Chains & sprockets	Wear strips	Side guide brackets & accessories	Levelers	Engineering manual
Modular belts & sprockets	Chain & belt return systems	Frame & structure supports	Bearing supports	
Curves & tracks	Side guide solutions	Miscellaneous products	Equipment	

SYSTEM PLAST®

Smart guide

10110a GENERAL INDEX

www.SystemPlastSmartGuide.com

5 years of NG® evo

RegalRexnord™

Revision 001

LEGEND ICONS

ICON	LEGEND
ALL – Maintenance, Construction, Application, Materials	Link to open menu for technical information related to the products listed on this page.
110111a	Link to find related products.
111150b	Link to find related products. Note: only available on our website www.SystemPlastSmartGuide.com
307020a	Codes in orange background are indicators for modular belts in molded to width versions.
	Information only available on our website: www.SystemPlastSmartGuide.com
	Link to other varieties of these chains and/or link to the chains used with the sprockets listed on this page.
	Link to other varieties of these modular belts and/or link to the belts used with the sprockets listed on this page.
	Link to the sprockets used with the chains or belts listed on this page.
MOQ	Minimum order quantity.
	Indicates chains, belts or curves suitable for magnetic curve systems.
PATENTED / Patented Feature / PATENTED	This product includes patented features.
	Link to general information about the products listed on this page.
	This product is not suitable in use with chains with hold-down tabs.

ICON	LEGEND
Kg/m	Weight in Kg/m
L	Length per standard code.
	Length per standard coil.
	Quantity standard packaging.
	Indication for products that contain a dry lubricant.
SS 430	Material: stainless steel AISI 430.
SS 304	Material: stainless steel AISI 304.
Al-a	Material: aluminum, anodized.
Al	Material: aluminum.
Zn	Material: zinc plated steel.
Ø 41	Nominal diameter 41mm.
	Product suitable for assembly to a rectangular profile.
N	Max load capacity.
	Wrench size.

SYSTEM PLAST®

30720a

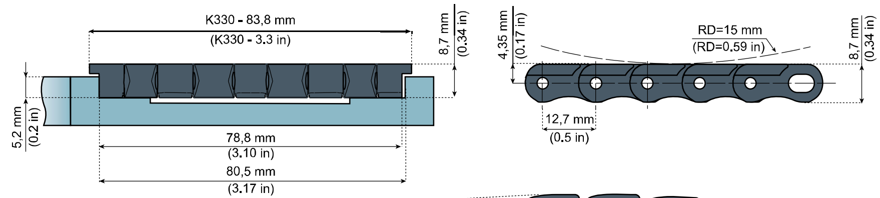
12,7 mm (½") MODULAR BELTS 2120M

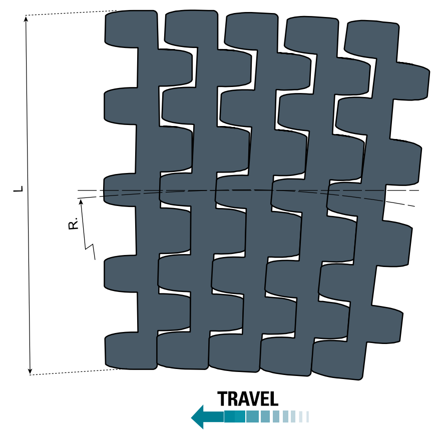
SIDEFLEXING BELT FOR MAGNETIC CURVES

www.SystemPlastSmartGuide.com

Reduce noise level by 12 dB

New





NG® *evo* conveyor components made from engineered plastic resin
Longer wearlife than acetal
Lower friction than acetal
Good chemical resistance
High abrasion resistance
It meets the requirement for materials as stated by EC1935/2004 and FDA CFR21 norms for direct food contact
Less dust than with acetal chains
More.........

Features:
This system offers a unique solution for sideflexing applications in plants with modular conveyors.

Applications:
- To be used in the dry end of the line where bottles or cans run in lanes separated by guides.
- The short pitch makes in-line transfers possible.

Weight: 13,7 kg/m² (2.8 lbs/ft².)
Pin material: Ferritic Stainless Steel

ITEM DESCRIPTION	MATERIAL	WIDTH L		R MIN.	MAX LOAD CAPACITY		WEIGHT	
		mm	in		N	lbs	Kg/m	lbs/ft.
NGE2120M-SFF-K330	**NGE** Grey Blue	83,8	3.30	500	1900	420	1,1	0.74

Standard length: 240 pitches (3,048 m - 10 ft.)

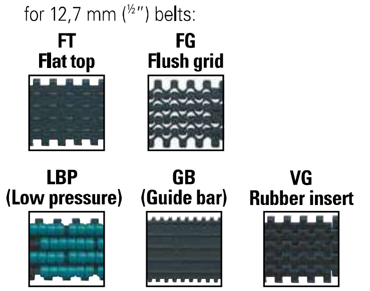
Information about this product is only available on our Smart Guide® website.

Standard material

NGE (GREY BLUE)
New Generation®

materials details: 73563a

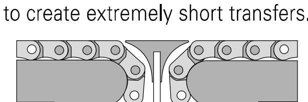
Other versions for 12,7 mm (½") belts:



30160a

page code: 50080a

Can be used with a Nose bar to create extremely short transfers.



page code: 30175a

Revision 001

APPLICATION EXAMPLES

HEAVY DUTY BELTS IN CAR MANUFACTURING.

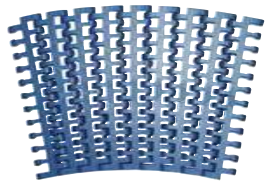
Go to:
30620a

Go to:
30645a

Picture by courtesy of Audi AG Ingolstadt - Germany

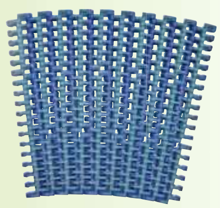
INDEX SIDEFLEXING MODULAR BELTS

SIDEFLEXING BELT 2256 - PITCH: 25,4 mm (1”)



30730a

SIDEFLEXING BELT 2256 - PITCH: 25,4 mm (1”) VERSION WITH RUBBER INSERTS

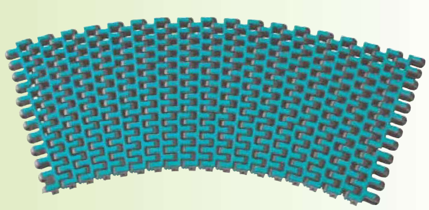


30735a

SIDEFLEXING BELT 2351/2451/2551/2651 - PITCH: 31,75 mm (1.¼”)

CURVE RATIO	STANDARD	HEAVY DUTY
1,6	30745a	30750a
1,0		

SIDEFLEXING BELT 2351 - PITCH:31,75 (1.¼”) VERSION WITH RUBBER INSERTS



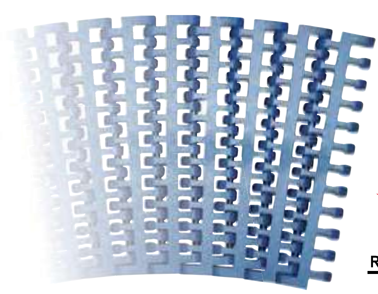
30755a

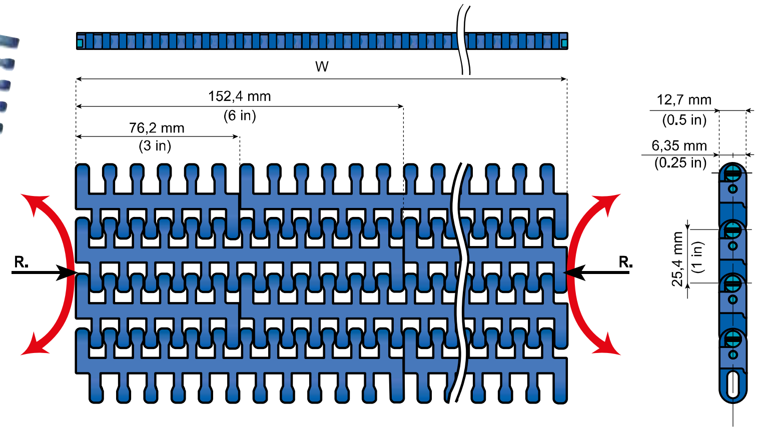
SYSTEM PLAST®

30730a 25,4 mm (1") MODULAR BELTS 2256

www.SystemPlastSmartGuide.com

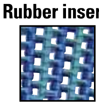
SIDEFLEXING





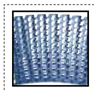
Other versions for 25,4 mm (1") belts:

VG Rubber insert

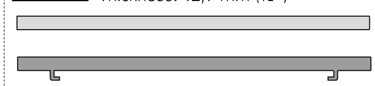


Pin material: PBT (white)
Open surface: 29% (straight)
Standard length:
width ≤ 24 in: 3,048 m (10 ft.)
width > 24 in: 1,524 m (5 ft.)

30740a



Notes: Schematic presentation of all sideflexing 25,4 mm (1") pitch belts. Thickness: 12,7 mm (½")



* Single track

WIDTH W mm	WIDTH W in	SIDE FLEX R. MIN.	MAX LOAD CAPACITY STRAIGHT N/m	MAX LOAD CAPACITY STRAIGHT lbs/ft.	MAX LOAD CAPACITY CURVE N	MAX LOAD CAPACITY CURVE lbs	BACK FLEX RADIUS mm	BACK FLEX RADIUS in	WEIGHT Kg/m²	WEIGHT lbs/ft.
76*	3	145	30000	2000	2000	450	25	0.98	7,75	1.58
152*	6	290								
229	9	435								
305	12	580								
381	15	725								
457	18	890								
533	21	1040								
610	24	1250								

This belt is bi-directional and can make both left and right turns.
Even S-curves are possible if the load allows for that.
The belt is available with several clips and guiding systems.

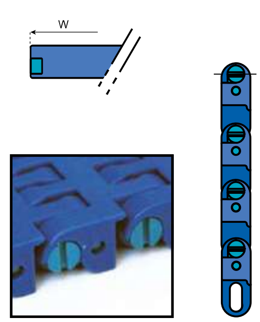
NG® *evo* conveyor components made from engineered plastic resin

Standard materials

LFB (BLUE)	NGE (GREY BLUE)
Low friction acetal resin	New Generation®

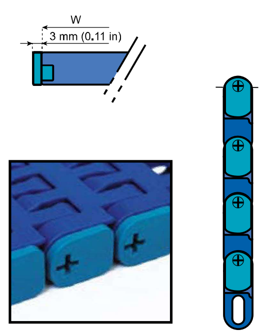
materials details:
73563a

Without TAB "C" version



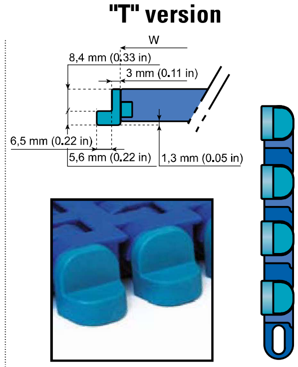
Just a clip for pin retention.

With slider shoe "S" version



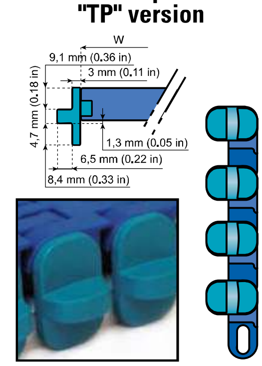
Attached to the pin retention clip is a slider shoe that can reduce friction and act as a wear part.

With TAB "T" version



Attached to the pin retention clip is a TAB that holds the belt down in the curves.

With TAB & positioner "TP" version



Attached to the pin retention clip is a TAB-Positioner combination that holds the belt down in the curves but also guides the belt on straight sections.

* Single track

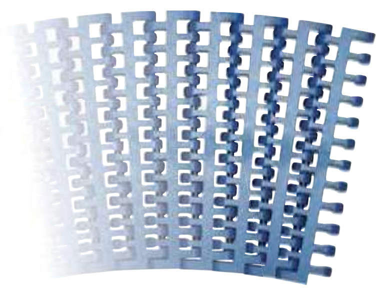
WIDTH W mm	WIDTH W in	ITEM DESCRIPTION	ITEM DESCRIPTION	ITEM DESCRIPTION	ITEM DESCRIPTION
76*	3	LFB2256C-K300	LFB2256S-K300	LFB2256TAB-K300	LFB2256TP-K300
152*	6	LFB2256C-K600	LFB2256S-K600	LFB2256TAB-K600	LFB2256TP-K600
229	9	LFB2256C-K900	LFB2256S-K900	LFB2256TAB-K900	LFB2256TP-K900
305	12	LFB2256C-K1200	LFB2256S-K1200	LFB2256TAB-K1200	LFB2256TP-K1200
381	15	LFB2256C-K1500	LFB2256S-K1500	LFB2256TAB-K1500	LFB2256TP-K1500
457	18	LFB2256C-K1800	LFB2256S-K1800	LFB2256TAB-K1800	LFB2256TP-K1800
533	21	LFB2256C-K2100	LFB2256S-K2100	LFB2256TAB-K2100	LFB2256TP-K2100
610	24	LFB2256C-K2400	LFB2256S-K2400	LFB2256TAB-K2400	LFB2256TP-K2400

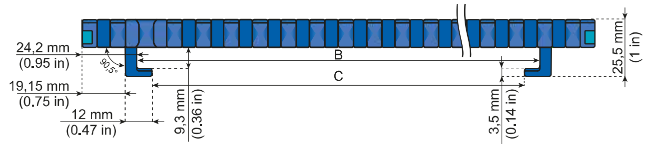
Other widths available on request.

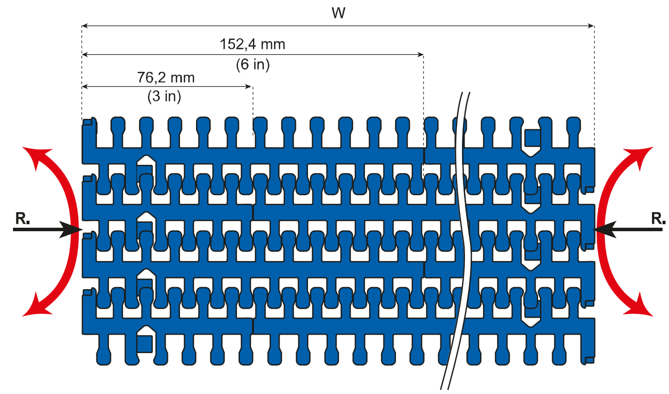
25,4 mm (1") MODULAR BELTS 2256ST TAB

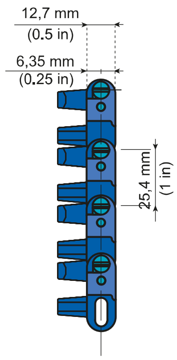
SIDEFLEXING

Contact us for more information or technical support









Pin material: PBT (white)
Available Widths: 4" single track, 6" single track, 6" + multiple of 3" (9", 12", 15", ...)
Opening Size (approximate): 8.5x7.3 mm (0.33"x0.28")
Open Area: 29% (once straight)
Drive Method: Hinge-driven
Materials: POM e NGE

Contact System Plast for precise belt measurements and stock status before designing equipment or ordering a belt.

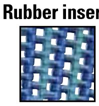
WIDTH W		B		C		R MIN.		MAX LOAD CAPACITY				BACK FLEX RADIUS		WEIGHT	
								STRAIGHT		CURVE					
mm	in	mm	in	mm	in	mm	in	N/m	lbs/ft.	N	lbs	mm	in	Kg/m²	lbs/ft.
101,6*	4	53,1	2.09	39,3	1.55	250	9.84	30000	2000	2000	450	25	0.98	7,75	1.58
152,4*	6	103,9	4.09	90,1	3.55	335	13.19								
228,6	9	180,1	7.09	166,3	6.55	500	19.69	30000	2000	2000	450	25	0.98	7,75	1.58
304,8	12	256,3	10.09	242,5	9.55	690	27.17								
381	15	332,5	13.09	318,7	12.55	870	34.25								
457,2	18	408,7	16.09	394,9	15.55	1050	41.34								
533,4	21	484,9	19.09	471,1	18.55	1225	48.23								
609,6	24	561,1	22.09	547,3	21.55	1400	55.12								

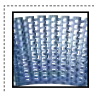
* Single track

This belt is bi-directional and can make both left and right turns. Even S-curves are possible if the load allows for that. The belt is available with several clips and guiding systems.

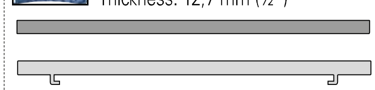
Other versions for 25,4 mm (1") belts:

VG
Rubber insert

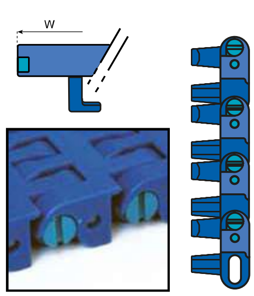




Notes: Schematic presentation of all sideflexing 25,4 mm (1") pitch belts. Thickness: 12,7 mm (½")

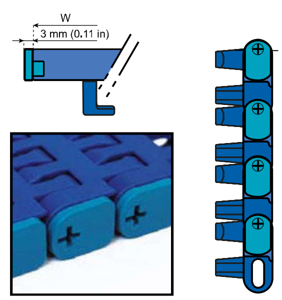


Clips without TAB "C" Version



Just a clip for pin retention.

Clips with slider shoe "S" version



Attached to the pin retention clip is a slider shoe that can reduce friction and act as a wear part.

* Single track

WIDTH W		ITEM DESCRIPTION	ITEM DESCRIPTION
mm	in		
101,6*	4	LFB2256ST-C-K400	LFB2256ST-S-K400
152,4*	6	LFB2256ST-C-K600	LFB2256ST-S-K600
228,6	9	LFB2256ST-C-K900	LFB2256ST-S-K900
304,8	12	LFB2256ST-C-K1200	LFB2256ST-S-K1200
381	15	LFB2256ST-C-K1500	LFB2256ST-S-K1500
457,2	18	LFB2256ST-C-K1800	LFB2256ST-S-K1800
533,4	21	LFB2256ST-C-K2100	LFB2256ST-S-K2100
609,6	24	LFB2256ST-C-K2400	LFB2256ST-S-K2400

3 0 7 4 0 a

NG® *evo* conveyor components made from engineered plastic resin..

Standard materials

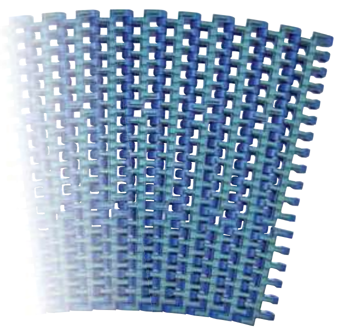
LFB (BLUE)	NGE (GREY BLUE)
Low friction acetal resin	New Generation®

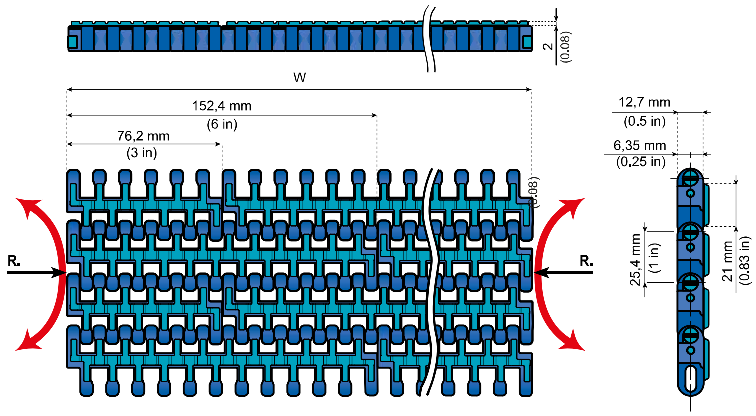
materials details: 7 3 5 6 3 a

30735a

25,4 mm (1") MODULAR BELTS 2256 - RUBBER INSERT

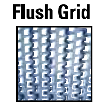
SIDEFLEXING



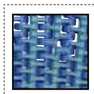


Other versions for 25,4 mm (1") belts:

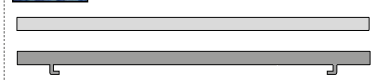
FG
Flush Grid



Belt material: low friction acetal resin, dark blue colour
Rubber material: thermoplastic rubber, waterblue colour, 75 shore A.
Pin material: PBT (white); **open surface:** 29% (straight)
Standard length: width ≤ 24 in: 3,048 m (10 ft.) / width > 24 in: 1,524 m (5 ft.)



Notes: Schematic presentation of all sideflexing VG 25,4 mm (1") pitch belts. Thickness: 12,7 mm (½")



WIDTH W		SIDE FLEX RADIUS MIN.	MAX LOAD CAPACITY		BACK FLEX RADIUS	WEIGHT
mm	in		STRAIGHT	CURVE		
76*	3	145	30000 N/m (2000 lbs/ft.)	2000 N (450 lbs)	25 mm (0.98 in)	7,75 Kg/m² (1.58 lbs/ft².)
152*	6	290				
229	9	435				
305	12	580				
381	15	725				
457	18	890				
533	21	1040				
610	24	1250				

* Single track

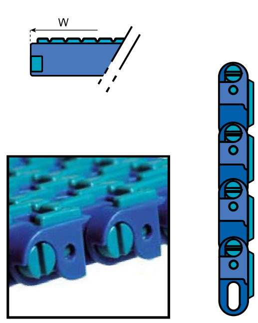
Standard materials

LFB (BLUE)	TPR (WATER BLUE)
Low friction acetal resin	Thermoplastic rubber
materials details: 73563a	materials details: 73570a

30740a

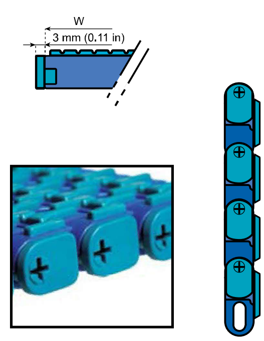
This belt is bi-directional and can make both left and right turns.
Even S-curves are possible if the load allows for that.
The belt is available with several clips and guiding systems.

Without TAB "C" version



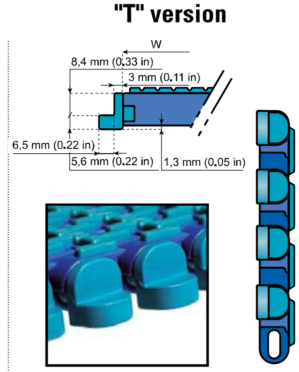
Just a clip for pin retention.

With slider shoe "S" version



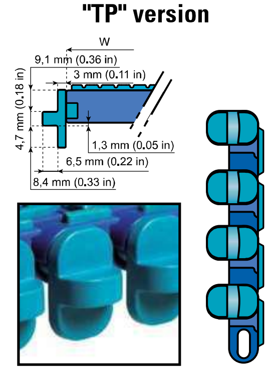
Attached to the pin retention clip is a slider shoe that can reduce friction and act as a wear part.

With TAB "T" version



Attached to the pin retention clip is a TAB that holds the belt down in the curves.

With TAB & Positioner "TP" version



Attached to the pin retention clip is a TAB-Positioner combination that holds the belt down in the curves but also guides the belt on straight sections.

* Single track

WIDTH W		ITEM DESCRIPTION	ITEM DESCRIPTION	ITEM DESCRIPTION	ITEM DESCRIPTION
mm	in				
76*	3	LFB2256C-K300VG	LFB2256S-K300VG	LFB2256TAB-K300VG	LFB2256TP-K300VG
152*	6	LFB2256C-K600VG	LFB2256S-K600VG	LFB2256TAB-K600VG	LFB2256TP-K600VG
229	9	LFB2256C-K900VG	LFB2256S-K900VG	LFB2256TAB-K900VG	LFB2256TP-K900VG
305	12	LFB2256C-K1200VG	LFB2256S-K1200VG	LFB2256TAB-K1200VG	LFB2256TP-K1200VG
381	15	LFB2256C-K1500VG	LFB2256S-K1500VG	LFB2256TAB-K1500VG	LFB2256TP-K1500VG
457	18	LFB2256C-K1800VG	LFB2256S-K1800VG	LFB2256TAB-K1800VG	LFB2256TP-K1800VG
533	21	LFB2256C-K2100VG	LFB2256S-K2100VG	LFB2256TAB-K2100VG	LFB2256TP-K2100VG
610	24	LFB2256C-K2400VG	LFB2256S-K2400VG	LFB2256TAB-K2400VG	LFB2256TP-K2400VG

Other widths available on request.

