SMILEY MONROE

THE GIANT HANDBOOK

YOUR COMPLETE GUIDE TO CONVEYOR BELTS

GIANTS OF BELTING

smileymonroe.com

NO ONE KNOWS CONVEYOR BELTS LIKE WE DO.

THEY DON'T CALL US THE GIANTS OF BELTING FOR NOTHING.

We've spent decades staying close to our customers, understanding their individual needs and problem solving.

To help us better serve your needs, we've captured the knowledge and experience of our conveyor belt experts in this handy publication.

Our goal is to make you, our customers as successful as possible. Please use this handbook as a guide but remember, our team is always on hand to deliver training, provide advice and answer questions. We look forward to working together.

CONTENTS

01 *CONVEYOR BELTS BASICS*

In this section you'll learn about the different types of conveyor belts, splice types and the Smiley Monroe product range. You'll also learn how to store and handle your conveyor belt as well as the appropriate maintenance measures to ensure long conveyor belt life.

CONVEYOR BELT OPTIONS

ENDLESS BELT READY TO FIT

A finished length of conveyor belt with a hot (vulcanised) splice forming a continuous loop.

STRIPPED BELT READY TO SPLICE

A measured length of conveyor belt with overlapping, stripped ends ready for hot or cold splicing.

CUT LENGTH

A length of conveyor belt with square ends that can include a length allowance for splicing.

MECHANICALLY FASTENED SCREW-IN

ZIP CLIP® - a mechanically fastened replacement conveyor belt with a screw-in connecting pin and polyurethane seal.

MECHANICALLY FASTENED PUSH-IN

ZIP CLIP® - a mechanically fastened replacement conveyor belt with an easy-to-fit push-in connecting pin and 2 zinc plated steel retaining collars which provides extra peace of mind by ensuring the pin can't become loose whilst the conveyor belt is running.

CONVEYOR BELT DESCRIPTION

FIG. 1

FABRIC TYPE
Polyester (E) Warp/
Polyamide (P) Weft

OVERALL TENSILE STRENGTH
in Newtons per mm

THICKNESS OF TOP & BOTTOM COVERS
in mm

1000mm EP 400/3 3mm+1.5mm DIN 22102

BELT WIDTH
in mm

NUMBER OF SYNTHETIC FABRIC PLIES

MANUFACTURING STANDARD

FABRIC TYPE

EP fabric consists of E (Polyester) and P (Polyamide) combined to give strength, impact resistence, flexibility and negligible elongation.

MANUFACTURING STANDARD

All of our belts are produced to the German manufacturing standard DIN 22102.

THICKNESS OF TOP & BOTTOM COVERS (MM)

The thickness of the top and bottom cover respectively.

OVERALL TENSILE STRENGTH

Rated breaking strength is 10 times the calculated working tension. The total strength is the total of the number of plies x tensile strength of each ply e.g. 800/5 IS 5 x 160 N/mm per ply.

BELT WIDTH (MM)

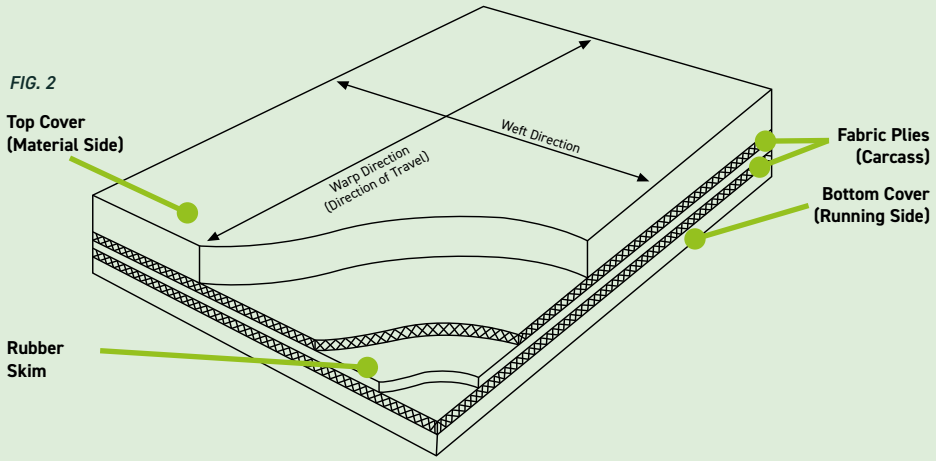
The metric belt width described in millimetres. Where the belt is described in imperial measurements, the closest metric width will be selected e.g. 24" = 600mm.

NUMBER OF SYNTHETIC FABRIC PLIES

The number of plies used to make up the total belt tensile strength. Note that more plies does not necessarily mean that the belt is stronger e.g. A 500/4 (4 ply) belt is the same strength as a 500/3 (3 ply) belt.

ANATOMY OF A BELT

FIG. 2



BELT OPERATING TEMPERATURES

Standard range
-30°C to +70°C
(-22°F to +158°F)

Extreme conditions (specialised belts)
-60°C to +600°C
(-76°F to 1112°F)

CONVEYOR BELT CONSTRUCTION

CARCASS

The function of the carcass is to transmit and absorb the forces acting on the belt. It is primarily a question of tensile forces from the driving pulley. Secondly the carcass absorbs the impact that partly appears when the material is loaded onto the conveyor, and partly when the belt with material passes over the carrying rollers.

The carcass consists of one or more plies of textile fabric with rubber on each side to give adhesion and flexibility. The longitudinal direction is called warp and the cross direction is called weft. The conveyor belt fabrics can have the same or different material in warp and weft. One letter designating each, for instance EP, in which E is Polyester in warp and P is Polyamide in weft.

COMMON CARCASS MATERIALS:

POLYESTER (E)
Synthetic fibres such as Terylene, Trevira, Diolen and Tetoron. Polyester fabrics are not influenced by moisture or micro-organisms. They are very flexible, have stability in length, and are acid resistant.

POLYAMIDE (P)
Synthetic fibres known as Nylon and Perlon. This fabric has similar characteristics as Polyester, but not the length stability.

POLYESTER-POLYAMIDE (EP) - MULTI-PLY
The EP fabrics have Polyester as the warp and Polyamide as the weft. This combination gives the best possible fabric characteristics with the following advantages:

— High strength in proportion to weight
— High resistance to impact
— Negligible elongation
— Great flexibility, excellent troughability
— Not susceptible to humidity and micro-organisms

These technical advantages as well as many years' experience in the conveyor belt field is the reason why Smiley Monroe prefer EP as carcass material in standard conveyor belts.

POLYAMIDE - POLYESTER (XE)
The XE fabrics have Polyester as the warp and Polyamide as the weft. The Polyester is, in general, made up of heavy monofile threads. Chemically, these fabrics have the same advantages as EP fabrics. Mechanically, 2 plies, in combination with an EP carcass, makes a traditional EP belt cross stabilised. This type of carcass is used to prevent the belt from troughing which is used in the manufacturing of sidewall belting, cover belting etc for swan neck / Z shape conveyors.

DID YOU KNOW THAT ALL BLACK RUBBER BELTS ARE ANTISTATIC.

EPP - TOUGHFLEX®
TOUGH FLEX® belts are constructed with a special weave of 2 fabric plies and an additional binder warp. The plies are reinforced to resist puncturing and are protected with heavy duty, wear resistant top and bottom covers.

BELT CONSTRUCTIONS

Belt construction means the combination of carcass and covers.

To calculate the correct belt construction the transmission of the necessary power, material type, lump size, height of fall, weight etc. are taken into consideration.

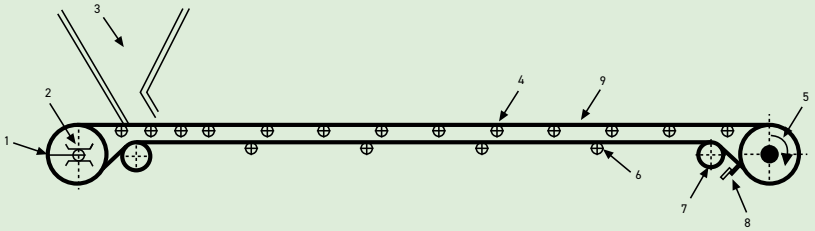
RIPSTOP
Ripstop™ utilises steel wire as an extra ply in the carcass, preventing the EP fabrics from longitudinal cuts.

FABRIC BREAKER
Constructed with EP fabric plies, an additional fabric breaker ply and a heavy duty top cover to provide more shock absorption to protect the carcass.

RUBBER COVERS
The covers protect the carcass and give the necessary friction between the belt and drive pulley and between the belt and material. Belt top covers can become damaged due to wear, impact, the carried material or external environmental conditions. It is therefore important to choose the correct conveyor belt for your application.
See Smiley Monroe Conveyor Belt Section page 19 for more information. We also offer a selection of Specialised Conveyor Belts (see page 29) which are flameproof, oil, heat and cold resistant for exceptional applications.

ANATOMY OF A CONVEYOR

FIG. 3



1. SCREW TENSION
2. TAIL PULLEY
3. HOPPER
4. CARRYING ROLLERS
5. DRIVING PULLEY
6. RETURN ROLLERS
7. SNUB PULLEYS
8. BELT CLEANER
9. CONVEYOR BELT

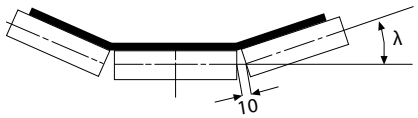
CARRYING SIDE

Can be supported by troughed rollers, flat roller or sliding plate.

THE THREE-SECTIONED ROLLERS

Are the most commonly used type. The optimum capacity is obtained at 45° trough angle, and the rollers being of the same length. Distance between rollers is standardised at max. 10 mm.

FIG. 4



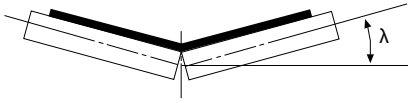
TROUGHED ROLLER SET

Troughed rollers ensure high capacity, small risk of spillage of material and effective belt guiding.

THE TWO-SECTIONED ROLLERS

Are normally only used for belt widths under 650 mm. A trough angle larger than 25° is inexpedient because of the influences on the belt. Distance between rollers is standardised at max. 10 mm.

FIG. 5



FLAT ROLLER SET

Is mainly used for transportation of packaged goods, and in such cases when the material is loaded and unloaded from the side, and for belts with sidewalls.

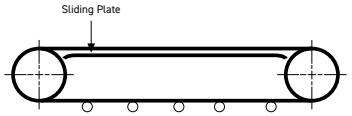
FIG. 6

SLIDING PLATE

Can be used for transportation of packaged goods and goods in bulk. The sliding plate can be made of steel or plastics.

Normally belts with low friction on the bottom side are used because of the friction forces between belt and sliding plate.

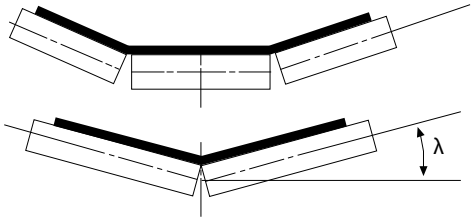
FIG. 7



RETURN PART

Is normally supported by flat rollers. However, on long conveyors it can be an advantage to use two sectioned rollers, which makes the belt guiding easier. Trough angle 10-15°.

FIG. 8



When transporting sticky materials return rollers with supporting rings or rubber lagging are used to reduce build-up of material on the rollers. Smiley Monroe Polymer King Rollers are self-cleaning.

Because of the guiding of the belts both carrying and return rollers must be adjustable in the travelling direction of the belt.

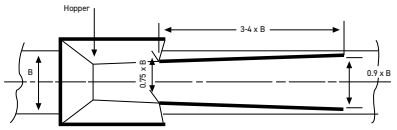
FIG. 9

LOADING OF GOODS IN BULK

Feeding should take place in the travelling direction of the belt at a speed equal to the belt speed. Material should be distributed symmetrically across the middle of the belt, as unsymmetrical material stream is often the cause of oblique travel.

After a few metres running the material stream will flatten out and assume the load stream cross section that is natural for the material. To avoid waste of material a hopper should therefore cover a maximum of 0.75 × belt width, see fig. 10.

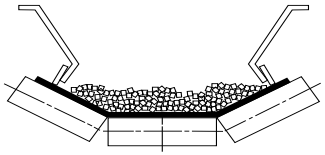
FIG. 10



In connection with the hopper, rubber skirting is often mounted to avoid spillage of material. The skirting must be rubber or PU, the hardness of which is lower than that of the belt cover. A higher shore hardness is necessary for PU skirting to achieve the optimum wear properties. Scraps of belt should not be used as rubber skirting.

