

Product overview

Contents

Standard aluminium conveyor systems	7	Conveyor component overview	15
Stainless steel conveyor systems	11	Structural systems XC/XF/XD	18
XT pallet system platform	12	Structural systems component overview	19
Conveyor accessories	12	Technical data – conveyors	21
Conveyor comparison chart	13	General safety and design considerations	26
Permitted load per link	13	Maintenance	28
Typical standard conveyor components	14		

Standard aluminium conveyor systems

Standard conveyors X45, X45H, XS, X65, X85, XH, XK, X180, X300

Together, FlexLink's standard conveyor product lines cover a wide range of applications. These multiflexing conveyor systems use plastic chains in many configurations. The chain design permits horizontal as well as vertical change of direction. Chain widths range from 43 mm up to 295 mm, for product widths up to 400 mm. Each system consists of a wide range of modular components which can be fitted using simple hand tools.



Pallet handling products (XT, HU, X65P, X85P, XKP)

Catalogue sections X65P/X85P/XKP contain special products for pallet handling, including pallets, pallet locating stations, pallet stop cylinders and pallet transfer stations. The systems are based on conveyor components from the standard conveyor lines.

The pallet handling system also includes divert/merge devices for easy transfer of pallets between conveyors.

Modular plastic belt conveyor WL

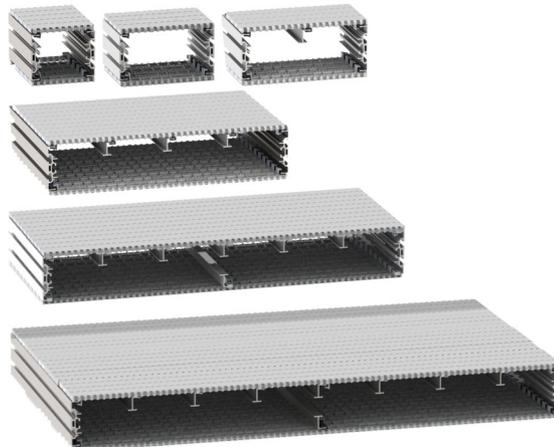
The Modular plastic belt conveyor is designed to transport bulky or soft, pliable, ready-packed products which call for the stable support of a wide chain.

The belt conveyor is suitable for applications that handle large cardboard boxes or products in soft plastic bags, such as detergent powder, wrapped tissue paper rolls, food products, personal care products and other large products.



Modular plastic belt conveyor WK

The modular belt conveyor is available in widths from 150-1200mm and is suitable for handling products from card board boxes to mechanical parts like bearings and sprocket wheels



**Conveyor system X45
(43 mm chain)**



Features

Very compact conveyor system for small and light items. Modular design concept for simplified engineering, fast configuration and ordering.

The X45e drive unit and puck handling units offer unique possibilities for easy and efficient control of single piece flow system.

Examples of application areas

All types of small products down to 10 mm diameter. Pharmaceutical bottles and perfume bottles. Puck handling of products like test tubes for blood and urine, small bottles, cosmetics.

**Conveyor system XS
(44 mm chain)**



Features

Chain permits transport of very small items which are otherwise difficult to handle. Compact and neat design.

Examples of application areas

Small ball bearings, perfume bottles, pharmaceutical bottles, sintered metal components.

**Conveyor system X65/X65P
(63 mm chain)**



Features

Suitable for a wide range of applications. Preferable in high speed applications. Includes components for pallet handling (X65P) and vertical wedge conveyors.

Examples of application areas

Tissue paper, gear wheels, aerosol cans, medium size ball bearings, piston parts, yoghurt, fuel injectors, dry batteries, plastic bottles, matches, cheese boxes, coffee and tea packages.

**Conveyor system X85/X85P
(83 mm chain)**



Features

Suitable for a wide range of applications. Includes components for pallet handling (X85P) and vertical wedge conveyors.

Examples of application areas

Ball valves, water meters, disk drives, pie packages, plastic bottles, beverage cans, products on pallets, paint cans, socks.

**Conveyor System X45H
(43 mm chain)**



Chain permits transport of very small items which are otherwise difficult to handle. Compact and neat design. Can be seamless

Combined with X45 for puck handling systems. Have the advantage of longer length conveyors and higher speed than X45.

**Conveyor system XH
(103 mm chain)**



Features

Suitable for larger items, especially if point of balance is somewhat offcenter.

Examples of application areas

Large ball bearings, turbo rotors, safety belt brackets, electric motors, shock absorbers, steering arm components, boxes.

**Conveyor system XK/XKP
(102 mm chain)**



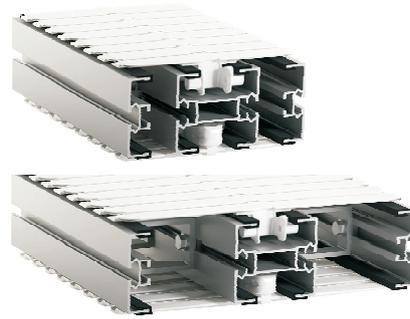
Features

Suitable for larger items, especially if point of balance is somewhat offcenter. Higher capacity than other types. Includes components for pallet handling (XKP).

Examples of application areas

Ball and roller bearings, heavy boxes, gear wheels, motor parts on pallets, disk brakes, hydraulic pumps.

Conveyor system X180/X300 (175 mm/295 mm chain)



Features

Chain travels on four slide rails. Wide track sideflexing safety chain. Compact horizontal and vertical bends. Suitable for soft packages.

Examples of application areas

Large cardboard boxes, products in soft plastic bags. Examples: detergent powder, wrapped tissue paper rolls, food products, personal care products.

Modular plastic belt conveyor WL (304/406/608 mm belt)



Features

The added advantage of a wide belt (up to 600 mm) permits effective transport and accumulation in several different configurations.

Examples of application areas

The WL conveyor system is designed for transport and accumulation of lightweight goods such as:

Secondary packaging of food and hygiene products, Pouches, Shrink wrapped products, Cardboard boxes, Plastic containers