SYSTEM PLAST®

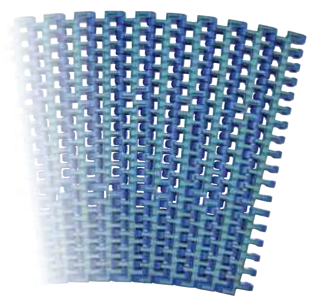
Smart guide

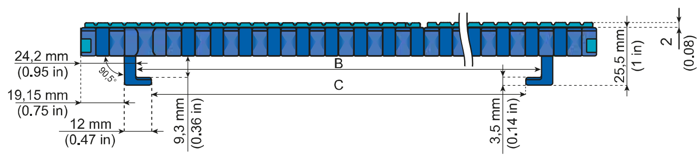
30735b 25,4 mm (1") MODULAR BELTS 2256ST VG TAB - RUBBER INSERT

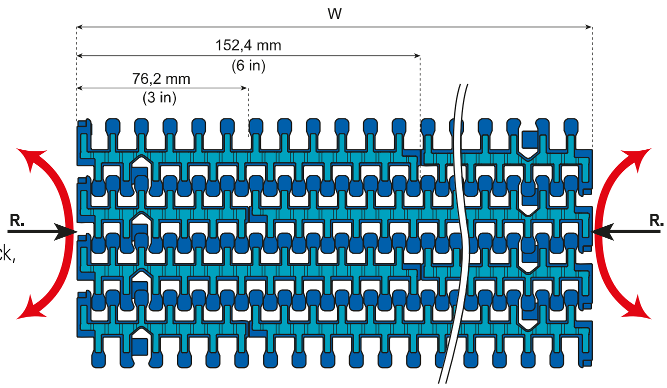
www.SystemPlastSmartGuide.com

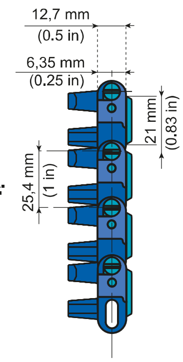
SIDEFLEXING

Contact us for more information or technical support









Pin material: PBT (white)
Available Widths: 4" single track, 6" single track, 6" + multiple of 3" (9", 12", 15", ...)
Opening Size (approximate): 8.5x7.3 mm (0.33"x0.28")
Open Area: 29% (once straight)
Drive Method: Hinge-driven
Materials: POM e NGE
Rubber material: thermoplastic rubber, waterblue colour, 75 shore A.

Contact System Plast for precise belt measurements and stock status before designing equipment or ordering a belt.

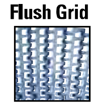
WIDTH W		B		C		R MIN.		MAX LOAD CAPACITY				BACK FLEX RADIUS		WEIGHT	
								STRAIGHT		CURVE					
mm	in	mm	in	mm	in	mm	in	N/m	lbs/ft.	N	lbs	mm	in	Kg/m²	lbs/ft.
101,6*	4	53,1	2.09	39,3	1.55	250	9.84	30000	2000	2000	450	25	0.98	7,75	1.58
152,4*	6	103,9	4.09	90,1	3.55	335	13.19								
228,6	9	180,1	7.09	166,3	6.55	500	19.69	30000	2000	2000	450	25	0.98	7,75	1.58
304,8	12	256,3	10.09	242,5	9.55	690	27.17								
381	15	332,5	13.09	318,7	12.55	870	34.25								
457,2	18	408,7	16.09	394,9	15.55	1050	41.34								
533,4	21	484,9	19.09	471,1	18.55	1225	48.23								
609,6	24	561,1	22.09	547,3	21.55	1400	55.12								

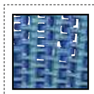
* Single track

This belt is bi-directional and can make both left and right turns. Even S-curves are possible if the load allows for that. The belt is available with several clips and guiding systems.

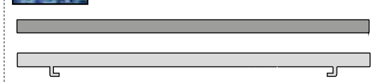
Other versions for 25,4 mm (1") belts:

FG Flush Grid

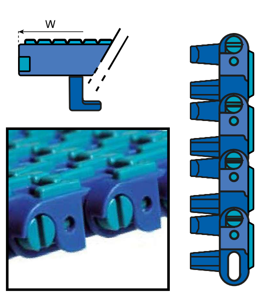




Notes: Schematic presentation of all sideflexing VG 25,4 mm (1") pitch belts. Thickness: 12,7 mm (½")

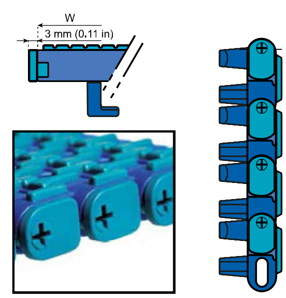


Clips without TAB "C" Version



Just a clip for pin retention.

Clips with slider shoe "S" version



Attached to the pin retention clip is a slider shoe that can reduce friction and act as a wear part.

* Single track

WIDTH W		C Version ITEM DESCRIPTION	S Version ITEM DESCRIPTION
mm	in		
101,6*	4	LFB2256ST-C-K400VG	LFB2256ST-S-K400VG
152,4*	6	LFB2256ST-C-K600VG	LFB2256ST-S-K600VG
228,6	9	LFB2256ST-C-K900VG	LFB2256ST-S-K900VG
304,8	12	LFB2256ST-C-K1200VG	LFB2256ST-S-K1200VG
381	15	LFB2256ST-C-K1500VG	LFB2256ST-S-K1500VG
457,2	18	LFB2256ST-C-K1800VG	LFB2256ST-S-K1800VG
533,4	21	LFB2256ST-C-K2100VG	LFB2256ST-S-K2100VG
609,6	24	LFB2256ST-C-K2400VG	LFB2256ST-S-K2400VG

30740a

NG® evo conveyor components made from engineered plastic resin..

Standard materials

LFB (BLUE)	NGE (GREY BLUE)
Low friction acetal resin	New Generation®

materials details: 73563a

SYSTEM PLAST®

Smart guide

30740a DRIVE AND RETURN SPROCKETS

www.SystemPlastSmartGuide.com

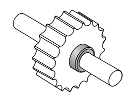
FOR BELT 2256 (VG)

ALL — Maintenance, Construction, Application, Materials

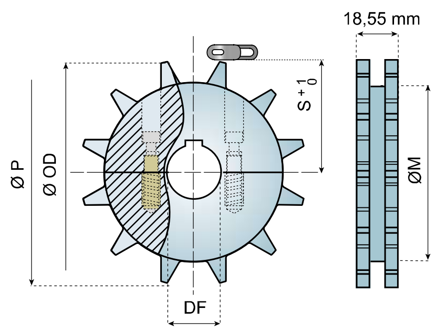
New design
30990a

Features:

- Very high strength.
- Split versions: quick and easy replacement.
- Foolproof design.
- Completely closed structure, easy to clean and to disinfect.
- Excellent wear and chemical resistance.
- Recyclable.



Set collars, go to: 54630a



Z	Ø P mm	Ø OD mm	Ø M mm	S mm
10	82,2	83,3	65,3	33
12	98,1	100	82	41
15	122,2	124,3	106,3	53
18	146,3	147,8	129	65

MACHINED DRIVE SPROCKETS - SPLIT

Z	Ø 25	Ø 30	Ø 40
	ITEM DESCRIPTION		
10	2256-10R25M-DPMS	2256-10R30M-DPMS	-
12	2256-12R25M-DPMS	2256-12R30M-DPMS	2256-12R40M-DPMS
15	2256-15R25M-DPMS	2256-15R30M-DPMS	2256-15R40M-DPMS
18	2256-18R25M-DPMS	2256-18R30M-DPMS	2256-18R40M-DPMS

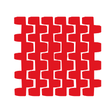
MACHINED RETURN SPROCKETS - SPLIT

Z	Ø 25	Ø 30	Ø 40
10	2256-10R25M-RMS	2256-10R30M-RMS	-
12	2256-12R25M-RMS	2256-12R30M-RMS	2256-12R40M-RMS
15	2256-15R25M-RMS	2256-15R30M-RMS	2256-15R40M-RMS
18	2256-18R25M-RMS	2256-18R30M-RMS	2256-18R40M-RMS

MACHINED DRIVE SPROCKETS SQUARE BORE - SPLIT FLOATING

Z	☐ 25X25	☐ 30X30	☐ 40X40
10	-	2256-10S30M-DMS	-
12	2256-12S25M-DMS	2256-12S30M-DMS	-
15	-	2256-15S30M-DMS	2256-15S40M-DMS
18	2256-18S25M-DMS	-	2256-18S40M-DMS

Material: polyamide (natural white), screws in stainless steel, bushings in brass.



See belts 2256: 30730a
See belts 2256 VG: 30735a

Revision 001

APPLICATION EXAMPLES

SPEEDRAIL ™ ROLLER GUIDES FOR SHRINK WRAPPED PRODUCTS.

Go to: 52510a

LUGGAGE HANDLING BELT WITH MODULAR BELTS WITH RUBBER INSERTS.

Go to: 30490a

ROLLER TRANSFER MODULES.

Go to: 52670a

30745a 31,75 mm (1 ¼”) MODULAR BELTS 2351 & 2551

SIDEFLEXING

Maintenance Construction ALL Application Materials

Features for 2351:

- Radius – width ratio min. 1,6
- Can also be used in S-curves

Weight: 9.0 kg/m² (1.84 lbs/f².)

Features for 2551:

- Radius – width ratio min. 1,0 for tight curves

Weight: 8.2 kg/m² (1.67 lbs/f².)

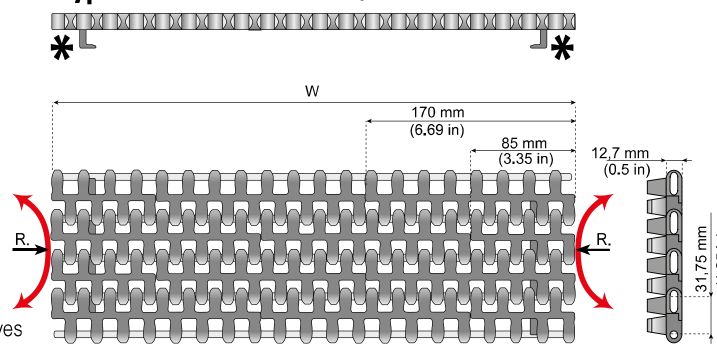
Features for both:

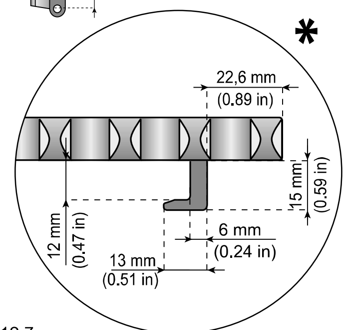
- Optimum product support
- Strong design
- For left or right L- or U-turns
- Easy installation and maintenance

Pin Material: PBT white

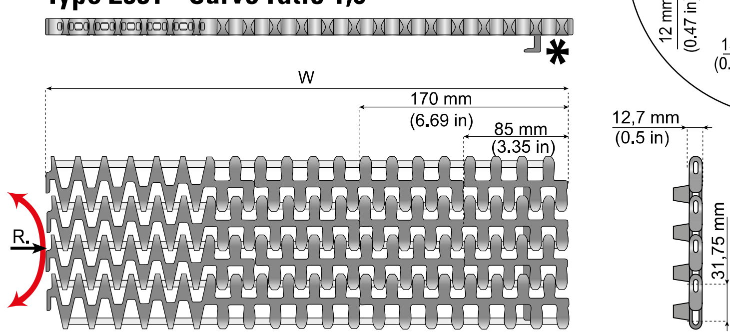
Standard length:
width ≤ 850 mm (33.46 in): 1,524 m (5 ft.)
width > 850 mm (33.46 in): on request

Type 2351 - Curve ratio 1,6





Type 2551 - Curve ratio 1,0



Information about this product is only available on our Smart Guide® website.

Standard material

LFG (GREY)
Low friction acetal resin

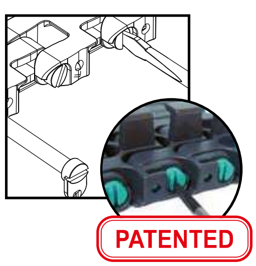
materials details: 73563a

Also available into

LFW (COLOR WHITE)
Low friction acetal resin 39999a

materials details: 73563a

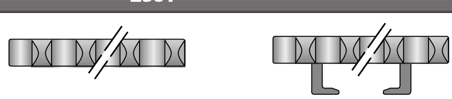
30760a



2351			2551			MAX LOAD CAPACITY		BACK FLEX RADIUS
WIDTH W		SIDE FLEX R. MIN.	WIDTH W		SIDE FLEX R. MIN.	STRAIGHT	CURVE	
mm	in		mm	in				
255	10.04	408	-	-	-	30000 N/m (2000 lbs/ft.)	2500 N (560 lbs)	25 mm (0.98 in)
340	13.39	545	340	13.39	340			
425	16.73	680	425	16.73	425			
510	20.08	840	510	20.08	510			
595	23.43	980	595	23.43	595			
680	26.77	1150	680	26.77	680			
765	30.12	1300	765	30.12	850			
850	33.46	1450	850	33.46	1050			

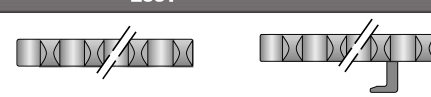
Side flex radius values are valid for curves up to 180 degrees. For larger angles or for spirals, please consult our Application Engineering.

2351



WIDTH W		Without TAB ITEM DESCRIPTION	With TAB 2 sides ITEM DESCRIPTION
mm	in		
255	10.04	LFG2351-M0255	LFG2351TAB-M0255
340	13.39	LFG2351-M0340	LFG2351TAB-M0340
425	16.73	LFG2351-M0425	LFG2351TAB-M0425
510	20.08	LFG2351-M0510	LFG2351TAB-M0510
595	23.43	LFG2351-M0595	LFG2351TAB-M0595
680	26.77	LFG2351-M0680	LFG2351TAB-M0680
765	30.12	LFG2351-M0765	LFG2351TAB-M0765
850	33.46	LFG2351-M0850	LFG2351TAB-M0850

2551



WIDTH W		Without TAB ITEM DESCRIPTION	With TAB 1 side ITEM DESCRIPTION
mm	in		
-	-	-	-
340	13.39	LFG2551-M0340	LFG2551TAB-M0340
425	16.73	LFG2551-M0425	LFG2551TAB-M0425
510	20.08	LFG2551-M0510	LFG2551TAB-M0510
595	23.43	LFG2551-M0595	LFG2551TAB-M0595
680	26.77	LFG2551-M0680	LFG2551TAB-M0680
765	30.12	LFG2551-M0765	LFG2551TAB-M0765
850	33.46	LFG2551-M0850	LFG2551TAB-M0850

Other widths available on request.

SYSTEM PLAST®

Smart guide

30750a 31,75 mm (1 ¼") MODULAR BELTS 2451 & 2651

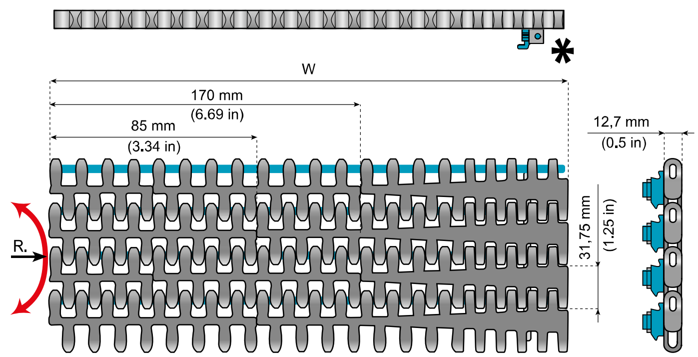
www.SystemPlastSmartGuide.com

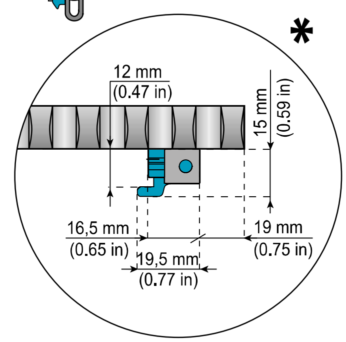
SIDEFLEXING HEAVY DUTY

Features for 2451:
- Radius – width ratio min. 1,6

Weight: 9.7 kg/m² (1.98 lbs/ft².)

TYPE 2451 - Curve ratio 1,6





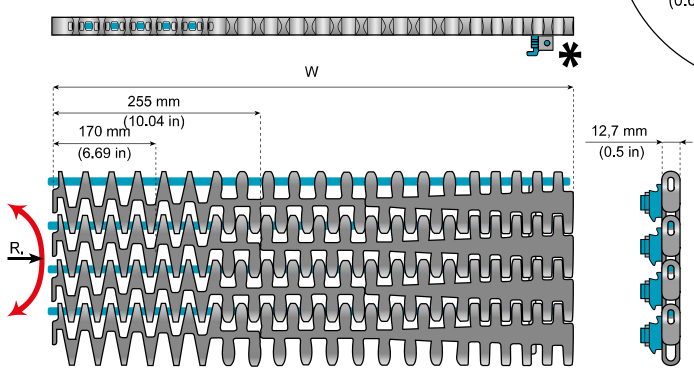
Features for 2651:
- Radius – width ratio min. 1.0 for tight curves

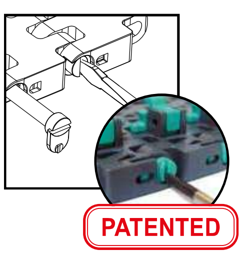
Weight: 8,8 kg/m² (1.8 lbs/ft².)

Features for both:
- Heavy-duty extra strong design
- For left or right L- or U-turns
- Optimum combination of materials
- Optimum product support
- Easy installation and maintenance

Pin Material: PBT white
Standard length:
width ≤ 850 mm (33.46 in): 1,524 m (5 ft.)
width > 850 mm (33.46 in): on request

TYPE 2651 - Curve ratio 1.0





30760a

WIDTH W mm	WIDTH W in	ITEM DESCRIPTION	2451 WIDTH W mm	2451 WIDTH W in	SIDE FLEX R. MIN.	MAX LOAD CAPACITY STRAIGHT N/m	STRAIGHT lbs/ft.	CURVE N	CURVE lbs	BACK FLEX RADIUS mm	BACK FLEX RADIUS in
-	-	-	-	-	-						
340	13.39	**LFG2451TAB-M0340**	340	13.39	545						
425	16.73	**LFG2451TAB-M0425**	425	16.73	680						
510	20.08	**LFG2451TAB-M0510**	510	20.08	840						
595	23.43	**LFG2451TAB-M0595**	595	23.43	980	30000	2000	3500	790	25	0.98
680	26.77	**LFG2451TAB-M0680**	680	26.77	1150						
765	30.12	**LFG2451TAB-M0765**	765	30.12	1300						
850	33.46	**LFG2451TAB-M0850**	850	33.46	1450						

Side flex radius values are valid for curves up to 180 degrees. For larger angles or for spirals, please consult our Application Engineering.

WIDTH W mm	WIDTH W in	ITEM DESCRIPTION	2651 WIDTH W mm	2651 WIDTH W in	SIDE FLEX R. MIN.	MAX LOAD CAPACITY STRAIGHT N/m	STRAIGHT lbs/ft.	CURVE N	CURVE lbs	BACK FLEX RADIUS mm	BACK FLEX RADIUS in
-	-	-	-	-	-						
425	16.73	**LFG2651TAB-M0425**	425	16.73	425						
510	20.08	**LFG2651TAB-M0510**	510	20.08	510						
595	23.43	**LFG2651TAB-M0595**	595	23.43	595	30000	2000	3500	790	25	0.98
680	26.77	**LFG2651TAB-M0680**	680	26.77	680						
765	30.12	**LFG2651TAB-M0765**	765	30.12	850						
850	33.46	**LFG2651TAB-M0850**	850	33.46	1050						

Information about this product is only available on our Smart Guide® website.

Standard material

LFG (GREY)
Low friction acetal resin

materials details: 73563a

Also available into

LFW (COLOR WHITE)
Low friction acetal resin 39999a

materials details: 73563a

Revision 001

SYSTEM PLAST®

Smart guide

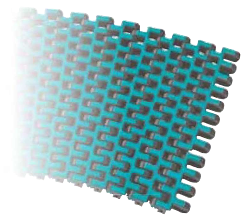
3 0 7 5 5 a

31,75 mm (1 ¼”) MODULAR BELTS 2351 - RUBBER INSERT

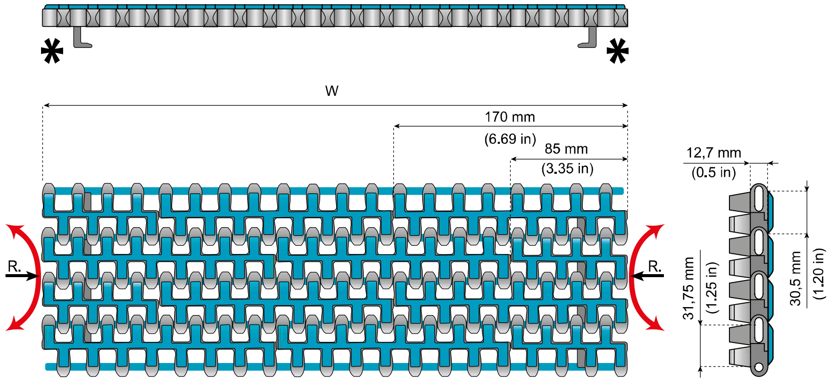
www.SystemPlastSmartGuide.com

SIDEFLEXING

Maintenance Construction ALL Application Materials

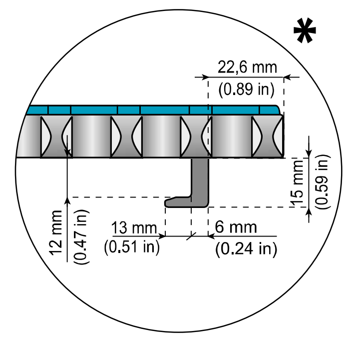


2351 VG - Curve ratio 1,6



Features:

- Radius – width ratio min. 1,6
- For left or right L- or U-turns
- Can also be used in S-curves
- Strong design
- Optimum product support
- Easy installation and maintenance

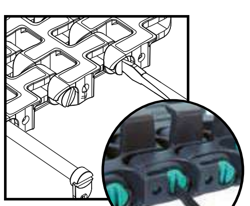


Rubber material: thermoplastic rubber, waterblue colour, 75 shore A.
Standard length: 96 pitches (3,048 m - 10 ft.)

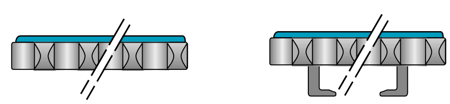
3 0 7 6 0 a

WIDTH W		SIDE FLEX R. MIN.	MAX LOAD CAPACITY				BACK FLEX RADIUS		WEIGHT	
			STRAIGHT		CURVE					
mm	in		N/m	lbs/ft.	N	lbs	mm	in	Kg/m²	lbs/ft².
255	10.04	408	22000	1500	2500	560	25	0.98	8,8	1.8
340	13.39	545								
425	16.73	680								
510	20.08	840								
595	23.43	980								
680	26.77	1150								
765	30.12	1300								
850	33.46	1450								

Side flex radius values are valid for curves up to 180 degrees. For larger angles or for spirals, please consult our Application Engineering.



PATENTED



Without TAB | **With TAB 2 sides**

Standard material

LFG (GREY)
Low friction acetal resin

materials details: 7 3 5 6 3 a

TPR (WATER BLUE)
Thermoplastic rubber

materials details: 7 3 5 7 0 a

Also available into

LFW (COLOR WHITE)
Low friction acetal resin

3 9 9 9 9 a

Information about this product is only available on our Smart Guide® website.

WIDTH W		ITEM DESCRIPTION	ITEM DESCRIPTION
mm	in		
255	10.04	LFG2351-M0255VG	LFG2351TAB-M0255VG
340	13.39	LFG2351-M0340VG	LFG2351TAB-M0340VG
425	16.73	LFG2351-M0425VG	LFG2351TAB-M0425VG
510	20.08	LFG2351-M0510VG	LFG2351TAB-M0510VG
595	23.43	LFG2351-M0595VG	LFG2351TAB-M0595VG
680	26.77	LFG2351-M0680VG	LFG2351TAB-M0680VG
765	30.12	LFG2351-M0765VG	LFG2351TAB-M0765VG
850	33.46	LFG2351-M0850VG	LFG2351TAB-M0850VG

Other widths available on request.

