%	80	*3.16*	35	*1.36*	46	*1.8*	52	*2.03*												
571111M	11	4.30%	97	*3.83*	43	*1.7*	54	*2.13*	61	*2.37*												
571113	13	3.00%	115	*4.51*	52	*2.04*	63	*2.47*	68	*2.71*												
571115	15	2.30%	132	*5.2*	60	*2.38*	72	*2.82*	77	*3.05*												
571117	17	1.80%	149	*5.88*	69	*2.72*	80	*3.16*	86	*3.39*												
571118	18	1.60%	158	*6.22*	73	*2.89*	85	*3.33*	90	*3.56*												
571119	19	1.50%	164	*6.47*	77	*3.02*	88	*3.45*	94	*3.69*												
571121	21	1.20%	184	*7.25*	87	*3.41*	98	*3.84*	104	*4.08*												
571123	23	1.00%	201	*7.93*	95	*3.75*	106	*4.18*	112	*4.42*												
571127	27	0.80%	236	*9.3*	113	*4.43*	124	*4.87*	130	*5.1*												
571129	29	0.70%	254	*10*	121	*4.78*	133	*5.22*	139	*5.45*												
1.1"							F54															
57110754	7	10.40%	63	*2.5*	26	*1.03*	37	*1.47*														
57110854	8	7.90%	72	*2.82*	30	*1.19*	41	*1.63*														
57110954	9	6.30%	80	*3.16*	35	*1.36*	46	*1.8*														
57111154	11	4.30%	97	*3.83*	43	*1.7*	54	*2.13*														
57111354	13	3.00%	115	*4.51*	52	*2.04*	63	*2.47*														
57111554	15	2.30%	132	*5.2*	60	*2.38*	72	*2.82*														
57111754	17	1.80%	149	*5.88*	69	*2.72*	80	*3.16*														
57111854	18	1.60%	158	*6.22*	73	*2.89*	85	*3.33*														
57111954	19	1.50%	164	*6.47*	77	*3.02*	88	*3.45*														
57112154	21	1.20%	184	*7.25*	87	*3.41*	98	*3.84*														
57112354	23	1.00%	201	*7.93*	95	*3.75*	106	*4.18*														
57112754	27	0.80%	236	*9.3*	113	*4.43*	124	*4.87*														
57112954	29	0.70%	254	*10*	121	*4.78*	133	*5.22*														
1.2" Radius							M3398															
M33S14	14	2,5%	148,3	*5,8*	70,1	*2,76*	84,0	*3,31*														
M33S18	18	1,6%	190,0	*7,5*	91,4	*3,60*	105,3	*4,15*														
1.2" Radius							PR612 1.6 PR612 2.2															
PR71207	7	10.00%	70	*2.8*	29	*1.15*	42	*1.65*														
PR71210	10	4.90%	99	*3.9*	43	*1.7*	56	*2.2*														
PR71213	13	3.00%	127	*5*	57	*2.25*	70	*2.75*														
PR71217	17	1.80%	166	*6.5*	76	*3*	89	*3.5*														
1.5" Radius							M3840/43		M3840 RT		M3843 GT		M3892									
M38S08	8	7.60%	100,6	*3,96*	43,1	*1,70*	61,1	*2,41*	63,6	*2,50*	66,1	*2,60*	73,1	*2,88*								
M38S12	12	3.40%	148,8	*5,86*	67,7	*2,67*	85,7	*3,37*	88,2	*3,47*	90,7	*3,57*	97,7	*3,85*								
M38S16	16	1.90%	197,3	*7,77*	92,4	*3,64*	110,4	*4,35*	113	*4,44*	115,4	*4,54*	122,4	*4,82*								
1.5"																						
SP71507	7	9.90%	88	*3.46*	37	*1.44*	52	*2.03*														
71509M	9	6.00%	112	*4.39*	48	*1.9*	63	*2.49*														
71512M	12	3.50%	147	*5.8*	66	*2.61*	81	*3.2*														
SP71515	15	2.20%	183	*7.22*	84	*3.32*	99	*3.91*														
SP71517	17	1.80%	207	*8.16*	96	*3.79*	111	*4.38*														

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Belt pitch, sprocket type	Number of teeth	Polygon effect	Pitch Ø dp		A1 +1 mm/ -0 mm (effective)								A0 +1 mm/ -0 mm (effective)							
			mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*
1.5"							**ST615 VT615**													
ST71509M	9	6.10%	111.5	*4.39*	46	*1.81*	58.7	*2.31*												
ST71512M	12	3.50%	147.3	*5.8*	64.8	*2.55*	77.5	*3.05*												
ST71515	15	2.20%	183.4	*7.22*	83.3	*3.28*	96	*3.78*												
ST71517	17	1.80%	207.3	*8.16*	95.5	*3.76*	108.2	*4.26*												
1.5" Radius							**IS615**													
SP71507	7	9.90%	88	*3.46*	37	*1.44*	52	*2.03*												
71509M	9	6.00%	112	*4.39*	48	*1.9*	63	*2.49*												
71512M	12	3.50%	147	*5.8*	66	*2.61*	81	*3.2*												
SP71515	15	2.20%	183	*7.22*	84	*3.32*	99	*3.91*												
SP71517	17	1.80%	207	*8.16*	96	*3.79*	111	*4.38*												
1.75"							**CC41 CC42**													
471707	7	10.10%	102	*4.39*	42	*1.64*	61	*2.39*												
471709	9	6.10%	130	*5.8*	56	*2.19*	75	*2.94*												
471711	11	4.10%	158	*7.22*	69	*2.73*	88	*3.48*												
471713	13	3.00%	186	*8.16*	83	*3.28*	102	*4.03*												
471714	14	2.60%	200	*5.8*	90	*3.56*	109	*4.31*												
471717	17	1.80%	242	*7.22*	112	*4.39*	131	*5.14*												
471721	21	1.20%	298	*8.16*	140	*5.5*	159	*6.25*												
2"							**M5010/10/15 M5020/21 M5032/33 M5060/62/65**		**M5023**		**M5013/14 M5015 GT M5067**		**M5010 RT M5032/33 RT**		**M5032 RT 0 – 90°**		**M5064**			
M50S06	6	13.40%	102.1	*4.02*	46,3	*1,82*	62,3	*2,45*	63,5	*2,50*	65,3	*2,57*	65,8	*2,59*	78,3	*3,08*	64,8	*2,55*		
M50S08	8	7.60%	133.4	*5.25*	62,6	*2,46*	78,6	*3,09*	79,8	*3,14*	81,6	*3,21*	82,1	*3,23*	94,6	*3,72*	81,1	*3,19*		
M50S10	10	4.90%	165.2	*6.5*	78,6	*3,09*	94,6	*3,72*	95,8	*3,77*	97,6	*3,84*	98,1	*3,86*	110,6	*4,35*	97,1	*3,82*		
M50S12	12	3.40%	197.2	*7.76*	95,3	*3,75*	111,3	*4,38*	112,5	*4,43*	114,3	*4,50*	114,8	*4,52*	127,3	*5,01*	113,8	*4,48*		
M50S13	13	2,90 %	213,2	*8,39*	103,6	*4,08*	119,6	*4,71*	120,8	4,76	122,6	4,83	123,1	4,85	135,6	5,34	122,1	*4,81*		
M50S16	16	1.90%	261.5	*10.3*	128,8	*5,07*	144,8	*5,70*	146	*5,75*	147,8	*5,82*	148,3	*5,84*	160,8	*6,33*	147,3	*5,80*		
M50S20	20	1,30 %	326,2	*12,8*	162,3	*6,39*	178,3	*7,02*	180	7,07	181,3	7,14	181,8	7,16	194,3	7,65	180,8	*7,12*		
2"							**M5131 M5182 RT**													
M51S10	10	4.90%	165.2	*6.5*	77,0	*3,03*	101,0	*3,98*												
M51S12	12	3.40%	197.2	*7.76*	93,3	*3,67*	117,3	*4,62*												
M51S13	13	2.90%	213.2	*8.39*	101,5	*4,00*	125,5	*4,94*												
M51S16	16	1.90%	261.5	*10.3*	126,2	*4,97*	150,2	*5,91*												
2"							**183,0**		**7,21**											
SP72006	6	13.30%	102	*4*																
72008M	8	7.60%	133	*5.23*	51	*2.01*	72	*2.82*												
72010M	10	5.00%	164	*6.47*	67	*2.64*	87	*3.44*												
SP72011	11	4.10%	180	*7.1*	76	*3*	97	*3.81*												
72012M	12	3.50%	196	*7.73*	85	*3.35*	105	*4.13*												
SP72015	15	2.20%	244	*9.62*	109	*4.29*	130	*5.1*												
SP72018	18	1.60%	293	*11.52*	134	*5.28*	154	*6.07*												

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Belt pitch, sprocket type	Number of teeth	Polygon effect	Pitch Ø dp		A1 +1 mm/ -0 mm (effective)		A0 +1 mm/ -0 mm (effective)													
			mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*
2"							**HDS620 FT HDS620 VT**		**HDS620 CT**		**HDS620 EZR**									
HDS72006	6	13.30%	102	*4*	34	*1.33*	56	*2.19*	59	*2.32*	58	*2.28*								
HDS72008M	8	7.60%	133	*5.23*	51	*2.01*	71	*2.81*	75	*2.94*	74	*2.9*								
HDS72010M	10	5.10%	162	*6.47*	68	*2.68*	87	*3.43*	90	*3.56*	89	*3.52*								
HDS72012M	12	3.50%	196	*7.73*	86	*3.33*	103	*4.06*	106	*4.19*	105	*4.15*								
HDS72016	16	2.00%	260	*10.25*	118	*4.63*	139	*5.49*	143	*5.62*	142	*5.58*								
2"							**HDU620 FT HDU620 VT**		**HDU620 CT**		**HDU620 EZR**									
HDU72006	6	13.30%	102	*4*	41	*1.6*	61	*2.4*	64	*2.53*	64	*2.5*								
HDU72008M	8	7.60%	133	*5.23*	56	*2.21*	76	*3.01*	80	*3.14*	79	*3.11*								
HDU72010M	10	5.00%	164	*6.47*	72	*2.84*	92	*3.64*	96	*3.77*	95	*3.77*								
HDU72012	12	3.50%	196	*7.72*	88	*3.46*	108	*4.26*	112	*4.39*	111	*4.39*								
HDU72014	14	2.60%	228	*8.99*	104	*4.09*	124	*4.89*	128	*5.02*	127	*4.99*								
HDU72016	16	2.00%	260	*10.25*	120	*4.73*	140	*5.53*	144	*5.56*	143	*5.63*								
2"							**FF620**		**FF620 WR**		**FF620 MC**									
72006	6	13.30%	102	*4*	37	*1.46*	54	*2.14*	60	*2.36*	60	*2.36*								
72008M	8	7.60%	133	*5.23*	53	*2.08*	70	*2.76*	76	*2.98*	76	*2.98*								
72010M	10	5.00%	164	*6.47*	68	*2.7*	86	*3.38*	91	*3.6*	91	*3.6*								
72012M	12	3.50%	196	*7.73*	84	*3.33*	102	*4.01*	107	*4.23*	107	*4.23*								
72016	16	2.00%	260	*10.25*	116	*4.59*	134	*5.27*	139	*5.49*	139	*5.49*								
2" Radius							**IS620**													
PR72010	10	4.90%	165	*6.5*	74	*2.9*	89	*3.5*												
2" Radius							**PR620 SPS**													
PR72010 SPS	10	4.90%	165	*6.5*	74	*2.9*	89	*3.5*												
2.2"							**M5482 RT**													
M54S09	9	6.20%	164	*6.5*	76,0	*2,99*	100,0	*3,94*												
M54S11	11	3.90%	199.1	*7.8*	93,9	*3,70*	117,9	*4,64*												
M54S13	13	2,90 %	234,4	*9,2*	111,9	*4,41*	135,9	*5,35*												
M54S15	15	2.20%	269.8	*10.6*	129,9	*5,11*	153,9	*6,06*												
2" Radius							**M5290 / 93**													
M52S08	8	7.60%	133.4	*5.25*	60,8	*2,39*	76,8	*3,02*												
M52S09	9	6.20%	149.2	*5.87*	68,9	*2,71*	84,9	*3,34*												
M52S10	10	4.90%	165.1	*6.5*	77,0	*3,03*	93,0	*3,66*												
M52S12	12	3.40%	197.2	*7.76*	93,3	*3,67*	109,3	*4,3*												
M52S16	16	2,00 %	261,5	*10,30*	126,1	*4,96*	142,1	*5,6*												
2.5"							**M6360**													
M63S06	6	13.40%	127,6	*5,04*	56,6	*2,23*	76	*2,98*												
M63S08	8	7.60%	166,7	*6,56*	76,5	*3,01*	95,5	*3,76*												
M63S10	10	4.90%	206,4	*8,13*	96,7	*3,81*	115,7	*4,56*												
M63S13	13	2.90%	266,6	*10,50*	127,3	*5,01*	146,3	*5,76*												
M63S15	15	2,20 %	306,9	*12,08*	147,8	*5,82*	166,8	*6,57*												
2.5"											**M6425**									
M64S10	10	4.90%	206.4	*8.13*	94,6	*3,72*	120,6	*4,75*	121,8	*4,79*	128,1	*5,04*								
M64S12	12	3.40%	246.4	*9.7*	115,4	*4,54*	141,4	*5,57*	142,6	*5,61*	148,9	*5,86*								
M64S13	13	2.90%	266.4	*10.49*	125,8	*4,95*	151,8	*5,98*	153,0	*6,02*	159,3	*6,27*								
M64S15	15	2.20%	306.7	*12.07*	146,7	*5,78*	172,7	*6,8*	173,9	*6,85*	180,2	*7,09*								
M64S20	20	1.20%	407.6	*16.05*	199,2	*7,84*	225,2	*8,87*	226,4	*8,91*	232,7	*9,16*								

For other sprocket sizes and appropriate dimensions, please contact your Habasit representative.

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Design recommendations
The correct adjustment of the belt support or shaft placement (dimension A1) is important. Excessive noise, increased sprocket wear and engagement problems may result if the recommendations are not followed.

Standard solution (Fig. 310)
Straight support guides are low cost and simple to produce. The supports should have a slight downward radius or chamfer leading edge. Distance C between the belt support and wear strip allows the respective link row to adapt its position to the up and down moving sprocket circumference (polygon effect). Take care that the guides do not touch the sprockets. For the dimension of C see the sprocket data sheets.

Optional (Fig. 320)
For smoother belt run and best load support and transmission at the belt end, Habasit recommends bending the wear strip leading edge. Take care that the guides do not touch the sprockets.

Minimum standard sprocket size
This table is for belts equipped with hold-down tabs or hold-down devices

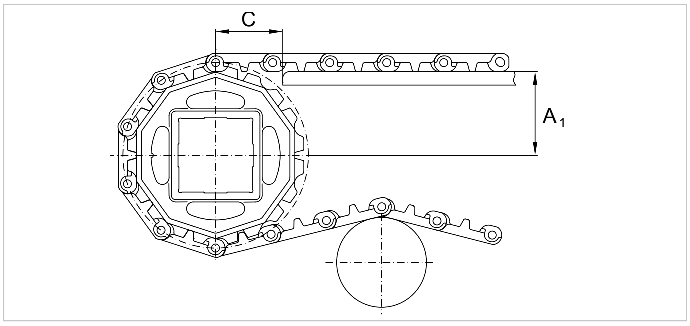

Figure 310

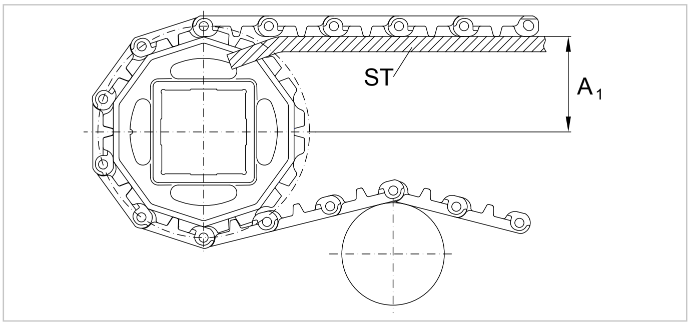

Figure 320

	Min. number of teeth	Max. square bore		Max. round bore	
		mm	*inch*	mm	*inch*
Series with hold-down tabs (H, T, ActivXchange)					
M1200	15	25	*1*	25	*1 3/16*
106	14	–	*1*	40	*1 ½*
106	16	40	*1.5*	50	*2*
M2400*	12	40	*1.5*	30	*1*
M2500	10	–	*1*	30	*1 3/16*
M2500	12	40	*1.5*	40	*1 3/16*
M2600*	12	40	*1.5*	40	*1 ½*
IS/CT610	9	–	–	–	1
IS/CT610	12	–	*1*	40	*1 ½*
IS/CT610	15	40	1.5	*40*	*1 15/16*
PR612	10	–	*1*	*40*	*1 ½*
PR612	13	40	*1.5*	*50*	*2*
M3840 side tabs only	10	40	*1.5*	–	–
M3800	12	60	*2.5*	–	–
IS615	7	–	*1*	*40*	*1 ½*
IS615	9	40	*1.5*	*40*	*1 15/16*
IS620	6	–	*1*	–	*1*
IS620	8	40	*1.5*	*40*	*1 15/16*
Series with hold-down devices (V-modules)					
M2500	12	40	*1.5*	*40*	*1 3/16*
M5000	8	40	*1.5*	–	–
M5000	10	60	*2.5*	–	–

* For multihub sprockets min. number of teeth 18

Sprocket installation, general
(also see the product data sheets)
In order to allow the belt to expand/contract, only the center sprocket on each shaft is fixed. For shafts with two sprockets, the sprocket on the drive side is fixed. Various locking methods are possible:

- Set screws and set collars (Fig. 330) – mainly used with round shafts on keyways.
- Retainer rings for square and round shafts (Figs. 340 and 350).
- Retaining plate (Figs. 360 and 370) – a simple low-cost method for square shafts.

