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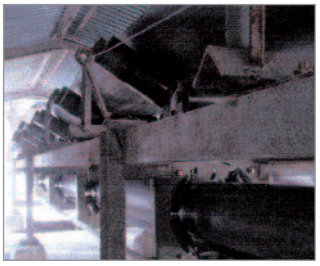
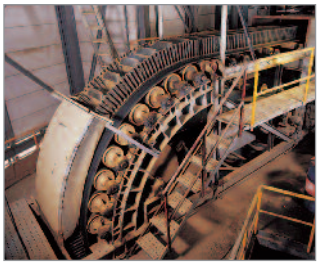
Conveyor System

DRB is equipped with unique conveyor belt design capabilities.
It designs solutions most appropriate to conveyor belt operation conditions based on its accumulated know-how is a conveyor belt specialist.
DRB designs and produces such specialty conveyor systems as pipe or corrugated sidewall conveyor belts as well as general conveyor belts.

Pipe Conveyor System

Features

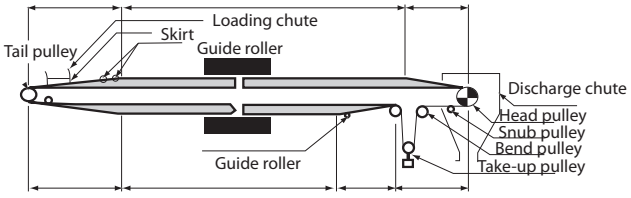
- Prevents transport materials from flying, spilling or mixing with foreign substances as transported in a sealed pipe.
- Consumes less energy than ordinary conveyor lines.
- 3-dimension layouts are available with openings at top, bottom, left or right.
- Allows for maximum 30 degree incline transport, much steeper than ordinary conveyor belts.
- Occupies minimum installation space.
- Generates much less noise than ordinary conveyor lines.

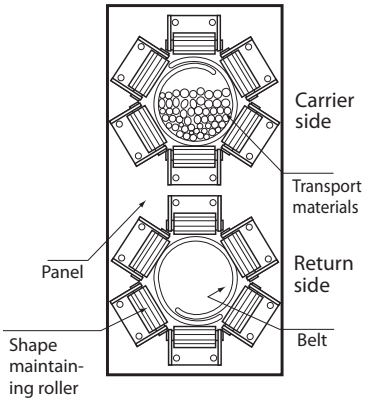
Structure

Inside diameter (mm)	Inside diameter (㎡)	Belt speed (m/min)	Transport volume (㎥/hr)
150	0.013	120	95
200	0.023	130	180
250	0.041	140	344
300	0.049	150	441
350	0.066	175	693
400	0.108	200	1296
500	0.155	225	2093

Floor plan

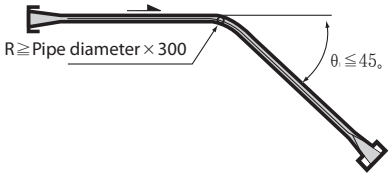
Side plan



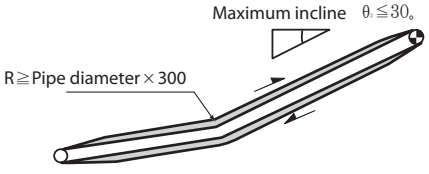


Layout Conditions of Pipe Conveyor

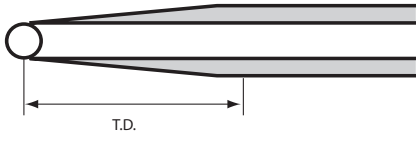
Plane curve

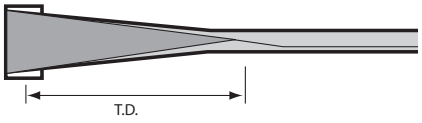


Side curve



Trough change distance(T.D.)
(T.D.)≧Pipe diameter × 25





Pipe Conveyor System

Standard Specifications

Pipe diamete (mm)	Belt width \ Standard strength (kN/m)	200	315	500	630	800
150	600	3.0 × 2.0	3.0 × 2.0			
200	780	3.0 × 2.0 5.0 × 2.0	3.0 × 2.0 5.0 × 2.0	3.0 × 2.0 5.0 × 2.0		
250	950		3.0 × 2.0 5.0 × 2.0	3.0 × 2.0 5.0 × 2.0	3.0 × 2.0 5.0 × 2.0	
300	1100		3.0 × 2.0 5.0 × 2.0	3.0 × 2.0 5.0 × 2.0	3.0 × 2.0 5.0 × 2.0	
350	1300			5.0 × 2.0 5.0 × 2.0	5.0 × 2.0	5.0 × 2.0
400	1500				5.0 × 2.0	5.0 × 2.0
500	1850				5.0 × 2.0	5.0 × 2.0

Return Pipe Conveyor System

Features

Minimizes contamination of line environment with debris generated at the return part, as the carrier side has a general trough structure and the return omit has a pipe structure.