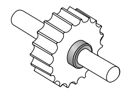
Revision 001

30760a DRIVE AND RETURN SPROCKETS, IDLER WHEELS

www.SystemPlastSmartGuide.com

FOR BELTS 2351 (VG)-2451-2551-2651

New design 30990a



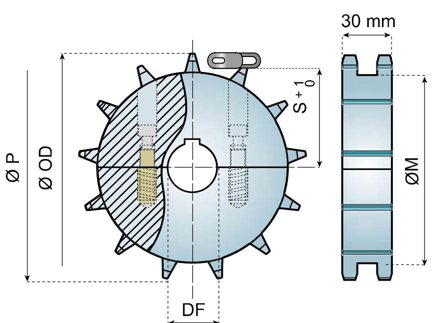
Set collars, go to: 54630a

Maintenance Construction ALL Application Materials

Features:

- Very high strength.
- Split versions: quick and easy replacement.
- Foolproof design.
- Completely closed structure, easy to clean and to disinfect.
- Excellent wear and chemical resistance.
- Recyclable.

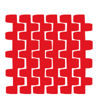
Z	Ø P mm	Ø OD mm	Ø M mm	S mm	DIAMETER OF THE SUPPORTING WHEEL mm
10	102,8	107,7	84	45	85,0
13	132,7	138,8	114	60	116,1
15	152,7	159,4	135	70	136,7
16	162,8	169,6	145	75	146,9



MACHINED DRIVE SPROCKETS - SPLIT FIXED

Z	Ø 30	Ø 40
	ITEM DESCRIPTION	
10	2351-10R30M-DMS	2351-10R40M-DMS
13	2351-13R30M-DMS	2351-13R40M-DMS
15	2351-15R30M-DMS	2351-15R40M-DMS
16	2351-16R30M-DMS	2351-16R40M-DMS

Material: polyamide (natural white), screws in stainless steel, bushings in brass, DIN 6885 key seat.



See belts 2351-2551:

30745a

See belts 2651-2451:

30750a

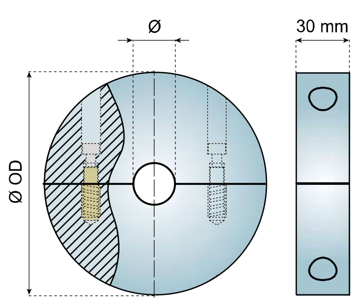
See belts 2351VG:

30755a

MACHINED RETURN SPROCKETS - SPLIT

Z	Ø 30	Ø 40
	ITEM DESCRIPTION	
10	2351-10R30M-RMS	2351-10R40M-RMS
13	2351-13R30M-RMS	2351-13R40M-RMS
15	2351-15R30M-RMS	2351-15R40M-RMS
16	2351-16R30M-RMS	2351-16R40M-RMS

Material: polyamide (natural white), screws in stainless steel, bushings in brass.



MACHINED IDLER WHEELS - SPLIT SUPPORTING WHEELS

Z	PART NUMBER	Ø	NOTES
10	2351-10R18M-WMS	18	Max. allowed bore: Ø30
13	2351-13R23M-WMS	23	Max. allowed bore: Ø50
15	2351-15R23M-WMS		
16	2351-16R23M-WMS		

Z	Ø OD mm
10	85,0
13	116,1
15	136,7
16	146,9

Material: polyamide (natural white), screws in stainless steel, bushings in brass.

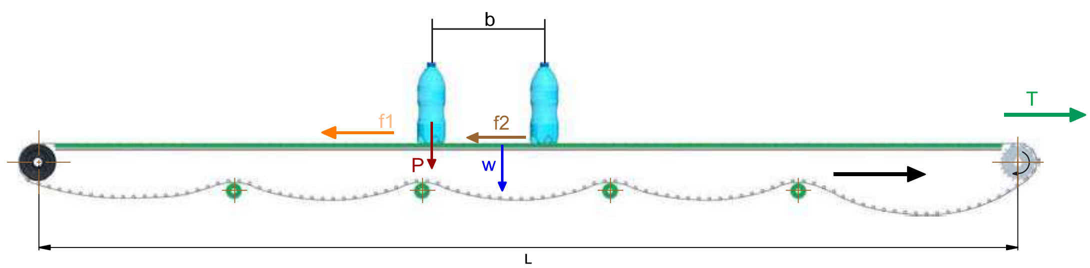
continue

CHAIN/BELT PULL CALCULATION FOR GENERAL PURPOSE CONVEYOR

The pull required to convey the products can be calculated for several conveyor types as follow:

A- STRAIGHT FLAT CONVEYOR WITHOUT ACCUMULATION

The total pull at drive end is the sum of return part pull and carry part pull. See below scheme for involved forces representations at conveyor carry and return parts.



L: Length of the conveyor shaft to shaft (m or ft);

b: Product pitch, not required when product weight per unit length is noted;

P: Product weight per unit length (N/m or lbf/ft);

W: belt/chain weight per unit length (N/m or lbf/ft);

g: gravity (m/s² or ft/s²);

The mass of chain per unit length is provided for each chain on SmartGuide® catalog;

For belt the mass per unit square is available on SmartGuide® catalog; the mass per unit length is done by multiplying the mass per unit square by the width of the belt in [m] or [ft].

CARRY PART:

The carry part pull Tc is the sum of f_1 and f_2:

$$(1)\quad Tc=(f_1+f_2)\ [N\ or\ lbf]$$

f_1 : friction force between belt/chain and wear strips due to the product weight

f_2 : friction force between belt/chain and wear strips due to belt/chain weight

$$(2)\quad f_1=\mu_{cp} * P * L$$

μ_{cp} : coefficient of dynamic friction between product and belt/chain due to product

$$(3)\quad f_2=\mu_{cw} * W * L$$

μ_{cw}: coefficient of dynamic friction between belt/chain and wear strip due to belt/chain

Equation (1) becomes:

$$(4)\quad T_c=(M * \mu_{cp}+M_c * \mu_{cw}) * g * L\quad [N\ or\ lbf]$$

M_c: Mass of chain/belt per unit length [kg/m or lb/ft]

M: Mass of the product per unit length [kg/m or lb/ft]

NOTE: In normal condition we assume the product for not slide over the chain/belt so $\mu_{cp} = \mu_{cw}$.

For other conditions where product slides over the chain/belt as accumulation $\mu_{cp} \neq \mu_{cw}$.

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RETURN PART

In the return part there is no product carried, thus the mass of the product per unit lenght $M=0$.

The return part pull T_R is then:

$$(5)\quad T_R = g * L * Mc * \mu_{cr} \quad [N \text{ or } lbf]$$

μ_{cr}: coefficient of dynamic friction between belt/chain and guide in the return part.

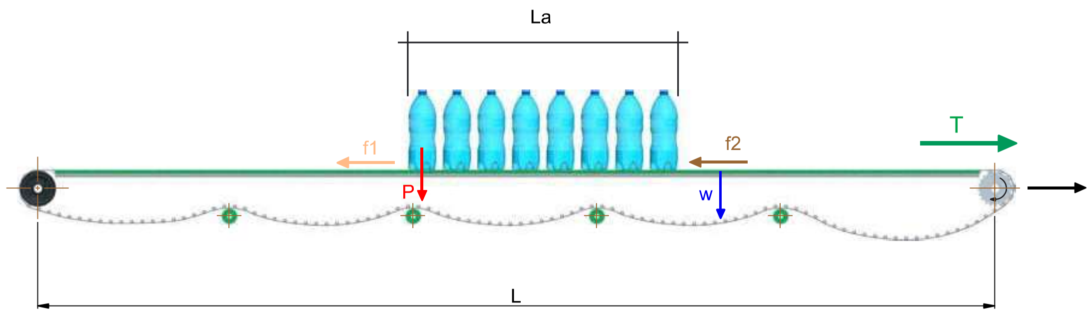
The total pull T of the flat conveyor (excluded the pull due to chordal effect) is done by:

$$(6)\quad T = T_C + T_R = g * L * (M * \mu_{cp} + M_c\,(\mu_{cw} + \mu_{cr})) \quad [N \text{ or } lbf]$$

The coefficient of friction can be monitored with the iCOF® device. For more details refer to 5 7 0 8 0 a

B- STRAIGHT FLAT CONVEYOR WITH ACCUMULATION:

In case of accumulation of the product, the pull will be as in formula (6) added the contribution of accumulation section.



Considering:

L_a: length of the accumulation section [m or ft];

M_a: mass per unit length of accumulated products [kg/m or lb/ft];

μ_{cp} friction coefficient between belt/chain and accumulated products;

The COFs between chain/belt and wearstrips and between chain/belt and products are available at page 7 3 5 7 8 a

The Total pull will be:

$$(6a)\quad T = T_C + T_R + Ta = [g * (L - La) * (M * \mu_{cp} + M_c * \mu_{cw}] + [g * L * Mc * \mu_{CR}] + [M_a * \mu_{cp} * g * L_a]$$

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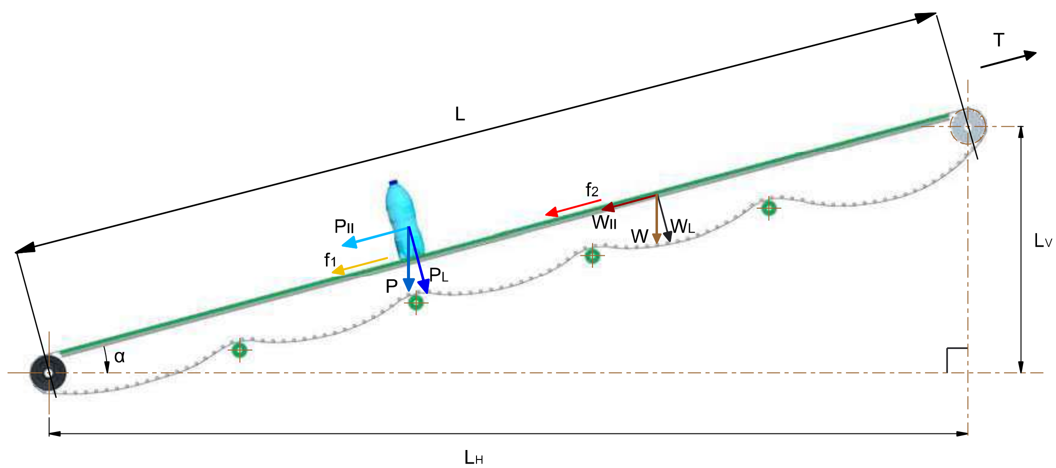
B- STRAIGHT INCLINED CONVEYOR

As the only difference between an inclined and a flat conveyor is the angle of inclination **α**, we will skip most calculation steps to get in the final formula.

In below inclined conveyor schematic, all significant forces of the conveyor are considered



α = incline angle (°);

CARRY PART

The carry part pull T_c is the sum of all horizontal forces;

$$(7)\ T_c = (f_1+P_{II}+f_2+W_{II})$$

where

$$(8)\ f_1 = \mu_{cp} * P_L * L = \mu_{cp} * P * L * \cos\alpha$$

$$(9)\ f_2 = \mu_{cw} * W_L * L = \mu_{cw} * W * L * \cos\alpha$$

$$(10)\ P_{II} = P * L * \sin\alpha = M * g * L * \sin\alpha$$

$$(11)\ W_{II} = W * L * \sin\alpha = Mc * g * L * \sin\alpha$$

RETURN PART

In the return part there is no product carried, thus **M=0**.

$$(12)\ T_r = M_c * g * L * (\mu_{cr} * \cos\alpha + \sin\alpha)$$

The total pull **T** of the inclined/declined conveyor (excluded the pull due to chordal effect) is done by:

$$(13)\ T = T_C + T_R = g * L * [M * (\mu_{cp} * \cos\alpha + \sin\alpha) + M_c * (\mu_{cw} * \cos\alpha + \sin\alpha)] + g * L * M_c * (\mu_{cr} * \cos\alpha + \sin\alpha)$$

C- NET SHAFT POWER NP

$$(14)\ NP = T * v$$

V is the conveyor speed [m/s or ft/s]

T the pull [kN or lbf]

NP [kW or lbf*ft/s]

Above calculation is the basic, for detailed calculation use our calculation program SPEC® (http://spec.systemplast.com)

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MAXIMUM ACCELERATION:

The maximum acceleration force F_{max} on a product to be able to convey the product with the chain depends on the friction between product and chain.

Maximum acceleration a_{max} can be calculated with:

$$a_{max} = \frac{F_{max}}{M} = \frac{W * \mu}{M} = \frac{M * g * \mu}{M} = g * \mu$$

W = weight of product in [N] or [Lb_f]

M = weight of product in [kg] or [lb_m]

μ = coefficient of friction between chain/belt and product

g = gravitational acceleration = $9.81\ m/s^2$ ($32.2\ ft/s^2$)

MAXIMUM FORCE ON PRODUCTS TO AVOID TIPPAGE:

The maximum acceleration a_{CG} without products falling over is dependent on the shape (position of the center of gravity), the weight, and the product material. This is for instance, it is also important when the product is being conveyed onto a dead plate.

When a bottle is moving on conveyors, there are external forces acting on it:

$$F^{ext} = M * a_{CG} = \mu * M * g$$

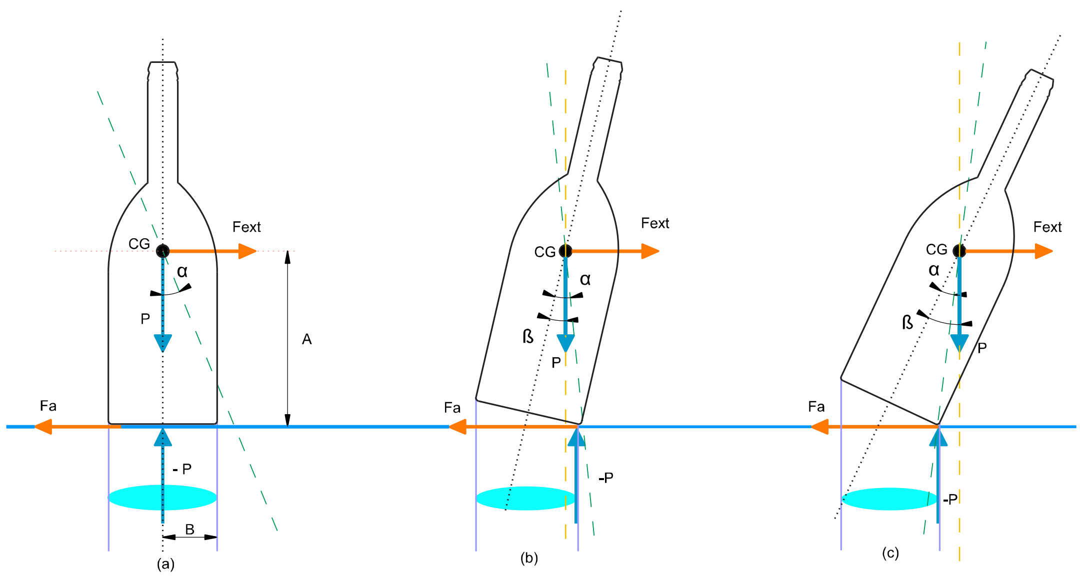

Figure 1

The force F^{ext} is the force due to acceleration or deceleration of the product or due to a different cause like other bottles or a side guide.

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BOTTLE EQUILIBRIUM:

The equilibrium condition of a bottle is that the vector of the vertical component of resultant forces passing by its gravity center falls inside support base (blue circle) i.e. $\alpha > \beta$. See figure 1.

Angle α is determined by the diameter of the footprint of the product (B= ½ * bottle diameter) and the height of the centre point of gravity (A).

Angle β is determined by the horizontal force on the bottle (F^{ext}) relative to the weight of the bottle (P).

Bottle falls when $\beta > \alpha$. That means in:

$$\frac{F^{ext}}{P} > \frac{B}{A} \; ; \; \frac{m * g * \mu}{m * g} > \frac{B}{A} \rightarrow \mu > \frac{B}{A}$$

In conclusion:

when $\mu > \frac{B}{A}$ containers fall; and when $\mu < \frac{B}{A}$ containers remain standing

CENTRIFUGAL FORCES:

When a product is being conveyed through a curve there's a centrifugal force working on the product. This force on the product is compensated by the friction between chain and product and by a side guide.

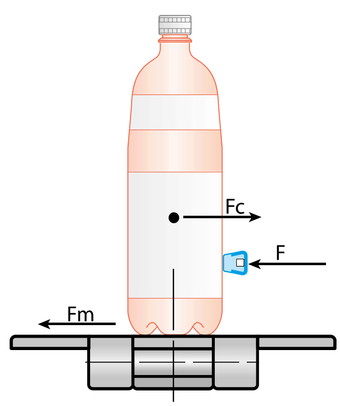
The centrifugal force is calculated with:

$$F_c = \frac{M * v^2}{r}$$

M = weight of the product

v = speed

r = center radius of the curve



Friction force between chain and product is calculated with:

$$F_m = M * g * \mu$$

g = gravitational acceleration

μ = coefficient of friction between belt/chain and product

The minimum force F that needs to be generated by the side guide is:

$$F = F_c - F_m = M * \left[\frac{v^2}{r} - g * \mu \right]$$

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PRESSURE OF ACCUMULATION PRODUCTS

GENERAL CALCULATION

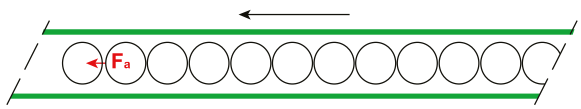
PRESSURE OF ACCUMULATING PRODUCTS OR BACKLINE PRESSURE:

When a product is standing still (e.g. against a stopper or guide), the chain running underneath the product creates a force on the product equal to the weight of the product multiplied by the coefficient of friction between chain and product.

Each following product is pushing with the same force against the next product, so the resulting force is proportional to the total weight of products upstream. This force is the same of the accumulation contribute on formula 6A.

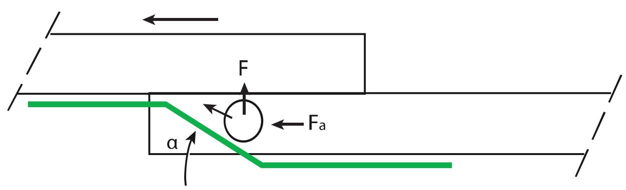
$$F_a = W_a * L_a * \mu$$

$$F_a = M_a * g * \mu_{cp} * L_a$$



F_a = accumulation force
W_a = weight of the accumulating products in Kg/m (or lb/ft).
L_a = length of accumulation in m (or ft)
μ = coefficient of friction between chain and product.

SIDE TRANSFER ACTION:



Pushing the product sideward creates a force F on the product against the side guide.

$$F = F_a * \sin(\alpha) = W_a * L_a * \mu * \sin(\alpha)$$

(see explanation of symbols above)

Nowadays, can and bottle wall thickness is becoming thinner and thinner. At the same time, more installations are running with less or no lubrication, thus increasing the coefficient of friction (unless they utilize our NGE / Nolu®-S parts solution). That's why it's important to take also the forces on the products into consideration.

In the above-mentioned formula, the angle α plays an important role in a smooth transfer and reduced forces on the products. This angle should be kept a small as possible. One should also consider the nesting pattern of cans and bottles during a side transfer to optimize guide rail geometry.

CALCULATION OF SIDE GUIDE DISTANCE:

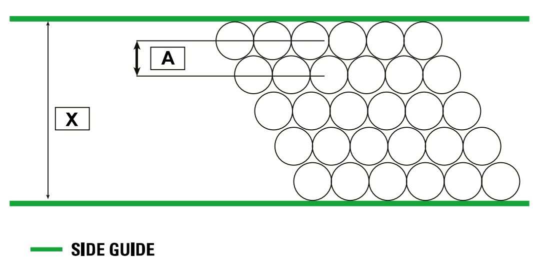
SIDE GUIDE DISTANCE $X = D + (N-1) * A$

Where:

D = Product diameter

N = Number of product rows

A = product-product center distance = $\sqrt{0.75 * D^2}$



Maintenance Construction Application

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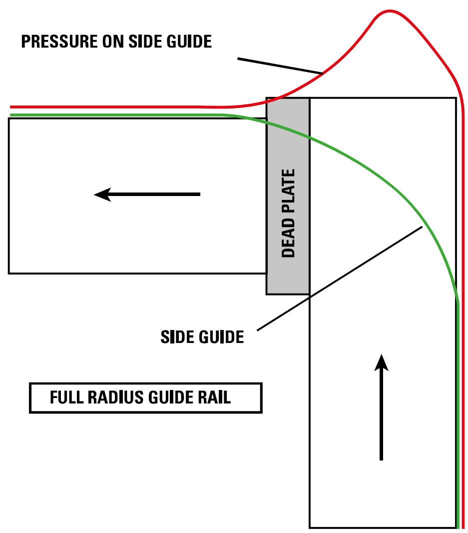
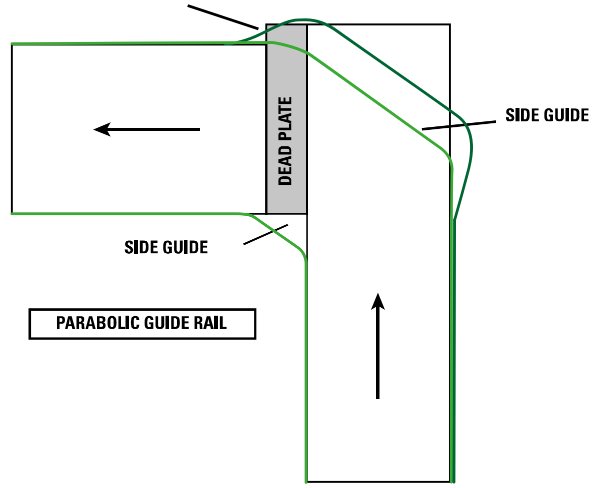
90° PRODUCT TRANSFER:

When transferring products from one conveyor to another at a 90° angle, it's common practice to use full radius guide rails with dead plates which span the space between the infeed and outfeed conveyors. Products moving along the full radius guide rail exert high pressure on the rail and on each other, easily resulting in damage.





The parabolic guide rail distributes the pressure better along the outer guide rail. This results in significantly less potential for damage on products or deflection of the guide rail. However, on the inside corner of the curve, extra room must be created for an extended dead plate "dead area".

The use of the System Plast® active transfer wing system will eliminate the dead plate and further reduce the pressure on products and side guides.

Belt with transfer wing. Go to:
½" 3 0 0 4 5 a
¾" 3 0 2 1 5 a
1" 3 0 3 2 0 a

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THERMAL EXPANSION

Due to temperature variation, the belt width can change according to the delta temperature. The belt width variation is function of the delta temperature and the belt material itself. See below formula for thermal expansion calculation.

CALCULATION:

Expected expansion ΔW [mm or in];

$$\Delta W = W * \Delta T * f$$

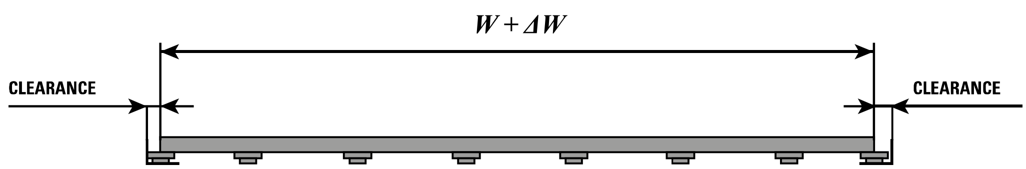
W = belt width [m] or [in]

ΔT = temperature difference (Operating temperature - Ambient temperature at manufacturing site) [°C] or [°F]

f = thermal expansion factor (material property) or Linear Thermal Expansion Coefficient [mm/m/°C] or[in/in/°F]

MATERIAL	THERMAL EXPANSION FACTOR F	
	[mm/m/°C]	[in/in/°F]
LF (Acetal)	0.12	6.66E-5
NG®evo conveyor components made from engineered plastic resin (PBT)	0.13	7.22E-5
PP (Polypropylene)	0.15	8.33E-5
HT (PA)	0.08	4.44E-5
XT (PPS)	0.26	1.44E-4

To be able to absorb the thermal expansion the belt needs some clearance on the side. Depending on the expected temperature difference the structure should be wide enough to make sure the belt will not get stuck at high temperatures or, in case of low temperatures, be small enough to still support the belt at low temperatures.



The total clearance per side to be considered is (indicative values):

BELT NOMINAL WIDTH		TOTAL CLEARANCE (*)	
W < 500 mm	W < 20"	4 mm	0.16"
500 < W < 1500 [mm]	20" < W < 60"	6 mm	0.24 "
1500 < W < 3000 [mm]	60" < W < 120"	8 mm	0.32"
W > 3000 mm	W > 120"	10 mm	0.39"

(*) For PP belts, please consider the extra dimension due to material expansion during molding process in the clearance calculations.