PO

CC

X45

XS

X65

X65P

X85

X85P

XH

XK

XKP

X180

X300

GR

CS

XT

HU

WL

WK

XC

XF

XD

ELV

CTL

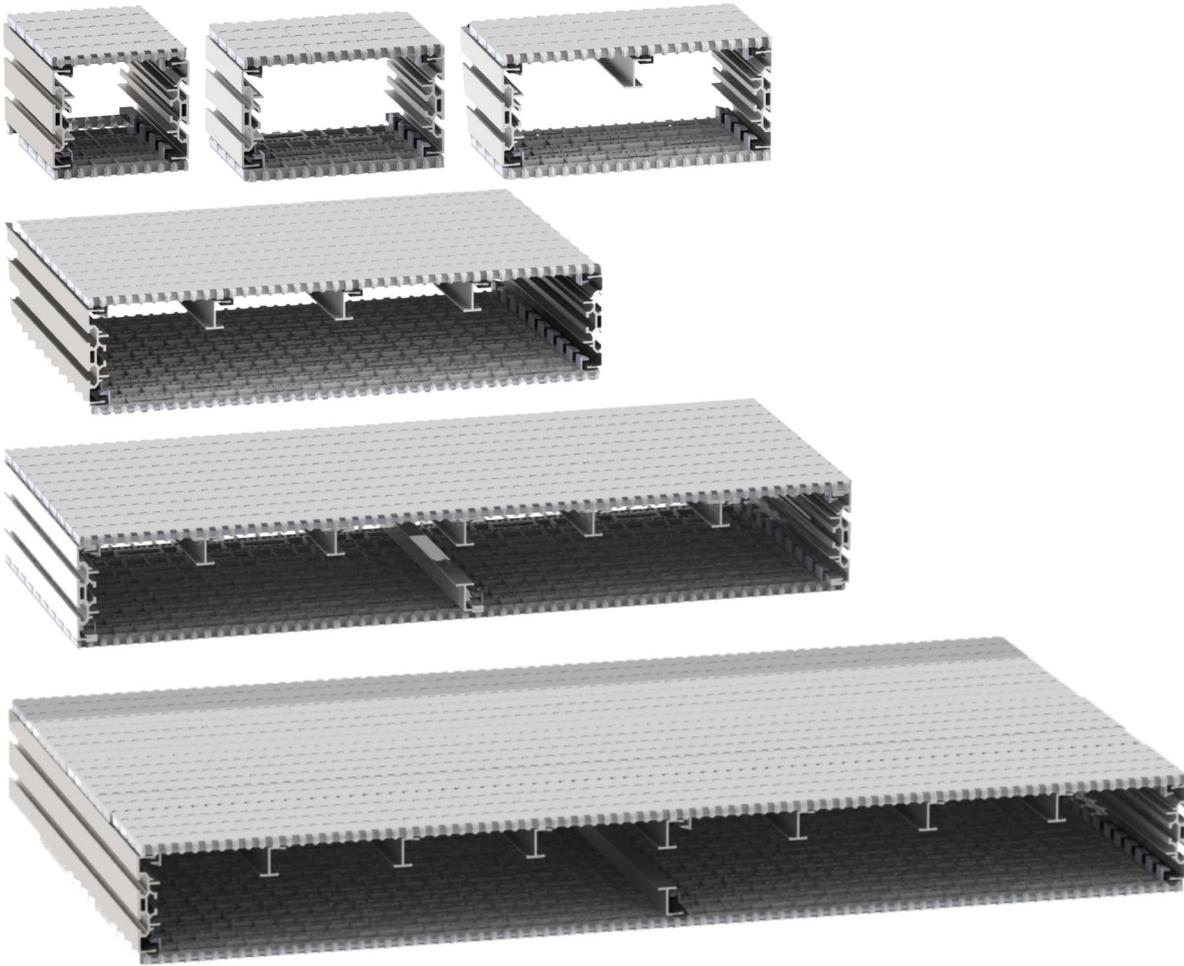
FST

TR

APX

IDX

Modular plastic belt conveyor WK (150/225/300/600/900/1200 mm belt)



Features

The added advantage of a wide belt (up to 1200 mm) permits effective transport and accumulation in several different configurations.

Examples of application areas

The WK conveyor system is designed for transport and accumulation of lightweight goods such as:

Secondary packaging of food and hygiene products,
Pouches, Shrink wrapped products, Cardboard boxes,
Plastic containers

(See Flexlink's Product catalogue - Stainless 5693)

Stainless steel conveyor system X70X, X85X, X180X, X300X (68, 83, 175, 295 mm chain)



Features

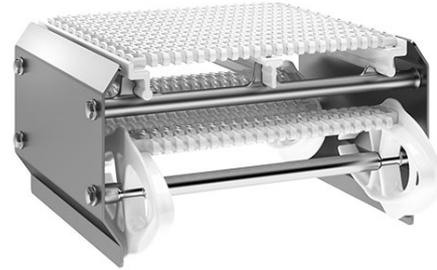
Split beams in stainless steel for easy cleaning. High resistance to aggressive chemicals. Matching drive units, idlers and guide rail and support components. Standard X180/X300 chains.

Series X are stainless steel designs adapted to the requirements of the food processing, pharmaceutical and hygiene industries. The Series X system is designed for easy integration with aluminium systems.

Examples of application areas

Aerosol cans, liquid soap in plastic bags, soft cheese, detergent powder, tissue paper rolls, food products, personal care products.

Stainless steel conveyor system WLX 222/273/374/526/678 (152, 203, 304, 456, 608 mm belt)



Features

FlexLink's newly developed stainless steel conveyor is designed to fit into demanding primary and secondary packaging applications. It addresses important aspects of today's packing processes, such as being easy to clean, smooth handling of products, safe for operators, robust design, long life, and easy to maintain with a low cost of ownership.

The modularized and standardized design ensures fast set up, and facilitates rapid future extensions and changes. Examples of application areas

Primary and secondary packed **food and personal products**

Wash down environments and heavy dust zone (vacuum)

- CC
- X45
- XS
- X65
- X65P
- X85
- X85P
- XH
- XK
- XKP
- X180
- X300
- GR
- CS
- XT
- HU
- WL
- WK
- XC
- XF
- XD
- ELV
- CTL
- FST
- TR
- APX
- IDX

Twin track pallet systems

Pallet system HU with standard modules including pre-defined control logics



Flexlink's newly developed HU pallet system is primarily designed to be well positioned for demanding applications within the automotive segment.

Twin-track pallet conveyor system XTC and XT



Features

Twin-track flexible plastic chain pallet conveyor system.

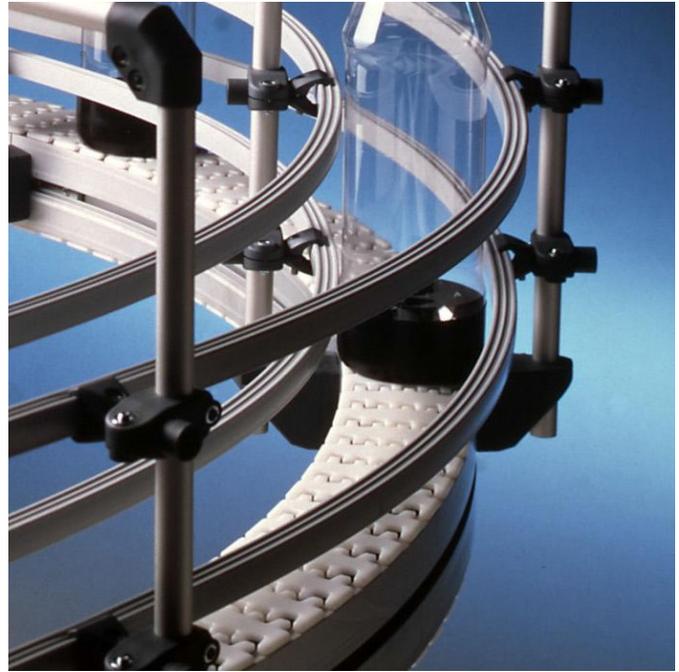
Pallet conveyor system XT is well suited for manual and automatic assembly and test systems in the automotive and electrical/electronics industries. It can handle square and rectangular pallets from 240 mm × 240 mm up to 640 mm × 640 mm.