Structure

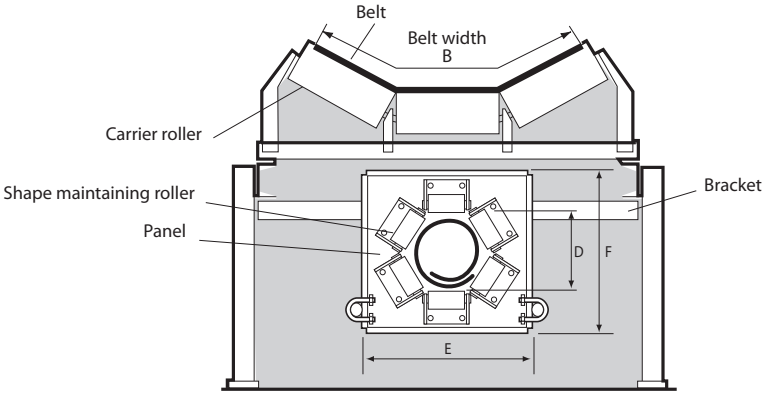
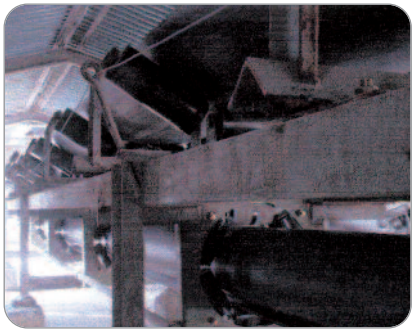


Photo of Installation

Amount of excess before return pipe conveyor applied

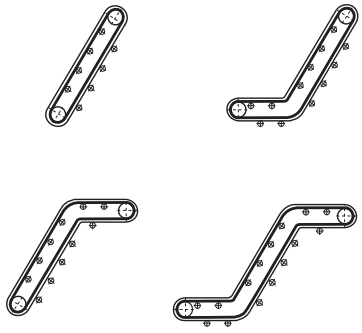


Cleanliness after return pipe conveyor applied

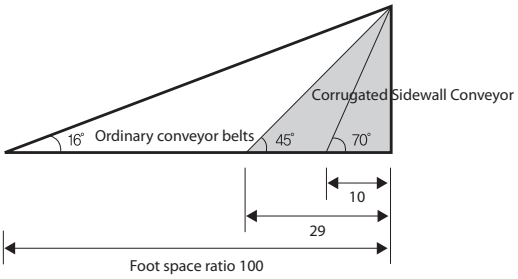
Features

Conveyor belts equipped with special waves or cleats called corrugated sidewall on the belt provide the following features:

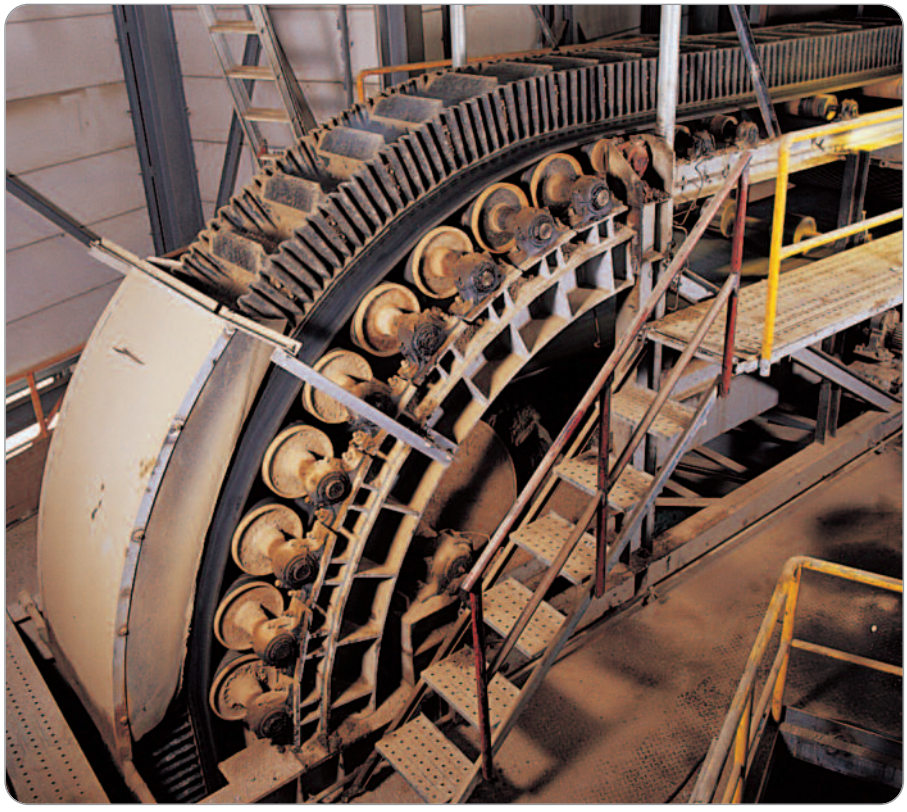
- Corrugated sidewall design allows for greater transport volume with increased sectional loading area, enabling a narrower conveyor design.
- Reduces foot space as steep incline or vertical transport is possible with cleats attached belt widthwise.
- No skirt board is required as transport materials spillage is prevented by high wavelike raised strips.
- Incline angle can be easily adjusted with specially strong belts and press rollers.
- Flat rollers may be used to reduce the equipment cost.



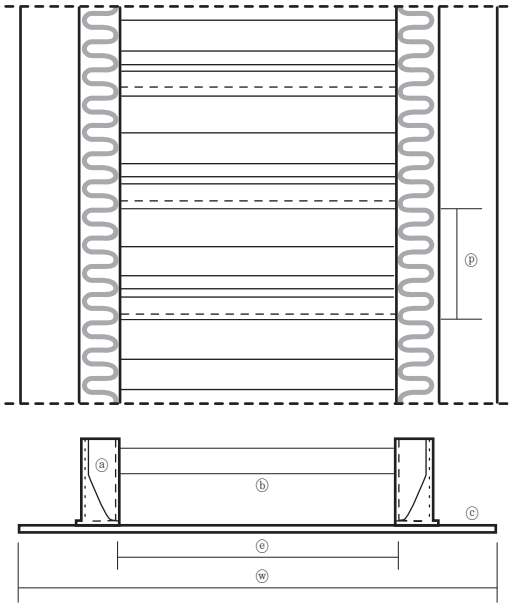
Line type



Foot space compared with that of ordinary conveyor belts



General Shape and Name of Corrugated Sidewall Conveyor Belts



ⓐ : Corrugated Sidewall

ⓑ : Cleat

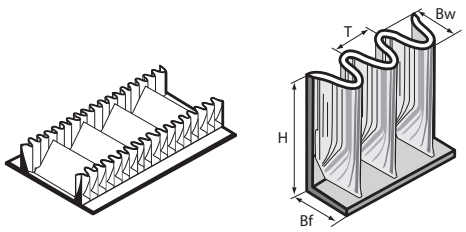
ⓒ : Free Zone width

ⓔ : Effective width

ⓟ : Cleat pitch

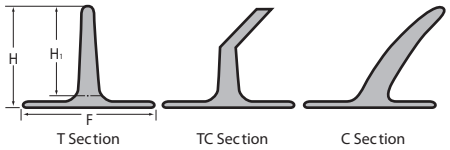
ⓦ : Belt width

Corrugated Sidewall Dimension and Types



H(mm)	Bw(mm)	Bf(mm)	T(mm)
60	45	50	45
80	45	50	45
100	45	50	45
120	45	50	45
160	70	80	65
200	70	80	65
240	70	80	65
300	80	90	75

Dimension and Types of Cleats



H(mm)	H1(mm)	F(mm)
80	70	100
100	90	100
120	110	100
160	140	140
200	180	190
240	220	230
TC:280	260	280

Note : Advance enquiry is urged as molds should be checked depending on your desired section shapes.

Air Floating Conveyor Belt

Features

Air Floating conveyor belt operates without rollers in the midsection, as the materials are carried on a layer of air that is continually created. As a result, the conveyor can be operated in a completely sealed frame, thereby minimizing caking and dust and making operation, maintenance, and repairs easier than for conventional conveyors.