NOMINAL WIDTH TOLERANCE

The standard tolerance on the nominal width of belts/chains made in Acetal (LF) or Polybutylene terephthalate (NGE) is **+0 / - 0,5 %.**

The standard tolerance on the nominal width of belts/chains made in Polypropylene (PP, PP-FR-EC, CR) is **+1 % / +2 %.**

The standard tolerance on the nominal width of belts/chains made in Acetal (POM-AS) is **0 / +0.6 %.**

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CONSIDERATION OF THERMAL INFLUENCES

continue

1. Calculate the thermal width expansion "ΔlW"
2. Calculate the thermal belt elongation "ΔlE"
3. Determine the catenary height "H"

2500RR Construction details. Go to: 723110a

NOTE: THESE CONSIDERATIONS ARE NOT INCLUDING THE EXPANSION INFLUENCES DUE TO BELT TENSION!

Thermal expansion calculation:

Calculation: Expected expansion **[mm]** $\Delta l = W \cdot \Delta T \cdot f$

f = thermal expansion factor (of PPG: ~ 0,15 mm/m/°C or 8.33E-5 in/in/°F)

W = belt width [mm]/1000 or belt length per zone [mm]/1000

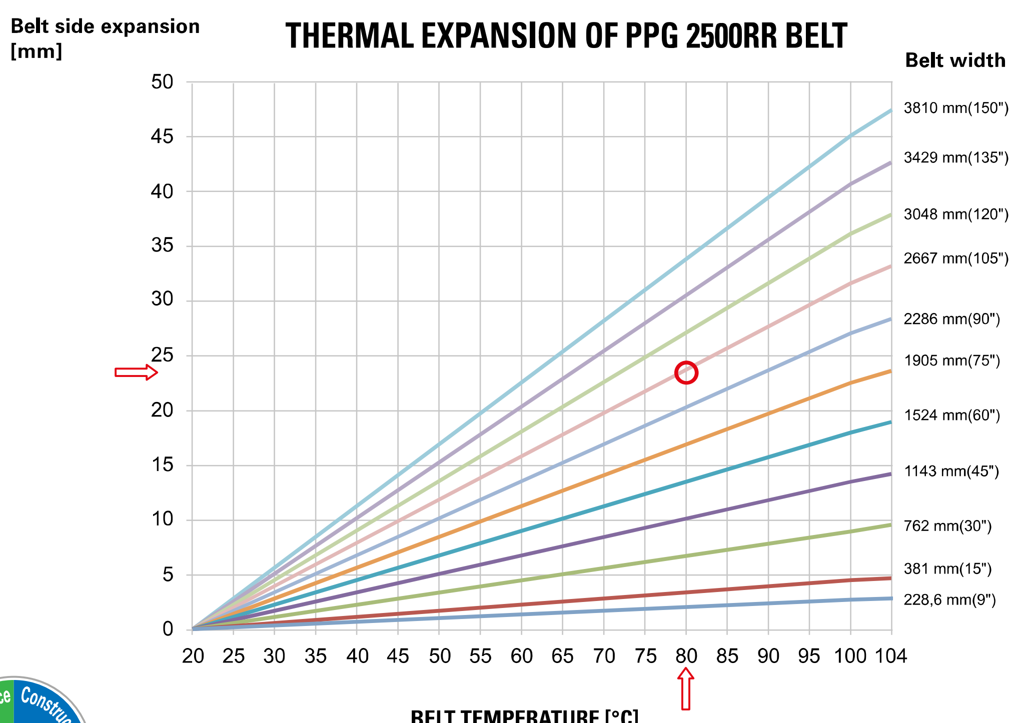
ΔT = temperature difference = ([°C] - 21°C)

1. **Calculate the thermal width expansion "ΔlW"**
   Example for a belt 105" (2667 mm) width, at 80°C

$$\Delta l = W \cdot \Delta T \cdot f$$
$$\Delta l = 2667\ mm/1000 \times (80° - 21°)C \times 0{,}15\ mm/m/°C$$

ΔlW = 23 mm

Thermal width expansion can also be read out of below diagram.



2500RR CALCULATIONS

RAISED RIB BELT 2500

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2. Calculate the thermal belt elongation "ΔlE" for e.g. different temperature zones in a warmer tunnel

Example for a warmer-tunnel, with a 17,5 m shaft-distance, standard conveyor design with head drive, and three temperature zones.

Zone 1 : 5 m long, 40°C

Zone 2 : 7,5 m long, 80°C

Zone 3 : 5 m long, 50°C

Note: Don't forget to count also the amount of belt of the return part, where the belt is also exposed to the several temperatures! This leads to double the elongation of the belt in each zone!

2500RR Construction details. Go to: 7 2 3 1 0 a

ΔlE = ΔlZone1 + ΔlZone2 + ΔlZone3

ΔlZone1 = WZone1 • ΔTZone1 • f = 5 m x (40 - 21)°C x 0,15 mm/m/°C = 14,3 mm x 2 = 28,6 mm

ΔlZone2 = WZone2 • ΔTZone2 • f = 7,5 m x (80 - 21)°C x 0,15 mm/m/°C = 66,4 mm x 2 = 132,8 mm

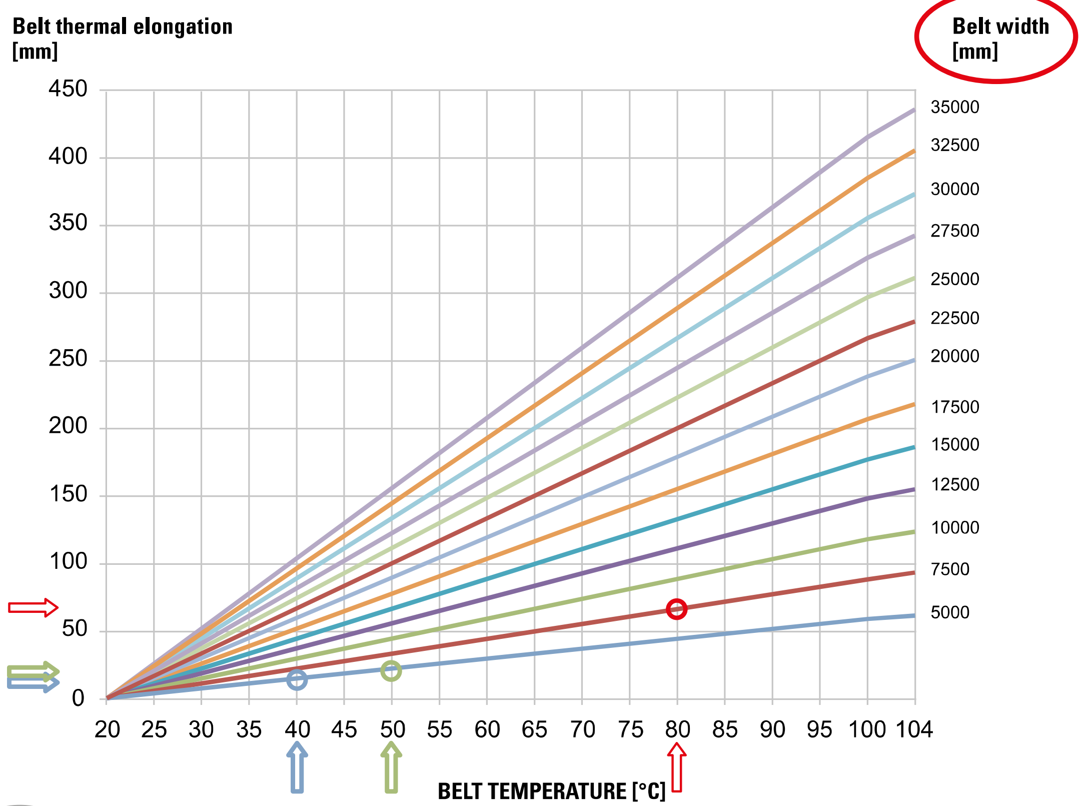
ΔlZone3 = WZone3 • ΔTZone3 • f = 5 m x (50 - 21)°C x 0,15 mm/m/°C = 21,8 mm x 2 = 43,6 mm

ΔlE = 28,6 mm + 132,8 mm + 43,6 mm

ΔlE = 205 mm

Thermal belt elongation can also be read out of below diagram.

THERMAL ELONGATION OF PPG 2500RR BELT



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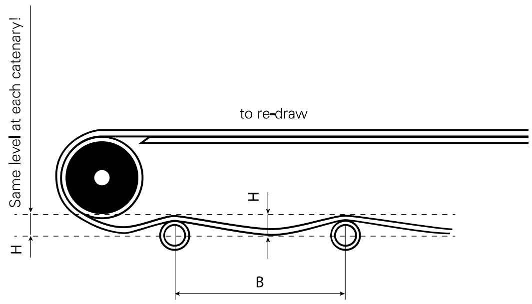
2500RR
Construction details.
Go to: 723 10a

3. Determine the catenary height "**H**"

Example based on a belt elongation of **ΔlE** = 205 mm, from thermal belt elongation example go to page code: 735 29a
determined by calculation or by using the diagram for thermal elongation go to page code: 735 29a)



H = **B x h/b**

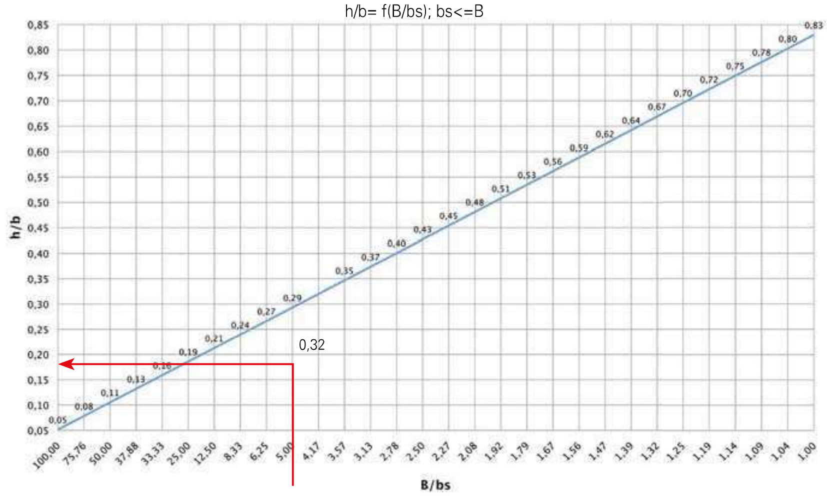
B = expected catenary length / distance between return roller (read out of drawing from the conveyor)

h/b = factor determined from the following diagram

bs = belt stretch (thermal elongation ΔlE from thermal belt elongation example go to page code: 735 29a
Determined by calculation or by using the diagram for thermal elongation go to page code: 735 29a

catenary height as a function of belt stretch for all catenary lengths and as long as belt stretch is smaller than the catenary length

h/b= f(B/bs); bs<=B



Example:

bs = ΔlE = 205 mm

B = 1000 mm

B/bs = 1000 mm / 205 mm = 4,88 ≈ 5

h/b = 0,29 (read out of diagram)

H = B x h/b = 1000 mm x 0,29 = 290 mm

Note: Consider a minimum tolerance of +/-30 mm for the calculated catenary height

7 3 5 3 1 a 2500RR LOAD CAPACITY DEPENDING ON APPLICATION TEMPERATURE

RAISED RIB BELT 2500

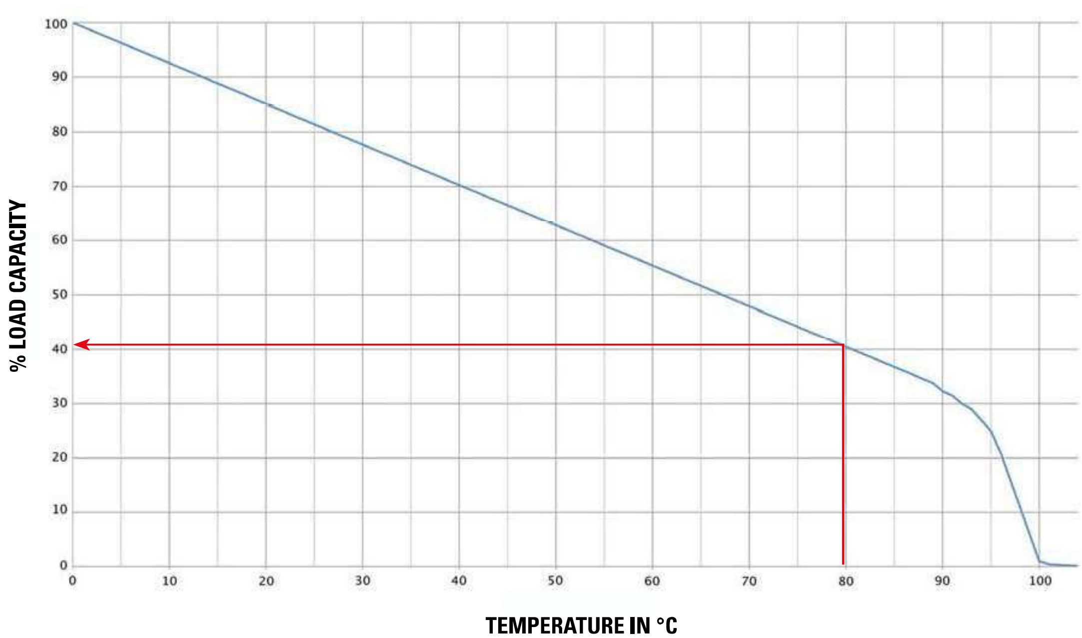
back

2500RR
Construction details.
Go to:
7 2 3 1 0 a

LOAD CAPACITY / TEMPERATURE GRAPH

NOTE: Mechanical properties of plastic materials degrade with the increasing temperature.
The following graph indicates the remaining load capacity (%) as a function of the temperature.

LOAD CAPACITY AS A FUNCTION OF THE TEMPERATURE



EXAMPLE:

Identify the hottest section. (In the example before: section 2, 80° C)
The allowable max. load capacity/working load of the belt in that particular section is:
Factor 0,41 (read 41% out of diagram) x 30000 N/m = 12300 N/m.
It can happen that the middle section of a machine is more critical with respect to belt load than the drive section, due to the fact that the temperature at the drive is lower and therefore the allowable belt tension is higher.
This needs to be checked carefully.

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Contacts: **EUROPE and ROW**: SystemPlastTechSupport@regalbeloit.com; **USA**: systemplast.engineering@regalbeloit.com; **Engineering calculator:** SPEC®

2253RTC CALCULATIONS

2253 ROLLER TOP BELT

continue

1- LATERAL MOVEMENT

Auxiliary drive units underneath the belt, running at right angles to the direction of belt travel, enable lateral transfers (left- or right side sorting) of conveyed goods. It can also be used to position a product, for example in front of a palletizer. Since no push-off devices, etc., are necessary (more safe), this approach works to prevent jamming, and allows for compact, space-saving layouts and no safety guards are required.

2253RTC
Construction details.
Go to:
7 2 2 9 0 a

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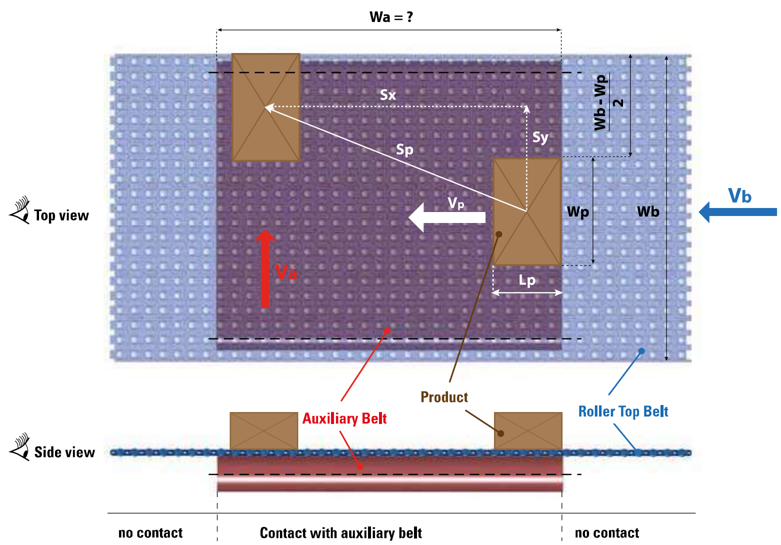
Applications.
Go to:
7 2 6 2 5 a

EXAMPLE HOW TO MAKE A LATERAL MOVEMENT ON THE FLY (*)



GIVEN DATA:

Width of pack (W_p) = 240 mm;

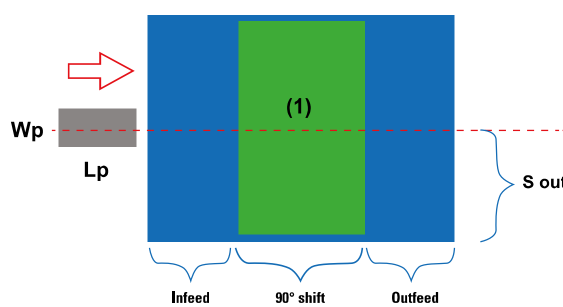
Length of pack (L_p) = 360 mm

Capacity (P_r) = 30 p/min.

S_{out} = 150 mm

As a rule of thumbs, for a side shift with only one auxiliary belt, the minimum width of the auxiliary belt (1) should be at least 1,5 times the transversal dimension of the pack Lp.

Bigger widths help in leaving more time to the movement thus reducing the speed of the auxiliary belt and consequently giving a better positioning of the pack (inertia results lower).



Sketch not in scale

Minimum Width of the auxiliary belt (1) (W_a) will be calculated as follow:

W_a= 1,5 x 360 mm = 540 mm ≈ 600 mm.

At the same time minimum pitch in feeding, centre to centre pack, needs to be equal or bigger than the auxiliary belt width to avoid packs to be rotated before being shifted. The minimum pitch will be equal to 600 mm.

(*) For stop and go motion the minimun width of the auxiliary belt W_a is equal to the product lenght L_p ($W_a = L_p$).

1 m	= 3.28 ft

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7 3 5 3 4 a 2253RTC CALCULATIONS

2253 ROLLER TOP BELT

This pitch must be realized, by means of appropriate feeding/metering conveyors (for instance equipped with VG belts) before the packs climb on the roller top belt or on the infeed static of the roller top belt.

Bigger pitches have the effect to increase the speed of the Roller Top system but not the overall dimension of the application.

- Pack speed V_p:

$$V_p = \frac{Pitch}{1000} * P_r = 0.6 * 30 = 18 \text{ m/min}$$

- The speed of 2253RTC belt (V_{rt}) can be calculated considering the 2253 Roller Top belt itself running fully on spheres:

$$V_{rt} = \frac{1}{2} * V_p = 0.5 * 18 = 9 \text{ m/min}$$

- Time for the pack to climb on the area (1) (t_c)

$$t_c = \frac{\text{lenght of pack } L_p \text{ [mm]}}{\text{pack speed } V_p \left[\frac{m}{min}\right]} = \frac{360 * 60}{18 * 1000} = 1.2 \text{ s}$$

- Time to cross the auxiliary belt area (1) (t_a)

$$t_a = \frac{\text{overall lenght shift area [mm]}}{\text{pack speed } V_p \left[\frac{m}{min}\right]} = \frac{600 * 60}{18 * 1000} = 2 \text{ s}$$

Once the pack is fully on the area (1) the shift can start.

If the shift is earlier activated, the pack will be turned/misaligned instead of being shifted.

Note: In case the auxiliary belt is running continuously, the dimensions of the auxiliary bet area as well as the overall footprint can be reduced. In such case a more defined and precise controls of the belts timings are required.

- The time available for the side shift **(ts)** is given by the difference of the time t_a and t_c

$$t_s = t_a - t_c = 2 - 1.2 = 0.8 \text{ s}$$

The pack is supposed to come on the Roller Top area about in the middle of it.

Consequently, the total travel distance to lead the outer front of the pack completely on the bay area is the sum of S_{out} + half of product width W_p.

- Considering this, the auxiliary belt speed V_a results:

$$V_a = \frac{S_{out} + \frac{W_p}{2} \text{ [mm]}}{t_s \text{ [s]}} = \frac{150 + 120}{0.8 * 1000} = 0.34 \text{ m/s } = 21 \text{ m/min}$$

The infeed is needed to have a stable pack before the shift (head to tail passage can affect the stability of the pack). It should be at least as big as the pack length.

Infeed = L_p = 360 mm ≈ 400 mm;

The outfeed is recommendable but not mandatory. The outfeed dimensions should be in the same dimension range of the infeed.

Outfeed = Infeed = 400 mm

The overall footprint or length of the roller top and auxiliary conveyor system will be the sum of infeed, outfeed and shift area length.

Overall footprint = (400 + 600 + 400) mm = 1400 mm.

1 m	= 3.28 ft
1 m/min	= 3.28 ft/min
1 m/s	= 3.28 ft/s

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2- ROTATION WITH PRODUCT STOPPED: TURNING DISC UNDERNEATH THE 2253RTC BELT

The main advantage of this configuration is the easier handling of the packs in terms of settings of drives required.
On the other hand it's need of a fairly exact displacement of the pack in the centre of the table area for a good rotation.

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2253RTC Construction details. Go to: 7 2 2 9 0 a

2253RTC Applications. Go to: 7 2 6 2 5 a

EXAMPLE OF HOW TO DIMENSION AN APPLICATION OF ROTATION WITH PRODUCT STOPPED:

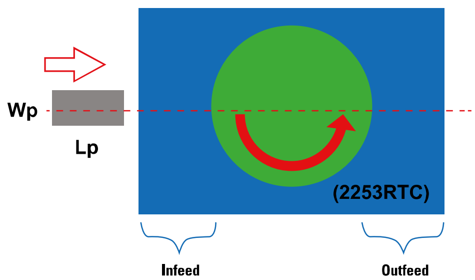
GIVEN DATA:

Width of pack (W_p) = 240 mm;

Length of pack (L_p) = 360 mm

Capacity (P_r) = 30 p/min.

Rotation angle (α) = 90°



For a proper rotation, the diameter of the disk (D_{TD}) should be in the same range of the dimension of diagonal of the pack. Slightly bigger disks help in reducing the need of a precise placing in the centre of it. In case of big diagonal dimension, if possible, reduce the dimension of the disk to not expose ball placed on the outer diameter to too quick accelerations. Movement would result longer since less balls in contact.

- Disk diameter can be calculated as follow:

$$D_{TD} = \sqrt{W_p^2 + L_p^2} = \left(\sqrt{240^2 + 360^2}\right) \text{ mm} = 432 \text{ mm} \approx 450 \text{ mm}$$

At the same time minimum pitch in feeding, centre to centre pack, needs to be equal or bigger than the turning disk diameter. This to avoid the pack to be rotated when the previous pack is still on the turning disk area. The minimum pitch will be equal to 450 mm.

This pitch must be realized, by means of appropriate feeding/metering conveyors (for instance equipped with VG belts) before the products climb on the 2253RTC or on the infeed static of the roller top belt.

Bigger pitches have the effect to increase the speed of the RollerTop system but not the overall dimension of the application.

- The product speed V_p will be as follow:

$$V_p = \frac{\text{Pitch}}{1000} * P_r = 0.45 * 30 = 14 \text{ m/min}$$

- The speed of 2253RTC belt (VRT) can be calculated considering the 2253 RollerTop belt itself running fully on spheres:

$$V_{rt} = \frac{1}{2} * V_p = 0.5 * 14 = 7 \text{ m/min}$$

1 m	= 3.28 ft
1 m/min	= 3.28 ft/min
1 m/s	= 3.28 ft/s

7 3 5 3 6 a 2253RTC CALCULATIONS

2253 ROLLER TOP BELT

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The time available for the rotation (tr) will be as follow:

$$t_r = \frac{Pitch}{1000 * V_p} = \frac{450}{1000} * \frac{60}{14} = 1.93\ s$$

The angular speed ω can be calculated through below formula:

$$\alpha = \omega * t_r$$

$$So\ \omega = \frac{\alpha}{t_r} = \frac{\frac{\pi}{2}}{1.93} = 0.81\ rad/s = 49\ rad/min$$

2253RTC Construction details. Go to: 7 2 2 9 0 a

2253RTC Applications. Go to: 7 2 6 2 5 a

Note: in this configuration, the conveyor must be stopped while the pack is rotating, and the pack should be as close as possible to the centre of the disk.