Always maintain a gap of 0.3 mm *(0.01")* between the sprocket hub and retaining device. All devices must be securely fastened.

Note: Molded sprockets should not be mixed with machined sprockets on the same shaft.

Tracking of M5010, M5011, M5013, M5014, M5060, M5064
The molded standard sprockets track the belt leaving some transversal clearance to the belt (approx. ± 2.5 mm *(0.10")*). This is advantagous in food applications with very critical cleaning requirements, e.g. in the meat industry. For other applications it may be desirable to reduce this clearance in order to provide accurate tracking performance. The most common way to do this is to use a pair of center sprockets instead of one only. These two sprockets are both located on the shaft at a fixed distance using one center fixing plate (Fig. 370).
The width of this plate is:
d = 20 mm *(0.79")* for M5010, M5011, M5013, M5014
d = 14 mm *(0.55")* for M5060, M5064

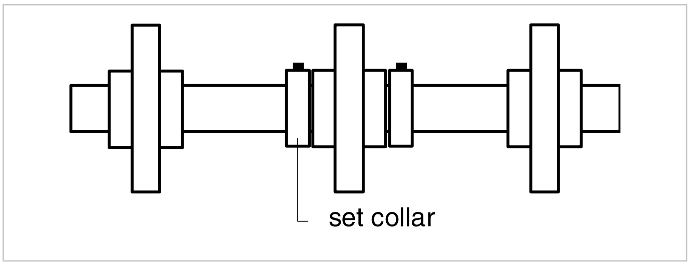

Figure 330: Type: set screws and set collars

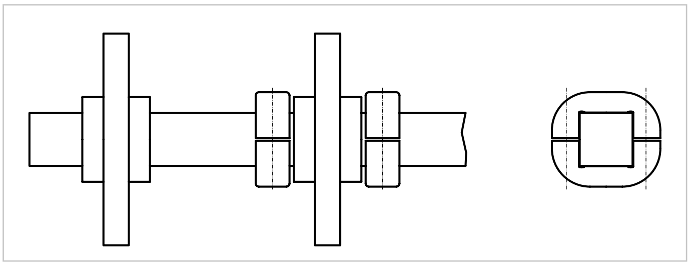

Figure 340: Type: retainer rings

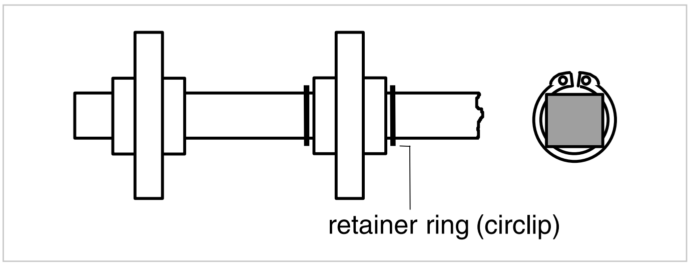

Figure 350: Type: retainer rings

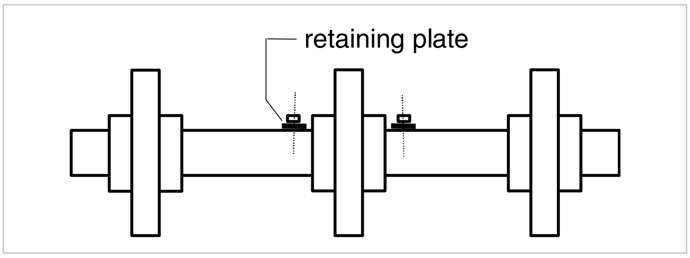

Figure 360: Type: retaining plate

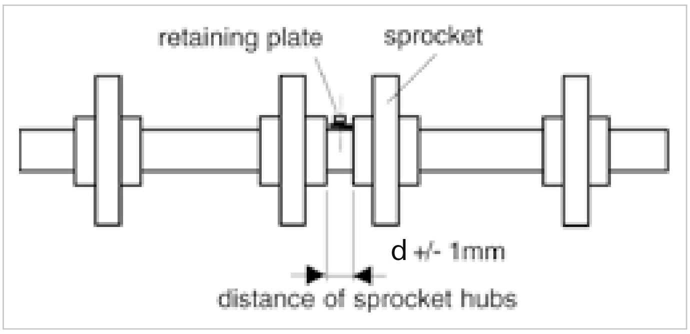

Figure 370

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Positioning and spacing of sprockets (Fig. 380)
Proper installation of sprockets ensures maximum belt to sprocket engagement. The number of sprockets (n), spacing and positioning must be evaluated from the respective table of the sprocket data sheet or calculated using the LINK-SeleCalc program. It can also be found in tables in the Appendix chapter on sprocket spacing in this engineering guide.

The center tracking sprocket must be installed either in the middle of the belt or offset.

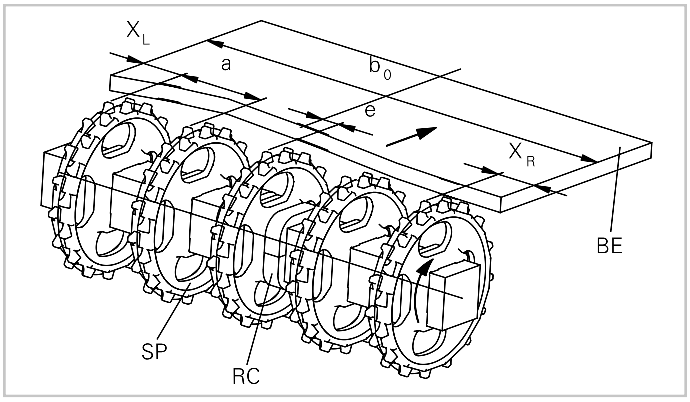

Figure 380

Support edge rollers (SR) (Fig. 390)
For belt Series M0800, M1065, M1100, M2585, F50, PR612, PR620 and RS511/RS515 additional support rollers must be installed on all shafts to support the belt at the edges.

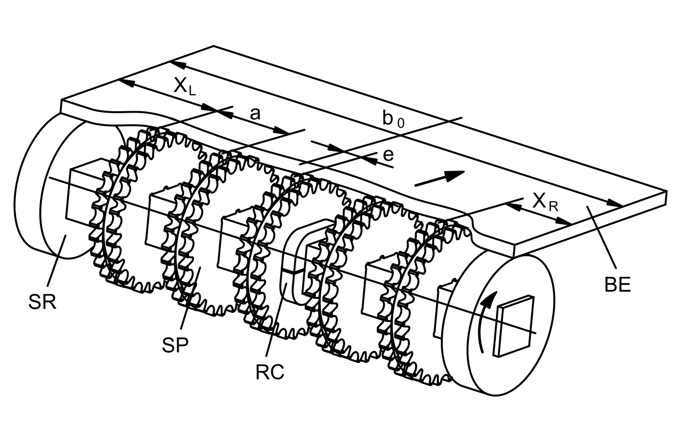

Figure 390

Topside drive for spirals
In exceptional cases some applications, for example spirals, may need to drive the belt by engaging the sprockets from the top side of the belt instead of the bottom side. In this case specially adapted sprockets are required.

For specific information please contact Habasit.

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Habasit provides both round and square bore sprockets to mount on a similarly shaped and sized shaft. Although square shafts are not a requirement for Habasit products, they eliminate the need for shaft keys and resist shaft deflection better than round shafts of the same size and can transmit higher torque. Round shafts are acceptable for moderate to lightly loaded belts with widths of 914 mm *(36")* or narrower. Square shafts are recommended for wide or heavily loaded belts and in applications involving extreme temperature variations.

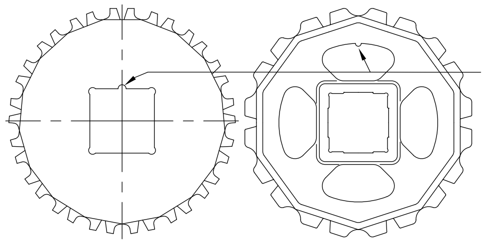


Figure 400

Round shafts (ambient temperature)
Special attention is required when mounting sprockets on round shafts. To properly mount sprockets on a round shaft, cut individual key seats for each sprocket location or one continuous key seat across the length of the shaft. The key length for the center-most or tracking sprocket is equal to the sprocket's hub width. Set collars or retaining rings are placed against the sprocket hub and tightened by using set screws. The outboard sprocket keys are cut to a length equal to the sprocket hub width **plus 12.7 mm *(0.50")***. Set collars or retaining rings are placed against the key, locking it in place while allowing the sprocket to freely float laterally on the shaft.

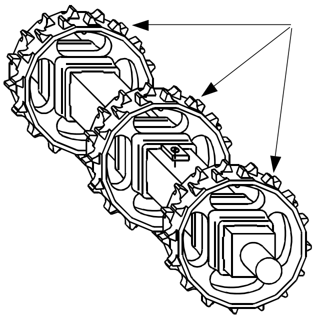


Figure 410

Sprocket alignment on the shafts (Figs. 400 and 410)
During installation of the sprockets on the shafts it is important to make sure that the teeth of all sprockets are correctly aligned. For this purpose the sprockets normally feature a timing mark. If the number of sprocket teeth is a multiple of four, every radial orientation of the sprocket on the shaft is possible. Therefore some sprockets do not feature timing marks.

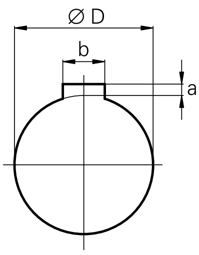


Figure 420

Keyways for round shafts (Fig. 420)
The keyways on sprockets fit the following shaft keyways:

Metric													
ø D	mm	20	25	30	35	40	50	60	70	80	90		
a	mm	2.8	3.3	3.3	3.3	3.3	3.8	4.4	4.9	5.4	5.4		
b	mm	6	8	8	10	12	14	18	20	22	25		

According to DIN 6885 tolerance for a: 0/-0.2

Imperial													
ø D	*inch*	*¾*	*1*	*1 3/16*	*1 ¼*	*1 7/16*	*1 ½*	*2*	*2 ½*	*2 ¾*	*3 ¼*	*3 ½*	*4 ½*
a	*inch*	*0.098*	*0.130*	*0.130*	*0.130*	*0.193*	*0.193*	*0.256*	*0.319*	*0.319*	*0.370*	*0.429*	*0.488*
b	*inch*	*3/16*	*¼*	*¼*	*¼*	*3/8*	*3/8*	*½*	*5/8*	*5/8*	*¾*	*7/8*	*1*

According to ANSI B17.1 tolerance for a: 0/-0.001

Shaft tolerances
The dimensional tolerance of round and square shaft shapes is according to ISO 286-2 h12.

Design guide
Slider support systems

Most applications require belts to be continuously supported on the load carrying section of a conveyor. The support system must be stiff enough to resist the specific conveying load. Consideration must be given to the carry way support configuration and material for optimizing conveyor performance. Various designs are possible.

The following are commonly used:

A **Straight or parallel wear strip arrangement (Fig. 440)** These are the most economical methods. For lower belt wear, the parallel wear strip segments may be arranged alternating offset instead of in-line or as a serpentine strip. For the number of wear strips refer to the product data sheets.

B **V-shaped arrangement of wear strips (Fig. 450)** (chevron or herringbone type). This provides an equal distribution of load and wear over the total belt width. The maximum distances between the wear strips have to be 100 mm *(4")* for 2" belts and 50 mm *(2")* for 1"/0.5" belts. Max. angle β = 45°.

C **Smooth continuous support/impact plate (Fig. 455)** This type of carry way is a plate or bed supporting the entire conveyor belt length and width practical. The bed can be perforated to provide drainage or to allow debris to fall through, and is typically used in very heavily loaded or high impact systems, i.e. greater than *25 lbs./ft²* (120 Kg/m²). For large conveyors supports plates can be installed in a bricklayed pattern.

For the number of wear strips see the product data sheets. The expansion and contraction of the wear strips or plate needs to be accommodated in any support configuration. Adequate accommodation is needed to prevent the wear strip or plate from buckling or expanding into sprockets, the frame, etc. Shoulder screws in slots may be an adequate solution to allow material expansion. Always keep screw heads below the sliding surface. The support plate must have an angled end. To ensure a smooth belt transfer it is recommended to have a distance p see Fig. 455, which should be equivalent to the belt pitch, between one side and the other side of the support. Bevel wear strip or plate edges for smooth belt transfer.

Formula to calculate the necessary clearance d:

$$d > \Delta l = l/1000 \cdot \alpha \cdot (T - 20\,°C)\ [mm]$$

l = Length at installation temperature (20 °C) [mm]
T = Max. operating temperature [°C]

For radius belts please refer to page 33.

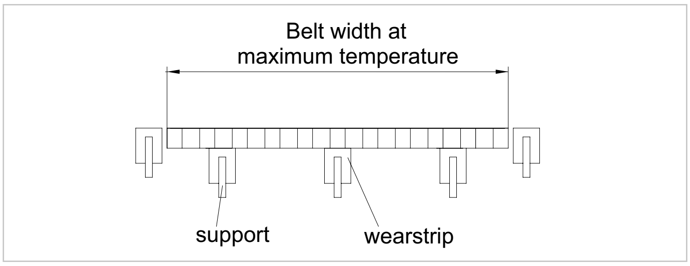


Figure 430: For straight running belts

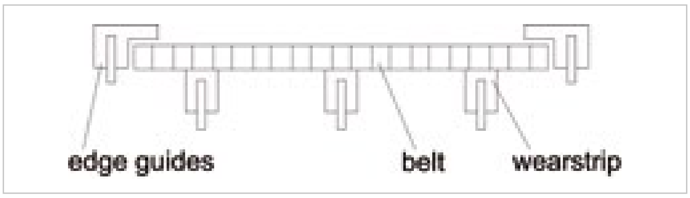


Figure 435: For radius belts

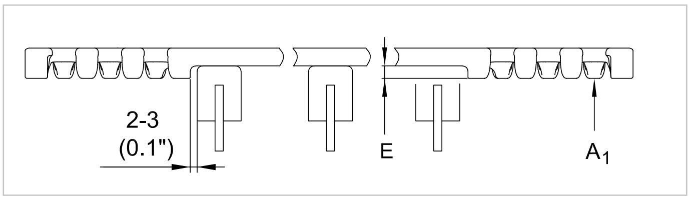


Figure 437: For Super HyCLEAN M2960 E = 4.5 mm (0.18")

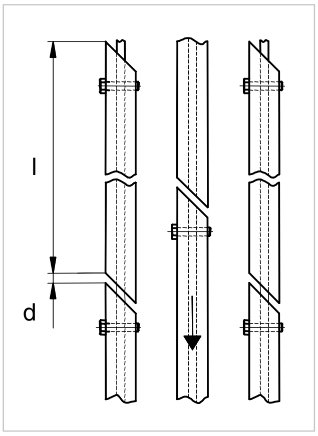


Figure 440: Version A

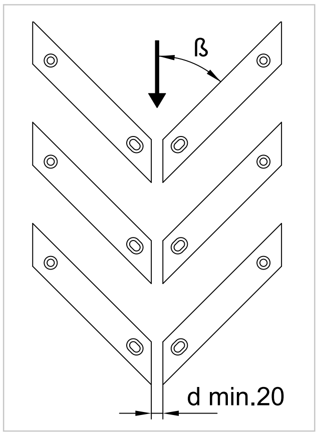


Figure 450: Version B

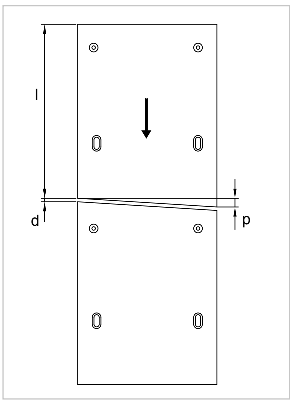


Figure 455: Version C

Design guide
Slider support systems

Material	Average coeff. of linear thermal expansion α	
	mm / (m · °C)	*in/(ft · °F)*
PE40, TP40	0.2	*0.00133*
PA6G-LF	0.1	*0.00070*
Steel	0.01	*0.00007*

Accommodation must be made to allow plastic wear strips secured with screw fasteners to thermally expand and contract. The most common method is to secure the tail edge of the wear strip with a screw. The head of the fastener is countersunk below the wear strip's top surface (if fixed from the top). Each successive hole in the wear strip is elongated (slot) and countersunk. Each fastener in the elongated (slot) holes is loosely fitted into the hole to allow the wear strip to freely expand or contract under the fastener head.