As the distance between the rubber skirting is gradually increased from 0.75 to 0.9 x belt width (see fig. 10), a self cleaning effect will occur, as the belt will pull out the material between skirting and belt. The rubber skirting must be placed at right angles to the belt to avoid the material pressing it on to the belt with consequent wear of the cover, see fig. 11.

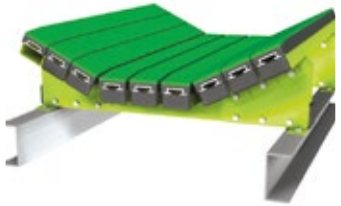
FIG. 11



The height of fall of the material should be the smallest possible in order to reduce the impact effect on the belt. The consequences of the impact can be reduced by supporting the belt in an appropriate manner by means of closely placed impact rollers, shock absorbing rubber mats or Smiley Monroe Impact Bars.

Impact Bars should be fitted at conveyor transfer and feed points to reduce the risk of costly puncture damage to conveyor belts as well as reduce the material spillage as the belt is held at a continuous level allowing the skirting rubber to be in contact at all times.

SMILEYMONROE.COM/PRODUCTS/IMPACTBARS



BELT CLEANERS

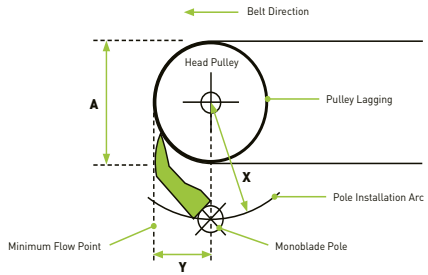
Many conveyor belt and vulcanised splice problems in bulk materials handling are caused by carryback material.

The installation of a reliable conveyor belt cleaner will help minimise many of these problems and keep costly maintenance and downtime to a minimum.

Smiley Monroe's conveyor belt cleaning system features primary and secondary cleaners to ensure consistent cleaning efficiency.

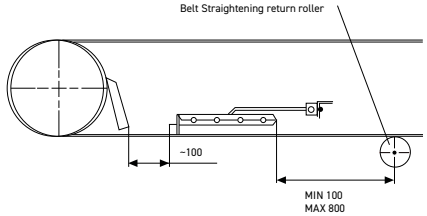
NOTE: Chevron Belt Cleaners are also available.

FIG. 12



IDEAL PLACEMENT OF A BELT CLEANER

FIG. 13



The pulley side of the belt is kept clean by means of diagonal or plough-shaped belt cleaners. An adjustment device should be made to prevent the rubber holder from getting into contact with the belt. Scraps of belt should not be used as belt cleaners.

Build-up of materials on pulleys must be avoided. A possibility is cleaners on the pulleys. Covering of the return part under the loading point can give an effective protection of the belt and can be recommended for transportation of goods in bulk, see fig. 13.

BELT TENSIONING SYSTEM

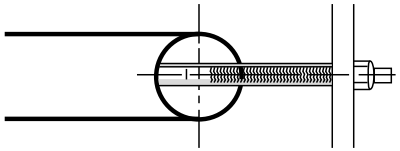
The purpose of a belt tensioning system is to give the belt the pre-tension ensuring;

- that the driving pulley drives the belt under all running conditions
- that the belt sag between carrying and return rollers is limited. In this way waste of material and bending resistance at belt passage over the rollers is reduced.

FIXED BELT TENSIONING SYSTEM

Screw take-up is often used for short, moderately loaded conveyors.

FIG. 14



BELT TENSIONING INSTRUCTIONS

To drive a conveyor belt without slippage and to track it in a proper way, a certain belt tension is neccessary. The tension applied has to be such that there is no slippage on the driving drum when the belt is started at full load.

Pollution or a wet sliderbed will increase the friction strongly. Therefore it is very important to clean your conveyor properly.

Tensioning a conveyor belt in practice:

- Put marks on the untensioned belt at exactly 1000 mm
- This has to be done on the left as well as the right side of the conveyor belt
- Tension the belt and let it turn a few times to equally divide the belt tension over the belt
- Then measure the elongation
- Adjust the belt tension, if necessary
- In case of applications with a medium load an elongation of 0.3 to 0.4% should be sufficient

With regards to the tracking behaviour of a belt a minimum stretch of approx. 0.2% is necessary. In case of a heavier load a higher belt tension is necessary (maximum approx. 0.7%).

MAINTENANCE OF BELT AND CONVEYOR

COMMON CAUSES OF CONVEYOR BREAKDOWN

A conveyor will stop working completely if:

- The belt breaks or becomes too damaged to operate
- Mechanical/environmental (weather) problems prevent the belt from turning when drive is applied
- The drive arrangement fails - motor /gearbox / power transfer equipment /hydraulics
- Fuel for the drive arrangement is not available (Electricity/Diesel)

MINIMIZING DOWNTIME OF BELT CONVEYORS

Carry out regular checks that are timed according to the loading and type of material and not just service hours.

WHAT CAN OPERATORS DO TO REDUCE UNPLANNED DOWNTIME?

Refer to the Troubleshooting section on page 66 or better still, speak to our Product Support Team about how our products can maximise uptime.

TOP TIPS FOR PREVENTING A BREAKDOWN

PREVENT MATERIAL SPILLAGE

Spillage, surge loading and airborne dust at conveyor transfer/feed points cause a number of costly environmental and safety problems. Material build up, seized rollers, pulley failure and premature belt wear erode conveyor maintenance budgets and often cause unplanned conveyor downtime.

HOW CAN I REDUCE SPILLAGE?

Smiley Monroe offer a number of proven spillage and dust seal solutions including Impact Bars, Dust Seals, PU & Rubber Skirting and Glide Tracker Rollers. See our website or speak to our Product Support team to learn more about our system.

SEE SMILEYMONROE.COM

MAINTAIN BELT TRACKING

There are a number of things which could cause a belt to become misaligned (see troubleshooting section) such as material build up on rollers, off centre loading or machine damage. Check that no steel structure or other parts interfere with the running of the belt and keep rollers and pulleys free from material build up by fitting adequate dust seal and spillage controls (see page 12) and by fitting Smiley Monroe's Low Friction Polymer King Roller. Its self-cleaning surface, reduces the risk of build up from carryback material which can cause tracking issues and premature belt wear.
Made of anti-corrosive HDPE, Polymer Roller is not susceptible to rust or sharp edges which could damage the conveyor belt during high speed rotation. Fitting a Smiley Monroe Glide Tracker Roller at the tail pulley of your conveyor will also prevent tracking issues and machine downtime

- Inspect belt joint regularly for any signs of damage or delamination. Carry out repair or replacement of the joint as necessary. Inspect any belt cleaners and ploughs regularly, re-tension and replace worn blades as necessary.
- Inspect belt condition regularly for signs of damage due to wear and tear - look out for deep cuts and punctures through the belt and plies, particularly lateral tears, belt delamination and complete wear of the covers through to the belt plies.

MECHANICAL/ENVIRONMENTAL PROBLEMS

- Regularly inspect and lubricate pulley bearings and clean spillage away from bearings and pulleys.
- Regularly inspect pulleys for signs of wear and fatigue - look out for thinning of pulley shells, cracks in welds of pulley bosses to sidewalls and shafts, damage to shafts caused by seized bearings.
- Check support of any items mounted over the conveyor - feed hoppers, bins, feed boots etc: to ensure that collapse does not cause conveyor failure/damage.
- Fit drive pulleys with lagging material appropriate to the likely operating environment to ensure maximum drum to belt friction.

KEEP ON TRACK

Smiley Monroe's Glide Tracker™ Roller is the cost-effective solution to the age-old problem of conveyor belt misalignment. Glide Tracker™ Roller solves the majority of tracking issues without the need for expensive mechanical steering rollers, which can be tricky to install and difficult to commission. Installing a Glide Tracker™ is easy and its simple innovative design keeps your belt tracked, preventing damage and downtime.

DRIVE ARRANGEMENT ISSUES

Test motors and gearboxes for consistent power output. Carry out repair or replacement if a drop in performance is found.

- Carry out monitoring of gearbox condition - shock pulse monitoring or similar. Carry out maintenance as necessary.
- Lubricate gearbox as recommended by manufacturer.
- Regularly inspect transmission equipment - vee drives, pulleys etc and replace as necessary.
- The timings of these maintenance issues is subject to the usage of the conveyor, capacity handled and material type. A planned maintenance schedule should be based on those criteria.

MAXIMISE UPTIME WITH SMILEY MONROE

Smiley Monroe's product range is designed to maximise uptime and reduce maintenance and running costs in the toughest conveying applications. Designing conveyors with these products, will lead to long term efficiencies, reduced conveyor maintenance and longer belt life.

Energy Saving Polymer Roller
Tougher than steel, up to 50% lighter, non-corrosive and in tests reduces power consumption by 14% on average.

SM Modular PU Belt Cleaner
Effective and economical OEM primary cleaner which can be fitted at time of manufacture or retrofitted as part of your aftermarket/spares offering.

Glide Tracker™ Roller
Easy to install and low maintenance, our Glide Tracker™ Roller keeps your belt tracked, preventing damage and minimising material spillage and associated clean-up costs.

SEE SMILEYMONROE.COM

BELT HANDLING

It pays to look after your conveyor belts once you accept delivery.

Deliveries of conveyor belts can involve different handling methods during transportation to your designated storage location.

On delivery, palletised or stillaged conveyor belts are most easily handled using a forklift truck. Care must be taken when handling individually packed conveyor belts.

The use of a forklift truck with blunt toes (to pass through the centre coil of the belt) is recommended. Extra care should be taken to avoid the forklift toes coming into contact with the rubber covers of the belt, as this can cut or gouge the rubber and render the belt unfit for use.

BELT STORAGE

- Store upright, off the ground in a dry area and out of direct sunlight.
- Where possible packaging material should be left intact to provide protection against weather, UV light and ozone attack. Do not store belt rolls on their side, as this can cause undue pressure on the edges and possibly lead to deformation and coning problems when unrolled.
- Belt rolls should be checked to prevent accidental movement. Ideally store between 10 - 20°C at approximately 65% relative humidity.
- Do not store in excessively wet places or in areas where oils, fuels, paint materials, acids or chemical solvents are present, as these can emit harmful vapours causing premature deterioration of rubber covers.
- Belts delivered in stillages should be removed from the stillages as soon as possible and stored as recommended above.

STOCK ROTATION

Optimum inventory levels and correct stock rotation methods should be employed so that the products remaining in store are those of most recent manufacture or delivery.

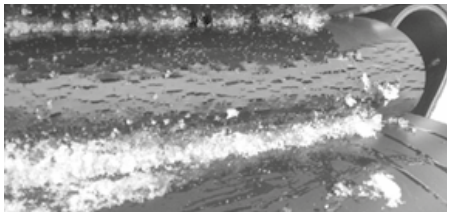
Smiley Monroe conveyor belts have various means of identifying the date of manufacture of endless conveyor belts held in stock. The large Identity label attached to the belt is colour coded to indicate which annual quarter the belt was manufactured in.

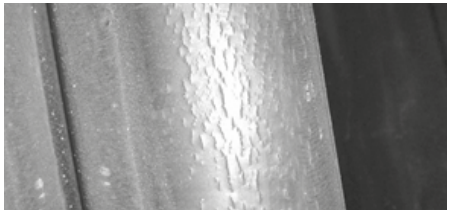
Additionally the Quality ID Number on each belt will follow in numerical sequence, which means that the lowest number shown on the label will be the oldest belt held in stock, this should be used first.

SURFACE CRAZING

Conveyor belts already fitted to machines can become severely compressed whilst the machine is held in the transport position for long periods; this can lead to surface crazing which can form around areas of highly stressed rubber.

This condition can be easily prevented by unfolding the conveyors monthly and moving the belts to relieve any stressed areas. The frequency of this procedure should be determined by the surrounding climatic conditions.





FURTHER READING

'Guidelines for the storage and handling of conveyor belts': ISO 5285:2012

'Rubber Products - Guidelines for storage': ISO 2230:2002

SPLICE TYPES

HOT VULCANISED SPLICE

Smiley Monroe Lab tests prove hot vulcanised joints to be almost twice as strong as cold vulcanised joints.