The infeed is recommended but not mandatory to have a stable product on conveyor before the rotation.

The infeed length should be at least as big as the pack: 360 mm ≈ 400 mm

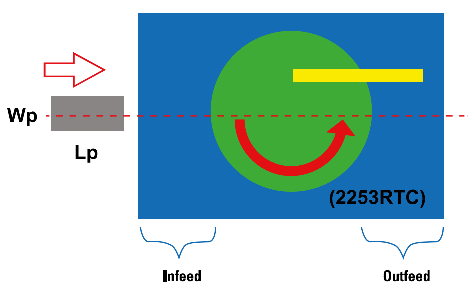
The outfeed is recommended too but not mandatory.

The outfeed length should be in the same dimension range of the dimension of the pack once rotated (i.e Wp): 240 mm ≈ 250 mm

The overall footprint or length of the roller top and turning disk system will be the sum of infeed, outfeed and rotation area diameter.

Overall footprint = (400 + 450 + 250) mm = 1100 mm.

Alternately, by placing a roller guide (in yellow) as shown in the sketch below is possible to keep the disk always in motion avoiding the stop of the conveyor during rotation.



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Contacts: **EUROPE and ROW**: SystemPlastTechSupport@regalbeloit.com; **USA**: systemplast.engineering@regalbeloit.com; **Engineering calculator:** SPEC

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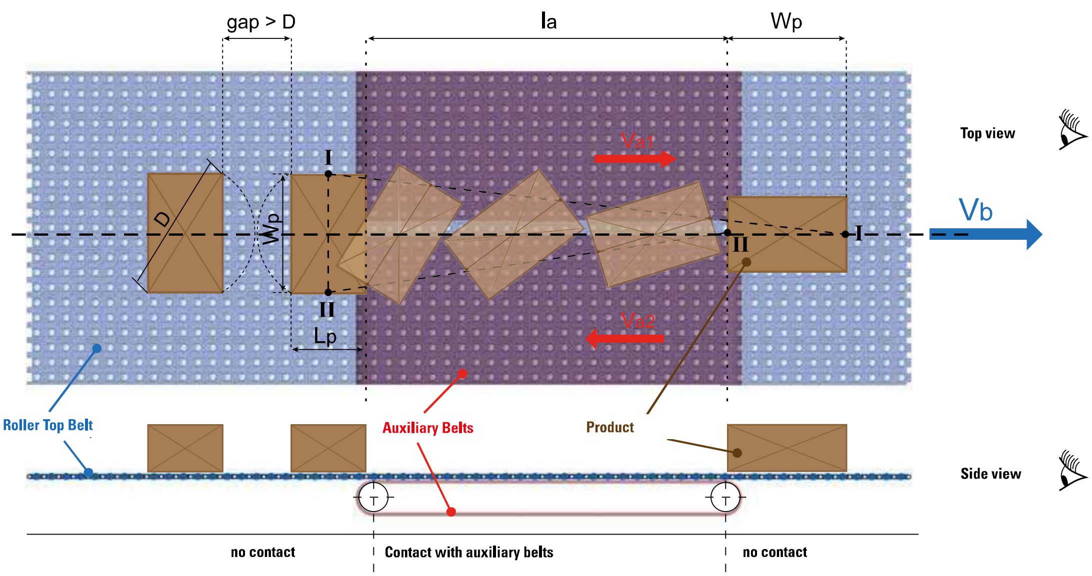
3- ROTATION WITH PRODUCT MOVING: AUXILIARY BELTS UNDERNEATH THE 2253RTC BELT

With two parallel auxiliary belts running underneath the 2253RTC belts at different directions, the packs positioned in between the auxiliary belts will rotate while moving on the 2253RTC belt.

EXAMPLE OF HOW TO DIMENSION AN APPLICATION OF ROTATION WITH PACK MOVING:



2253RTC Construction details. Go to: 7 2 2 9 0 a

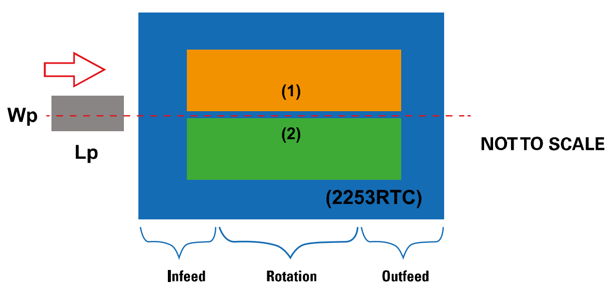
2253RTC Applications. Go to: 7 2 6 2 5 a

Width of pack ($\mathbf{W_p}$) = 240 mm;

Length of pack ($\mathbf{L_p}$) = 360 mm

Capacity ($\mathbf{P_r}$) = 30 p/min.

Rotation angle ($\boldsymbol{\alpha}$) = 90°



The minimum product pitch, centre to centre pack, needs to be equal or bigger than the product diagonal (D) in order to avoid product touching each other during the rotation.

- The minimum pitch will be equal to

$$\text{Pitch} = D = \sqrt{W_p^2 + L_p^2} = \left(\sqrt{240^2 + 360^2}\right) \text{ mm} = 432 \text{ mm} \approx 450 \text{ mm}$$

This dimension is also corresponding to the minimum product pitch in feeding, centre to centre pack.This pitch must be realized, by means of appropriate feeding/metering conveyors (for instance equipped with VG belts) before the packs climb on the 2253RTC or on the infeed static of the roller top belt.

1 m = 3.28 ft

2253RTC CALCULATIONS

2253 ROLLER TOP BELT

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Bigger pitches have the effect to increase the speed of the RollerTop system but not the overall dimension of the application.

- The pack speed Vp will be as follow:

$$V_p = \frac{Pitch}{1000} * P_r = 0.45 * 30 = 14 \text{ m/min}$$

- The speed of 2253RTC belt (V_{RT}) can be calculated considering the 2253 Roller Top belt itself running fully on spheres:

$$V_{RT} = \frac{1}{2} * V_p = 0.5 * 14 = 7 \text{ m/min}$$

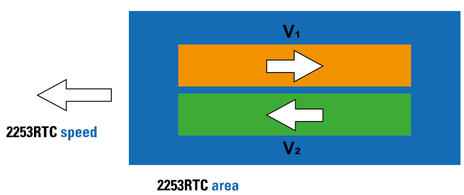
It is recommended to keep the length of auxiliary belts (1) e (2) at least equal 1,5 times the diagonal (D) of the product. So, the minimum length of auxiliary belts (1) and (2) will be:

$$L_a = 1.5 * D = 1.5 * 450 \text{ mm} = 675 \text{ mm} \approx 700 \text{ mm}$$

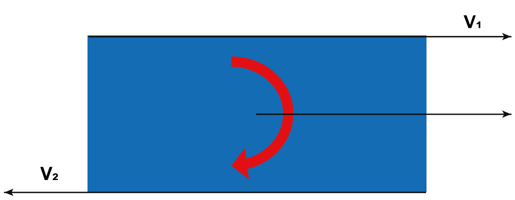
The time to cross (ta) the auxiliary belt area (1) and (2) will be as follow:

$$t_a = \frac{\text{overall lenght shift area } L_a \text{ [mm]}}{\text{pack speed } V_p \left[\frac{m}{min}\right]} = \frac{700}{1000} * \frac{60}{18} = 2.33 \text{ s}$$

Considering V_1 and V_2 the speeds given to the spheres by the auxiliary belts (1) and (2) underneath.



The speed of the gravity centre of the product is 7 m/min.



- Considering the angular speed ω of the pack the following relations are valid:

$$\alpha = \omega * t_a$$

$$\text{So } \omega = \frac{\alpha}{t_a} = \frac{\frac{\pi}{2}}{2} = 0.79 \text{ rad/s} = 47 \text{ rad/min}$$

1 m	= 3.28 ft
1 m/min	= 3.28 ft/min
1 m/s	= 3.28 ft/s

2253RTC Construction details. Go to: 72290a

2253RTC Applications. Go to: 72625a

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Contacts: EUROPE and ROW: SystemPlastTechSupport@regalbeloit.com; USA: systemplast.engineering@regalbeloit.com; Engineering calculator: SPEC

2253RTC CALCULATIONS

2253 ROLLER TOP BELT

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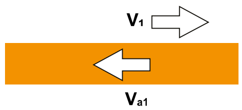
The required difference speed to rotate the product will be:

$$(V_1 - V_2) = 0.79 * 225 = 0.17 \text{ m/s} = 11 \text{ m/min}$$

Another way to calculate the difference in speed of balls can be used. See following relation:

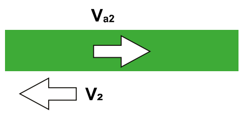
Considering V_{a1}, the speed given to the auxiliary belt (1) and opposite in respect to V_1 (actual speed of balls under auxiliary belt (1));

$$V_1 = 2 * V_{RT} + V_{a1}$$



Similarly, but opposite in running direction is V_{a2}:

$$V_2 = 2 * V_{RT} - V_{a2}$$



Thus:

$$(V_1 - V_2) = 2 * V_{RT} + V_{a1} - (2 * V_{RT} - V_{a2}) = V_{a1} + V_{a2} = 11 \text{ [m/min]}$$

From the above relation is therefore possible to determine the real speeds Va1 and Va2 of the auxiliary belts by combining two speeds at choice V_1 and V_2.

For instance, considering fixed the difference in speed $(V_1 - V_2)$:

$(V_1 - V_2)$ = 11 m/min ;

V_1 = 20 m/min ;

$V_2 = V_1$ + 11 m/min = (20 + 11) m/min = 31 m/min.

The auxiliary belt (1) will run in the same sense of the main belt with a speed Va1.

$$V_{a1} = V_1 - 2 * V_{RT} = (20 - 7 * 2) \text{ m/min} = 6 \text{ m/min}$$

While the auxiliary belt (2) will run in the opposite sense of the main belt with a speed V_{a2} = 31 - 7*2 = 17 m/min

$$V_{a2} = V_2 - 2 * V_{RT} = (31 - 7 * 2) \text{ m/min} = 17 \text{ m/min}$$

1 m	= 3.28 ft
1 m/min	= 3.28 ft/min
1 m/s	= 3.28 ft/s

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2253RTC CALCULATIONS

2253 ROLLER TOP BELT

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In case of use of two speeds opposite to the running direction of the product (Fig. A), the following relation is valid:

$$(V_1 - V_2) = 2 * V_{RT} + V_{a1} - (2 * V_{RT} + V_{a2}) = V_{a1} - V_{a2} \text{ m/min}$$

This configuration requires higher speeds of the auxiliary belts and has the main advantage of the better control and stable product rotation.

At last, it is also possible to use a fixed plate instead of one of the two auxiliary belts (Fig. B).

This solution makes application cheaper (one less drive and auxiliary belt) but has the disadvantage to lead to an higher speed of the auxiliary belt, thus potential higher wear rate.

The infeed is needed to have a stable pack before the rotation (head to tail passage can affect the stability).

The infeed length should be at least as big as the product length: 360 mm ≈ 400 mm

The outfeed is recommended too but not mandatory.

The outfeed length should be in the same dimension range of the dimension of the pack once rotated (Wp): 240 mm ≈ 250 mm.

The overall footprint or length of the roller top and auxiliary belts system will be the sum of infeed, outfeed and shift area length.

Overall footprint = (400 + 700 + 250) mm = 1350 mm.

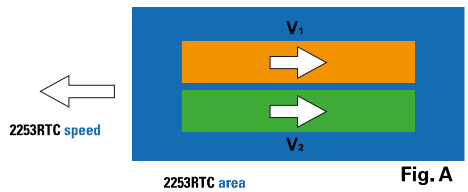

Fig. A

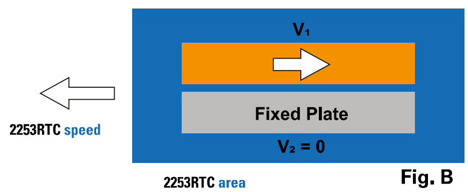

Fig. B

2253RTC Construction details. Go to: 72290a

2253RTC Applications. Go to: 72625a

Note: The SSL (Short Side Leading) rotation is generally less efficient than LSL (Long Side Leading) since the number of balls in contact at the beginning as well as arm of rotation is smaller.

Rotation could therefore seem not to start immediately and then be sudden.

In case of high speed differentials of $(V_1 - V_2)$ is recommendable to increase the auxiliary belts area (the length) to speeds lower and thus realize a smoother rotation.

For a properly working rotation we advise a **length/width ratio of max. 2**

1 m	= 3.28 ft
1 m/min	= 3.28 ft/min
1 m/s	= 3.28 ft/s

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BEARING SELECTION:

The following general information will serve the purpose of aiding the machine designer or bearing user when applying the bearings covered in System Plast® catalog.

Before beginning the bearing selection for a particular application, it is important to have a good idea of where the bearing will be installed, what its purpose will be, what operating conditions will the bearing be expected to function in, and a desired bearing life. Each bearing type has certain characteristics which make it suitable for a certain application(s). Having comprehensive knowledge of these requirements will aid in bearing selection. In most cases, there are several factors to consider when choosing a bearing type. Therefore, the following information is to be used only as a guide. In the selection process the following factors must be considered:

magnitude and direction of load; misalignment (static or dynamic), noise; vibration and shock loading, environment and bearing type.

Bearing mounting. Go to: 7 3 0 5 2 a

LOAD - MAGNITUDE AND DIRECTION

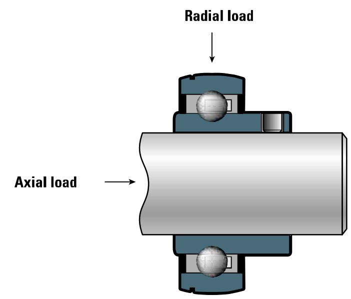
Load magnitude typically dictates size of bearing required but it can also affect the type of bearing. Ball bearings work well in light to moderate loads typical of conveyor applications. Load direction can be radial, axial, or a combination of these two directions. These directions along with load magnitude are deciding factors in selection of bearing type.

System Plast® bearings are mostly used in application where there are only radial load or radial loading plus slight axial load.

Radial loading is the most common type of bearing load and is defined as a load perpendicular to the shaft center line. Most ball bearings are designed to accept primarily radial loads.

Axial loading is defined as loading in the direction through the shaft centerline.

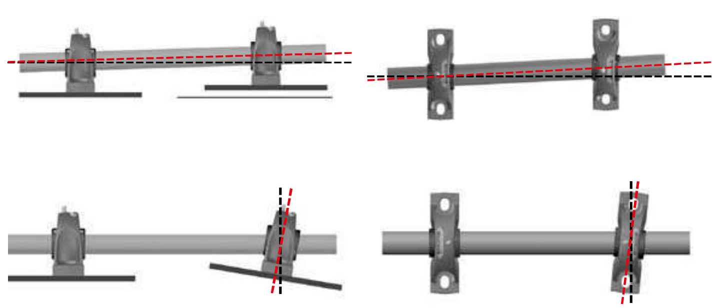
Combination loading consists of both a radial and a thrust load acting simultaneously on the bearing. When combination loads are acting on a bearing it is necessary to determine an equivalent radial load when calculating bearing life.



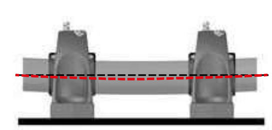
MISALIGNMENT

Bearing misalignment is a result of angular misalignment between the shaft and housing. This misalignment comes in two different forms, static and dynamic. Static misalignment is the outcome of bearings that are mounted on different planes causing an angular shaft displacement and resulting in the bearing operating under fixed misalignment angle. Mounted ball bearings have a design feature that allows them to accommodate a limited degree of fixed misalignment. Dynamic misalignment is an eccentric shaft rotation caused by shafting imperfections and resulting in the bearing operating under a varying misalignment angle.

Static System Misalignment



Dynamic System Misalignment



Each bearing type is capable of accommodating a certain amount of either static, dynamic, or combination misalignment. When application misalignment exceeds the allowable limit for the particular bearing, increased contact stresses between bearing rolling elements and raceways occurs and bearing life is reduced. Individual product sections contain additional information regarding degrees of misalignment each bearing type is capable of handling.

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NOISE:

Noise sensitive applications require smooth running of bearings. These are typically low duty environments which makes ball bearings a good choice. Concentric or Skwezloc® locking mechanisms are preferred to keep vibration at a minimum.

VIBRATION AND SHOCK LOADING:

Vibration and shock loading can be present in some applications and can transfer large forces to bearings and accompanying raceways. These loads create large stresses at the interface between the rolling elements and raceways and can cause considerable damage and a reduction of bearing life.

ENVIRONMENT:

Environmental factors such as solids contamination exposure to moisture and thermal conditions are important variables in bearing selection. Bearing components (seals, grease, bearing material, etc..) can be modified in order to better suit a specialized application. Availability of special features may be affected by shaft size, bearing type, and housing type therefore this must be considered in the bearing selection process. Individual product sections contain additional information regarding these specialized features and availability.

BEARING TYPE: RADIAL BALL BEARINGS

Radial ball bearings create a fairly small elliptical contact between the ball-path and rolling element thus distributing loads across a small area. Surface contact is minimized and less friction and heat is generated which allows ball bearings a higher speed range. This small contact area also limits ball bearings to accepting only light to moderate loads. Radial ball bearings have a zero-degree free contact angle but can accept light thrust loads (in combination with a radial load) due to the shape geometry of their raceways. Mounted ball bearing units have some degree of external static self-aligning capability (the bearing insert can misalign with respect to the housing). Mounted ball bearings come in a variety of housing styles and features to suit a wide variety of applications. Only "radial" ball-bering type are available from System Plast® product range.

BEARINGS DRAWING EXPLODED VIEW

FREE MAINTENANCE BEARING: TRIATHLON® WASHDOWN BEARING - 2 HOLE VERSIONS - SKWEZLOC® BEARING

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Bearing mounting.
Go to: 7 3 0 5 2 a

POS.	ITEM DESCRIPTION	QTY
1	Bearing housing machined oval	1
2	Spacer Ø 14mm	2
3	Bearing PN-206T with SKWEZLOC® concentric locking collar	1
4	Safety cap	1

FLANGED HOUSINGS - 2 HOLE VERSIONS - GRUB SCREW LOCK

POS.	ITEM DESCRIPTION	QTY
1	Bearing housing machined oval	1
2	Grease nipple 1/8"	1
3	Bearing with screw	1
4	Spacer Ø 14mm	2
5	Washer	2
6	Heavy ring double lips	1
7	Safety cap	1
8	O-ring	1

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7 3 5 2 8 a 2500RR calculations
7 3 5 1 5 a Product handling
7 3 5 2 4 a 90° product transfer with belts
7 3 5 3 3 a 2253RTC calculations
7 3 5 1 9 a Product handling maximum acceleration
7 3 5 2 6 a Thermal expansion
7 3 5 7 8 a Coefficient of friction of standard materials

Contacts: **EUROPE and ROW**: SystemPlastTechSupport@regalbeloit.com; **USA**: systemplast.engineering@regalbeloit.com; **Engineering calculator:** SPEC

FLANGED HOUSINGS - 4 HOLE VERSIONS - ECCENTRIC LOCK

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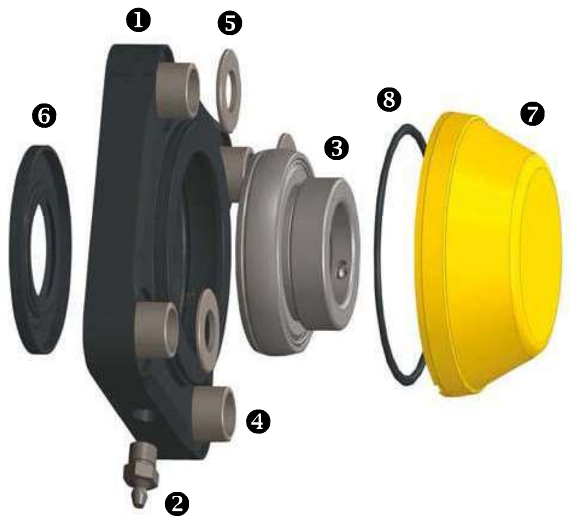
Bearing mounting. Go to: 7 3 0 5 2 a



POS.	ITEM DESCRIPTION	QTY
1	Bearing Housing	1
2	Grease nipple 1/8”	1
3	Bearing with eccentric ring	1
4	Spacer	4
5	Washer	4
6	Heavy ring double lips	1
7	Safety cap	1
8	O-ring	1

continue

SHAFT SIZE:

THE SHAFT MUST FULFILL THE FOLLOWING CONDITIONS:

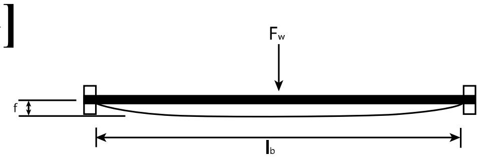
- Maximum shaft deflection Fmax under full load (Fw) is 2,5 mm (0.10 in). If the calculated shaft deflection exceeds this max value, select a bigger shaft size or install an intermediate supported bearing on the shaft.
- Torque (**Ts**) at maximum load must be below critical value;
  Shaft maximum deflection under concentrated load applied in the center can be calculated with following formula:

Bearing mounting. Go to: 730552a

2 BEARINGS

$$f = \frac{5}{384} * Fw \frac{l_b^3}{E * I} \text{ [mm]: } Fw \text{ [N]}, l_b \text{ [mm]}, I \text{ [mm}^4\text{]}, E \left[\frac{N}{mm^2}\right]$$

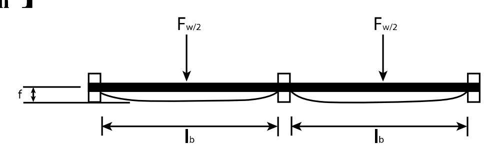
$$f = \frac{5}{384} * Fw \frac{l_b^3}{E * I} \text{ [in]: } Fw \text{ [lb]}, lb \text{ [in]}, I \text{ [in}^4\text{]}, E \left[\frac{lb}{in^2}\right]$$



3 BEARINGS

$$f = \frac{1}{370} * Fw \frac{l_b^3}{E * I} \text{ [mm]: } Fw \text{ [N]}, lb \text{ [mm]}, I \text{ [mm}^4\text{]}, E \left[\frac{N}{mm^2}\right]$$

$$f = \frac{1}{370} * Fw \frac{l_b^3}{E * I} \text{ [in]: } Fw \text{ [lb]}, lb \text{ [in]}, I \text{ [in}^4\text{]}, E \left[\frac{lb}{in^2}\right]$$



For uni-directional head drive $F_w = T_s$

For bi-directional center drive $F_w = 2 * T_s$

For uni-directional pusher drives $F_w = 2.2 * T_s$

For modulus of elasticity (E) use: 200.000 N/mm² or 28.500.000 lb/in². Values are for carbon steel (C50) or stainless steel AISI 304/316. Modulus of elasticity for other materials can be referenced via industry standards.

MOMENT OF INERTIA FOR SOLID SHAFTS (I)			
SHAFT SIZE		INERTIA	
mm	in.	mm⁴	in⁴
SQUARE SHAFTS			
25	-	32552	-
40	-	213333	-
60	-	1080000	-
90	-	5467500	-

Moment of inertia can be calculated for all shaft diameter and shape. It's a geometrical property of the shaft.

MOMENT OF INERTIA FOR SOLID SHAFTS (I)			
SHAFT SIZE		INERTIA	
mm	in.	mm⁴	in⁴
ROUND SHAFTS			
20	-	7850	-
25	-	19150	-
30	-	39750	-
35	-	73650	-
40	-	125600	-
45	-	201200	-
50	-	306650	-
55	-	449000	-
60	-	635850	-
80	-	2009600	-
90	-	3220000	-
-	1	-	0.049
-	1.1875	-	0.098
-	1.25	-	0.120
-	1.4375	-	0.210
-	1.5	-	0.248

7 3 5 4 8 a **BEARING AND SHAFT**

BEARING

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Bearing mounting. Go to: 7 3 0 5 2 a

BEARING CALCULATIONS FOR SERIES UC AND UF:

STATIC LOAD CALCULATION:

In case the bearing is loaded without rotating, very slowly rotating or is making a slow oscillating movement, the bearing power is not determined by the fatigue life of the material but by the deformation of the rollers and the groove. This calculation is also valid if at a fraction of the rotation a shock load is present.