Wear strip material and guiding profiles
The operating environment for the conveyor belt dictates the most suitable wear strip material for the conveyor system. For suitable wear strip materials and recommendations see pages 17 and 18. **Please also consult the separate HabiPLAST brochure. U-shaped profiles** MB type (old code MB01) are commonly used as wear strips for slider supports, fitted onto a simple metal strip of 2 mm *(0.08")* to 5 mm *(0.2")* thickness. Type MT type (old code MT01) offers a wider support area.

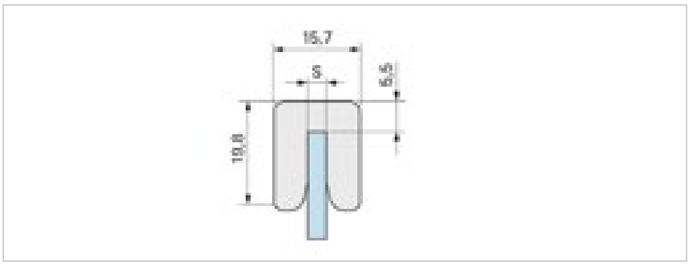


Figure 470: MB type (old code MB01)

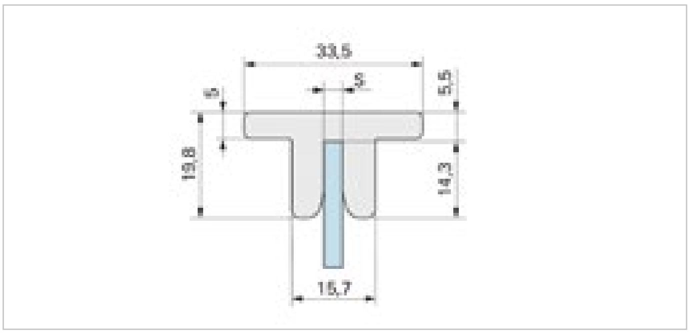


Figure 480: MT type (old code MT01)

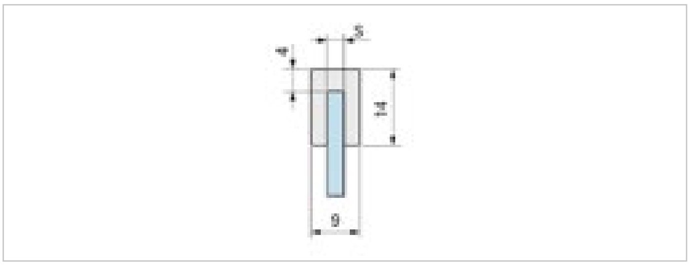


Figure 495: GB type (old code GL-2)

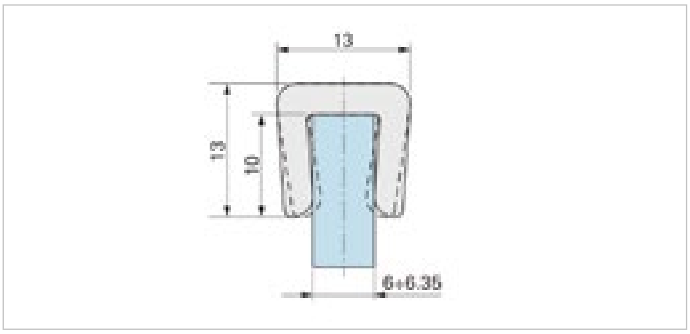


Figure 497: GA-60 type (old code GL-7)

L-shaped guides (MB 02) are mainly used as hold-down guides for radius belts. See also the design guide for the radius belt.

Type MB 02 is suitable for the 1" radius belt, the MB 02U is larger to fit the thicker 1.5" radius belt. Special dimensions are possible on request. (Figs. 500 and 510)

Type	S	
	mm	*inch*
MB-22 (old code MB01-X)	2,0	*0,08*
MB-27 (old code MB01-A)	2,5	*0,10*
MB-32 (old code MB01-B)	3,0	*0,12*
MB-47 (old code MB01-C)	4,5	*0,18*
MB-52 (old code MB01-D)	5,0	*0,20*
GB-22 (old code GL-2)	2,0	*0,08*
GB-32 (old code GL-2A)	3,0	*0,12*
GB-42 (old code GL-2B)	4,0	*0,16*
MT-22 (old code MB01T-X)	2,0	*0,08*
MT-27 (old code MB01T-A)	2,5	*0,10*
MT-32 (old code MB01T-B)	3,0	*0,12*
MT-47 (old code MB01T-C)	4,5	*0,18*
MP-22 (old code MB02S-X)	2,0	*0,08*
MP-27 (old code MB02S-A)	2,7	*0,11*
MP-32 (old code MB02S-B)	3,0	*0,12*
MP-47 (old code MB02S-C)	4,5	*0,18*
MP-52 (old code MB02S-D)	5,0	*0,20*
MU-22 (old code MB02U-X)	2,0	*0,08*
MU-27 (old code MB02U-A)	2,5	*0,10*
MU-32 (old code MB02U-B)	3,0	*0,12*
MU-47 (old code MB02U-C)	4,5	*0,18*

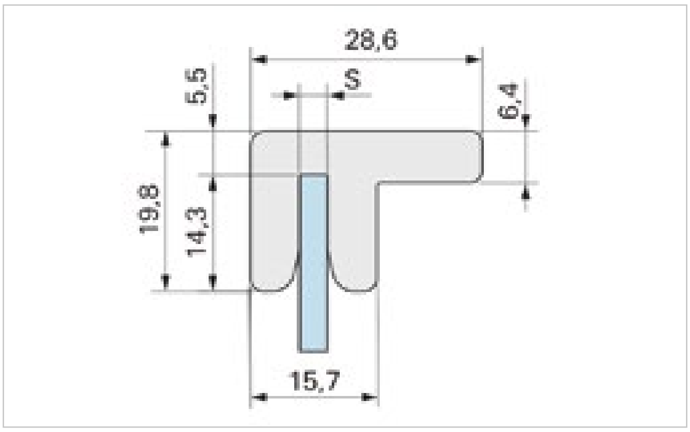


Figure 500: MP type (old code MB02S)

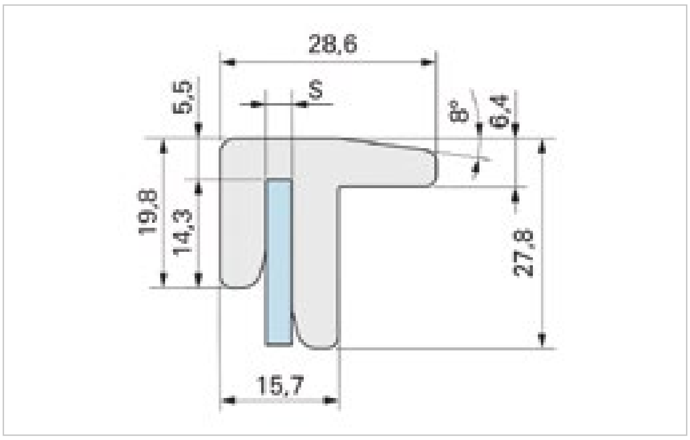


Figure 510: MU type (old code MB02U)

Comb (finger plate) installation (Fig. 525)
For the main dimensions and instructions for combs please see the product data sheet. The plates contain slots. Special bushings and screws are delivered with the plates; they allow free lateral movement to compense for thermal expansion or contraction of the belt. For belt widths up to 300 mm *(12")*, the plates can be firmly fixed.
Fingerplate mounting must begin at the belt's center line, working towards the outside belt edges.

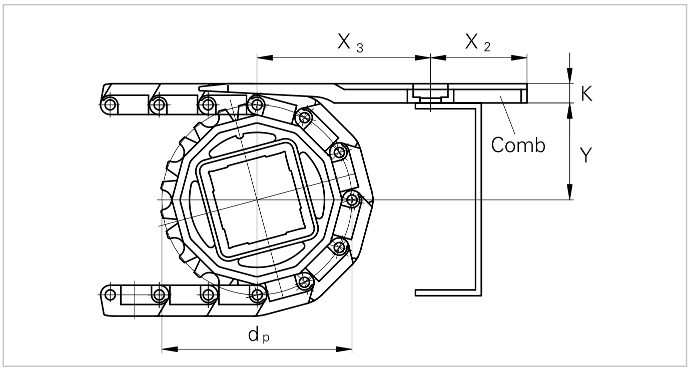


Figure 525

Screw position (Fig. 530)
The application operating temperature influences the positioning of the shoulder bolts.

- **When operating temperatures exceed environmental temperatures:** The fingerplate shoulder bolts are positioned at the outer edge of the mounting holes allowing the fingerplates to laterally move with belt width expansion.
- **When operating temperatures are below environment temperatures:** The fingerplate shoulder bolts are positioned at the inner edge of the mounting holes allowing the fingerplates to laterally move with belt width contraction.

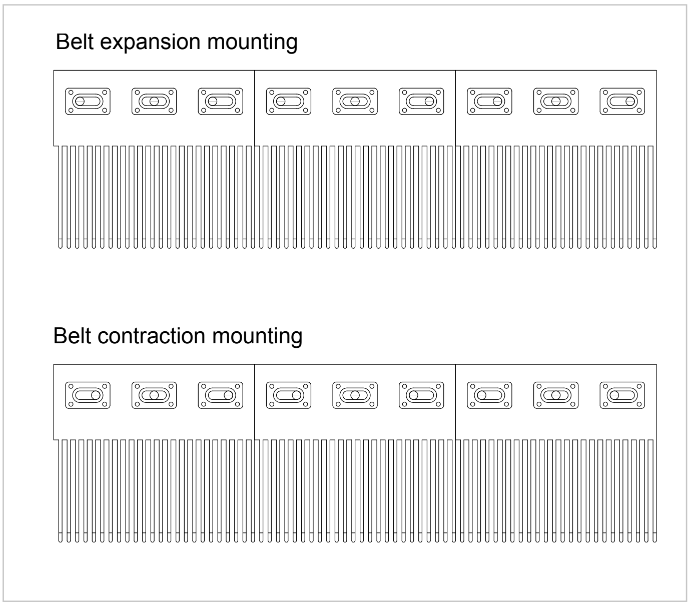


Figure 530

Fingerplate installation for Series 208 RR and FF620-WR fingerplate positioning (Fig. 540): Fingerplates are mounted using shoulder bolts, with the upper surface of the fingerplate positioned 1 mm *(0.4")* below the top surface of the belt.

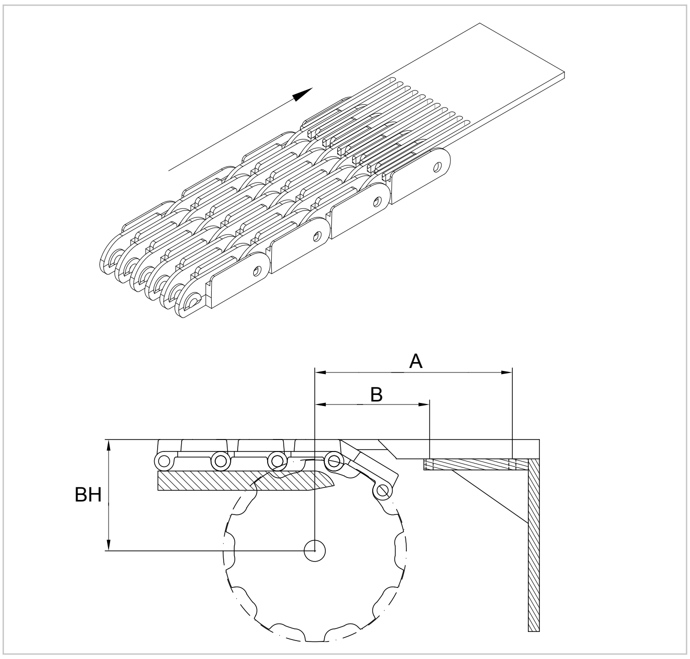


Figure 540

Note:

Dimensions						
Number of sprocket teeth	A		B		BH	
	mm	*inch*	mm	*inch*	mm	*inch*
Series 208 Comb A (Extended Dead Plate)						
10	108	*4.25*	63.5	*2.5*	50.8	*2*
12	111.3	*4.38*	66.8	*2.63*	58.4	*2.3*
18	117.6	*4.63*	73.2	*2.88*	82.6	*3.25*
19	120.7	*4.75*	76.2	*3*	88.6	*3.41*
20	122.2	*4.81*	77.7	*3.06*	90.4	*3.56*
Series 208 Comb B (Short Dead Plate)						
10	63.5	*2.5*	–	–	50.8	*2*
12	66.8	*2.63*	–	–	58.4	*2.3*
18	73.2	*2.88*	–	–	82.6	*3.25*
19	76.2	*3*	–	–	88.6	*3.41*
20	77.7	*3.06*	–	–	90.4	*3.56*
Series FF62000-WR Comb						
6	138	*5.44*	–	–	54	*2.14*
8	138	*5.44*	–	–	70	*2.76*
10	138	*5.44*	–	–	86	*3.38*
12	138	*5.44*	–	–	102	*4.01*
16	138	*5.44*	–	–	134	*5.27*

Transfer plates for product transfer (Fig. 550)
Transfer plates D are used for product transfer at the conveyor ends of flat top and flush grid belts. The discharge end should be adjusted to 1 mm *(0.04")* below the belt surface and the infeed end 1 mm *(0.04")* above the belt surface. The gap (X_5) varies during belt movement, but should be as small as possible when the belt hinge passes the edge of the plate.

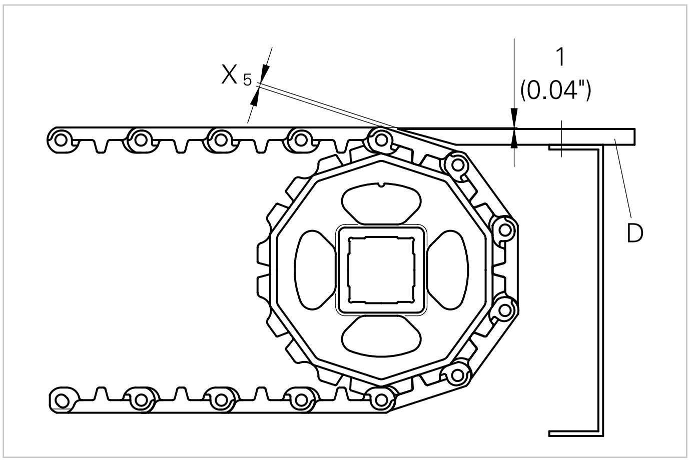


Figure 550

Curved top belts (Fig. 560)
Belts with a curved top surface allow the dead plate gap (X5 Figure 550) to be eliminated. This facilitates smooth transfers by allowing the transfer plate(s) to maintain continuous contact with the arc formed as the belt wraps around the drive sprocket.

Curved top belts form a smooth outer radius with the following belt/sprocket combinations:

- *0.5*" pitch curved top with a *0.75*" nosebar
- *1*" pitch curved top with 9 tooth sprockets
- 1.3" pitch curved top with 14 tooth sprockets
- *2*" pitch curved top with 12 tooth sprockets

The gap to the transfer plate can be significantly reduced with all curved top belts. Scrapers can be applied to clean the belt surface. Due to the curved top surface product contact with the belt is reduced. Smoother product transfer can also be achieved when using other sprocket sizes than recommended.

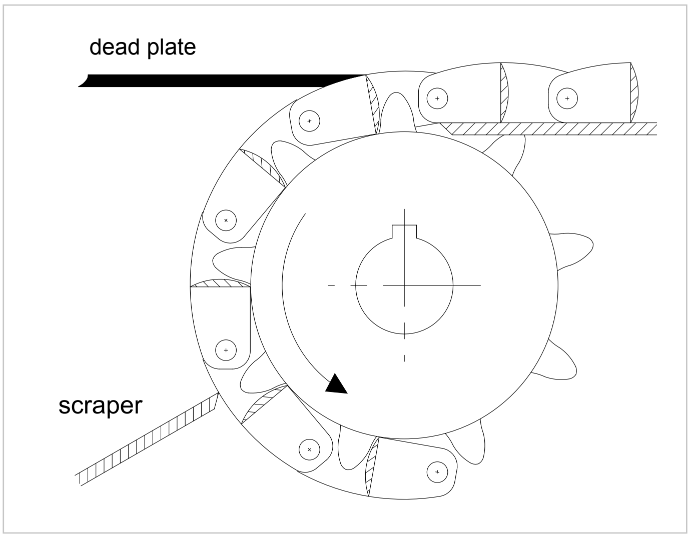


Figure 560

Patent protected

ActivXchange transfer to belt (Fig. 565)
ActivXchange modules allow a smooth 90° product transfer without deadplates and provide a self clearing transport from one belt to the other. The module is provided with two tabs in order to guarantee an accurate position and tracking of the ActivXchange belt.