- **Moisture & Dust** - the curing process is less likely to be affected by adverse weather conditions, dust and humidity as cold vulcanising.
- **Curing time** - the conveyor belt can be run immediately on completion of a hot vulcanised splice.
- **Smooth operator** - belt cleaners are highly effective with hot vulcanised splices on flat belts.
- **OEMs** - we supply you with customised 'endless' conveyor belts, already spliced in our factory, and ready-to-fit on your production line.

DID YOU KNOW THAT ALL SMILEY MONROE ENDLESS BELTS ARE HOT VULCANISED FOR SUPERIOR SPLICE STRENGTH.

ZIP CLIP® MECHANICALLY FASTENED SPLICE

- **Easy-to-fit** – we supply you with replacement conveyor belts with mechanically prepared ends: ready for mounting and joining with our push - in or screw - in pin system, with minimum machine dismantling required.
- **User friendly** – fitting instructions are included and no previous vulcanising experience is required, but we can provide training.
- **Do it yourself** – start fitting a ZIP CLIP® belt as soon as a breakdown occurs. No specialist tools or knowledge is required and once fitted the ZIP CLIP® belt is ready to run. This can be achieved in as little as one hour.
- **No power, no problem** – mechanically fastened splices, joined with our push-in pin system, are carried out without power tools, unlike some mechanical systems.
- **No curing time** – the conveyor belt can be run immediately on completion of a mechanically fastened splice.
- **Less Spillage** – screw In fasteners have a PU seal which reduces fines dropping through splice.
- Due to the recessed clips, SM ZIP CLIP® belts are **friendly towards PU belt cleaners.**
- Unlike some other mechanical fastners, ZIP CLIP® **is suitable for use with overband magnets.**

DON'T WAIT FOR A SPLICE CREW

Get up and running again fast in an emergency breakdown.

ZIP CLIP® is supplied ready-to-fit with no training required. We recommend having a ZIP CLIP® belt in stock next to your most critical conveyor to help maximise uptime. ZIP CLIP® can be fitted within 30 mins - 1 hour and is immediately ready-to-run.

For more information on ZIP CLIP® see page 31.

02 *CONVEYOR BELT PRODUCTS*

All Smiley Monroe Conveyor Belts aremanufactured to DIN Standard 22102 across our three global production centres. With 45 years' under our belt, we produce over 600 km of Endless Conveyor Belt every year, exporting to 60 countries around the world.

SMILEY MONROE EP MULTI-PLY CONVEYOR BELTS

Smiley Monroe EP Multi-ply Fabric conveyor belts are recommended for carrying large lumps & abrasive materials under extreme conditions.

As an approved supplier to worldclass customers, you are assured of the highest quality products and service. We monitor all stages of our entire process with uncompromising quality assurance, from inquiry right through to delivery, in accordance with the stringent ISO 9001 guidelines.

Designed to handle the toughest conveying applications, Smiley Monroe's EP Multiply Fabric conveyor belts fulfill the highest national and international standards for tensile strength and wear resistance - DIN 22102, ISO 10247 and BS 490.

INDUSTRIES

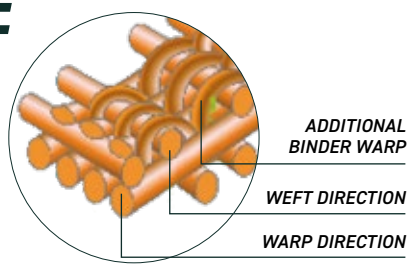
- Quarrying
- Construction & Demolition
- Recycling
- Environmental
- Road Construction
- Agriculture
- Washing Systems
- Conveyor Fabrication
- Port Material Handling
- Mining

ADVANTAGES OF EP MULTI-PLY FABRIC

- 2 ply to 5 ply polyester/nylon (EP) Multi-ply fabric carcass conveyor belts.
- Manufactured to DIN 22102 and covered by a 12 month warranty.
- Excellent cut, impact and wear resistant covers.
- Large stocks of various widths (up to 2600mm), tensile strengths and covers - from heavy duty primary to light duty applications.
- Routinely quality tested in our in-house belt testing lab.
- Expertise in serving OEMs, resellers and end users.
- ISO 9001: 2008 OHSAS 18001: 2007.

Tensile Strength (N/mm)	Ply	Top/Bottom Cover (mm)	Max Working Tension (N/mm)	Approx Belt Thickness (mm)	Weight per m^2 (kg)	Belt Width (mm)
EP400	3	3 + 1.5	40	7.5	9.63	500, 650, 750, 800, 830, 900, 1000, 1050 & 1200
EP400	3	4 + 2	40	9	11.34	400, 450. 500, 600, 650, 750, 800, 900, 1000, 1050, 1200, 1400, 1500, 1800 & 2000
EP500	3	5 + 1.5	50	9.8	12.21	500, 600, 650, 750, 800, 900, 1000, 1050, 1200, 1400, 1500, 1600 & 1800
EP500	3	8 + 2	50	14	16.2	800, 900, 1000 & 1100
EP630	4	6 + 2	63	12.4	15.52	600, 750, 800, 900, 1000, 1050, 1200, 1300, 1400, 1600, 2200, 2400, 2600
EP800	5	8 + 2	80	15.5	19.4	1050, 1200, 1500 & 1600

SMILEY MONROE TOUGH FLEX® *BELT FOR THE HARD HITS*



ToughFlex® conveyor belts have been designed to handle the toughest conveying applications.

TOUGH FLEX® belts are constructed with a special weave of 2 fabric plies and an additional binder warp. The plies are reinforced to resist puncturing and are protected with heavy duty, wear resistant top and bottom covers. This 2 ply construction, enables TOUGH FLEX® to perform well on small to medium sized pulleys.

TOUGH FLEX® can be easily hot spliced (vulcanised) or supplied as a ZIP CLIP® replacement belt to offer the perfect all-round solution for extreme conveying.

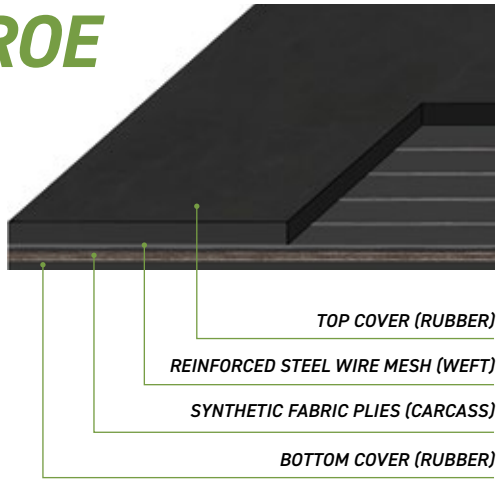
WHY TOUGH FLEX®?

- Superior cut, impact and wear resistant covers
- Reinforced fabric plies to resist puncturing
- Performs well on small to medium sized pulleys
- Excellent troughability
- Longer lifespan - TOUGH FLEX® outlasts Multi-ply belts
- Perfect all-round solution for extreme conveying

TOUGH FLEX® CONSTRUCTION

BELT TYPE	Tentile Strength (N/mm)	Ply	Top / Bottom Cover (mm)	Max Working Tension (N/mm)	Approx Belt Thickness (mm)	Weight per m^2 (kg)	Belt Width (mm)
TOUGH FLEX® A120	EPP630	2	9 + 3	63	16.5	18.82	900, 1000, 1050, 1100, 1200, 1300, 1400, 1500

SMILEY MONROE RIPSTOP



Constructed with synthetic fabric plies and an additional reinforced steel wire mesh for excellent rip and puncture resistance, Ripstop conveyor belts are ideal for handling the harshest Construction and Demolition materials in some of the most demanding crusher applications.

WHY RIPSTOP?

- Reinforced steel wire mesh for excellent rip and puncture resistance
- Longer lifespan - outlasts Multi-ply belts
- Ideal for Construction and Demolition (C&D) waste materials e.g. rebar and concrete
- Suitable for use on machines fitted with overband magnets
- Can be hot spliced (vulcanised) or mechanically fastened

APPLICATIONS

- **Construction and Demolition (C&D) waste**
- **Crusher Collection Belts**

RIPSTOP CONSTRUCTION

Tentile Strength (N/mm)	Ply	Top/Bottom Cover (mm)	Max Working Tension (N/mm)	Approx Belt Thickness (mm)	Av. Weight per m² (kg)	Belt Width (mm)
EP400	3 + 1	4 + 2	40	10.1	15.9	800
EP500	3 + 1	8 + 2	50	14.4	19.4	800, 900, 1000, 1200
EP630	4 + 1	6 + 2	63	13.7	20.1	1400

SMILEY MONROE FABRIC BREAKER

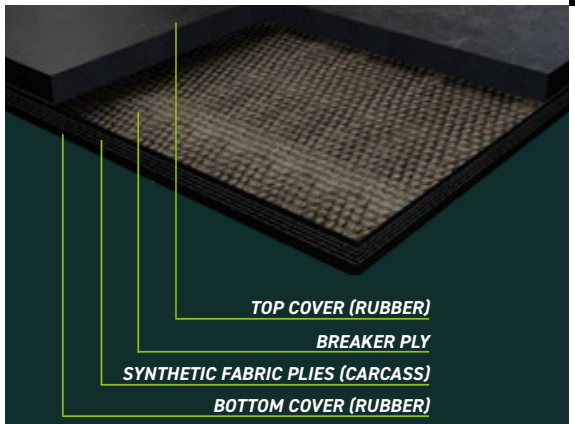
Constructed with synthetic fabric plies, an additional fabric breaker ply and a heavy duty top cover, Fabric Breaker conveyor belts are a good all-rounder for crushing and screening.

WHY FABRIC BREAKER?

- Breaker ply protects the belt carcass
- Heavy duty rubber top cover
- Longer lifespan - outlast Multi-ply belts
- Can be easily hot spliced (vulcanised)

APPLICATIONS

- **Cone Crusher Collection Belts**
- **Primary Screen feed conveyors/hoppers**



SMILEY MONROE FABRIC BREAKER IS RECOMMENDED FOR CARRYING LARGE LUMPS AND ABRASIVE MATERIALS

FABRIC BREAKER CONSTRUCTION

Tentile Strength (N/mm)	Ply	Top/Bottom Cover (mm)	Max Working Tension (N/mm)	Approx Belt Thickness (mm)	Weight per m² (kg)	Belt Widths (mm)
EP500	3 + 1	8 + 2	50	14	18	900, 1000, 1050, 1200
EP500	4 + 1	10 + 3	50	17.8	21.96	1200, 1300, 1500

CONVEYOR BELT COMPARISON CHARTS

	ToughFlex®	Ripstop	Fabric Breaker
Wear Resistance	Excellent	Good	Good
Impact Resistance	Excellent	Good	Good
Rip Resistance	Excellent	Excellent	Good
Puncture Resistance	Excellent	Good	Good
Cut Resistance	Excellent	Good	Good
Small Pulley Diameters	Excellent	Good	Good
Troughability	Excellent	Good	Good

SMILEY MONROE CLEATED CONVEYOR BELTS

Smiley Monroe's Endless conveyor belts can be further customised with features such as siderails and cross-cleats, hot moulded to the conveyor belt's carrying surface to ensure long product life.

We manufacture in-house from our stock range of siderails and cross-cleats or design a custom solution to suit your specific applications.

Smiley Monroe's Product Support & Development team works closely with our customers in the early stages of their product design process to ensure optimum conveyor performance.

Belt customisation options can reduce material spillage and rollback in inclined conveying.

WHY CUSTOM BELTS?

- **Manufactured to DIN 22102 - routinely tested in our fully equipped in-house Belt Testing Lab**
- **Custom made to your exact requirements**
- **Hot moulded for long product life - even on smaller diameter pulleys**
- **Branded with a unique quality identification number for full traceability**
- **TOUGH FLEX®, Fabric Breaker and Ripstop base belt options for your toughest conveying applications**
- **Stock Siderail heights: 15mm or 25mm**
- **Stock Cross-cleat thicknesses: 10mm,15mm, 20mm**

DID YOU KNOW SMILEY MONROE OFFER A FAST PROTOTYPING SERVICE?

APPLICATIONS

- **Crushing, Screening & Recycling**
- **Demolition & Road Construction**
- **Environmental**
- **Bulk Material Handling**

Our experts work closely with our customers from the early stages of product design to deliver innovative conveying solutions for any application. Speak to our Sales or Product Support team to discuss which Cleated Belt would be right for your application.

SPECIALISED CONVERYOR BELTS FOR EXCEPTIONAL APPLICATIONS

HEAT RESISTANT

Heat Resistant belts are required for the transportation of hot abrasive materials such as blast furnace clinker, coke, foundry sand, ore, slag etc. For materials above 70°C please get in touch with the Smiley Monroe team to discuss heat resistant options.