$P_0=X_0*F_r+Y_0*F_a= 0.6*F_r +0.5*F_a$

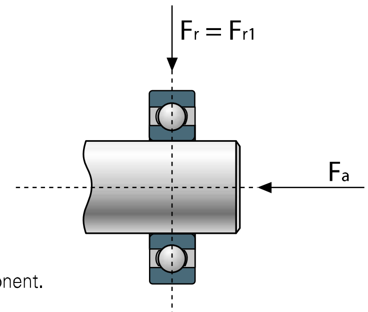
P_0 equivalent static load [N];

X_0 radial static factor;

F_r radial load [N];

Y_0 axial static factor;

F_a axial load [N];



P_0 is calculated when there is not only a radial component in the load but also an axial component.

When the load on the bearing is strictly radial the equivalent static load $P_0 = F_r$.

The minimum static load coefficient C_0 is calculated while taking into account the static safety factor S_0.

Then in the bearing tables the right size bearing can be found checking the C_0.

$C_0=S_0*P_0$

C_0 static load coefficient in [N]

S_0 static safety factor;

S_0 = 1 for normal circumstances,

= 1.5 when vibrations are involved and

=2 - 2.5 for noiseless applications.

DYNAMIC LOAD CALCULATION:

For normal circumstances, the dynamic load coefficient is calculated and compared to the equivalent dynamic load to determine the theoretical service life of the bearing. The calculated service life is then compared to the standard for the application and industry.

$$L_{10}=\left(\frac{C}{P}\right)^3$$

L_{10} = nominal life time in millions of revolutions

C = dynamic load coefficient in [N]

P = equivalent dynamic load [N]

When bearings run at constant speed, their life can be determined in working hours:

$$L_{10h}=\frac{1.000.000}{60n}*\left(\frac{C}{P}\right)^3$$

L_{10h} = life in hours.

n = speed [rpm].

When the load on the bearing is strictly radial the equivalent dynamic load $P = F_r$.

When there's also an axial load involved the equivalent dynamic load is:

$P=X*F_r+Y*F_a$

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BEARING AND SHAFT

BEARING

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Bearing mounting.
Go to: 7 3 0 5 2 a

X radial dynamic factor;

Y axial dynamic factor;

The axial force only influences the equivalent dynamic load when Fa/ Fr > E

CALCULATION FACTORS					
		$F_A/F_R < E$		$F_A/F_R > E$	
F_A/C_0	E	X	Y	X	Y
0.025	0.22	1	0	0.56	2
0.04	0.24	1	0	0.56	1.8
0.07	0.27	1	0	0.56	1.6
0.13	0.31	1	0	0.56	1.4
0.25	0.37	1	0	0.56	1.2
0.5	0.44	1	0	0.56	1

THE AXIAL LOAD SHOULD NEVER EXCEED 20% OF THE DYNAMIC LOAD COEFFICIENT (C).

INDICATIVE SPEED FOR SHAFT TOLERANCES:

SHAFT DIAMETER		SHAFT TOLERANCES				
		h6	h7	h8	h9	h11
Limiting speeds - Shaft tolerance						
mm	in.	RPM				
Ø12	-	9500	6000	4300	1500	950
Ø15	-	9500	6000	4300	1500	950
Ø16	-	9500	6000	4300	1500	950
Ø17	-	9500	6000	4300	1500	950
Ø20	-	8500	5300	3800	1300	850
Ø25	-	7000	4500	3200	1000	700
Ø30	-	6300	4000	2800	900	630
Ø35	-	5300	3400	2200	750	530
Ø40	-	4800	3000	1900	670	480
-	Ø1	7000	4500	3200	1000	700
-	Ø1 3/16	6300	4000	2800	900	630
-	Ø1 1/4	5600	3600	2500	800	550
-	Ø1 7/16	5300	3400	2200	750	530
-	Ø1 1/2	5000	3100	2000	700	500

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SYSTEM PLAST®

Smart guide

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BEARING

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MAXIMUM RADIAL LOAD CAPACITY OF HOUSING:

Values indicated in the table below, are obtained at 23°C. Value indicated: N, Values of polyamide version (values of polypropylene version in brackets). For further information please consult System Plast® SmartGuide® pages regarding bearing type you are interested in.

Bearing mounting.
Go to: 7 3 0 5 2 a

Series **SQL** ø mm				
12-15-16-17	6500	(-)	6000	(-)
20	5800	(-)	5300	(-)

Series **UCFH/UCFH-R** ø mm				
12-15-16-17	6500	(-)	7000	(-)
20	7000	(-)	7500	(-)
25	7500	(-)	8000	(-)
30	8000	(-)	8800	(-)
35	8500	(-)	9000	(-)

Series **UCFL/UCFL-W** ø mm				
20	6900	(3200)	7500	(3500)
25	6750	(2950)	7200	(3000)
30	12000	(5800)	13000	(6000)
35	11000	(5300)	12800	(6000)
40	10800	(5100)	12850	(5800)

Series **UCFQ/UCFQ-R** ø mm				
12-15-16-17	12000	(-)	12000	(-)
20	12500	(-)	11500	(-)
25	12500	(-)	11500	(-)
30	12800	(-)	11000	(-)
35	12300	(-)	10500	(-)
40	12000	(-)	10000	(-)

Series **UCPA/UCPA-R** ø mm						
20	6500	(3000)	2000	(1000)	4000	(1600)
25	7800	(3200)	2500	(1400)	4800	(1800)
30	11000	(4000)	2900	(1500)	5700	(2000)

Series **UCT/UCT-R** ø mm						
20	7800	(3200)	2500	(1400)	4800	(1800)
25	6500	(3000)	2000	(1000)	4000	(1600)
30	12000	(5500)	3500	(1800)	6000	(2400)
35	10000	(3600)	2900	(1500)	5500	(2000)

Series **UCFG/UCFG-R** ø mm				
20	12000	(-)	10000	(-)
25	12500	(-)	11000	(-)
30	12800	(-)	11500	(-)

Series **UCHE/UCHE-R** ø mm						
20	10000	(3600)	2500	(1400)	4800	(1800)
25	8500	(3200)	2000	(1000)	4000	(1600)
30	14000	(6500)	3500	(1800)	6000	(2400)
35	12000	(5500)	2900	(1500)	5500	(2000)

Series **UCFA/UCFA-R** ø mm						
20	8000	(-)	2000	(-)	2500	(-)
25	8500	(-)	3000	(-)	3000	(-)
30	9000	(-)	3500	(-)	3500	(-)

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STEEL CHAIN MATERIALS

MATERIALS

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Index chains.
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C45

CARBON STEEL: S AND SR

C45 steel material allows a higher yield load capability than stainless steel but is not corrosion resistant, thus only suitable for dry environments. Oil lubrication may be necessary to reduce rust and drag. The through hardened plate material provides a uniform hardness and a high abrasion resistance.

FEATURES:

- Surface hardness: 44 HRC

BENEFITS:

- High mechanical strength
- High abrasion resistance

STANDARD

RUST

STANDARD STAINLESS STEEL: SS AND SSL

AISI 430 Stainless steel material with good mechanical characteristics and corrosion resistance. An economical option for many conveying applications.

Lower load and lower wear resistance capability than our higher grade stainless steel materials.

FEATURES:

- Standard stainless steel

BENEFITS:

- Food grade
- Economical solution

EXTRA PLUS

RUST

EXTRA PLUS STAINLESS STEEL: SSE, SSSR, SSEL AND SPSL

High performance stainless steel, specially developed for high speed and heavy-duty application. Offers excellent corrosion resistance and surface hardness.

FEATURES:

- Surface hardness of HRC 26-30
- Extremely flat and smooth surface finish
- High corrosion and wear resistance
- Highest ultimate yield loading capability

BENEFITS:

- Food grade
- Typically used in glide liners and pressureless combiners and very long conveyors
- For improved product stability

AUSTENITIC

RUST

AUSTENITIC STAINLESS STEEL: SSA

AISI 304 Austenitic stainless steel which offers high corrosion and acid resistance properties.

FEATURES:

- Stainless steel with 18% chrome and 8% nickel

BENEFITS:

- Food grade
- High corrosion and acid resistance material

				RUST	
HIGH STRENGTH	FOOD GRADE	MEDIUM HIGH SPEED	VERY HIGH SPEED	CORROSION RESISTANCE	CHEMICAL RESISTANCE

7 3 5 6 1 a PIN MATERIALS FOR STEEL AND PLASTIC CHAINS

MATERIALS

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SPM

STANDARD PIN MATERIAL

Special stainless steel with higher tensile strength and improved surface hardness.

These pins are offered as standard in most stainless steel and plastic chains.

FEATURES:

- High wear, corrosion and acid resistance

BENEFITS:

- Longer wear life

HB

SPECIAL PIN MATERIAL

Vacuum hardened stainless steel with exceptionally high wear resistance characteristics, good corrosion and chemical resistance, for high speed and or abrasive applications with steel chain.

Pin wear is the main contributing factor in chain elongation.

Due to their extraordinary hardness, HB pins offer a much better resistance against mechanical/abrasive wear and thus extended service life of chain.

HB (Harten Bolzen) pins are recommended for the following operating conditions and applications:

- Abrasive environment (e.g. crate and bottle conveyors)
- Short conveyors running at high speed (e.g. filler area, inspector sections, pressure less combiners)
- High load applications (e.g. accumulation area, full crate conveyors, full bottle accumulation tables, keg lines)

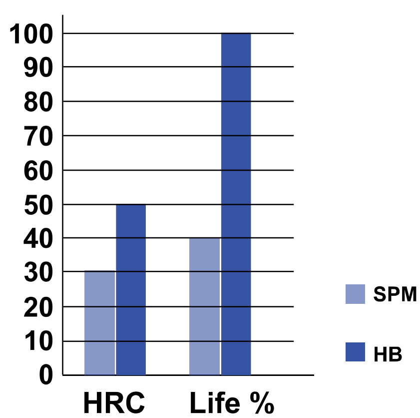
FEATURES:

- Hardness > HRC 48

BENEFITS:

- Ultimate abrasion resistance
- Outstanding wear life
- Wear resistance twice of standard pin

SPECIAL PIN MATERIAL HB
vs
STANDARD PIN MATERIAL SPM



HIGH STRENGTH	VERY HIGH SPEED	CORROSION RESISTANCE	CHEMICAL RESISTANCE

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PIN MATERIALS FOR STEEL AND PLASTIC CHAINS

PPM

PLASTIC PIN MATERIAL

Special reinforced acetal resin. For plastic chains only.

FEATURES:

- Optimum strength

BENEFITS:

- Ultimate abrasion resistance
- Outstanding wear life
- Suitable for metal detection applications

FPM

FERRITIC STEEL PIN MATERIAL FOR MAGNETIC CHAINS

Ferritic Stainless-Steel pin is used for magnetic side-flexing chains. This material offers a great retention force in combination with magnetic curve.

FEATURES:

- High wear resistance

BENEFITS:

- Optimum retention force
- Longer wear life

SUITABLE FOR METAL DETECTION APPLICATION	MAGNETIC

735 73a Nolu®-S parts
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735 86a Chemical resistance of standard materials
735 76a Storage of plastic chains and belts & RoHs
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Index plastic belts. Go to: 3 0 0 1 0 a

LF

LFG

LFB

LFW

LOW FRICTION ACETAL RESIN

This material is commonly used in the market and offers an improved coefficient of friction.

It is also suitable for use in high speed applications.

Plastic Chain Color: Light Brown (LF), Dark Grey (LFG) or White (LFW)

Plastic Belt Color: Grey (LFG); Blue (LFB); white (LFW)

FEATURES:

- Optimum strength and wear life

BENEFITS:

- Food grade

NG®evo

NG®evo conveyor components made from engineered plastic resin

Extra performance PBT with lowest coefficient of friction in our range, resulting in good strength and optimum wear resistance, reduced plate wear and reduced pitch elongation.

Available exclusively from Regal® System Plast® product.

Color: Grey Blue

FEATURES:

- Optimum strength and wear life
- Lowest coefficient of friction
- Optimum abrasive resistance
- Higher operating temperature in dry conditions

BENEFITS:

- Food grade
- High speed application
- Dry running application

HIGH STRENGTH	FOOD GRADE	MEDIUM HIGH SPEED	VERY HIGH SPEED	VERY LOW COEFFICIENT OF FRICTION

7 3 5 7 3 a **Nolu®-S parts**

7 3 5 7 6 a **Storage of plastic chains and belts & RoHs**

7 3 5 7 8 a **Coefficient of friction of standard materials**

7 3 5 8 0 a **Coefficient of friction - Measurement procedure**

7 3 5 8 6 a **Chemical resistance of standard materials**

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SPECIAL PLASTIC CHAIN AND BELT MATERIALS

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Index belts. Go to: 30010a

On request and for adequate quantities belts may be produced in other materials such as:

AS

ANTI-STATIC ACETAL RESIN

Anti-static acetal material with improved surface conductivity for greater protection against static electrical discharges.

Color: Black (AS)

FEATURES:

- Antistatic

BENEFITS:

- Dissipates nuisance static build-up

HT

HIGH TEMPERATURE RESISTANT

Polyamide material based for high temperature applications up to 140°C.

Color: Natural white

BENEFITS:

- High temperature resistance
- Food grade

XT

EXTRA TEMPERATURE

This material with fiber glass-reinforced offers an excellent heat and chemical resistance for belt/chain and a good load capacity in respect to other materials. XT is suitable for extra high temperature applications up to 240° C.

Color: Beige

BENEFITS:

- Very high temperature up to 240°C

PP

PPW

CHEMICAL RESISTANCE

For belts: polypropylene material for greater chemical and temperature resistance. Polypropylene has lower mechanical strength than acetal. For belts (PP) the pins and clips are also made of Polypropylene.

Color: Beige (PP), White (PPW).

BENEFITS:

- Food grade
- Higher temperature resistance
- Optimum chemical resistance

PPG

PPLG

HIGH STABILIZED HOMOPOLYMER

For belts: Polypropylene material for a greater chemical and temperature resistance. This Polypropylene is a high stabilized homopolymer, combining high impact strength and stiffness. It has been developed especially for high detergent resistance and heat stability. Apart from pasteurizers, this material is also used in industrial washing machines, heat exchangers and dishwashers.

Color: Dark Grey (PPG), Light Grey (PPLG).

BENEFITS:

- Food grade
- Higher temperature resistance
- Optimum chemical resistance

CR

For chains: reinforced polypropylene material for greater acid and chemical resistance. Polypropylene has lower mechanical strength than acetal. **Reinforced PP is not food grade.**

Color: White (CR, for chains only)

Special colours
On request and for adequate quantities, chains and belts may be produced in other colours.

FOOD GRADE	ANTISTATIC	HIGH TEMPERATURE RESISTANCE	VERY HIGH TEMPERATURE RESISTANCE	CHEMICAL RESISTANCE

73573a Nolu®-S parts
73576a Storage of plastic chains and belts & RoHs
73578a Coefficient of friction of standard materials
73580a Coefficient of friction - Measurement procedure
73586a Chemical resistance of standard materials
73588a Application temperatures

Contacts: **EUROPE and ROW**: SystemPlastTechSupport@regalbeloit.com; **USA**: systemplast.engineering@regalbeloit.com; **Engineering calculator:** SPEC

PP-FR-EC

FLAME RETARDANT, ELECTRICALLY CONDUCTIVE POLYPROPYLENE

Flammability according to UL94 is classified as V0. Due to the very low surface resistivity, this material can be considered electrically conductive.

Colour: Black.

Special colours

On request and for adequate quantities, chains and belts may be produced in other colours.

FLAME RETARDANT	ELECTRICALLY CONDUCTIVE

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7 3 5 8 6 a Chemical resistance of standard materials

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PIN MATERIALS FOR BELTS

MATERIALS

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Index belts.
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PBT

PBT

Most commonly used pin material in System Plast® belts. This material offers a high abrasion resistance as well as a low noise operation.

POM

POM

Polyacetal pins are used in System Plast® belts. This pin material gives optimum strength.

PP

PP

Polypropylene pins are used in all belts made of PP material. The pin material is adapted to the high temperature and high chemical resistance of the belt material.

SS

SS

Ferritic stainless steel pin is used for side-flexing belt 2120M. This material offers a great retention force in combination with magnetic curve.

RUBBER MATERIALS

MATERIALS

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TPR

TPR (SEBS)

TPR is used for VG chains and belts and for plastic gripper chains. TPR is a SEBS type rubber, which assures an optimum bonding on the plastic base material.

Mechanical properties data available on MDS.

NBR

NBR

NBR rubber is used for our gripper chains serie 1874.

It offers a soft grip and a good resistance against oils.

EPDM

EPDM

EPDM rubber is used for our gripper chains.

It offers good weather and chemical resistance, although contact with oils, gasoline and concentrated acids must be avoided.

EPDM-PP

EPDM-PP

EPDM-PP rubber is used for our gripper chains.

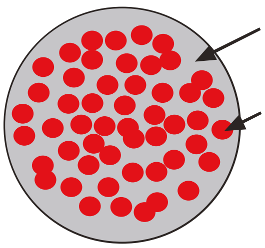
It offers improved chemical resistance and can be used at higher temperatures.

Resistance against steam is good.

Contacts: **EUROPE and ROW**: SystemPlastTechSupport@regalbeloit.com; **USA**: systemplast.engineering@regalbeloit.com; **Engineering calculator:** SPEC

WHAT ARE NOLU PLASTICS?

Nolu® plastic parts are made with Regal's exclusive compounds of UHMWPE and solid lubricants/unique ingredients. They provide reduced coefficients of friction while maintaining the characteristics of UHMWPE. Our featured component brands are Nolu-S, Nolu-SR and Nolu-SX.



NOLU®-S

Nolu-S parts are made with a blend of UHMWPE and other dry lubricants that maintain good wear characteristics while significantly reducing coefficient of friction. Its unique self-lubricating properties make it ideal for applications requiring reduced friction and noise reduction.

FEATURES:

- RAM extruded or machined
- Very low coefficient of friction material flow
- High-impact strength
- Chemical resistant with minimal moisture absorption
- The Nolu®-S parts ingredients comply with EU and FDA food regulations
- Noise suppressant
- Easy to machine - most general power tools are sufficient

BENEFITS:

- Extends the life of mating surfaces
- Reduce surface marring and damage
- Reduces energy consumption
- Minimizes product pulsation on conveyors
- Low noise operation

NOLU®-SR PARTS

back

Nolu-SR parts have the same unique self-lubricating properties as Nolu®-S parts, however, they are made with additional proprietary ingredients. These unique ingredients increase the hardness of the material, providing superior wear resistance as compared to standard UHMWPE. Benefits of Nolu-SR parts include high wear resistance, extended wear life, minimization of product pulsation and low noise.

FEATURES:

- RAM extruded or machined
- Superior wear resistance - greater than standard virgin or repro material
- Low coefficient of friction - promotes material flow
- High-impact strength
- The Nolu-SR parts are made with ingredients that comply with EU and FDA regulations
- Chemical resistant with minimal moisture absorption
- Easy to machine - most general power tools are sufficient

BENEFITS:

- Even greater wear resistance
- Extends the life of mating surfaces
- Reduce surface marring and damage
- Reduces conveyor chain loads
- Reduces energy consumption
- Reduces product pulsation on conveyors
- Low noise operation
- Suitable for running dry at higher speed

NOLU®-SX PARTS

Nolu-SX parts has the same unique self-lubricating properties as Nolu-SR parts; however, Nolu-SX parts has a material blend that reduces the thermal expansion characteristics of the material. The thermal expansion is reduced up to 40% compared to standard UHMWPE products, making it the ideal material for neck guides.

Nolu plastics should be stored at room temperature between 50°F (10°C) and 104°F (40°C) to prevent premature aging of the material. They should also be stored in a manner to prevent distortion. Regular cleaning is also recommended with warm water and soap agents with a pH value of 4.5 to 9.0. For more technical information regarding Nolu parts, please contact our Application Engineering Group.

CURVES, WEARSTRIPS AND SIDE GUIDE MATERIALS

UHMWPE GREEN

UHMWPE BLACK

UHMWPE WHITE

UHMWPE WATER BLUE

ULTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE (UHMWPE)

This Polyethylene polymer with extremely high molecular weight has several unique properties such as high abrasion resistance, impact strength and low coefficient of friction. The UHMWPE are used for our side guide profiles, curves and wearstrips.

UHMWPE-AS BLACK

ANTISTATIC ULTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE (UHMWPE-AS)

This PE polymer with extremely high molecular weight has several unique properties such as good wear resistance, good impact strength, good sliding and antistatic properties. These properties make the material suitable for curves and straight tracks.

Surface Resistivity: 10^3 - 10^4 Ω ; Volume Resistivity: 10^3 - 10^4 Ω.cm.

NOLU®-CP

NOLU®-CP PARTS

Nolu-CP parts are made with Regal's exclusive compounds of UHMWPE and micro glass beads. Curves and neck guide made with this material are the most suitable for abrasive working conditions.

POM - GREEN

POM - WHITE

POM-ACETAL

This polyacetal used for roller guide provide a high rigidity, hardness and toughness and good chemical resistance to alkalis.

SPROCKETS, IDLER MATERIALS

PA BLACK

GLASS FIBER REINFORCED POLYAMIDE (PA-FV)

The reinforced polyamide with glass fiber is used for molded sprockets and idlers to offer a high strength and wear resistance.

PA WHITE

POLYAMIDE (PA)

The cast polyamide 6 is used for machined sprockets and idlers to offer a high strength and wear resistance.

RETURN ROLLERS MATERIALS

PE-HD BLACK

PE-HD GREEN

HIGH-DENSITY POLYETHYLENE (PE-HD)

The high-density polyethylene is used for return roller and it has a good abrasion resistance, impact strength and a low coefficient of friction.

PA BLACK

PA GREEN

POLYAMIDE (PA)

The impact polyamide resin is used for return roller to offer a high strength and wear resistance.

Contacts: **EUROPE and ROW**: SystemPlastTechSupport@regalbeloit.com; **USA**: systemplast.engineering@regalbeloit.com; **Engineering calculator:** SPEC

7 3 5 7 6 a STORAGE OF PLASTIC CHAINS AND BELTS AND RoHS

MATERIALS

continue

STORAGE OF PLASTIC CHAINS AND BELTS

Plastic chains, belts and components offer best stability and resistance against environmental effects at appropriate storage:

- In the original packaging, and not exposed to the environment
- Without environmental radiation / UV light / direct sunlight
- Dry
- In a non-aggressive environment
- A consistent temperature between 10°C (50° F) and 40°C (104° F)

FIRST IN, FIRST OUT

- We have applied that procedure in our logistic department.
- We recommend this procedure to any external warehouse.

Do not stack pallets or other heavy goods on top of chain packs. Chains inside the packs might get damaged.

Do not stack chain packs higher than the original stacking height - as dispatched from our shipping department.

PRODUCT SHELF LIFE

PRODUCT CLASS	TIME FROM MANUFACTURING DATA	REFURBISH (INSPECT, CLEAN, RELUBRICATE AND REPACKAGE)	DON'T USE
All solid steel and cast iron	5 years	5 years	10 years
Plastic: rubber and EPDM	3 years	Not Applicable	3 years
Plastic: UHMWPE	3 years	Not Applicable	3 years
Plastic belts and Chains	3 years	Not Applicable	3 years
Plastic idler and sprockets	3 years	Not Applicable	3 years
Bearings	3 years	3 years	6 years

RoHS

System Plast® CHAINS, BELTS AND COMPONENTS materials do meet the base requirements of this european directive. Therefore, the RoHS (Restriction of Hazardous Substances) directive of 2002/95/CE and subsequent modifications do not apply to our products.

ATEX

FOR ATEX APPLICATION, CONTACT OUR TECHNICAL SUPPORT.

REACH

Regal materials meet the requirements of this European regulation.

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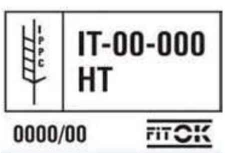
DISPOSAL OF PLASTIC CHAINS AND BELTS

The non-electric nor electronics waste (plastic, rubber and metals parts) are not considered special waste and must be disposed of in strict compliance with the local regulations regarding non-special waste.

DISPOSAL OF MODSORT® MODULES

The wood packaging material of Modsort® modules is fully recyclable and FITOK certified in accordance with the ISPM-15 regulation.



The electrical and electronic parts of Modsort® modules listed below are marked with the symbol

and classified as Waste of electric and electronic equipment (WEEE) in accordance with the European Directive 2012/19 / EU on WEEE.

- Control Card
- Divert Belt and Roller Top Belt's Motorized Drive Rollers (MDRs)
- Photo eyes
- Power Supply Unit

These WEEE must be disposed correctly at a suitable collection point according to the procedures in use in the country of disposal.