The tables below show the transfer from equal belt series width several sprocket sizes. The belt types are distinguished by its thickness.

Product transfers from or to other belt series are applicable as well.

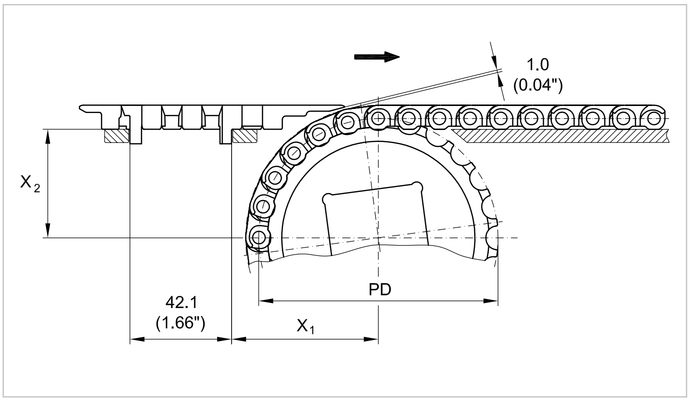


Figure 565: Conceptual drawing for product transfer to belt

M1220 ActivXchange to belt

Transfer from ActivXchange	to Belt Typ	Sprocket typ	Pitch Diameter Sprocket (PD)		X1		X2	
(thickness)	(thickness)		mm	*inch*	mm	*inch*	mm	*inch*
M1220L03 (10mm)	M1280 (8.7mm)	M12S10	41,2	*1,6*	56,1	*2,2*	15,0	*0,6*
		M12S15	62,4	*2,5*	58,1	*2,3*	25,4	*1,0*
		M12S24	99,2	*3,9*	60,7	*2,4*	43,8	*1,7*
		M12S28	116,5	*4,6*	61,8	*2,4*	52,5	*2,1*
		M12S36	149,8	*5,9*	63,7	*2,5*	69,2	*2,7*
	M1200 (10mm)	M12S10	41,2	*1,6*	56,3	*2,2*	16,2	*0,6*
		M12S15	62,4	*2,5*	58,2	*2,3*	26,6	*1,0*
		M12S24	99,2	*3,9*	60,8	*2,4*	45,0	*1,8*
		M12S28	116,5	*4,6*	61,9	*2,4*	53,7	*2,1*
		M12S36	149,8	*5,9*	64,2	*2,5*	70,3	*2,8*

M1280 ActivXchange to belt

Transfer from ActivXchange	to Belt Typ	Sprocket typ	Pitch Diameter Sprocket (PD)		X1		X2	
(thickness)	(thickness)		mm	*inch*	mm	*inch*	mm	*inch*
M1280L04 (8.7mm)	M1200 (8.7mm)	M12S10	41,2	*1,6*	83,4	*3,3*	16,3	*0,6*
		M12S15	62,4	*2,5*	85,3	*3,4*	26,7	*1,1*
		M12S24	99,2	*3,9*	88,0	*3,5*	45,1	*1,8*
		M12S28	116,5	*4,6*	89,0	*3,5*	53,8	*2,1*
		M12S36	149,8	*5,9*	90,5	*3,6*	70,5	*2,8*
	M1200 (10mm)	M12S10	41,2	*1,6*	83,6	*3,3*	17,5	*0,7*
		M12S15	62,4	*2,5*	85,5	*3,4*	27,9	*1,1*
		M12S24	99,2	*3,9*	88,1	*3,5*	46,3	*1,8*
		M12S28	116,5	*4,6*	89,1	*3,5*	55,0	*2,2*
		M12S36	149,8	*5,9*	90,7	*3,6*	71,7	*2,8*

M2420 ActivXchange to belt

Transfer from ActivXchange	to Belt Typ	Sprocket typ	Pitch Diameter Sprocket (PD)		X1		X2	
(thickness)	(thickness)		mm	*inch*	mm	*inch*	mm	*inch*
M2420L03 (8.7mm)	M2400 (8.7mm)	M24S12	99,1	*3,9*	60,7	*2,4*	45,2	*1,8*
		M24S15	123,4	4,9	62,1	2,4	57,4	2,3
		M24S18	147,7	5,8	63,7	2,5	69,6	2,7
		M24S20	164,0	6,5	65,1	2,6	77,6	3,1
	M2500 (10mm)	M25S12	98,6	3,9	60,8	2,4	45,6	1,8
		M25S16	130,8	5,1	62,8	2,5	61,7	2,4
		M25S18	146,9	5,8	63,7	2,5	69,8	2,7
		M25S20	163,0	6,4	64,7	2,5	77,9	3,1

M2470 ActivXchange to belt

Transfer from ActivXchange	to Belt Typ	Sprocket typ	Pitch Diameter Sprocket (PD)		X1		X2	
(thickness)	(thickness)		mm	*inch*	mm	*inch*	mm	*inch*
M2470L04 (8.7mm) or M2480L04 (8.7mm)	M2400 (8.7mm)	M24S12	99,1	*3,9*	88,1	*3,5*	45,2	*1,8*
		M24S15	123,4	4,9	89,5	3,5	57,4	2,3
		M24S18	147,7	5,8	91,0	3,6	69,6	2,7
		M24S20	164,0	6,5	92,4	3,6	77,6	3,1
	M2500 (10mm)	M25S12	98,6	3,9	88,2	3,5	45,6	1,8
		M25S16	130,8	5,1	90,2	3,6	61,7	2,4
		M25S18	146,9	5,8	91,1	3,6	69,8	2,7
		M25S20	163,0	6,4	92,1	3,6	77,9	3,1

M2670 ActivXchange to belt

Transfer from ActivXchange	to Belt Typ	Sprocket typ	Pitch Diameter Sprocket (PD)		X1		X2	
(thickness)	(thickness)		mm	*inch*	mm	*inch*	mm	*inch*
M2670L04 (12.7mm)	M2600 (12.7mm)	M26S12	99,1	*3,9*	88,2	*3,5*	43,2	*1,7*
		M26S16	131,5	5,2	90,1	3,5	59,5	2,3
		M26S18	147,7	5,8	91,1	3,6	67,6	2,7
		M26S21	172,1	6,8	93,1	3,7	79,7	3,1

ActivXchange transfer from belt (Fig. 566)
ActivXchange modules allow a smooth 90° product transfer without deadplates and provide a self clearing transport from one belt to the other. The module is provided with two tabs in order to guarantee an accurate position and tracking of the ActivXchange belt.

The tables below show the transfer from equal belt series width several sprocket sizes. The belt types are distinguished by its thickness.

Product transfers from or to other belt series are applicable as well.

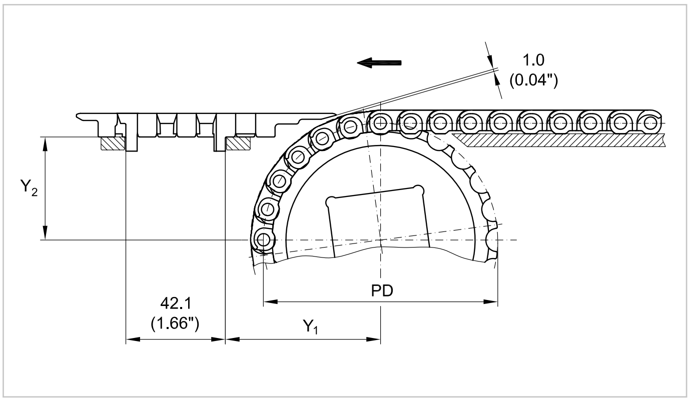


Figure 566: Conceptual drawing for product transfer "from belt" to AxtivXchange belt

M1220 ActivXchange

Transfer from Belt Type	to ActivX-change	Sprocket typ	Pitch Diameter Sprocket (PD)		Y1		Y2	
(thickness)	(thickness)		mm	*inch*	mm	*inch*	mm	*inch*
M1220L03 (10mm)	M1220L03 (10mm)	M12S10	41,2	*1,6*	58,4	*2,3*	14,0	*0,6*
		M12S15	62,4	*2,5*	60,8	*2,4*	24,4	*1,0*
		M12S24	99,2	*3,9*	64,0	*2,5*	42,8	*1,7*
		M12S28	116,5	*4,6*	65,4	*2,6*	51,5	*2,0*
		M12S36	149,8	*5,9*	67,8	*2,7*	68,1	*2,7*
M1200 (10mm)		M12S10	41,2	*1,6*	60,7	*2,4*	14,1	*0,6*
		M12S15	62,4	*2,5*	62,4	*2,5*	25,0	*1,0*
		M12S24	99,2	*3,9*	65,4	*2,6*	43,6	*1,7*
		M12S28	116,5	*4,6*	66,6	*2,6*	52,4	*2,1*
		M12S36	149,8	*5,9*	68,7	*2,7*	69,1	*2,7*

M1280 ActivXchange

Transfer from Belt Type	to ActivX-change	Sprocket typ	Pitch Diameter Sprocket (PD)		Y1		Y2	
(thickness)	(thickness)		mm	*inch*	mm	*inch*	mm	*inch*
M1200 (8.7mm)	M1280L04 (8.7mm)	M12S10	41,2	*1,6*	85,7	*3,4*	15,3	*0,6*
		M12S15	62,4	*2,5*	88,0	*3,5*	25,7	*1,0*
		M12S24	99,2	*3,9*	91,2	*3,6*	42,4	*1,7*
		M12S28	116,5	*4,6*	92,6	*3,6*	52,8	*2,1*
		M12S36	149,8	*5,9*	95,1	*3,7*	69,4	*2,7*
M1200 (10mm)		M12S10	41,2	*1,6*	87,9	*3,5*	15,4	*0,6*
		M12S15	62,4	*2,5*	89,8	*3,5*	26,2	*1,0*
		M12S24	99,2	*3,9*	92,7	*3,6*	44,9	*1,8*
		M12S28	116,5	*4,6*	94,0	*3,7*	53,6	*2,1*
		M12S36	149,8	*5,9*	96,0	*3,8*	70,4	*2,8*

M2420 ActivXchange

Transfer from Belt Type	to ActivX-change	Sprocket typ	Pitch Diameter Sprocket (PD)		Y1		Y2	
(thickness)	(thickness)		mm	*inch*	mm	*inch*	mm	*inch*
M2400 (8.7mm)	M2420L03 (8.7mm)	M24S12	99,1	*3,9*	68,4	*2,7*	42,5	*1,7*
		M24S15	123,4	*4,9*	69,9	*2,8*	55,0	*2,2*
		M24S18	147,7	*5,8*	71,4	*2,8*	67,4	*2,7*
		M24S20	164,0	*6,5*	72,3	*2,8*	75,6	*3,0*
M2500 (10mm)		M25S12	98,6	*3,9*	68,4	*2,7*	43,0	*1,7*
		M25S16	130,8	*5,1*	70,5	*2,8*	59,4	*2,3*
		M25S18	146,9	*5,8*	71,5	*2,8*	67,6	*2,7*
		M25S20	163,0	*6,4*	72,3	*2,8*	75,8	*3,0*

M2470 ActivXchange

Transfer from Belt Type	to ActivX-change	Sprocket typ	Pitch Diameter Sprocket (PD)		Y1		Y2	
(thickness)	(thickness)		mm	*inch*	mm	*inch*	mm	*inch*
M2400 (8.7mm)	M2470L04 (8.7mm) or M2480L04 (8.7mm)	M24S12	99,1	*3,9*	95,9	*3,8*	42,5	*1,7*
		M24S15	123,4	*4,9*	97,4	*3,8*	55,0	*2,2*
		M24S18	147,7	*5,8*	98,8	*3,9*	67,4	*2,7*
		M24S20	164,0	*6,5*	99,7	*3,9*	75,6	*3,0*
M2500 (10mm)		M25S12	98,6	*3,9*	95,8	*3,8*	43,0	*1,7*
		M25S16	130,8	*5,1*	97,9	*3,9*	59,4	*2,3*
		M25S18	146,9	*5,8*	98,9	*3,9*	67,6	*2,7*
		M25S20	163,0	*6,4*	99,7	*3,9*	75,8	*3,0*

M2670 ActivXchange

Transfer from Belt Type	to ActivX-change	Sprocket typ	Pitch Diameter Sprocket (PD)		Y1		Y2	
(thickness)	(thickness)		mm	*inch*	mm	*inch*	mm	*inch*
M2600 (12.7mm)	M2670L04 (12.7mm)	M26S12	99,1	*3,9*	96,1	*3,8*	40,5	*1,6*
		M26S16	131,5	*5,2*	97,9	*3,9*	57,2	*2,3*
		M26S18	147,7	*5,8*	98,9	*3,9*	65,4	*2,6*
		M26S21	172,1	*6,8*	100,2	*3,9*	77,8	*3,1*

Nosebar transfer for micropitch and minipitch belts
The micropitch belt (Series M0800) and the minipitch belts (Series M1000 ,M1100, M1200, M1960 and SM605) are perfectly suited for dynamic or static nosebars. This allows smooth and gentle transfer of the product with a short sliding distance to the following belt or table.

For certain transfer conditions a minimum diameter is possible. In this case the smoothness of the transfer may be reduced to some extent.

Please respect the correct geometric dimensions of rollers and transfer components.

Series	M0800	M1000	M1100	M1200	M1960	SM, CM605
	mm *inch*	mm *inch*	mm *inch*	mm *inch*	mm *inch*	mm *inch*
Minimum back-bending roller diameter R	50 *2*	75 *3*	75 *3*	75 *3*	75 *3*	75 *3*
Distance A between sprocket pitch diameter and roller R	9 *0.4*	12 *0.5*	11 *0.5*	15 *0.6*	12 *0.5*	12 *0.5*
Distance C1 between nosebars	16 *0.63*	20 *0.8*	22 *0.9*	30 *1.2*	20 *0.8*	30 *1.2*
Distance C2 Maximum width of transport plate	–	15 *0.6*	16 *0.6*	25 *1*	15 *0.6*	25 *1*
Minimum nosebar diameter D	6 *0.24*	12,7 *0.5*	12.7 *0.5*	18 *0.71*	18 *0.71*	19 *0.75*

For high speed applications a temperature conductive material e.g. hard chrome plated steel nosebar is needed.
Note: high speed nosebar applications can be noisy.