Examples of application areas

Manual and automatic assembly and test systems in the automotive and electrical/electronics industries. Examples: assembly and transport of receivers, computers, gear boxes, medical equipment, sewing machines, cell phones, housings, pumps, and air filters.

Conveyor accessories

Guide rail components (GR)



Catalogue section *Guide rail components* deals with various types of guide rails and guide rail support components. Those products are used with several of the conveyor systems. A number of pre-designed guide rail structures are shown as examples. New components are available for building automatically adjustable guide rail systems, accommodating products with different widths.

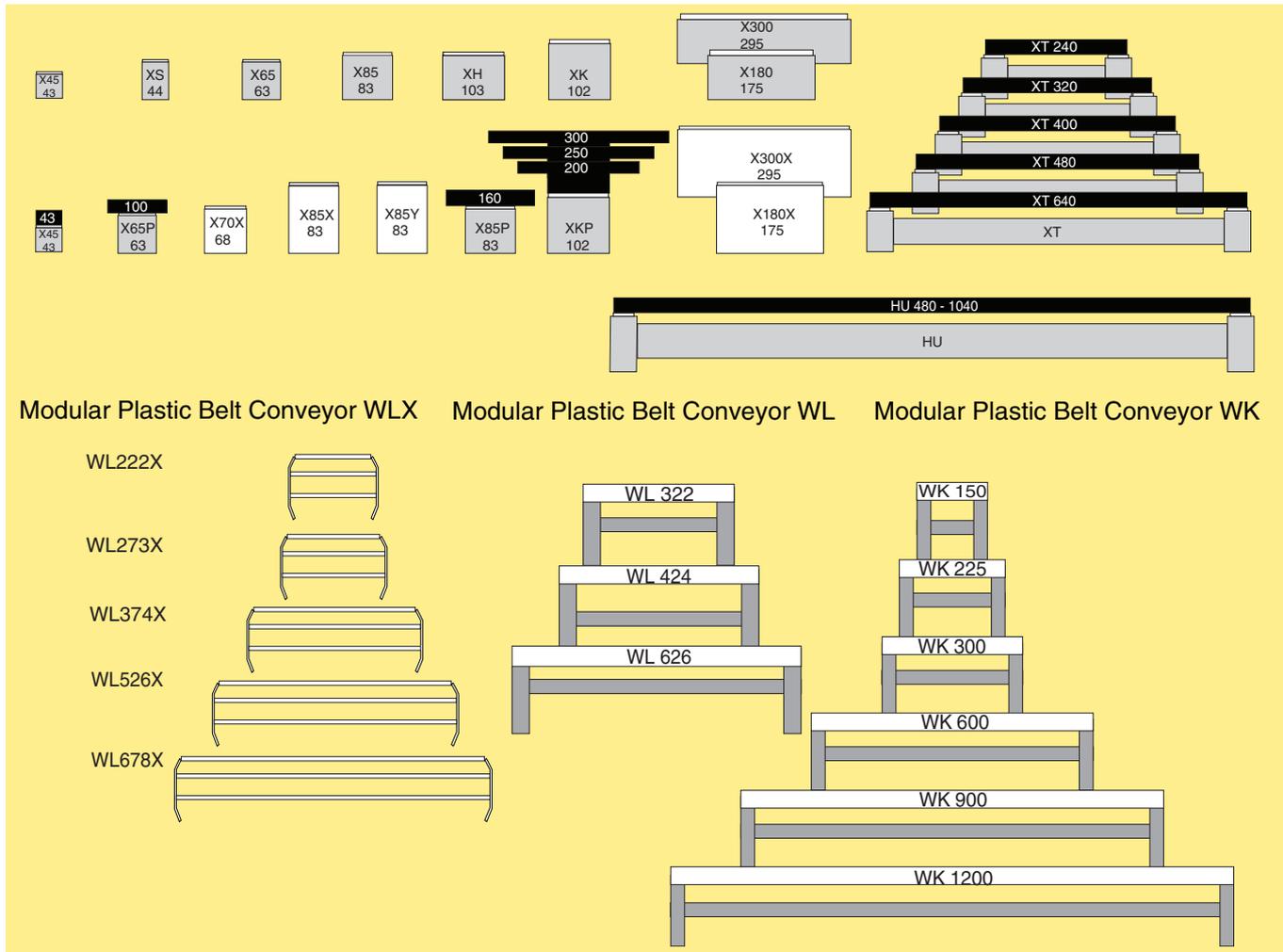
Conveyor support components (CS)



The conveyors are held in place by a well balanced range of support components, with beam support brackets, support beams, feet, etc.

A number of pre-designed support structures are shown as examples.

Conveyor structures built from aluminium beams with standardized T-slots simplify attachment of components and accessories.



CC
X45
XS
X65
X65P
X70X
X85
X85X
X85Y
X85P
XK
XK102
X300
X300X
X180
X180X
XT
XT 240
XT 320
XT 400
XT 480
XT 640
XT
HU
HU 480 - 1040
HU
X85
X85P
X85P
XH
XK
XKP
X180
X300
GR
CS
XT
HU
WL
WK
XC
XF
XD
ELV
CTL
FST
TR
APX
IDX

Simplified end views of conveyor beams, drawn to the same relative scale. Numeric values are widths in mm.

Legend

- Light grey: Conveyor beams
- Black: Pallets or puck
- White: Stainless steel conveyor and Chain/Belt on top
- WL, X45, XS, X65, X85, XH, XK, X180, X300, XT, WK, HU: Aluminum Conveyors
- XLX, X85X, X180X, X300X: Stainless steel conveyor

Permitted load per link

Conveyor platform	Chain width, mm	Maximal permitted load per link/ Kg
X45	43	0,1
XS	44	0,5
X45H	44	1
XTC	35	0,5
XT	35	1
X65	63	1,5
X85	83	2,5
XH	103	2
XK	103	5
X180	175	2,5
X300	295	2,5
WL 322	304	2
WL 424	406	2
WL 626	608	2
WK 150	145	5
WK 225	220	5
WK 300	299	5
WK 600	597	5
WK 900	896	5
WK 1200	1195	5