7 3 5 7 8 a COEFFICIENTS OF FRICTION OF STANDARD MATERIALS

MATERIALS

Below listed coefficients can be used as a guideline. Depending on environmental and application requirements, (temperatures, lubricant, material combinations, dirt/debris, product and chain/belt surfaces, etc.) the coefficients are subject to some variation. Values are generally conservative.

COEFFICIENT OF FRICTION BETWEEN CHAIN/BELT AND WEARSTRIP:

CHAIN/BELT MATERIAL	LUBRICATION	WEAR STRIP MATERIAL					
		STAINLESS STEEL STEEL	UHMWPE PA	NOLU®-S PARTS	WOOD	RETURN ROLLER	EXTRA WITH METAL STRIP
Stainless steel	Dry	N/A	0.35	0.32	0.35	0.10	not applicable
	Dry lube	0.39	0.26	0.23	N/A	0.08	
	Water&Soap	0.20	0.18	0.15	N/A	0.05	
Carbon steel	Dry lube or Oil lube	0.39	0.26	0.23	N/A	0.08	not applicable
LF - Acetal	Dry	0.24	0.20	0.18	0.23	0.10	0.19
	Dry lube	0.18	0.17	0.13	N/A	0.07	0.14
	Water&Soap	0.15	0.10	0.10	N/A	0.05	0.10
NG®evo conveyor components made from engineered plastic resin	Dry	0.20	0.16	0.13	0.17	0.10	0.14
	Dry lube	0.16	0.10	0.08	N/A	0.07	0.09
	Water&Soap	0.14	0.09	0.08	N/A	0.05	0.09
PP / CR	Dry	0.29	0.24	0.21	0.22	0.10	0.23
	Dry lube	0.22	0.18	0.16	N/A	0.07	0.17

Valid for ambient temperature 21°C (70° F)

COEFFICIENT OF FRICTION BETWEEN CHAIN/BELT AND PRODUCT:

For iCOF® device. Go to product page: 5 7 0 8 0 a

CHAIN/BELT MATERIAL	LUBRICATION	PRODUCT MATERIAL					
		PAPER CARTON	METAL (STEEL)	ALUMINUM	PLASTICS INCL. PET	GLASS (RETURN)	NEW GLASS, CERAMICS
Stainless steel	Dry	0.40	0.50	0.35	0.30	0.47	0.35
	Dry lube	N/A	0.34	0.29	0.24	0.30	0.29
	Water&Soap	N/A	0.20	0.15	0.15	0.21	0.15
Carbon steel	Dry lube or Oil lube	N/A	0.34	0.29	0.24	0.30	0.29
Speed - Line	Dry	0.40	0.45	0.32	0.27	0.40	0.29
	Dry lube	N/A	0.29	0.26	0.22	0.25	0.23
	Water&Soap	N/A	0.15	0.14	0.13	0.18	0.13
LF - Acetal	Dry	0.28	0.25	0.25	0.21	0.24	0.20
	Dry lube	N/A	0.19	0.17	0.15	0.17	0.14
	Water&Soap	N/A	0.15	0.14	0.13	0.14	0.12
NG®evo conveyor components made from engineered plastic resin	Dry	0.20	0.18	0.15	0.13	0.14	0.12
	Dry lube	N/A	0.15	0.13	0.11	0.12	0.11
	Water&Soap	N/A	0.13	0.12	0.10	0.11	0.10
LBP	Dry	0.10	0.10	0.10	0.10	0.10	0.10
VG	Dry	0.60	0.73	0.50	0.50	0.50	0.50
PP / CR	Dry	0.40	0.30	0.32	0.28	0.29	0.26
	Dry lube	N/A	0.23	0.25	0.21	0.22	0.20

Valid for ambient temperature 21°C (70° F)

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7 3 5 8 0 a COEFFICIENT OF FRICTION - MEASUREMENT PROCEDURE

MATERIALS

In this section, we will describe the measurement method for coefficient of friction (COF or μ) between belt/chain and product on a running conveyor.

The COF is defined as the ratio between the force necessary to move one surface horizontally over another and the pressure between the two surfaces. It can be measured by dividing the force required to push or pull an object by its weight. The pull and the product weight can be determined by measurement using a spring or force gauge. Please follow the below instructions, ensuring both conveyor and sample product are clean and clear of all debris:

For iCOF® device.
Go to product page:
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1- At first be sure to have:

- **a.** Mechanical or digital spring gauge with suitable sensitivity and accuracy
- **b.** A spirit level gauge (in case of inclined conveyor)
- **c.** A suitable sample of product weight (bottles/cans etc.)
- **d.** Available space on the running conveyor where the COF measurement is required

2- Measure the sample weight (W):

- **a.** Use sample product with suitable weight. It is recommended to collect one or more products to get 1 kg of product weight.
- **b.** Measure the product weight using a scale or spring gauge
- **c.** Record the value when the scale is stabilized

3- Measure the pull (F_0):

- **a.** Be sure that conveyor is running and the surface is level. Otherwise measure carefully the angle
- **b.** With the same sample as step 2.a), take measurements in the same location on the conveyor and at the same speed if possible
- **c.** Secure the gauge to a fixed point on the conveyor or hold the gauge by hand avoiding movements.
  If possible, steady your hand by resting it on conveyor frame or guide rail
- **d.** Ensure that the gauge is parallel to the conveyor
- **e.** Put the sample product on the conveyor, attach to spring gauge, and measure the horizontal pull (F_0).
- **f.** Take the value when the measurement is stabilized
- **g.** Make three (03) measurements at the same conditions
- **h.** Make the average of the obtained three (03) values
- **i.** Repeat steps 2 and 3 for multiple different containers

4- COF calculation:

- **a.** Be sure that the average **W** and F_0 values are in the same measurement unit (g or kg or lb);
- **b.** Use the formula $\mu = \frac{F_0}{W} = \frac{\text{measured pull}}{\text{measured weight}}$ to obtain the average value of COF; (4b)

Be aware that for some gauges it is required to compensate the reading with the plunger weight (P) (1) since it is used horizontally. Refer to page 7 3 5 8 1 a for further details.

With the plunger weight compensation, the formula 4b) becomes:

$$\mu = \frac{(F_0 + P)}{W} \qquad \frac{\text{measured pull + plunger weight}}{\text{measured weight}}$$

If the conveyor is inclined with respect to the running direction, the angle α is to be considered as following:

- Measure the angle α (usually from 2° to 5°);
- Use the formula $\mu = \frac{(F_0 + P)}{W \cos\alpha} - \tan\alpha$ (Running direction downwards) (1).
- Use the formula $\mu = \frac{(F_0 + P)}{W \cos\alpha} + \tan\alpha$ (Running direction upwards) (1).

Notes: (1) P=0 for spring gauges with adjustable preload. Refer to good measurement practice for further details.

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Contacts: **EUROPE and ROW**: SystemPlastTechSupport@regalbeloit.com; **USA**: systemplast.engineering@regalbeloit.com; **Engineering calculator:** SPEC

COEFFICIENT OF FRICTION - GOOD MEASUREMENT PRACTICE

MATERIALS

continue

Here we describe good practices when measuring the COF within belt/chain in a running conveyor.

SELECTION OF THE INSTRUMENT

The higher the sensibility, the more accurate the measurement. 10 g divisions and +/- 10% (or ounces) is a good compromise for a rough estimation.

A. Gauge with mechanical spring (0-10 kg)

i. Needs certain weight
ii. Needs to compensate spring preload and "plunger"
iii. Is more accurate / repeatable

There are spring gauges on the market with adjustable preload, in order to compensate the plunger. For those types of gauges, just adjust the reading scale to 0 when reading in horizontal position. Remember to reset the scale to 0 when reading values in vertical position (i.e. when weighting a bottle).

B. Digital gauge (0-45 kg)

i. Needs lower weight
ii. Don't always need to compensate for the "plunger"
iii. Less accurate / repeatable

REQUIRED ACTIVITIES AND CHECKS PRIOR TO MEASUREMENT

A. Gauge with mechanical spring: Plunger preload determination

i. Prior to the measurement ensure that also the spring dynamometer reads zero when in vertical working position. Tare if necessary.
ii. Weight the dynamometer on a balance or using a second scale. Record the value. Weight reading of the total scale x = A plunger preload + B scale body [g]
iii. Hang the dynamometer upside down. If the instrument's own weight is not enough to pull the plunger by at least 10% of his own full scale, hang some additional weight at the bottom. The additional weight should be deducted from the reading.
iv. Weight reading of the scale upside-down y = B scale body - A plunger [g]. Read and store the value on the scale.

v. Plunger weight (spring preload) will be . $A = \frac{x - y}{2}$ RECORD THIS VALUE!

Example:

Gauge weights 140 g, upside-down reading is 36 g, the spring-preload is (140-36)/2 = 52 g.

For the horizontal reading, you will have to add this value to the displayed forc.

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B. Digital gauge: Plunger preload determination

If your digital tool offers the possibility to switch it to horizontal, you don't need to calculate the plunger preload. In fact, in horizontal configuration, the cell automatically pre-sets to zero.

Some digital tools, on the contrary, do not allow to be switched to horizontal (they need a certain weight, given by the plunger when lying vertically to activate the cell). Under such condition proceed in plunger preload determination as per previous point.

Periodically check your instrument and compare the measurements with a second one. This is required to check any possible deviation of measurements due to loss of tare.

Recommendations

- A higher is the sample product weight, a lower is the error in the estimated value
  - If possible, we recommend using multiple containers to increase product weight
- Measure the product weight close to the ground so as to prevent any dropped bottles from breaking
- Take a stabilized measurement. Instrument gauge has a response time, so we recommend respecting this time to read an accurate value
- The more measurements that are taken and averaged, the more reliable the result will be.
- A smooth, clean surface allows an accurate COF measurement without the influence of wear
- Using the same sample(s) in all measurements will lead to a uniform and repeatable value
- Securing the gauge to a fixed point on the conveyor will remove human error from holding the spring gauge
- Ensure you hold the gauge and the plunger parallel to the conveyor, so as to achieve an accurate measurement

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7 3 5 8 6 a CHEMICAL RESISTANCE OF STANDARD MATERIALS

MATERIALS

Data shown in the table was taken from laboratory tests performed on unstrained samples and are merely indicative.

continue ▶

Chemical resistance under normal working conditions can depend on various factors, such as stress and temperature, concentration of the chemical agent and contact time. Conveyor rinsing can also be a huge factor, as a corrosive chemical that is allowed to dry and concentrate will be more problematic than one that is allowed contact for a short time and thoroughly rinsed away.

VALID FOR AMBIENT TEMPERATURE (21°C / 70°F)

CHEMICAL AGENT	METALS								PLASTICS										RUBBERS							
	EXTRA		AISI 304		AISI 316		OT.NI		LF (POM)		NGE (PBT)		PP		PA		PE		EPDM		NBR		SEBS		VITON*	
	C%		C%		C%		C%		C%		C%		C%		C%		C%		C%		C%		C%		C%	
Acetic Acid	5	✓	20	✓	100	✓		O	5	✗	10	✓	40	✓	10	✗	10	✓	25	✓		✗	25	O	20	✗
Acetone		✓	25	✓		✓		✓		O		O		✓	100	✓		✓		✓		✗		O		✗
Acrylonitrile						✓								✓	100	✓		✓		✓		✗		O		✗
Aluminium chloride				O	10	O								O	10	✓		✓		✓		✓		✓	SA	✓
Aluminium sulphate					SA	✓								✓	10	✓	SA	✓		✓		✓		✓	SA	✓
Amyl alcohol				✓		✓						✓		✓	10	✓		✓		✓				✓		✓
Ammonia		✓	100	✓		✓		✗		✓		O	30	✓	10	✓		✓		✓		O		O		O
Ammonium chloride				O		✓							10	✓	10	✓		✓		✓		✓		✓	SA	✓
Aniline		✓		✓		✓								✓	100	O	3	✓		✗		✗		✗		✓
Barium chloride				O	SA	✓								✓	10	✓		✓		✓		✓		✓		✓
Beer		✓		✓		✓		✓		✓				✓		✓		✓		✓		✓		✓		✓
Benzene		✓	70	O		✓				✓		✓		✓				O		✗				✗		
Benzoic acid			100	✓	SA	✓						✓	SA	✓	SA	O		✓		✗		✓		✗		✓
Benzol				✓		✓		✓		✓		✓		O	100	✓		✓		✗		✗		✗		O
Boric acid		O	SA	✓		✓				✗	10	✓	SA	✓	10	✓	SA	✓		✓		✓		✓	SA	✓
Brine	10	✗		O		✓						✓		O		O				✓				O		
Butter				✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		O		✓
Butyl acetate						✓				✓		O		O	100	✓		✓		O				O		✗
Butyl alcohol				✓						✓		✓		✓	100	✓		✓		✓		O		✓		✓
Butyl glycole						✓								✓	100	✓		✓		✓				✓		
Calcium chloride		✗		O		✓		✓	10	✓		✓	50	✓	10	✓	SA	✓		✓		✓		✓	SA	✓
Carbon sulphide				✓		✓				✓				✓	100	✓		O		✗		✗		✗		✓
Carbon tetrachloride			10	✓				✓		✓		✓		✗		✓						✗				✓
Chlorine water		✗		✗		O				✗		✗		✗				✓	3	O			3	O		
Chloroform		O	10	✓		✓		✓		✗		✗		O	100	✗		✗		✗		✗		✗		✓
Chromic acid			25	✓	50	O				✗		O			1	O	50	O	50	O		✗	50	✗	50	✓
Citric acid	10	✓		✓	SA	✓		✗		O	10	✓	10	✓	10	O	SA	✓		✓		✓		✓	SA	✓
Cyclohexane						✓						✓		✓	100	✓		✓		✗		✓		✗		✓
Cycloexanol						✓						✓		✓	100	✓		✓		✗		✓		O		✓
Decalin						✓						O		O		✓				✗		O		✗		✗
Dioxane						✓				O		✓		O		✓		✓		O		✗		✗		
Distilled water		✓	10	✓		✓		✓		✓		✓		✓		✓		✓		✓				✓		✗
Ethyl acetate				O		✓				O		O		✓	100	✓		✓				✗				O
Ethyl alcohol				✓						✓		✓	96	✓	96	✓	96	✓				O				✓
Ethyl chloride				✓				O		✓				✗	100	✓		O				O				✗
Ethyl ether						✓						✓		✓	100	✓		O								✓
Ferric chloride				O		✓				O	10	✓		✓	10	✓		✓		✓		✓		✓	SA	✓
Food fats		✓	100	✓		✓				✓		✓				✓		✓		O		✓		O		✓
Food oils		✓		✓		✓				✓		✓		✓		✓		✓				✓				✓

* Viton is believed to be the trademark and/or trade name of The Chemours Company FC, LLC and is not owned or controlled by Regal Beloit Corporation.

ABBREVIATION

✓ = good resistance — **C** = concentration

O = fairly good resistance depending on use conditions — **SA** = saturated

✗ = insufficient resistance (not recommended) — **blank spaces** = no tests performed

All values are only applicable to temperatures below 21°C / 70°F.

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7 3 5 8 6 b CHEMICAL RESISTANCE OF STANDARD MATERIALS

MATERIALS

Data shown in the table was taken from laboratory tests performed on unstrained samples and are merely indicative.

Chemical resistance under normal working conditions can depend on various factors, such as stress and temperature, concentration of the chemical agent and contact time. Conveyor rinsing can also be a huge factor, as a corrosive chemical that is allowed to dry and concentrate will be more problematic than one that is allowed contact for a short time and thoroughly rinsed away.

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VALID FOR AMBIENT TEMPERATURE (21°C / 70°F)

CHEMICAL AGENT	METALS								PLASTICS										RUBBERS							
	EXTRA		AISI 304		AISI 316		OT.NI		LF (POM)		NGE (PBT)		PP		PA		PE		EPDM		NBR		SEBS		VITON*	
	C%		C%		C%		C%		C%		C%		C%		C%		C%		C%		C%		C%		C%	
Formaldehyde		✓		✓		✓		✓		✓		✓	40	✓	30	✓		O		O		O		O	40	✘
Formic acid	2	O		✘	100	✓		✓	10	✘		O			10	✘	85	✓		✓		✘		✓		O
Freon 12				✓								✓				✓	100	O				✓				✓
Fresh water		✓		✓		✓				✓		✓		✓		✓		✓		✓		✓		✓		✓
Fruit juice		✓		O		✓				✓		✓		✓		✓		✓		✓		✓		✓		✓
Gasoline		✓		✓		✓		O		✓		O		O		✓		O		✘		O		✘		✓
Glycerine		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
Hydrocloric acid		✘		✘		✘		O	35	✘	20	O	30	✓		✘	35	✓	15	✓		O	15	✓	37	✓
Hydrofluoric acid				✘		✘					5	O	40	✓		✘	70	✓				✘			48	✓
Hydrogen peroxide	3	✓		✓	100	✓			30	✓	5	✓				✘	10	O	30	O		✘	30	✘	90	✓
Isopropyl alcohol						✓				✓		✓		✓		✓				✓				✓		✓
Lactic acid		O				✓		✘		✓	10	✓	20	✓		✓		✓		O		✓		O		✓
Linseed oil				✓		✓				✓		✓		✓		✓		✓		O		✓		✘		
Magnesium chloride				O		✓						✓		✓		✓		✓		✓		✓		✓	SA	✓
Methyl acetate				O		✓				O		O		✓		✓		✓		O		✘		✘		✘
Methyl alcohol			80	✓		✓		✓		✓		✓				✓		✓		✓		O		✓		O
Methylene chloride		O		O		✓				✘		✘		O		✓		O		✘		✘		✘		O
Milk		✓		✓		✓		✓		✓		✓		✓		✓		✓		O		✓		✓		✓
Mineral oil				✓		✓				✓		✓		✓		✓		✓		✘		✓		✘		✓
Nitric acid	25	O	65	✓						✘				✓		✘		O			10	✘			70	✓
Nitrobenzene						✓						✓		✓		O		✓		✘		✘		O		O
Oxalic acid			65	✓		✓					10	✓		✓		O		✓		O		O		O		✓
Paraffin						✓				✓		✓						✓		O				✘		
Petroleum				✓		✓		✓		✓		✓		✓		✓		✘		✘		✓		✘		✓
Petroleum ether				✓		✓		✓		✓		O		✓		✓		✓		✘		✘		✘		✓
Phenol				✓		✓				O		✘		✓		✘		✓		O		✘		O		✓
Phosphoric acid	25	O		✘		✓		✘		✘		✘		✓		✘		✓		✓	20	O		✓	85	✓
Potassium bichromate					SA	✓						O		✓		O	SA	✓		✓		O		O	SA	✓
Potassium bromite						✓						✓		✓		✓	10	✓		✓		✓		✓		✓
Potassium hydroxide		✓	50	✓		✓				✓		✘		✓		✓		✓		✓		O		✓		✓
Potassium permanganate				✓		✓			10	O		✓		✓		✘		✓	10	✓		✘	10	O		✓
Sea water		✘		✓		✓		✓		O		✓		✓		✓		✓		✓		✓		O		✓
Silicone oil						✓						✓		✓		✓		✓		✓		✓		✓		✓
Silver nitrate				O		✓								✓		✓		✓				O				✓
Sodium carbonate		✓	100	✓	SA	✓			10	✓	10	✓		✓		✓		✓		✓		✓		✓		✓
Sodium chloride		O		O		✓		✓		✓	10	✓		✓		✓		✓		✓		✓		✓	SA	✓
Sodium hydroxide	40	✓		✓	60	✓				✓	10	✘				✓		✓		✓		O		✓		
Sodium hypochlorite				✘	SA	O				✘	10	✓		✓		✓		✓	10	✓		✘	10	O	5	✓
Sodium silicate			100	✓		✓										✓		✓		✓		✓		✓		✓

* Viton is believed to be the trademark and/or trade name of The Chemours Company FC, LLC and is not owned or controlled by Regal Beloit Corporation.

ABBREVIATION

✓ = good resistance
O = fairly good resistance depending on use conditions
✘ = insufficient resistance (not recommended)

C = concentration
SA = saturated
blank spaces = no tests performed

All values are only applicable to temperatures below 21°C / 70°F.

7 3 5 6 0 a **Steel chain materials**

7 3 5 7 6 a **Storage of plastic chains and belts & RoHs**

7 3 5 8 0 a **Coefficient of friction - Measurement procedure**

7 3 5 7 3 a **Nolu®-S parts**

7 3 5 7 8 a **Coefficient of friction of standard materials**

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Contacts: **EUROPE and ROW**: SystemPlastTechSupport@regalbeloit.com; **USA**: systemplast.engineering@regalbeloit.com; **Engineering calculator:** SPEC

7 3 5 8 6 c CHEMICAL RESISTANCE OF STANDARD MATERIALS

MATERIALS

Data shown in the table was taken from laboratory tests performed on unstrained samples and are merely indicative.

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Chemical resistance under normal working conditions can depend on various factors, such as stress and temperature, concentration of the chemical agent and contact time. Conveyor rinsing can also be a huge factor, as a corrosive chemical that is allowed to dry and concentrate will be more problematic than one that is allowed contact for a short time and thoroughly rinsed away.

VALID FOR AMBIENT TEMPERATURE (21°C / 70°F)

CHEMICAL AGENT	METALS								PLASTICS										RUBBERS							
	EXTRA		AISI 304		AISI 316		OT.NI		LF (POM)		NGE (PBT)		PP		PA		PE		EPDM		NBR		SEBS		VITON*	
	C%		C%		C%		C%		C%		C%		C%		C%		C%		C%		C%		C%		C%	
Sodium sulphate			100	✓		✓										✓	SA	✓		O		✓		✓		✓
Soft drinks				✓		✓				✓		✓		✓		✓		✓		✓		✓		✓		✓
Suds				✓		✓				✓	10	✓		✓		✓		✓		✓		✓		✓		✓
Sulphuric acid		✗		✗		O		✓		✗	2	✓		✓		✗	80	✓	50	✓		✗	50	O	95	✓
Tartaric acid		✓	50	✓		✓		✗		O	50	✓		✓		✓		✓		O		✓		✓		✓
Tetrahydrofuran						✓				O		✓		O		✓		O		✗		✗		✗		✗
Tetralin				✗		✓				✓		✓		✗		✓		✓		✗		✗		✗		✓
Tincture of iodine				O		✓		✗						✓		✗		✓		O		✗		O		✓
Toluol		✓				✓						✓		✓		✓				✗		✗		✗		O
Transformer oil		✓				✓				✓		✓		O		✓		✓		✗		✓		✗		✓
Tricholoethylene				✗	100	✓				O		✗		O		O		O		✗		✗		✗		✓
Triethanolamin						✓						✓		✓		✓		✓		O		✗		O		✗
Turpentine		✓		✓		✓				✗		✓						O		✗				✗		
Vaseline						✓						✓				✓		O		✗		✓		✗		✓
Vegetable juice		✓		✓		✓				✓		✓		✓		✓		✓		✓		✓		✓		✓
Vegetable oils		✓		✓		✓				✓		✗		✓		✓		✓		O		✓		O		✓
Vinegar		✓		✓	100	✓		✓		✓	10	✓		✓		✓		✓	25	✓		O	25	O		✗
Water and soap		✓		✓		✓				✓		✓		✓		✓		✓		✓		✓		✓		✓
Whisky		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
Wine		✓		✓		✓		✓		✓		✓		✓		✓		O		✓		✓		✓		✓
Xilol		✓		✓		✓		O		✗		✓		✗		✓		✓		✗		✗		✗		✓

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7 3 5 8 8 a APPLICATION TEMPERATURES

MATERIALS

For low and high temperature application please consult our Application Engineering department.