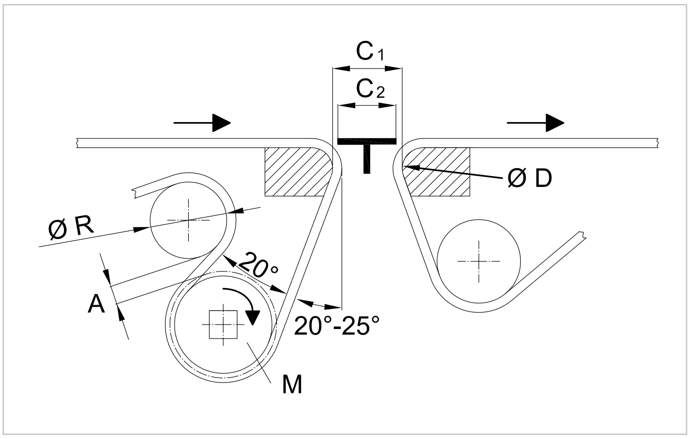


Figure 570

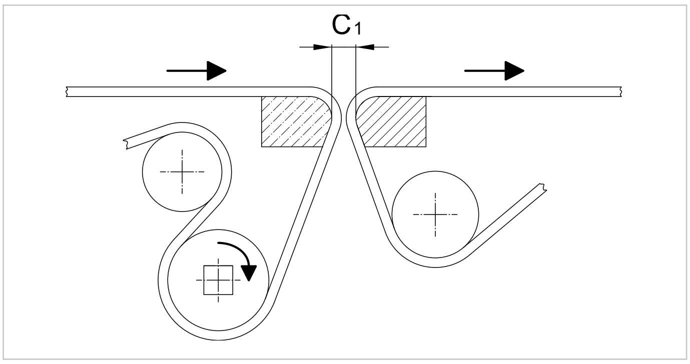


Figure 575: For M0800

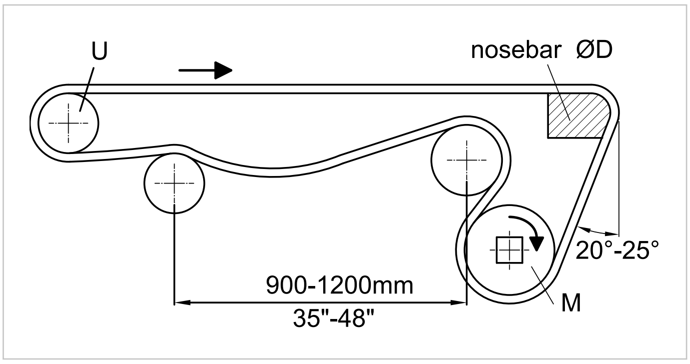


Figure 580

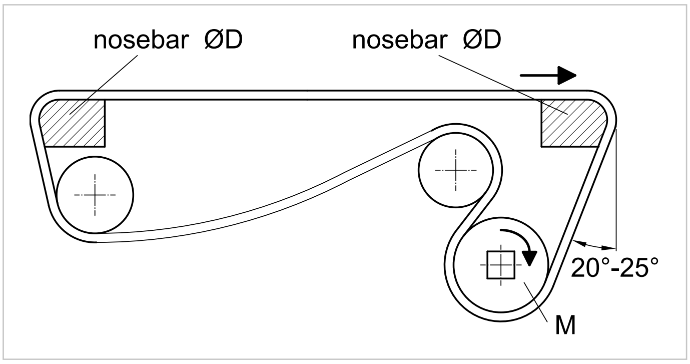
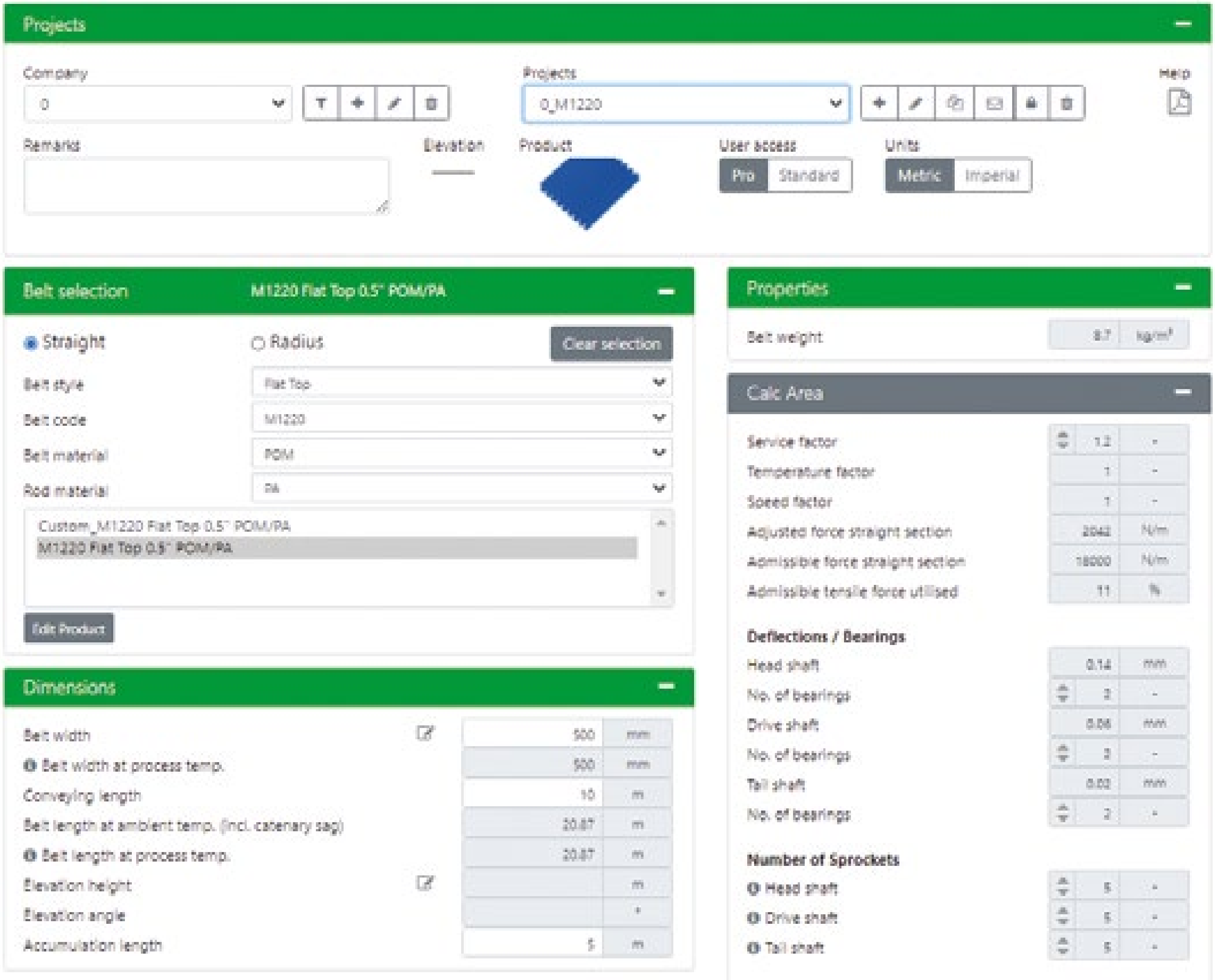


Figure 590

Habasit support for design and calculation
Habasit provides a calculation program **LINK-SeleCalc** to analyze the forces and verify the admissible belt strengths for different conveyor designs.

For any further questions and additional documentation please contact Habasit.



Calculation guide
Effective tensile force (belt pull) F'_E

Horizontal straight belt without accumulation

$$F'_E = (2\ m_B + m_P)\ l_0 \cdot \mu_G \cdot g\ [N/m]$$

Horizontal straight belt with accumulation, simplified

$$F'_E = [(2\ m_B + m_P)\ l_0 \cdot \mu_G + m_P \cdot \mu_P \cdot l_a]\ g\ [N/m]$$

Inclined conveyor without accumulation

$$F'_E = [(2\ m_B + m_P)\ l_0 \cdot \mu_G + m_P \cdot h_0]\ g\ [N/m]$$

Inclined conveyor with accumulation, simplified

$$F'_E = [(2\ m_B + m_P)\ l_0 \cdot \mu_G + m_P \cdot \mu_P \cdot l_a + m_P \cdot h_0]\ g\ [N/m]$$

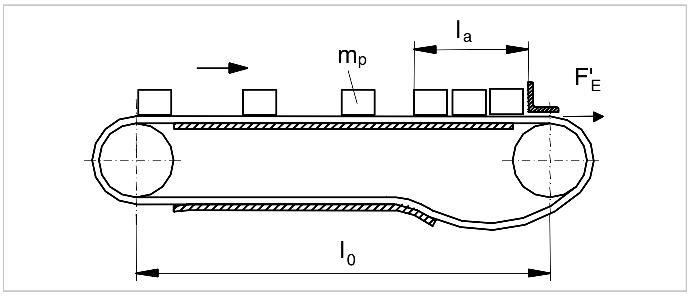


Figure 600

Further analyses of tensile forces caused by accumulated products

The above equations with accumulation are based on the simplification that the product load per m^2 of belt is the same over the accumulation length as when moving with the conveyor. This is generally not the case. In reality the density of the product distribution over the accumulation length l_a will be higher. Since this value is often unknown, it is common practice to use the same product load value for accumulation as for conveying.

In this case the above formulas have been used. The calculated force is somewhat too low, but normally not critical for straight belts. If the accumulated product load per m^2 is known, and for more accurate calculation, replace m_P in the term $m_P \cdot \mu_P \cdot l_a$ by m_{Pa}.
The following formulas result:

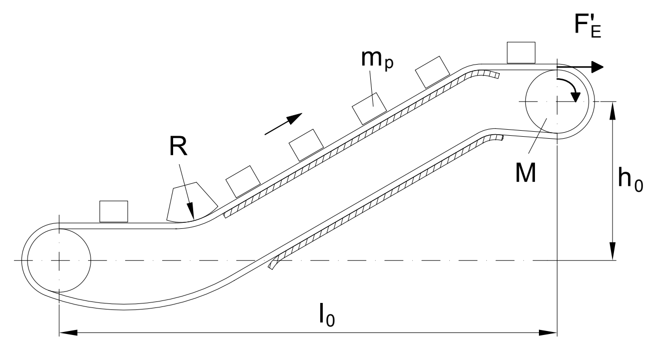
Horizontal straight belt with accumulation

$$F'_E = [(2\ m_B + m_P)\ l_0 \cdot \mu_G + m_{Pa} \cdot \mu_P]\ g\ [N/m]$$

Inclined conveyor with accumulation

$$F'_E = [(2\ m_B + m_P)\ l_0 \cdot \mu_G + m_{Pa} \cdot \mu_P \cdot l_a + m_P \cdot h_0]\ g\ [N/m]$$

g = Acceleration factor due to gravity (9.81 m/s^2)



F'_E	=	Effective tensile force [N/m]
m_B	=	Weight of belt [kg/m^2]
m_P	=	Weight of conveyed product [kg/m^2]
m_{Pa}	=	Weight of accumulated product [kg/m^2]
μ_G	=	Coefficient of friction belt to slider support
μ_P	=	Coefficient of friction belt to product
l_0	=	Conveying length [m]
l_a	=	Length of accumulation [m]
h_0	=	Height of elevation [m]
R	=	Back flexing radius

Figure 610

Calculation guide
Effective tensile force (belt pull) F'$_E$

Radius belts
Radius belts have higher friction losses than straight belts due to the radial forces directed to the inside of the curve. It must also be taken into account that in the belt curves tensile forces are not distributed over the total belt width but are concentrated at the outer belt edge.

Admissible tensile forces (F_{adm}) for radius belts
Since the belt pull in the curve is concentrated at the outer belt edge, the admissible belt force is limited by the belt strength of the outermost belt modules. Therefore the absolute tensile forces F_{SR} [N] are applied for comparison with the nominal belt strength F_N.

To calculate radius belts please consult Habasit's LINK-SeleCalc program.

Note
Due to the concentration of the belt pull (tensile forces) on the outer belt edge at the curve end, the applicable number of curves is very limited. In practice one to two curves are often used. For long radius belts it is advisable to place the curve as near to the idling shaft as possible. This way the belt pull at the outer curve edge is minimized.

Nominal strength for radius belts in curves
The nominal strength for radius belts in curves increases with wider belts (bigger radius). Due to the smaller angle between the modules the forces are distributed over more links. For high loads the application of steel rods may be advisable to increase belt stiffness.

Please contact your Habasit representative for detailed information.

An appropriate quality of conveyor, especially regarding smooth and low coefficient of friction, inside wear strips and smooth start-up, is important. The belt on the return way must be properly held down by wear strips or hold-down tabs as described in the design guide.

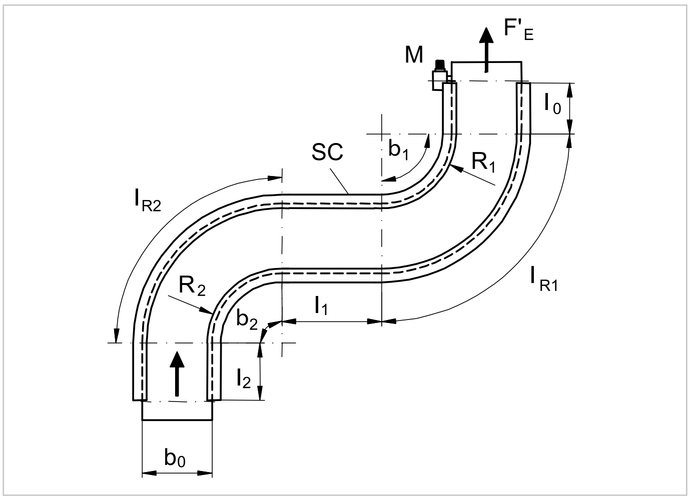


Figure 620

Calculation guide
Admissible tensile force F_{adm}

Speed and temperature reduce the maximum admissible tensile force F'_{adm} below nominal tensile strength F'_N. For nominal tensile strength F'_N please refer to the product data sheets.

$$F'_{adm} = F'_N \cdot c_T \cdot c_V \text{ [N/m]}$$

F'_{adm} = Admissible tensile force [N/m]
F'_N = Nominal tensile strength [N/m]
c_T = Temperature factor (see diagram below)

For radius belt calculations absolute tensile forces are applied (N). See also the calculation guide for radius belts.

Speed factor c_V
The belt speed increases the stress on the belt mainly at the point where the direction of movement is changing:
- Driving sprockets
- Idling shafts with or without sprockets
- Support rollers
- Snub rollers

Centrifugal forces and sudden link rotations increase the forces on the belt and belt wear. These impacts are substantially increased above 30 m/min *(98 ft/min)*.

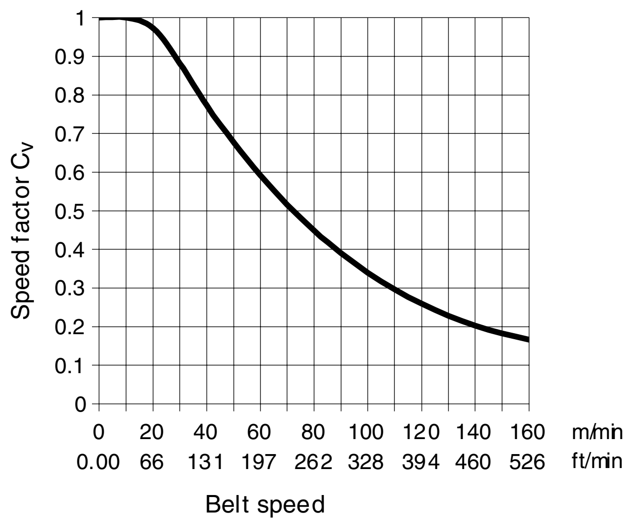


Figure 630

Lifetime (influence of belt length and sprocket/roller size)
The calculation with c_v does not take into account the influence of the conveyor length and sprocket/roller sizes used. These design features influence belt lifetime, because the number and angle of link rotations depend on them. The bigger the number and / or angle of rotation, the greater the wear in the link and the earlier the belt will be lengthened to its limit.
General rule:
- Doubling the length reduces the number of link rotations by half and vice versa.
- Doubling the sprocket/roller diameter reduces the angle of link rotation by half and vice versa.

Consequently belt lifetime increases/decreases in the same relation. For belt lifetime, lengthening of the belt is a main criterion. The initial length is measured after running-in, generally for about one hour.

General rule: The maximum **allowable belt lengthening is approx. 3%** of the belt length. When this value is reached, the belt should be exchanged. Belt lifetime cannot easily be predicted since the rate of wear on the links and consequent lengthening depends on the process and environmental conditions (dust, sand and other contaminants).

Calculation guide
Admissible tensile force F_{adm}

Temperature factor c_T
The measured breaking strength (tensile test) of thermoplastic material increases at temperatures below 20 °C *(68 °F)*. At the same time other mechanical properties are reduced at low temperatures.
For this reason:

At temperatures **< 20 °C *(68 °F)*: c_T = 1**

Standard materials

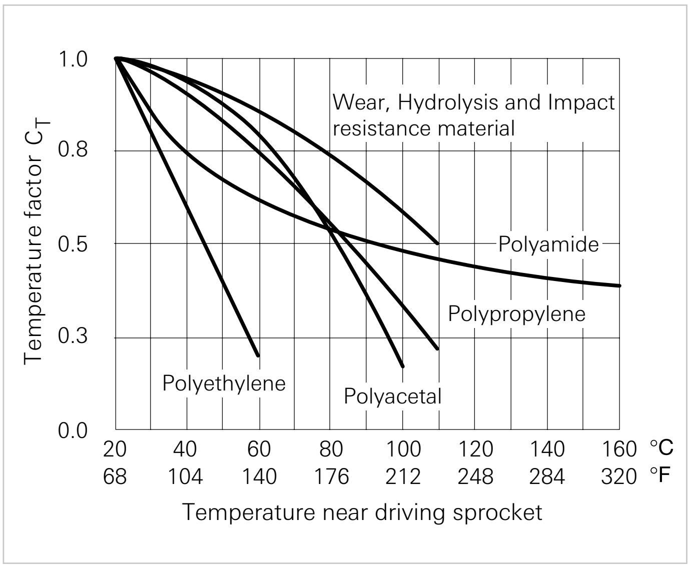


Figure 640

Special materials

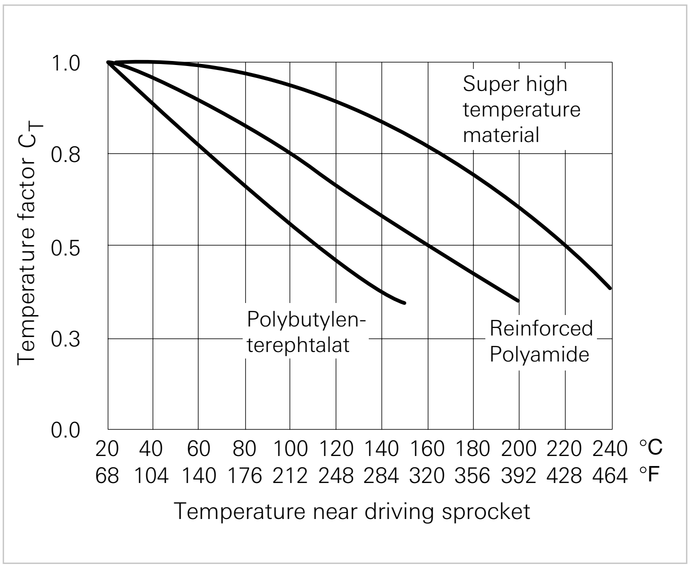


Figure 650

Calculation guide
Dimensioning of shafts

Select shaft type, shaft material and size. The shaft must fulfill the following conditions:

- Max. shaft deflection under full load (F_W):
  f_{max} = 2.5 mm *(0.1")*
  For a more accurate approach please refer to the LINK-SeleCalc program. If the calculated shaft deflection exceeds this maximum value, select a bigger shaft size or install an intermediate bearing on the shaft.