COLD & FROST RESISTANT

REQUIRED FOR ANYTHING - 30°C
When operating in adverse weather, conveyor belts that are cold resistant have a much longer operational lifespan. Low temperatures can do serious damage to the actual conveyor belt carcass itself. Choosing the correct thickness of the cover is essential because the cover acts as a barrier between the cold source and the carcass.

FLAME PROOF

This type of belt should be used when handling combustible materials which could spark to cause a fire or where a fire could have serious Health & Safety implications or risk the destruction of expensive equipment e.g. underground or sawdust/biomass storage shed.

OIL & FAT RESISTANT

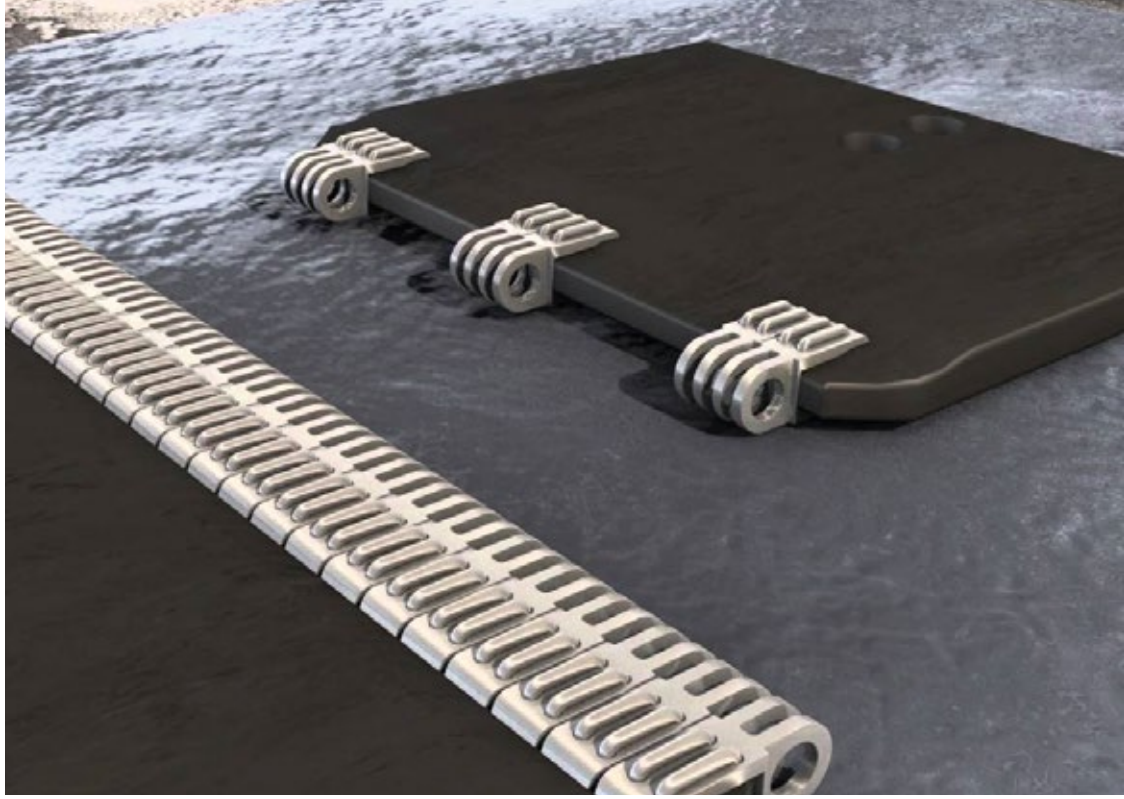
Oil and fat can have a detrimental effect on the performance and lifespan of a conveyor belt. The oil can penetrate into the rubber, causing it to warp and distort, resulting in serious operational problems. Where oil and fat are present within the application, an oil and fat resistant belt should be specified. This belt type is typically used within industries manufacturing and handling grain, fertilisers, fodder mixtures, wood, food and some recycling plants. Belts which are resistant to both heat and oil are also available.

ZIP CLIP®
WORLD'S FASTEST REPLACEMENT BELT

Our mechanically fastened replacement conveyor belt, ZIP CLIP®. With an easy-to-fit push-in connecting pin, ZIP CLIP® belts are a fast, safe and secure installation method which we developed specifically for the aftermarket. This can be kept as a replacement belt next to your most critical conveyor or specified to a machine operating in a remote location where it would be impossible for a vulcanising team to attend in the event of a breakdown.

Once fitted and tensioned, ZIP CLIP® belts can be run immediately. Even environmental conditions, such as high humidity, dust, sand or extreme cold will not adversely affect installation.

ZIP CLIP® is available as both a Push In Pin or Screw In Pin option. Please discuss options with your Smiley Monroe sales team.



WHY ZIP CLIP®?

- **Belt can be run immediately - maximising uptime**
- **Factory-made recessed splice is friendly towards belt cleaners (PU blades) and feed boot skirting (rubber & PU)**
- **Corrosion & wear resistant - stainless chromium-steel staples and stainless chromium-nickel armoured Connecting Pin designed for maximum wear resistance**
- **Factory manufactured using hydraulic equipment ensures consistently high quality splice for longer life**
- **Superior splice strength and belt straightness compared to hammer-in rivet hinge fasteners**

APPLICATIONS

- **Mobile Crushing & Screening**
- **Recycling & Demolition**
- **Washing**
- **Environmental**
- **Bulk Material Handling**
- **Road Construction**
- **Screening**

ZIP CLIP
BELT BY SMILEY MONROE

INSTRUCTIONS

No special training or specialised equipment required - Fitting Instructions shipped with every ZIP CLIP® belt.

03 *CONVEYOR BELT SCIENCE*

Ready to start building a conveyor? In this section you will find all you need to select the correct conveyor belt for your application and then design a conveyor accordingly. We've broken down the design process into stages and supplied you with everything you need to design a conveyor step by step.

If you need any extra advice, our Product Support Team is always on hand to answer your questions.

BELT SELECTION

TABLE 1: SELECTING THE MINIMUM BELT WIDTH (MM)

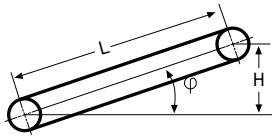
Material	Belt Width (mm)										
	400	500	650	800	1000	1200	1400	1600	1800	2000	2200
Sorted, max. length	50	75	125	175	250	350	400	450	550	600	600
Unsorted, max. edge length	100	150	200	300	400	500	600	650	700	750	750

TABLE 2: SELECTING THE MAXIMUM BELT SPEED V (M/S)

Material	Belt Width (mm)										
	400	500	650	800	1000	1200	1400	1600	1800	2000	2200
Ligtht, fine grained	2.5	3.15	3.15	3.55	4.0	4.0	4.0	4.0	4.5	4.5	4.5
Moderate, abrasive	1.6	2.0	2.5	2.5	3.15	3.15	3.15	3.55	3.55	3.55	3.55
Heavy, very abrasive	1.25	1.6	1.8	1.8	2.24	2.24	2.24	2.5	2.5	2.5	2.5

TABLE 3: CAPACITY FACTOR

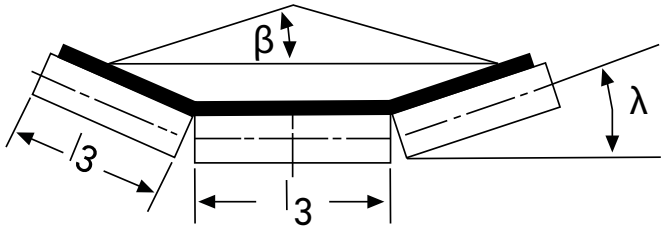
FIG. 15



(φ°)	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
H L	0.03	0.07	0.10	0.14	0.17	0.21	0.24	0.28	0.31	0.34	0.37	0.41	0.44	0.47	0.50
k	1	0.99	0.98	0.97	0.95	0.93	0.91	0.89	0.85	0.81	0.76	0.71	0.66	0.61	0.56

TABLE 4: THERORETICAL CAPACITY Q'T (M³/H) 3 - ROLLER TROUGH SET AT V = 1 M/S

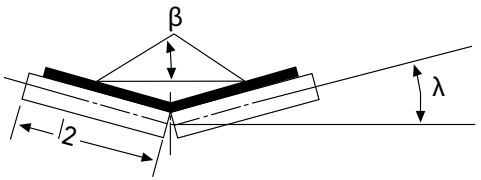
FIG. 16



B (mm) Length	13 (mm) roller	Roller set trough angle											
		20		25		30		35		40		45	
		Material angle of repose () normally 15, for dry powdery material use 10											
		10	15	10	15	10	15	10	15	10	15	10	15
400	160	36	43										
500	200	60	73	67	79								
650	250	110	132	123	145	134	155	145	164	153	171	160	176
800	315	172	207	193	226	211	243	227	257	240	268	250	276
1000	380	281	337	315	369	345	396	371	419	391	437	407	449
1200	465	412	493	461	540	505	581	543	614	573	640	597	658
1400	530	573	685	642	750	703	807	755	803	797	888	829	913
1600	600	758	907	851	993	932	1068	1000	1128	1056	1075	1097	1208
1800	670	970	1160	1088	1270	1196	1365	1279	1443	1350	1502	1402	1544
2000	750	1204	1435	1351	1577	1479	1695	1588	1791	1676	1865	1742	1917
2200	800	1476	1740	1656	1930	1813	2074	1946	2191	2052	2281	2131	2342

TABLE 5: THERORETICAL CAPACITY Q'T (M³/H) 3 V = 1 M/S TWO ROLL SET

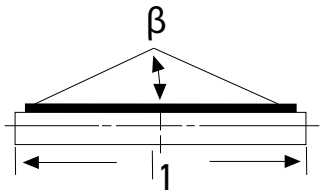
FIG. 17



Two - sectioned carrying rollers								
B (mm)	l_2 (mm)	λ°	15°		20°		25°	
		ß°	10°	15°	10°	15°	10°	15°
300	200		18	21	21	24	23	26
400	250		30	43	41	48	46	52
500	300		60	72	69	80	76	87
650	375		107	129	123	144	136	155
800	465		168	202	193	225	213	244
1000	600		270	325	310	363	344	392

TABLE 6: THERORETICAL CAPACITY Q'T (M³/H) 3 V = 1 M/S FLAT ROLLER

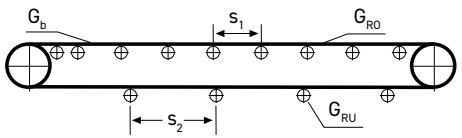
FIG. 18



Flat carrying rollers							
B (mm)	l (mm)	ß =10 °	ß =15 °	B (mm)	l_1 (mm)	ß =10 °	ß =15 °
300	400	8	12	1200	1400	168	256
400	500	15	23	1400	1600	232	353
500	600	25	39	1600	1800	307	466
650	750	45	69	1800	2000	391	594
800	950	71	108	2000	2200	406	739
1000	1150	115	174	2200	2400	591	898

TABLE 7: WEIGHT OF MOVING PARTS G (KG/M)

FIG. 19



$$G\ (kg/m) = 2G_b + \frac{G_{RO}}{S_1} + \frac{G_{RU}}{S_2}$$

Where, GB = belt weight (kq/m), GRO = Weight of 3-roll set (kg), GRU = weight of return roller (kg)

S1 (mm)	S2 (mm)	Conveyor type	Belt Width (mm)										
			400	500	650	800	1000	1200	1400	1600	1800	2000	2200
1.0	2.0	γ <1.5	11	13	17	28	37	52	69	82	108	128	145
		γ >1.5	15	20	28	43	57	77	100	120	143	164	186
1.25	2.5	γ <1.5	10	12	15	25	33	48	62	75	96	115	131
		γ >1.5	14	18	25	39	52	71	90	109	131	148	169
1.5	3.0	γ <1.5	10	11	14	23	31	45	58	70	89	107	121
		γ >1.5	13	17	23	36	48	67	84	102	122	138	156
Trough Roller Set Type (2, 3 or 5 roll)			2 or 3	2 or 3	2 or 3	3	3	3	3	3 or 5	3 or 5	3 or 5	3 or 5
Light	Roller Ø (mm) GRO = GRU (kg)		51	51	63	89	89	89	108	108	133	133	133
Light	Roller Ø (mm) GRO = GRU (kg)		63	63	89	108	108	108	133	133	159	159	159

In the values for G the recommended values for GRO and GRU are used. If one or more of these factors included in G be determined in the dimensioning phase they should be used when calculating the G-value.