Be aware:

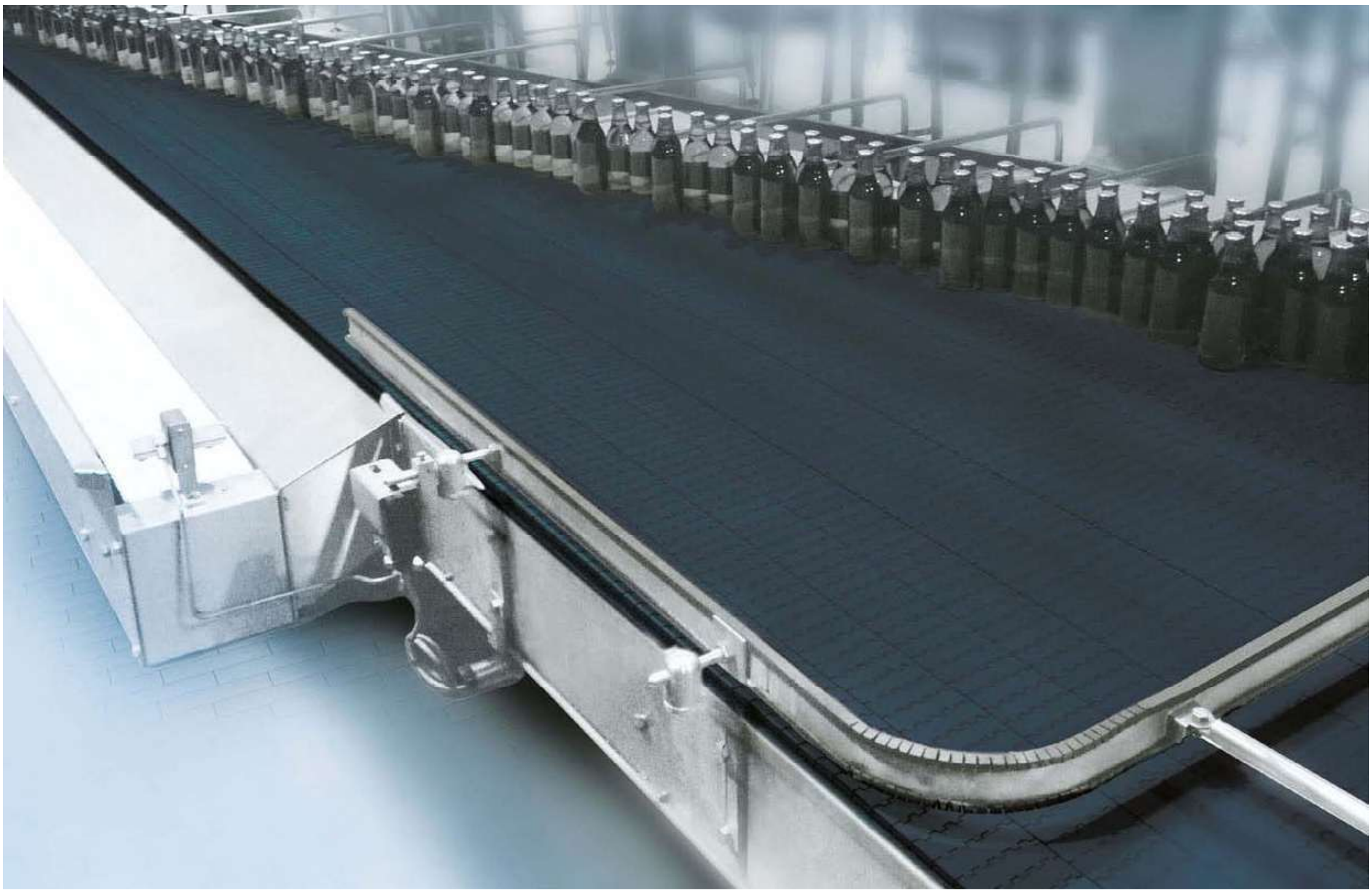
- If a chain, belt or other component is composed of several materials, all materials will have to be considered individually.
- Please note that the properties of a material change when the temperature changes
- In general, the impact resistance is reduced at low temperatures.
- The strength and wear resistance are reduced at elevated temperatures.
- High temperatures can also influence chemical resistance
- Some materials absorb moisture and expand/swell

MATERIAL	SYMBOL	USER FOR	MIN TEMP. °C	MAX. TEMP. °C		MIN TEMP. °F	MAX. TEMP. °F	
				DRY	WET		DRY	WET
Carbon steel	C45	*Steel chains, roller chains*	-70	180	not recommended	-95	350	not recommended
Ferritic stainless steel	Standard	*Steel chains*	-30	400	130	-20	750	265
Extra stainless steel	Extra	*Steel chains*	-30	400	130	-20	750	265
Extra plus stainless steel	Extra plus	*Steel chains*	-30	400	130	-20	750	265
Austenitic stainless steel	Austic	*Steel chains, roller chains*	-30	400	130	-20	750	265
Acetal resin	D,W	*Plastic chains*	-40	80	65	-40	175	150
Low friction acetal resin	LF (all colors)	*Plastic chains and belts*	-40	80	65	-40	175	150
Anti static acetal resin	AS	*Plastic chains and belts*	-40	80	not applicable	-40	175	not applicable
NG®evo conveyor components made from engineered plastic resin	**NG®evo**	*Plastic chains and belts*	-40	120	60	-40	250	140
Polypropylene	PP	*Plastic chains and belts*	5	104	104	41	220	220
Chemical resistant	CR	*Plastic chains*	5	104	104	41	220	220
Polyamide - PA High temperature resistance	HT	*Plastic chains and belts*	0	140	not applicable	30	285	not applicable
Polyphenylene sulfide Extra high temperature resistance	XT	*Plastic chains and belts*	-40	240	not applicable	-40	464	not applicable
Polyamide - PA Abrasion resistance	AR	*Plastic chains*	0	90	90	30	195	195
Thermoplastic rubber SEBS	TPR	*VG chains and belts, gripper chains*	-40	100	100	-40	210	210
NBR rubber	NBR	*Gripper chains*	-25	100	100	-15	210	210
EPDM rubber	EPDM	*Gripper chains*	-40	120	120	-40	250	250
EPDM-PP rubber	EPDM-PP	*Gripper chains*	-40	120	120	-40	250	250
Polyamide	PA	*Sprockets, components*	0	90	90	30	195	195
Polyamide reinforced	PA FV	*Sprockets, bearing, components*	0	90	90	30	195	195
Polypropylene	PP	*Components*	5	104	104	41	220	220
Polypropylene reinforced	PP FV	*Bearing, components*	5	104	104	41	220	220
Polyethylene	PE	*Curves, components*	-40	80	80	-40	175	175
Nolu®-S parts	Nolu®-S parts	*Curves, components*	-40	80	80	-40	175	175

SYSTEM PLAST®

continue

Plastic Chains & Modular Belts



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NG® evo

WHAT PLASTIC MATERIALS ARE USED IN NEW GENERATION® CONVEYOR COMPONENTS?

The System Plast® New Generation® family of chains and belts conveyor components are made of proprietary engineered resins designed to provide a sustainable advantage over "industry standard" materials. Their reduced coefficient of friction properties enable end users to reduce or eliminate their chain/belt lubrication thus providing a true "dry running" conveyor. Better sliding properties also result in reduced power consumption, increased wear life, reduced dust generation and the ability to run at higher speeds.

SYSTEM PLAST PRODUCTS ARE LEADING THE WAY WITH INNOVATION!

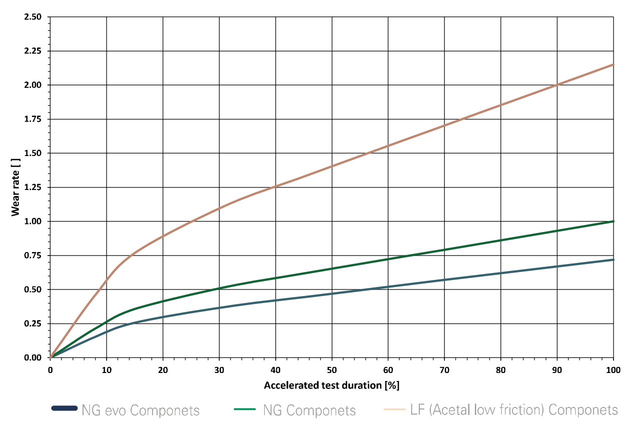
We introduced the New Generation® brand of conveyor components 20 years ago. It was soon recognized to offer new possibilities for running conveyors lines without lubrication. This enabled the reduction/elimination of soap & water or dry lubricants creating a safer work environment and cost savings. NG® conveyor components have also proven they provide longer wear life in comparison to acetal materials, and reduce noise levels in dry applications.

Regal expertise with unique materials and in-house integrated tool development is critical for consistent control over design and manufacturing processes.

MATERIAL EVOLUTION TO MEET YOUR GOALS

Understanding the growing demands on safety, hygiene, sustainability and TCO (total cost of ownership) - Regal challenged itself to improve the original formulation. This successful development created a new and improved resin used to make NG® Evolution conveyor components which helps to meet your goals. Your floors can be drier, bacteria growth can be reduced, energy and water consumption can be less and your TCO will be improved.

- Improved base material
- Improved additives
- Tested in our laboratory
- Tested in production



IMPROVEMENTS OF NG® EVO COMPARED TO NG® CONVEYOR COMPONENTS

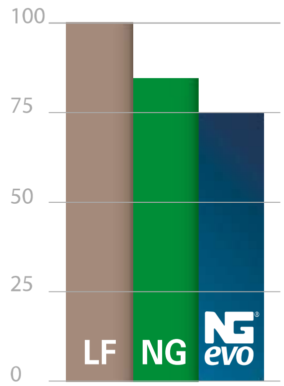
Lower friction - Friction is reduced up to 15%.

Higher strength - Up to 10%

Higher abrasion resistance

Approved for direct food contact according to EU and FDA regulations

NG®EVO CONVEYOR COMPONENTS MADE FROM ENGINEERED PLASTIC RESIN



UHMWPE WEARSTRIP

LOWEST COEFFICIENT OF FRICTION BETWEEN CHAIN /BELT AND WEARSTRIP

Coefficient of friction NG® evo conveyor components on UHMWPE wearstrip:

25% lower than LF acetal chain
15% lower than NG chain

Coefficient of friction values of 0,10 or even less are achievable in running dry applications
- Less power consumption
- Improved product stability
- Improved product flow
- Improved productivity

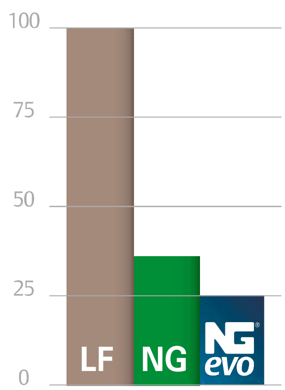


PLATE WEAR

HIGHEST PLATE WEAR RESISTANCE

Plate wear in accelerated abrasion test after 5400 km run length

75% less wear than LF acetal chain
30% less wear than NG chain

Increased wear provides many advantages
- Less dust generation
- Reduced contamination
- Reduced cleaning requirements

NG® EVO CONVEYOR COMPONENTS ARE APPROVED FOR DIRECT FOOD CONTACT ACCORDING TO EU AND FDA REGULATIONS

NOISE REDUCTION:

With NG evo components the risk of noisy chains is greatly reduced compared to LF acetal chains. Squealing curves can be resolved and improve the work environment.

HIGH PV (PRESSURE VELOCITY) LIMIT:

With NG evo conveyor components, higher speeds and higher loads are achievable in dry running lines compared to LF Acetal chains. Additional speed and wear advantages can be also gained when used in combination with NOLU®-S or NOLU-SR curves.

CHEMICAL RESISTANCE:

NG evo conveyor components have a better chemical resistance than LF acetal materials, being compatible with most cleaning agents, especially in aseptic filling with the presence of H_2O_2 (hydrogen peroxide). The material in NG evo components, unlike many other materials used in the same application, do not get attacked by this chemical.

ENHANCED RUNNING DRY POSSIBILITIES WITH NG®EVO CONVEYOR COMPONENTS:

Contact Regal for assistance to help you achieve this goal.

An overview of the process is shown below :

STEP 1: GOAL TO RUN DRY

- Save water / lubricant consumption
- Eliminate wet floors • safety
- Less bacteria growth • hygiene
- Reduce maintenance
- Reduce energy consumption

STEP 2: DEFINE PROCESS PARAMETERS

- Layout
- Production / hour • speeds
- Geometry bottle, can, etc.

STEP 3: DEVELOP A ROBUST PROCESS

- Analyze the data from the previous step
- Discuss requirements and conditions with OEM and End user
- Select the correct productsi

STEP 4: IMPLEMENT DRY RUNNING

- Advise during installation
- Train operators

STEP 5: CONTROL AND IMPROVE PROCESS

- Monitor, follow up and make changes if necessary
- Analyze the collected data

A SUCCESS STORY OF NG® CONVEYOR COMPONENTS

DRY RUNNING SYSTEM PLAST® CONVEYOR COMPONENTS HELP HEINEKEN BREW A BETTER FUTURE WITH WATERLESS BOTTLING CONVEYORS IN ZOETERWOUDE PLANT

THE TWO WATER FOOTPRINT NETWORK PARTNERS TEAM UP TO IMPROVE PLANT SAFETY AND SUSTAINABILITY BY REDUCING WATER USE, ENERGY CONSUMPTION, AND SOUND LEVELS AT ZOETERWOUDE BREWERY.

Zoeterwoude, Netherlands 2014 - Heineken* N.V.'s global sustainability strategy, known as "Brewing a Better Future," produced a company-wide reduction of 20 percent in water use between 2008 and 2013. Playing a role in that improvement are System Plast NG® conveyor chain/belts and NOLU®-S wear track from System Plast S.r.l., a subsidiary of Regal Beloit Corporation (referred to from here on as "Regal"). The ultra-low-friction components, which are being deployed in phases at Heineken's Zoeterwoude brewery, eliminate the need for water and chemical-based lubrication on the filling lines - including those where abrasive particles from aluminum cans, party kegs and returnable glass bottles have been a problem in the past.

According to managers at the brewery, the dry running conveyor is producing a cascade of sustainability improvements with a cleaner, quieter, more energy-efficient and reliable plant. "We have experienced a wide variety of gains from the System Plast dry running conveyor," said Mr. Cok Duivenvoorden, Technical Line Manager at Zoeterwoude. "Specifically, we have improved plant safety and hygiene with dry equipment and floors. Maintenance is easier because of the cleanliness and better access where drip trays have been removed. We have reduced costs for water, lubricating chemicals and wastewater discharge. Dry operation is easier on conveyor bearings and frames, yet still reduces energy consumption because of the low-friction components. System Plast NG chain lasts up to five times longer than low-friction acetal in some of our applications. And when installed to replace worn-out conveyor, the new chain pays for itself in as little as a year."

A JOINT GOAL TO REDUCE WATER USE IN BEVERAGE PROCESSING

One goal of Heineken's "Brewing a Better Future" sustainability program is to reduce water consumption by at least 25% by 2020, and both Heineken and Regal are pursuing dry conveying solutions as members of the Water Footprint Network. The network is a global organization of businesses, governmental agencies and environmental groups that promotes the transition to sustainable use of fresh water resources through increased awareness of how production and consumption of goods affect fresh water systems.

*Heineken is believed to be a trademark and/or trade name of Heineken Brouwerijen B.V. and is not owned or controlled by Regal Beloit Corporation.

73995a APPLICATION CONSIDERATIONS

The proper selection and application of power transmission products and components, including the related area of product safety, is the responsibility of the customer. Operating and performance requirements and potential associated issues will vary appreciably depending upon the use and application of such products and components. The scope of the technical and application information included in this publication is necessarily limited. Unusual operating environments and conditions, lubrication requirements, loading supports, and other factors can materially affect the application and operating results of the products and components and the customer should carefully review its requirements. Any technical advice or review furnished by Regal Beloit America, Inc. and its affiliates with respect to the use of products and components is given in good faith and without charge, and Regal assumes no obligation or liability for the advice given, or results obtained, all such advice and review being given and accepted at customer's risk.

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Legend

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SSA805..	11120a
SSA815..	11030b
SSA881O..	11080a
SSA881OTAB..	11070a
SSE515..	11130a
SSE805..	11120a
SSE805..VG	11180a
SSE815..	11030a
SSE8157..	11100a
SSE8157..VG	11180a
SSE8157TAB..VG	11180a
SSE881O..	11080a
SSE881..VG	11170a
SSE881M..	11060a
SSE881MO..	11060a
SSE881MO..	11160a
SSE881O..	11080a
SSE881OTAB..	11070a
SS881OTAB..	11070a
SSE881RTAB..	11070a
SSE881TAB..VG	11170a
SSE8857M..	11110a
SSE8857M..VG	11160a
SSE8857TAB..	11110a
SSEL815..	11020a
SSEL815..	11030a
SSEL881MO..	11060a
SSER814..VG	11150a
SSER815..VG	11150a
SSER815TAB..VG	11150a
SSL812..	11030a
SSL881MO..	11060a
SSSR815..	11030a
TC-20..	53610a
TC-60..	53625a
TCHD-R150-R150-S	54080a
TC-R150-S	54080a
TEE..	54080a
TEE-3815-BM10	54080a
TEE-4415-BM10	54080a
TEE-4815-BM10	54080a
TE-R..	55765a
TE-S..	55765a
TME..	52670a
TME-K..	52671a
TOP-20P	53585a
TOP-23P..	53585a
TOP-23S..	53585a
TOP-24P..	53585a
TOP-24S..	53585a
TOP-25S..	53585a
TOP-40P..	53585a
TOP-40S..	53585a
TOP-60S..	53585a
TOP-90S..	53585a
TTM01..	50050a
TTM02..	50050a
TTM03..	50020a
TTM04..	50050a
TTM05..	50030a
TTM06..	50020a
TTM07..	50020a
TTM08..	50020a
TTM09..	50020a
TTM10..	50020a
TTM11..	50030a
TTM12..	50030a
TTM21..	50040a
TTM22..	50040a
TTM23..	50040a
TTM31..	50040a
TTM32..	50040a
TTM33..	50040a
TTM37	50040a
TTM39..	50060a
TTM40..	50060a
TTM41..	50060a
TTM42..	50060a
TTM48..	50060a
TTM52..	50060a
TTM61..	50050a
TTM62..	50050a
TTM64..	50101a
TTM66..	50101a
TTM68..	50070a
TTM71.	50070a
TTM78..	50070a
TTM82..	50070a
TTM84..	50101a
TTM85..	50101a
TTM86..	50101a
TTM87..	50101a
TTM90..	50091a
TTM91..	50091a
TTM92..	50091a
TTM93..	50091a
TTM96..	50091a
TTM97..	50101a
TTMK..	50565a
TUBE-R10S-6000	53605a
TWP-S4030..	55765c
UC..	56300a
UCFB..	56140a
UCFG..	56080a
UCFH..	56020a
UCFH..	56030a
UCFH..	56042a
UCFH..ME..	56040a
UCFHXX..	56042a
UCFL..	56020a
UCFL..ME..	56040a
UFLX..	56020a
UFLQ..	56072a
UFLZ..ME..	56040a
VG-009M-01	51630a
VG-011..	51620a
VG-012-01	51620a
VG-013..	51620a
VG-016-02	51630a
VG-018M..	51630a
VG-022-01	51630a
VG-113SM-08G	51820a
VG-1568M..	52611a
VG-213..	53565a
VG-213R-TOP..	53590a
VG-222JQ..	51810a
VG-223R..	53565a
VG-223R-TOP..	53590a
VG-245..	53575a
VG-253..	53570a
VG-254..	53570a
VG-3050..	54020a
VG-3051..	54050a
VG-3052..	54050a
VG-3055..	54050a
VG-3070..	54060a
VG-3080..	54060a
VG-3087..	54060a
VG-3110..	54070a
VG-3115..	54070a
VG-60..	53615a
VG-619..	53610a
VG-620..	53615a
VG-632..	54560a
VG-633..	54550a
VG-634..	54550a
VG-641T..	53590a

Legend
Codes ending with .. indicate a group of item descriptions all starting with the code listed. Example: 2122.. (all item descriptions starting with 2122).
Codes with .. in the middle indicate a group of item descriptions starting and ending with the codes listed. Example 2251..RS (all item descriptions starting with 2251 and ending with RS). **Information about item descriptions, printed in blue, is only available on our website: www.SystemPlastSmartGuide.com**

Item description	Page code
VG-686A-1.25-3M	52611a
VG-687-1.4-3M	52612a
VG-687-3.3-3M	52612a
VG-687FLEX-1.4-3M	52610a
VG-687H-1.4-3M	52611a
VG-687H-3.3-3M	52611a
VG-687LDB-M8	52612a
VG-687NP-1.4M	52612a
VG-687SP	52611a
VG-688-1.4-3M	52614a
VG-688-3.3-3M	52614a
VG-688FLEX-1.4-3M	52610a
VG-688H-1.4-3M	52613a
VG-688H-3.3-3M	52613a
VG-750-10	50550b
VG-A2520..	51740b
VG-A330M..	50580a
VG-A600A..	51740a
VG-A840..	52650a
VG-ABG..	51730a
VG-AP330C..	50580b
VG-BP..	54030a
VG-BPT..	54030b
VG-BPV..	54030b
VG-BWS-125-10	50570a
VG-DB83M-B-10	51710a
VG-F203M..	50550b
VG-F205M..	50550b
VG-F205M..	51120a
VG-F206M..	51120a
VG-F253M..	50550b
VG-F303M..	50550b
VG-F403..	50550a
VG-F403M..	50550b
VG-F503M..	50550b
VG-F603M..	50550b
VG-F703M..	50550b
VG-G1020M..	51660b
VG-GD..	51660a
VG-H7816M..	51690a
VG-H14022M..	51703a
VG-H8716M..	51700a
VG-H9014M..	51680a
VG-J100-125T..	50530a
VG-J100-188..	50530b
VG-J21M..	50520a
VG-J23M..	50520a
VG-JEL-078..	50530a
VG-JL19M..	50520a
VG-JS100-125..	50530a
VG-JS100-188..	50530b
VG-JS150-125..	50530a
VG-JS150-18..	50530b
VG-JS200-125..	50530a
VG-JS200-188..	50530b
VG-JS3-075-125..	50530a
VG-JSL075-125..	50530a
VG-JSL075-188..	50530b
VG-L20M..	50520a
VG-LGSF..	51520a
VG-LGSR..	51520a
VG-LGST..	51520b
VG-LSSF..	51520a
VG-LSSM..	51520a
VG-LSSMT..	51520c
VG-LSSR..	51520a
VG-LSST..	51520b
VG-LSST..	51520a
VG-LSST..	51520c
VG-LSSWF..	51520a
VG-LSSWF..	51520b
VG-MBG-50-NS-10	50570a
VG-NG110..	51720a
VG-NG125..	51720a
VG-NG47..	51720a
VG-NG49..	51720a
VG-NG50..	51720a
VG-NG81..	51720a
VG-NG91..	51720a
VG-P1040M..	50560a
VG-P105..	50650a
VG-P10MRD..	51710a
VG-P12MRD..	51710a
VG-P14BC..	50650a
VG-P14HD..	50650b
VG-P18BC..	50650a
VG-P18CC-100	50530a
VG-P18HD..	50650b
VG-P2520..	51740b
VG-P316BC..	50650a
VG-P316HD..	50650b
VG-P330C..	50580a
VG-P330CW..	50610a
VG-P330M..	50560a
VG-P516BC..	50650b
VG-P640M..	50560a
VG-P650M..	50560a
VG-P680M..	50560a
VG-P7GABC..	50650a
VG-P7GAHD..	50650b
VG-P813..	51740a
VG-P816..	51740a
VG-P822..	51740a
VG-P834..	51740a
VG-P840DBM..	51710a
VG-P840M..	50560a
VG-P8MRD..	51710a
VG-PBG5..	51730a
VG-PBG7..	51730a
VG-PD..	51660b
VG-PM10BC..	50650b
VG-PM4BC..	50650a
VG-Q-75-40..	53595a
VG-QSC..	53595a
VG-QT-01	53595a
VG-S1020M..	51660b
VG-S1040M..	50560a
VG-S330M..	50580a
VG-S4-330M..	50580a
VG-S4P330C..	50580b
VG-S4-S3020..	50550a
VG-S640M..	50560a
VG-S840M..	50560a
VG-SC..	54630a
VG-SCL..	54630a
VG-SD..	51660a
VG-SP1040M..	50560a
VG-SP330C..	50580b
VG-SP640M..	50560a
VG-SP840M..	50560a
VG-SSF-HT-10	51520a
VG-SSMT..	51520c
VG-SSTS..	51520b
VG-T425M..	50550b
VG-TP..	54030a
VG-U3041..	50550a
VG-U3042..	50550a
VG-U3043..	50550a
VG-U4045..	50550a
VG-J23..	50520a
VG-Z18M.	50520a
VG-Z20M..	50520a
VG-Z20WM..	50520a
VG-Z21..	50520a
VT1701T..	50170a
VT1710CT..	50170a
VT1713CT..	50180a
VT1873T..	50160a
VT880B..	50130a
VT880T..	50110a
VT882..	50140a
VT882B..	50150a
VTC880..	50120a
VTR880B..	50130a
VTR882B..	50150a
W1700	11530a

Legend

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