Shaft deflection

2 bearings: $f = 5/384 \cdot F_W \cdot l_b^3/(E \cdot I)$ [mm]

3 bearings: $f = 1/2960 \cdot F_W \cdot l_b^3/(E \cdot I)$ [mm]

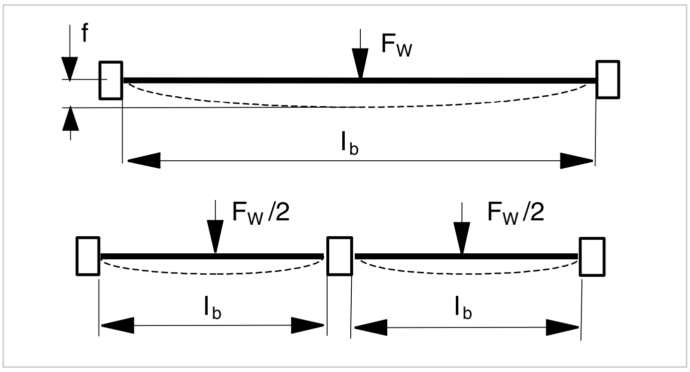


Figure 660

For uni-directional head drives: $F_W = F'_S \cdot b_0$
For lower head drives: $FW = 1.5 \cdot F'_S \cdot b_0$
For bi-directional center drives: $F_W = 2 \cdot F'_S \cdot b_0$
For uni-directional pusher drives: $F_W = 2.2 \cdot F'_S \cdot b_0$
For bi-directional pusher drives: $F_W = 3.2 \cdot F'_S \cdot b_0$
Note: pusher drives need a tensioning device

b_0 = Belt width [m]
l_b = Distance between bearings [mm]
If the effective distance is not known use belt width + 100 mm

Torque on journal (shaft end on motor side)

The torque is calculated in order to evaluate the shaft journal diameter needed for transmission. Verify the selected size of the shaft journals by comparing the effective torque (T_M) with the **admissible torque** (tadm).

Effective torque: $T_M = F'_S \cdot b_0 \cdot d_P/2 \cdot 10^{-3}$ [Nm]

Admiss. torque: $T_{adm} = \tau_{adm} \cdot p \cdot d_W^3/16 \cdot 10^{-3}$
Simplified: $T_{adm} = \tau_{adm} \cdot d_W^3/5000$ [Nm]

b_0 = Belt width [m]
d_P = Pitch diameter of sprocket [mm]
τ_{adm} = Max. admissible shearing stress [N/mm^2]
For carbon steel approx. 60 N/mm^2
For stainless steel approx. 90 N/mm^2
For aluminum alloy approx. 40 N/mm^2
d_W = Shaft diameter [mm]

Calculation guide
Calculation of the catenary sag

Catenary sag (belt sag) is an unsupported length of the belt used to absorb belt length variations caused by thermal expansion/contraction and load changes on the belt. In addition, due to its weight the sag exerts tension on the belt, which is necessary for firm engagement of the sprockets in the belt. This tension depends on the length (l_C) and height (h_C) of the sag and the distance to the drive sprockets.

The following minimal tension force should be applied by the catenary sag for proper sprocket engagement (catenary sag after drive sprockets):

0.3" belts: 50 N per m belt width *(3.5 lb/ft)*
0.5" and 1" belts: 75 N per m belt width *(5 lb/ft)*
1.5" and 2" belts: 100 N per m belt width *(7 lb/ft)*
2.5" belts: 125 N per m belt width *(9 lb/ft)*

Experience shows that the sag of the dimensions recommended on page 23 provides the belt tension needed for proper engagement of the sprockets.
For belts running in cold environments (freezers, etc.) additional belt length should be considered in the catenary layout to compensate for belt shortening (see the next page).

Belt tension of catenary sag F′c

$F'_C = (l_C^2 \cdot m_B \cdot g)/(8 \cdot h_C)$ [N/m]

Example:
For l_C = 1 m, m_B = 10 kg/m², h_C = 0.122 m,
we get: F'_C = 100 N/m (≈ 10 kg/m)

Required distance length lc

$l_C = ((F'_C \cdot 8 \cdot h_C)/(m_B \cdot g))^{0.5}$

Example for a 1" belt:
For F'_C = 150 N per m belt width *(10 lb/ft)*, m_B = 10 kg/m², h_C = 0.075 m, we get: l_C = 1 m

F'_C	=	Belt tension of catenary sag [N]
l_C	=	Length of the sag [m]
h_C	=	Height of the sag [m]
m_B	=	Weight of belt [kg/m²]
g	=	Acceleration factor due to gravity (9.81 m/s²)

Belt elongation

While operation the belt is exposed to wear, load and temperature changes. These factors will elongate the belt and increase the catenary height lc. The catenary sag(s) should not exceed 152 mm (6") in height.

If the conveyor design does not allow for a sufficient number of catenary sags for length compensation a gravity take-up assembly is required.

During first time belt starting up and while running in phase (for a about 1-2 weeks) the catenary sag(s) must be monitored regularly and the belt has to be shorten if needed.

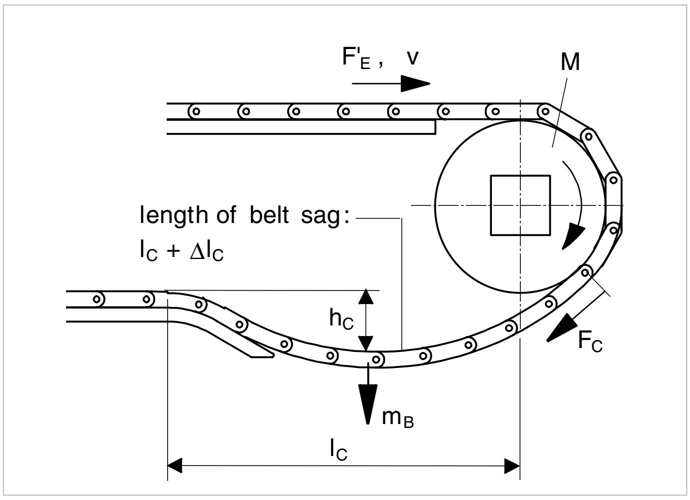


Figure 670

Calculation guide
Effective belt length and width

After the sag length (l_C) and height (h_C) have been established, it is important to calculate the excess belt length (Δl_C) required by the sag (see formula below). This permits calculation of the final belt length needed.

$$\Delta l_C = 2.66 \cdot (h_C / 1000)^2 / l_C \text{ [m]}$$

$$l_g = 2 \cdot l_0 + d_P / 1000 \cdot PI + 2.66 \cdot (h_C / 1000)_2 / l_C \text{ [m]}$$

l_g, l_0, l_C = Length [m]
d_P = Pitch diameter of sprocket [mm]
h_C = Height of catenary sag [mm]

The calculated geometrical belt length (l_g) is the total belt length, which equals the length of the transport side plus the return side, and the sprocket circumference plus the excess length of the catenary sag (Δl_C). The final length of the assembled belt will be somewhat longer than the calculated length, due to the clearance between the pivot rod and the bore in the link (hinge clearance). The excess length may be around 1 % of the belt length.

Influence of thermal expansion
After installation the belt may be heated or cooled by the process, so its length will change and consequently the height h_c of the catenary sag will change as well. The resulting belt length difference will have to be compensated for within the tolerance of the sag height. For recommended dimensions of the catenary sag see page 23. The sag height should not be below 25 mm. If the process temperature deviates from the installation temperature, correct the calculated belt length as indicated by this formula:

$$l_g(T) = l_g + l_g / 1000 \cdot \alpha \cdot (T_2 - T_1) \text{ [m]}$$

l_g = Total belt length [m]
T_1 = Installation temperature [°C]
T_2 = Process temperature [°C]
α = Coeff. of linear thermal expansion

Belt material	Average coeff. of linear thermal expansion α	
	mm / (m · °C)	*in / (ft · °F)*
Polypropylene	0.13	*0.00087*
Polyethylene	0.20	*0.00133*
Polyoxymethylene (Acetal)	0.09	*0.00060*
Polybutyleneterephtalate	0.12	*0.00078*
Polyamide	0.12	*0.00078*
Polyamide reinforced	0.08	*0.00053*
Super high temperature material	0.05	*0.00033*
Wear Hydrolysis and Impact resistant material	0.1	*0.0007*

Calculation guide
Effective belt length and width

Dimensional changes due to moisture
Dimensional changes due to moisture absorption are generally quite small under common operating conditions. Therefore for all HabasitLINK® thermoplastic materials used, dimensional changes due to moisture absorption do not have to be considered, except for polyamide.

HabasitLINK® polyamide products absorb moisture from the air and reach an equilibrium at about 2.8% water at 50% RH (relative humidity) and at about 8.5% at 100% RH. The day-to-day or week-to-week variations in relative humidity have little effect on the total moisture content of HabasitLINK® polyamide products.

PA rods
PA rods can also absorb moisture which mainly affects the rod length. The typical elongation of an unconditioned PA rod from dry to wet environments is between 1% and 2% of rod length. This should be considered when using PA rods. Habasit recommends reducing the PA rod length as follows:

Unconditioned PA rods
For dry applications (humidity < 60%) 1%
For wet applications (humidity > 60%) 2%

Conditioned PA rods
For dry applications (humidity < 60%) 0%
For wet applications (humidity > 60%) 1%

Material properties
Chemical resistance

The data presented in the following table are based on the information given by the raw material manufacturers and suppliers. It does not remove the need for qualification testing of the products for your application. In individual cases the stability of the material in the medium in question should be examined.

Conditionally resistant: material may be used under certain limited conditions (e.g. period of exposure, temperature, the concentration and the type of the chemicals)

Rating	Polypropylene (PP)	Polyethylene (PE or PE- UHMW)	Polyoxymethylene (POM) Acetal
	Also valid for +FR,+AS, +EC, +FC, +GH	Also valid for +DE and +H15	Also valid for +AS,+EC, +DE, +UV, +IM,+JM, +LF,+ PK and +UF
Resistant	**Acids** (dilute or weak)	**Acids** (dilute or weak)	**Alcohols** (Ethanol, Isopropanol, Methanol)
	Alcohols (Ethanol, Isopropanol, Metha-nol)	**Acids** (strong/concentrated)	**Alkalis** (Sodium hydroxide, Potassium hydroxide, Ammonia)
	Alkalis (Sodium hydroxide, Potassium hydroxide, Ammonia)	**Alcohols** (Ethanol, Isopropanol, Metha-nol)	**Detergents**
	Detergents	**Alkalis** (Sodium hydroxide, Potassium hydroxide, Ammonia)	**Greases, lubricants**
	Ketones (Aceton, Methyethyl ketone, Cyclohexanone)	**Detergents**	**Fuels** (diesel, gasoline, kerosene)
		Ketones (Aceton, Methyethyl ketone, Cyclohexanone)	**Mineral oil**
		Oxidants (Bleaches, Hydrogen peroxide, Ozone, Peracetic acid)	**Vegetable oils** (Olive oil, Sunflower oil)
Conditionally resistant	**Acids** (strong/concentrated)	**Fuels** (diesel, gasoline, kerosene)	**Acids** (dilute or weak)
	Fuels (diesel, gasoline, kerosene)	**Mineral oil**	
	Mineral oil	**Vegetable oils** (Olive oil, Sunflower oil)	**Ketones** (Aceton, Methyethyl ketone, Cyclohexanone)
	Oxidants (Bleaches, Hydrogen peroxide, Ozone, Peracetic acid)		
	Vegetable oils (Olive oil, Sunflower oil)		
Not resistant	**Aromatic hydrocarbons** (Benzene, Toluene, Xylene)	**Aromatic hydrocarbons** (Benzene, Toluene, Xylene)	**Acids** (strong/concentrated)
	Halogenated hydrocarbons (Chloroform, Tetrachloroethylene)	**Halogenated hydrocarbons** (Chloro-form, Tetrachloroethylene)	**Oxidants** (Bleaches, Hydrogen peroxide, Ozone, Peracetic acid)
		Mineral oil	**Halogenated hydrocarbons** (Chloroform, Tetrachloroethylene)
			Dimethylformamide, Dimethylsulfoxide
			Phenols

Material properties
Chemical resistance

Rating	Wear, hydrolysis and impact resistance material (WHI)	Polyamide (PA)	Polybutylene terephthalate (PBT)
		Also valid for +GF, +HT, +HN, +RM and +IM	Also valid for +FR
Resistant	**Acids** (dilute or weak)	**Alkalis** (Sodium hydroxide, Potassium hydroxide, Ammonia)	**Acids** (dilute or weak)
	Alcohols (Ethanol, Isopropanol, Methanol)	**Aromatic hydrocarbons** (Benzene, Toluene, Xylene)	**Alcohols** (Ethanol, Isopropanol, Methanol)
	Aromatic hydrocarbons (Benzene, Toluene, Xylene)	**Detergents**	**Aromatic hydrocarbons** (Benzene, Toluene, Xylene)
	Detergents	**Greases, lubricants**	**Detergents**
	Greases, lubricants	**Ketones** (Aceton, Methyethyl ketone, Cyclohexanone)	**Greases, lubricants**
	Fuels (diesel, gasoline, kerosene)	**Mineral oil**	**Fuels** (diesel, gasoline, kerosene)
	Ketones (Aceton, Methyethyl ketone, Cyclohexanone)	**Vegetable oils** (Olive oil, Sunflower oil)	**Ketones** (Aceton, Methyethyl ketone, Cyclohexanone)
	Mineral oil		**Mineral oil**
	Vegetable oils (Olive oil, Sunflower oil)		**Vegetable oils** (Olive oil, Sunflower oil)
Conditionally resistant	**Alkalis** (Sodium hydroxide, Potassium hydroxide, Ammonia)	**Alcohols** (Ethanol, Isopropanol, Methanol)	**Acids** (strong/concentrated)
	Oxidants (Bleaches, Hydrogen peroxide, Ozone, Peracetic acid)		**Oxidants** (Bleaches, Hydrogen peroxide, Ozone, Peracetic acid)
Not resistant	**Acids** (strong/concentrated)	**Acids** (dilute or weak)	**Alkalis** (Sodium hydroxide, Potassium hydroxide, Ammonia)
	Halogenated hydrocarbons (Chloroform, Tetrachloroethylene)	**Acids** (strong/concentrated)	**Hot water** (>50 °C)
		Hot water (>50 °C)	**Halogenated hydrocarbons** (Chloroform, Tetrachloroethylene)
		Oxidants (Bleaches, Hydrogen peroxide, Ozone, Peracetic acid)	
		Phenols	

Material properties
Chemical resistance

Rating	Super high temperature material (ST)	Thermoplastic polyurethane (TPU)	Thermoplastic elastomer (TPE)
			Also valid for +FR
Resistant	**Acids** (dilute or weak)	**Acids** (dilute or weak)	**Acids** (dilute or weak)
	Alcohols (Ethanol, Isopropanol, Methanol)	**Detergents**	**Alkalis** (Sodium hydroxide, Potassium hydroxide, Ammonia)
	Alkalis (Sodium hydroxide, Potassium hydroxide, Ammonia)	**Greases, lubricants**	**Detergents**
	Aromatic hydrocarbons (Benzene, Toluene, Xylene)	**Vegetable oils** (Olive oil, Sunflower oil)	
	Detergents		
	Greases, lubricants		
	Ketones (Aceton, Methyethyl ketone, Cyclohexanone)		
	Mineral oil		
	Vegetable oils (Olive oil, Sunflower oil)		
Conditionally resistant	**Acids** (strong/concentrated)	**Alcohols** (Ethanol, Isopropanol, Methanol)	**Alcohols** (Ethanol, Isopropanol, Methanol)
		Alkalis (Sodium hydroxide, Potassium hydroxide, Ammonia)	
	Oxidants (Bleaches, Hydrogen peroxide, Ozone, Peracetic acid)		
		Aromatic hydrocarbons (Benzene, Toluene, Xylene)	
		Fuels (diesel, gasoline, kerosene)	
		Mineral oil	
Not resistant	**Halogenated aromatic hydrocarbons**	**Ketones** (Aceton, Methyethyl ketone, Cyclohexanone)	**Aromatic hydrocarbons** (Benzene, Toluene, Xylene)
		Oxidants (Bleaches, Hydrogen peroxide, Ozone, Peracetic acid)	**Mineral oil**
		Halogenated hydrocarbons (Chloroform, Tetrachloroethylene)	**Oxidants** (Bleaches, Hydrogen peroxide, Ozone, Peracetic acid)
			Vegetable oils (Olive oil, Sunflower oil)

Conditionaly resistant: material may be used under certain limited conditions.
Chemical resistance depends on the period of exposure, temperature, the concentration and the type of the chemical substance.