TABLE 8: ADDITION I (M) FOR CENTRE DISTANCE L (M)

L (m)	<30	<80	<100	>100
I (m)	50	70	80	100

The centre distance L is increased by I to include the resistances caused by the bending of belt over pulleys, friction and inertia torque at loading and the belt cleaners.

TABLE 9: COEFFICIENT OF FRICTION OF ROLLING PARTS F (-)

Excellent conditions with free moving rollers and minimum friction in material	0.017
Standard value for normal conditions	0.020
Unfavourable operating conditions, dusty environment and periodic overload	0.023 - 0.030
Descending conveyor with brake motor	0.012

The standard value f = 0.020 is increased at the following conditions:

- **High internal friction in material**
- **Trough angles > 30°**
- **Carrying rollers < 108 mm**
- **Belt speed > 5 m/s**
- **Temperature < 20°C**
- **Lower belt tension**
- **Flexible belts and high cover thicknesses**

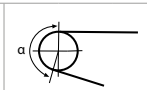
TABLE 10: ADDITIONAL POWER REQUIRED

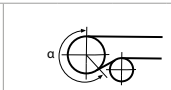
Additional Power Per	Belt width (mm)	At 1 m/s	N4 (kW)
Material discharged by means of tripper or plough	≤500	0.8 kW	0.08 x v
	≤1000	1.5 kW	1.5 x v
	>1000	2.2 kW	2.2 x v
Length of rubber skirting in contact with belt		0.08 kW	0.08 x v x length

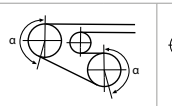
The values are recommendations and may be increased with extraordinary running conditions.

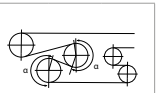
TABLE 11: DRIVE FACTOR M

$$m = 1 + \frac{1}{e^{\mu\alpha} - 1}$$









Drive Pulley		μ	Arc of contact α (°)												
			120	150	180	210	220	230	240	360	380	400	420	440	450
Lagged	Dry	0.40	1.76	1.54	1.40	1.30	1.27	1.25	1.23	1.09	1.08	1.07	1.06	1.05	1.04
	Humid	0.35	1.92	1.67	1.50	1.39	1.35	1.33	1.30	1.12	1.11	1.10	1.08	1.07	1.07
Bare	Dry	0.35	1.92	1.67	1.50	1.39	1.35	1.33	1.30	1.12	1.11	1.10	1.08	1.07	1.07
	Humid	0.20	2.92	2.45	2.14	1.93	1.87	1.81	1.76	1.40	1.36	1.33	1.30	1.27	1.20

The values m in the table are valid for automatic take-up (e.g. gravity take-up).
For screw take-up from = 120° to = 220° the values are multiplied by 1.20.

For belts with non-rubberised running side, see calculation of belts for conveyors with sliding plate.

TABLE 12: TOP COVER THICKNESS SELECTION GUIDE {WHERE V = BELT SPEED (M/S AND L = CONVEYOR CENTRE DISTANCE (M)}

30 x v / L / v = m/s / L = centre distance m	Slightly Abrasive		Moderately Abrasive				Very Abrasive				Extremely Abrasive			
	Particle Size (mm)		Particle Size (mm)				Particle Size (mm)				Particle Size (mm)			
	to 10	10 to 50	to 10	10 to 50	50 to 200	200 and over	to 10	10 to 50	50 to 200	200 and over	to 10	10 to 50	50 to 200	200 and over
0.25	3	3	3	3	4	5	3	3	4	5	3	3	5	7
0.33	3	3	3	3	4	5	3	3	4	5	3	3	5	7
0.50	3	3	3	3	4	5	3	3	4	5	3	3	5	8
0.67	3	3	3	3	4	5	3	3	5	6	3	3	5	8
1.00	3	3	3	3	4	5	3	3	5	7	3	4	7	8
1.25	3	3	3	3	4	6	3	3	5	8	3	5	8	8
1.67	3	3	3	3	5	6	3	4	7	8	3	6	8	8
2.50	3	3	3	3	6	8	4	7	8	8	5	8	8	8
5.00	3	5	5	6	8	8	6	7	8	8	8	8	8	8

Type of material, lump size, height of fall and variation of speed between belt and material are influencing the wear of the cover decisively. The table gives a guide for determination of cover thickness on carrying side for wear resistant belts. Although the cover thicknesses are sometimes identical, the same wear resistance cannot be expected. Cover thicknesses for special belts, for instance heat resistant belts, are determined according to the indications in each single belt programme.

TABLE 13: BOTTOM COVER RUBBER SELECTION GUIDE

Material Properties	Cover Thickness, Running Side (mm)
Slightly abrasive materials	1
Moderately to very abrasive materials	1 - 1.5
Very abrasive and coarse grained materals	1.5 - 2

The cover thicknesses on the running side must be in harmony with the chosen thickness on the carrying side. The belt programme indicates recommended cover combinations.

TABLE 14: SPECIAL COVER TYPE GUIDE

	Flameproof		Oil Resistant		Heat Resistant	
Application	Normal	Oil	Medium	Full	<150	<200
Wear resistance	◊ ◊	◊	◊	◊	◊ ◊	◊ ◊
Cut resistance	◊ ◊	◊ ◊	◊ ◊	◊ ◊	◊ ◊	◊ ◊
Fire resistance	◊ ◊ ◊ ◊	◊ ◊ ◊ ◊	x	x	x	x
Vegetable oil	x	◊ ◊ ◊ ◊	◊ ◊ ◊ ◊	◊ ◊ ◊ ◊	x	x
Mineral oil	x	◊ ◊ ◊ ◊	◊ ◊	◊ ◊ ◊ ◊	x	x
Heat	◊ ◊	◊ ◊	◊ ◊	◊ ◊	◊ ◊ ◊	◊ ◊ ◊ ◊
Conductivity	◊ ◊ ◊ ◊	◊ ◊ ◊ ◊	◊ ◊ ◊ ◊	◊ ◊ ◊ ◊	◊ ◊ ◊ ◊	◊ ◊ ◊ ◊

KEY

x Not Suitable | ◊ Fair | ◊ ◊ Good | ◊ ◊ ◊ Very Good | ◊ ◊ ◊ ◊ Excellent

TABLE 15: BELT WEIGHT AND THICKNESS

Multi-ply Belts									
Fabric types	EP100	EP125	EP160	EP200	EP250	EP315	EP400	EP500	EP630
Approx. weight/ply kg/m²	1.35	1.50	1.60	1.70	1.90	2.00	2.50	2.80	3.50
Approx. thickness/ ply (mm)	0.9	1.0	1.2	1.3	1.4	1.6	1.8	2.2	2.6

POWER: CALCULATION FORMULAE

FORMULA 1 — THEORETICAL TONNAGE Q (t/h)

Theoretical capacity (t/h) Q = Qt x γ

Theoretical capacity (m^3/h) Qt = Q't x v x k

Theoretical capacity at 1 m/s (m^3/h) Q't = $\frac{Q_2}{v \times k \times \gamma}$

Where k = capacity factor

Q_2 = required capacity in t/h

FORMULA 2 — POWER REQUIRED TO DRIVE THE CONVEYOR EMPTY N1 (kW)

$$N_1 = \frac{G\,(L + l)f \times v}{102}$$

Where G = weight of moving parts (kg/m)
L = conveyor centre distance (m)
l = additional conveyor resistance (m)
f = coefficient of friction of moving parts
s1 = troughing roller centre distance (m)
s2 = return roller centre distance (m)

FORMULA 3 — POWER REQUIRED TO DRIVE THE CONVEYOR EMPTY N2 (kW)

$$N_2 = \frac{Q\,(L + l)f}{367}$$

Where Q = theoretical capacity (t/h)
L = conveyor centre distance (m)
l = additional conveyor resistance (m)
f = coefficient of friction of moving parts

FORMULA 4 — POWER REQUIRED TO ELEVATE MATERIAL N3 (kW)

$$N_3 = \frac{Q \times H}{367}$$

Where Q = theoretical capacity (t/h)
H = vertical lifting or falling height (m)

FORMULA 5 — ADDITIONAL POWER REQUIREMENT N4 (kW)

(Refer to table 10)

FORMULA 6 — THEORETICAL REQUIRED MOTOR CAPACITY Nn (kW)

Theoretical Motor capacity (kW) $N_n = N_1 + N_2 + N_3 + N_4$

Where N_1 = power to drive the empty conveyor (kW)
N_2 = power required to convey material on the level (kW)
N_3 = power required to elevate material (kW)
N_4 = additional power requirements e.g. skirting (kW)

FORMULA 7 — MOTOR CAPACITY N (kW)

Motor Capacity (kW) $N_m = \frac{N_n}{\eta}$

Where η = Drive efficiency

SMILEY MONROE TENSILE STRENGTH RECOMMENDATIONS*

Jaw		
	Main	Dirt
Heavy	EPP630/2 9+3 ToughFlex®	EP500/3 5+1.5
Light	EP500/3 5+1.5	EP400/3 3+1.5

Cone				
	Feed	Dirt	Prescreen	Main
Heavy	EP800/5 8+2	EP400/3 4+2	EP500/3 5+1.5	EP500/3 5+1.5
Light	EP400/3 4+2	EP400/3 3+1.5	EP400/3 4+2	EP400/3 4+2

Impactor				
	Main	Transfer	Recirc	Fines
Heavy	EPP630/2 9+3 ToughFlex®	EP500/3 5+1.5	EP400/3 3+1.5	EP500/3 5+1.5
Light	EP500/3 8+2 RIPSTOP	EP400/3 3+1.5	EP315/3 3+1.5 SIDE RAIL CHEV	EP400/3 3+1.5

Screener			
	Feed	Wing	Discharge
Heavy	EPP630/2 9+3 ToughFlex®	EP500/3 5+1.5	EP500/3 5+1.5
Light	EP400/3 4+2	EP400/3 3+1.5	EP400/3 3+1.5

Stockpiler		
	Feed	Main
Heavy	EP630/4 6+2	EP630/4 6+2
Light	EP400/3 4+2	EP400/3 4+2

Shredder		
	Feed	Main
Heavy	EP1050/3 9.5+2.5	EP500/3 5+1.5
Light	EP500/3 5+1.5	EP385/2 5+1.5 15MM CHEV

Trommel		
	Feed	Main
Heavy	EP630/4 6+2	EP500/3 5+1.5
Light	EP500/3 5+1.5	EP400/3 3+1.5

Washing			
	Feed	Main	Wing
Heavy	EP630/4 6+2	EP500/3 5+1.5	EP400/3 3+1.5
Light	EP500/3 5+1.5	EP400/3 3+1.5	EP250/2 3+1.5

*These tables provide a guide to maximum and minimum belt specifications based on your machine type and application - however there are numerous belt specification options in between. Below is a list of our most popular belt specifications from heaviest to lightest. Based on your knowledge of the machine application you can choose any specification between your recommended heaviest and lightest belt. More information on each specification can be found on the next page. If you would like further help and advice please contact our Product Support Team or your Sales Representative.

EP800/5 8mm + 2mm
ToughFlex® A120 EPP630/2 9mm + 3mm
EP630/4 6mm + 2mm
Ripstop EP500/3+1 8mm + 2mm
Fabric Breaker EP500/4+1 10mm + 3mm
EP500/3 8mm + 2mm
EP500/3 5mm + 1.5mm
EP400/3 4mm + 2mm
EP400/3 3mm + 1.5mm
EP385/2 5mm + 1.5mm
EP315/3 3mm + 1.5mm
EP250/2 3mm + 1.5mm

04 *CONVEYOR BELT GENERAL INFORMATION*

We've listed opposite our most popular conveyor belt options. Within this range you should find a belt suitable for your mobile applications. You can speak with our Product Support Team if your requirement falls outside of these specifications.