Main Specifications

- ME AFC FR EP1250 1800X4X6X3
- ME AFC EP1500 1000X3X5X2
- ME AFC EP1250 900X4X5X2
- ME AFC EP630 600X2X4.0X1.5

Tips for Selecting Conveyor Belt

Caution

- Please fill out and forward to us the use condition details on the rear cover of the catalog for right belt selection.
- Do not use conveyor belts for transporting bulk or unpacked foodstuff.
- Advance enquiry is invited for use environment prone to cracks (on belt surface) by ozone (seashore, woods, or other places exposed to direct sunray).
- Observe the following instructions in selecting conveyor belts:

	Instructions
Ordinary Belt	Belt surface temperature should be within the range of -30℃~+50℃. This cannot be applied to such specialty belts as heat-resistant, cold-resistant, acid-resistant, alkali-resistant, foodstuff transporting, fire-retardant, human transporting, and bucket elevator conveyor belts.
Heat-Resistant Belt	Belt life span is greatly reduced if use in a sealed space as belt temperature soon becomes the ambient temperature. Do not use belt for transporting materials above allowed temperatures as indicated on the catalog. The belt is not fully fire proof.
Oil-Resistant Belt	Please indicate the intended use conditions when ordering belts as belt life span is greatly affected by adhesion of materials on belt surface, types and amount of oil contained in materials, and temperature of materials.
Fire Resistant Belt	Flame-retardant belts may ignite into flames though they satisfy the flame retardancy standards.
Color Belt	Store belts indoors after covering. Do not leave belts idle on machines for an extended time.

Tips for Using Conveyor Belt

Routine Maintenance

Caution

Belts should be inspected as to the following checkpoints before using them. Appropriate actions should be taken for any abnormal condition. Please contact the dealer if such abnormal conditions persist.

Checkpoints	Corrective actions
(1) Damage or wear of belt body	Repair or replacement
(2) Peeling or damage on joining parts	Repair and rejoining
(3) Poor roller rotation	Repair or replacement
(4) Foreign materials attached to pulley or rollers	Removal of foreign materials
(5) Abnormal take-up action parts	Maintenance
(6) Skirt or cleaner damages	Maintenance
(7) Shute damages	Maintenance
(8) Foreign materials or substances attached	Removal

Points to note in operation


Caution

- Install a shield wall or safety cover.
  Operator or others may be squeezed or drawn between the belt and equipment while under operation.
- Do not enter the area behind the shield wall.
- Do not wear a necktie and check for any loose clothing.
  Human body may be squeezed or drawn into the equipment.
- During operation don't step on the belt. Don't touch the belt with your hand or body.
- Don't throw in any foreign materials like cigarette butts or anything that may catch fire.
- Check power switch, emergency stop device, and escape exit before starting operation.
- Observe maximum load limit to prevent an unusual strain. It may cause the belt to break.
- Ensure transport materials are not spilt over the belt sides.
- Install a detection device on equipment for emergency stop situation.
  Ex) Device to prevent reverse rotation, serpentine action detection device, emergency stop device etc.

- Immediately stop and check the line for any joint breaks or serpentine action or any other maintenance issue.
- Do not enter the space below the belt or take-up part.
- Do not remove cake or debris while the belt is in operation.

Points to note when stopped

- Turn off the switch and display "Stopped" sign on the switch to prevent a mistaken operation.
- Never step on the belt unless necessary for repair.
- Do not stop the belt with transport materials on it. Fire may result.


Caution

- Do not turn on the switch for resuming operation until the entire line safety is thoroughly checked.
- Do not step on the belt for repair with cleated shoes. The belt may be damaged.
- Ensure that harmful objects do not fall onto or attach to the belt, including oil, chemical, welding torch flames, and heavy items.