→ Tracking problems

Possible cause	Recommended measures
Sprockets not "timed" correctly	If the total number of teeth is not divisible by four, the sprockets must be "timed" by aligning the timing marks.
Sprockets on drive and idle shaft misaligned; locked sprocket on drive or idle shaft has incorrect placement or is loose	The center sprocket on the drive and idle shafts must be aligned and engaging the belt. Check the retaining devices to ensure the sprockets are secured.
Conveyor frame not level and square	Check and adjust if necessary.
Drive and idle shafts are not level and square with each other	Check and adjust if necessary to ensure that drive and idle shafts are level and square.
Bad splice in belt	Inspect belt for a bad splice.

→ Sprocket engagement fails

Possible cause	Recommended measures
Sprockets not "timed" correctly	If the total number of teeth is not divisible by four, the sprockets must be "timed" by aligning the timing marks.
Insufficient belt tension	Check to see that there is sufficient length for the catenary sag located in the recommended area, see design guide.
Arc of contact too small	Check belt wrap to drive sprockets. Minimum arc of contact should be 180°.
Belt length at center or lower head drive configuration is longer than the catenary sag length	Increase catenary sag distance. Increase belt wrap to approx. 200°. Check distance from shaft to backbending or snub roller(s) (2–3 times belt pitch). If necessary, install a gravity roller(s).

→ Excessive sprocket wear

Possible cause	Recommended measures
Abrasive material	Improve cleaning or add protective shields to reduce the amount of abrasive material in contact with the belt and sprockets. Use TPU sprockets.
Incorrect number of sprockets	Check to see if the minimum number of recommended sprockets is used. Too few sprockets will cause premature sprocket wear.
Sprockets not "timed" correctly	If the total number of teeth is not divisible by four, the sprockets must be "timed" by aligning the timing marks.
Incorrect "A1" and "C" dimensions	Check to see that the shaft is adjusted to provide the recommended "A1" and "C" dimensions.
Locked sprocket on drive or idle shaft has incorrect placement or is loose (sprockets misaligned)	The center sprocket on the drive and idle shafts must be aligned and engaging the belt. Check the retaining devices to ensure the sprockets are secured.
High belt speed	High belt speeds will increase belt wear, especially on conveyors with short centerline distances. Reduce belt speed if possible.
High belt tension	High belt tension will increase belt wear. Check to ensure the recommended catenary sag is present. Use TPU sprockets.

→ Excessive belt wear

Possible cause	Recommended measures
Abrasive material	Improve cleaning or add protective shields to reduce the amount of abrasive material in contact with the belt and sprockets.
Incorrect belt material	Check material specifications to ensure that the optimal material is used. Call the Habasit technical service team for recommendations.
Incorrect wear strip material	Check material specifications to ensure that the optimal material is used. Call the Habasit technical service team for recommendations.
Incorrect wear strip placement	Check material specifications to ensure that the optimal material is used. Call the Habasit technical service team for recommendations.
Method of product loading	Reduce the distance at which product is deposited on the belt. If product sliding occurs, refer to material specifications.
High belt speed	High belt speeds will increase belt wear, especially on conveyors with short centerline distances. Reduce belt speed if possible.

→ Belt stretching and excessive catenary sag

Possible cause	Recommended measures
Abrasive material	Improve cleaning or add protective shields to reduce the amount of abrasive material in contact with the belt and sprockets.
Incorrect tension	Adjust.
Incorrect belt/rod material	Check the material combinations used and call Habasit to confirm the correct material for the application.
High temperatures	High temperatures cause the belt to elongate by a large percentage. Check if the catenary sag is long enough to compensate the elongation. It may be necessary to install a gravity or pneumatic tensioning device.

→ Pivot rod (hinge pin) migrating out of belt

Possible cause	Recommended measures
Rods not properly seated in snap-in position	Check if the rod head and/or edge module is damaged; if necessary replace. Reinstall properly.
Rod elongates due to high load and/or high temperature	Shorten the rod and reinstall or replace it by a new and shorter rod.
Rod does not snap in properly (too loose or too tight)	Check if the correct rod is used → see product data sheet
Rod cannot be extracted	Smart Fit retaining system: check correct screw-driver position (should be between modules).

Appendix
List of abbreviations

1. Symbols for calculations

Term	Symbol	Metric unit	Imperial unit
Acceleration factor due to gravity	g	9.81 m/s^2	–
Adjusted tensile force (belt pull) with service factor, per m of belt width	F'_S	N/m	*lb/ft*
Admissible tensile force, per m of belt width	F_{adm}	N/m	*lb/ft*
Belt (module) pitch	p	mm	*inch*
Belt length with accumulated products	l_a	m	*ft*
Belt speed	v	m/s	*ft/min*
Belt tension caused by the catenary sag	F'_C	N/m	*lb/ft*
Belt width	b_0	mm	*inch*
Coefficient of friction belt/product	μ_P	–	–
Coefficient of friction belt/support	μ_P	–	–
Coefficient of thermal expansion	α	$\frac{mm}{m \cdot °C}$	$\frac{inch}{ft \cdot °F}$
Collapse factor (radius belts)	Q	–	–
Conveying distance, horizontal projection	l_0	m	*ft*
Conveying height	h0	mm	*inch*
Distance between bearings	l_b	mm	*inch*
Effective tensile force (belt pull), per m of belt	F'_E	N/m	*lb/ft*
Height of catenary sag	h_C	mm	*inch*
Inner radius of curve radius belt	R	mm	*inch*
Length of catenary sag	l_C	mm	*inch*
Length of curve (radius belt)	l_R	mm	*inch*
Mass of belt / m^2 (weight of belt/m^2)	m_B	kg/m^2	*lb/sqft*
Mass of product/m^2 (weight of prod./m^2)	m_P	kg/m^2	*lb/sqft*
Nominal tensile strength, per m of belt width	F'_N	N/m	*lb/ft*
Operating temperature	T	°C	*°F*
Pitch diameter of sprocket	d_P	mm	*inch*
Shaft deflection	f	mm	*inch*
Shaft diameter	d_W	mm	*inch*
Shaft load	F_W	N	*lb*
Speed factor	c_V	–	–
Temperature factor	c_T	–	–
Torque of motor	T_M	Nm	*in-lb*
Total geometrical belt length	l_g	mm	*inch*

2. Symbols for illustrations

Term	Symbol	Metric unit	Imperial unit
Belt	BE		
Belt thickness	S	mm	*inch*
Catenary sag	CA	–	–
Distance between end of slider support and sprocket shaft center	C	mm	*inch*
Height of flights/side guards	H	mm	*inch*
Hub size (shaft diameter) of sprocket, square or round	B	mm	*inch*
Idling shaft	U	–	–
Inside radius of radius belt or Roller	R	–	–
Length of flight module	L	mm	*inch*
Level (height) of belt surface from the shaft center	A0	mm	*inch*
Level (height) of slider support from the shaft center	A1	mm	*inch*
Motor/drive shaft	M	–	–
Offset center sprocket from belt centerline	e	mm	*inch*
Pitch diameter of sprocket	dp	mm	*inch*
Retainer clip for sprockets	RC	–	–
Side guides radius belt (hold-down rails)	SC	–	–
Slider shoe for hold-down or support of belt	SH	–	–
Slider support return side	SR	–	–
Slider support transport side	ST	–	–
Sprocket	SP	–	–
Sprocket distance	a	mm	*inch*
Sprocket distance to left belt edge	XL	mm	*inch*
Sprocket distance to right belt edge	XR	mm	*inch*
Take-up device (tensioning device)	TU	–	–
Thickness of transfer plate (comb)	K	mm	*inch*
Wear strip for support of flights on return way	SF	–	–
Tangential distance beteween sprocket pitch diameter and roller	A	mm	*inch*

Appendix
Conversion of units metric / imperial

Metric units		Factor to convert to imperial units			Factor to convert to metric units		
Length							
mm	millimeter	0.0394	*in*	*inch*	25.4	mm	millimeter
m	meter	3.281	*ft*	*foot*	0.3048	m	meter
Area							
mm^2	square-millimeter	0.00155	*in^2*	*square-inch*	645.2	mm^2	square-millimeter
m^2	square-meter	10.764	*ft^2*	*square-foot*	0.0929	m^2	square-meter
Speed							
m / s	meter / second	3.281	*ft / s*	*foot / second*	0.3048	m / s	meter / second
m / min	meter / minute	3.281	*ft / min*	*foot / minute*	0.3048	m / min	meter / minute
Mass							
kg	kilogram	2.205	*lb*	*pound-weight*	0.4536	kg	kilogram
kg / m	kilogram / meter	0.672	*lb / ft*	*pound / foot*	1.4882	kg / m	kilogram / meter
kg / m^2	kilogram / sqm	0.205	*lb / ft^2*	*pound / square-foot*	4.882	kg / m^2	kilogram / sqm
Force and strength							
N	Newton	0.225	*lb*	*pound-force*	4.448	N	Newton
N / mm	Newton / millimeter	5.7102	*lb / in*	*pound / inch*	0.17513	N / mm	Newton / millimeter
N / m	Newton / meter	0.0685	*lb / ft*	*pound / foot*	14.6	N / m	Newton / meter
Power							
kW	kilowatt	1.341	*hp*	*horsepower*	0.7457	kW	kilowatt
Torque							
Nm	Newton-meter	8.85	*in-lb*	*inch-pound*	0.113	Nm	Newton-meter
Temperature							
°C	Celsius	9 · (°C / 5) + 32°	*°F*	*Fahrenheit*	5 / 9 · (°F -32°)	°C	Celsius

Appendix
Glossary of terms

Term	Explanation	Habasit symbol
Accumulation conveyors	Conveyors that collect temporary product overflows.	l_a
Accumulation length (distance)	Length of product accumulation in running direction of the belt.	
Acetal	See Polyacetal.	
Adjusted tensile force (adjusted belt pull) per meter of belt width	Applies a service factor to adjust the effective tensile force calculated near the driving sprocket, taking into account possible inclines and frequent starts/stops.	F'_S
Admissible tensile force per meter of belt width	Force or belt pull per meter of belt width allowed near the driving sprocket under operating conditions (temperature, speed).	F'_{adm}
Backbending	Negative bending of the belt (opposite of belt bending over sprocket)	
Conveying length	Conveying length measured as a vertical projection of distance between the centers of the driving and idling shafts.	l_0
Belt length (theoretical)	Length of the belt measured around the sprockets including the additional length of the catenary sag.	l_g
Belt pitch (module pitch)	Center distance between the pivot rods (hinge rods) of a belt module.	p
Belt width	Geometrical width of an assembled belt from edge to edge.	b_0
Bi-directional drive	Driving concept allowing the belt to run forwards and backwards.	
Bricklaid	The modules of the assembled belts are staggered from row to row (like bricks in a brick wall).	
Carry way	Transport side of the belt, carrying the product.	
Catenary sag	Unsupported length of the belt used for absorbing belt length variations due to belt thermal expansion and load changes.	CA
Center driven belt	Sprocket of the belt engaging in the middle of the modules.	
Central drive concept	Motor located on the lower belt track halfway between the belt ends (for bi-directional drive).	
Chevron supports	Belt supports with wear strips arranged in an overlapping “V” pattern.	
Chordal action	Polygon effect: pulsation of the belt velocity caused by the polygon shape of the driving sprocket, with rise and fall of the belt surface.	
Coefficient of friction	Ratio of frictional force and contact force acting between two material surfaces.	μ_G, μ_P
Coefficient of thermal expansion	Ratio of belt lengthening and the product of belt length and temperature change.	α
Dead plate	A metal or plastic plate installed between meeting conveyors as a transfer bridge.	
Effective tensile force (effective belt pull) per meter of belt width	Calculated near the driving sprocket, where in most cases it reaches its maximum value during operation. It depends on the friction forces between the belt and the slider supports (ST) and (SR) as well as friction against the accumulated load.	F'_E
Elevating conveyor	Conveyors transporting products to a higher or lower level, using flights or other suitable means to keep the products in place.	
EU	Material is compliant for food contact articles in at least one member state of the European Union.	EU
FDA	Food and Drug Administration. US federal agency that regulates what materials may come into contact with food.	FDA
Finger plates (combs)	Transfer plates, installed at the belt ends of a raised rib belt. Their fingers extend between the ribs of the belt for smooth transfer of the product	
Flat top belt	Flat top belt with 0% open area and a variety of reverse sides, e.g. smooth (M5010) or grid-like reinforcement (e.g. M2520)	
Flat top belt, perforated	The same as a flat top belt solid, but its plate modules have slots or holes for draining fluids.	
Flight	Belt module with a molded vertical plate for elevating conveyors. Flights prevent the product from slipping back while being moved upwards.	

Appendix
Glossary of terms

Term	Explanation	Habasit symbol
Flush grid belt	Belt with a large percentage of open area, usually over 20%. Particularly suitable for washing, cooling applications, or if dust/dirt falls off the product.	
Gravity take-up	Belt is tensioned by the weight of a roller resting on the belt at the catenary sag on its return way (mainly for long belts).	
Hinge driven belts	Sprocket engages at the hinge of the belt.	
Hold-down device	Module with a T-shaped tab on the belt bottom, running in special guiding rails. Mainly used for large Z-conveyors to keep the belt on the base when changing from a horizontal to an inclined run.	
Hold-down tab (Hook modules)	"Hook" shaped tabs on the bottom of the radius belt edge, running below a guide rail. Prevents the belt lifting in the curve.	
Idling shaft	Shaft at the belt end opposite to the driving shaft. It is normally equipped with sprockets. As an alternative for shorter belts, flat drums can be used.	
Indent	Space at the belt edge free of flights or rubber lining.	
ISO 340 and EN 20340	International standard for flame retardation of conveyor belts. A standardized test specimen is cut out of a belt, including a rod and modules, and is exposed to a flame for 45 seconds. The standard is met if the flame is extinct within 15 seconds after the flame is removed.	**ISO 340**
Mass of belt per m^2 (belt weight per m^2)	The belt mass (weight) is added to the product mass per m^2 for calculation of the friction force between the belt and the slider frame.	$\mathbf{m_B}$
Mass of product per m^2 (product weight per m^2)	Conveyed product weight as expected to be distributed over the belt surface; calculated average load per m^2.	$\mathbf{m_P}$
Nominal tensile strength per meter of belt width	Catalogue value. This reflects the maximum allowable belt pull at room temperature and very low speed.	$\mathbf{F'_N}$
Oblong hole	Pivot hole with an oblong shape for better cleaning.	
Open area	Percentage of open surface (real vertical openings).	
Open contact area	Percentage of belt surface which is not in contact with the conveyed product.	
Open hinge	The module hinge is designed so that the pivot rod (hinge rod) is exposed for a part of its surface, allowing better cleaning.	
Perforated flat top	See flat top perforated.	$\mathbf{d_P}$
Pitch diameter	Diameter of the sprocket, which defines the position of the pivot rods of the driven belt.	
Pivot rods (hinge rods)	These rods (pins) link the modules of a belt to provide pivoting and strong connection. Materials are normally PP, POM and PE.	
Polygon effect	"Chordal action": pulsation of the belt velocity caused by the polygon shape of the driving sprocket, with rise and fall of the belt surface.	
Radius belt	Belt suitable for running around curves (radius applications).	
Raised rib belt	Belt with higher longitudinal ribs on its top surface. These ribs create longitudinal "slots" for the engagement of finger plates for smooth product transfer at the belt ends.	
Screw type take-up	The catenary sag is adjusted by means of a screw tensioning device at the idling shaft of the conveyor.	
Service factor	The calculated effective belt pull is adjusted by the service factor, taking into account possible heavy running conditions (start/stop, inclination).	$\mathbf{c_S}$
Sideguards	Plates designed to be installed lengthwise at the belt edge to form a wall. Usually used in connection with flights.	
Slider support/bed	Frame equipped with wear strips to carry the running belt with low friction and wear. A closed plate is called a slider bed.	**ST, SR**
Speed factor	The nominal tensile strength, valid at very low speeds and room temperatures, is reduced to the admissible tensile force by the influence of higher speeds and/or temperatures; therefore it is multiplied by the respective factor.	$\mathbf{c_V}$

Appendix
Glossary of terms

Term	Explanation	Habasit symbol
Spiral conveyor	Radius belt with more than one full turn, travelling in a helical path around a central cylinder upwards or downwards.	
Sprocket	Gear, mostly plastic, in exceptional cases made of metal, shaped to engage in the grid pattern of the belt modules, providing positive torque transmission to the belt.	
Take-up	Tensioning device for adjustment of the catenary sag, screw type, gravity type, or spring-loaded type at the idling shaft of the conveyor.	**TU**
Temperature factor	The nominal tensile force, valid at very low speeds and room temperatures, is reduced to the admissible tensile force by the influence of higher speeds and / or temperatures; therefore it is multiplied by the respective factor.	c_T
USDA	United States Department of Agriculture. US federal agency that has defined requirements for equipment that may be in contact with meat and poultry or dairy.	**USDA**
UL 94	Underwriters Laboratories Standard for flame retardation of thermoplastic materials. UL 94 V0 (5 samples, mean duration of burning ≤ 10 sec) UL 94 V1 (5 samples, mean duration of burning ≤ 30 sec) UL 94 V2 (like V1 but burning particles may drop down) UL 94 HB (test material that does not meet V1 can be tested with horizontally arranged test specimens instead of vertically)	**UL 94 V0** **UL 94 V1** **UL 94 V2** **UL 94 HB**
Wear strip	Plastic strip, mainly from PE, used on the support frame of the belt to provide low friction and low wear.	