BELT WEIGHTS

TABLE 16: BELT WEIGHTS (KG/M)

Belt Specification	Belt Width (mm)																					
	400	450	500	600	650	750	800	830	900	1000	1050	1100	1200	1300	1400	1500	1600	1800	2000	2200	2400	2600
EP400/3 3+1.5			4.82		6.26	7.22	7.7	7.99	8.67	9.63	10.11		11.56									
EP400/3 4+2	4.54	5.10	5.67	6.8	7.37	8.51	9.07		10.21	11.34	11.91		13.61		15.88	17.01		20.41	22.68			
EP500/3 5+1.5			6.11	7.33	7.94	9.16	9.77		10.99	12.21	12.82		14.65		17.09	18.32	19.54	21.98				
EP500/3 8+2							12.96		14.58	16.2		17.82										
EP630/4 6+2				9.31		11.64	12.42		13.97	15.52	16.3		18.62	20.18	21.73		24.83			34.14	37.25	40.36
EP800/5 8+2											20.37		23.28			29.1	31.04					
Fabric Breaker EP500/4+1 10+3													26.35	28.55		32.94						
Ripstop EP500/ 3+1 8+2									17.46	19.4			23.28									
ToughFlex® EPP630/2 9+3									16.94	18.82	19.76	20.70	22.59	24.47	26.35	28.23						

All weights in kilograms per linear metre and based on standard wear resistant belting.

BELT THICKNESSES

TABLE 17: BELT THICKNESSES (MM)

Belt Specification	Carcass Thickness	Cover Thickness	Total Belt Thickness
EP400/3 3+1.5	3	4.5	7.5
EP400/3 4+2	3	6	9
EP500/3 5+1.5	3.3	6.5	9.8
EP500/3 8+2	4	10	14
EP630/4 6+2	4.4	8	12.4
EP800/5 8+2	5.5	10	15.5
Fabric Breaker EP500/4+1 10 + 3	4.8	13	17.8
Ripstop EP500/3+1 8 + 2	4.4	10	14.4
ToughFlex® A120 EPP630/2 9 + 3	4.5	12	16.5

05 *CONVEYOR BELT HANDY CALCULATIONS*

We've listed some handy conveyor belt calculations which could help speed up your day.

CALCULATING THE LENGTH OF BELT IN A BELT ROLL

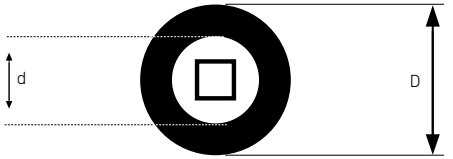
This formula will calculate the length of a belt stored in a belt roll

$$L\,(m) = \frac{(D^2 - d^2)\ 0.785}{Tb}$$

Where D = Outside diameter of the roll of belt (m) d = Inner core diameter (m) Tb = belt thickness (m)

Example:
D = 1.1m, d = 0.3m and Tb = 0.0105m (10.5mm)
Length of belt in roll = 83m

FIG. 20



Where D = Outside diameter of roll of belt (m) d = Inner core diameter (m) Tb = Belt thickness (m)

CALCULATING THE WEIGHT OF A ROLL OF BELT

Roll weight (kg) = Belt weight (kg/m²) x Belt width (m) x Belt Length

CONVERTING BELT TENSILE STRENGTH FROM METRIC TO IMPERIAL

$$PIW = \frac{(N/mm)\ x\ 5.72}{S.F}$$

PIW = Imperial Rating
N/mm² = Metric Tensile Strength
5.72 = Imperial to Metric Conversion
S.F. = Safety Factor (10.1)

CONVERTING BELT WEIGHT FROM METRIC TO IMPERIAL

lb/yd² = 1.84334529 x kg/m²

ENDLESS BELT LENGTH CALCULATOR

(Drum centres mm x2) + (tail drum mm ÷ 3.14) + (head drum mm ÷2 x 3.14) ÷ 1000) = Endless belt length in metres

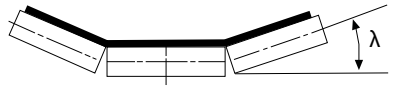
06 *CONVEYOR BELT DESIGN CRITERIA*

There's lots of data to consider when designing a conveyor. We've provided the key calculations here to help you on your way.

MAXIMUM TROUGH ANGLE

TABLE 18: MAXIMUM TROUGH ANGLE (0)

FIG. 21



Belt Specification	Belt width (mm)								
	300	400	500	650	800	1000	1200	1400	1600
EP400/3		45	45	45	45	45	45		
EP500/3		30	45	45	45	45	45	45	
EP630/4			30	45	45	45	45	45	45
EP800/5			30	45	45	45	45	45	45
Fabric Breaker EP500/4+1		30	45	45	45	45	45	45	
Ripstop EP500/3+1		30	45	45	45	45	45	45	
ToughFlex® EPP630/2			30	45	45	45	45	45	45

MINIMUM PULLEY DIAMETERS

TABLE 19: MINIMUM PULLEY DIAMETERS

Belt Specification	Tension								
	>60%			30 - 60%			<30%		
	D1	D2	D3	D1	D2	D3	D1	D2	D3
EP400/3	315	250	200	250	200	160	200	160	160
EP500/3	400	315	250	315	250	200	250	200	160
EP630/4	500	400	315	400	315	250	315	250	200
EP800/5	630	500	400	500	400	315	400	315	250
Fabric Breaker EP500/4+1	400	315	250	315	250	200	250	200	200
Ripstop EP500/3+1	400	315	250	315	250	200	250	200	160
ToughFlex® EPP630/2	500	400	315	400	315	250	315	250	200

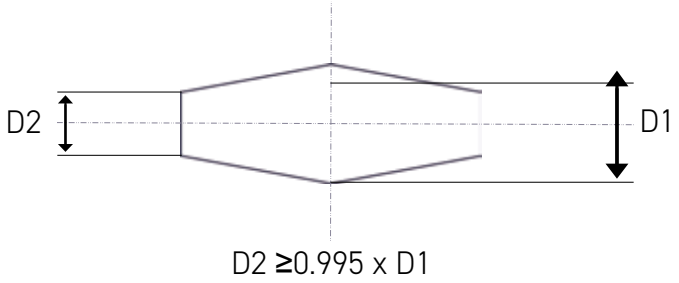
D1: Drive and high tension pulleys **D2:** Tail pulleys
D3: Snub or bend pulleys where the change of direction does not exceed 30 degrees

NOTE: **Belts with chevron cleats may alter the minimum pulley diameter - see chevron profile designs section and follow the greater dimension**

CROWNING OF DRUMS

TABLE 20: MAXIMUM PERMISSABLE CROWN (MINIMUM DIAMETER OF D2)

FIG. 22

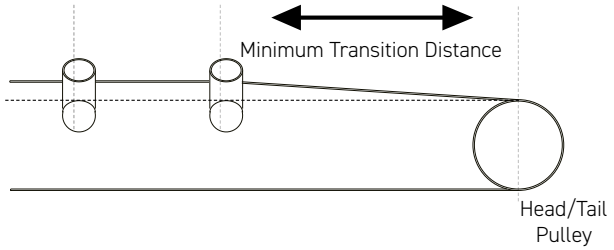


D1 Drum diameter (mm)	D2 Drum diameter (mm) minimum c.t.c
125	124.38
160	159.20
200	199.00
250	248.75
315	313.43
400	398.00
500	497.50
630	626.85
800	796.00
1000	995.00
1250	1243.75
1600	1592.00

CONVEYOR MINIMUM TRANSITION DISTANCES

TABLE 21: MINIMUM TRANSITION DISTANCES

FIG. 23



% of rated tension	Trough Angle (°)		
	30°	35°	45°
> 90%	1.5 x belt width B (mm)	1.9 x belt width B (mm)	2.8 x belt width B (mm)
60 - 90%	1.3 x belt width B (mm)	1.5 x belt width B (mm)	2.2 x belt width B (mm)
<60%	1.0 x belt width B (mm)	1.2 x belt width B (mm)	1.7 x belt width B (mm)

The minimum transition distance can be reduced by raising the height of the top of the drum above the height of the top of the centre trough rollers (see dotted line above).

THESE ARE THE MINIMUM TRANSITION DISTANCES BUT THEY MAY NEED TO BE ADJUSTED. SPEAK TO THE SMILEY MONROE PRODUCT SUPPORT TEAM FOR MORE INFORMATION.

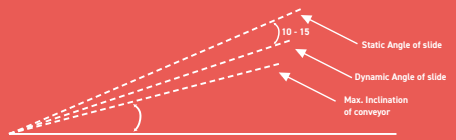
07 *CONVEYED MATERIAL DATA*

The table opposite covers bulk density, static angle of slide as well as max. angle of inclination (°), under which the material can be transported on conveyor belts without cleats.

The angle of inclination is determined by the friction between material and belt, but decisive is the static and dynamic angle of slide of material, which depends on its internal friction.

The max. angle of inclination is lower than the dynamic angle of slide of material, which is rather difficult to determine exactly.

FIG. 24



For most materials it can be said that the dynamic angle of slide is 10-15° lower than the static angle, which is formed horizontally by the material when it falls down shaping a free pile.

Ribs can increase the angle of inclination in case the friction between belt and material is lower than the internal dynamic friction of the material, which determines the max. angle of inclination.

The bulk density, the angle of slide and max.angle of inclination being highly dependent on lump size, content of humidity etc., the values indicated in the table must be considered recommendations.

Material		Bulk Density T/m³	Max. angle of inclination (°)	Max. angle of inclination (°)
Aluminium	oxide	0.8 - 1.0		
	hydrate	0.3	25	
	sulphate	0.86	17	
Asphalt	road	1.3 - 1.4	30	
	solid	1.6		
Barley	dry	0.6 - 0.7	15	25 to 40
Bauxite	natural	1.3 - 1.44	17	31
	dry, fine	1.04 - 1.12	18	35
Beet	unwashed	0.65 - 0.77	12 to 15	35 to 40
	washed	0.5 - 0.6	10 to 12	30 to 45
	mass, wet	0.4 - 0.7	18 to 20	31
	slices		20	35
Briquette	lignite	0.7 - 0.85	18	
	anthracite	0.8 - 1.0	10	
Cement	portland	1.2 - 1.36	20	39
	acerated	0.8 - 1.2	6	
	slurry	1.4 - 1.7	12	
Clay	dry	1.6 - 1.9	20 - 22	35
	dry, lumps 75mm	1.0 - 1.2	18 -20	35
	moist, 50mm	1.52 - 1.6	18	15 to 24
Clinker		1.2 - 1.5	18	33
Coal	ashes, dry	0.5 - 0.7	25	34 to 40
	ashes, wet	0.7 - 0.9	30	50
	anthracite, coarse	0.8 - 0.96	16	27
	bituminous, coarse	0.7 - 0.9	18	38
	lignite	0.72- 0.88	22	38
Coal	fine, crushed	0.7 - 0.8	22	
Cocoa beans		0.53 - 0.6	15	28
Coffee beans	dry	0.35 - 0.42	20	35
	fresh	0.51	10 to 15	25

Material		Bulk Density T/m³	Max. angle of inclination (°)	Static angle of slide (°)
Coke/furnace coke		0.4 - 0.55	20	45
Concrete	lightweight	0.3 - 1.5		
	wet	1.6 - 2.4	25	20 - 30
	dry	2.1 - 2.4		
Copper Ore		1.6 - 2.5	20	
Corn		0.75	10	30
Dolomite stone		1.2 - 1.6	22	40
Earth filling	moist	1.5 - 1.8	22	45
	dry	1.15 - 1.2	20	35
Foundry sand	prepared	1.3 - 1.45	24	32
Foundry sand	knocked out	1.45 - 1.6	22	39
	core stand	1.04	26	41
Glass	crushed	1.3 - 1.6	20	35
	broken	1.1	15	20 - 30
Granite	broken	1.3 - 1.6	18	40
	broken stones	1.4 - 1.8	20	35
	pebble, 10mm	1.28 - 1.44	20	40
Graphite	crushed	1.4		
	flakes	0.65	5	
Gravel	dry	1.44 - 1.76	16	35
	moist	1.84 - 2.1	20	32
	pebble	1.5	20 to 25	35
Gypsum	powder	0.95 - 1.4	20	40
	crushed, 3 - 10mm	1.12 - 1.28	21	40
Iron Ore		1.6 - 3.2	18 - 20	35
Lead	fine	3.2 - 4.3	15	30
	sulphate	1.6	33	45
	oxide	1.0 - 2.4	20	