Typical standard conveyor components

Feet and support beams



Beam support brackets



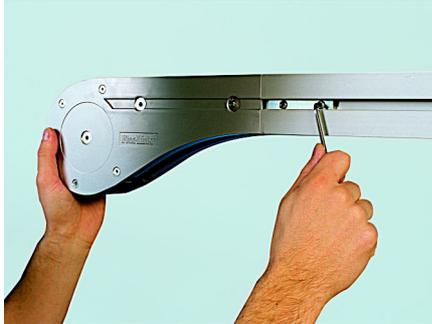
Conveyor beams and bends



Drive units



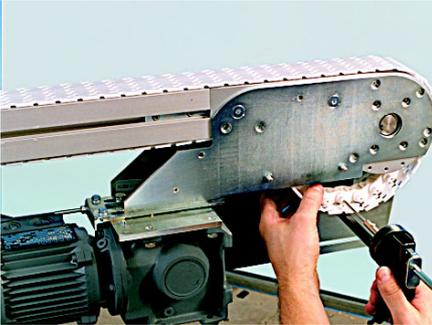
Idlers



Slide rail



Conveyor chain



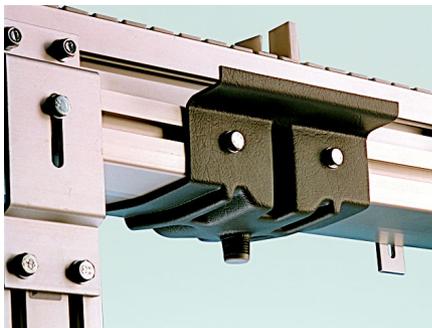
Guide rail brackets



Guide rails



Drip trays and drip pans



Chain products X45, X45H, XTC, XT, XS, X65, X85, XH, XK

<i>Plain chain</i>	<i>Steel top chain</i>	<i>Friction top chain</i>	<i>Universal chain</i>	CC
				X45
<i>Cleated chain Type A</i>	<i>Cleated chain Type B</i>	<i>Cleated chain Type C</i>	<i>Cleated chain Type D</i>	XS
				X65
<i>Cleated chain Type G</i>	<i>Flexible cleat chain Type B</i>	<i>Flexible cleat chain Type C</i>	<i>Flexible cleat chain Type D</i>	X65P
				X85
<i>Roller top chain</i>	<i>Roller cleat chain</i>	<i>Steel chain</i>		X85P
				XH
				XK
				XKP

Chain products X180/X300

<i>Plain chain</i>	<i>Friction top chain</i>	<i>Roller cleat link</i>	Conveyor beam X180/X300	X180
			<i>Conveyor beam section</i>	X300
				GR
				CS

Drive units and idlers X180/X300

<i>End drive units</i>	<i>Idler end unit</i>	Bends X180/X300		XT
		<i>Plain bends</i>	<i>Vertical bends</i>	HU
				WL
				WK

Conveyor beams X45, X45H, XTC, XT, XS, X65, X85, XH, XK

<i>Standard</i>	<i>Reinforced (XH only)</i>	<i>XK, standard</i>	<i>XK, Type N</i>	XC
				XF
				XD

Conveyor beam support brackets X45, X45H, XTC, XT, XS, X65, X85, XH, XK, X180/X300

<i>Type CT, aluminium</i>	<i>Type CS, aluminium</i>	<i>Type CS, polyamide</i>	<i>Type CU, aluminium</i>	ELV
				CTL
				FST

Conveyor support products (support beams, feet, etc.) are presented in catalogue section *Conveyor support components* (CS). For additional beam types, connectors, etc., see *Structural system XC/XD/XF* (page 18).

A range of pre-engineered support solutions are available. Please contact FlexLink for more information.

Drive units and idler units X45, XTC, XT, XS, X65, X85, XH, XK

X45 End drive unit 24V



End drive units



End drive units, direct drive



End drive units, double



X45 End drive unit 400V



Intermediate drive units



Catenary drive units



Bend drive units



X45 Idler end



Synchronous drive units



End drive units



Idler units



Wheel bends XT, XS, X65, X85, XH, XK

Wheel bends



Bends X45, XTC, XS, X65, X85, XH, XK

Plain bends



Vertical bends



Accessories XS, X65, X85, XH, XK

Angle plates



Angle plates for bends



Front piece



Drip trays



Drip pans for wheel bends



Drip pans for vertical bends



Guidance X45, XS, X65, X85, XH, XK, X180/X300

Guide rail profiles



Flexible roller guide rail



Guide discs (not X180/X300)



Built-up guide rail brackets



Fixed guide rail brackets, aluminium



Fixed guide rail brackets, polyamide



Adjustable guide rail brackets, aluminium

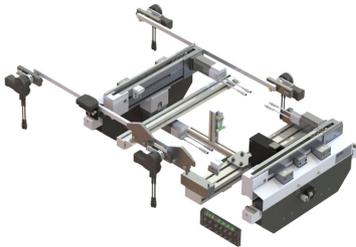


Adjustable guide rail brackets, polyamide

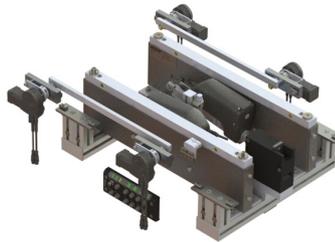


Pallet handling components HU, XT, XTC, X65, X85, XK

Transfer HU



Locating unit HU



Speed Booster HU



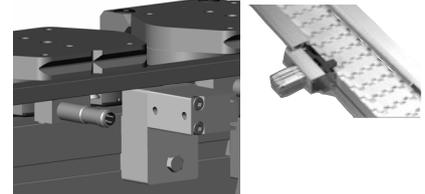
Product carriers (pallets)



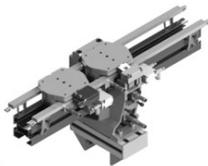
Guide rails for bend



Pallet stop device



Pallet locating station



Diverting and merging modules X85/XK



Locating modules X85



Diverter kits



Merge kits



Combined divert-merge kits



P0
CC
X45
XS
X65
X65P
X85
X85P
XH
XK
XKP
X180
X300
GR
CS
XT
HU
WL
WK
XC
XF
XD
ELV
CTL
FST
TR
APX
IDX

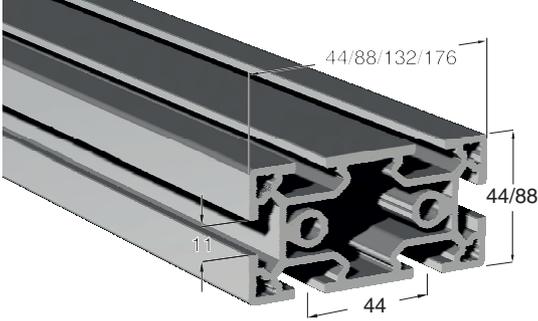
Features

- A wide range of modular extruded aluminium beams with uniform T-slots.
- Standard component assortment for every application area.
- Easy to assemble, adjust, and dismantle using simple hand tools.
- Short time from concept to finished design.
- No welding or painting necessary.

Examples of application areas

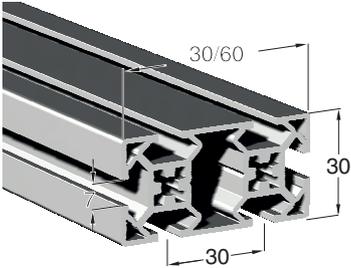
Frameworks, workbenches, enclosures, special machinery, pick-and-place units, gantry robots

XC – heavier frameworks and machine stands



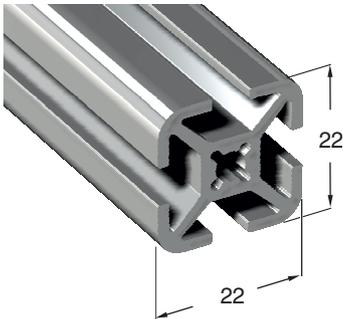
Structural system XC is based on the module 44 mm and offers sturdy components which provide high load capacity for both static and linear motion systems. It is used within a wide range of applications, from frameworks, work benches and enclosures to special machinery, pick and place units and gantry robots.