Note: The "apostrophe" after the symbols (F') indicates that these forces are not absolute values but are specific forces (N per meter of belt width).

Appendix
Design recommendations

Recommendations for nosebars, support, idling rollers and backbending diameters

	Min. nosebar diameter		Min. diameter for idling rollers [U]		Diameter for support rollers [R1]		Diameter of gravity, center and lower head drive rollers [R2]		Min. backbending radius for elevators, Z-conveyor without side guards		Min. backbending radius for elevators, Z-conveyor with side guards	
	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*
M0800	6	*0.24*	6	*0.24*	50	*2.0*	50	*2.0*	–	–	–	–
M1000	12	*0.5*	12	*0.5*	50	*2.0*	50	*2.0*	–	–	–	–
M1100	12	*0.5*	12	*0.5*	50	*2.0*	75	*3.0*	–	–	–	–
M1200	18	*0.7*	18	*0.7*	50	*2.0*	75	*3.0*	150	*6.0*	250	*10*
M1960	18	*0,7*	18	*0,7*	50	*2,0*	75	*3,0*	–	–	–	–
SM605	19	*0.75*	19	*0.75*	50	*2.0*	100*	*4.0*	150	*6.0*	300	*12*
HDS605	19	*0.75*	19	*0.75*	50	*2.0*	100	*4.0*	150	*6.0*	–	–
RS511/515	19	*0.75*	19	*0.75*	50	*2.0*	100*	*4.0*	150	*6.0*	–	–
106	–	–	32	*1,2*	50	*2.0*	100	*4.0*	150	*6.0*	300	*12*
M2400	–	–	50	*2,0*	50	*2.0*	100	*4.0*	150	*6.0*	–	–
M2500	–	–	*50*	*2,0*	50	*2.0*	100	*4.0*	150	*6.0*	250	*10*
M2600	–	–	50	*2,0*	50	*2.0*	100	*4.0*	150	*6.0*	–	–
M2960	–	–	50	*2,0*	50	*2.0*	100	*4.0*	150	*6.0*	–	–
IS/CT610	–	–	50	*2,0*	75	*3.0*	100*	*4.0*	150	*6.0*	300	*12*
ST/VT610	–	–	50	*2,0*	75	*3.0*	100	*4.0*	150	*6.0*	300	*12*
HDS610	–	–	50	*2,0*	75	*3.0*	100*	*4.0*	150	*6.0*	300	*12*
208	–	–	50	*2,0*	75	*3.0*	100	*4.0*	150	*6.0*	–	–
MB610	–	–	50	*2,0*	75	*3.0*	100	*4.0*	150	*6.0*	–	–
F50	–	–	50	*2,0*	75	*3.0*	100	*4.0*	150	*6.0*	300	*12*
PR612	–	–	50	*2,0*	75	*3.0*	100	*4.0*	150	*6.0*	300	*12*
M3300	–	–	75	*3,0*	75	*3.0*	100	*4.0*	150	*6.0*	–	–
M3800	–	–	90	*3,6*	100	*4.0*	150	*6.0*	150	*6.0*	250	*10*
IS615	–	–	75	*3,0*	75	*3.0*	150	*6.0*	150	*6.0*	300	*12*
ST615	–	–	75	*3,0*	75	*3.0*	150	*6.0*	150	*6.0*	300	*12*
CC40	–	–	75	*3,0*	75	*3.0*	150	*6.0*	150	*6.0*	300	*12*
M5000	–	–	100	*4,0*	100	*4.0*	200	*8.0*	150	*6.0*	250	*10*
M5100	–	–	100	*4,0*	100	*4.0*	200	*8.0*	150	*6.0*	–	–
M5200	–	–	100	*4,0*	100	*4.0*	200	*8.0*	150	*6.0*	250	*10*
M5400	–	–	100	*4,0*	100	*4.0*	200	*8.0*	150	*6.0*	–	–
SP/SE620	–	–	100	*4,0*	100	*4.0*	200	*8.0*	150	*6.0*	300	*12*
HDS620	–	–	100	*4,0*	100	*4.0*	200	*8.0*	250	*10.0*	300	*12*
HDSCT620	–	–	100	*4,0*	100	*4.0*	200*	*8.0*	300	*12.0*	300	*12*
HDU620	–	–	100	*4,0*	100	*4.0*	200	*8.0*	250	*10.0*	300	*12*
HDUCT620	–	–	100	*4,0*	100	*4.0*	200*	*8.0*	300	*12.0*	300	*12*
FF620	–	–	100	*4,0*	100	*4.0*	200	*8.0*	200	*10.0*	600	*24*
FF620-WR	–	–	100	*4,0*	100	*4.0*	200	*8.0*	250	*12.0*	600	*24*
MB620	–	–	100	*4,0*	100	*4.0*	200	*8.0*	200	*10.0*	–	–
PR620	–	–	100	*4,0*	100	*4.0*	200*	*8.0*	150	*6.0*	300	*12*
M6300	–	–	125	*5,0*	125	*5*	200	*8.0*	150	*6.0*	–	–
M6400	–	–	125	*5,0*	125	*5*	200	*8.0*	200	*8.0*	–	–

*Multiply by 1.5 for curved top belts. See illustrations on pages 26 to 31 and 56.

Appendix
Sprocket spacing

For Series MXXXX belts consult the sprocket data sheets

Sprocket center distance dependent on load													Distance belt edge to first sprocket up to*	
Series	**Belt pitch**	**At load 50% or less**		**At load > 50%–60%**		**At load > 60%–70%**		**At load > 70%–80%**		**At load > 80%–100%**				
		mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*	mm	*inch*		mm	*inch*
SM/CM605	12.7	101.6	*4*	88.9	*3.5*	76.2	*3*	63.5	*2.5*	50.8	*2*		25.4	*1*
HDS605	12.7	101.6	*4*	88.9	*3.5*	76.2	*3*	63.5	*2.5*	50.8	*2*		25.4	*1*
RS511/515	Note: For 511/515 sprocket spacing, consult the specific engineering guidelines													
106	19.1	101.6	*4*	88.9	*3.5*	76.2	*3*	63.5	*2.5*	50.8	*2*		25.4	*1*
IS/CT610	25.4	152.4	*6*	127	*5*	101.6	*4*	76.2	*3*	50.8	*2*		25.4	*1*
SP/IS615	38.1	152.4	*6*	127	*5*	101.6	*4*	76.2	*3*	50.8	*2*		25.4	*1*
ST/VT610	25.4	152.4	*6*	137.7	*5.5*	127	*5*	114.3	*4.5*	101.6	*4*		25.4	*1*
HDS610	25.4	152.4	*6*	137.7	*5.5*	127	*5*	114.3	*4.5*	101.6	*4*		25.4	*1*
208	25.4	152.4	*6*	137.7	*5.5*	127	*5*	114.3	*4.5*	101.6	*4*		25.4	*1*
MB610	25.4	152.4	*6*	137.7	*5.5*	127	*5*	114.3	*4.5*	101.6	*4*		25.4	*1*
F50	27.9	152.4	*6*	137.7	*5.5*	127	*5*	114.3	*4.5*	101.6	*4*		50.8	*2*
PR612	30.5	152.4	*6*	137.7	*5.5*	127	*5*	114.3	*4.5*	101.6	*4*		101.6**	*4*
ST/VT615	38.1	152.4	*6*	137.7	*5.5*	127	*5*	114.3	*4.5*	101.6	*4*		25.4	*1*
CC40	44.5	152.4	*6*	137.7	*5.5*	127	*5*	114.3	*4.5*	101.6	*4*		63.5	*2.5*
SP/SE/IS620	50.8	152.4	*6*	137.7	*5.5*	127	*5*	114.3	*4.5*	101.6	*4*		25.4	*1*
HDS620	50.8	152.4	*6*	137.7	*5.5*	127	*5*	114.3	*4.5*	101.6	*4*		76.2	*3*
HDU620	50.8	152.4	*6*	137.7	*5.5*	127	*5*	114.3	*4.5*	101.6	*4*		76.2	*3*
FF620	50.8	152.4	*6*	137.7	*5.5*	127	*5*	114.3	*4.5*	101.6	*4*		76.2	*3*
MB620	50.8	152.4	*6*	137.7	*5.5*	127	*5*	114.3	*4.5*	101.6	*4*		76.2	*3*
PR620	50.8	152.4	*6*	137.7	*5.5*	127	*5*	114.3	*4.5*	101.6	*4*		76.2	*3*

* For belts using hold-down tabs, allow minimum clearance of *1*" (25 mm) from the hold-down tab.
* PR61200 – 4" (100 mm) in from the belt edge with wheel support for the outer edges.
Sprockets are equally spaced between the locked center and the now properly positioned outboard sprockets.

Sprocket spacing in special situations for Series 40 (41 and 42) (Fig. 680)

Series 41 and 42 belting has a special molded-in tracking groove on the underside of the belt. A green-colored tracking sprocket with a large outer diameter engages in the groove keeping the belt from mistracking. The white-colored driving sprockets have a smaller outer diameter and do not engage the belt laterally. (Figure 680)
Note: Belt widths of *9*" (305 mm) or less do not require a tracking sprocket.
Sprocket spacing must not exceed *6*" (152 mm), and should not start closer than *2.5*" (63 mm) from the edge of the belt.

The design of the Series 40 belts allows for the use of setscrews through the sprocket hub to maintain sprocket positioning on the shaft. Consideration must first be given to using the preferred method: retainer rings or set collars.

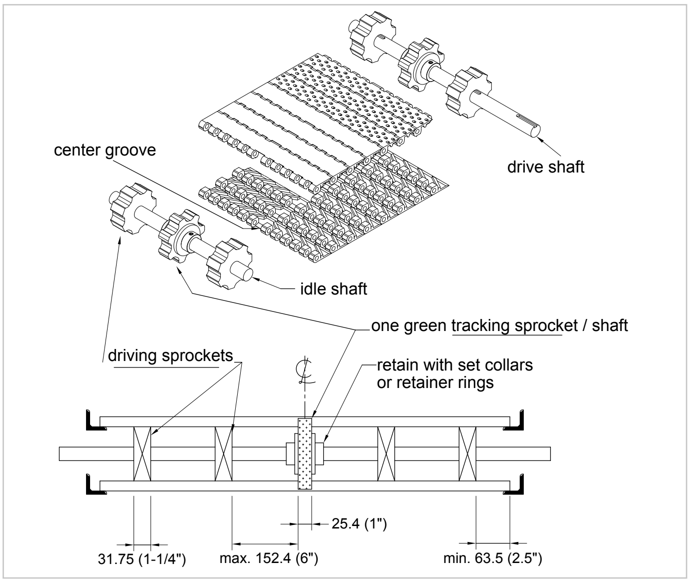


Figure 680

Appendix
Sprocket spacing

Series 50 (51, 52, 53 and 54) (Fig. 690)
Special attention must be paid to sprocket positioning on the drive, idle and intermediate idler shafts when using any of the Series 50 belt styles. Figure 690 shows the proper positioning of the sprocket so that when the belt is moving, the sprocket teeth do not touch the hinge pins.

Drive shaft sprockets are positioned in the even-numbered holes across the belt width. In this position the sprocket tooth pushes against the plastic portion of the belt hinge and not the exposed hinge rod.

For the tail and intermediate shafts, the sprockets are positioned in the odd-numbered holes across the belt width. In this position the plastic portion of the belt hinge, not the exposed hinge rod, pushes the sprocket tooth.
Sprocket spacing should not exceed *6*" (152 mm) and should not start closer than *2*" (50 mm) from the belt edge.

The design of the Series 50 belts allows the use of setscrews through the sprocket hub to maintain sprocket positioning on the shaft. Consideration must first be given to using the preferred method: the use of retainer rings or set collars.

Note: Due to the positioning requirements of the drive and tail shaft sprockets, the lateral positioning of the locked center-most sprockets will be offset by approximately *0.66*" (17 mm).

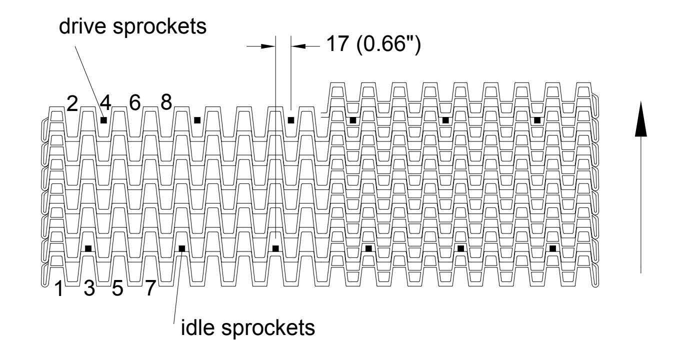


Figure 690

Customers first
Your success is our goal. That is why we don't just offer products; we provide solutions. As committed partners to our customers, we are dedicated to sharing our knowledge and providing full support.

Since our founding in 1946, Habasit has been finding ways to meet customer-specific needs in every application. This is what differentiates us as the #1 worldwide belting provider in the industry today.

Comprehensive consulting and technical support
Profit from the best consulting and technical support in the lightweight belting industry. Local experts are always available to assist you with your belting needs. The Habasit team is proud to provide the highest level of support, together with top-quality products that have led the global market for decades.

Belt selection and calculation assistance
We are always glad to help you select the most suitable belt for any application for your convenience. We now also provide the free online tool 'SeleCalc' which allows you to easily make selections and calculations yourself.
Simply register online at selecalc.habasit.com.

Fabrication, assembly and local installation services
As a full-service belting provider, we offer joining and assembly services either at our own locations or directly on your equipment.

Habasit has over 30 affiliates worldwide, each with its own inventory, fabrication, assembly and service facilities.

Together with representative offices and numerous qualified distributors, we can react quickly and efficiently to meet all your needs.

Customer training programs
To ensure the optimal performance and maximum lifespan of all our products, we offer training programs and various support tools. This includes proper procedures for fabrication, installation, assembly, maintenance and belt repair, all of which take place at a Habasit site or at your location.

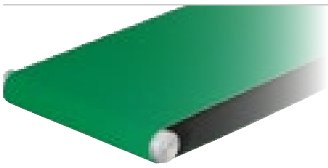
Belt monitoring, inspections, analyses and process optimization proposals
We organize and handle belt maintenance, inspections, analyses and surveys at customers' sites. Upon request, we are ready to develop optimization proposals to ensure you're getting maximum value from your machinery and process output.

Design assistance for customized solutions
Habasit believes in building partnerships with our customers. Our engineering team will work closely with your engineers on joint design developments from initial design to final implementation. This expert service can be invaluable for projects involving new technologies or large-scale modifications and adaptations.

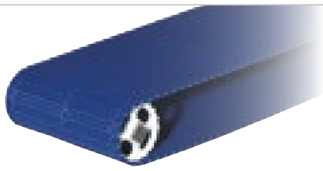
Committed to innovation
Because our customers' belting challenges and needs are always changing, we consistently invest a substantial amount of labor and resources into the research and development of new products and solutions.

Certified for quality
We deliver the highest quality standards not only in our products and solutions, but also in our employees' daily work processes. Habasit AG is certified according to ISO 9001:2015.

Worldwide leading product range
Habasit offers the largest selection of belting, conveying, processing and complementary products in the industry. Our response to any request is nothing less than a specific, tailor-made solution.



HabaFLOW®
Fabric-based conveyor and processing belts



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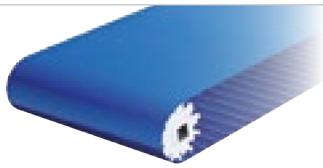
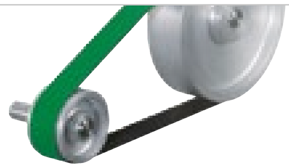
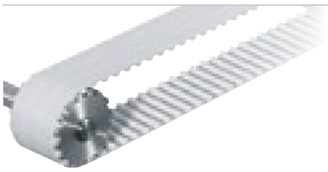


Habasit® Cleandrive
Monolithic reinforced conveyor belts

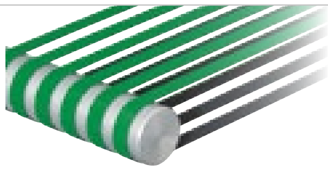


HabaDRIVE®
Power transmission belts

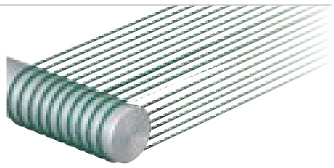


HabaSYNC®
Timing belts

HabaCHAIN®
Chains (slat and conveyor chains)

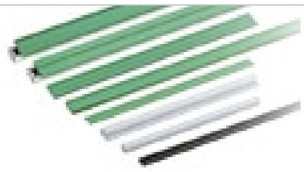


Machine tapes



Round belts

Seamless belts



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