Material		Bulk Density T/m³	Max. angle of inclination (°)	Static angle of slide (°)
Lime	agricultural	1.1 - 1.2	20	30
	lumps	1.2 - 1.28	18	40 - 45
	burnt, 2mm	1.0	22	
	burnt, 2mm - 22mm	0.96	15	5
Limestone	from quarry	1.35 - 1.45	18	30 - 45
Manganese Ore		2.0 - 2.3	20	39
Marble	crushed	1.3 - 1.6	10 to 15	20 to 30
Marl		1.3 - 1.5	20	35
Mortar	wet	2.4	20 - 22	
Pebble		1.8	15	
Phosphate	fractional	1.2 - 1.4	12 to 15	25 to 30
	pulversied	0.96	13	26
Potassium	from quarry	1.2 - 1.35	12 to 15	
Potatoes		0.7 - 0.8	12 to 15	
Quartz	coarse grained	1.35 - 1.52	18	35
	pulverised	1.3 - 1.45	20	35
Saltpetre		1.1		30 to 45
Sand	fine, dry	1.45 - 1.75	16 to 18	30 - 40
	fine, moist	1.75 - 2.1	20 - 22	45
Sandstone	crushed	1.36 - 1.44	18	40
Saw dust		0.15 - 0.21	22	36
Shingle		1.4 - 1.5	20	35
Slag	coarse, furnace	1.28 - 1.44	16	30
	crushed, dry	0.96 - 1.04	16	30
	crushed, wet	1.44 - 1.6	20 to 22	45
Slate	crushed	1.3 - 1.5	18	
Stone	broken	1.3 - 1.6	18	40
Sulphur	lumps	1.2 - 1.4	18	
	powder	0.8 - 1.0	21	
Woodchips		0.2 - 0.5	22 to 24	30
Zinc	crushed	2.4 - 2.6	22	38

08 *SYMBOLS*

B =	belt width (mm)
C =	factor for sliding belts (-)
D =	roll diameter of belt (m)
D1 =	driving pulley diameter (mm)
D2 =	tail pulley diameter (mm)
D3 =	diameter of snub pulley (mm)
d =	diameter of belt roller drum (m)
e =	2,7183, the base of natural logarithms
f =	coefficient of friction of rolling parts (-)
G =	weight of moving parts of conveyor (kg/m)
G_b =	weight of belt (kg/m)
G_k =	gravity take-up (kg)

G_m =	weight of material, kg per m belt (kg/m)
GRO =	weight of carrying rollers (kg)
GRU =	weight of return rollers (kg)
g =	acceleration due to gravity (m/s²)
H =	Lifting or falling height (m)
H1 =	height from driving pulley to gravity take-up (m)
k =	correction factor (-)
L =	centre distance (m)
L1 =	distance from driving pulley (m)
l1 =	length of rollers, flat rollers (mm)
l2 =	length of rollers, two sectioned rollers (mm)
l3 =	length of rollers, three sectioned rollers (mm)

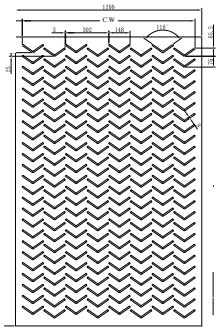
m =	drive factor for sliding belts
N_1 =	power required to drive empty conveyor (kW)
N_2 =	power required to convey material on the level (kW)
N_3 =	power required to elevate or lower material (kW)
N_4 =	additional power requirement (kW)
N_n =	theoretical necessary power requirement (kW)
p =	working tension (N/mm)
p =	effective tension (N)
PRO =	frictional resistances, carrying part on sliding belts (N)
PRU =	frictional resistances, return part on sliding belts (N)
Pst =	lifting or lowering load, sliding belts (N)
PNstop =	braking of material, sliding belts (N)
Q1=	required capacity (m³/h)
Q2 =	required capacity (t/h)
Q't =	theoretical capacity at v =1m/s (m³/h)
Q=	theoretical capacity (t/h)
q =	belt sag between rollers (m)

s1 =	distance between carrying rollers (m)
s2 =	distance between return rollers (m)
T =	belt tension (N)
T1 =	max. belt tension when approaching driving pulley (N)
T2 =	belt tension when leaving driving pulley (N)
T_{min} =	lowest permissible belt tension (N)
td =	thickness of cover (mm)
tb =	thickness of belt (mm)
v =	belt speed (m/s)
vmax =	max. belt speed (m/s)
α	arc of contract on driving pulley (°)
ß	basic angle of load stream cross section (°)
γ	bulk density (t/m³)
η	degree of efficiency of the transmission (-)
μ	coefficient of friction for sliding belts (-)
λ	trough angle, carring rollers (°)
φ	angle of inclination of conveyor (°)

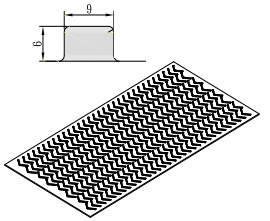
09 *CHEVRON PROFILE DESIGNS*

Chevron cleats prevent roll back of conveyed material however material type and application should be considered when choosing a chevron pattern for your conveyor belt. Our most popular chevron patterns are shown opposite.

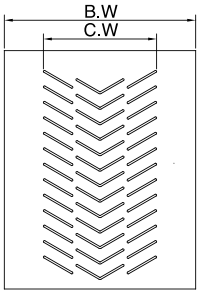
V6



Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
830	EP400/3 3 + 1.5	830	75	6	Standard
1200	EP500/3 3 + 1.5	1200	75	6	Standard
1500	EP400/3 3 +1.5	1500	75	6	Standard

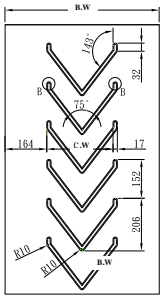


E6P710

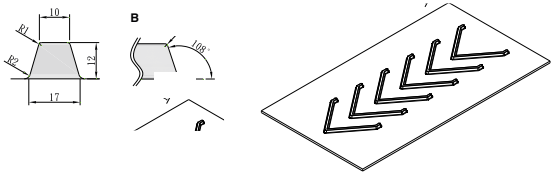


Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
1200	EP500/3 5+1.5	710	97	6	Standard

C12V250



Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
400 & 500	EP315/3 3+1.5	275	150	12	250



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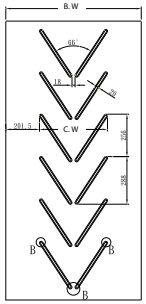
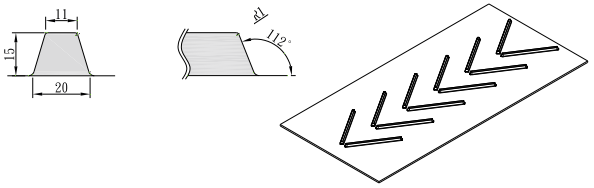


Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
450 - 800	EP315/3 3 +1.5	400	250	15	250



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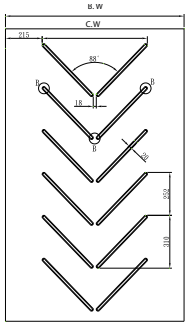
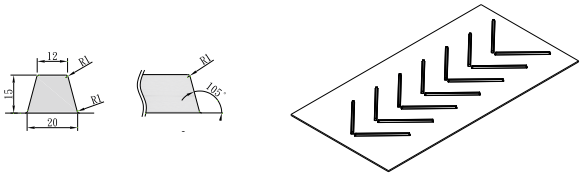
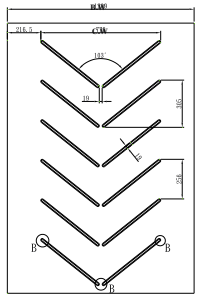


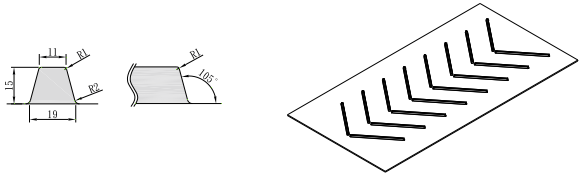
Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
900	EP315/3 3 + 1.5	610	250	15	250
900	EP500/3 5 + 1.5	610	250	15	250
1000	EP315/3 3 + 1.5	610	250	15	250
1050	EP315/3 3 + 1.5	610	250	15	250



C15P750



Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
1050	EP315/3 3 + 1.5	770	250	15	250



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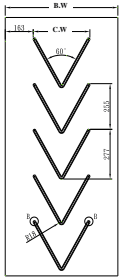
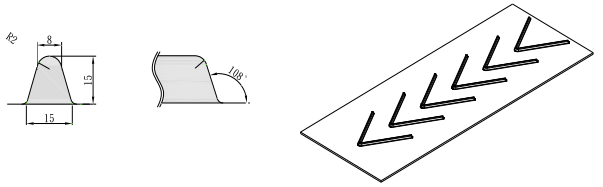


Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
400	EP315/3 3 +1.5	330	250	15	250



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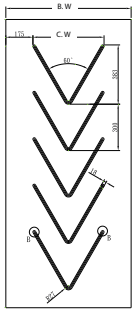
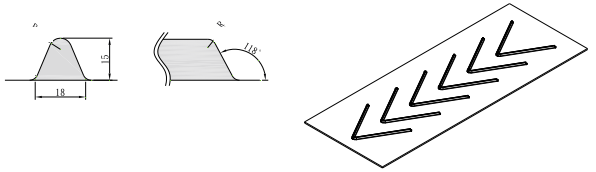


Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
900	EP315/3 3 + 1.5	450	300	15	250



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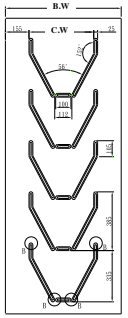
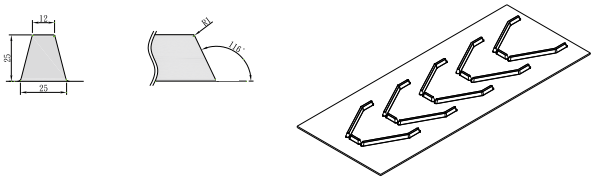
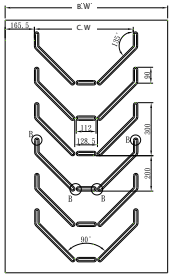


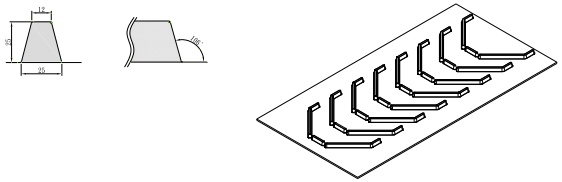
Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
650	EP315/3 3 + 1.5	450	335	25	315



C25P550



Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
900	EP400/3 3 +1.5	550	20	25	315



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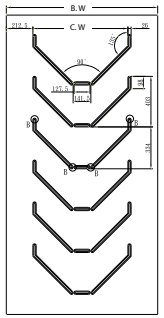
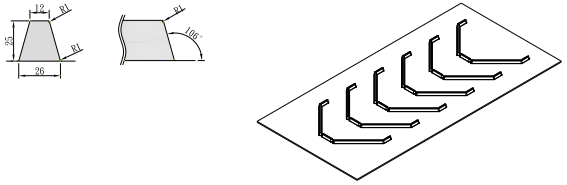
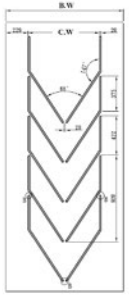


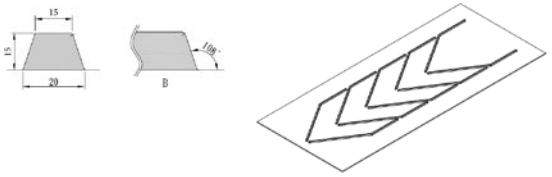
Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
1200	EP400/3 4 + 0	785	330	25	315



S15P750



Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
1000 & 1200	EP315/3 3 +1.5	750	420	15	250



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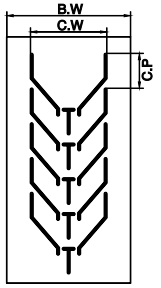
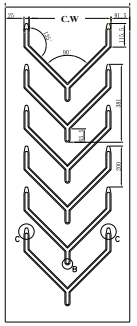
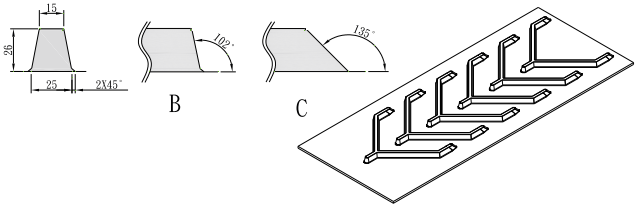


Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
1050	EP315/3 3 +1.5	750	340	25	315