XF – compact and light enclosure applications



Structural system XF is based on the module 30 mm. It consists of a range of standard components, with emphasis on enclosure applications.

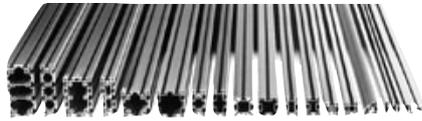
XD – compact and light automation applications



Structural system XD is based on the module 22 mm. The system focuses on compact, light automation applications. It consists of a comprehensive range of standard components and ready-made functional units for linear and rotary motion.

Beams XC

Support beams/Enclosure beams



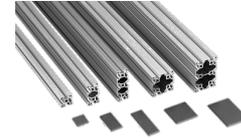
Beams XF

Support beams/Enclosure beams



Beams XD

Support beams/Enclosure beams



CC

X45

XS

X65

Connectors

Angle brackets



Mounting plates



Slot fasteners



Small fittings



X65P

X85

X85P

XH

Feet

Feet, aluminium



Feet, polyamide



Foot plates



Adjustable feet



XK

XKP

X180

Castors



End plates



Floor attachment brackets



X300

GR

CS

XT

Enclosure components

Profiles for sliding door, Slide strip



Profiles for enclosures



Enclosure strips



HU

WL

WK

Hinges, Multiblock



Handle



Enclosure connectors



XC

XF

XD

Corner bracket kit



Ball latch lock kit



Safety switch kits



ELV

CTL

FST

TR

APX

IDX

Components for linear motion and rotating motion

Sliding element for T-slot



Sliding elements for guide profile



Wheels, Wheel yoke



Roller units for linear beams



Joint, Extruded joint



Conduit elements

Cable duct



Cable duct with divider



L-connection 45° and 90° and T-connection



Technical data – conveyors

Drive unit capacity

The required motor output power P depends on

- Traction force F
- Chain speed v

The following equation applies:

$$P [W] = 1/60 \times F [N] \times v [m/min]$$

The maximum permissible traction force of the various drive units, and other useful parameters, are shown in the following tables. Also see diagrams on page 22.

More information

Detailed information about the drive units can be found in “Drive unit guide” and “Spare parts”. See “Technical library” on FlexLink’s website. For information about drive units with variable speed motors, see *Drive Unit Guide*.

Drive unit specifications

End drive unit

	X45H	XS	X65	X85	XH	XK	X180/ X300
Number of teeth on sprocket wheel	16	16	C: 11 M: 11 H: 16	C: 9 M: 9 H: 12	12	11	12
Chain pitch (mm)	25,4	25,4	25,4	33,5	35,5	38,1	33,5
Maximum traction force (N)							
Type CN_P			300	300			
Type MN_P			700	800			
Type H, H_P, HN_P		500	1000	1250	1250	2500	1250
Standard	900						

Double drive unit

	XS	X65	X85	XH	XK
Number of teeth on drive wheel	16	16	12	12	11
Chain pitch (mm)	25,4	25,4	33,5	35,5	38,1
Maximum traction force (N)	500	1000	1250	1250	1250
c/c distance between the two lanes (mm)	55 or 90–350	66 or 110–350	86 or 130–350	106 or 150–350	106 or 150–350

Intermediate drive unit

	X65 Medium	X65 Heavy	X85	X85 Heavy	XH
Number of teeth on drive wheel	11	16	9	9	9
Chain pitch (mm)	25,4	25,4	33,5	33,5	35,5
Maximum traction force (N)	200	700	200	875	200

Catenary drive unit

	XH	XK
Number of teeth on drive wheel	12	11
Chain pitch (mm)	35,5	38,1
Maximum traction force (N)		
Type H	1250	2500
Standard		1250

Bend drive unit

	XS	X65	X85	XH	XK
Pitch diameter (mm)	300	300	320	340	400
Maximum traction force (N)	200	200	200	200	200

Direct drive unit for wedge conveyor

See “End drive units”, above.

Synchronous drive unit for wedge conveyor

	X65	X85
Number of teeth on drive wheel	16	12
Chain pitch (mm)	25,4	33,5

End drive unit WL

Number of teeth on sprocket wheel... 2x16

Number of sprocket wheels vs. conveyor width

Width	322 mm	424 mm	626 mm
Sprocket wheels	5	5	7
Belt pitch (mm)	25,4 mm		

Temperatures

What temperatures can a FlexLink conveyor operate in?

A FlexLink conveyor can operate in temperatures between -20 °C and +60 °C.

Temperatures up to +100 °C can be taken for short periods. This is mainly for cleaning and rinsing.

What happens if these limits are exceeded?

In cases where the recommended specifications have not been followed, such as in very warm and cold conditions, this will change the properties of the materials used.

FlexLink cannot guarantee components and their functionality in case these recommendations are not followed.

Chain tension limits

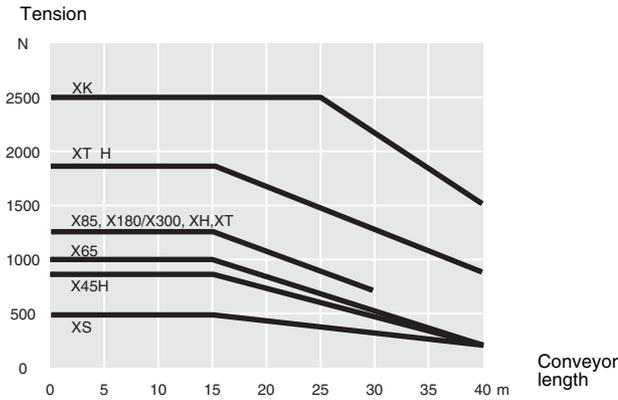
To determine the maximum chain tension allowed, it is necessary to take conveyor speed and conveyor length into consideration. Check diagram 1A and 2B-2E and use the lowest tension value obtained.

Note!

The drive unit configurator on the web always proposes a motor strong enough to utilize the maximum permissible chain tension as specified in the diagrams below. Variable speed motors at very low frequencies can sometimes drop below the specified tension. Always check motor data if high pulling force is critical.