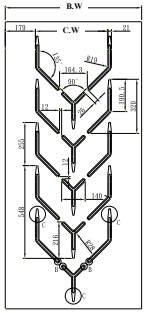
Y26P400



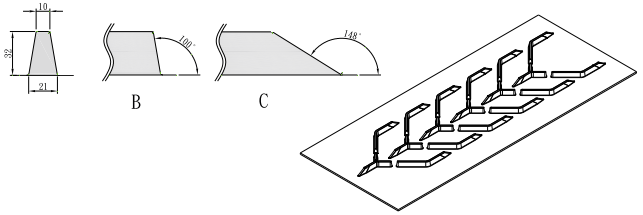
Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
500 & 550	EP315/3 3 + 1.5	425	310	23	315



Y32P460



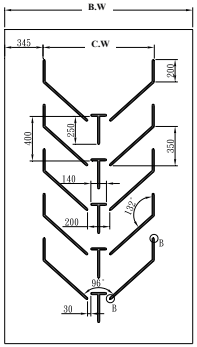
Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
650*	EP500/3 10 + 3	450	255	32	315

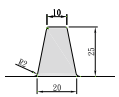


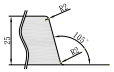
*Also available for 800 width Ripstop chevron

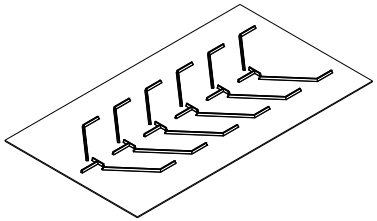
C25P1000

Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
1400	EP500/3 5 + 1.5	1000	400	25	315
1500	EP500/3 4 + 2	1000	400	25	315
1500	EP800/4 8 + 2	1000	400	25	315
1600	EP500/3 4 + 2	1000	400	25	315



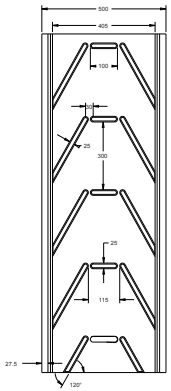


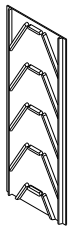


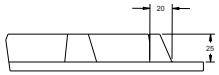


C25P400 SIDE RAIL

Belt Width (mm)	Belt Specification	Cleat Width (mm)	Cleat Pitch (mm)	Cleat Height (mm)	Minimum Pulley Diameter
500	EP315/3 3 + 1.5	450	300	25	315







GET IN TOUCH WITH THE SMILEY MONROE TEAM FOR MORE INFORMATION ABOUT ADDITIONAL CUSTOM CHEVRON PROFILES

10 *TROUBLESHOOTING*

Designing a conveyor and choosing a belt is just the start. We've outlined a few common conveyor problems, possible causes and how to fix them.

BELT MISALIGNMENT ISSUES

BELT RUNS TRUE WHEN EMPTY, BUT MIS-TRACKS WHEN LOADED

CAUSE: Off centre loading
CURE: Adjust chute and other loading devices so load is delivered to centre of belt travel

CAUSE: Fluctuations in load
CURE: Use notched chute to keep load peak in centre of belt

CAUSE: Belt/roller contact not equal
CURE: Adjust height of rollers for even contact

ONE SECTION OF BELT RUNS OFF TO THE ONE SIDE FOR THE LENGTH OF THE CONVEYOR

CAUSE: Splice(s) not straight
CURE: If Smiley Monroe belt, please contact Smiley Monroe with ID number

CAUSE: Crooked or bowed belt
CURE: If belt is new, it may correct itself when properly broken in

CONVEYOR BELT RUNS TO ONE SIDE AT A PARTICULAR POINT ALONG CONVEYOR

CAUSE: Rollers not at right angles to centre line of belt
CURE: Move the end of the roller to which belt has moved in the direction of belt travel

CAUSE: Conveyor frame crooked, or roller stand(s) not centred on frame
CURE: Survey and align components

CAUSE: Sticking rollers
CURE: Clean and lubricate rollers; replace if necessary

CAUSE: Loose roller
CURE: Secure idler or roller in proper position

CAUSE: Structure not level, belt climbs to high side
CURE: Align and level structure

CAUSE: Build - up of material on rollers
CURE: Clean rollers; install effective belt cleaning and transfer point sealing systems

CAUSE: Improper belt loading
CURE: Change loading point and loading conditions so that load is centred properly

BELT HAS ERRATIC ACTION, FOLLOWING NO CERTAIN PATTERN

CAUSE: Belt too stiff to track correctly
CURE: May be due to new belt, if so allow proper break - in time (It may shorten break - in time if belt is left loaded during downtime), use more troughable belt or install self - aligning training rollers

BELT RUNS OFF AT HEAD PULLEY

CAUSE: Head pulley or troughing rollers leading to head pulley out of alignment
CURE: Survey and align pulley and adjacent troughing rollers

CAUSE: Pulley lagging worn
CURE: Replace worn lagging; use grooved lagging for wet conditions

CAUSE: Material accumulations on pulley face
CURE: Clean up the fugitive material; install effective belt cleaning and transfer point sealing systems

BELT RUNS OFF AT TAIL PULLEY

CAUSE: Build - up of material on return rollers and /or pulley
CURE: Clean up the fugitive material; install effective belt cleaning and transfer point sealing systems

CAUSE: Return rollers out of line
CURE: Adjust loading chute to properly centre the load or control flow with feeder belts and deflectors to load material at speed of belt

CAUSE: Counterweight too light
CURE: Re - calculate weight required and adjust counterweight or screw - takeup accordingly

CAUSE: Rollers frozen
CURE: Clean and lubricate rollers or install effective belt cleaning and transfer point sealing systems to control fugitive material

BELT RUNS OFF OCCASIONALLY

CAUSE: Environmental conditions alter tracking
CURE: Install wind screens and/or conveyor covers to reduce exposure to elements or install self-adjusting rollers

BELT DAMAGE

EXCESSIVE WEAR ON BOTTOM COVER OF BELT

CAUSE: Slippage between belt and drive pulley or pulleys
CURE: Increase tension on belt take - up device, lag drive pulleys, or new worn - out lagging, or increase arc of contact on drive pulley with snub pulley, or use tandem drive

CAUSE: Sticking troughing rollers
CURE: Clean and lubricate or replace rollers to free rotation or install effective belt cleaning and transfer point sealing systems to control fugitive material

CAUSE: Excessive troughing roller tilt
CURE: Correct to not more than 2 from upright

CAUSE: Material grinding between pulley and belt
CURE: Remove accumulated material or install tail protection plough and effective belt cleaning and transfer point sealing systems to control fugitive material

WEAR ON TOP (CARRYING) SIDE OF BELT

CAUSE: Excessive impact of material on belt
CURE: Use correctly designed chutes and baffles, load fines first to minimise Impact Bars level or install impact cradles or impact rollers to absorb impact force

CAUSE: Excessive sag between rollers
CURE: Reduce roller spacing or install belt support rails to maintain sag - free belt line

CAUSE: Dirty, sticking, or mis - aligned return rollers
CURE: Clean, repair, lubricate and align return rollers or install tail protection ploughs and effective belt cleaning and transfer point sealing systems to control fugitive material

CAUSE: Abrasive “pooling” action in loading area
CURE: Reduce chutes and feeder belts to feed load in the same direction and at same speed as belt travel

CAUSE: Belt folding back on itself
CURE: Realign rollers to centre the belt, remove obstruction causing belt edge to fold back or install misalignment (limit) switches to shut down power if belt wanders

LENGTHWISE GOUGING OR STRIPPING OF TOP COVER

CAUSE: Material entrapped by skirting
CURE: Metal sides of chute or skirts too close to belt

CAUSE: Space between belt and skirtboard not increasing in direction of belt travel
CURE: Adjust gap between skirt and belt to 3/8 to _ inch (10 to 18mm) gap: gap should increase in direction of travel

STAR - SHAPED BREAK OR TRANSVERSE BREAK IN BELT COVERS OR CARCASS

CAUSE: Impact damage
CURE: Use impact module below belt in loading zone to absorb impact energy or redesign transfer point to reduce impact

CAUSE: Material impingement between belt and pulley
CURE: Install tail protection plough to sweep material from return run of belt or install decking or guards to prevent material falling onto return run

CAUSE: Damage from exposure to abrasion, chemicals, heat mildrew, oil or environmental conditions
CURE: Use belt designed for specific conditions, avoid over-lubrication of rollers or enclose belt line for protection from environmental conditions

EXCESSIVE WEAR OF BELT EDGES

CAUSE: Improper loading, side loading
CURE: Control flow with feeders, chutes and skirtboards or feed should be in direction of belt travel in centre of conveyor

CAUSE: Belt strained on one side
CURE: Allow time for new belt break - in or if belt is not new or does not break - in properly, replace strained section

CAUSE: Damage from exposure to abrasion, chemicals, heat mildrew, oil or environmental conditions
CURE: Use belt designed for specific conditions, avoid over - lubrication of rollers or enclose belt line for protection from environmental conditions

TRANSVERSE BREAK IN BELT IMMEDIATELY BEHIND MECHANICAL SPLICE

CAUSE: Fastener plates too long for pulley size
CURE: Change to smaller/shorter plates in mechanical splices or increase pulley size

SOFT SPOTS IN COVER OR CARCASS , RUPTURES, CRACKS, GOUGES, OR GENERAL FABRIC DECAY

CAUSE: Impact damage
CURE: Use impact module below belt in loading zone to absorb impact energy or redesign transfer point to reduce impact

CAUSE: Material impingement between belt and pulley
CURE: Install tail protection plough to sweep material from return run of belt or install decking or guards to prevent material falling onto return run

CAUSE: Damage from exposure to abrasion, chemicals, heat, mildrew, oil, or environmental conditions
CURE: Use belt designed for specific conditions, avoid over - lubrication of rollers or enclose belt line for protection from environmental conditions. See Conveyor Belt options section for help choosing the correct belt for your application

CAUSE: Cover swelling in spots or streaks, belt hardened or cracked, covers checked or brittle
CURE: Use belt designed for specific conditions or avoid over lubrication of rollers

CAUSE: Improper storage and handling of belt
CURE: Handle belt in accordance with manufacturer guidelines. See our section on belt storage (page 20)

CAUSE: Severe convex vertical curve
CURE: Decrease roller spacing in curve area, use transition rollers, increase curve radius or remove or lower any elevated rollers in curve area

CAUSE: Excessive forward tilt of trough rollers
CURE: Reduce forward tilt

CAUSE: Excessive gap between idler rollers causing sag
CURE: Replace with heavier belt , replace rollers with new ones with maximum gap of 0.4 inches (10mm)

CAUSE: Insufficient belt stiffness
CURE: Replace belt with stiffer belt

MATERIAL SPILLAGE AT LOADING/TRANSFER POINT

CAUSE: Impact rollers cause sag between rollers and carrying side of belt allowing material to spill
CURE: Install impact module at loading/ transfer point to prevent belt sag and ensure consistent contact with running side of belt and therefore skirting rubber will be in consistent contact with carrying side

CAUSE: Skirting rubber failure due to folding behind belt
CURE: Moulded side rail belt prevents material from pushing skirting rubber off the edge of the belt. Using heavier shore hardness skirting to catch larger particles and secondary skirting to catch fine materials

CAUSE: Belt misalignment
CURE: See belt misalignment section

SEPERATION OF VULCANISED SPLICE

CAUSE: Excessive tension
CURE: Reduce belt tension, cons

CAUSE: Pulleys too small
CURE: Use larger diameter

CAUSE: Material between belt and pulley
CURE: See Smiley Monroe Belt Clean

CAUSE: Splice improperly performed
CURE: Organise repair of vulcanised sp

All Smiley Monroe endless belts are hot vulcanised to Din Standard 22012 under factory conditions and come with a unique ID number for full traceability and a 12 month warranty on the joint.

MATERIAL SPILLAGE AT MECHANICAL FASTENER

CAUSE: Gaps in mechanical fastener
CURE: Smiley Monroe Zip Clip® screw in has a PU Seal to prevent sifting of fine materials

MECHANICAL FASTENER & PIN MIGRATION

CAUSE: Inadequate belt tension/extreme troughing conditions
CURE: Zip Clip® push in pin uses retaining collars to ensure pin remains secure, Zip Clip® screw in pin uses PU liner which moulds to fastener shape ensuring pin security

RUSTING OF MECHANICAL FASTENERS

CAUSE: Weather /environmental conditions/corrosive steel fastener
CURE: Zip Clip® is made of steel alloy which is resistant to corrosion/rusting

MECHANICAL FASTENER PULL - OUT

CAUSE: Improper fastener or improper installation
CURE: Review fastener selection and installation procedures

CAUSE: Excessive tension
CURE: Reduce belt tension or consider “soft” or slower start up

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