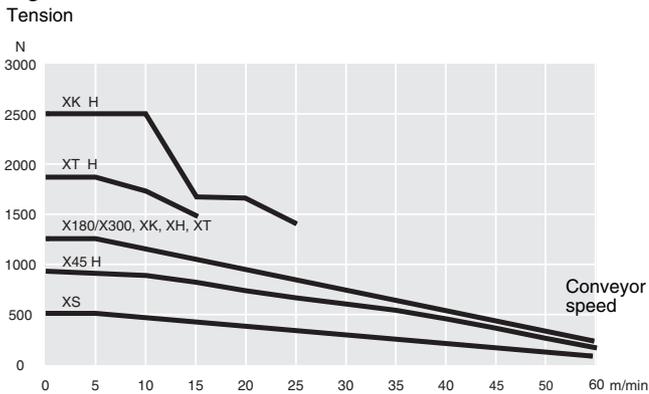
Maximum permissible chain tension

Diagram 1A



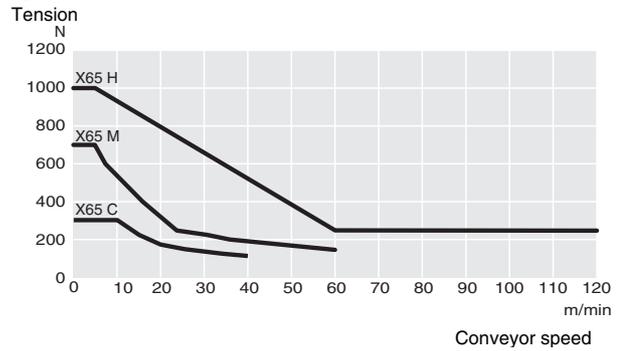
Tension/length diagram

Diagram 2A



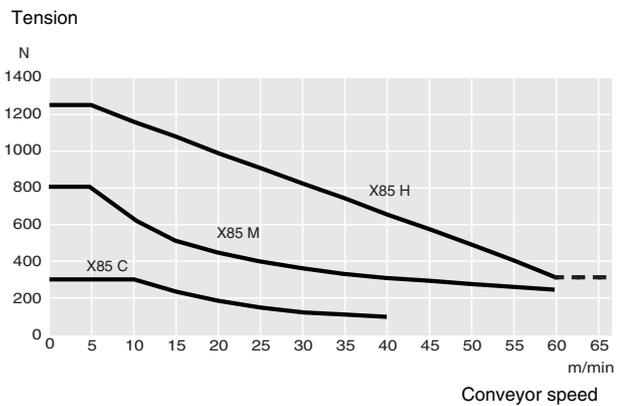
Tension/speed diagram, XS, X180/X300, XK conveyors

Diagram 2B



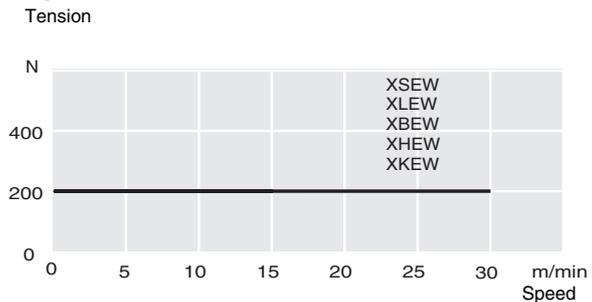
Tension/speed diagram, X65 Type C/M/H

Diagram 2C



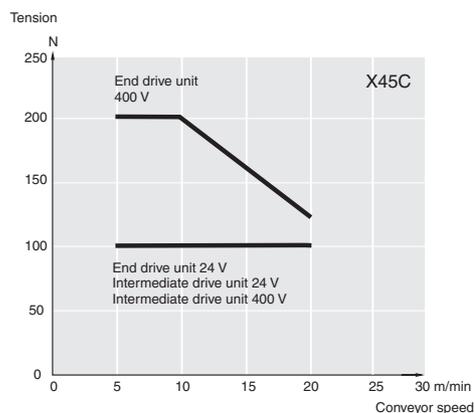
Tension/speed diagram, X85 C/M/H

Diagram 2D



Tension/speed diagram, Bend drive units

Diagram 2E



Tension/speed diagram, X45 Drive units

P0
CC
X45
XS
X65
X65P
X85
X85P
XH
XK
XKP
X180
X300
GR
CS
XT
HU
WL
WK
XC
XF
XD
ELV
CTL
FST
TR
APX
IDX

Selecting the right chain material

Links

The base link parts of the chain links have the same basic shape, and the same technical properties. Five different materials are used. The standard material is acetal resin (POM). Different materials are used.

Strength values at 20 °C:

Product (POM)	XS	X65	X85, XH, X180/X300	XK	XT, X45H	XT Compact
Maximum working tension	500 N	1000 N (800 N XLTP 5A65 C)	1250 N	2500 N	900 N	180 N

The other materials are not as strong as POM:

- Polyester (PBT): 50% of POM value
- Polyvinylidene fluoride (PVDF): 40% of POM value.
- Conductive POM: 40% of POM value
- High temperature resistant material, 50% of POM value
- Intrinsically static dissipative (ISD) POM: see the following table..

Product (POM ISD)	X65	X85	XH	XT X45H	XT Compact
Maximum working tension	400 N	400 N	550 N	450 N	180 N

Pivots

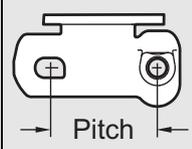
Most pivots are made in materials as specified in the table below. Otherwise the material is specified next to the link designation.

Link	POM	POM (ISD)	PBT	PVDF
Pivot	PA66	PA66 (ISD)	PA66	PVDF

Chain pitch and weight

The *Chain guide* lists the weight of most links. To calculate chain weight, you need to know the chain pitch (see picture below), the weight of the plastic pivot, the weight of the steel pin, and the cleat separation. See the following table.

Parameter	Conveyor type						
	XS	X85	XH	XK	X180/X300	XT X45H X65	XT Compact, X45
Chain pitch, mm	25,4	33,5	35,5	38,1	33,5	25,4	12,7
Plastic pivot weight, g	1	2	3	5	2	1	n.a.
Steel pin weight, g	4	10	17	24	10	3	1



Note

Some of the chains require modification of the drive units. There may also be limitations on minimum bend radius.

Material abbreviations

Material abbreviation	Material
POM*	Acetal resin
POM* polished	Acetal resin, polished surface
POM*, pivot PVDF	Acetal resin, pivot: PVDF
POM* GY	Acetal resin, grey
POM* BK	Acetal resin, black
POM* COND	Acetal resin, conductive
POM* ISD NAT	Acetal resin ISD, natural colour
POM* ISD GY	Acetal resin ISD, grey
PBT	Polyester
PVDF	Polyvinylidene fluoride
PVDF, pivot PA66	Polyvinylidene fluoride, pivot: PA66
POM* + steel	Acetal resin, steel top
POM* + SS	Acetal resin, stainless steel top
PA	Polyamide

Chain strength and expansion vs. temperature

Temperature °C	-20	0	20	40	60	80	100	120
Tensile strength factor	1,2	1,1	1,0	0,9	0,8	0,6	0,5	0,3
Linear expansion%	-0,4	-0,2	0	0,2	0,5	0,8	1,0	1,3

Service factor

The maximum permissible chain tension (see diagrams 1A and 2A-2E on Page 22) depends on the number of conveyor starts and stops per hour. Many conveyors run continuously, whereas others start and stop frequently. It is obvious that frequent starts and stops increase the stress on the chain.

The service factor (see table below) is used to derate for high frequency of starts and stops and for high chain speeds. Divide the tension limit obtained from the graphs by the service factor to get the derated tension limit. A high service factor can be reduced by providing a soft start/stop function.

Operating conditions	Service factor
Low to moderate speed or max. 1 start/stop per hour	1,0
Max. 10 starts/stops per hour	1,2
Max. 30 starts/stops per hour	1,4
High speed, heavy load, or more than 30 starts/stops per hour	1,6

Important

The chain tension calculations are made to ensure that the capacity of the drive unit is sufficient, but not excessive, in relation to the strength and friction of the chain. The calculations do not take into account the increased wear resulting from the higher friction in plain bends.

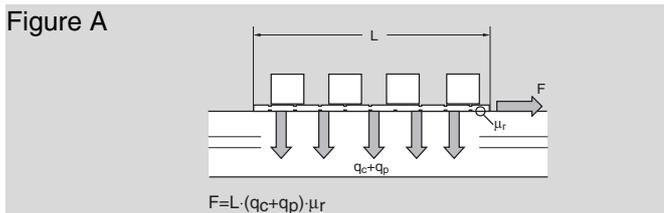
Chain tension calculations

Chain tension

The tension building up in the chain can be divided into several components:

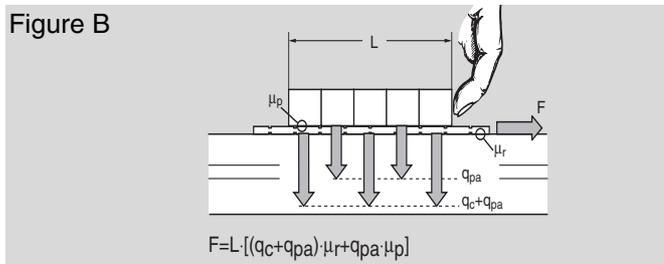
- 1 Friction between unloaded chain and slide rails, for example on the underside of the conveyor beam.
- 2 Friction between loaded chain and slide rails (Figure A).

Figure A



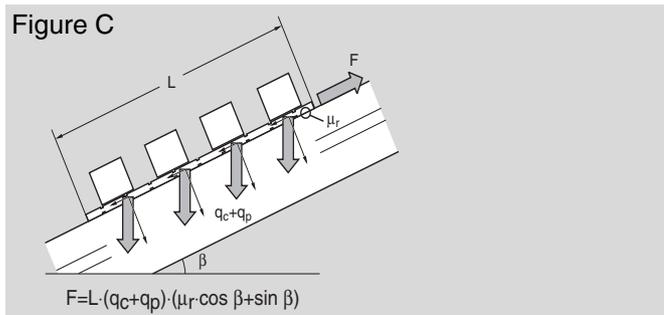
- 3 Friction between accumulating products and top surface of chain (Figure B).

Figure B

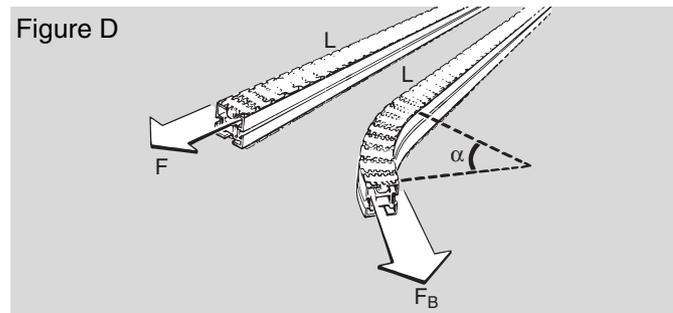


- 4 Gravity force acting on products and chain in inclines and verticals (Figure C).

Figure C



- 5 Added friction in plain bends. This friction is proportional to the chain tension on the low-tension side of the bend. This means that the actual friction depends on the position of the bend in the conveyor (Figure D).



Traction force

The traction force F required to move the chain depends on the following factors:

Conveyor length.....	L
Product gravity load per m Transport.....	q_p
Accumulation	q_{pa}
Chain gravity load per m	q_c
Friction coefficient	
Between chain and slide rail	μ_r
Between chain and products.....	μ_p
Bend factor, α° plain bend (hor./vert.).....	$k\alpha$
Inclination angle	β

Bend factors

Each plain bend introduces a bend factor $k\alpha$. This factor is defined as the ratio between chain tension measured just after the bend and that measured before the bend.

The bend factor depends on

- the amount of direction change of the bend (angle α)
- the coefficient of friction, μ_r , for the friction between chain and slide rails.

When the conveyor is dry and clean, the friction coefficient, μ_r , will be close to 0,1.

The bend factor must be used since the frictional force of a plain bend depends not only on the chain and product weight and the coefficient of friction, but also on the actual tension of the chain through the bend. This tension causes additional pressure to the conveyor beam and slide rail from the chain. The additional force is directed towards the centre of the bend.

Calculation of this additional force is more complicated, since the chain tension varies through the conveyor, being maximum at the “pull” side of the drive unit, and virtually zero at the inlet of the return chain. The bend factor provides a means of including the added friction in bends into the calculations.

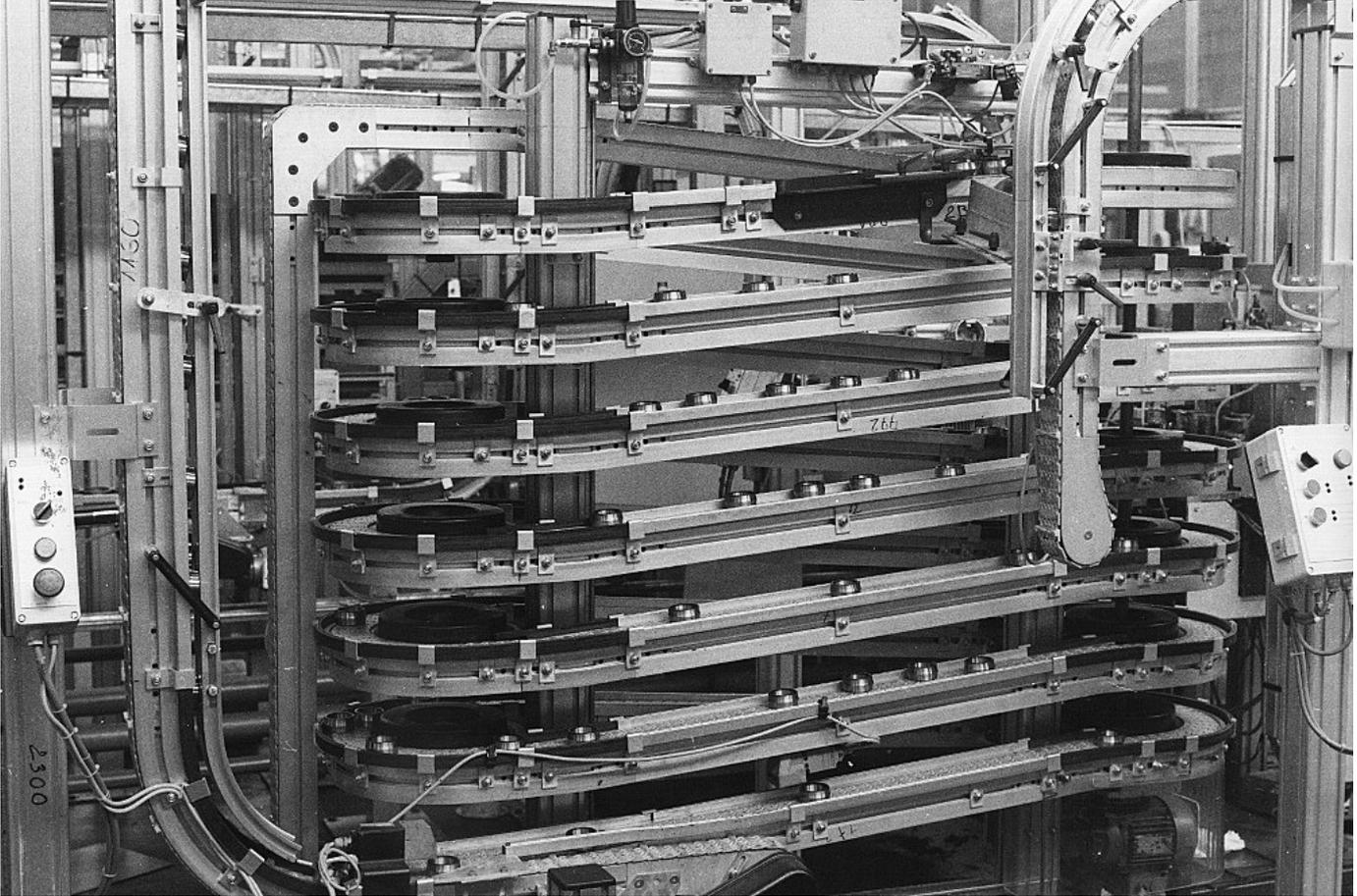
The same bend factors apply to horizontal and vertical plain bends. See the table.

Note

Plain bends should only be used in exceptional cases. For normal applications, use wheel bends.

Bend type (Vertical or Plain bend)	30°	45°	60°	90°
Bend factor $k\alpha$	1,2	1,3	1,4	1,6

Introduction



Critical factor

To achieve an operational installation which is reasonably safe for all people involved in its use and maintenance, it is necessary to consider certain aspects. This is done when designing a conveyor system. The chain is generally the critical factor to consider with guarding.

Safeguarding

All pinch and shear points as well as other exposed moving parts that present a hazard to people at their workstations or their passageways must be safeguarded. Overhead conveyors must be guarded to prevent objects falling. Cleated conveyor chains are more hazardous in creating more pinch and shear points than plain conveyor chains.

Safeguarding can be achieved by:

- Location

Location of the hazardous area away from the area occupied by personnel, wherever possible.

- Guards

Mechanical barriers preventing entry into the hazardous areas or protecting against falling objects.

- Control devices

Machine controls which prevent the interruption of hazardous operations/conditions.

- Warnings

Instructions, warning labels, or sound/light signals which alert to hazardous conditions.

Safeguarding should be designed to minimize discomfort or difficulties to the operator. Bypassing or overriding the safeguarding during operation should be difficult.

Warning labels etc. should only be used when all other means of safeguarding will impair the function of the installation or are not cost effective.

The degree of safeguarding required should be identified during the implementation of the essential safety requirement during the design process.

Special considerations

When correctly applied, FlexLink family of components are safe to use and maintain. It is however necessary for those responsible for design, installation, operation and maintenance of installations to be aware of certain areas where special attention is required.

All drive units with slip clutch

- Before adjusting the slip clutch it is necessary to remove all objects from the chain to remove any remaining chain tension.
- Adjustment should be conducted in accordance with the maintenance procedures.
- All drive units, except the direct drive units, are fitted with transmission chain covers, these covers must be fitted before unit is operated.

Note

The slip clutch is not a personnel safety device, but a device to protect the conveyor equipment.

End drive units

- The chain slack (catenary) of the end drive units must be maintained during the system lifetime.
- If side plates are fitted, the chain must be shortened if the chain becomes visible below the level of the side plates.
- The opening between the links when they turn round the end roller could be a risk. Drive ends should not be accessible during conveyor operation wherever possible.

For coupled drive units, safety protection should be applied to the connecting shaft.

Intermediate drive units

- The area near the guides for the return loop of the chain should not be accessible during conveyor operation.

Catenary drive unit

- The 'bridge' area where the chain goes down into the drive should not be accessible during conveyor operation.

Bend drive unit

- The drive wheel and the transmission chain should not be accessible during the conveyor operation.

Idler units

- The opening between the links when they turn round the idler roller could be a risk. Idler ends should not be accessible during conveyor operation wherever possible.

Wheel bends

- Guarding may be required at wheel bends depending upon location of bends and load applied to the conveyor.

Cleated chains

- Any application incorporating cleated chains requires careful safety consideration. Pinch and shear points are generated throughout the assembly of the incorporated components. Therefore generous guarding should always be employed to fully protect within user operating limitations.
- There is a higher risk of product damage when using cleated chains. Special attention must be given to operator access in the event of products becoming trapped or similar.

Maintenance

The maintenance routine of FlexLink's conveyors should also include procedures to ensure that the guarding remains securely fastened and effective (if not interlocked via control system etc.).

FlexLink's components are continuously reviewed to improve performance either by design modification or material upgrade. In all these reviews user safety is our primary consideration.

All associated technical data is retained at the manufacturer's address.

Control system

Before operating or completing any maintenance on control system, read the associated section as supplied with the equipment documentation.

If there are any questions as to the safe operating procedures of the equipment supplied, please contact Flex-Link immediately.

CC
X45
XS
X65
X65P
X85
X85P
XH
XK
XKP
X180
X300
GR
CS
XT
HU
WL
WK
XC
XF
XD
ELV
CTL
FST
TR
APX
IDX

System maintenance

Introduction

The following section is designed to offer assistance for your planned maintenance schedule. It may become evident that the suggested maintenance intervals can be extended to accommodate your local environmental conditions.

Maintenance of the conveyor systems should only be carried out by competent persons, who are familiar with FlexLink's equipment. If there is any doubt as to the most suitable procedure for maintenance, consult your Flex-Link supplier.

Run-in period

Two to three weeks is usually enough as a run-in period. During this time, the conveyor should be cleaned a couple of times, to remove dust. After run-in, wear will be minimal, unless particles from the product or process reach the conveyor continuously.

Chain elongation

Especially during the run-in period, and if the load is heavy, the conveyor chain will slowly increase in length. This effect will be most obvious for long conveyors. After continuous operation for two weeks, it is often possible to remove a couple of chain links. After this period, we recommend a check every 3–6 months.

Non FlexLink equipment

Equipment and components which are not from the Flex-Link family of products should be maintained and serviced in accordance with their respective manufacturer's instructions.

Safety considerations

Before starting any maintenance on your FlexLink equipment, the following safety instructions must be observed:

- All electricity must be switched off.
- Make sure that the motor switch is also switched off and locked in the "off" position.
- Pneumatic and/or hydraulic power must be disconnected and any pressure accumulation released.
- Products being transported should, if possible, be removed from the conveyor chain.
- Staff affected must be informed that maintenance work is being undertaken.

Warning

Do not climb onto the equipment.