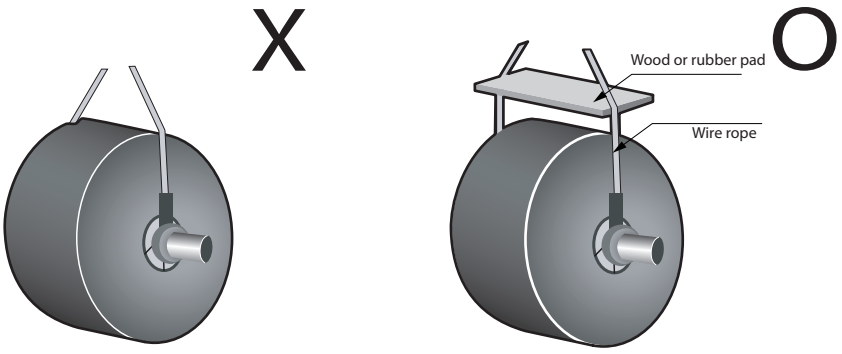
Points to note when splicing belts

- Belts should be joined on an even surface according the strict procedures to ensure safety.
- Be careful in performing work or handling tools at a high or dangerous line.
- Beware of ignition in the workplace. Fire may result.
- Avoid direct sunlight and remove moisture or dust from the joint when joining belts. Adhesive power may be degraded.
- Ensure sufficient ventilation when rubber bond or solvent is used. They may hurt your health.
- Do not leave rubber bond or solvent or any other accelerants in the workplace. They may cause fire.
- Use only materials allowed for joining belts. Also observe the validity of the joining materials.

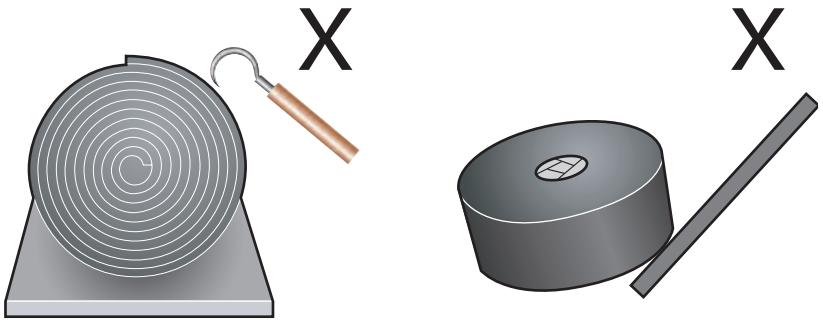
Belts are rolled on wood or steel drum and wrapped with polypropylene. Beware of the following points:

Caution

- The belt rolls should be fixed on the cargo bed of a truck. Pay special care not to damage them with forks of lift trucks.
- Do not roll them. It may hurt people in the area.
- Ensure the belt is not damaged by inserting a shaft in the roll holes as shown in the figure when you lift them by a crane.



- Do not use a hook or lever.



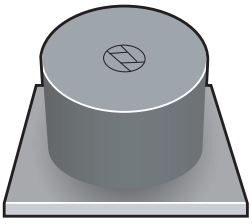
Tips for Storing Conveyor Belt

When Keeping stand-by belts or used belts, pay attention to the following points to prevent aging or damage from prolonged storage:

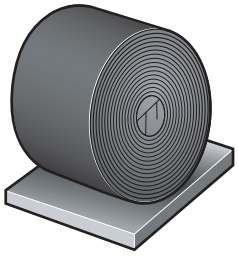
Acceptable storage conditions

Caution

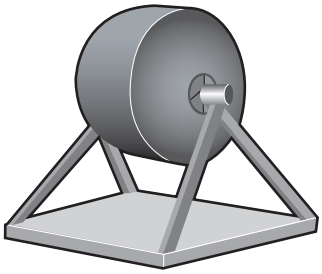
- Keep the belts away from direct sunlight.
- Keep the belts away from wind, rain, or moisture.
- Keep them in a dry, even place.
- Keep them away from harmful objects like fire, oil, chemical or organic gas.
- Fix belt rolls to prevent them from rolling.



When laid flat

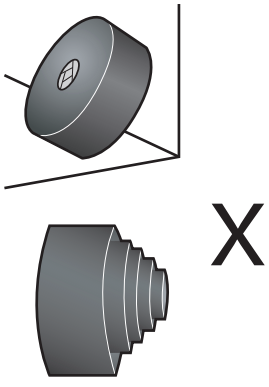


When kept upright

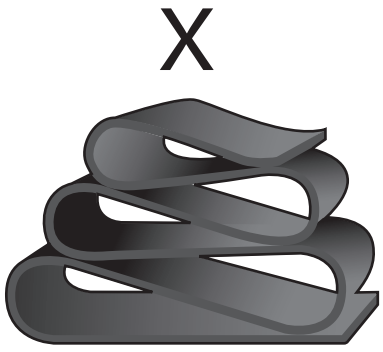


When hung

Inadequate storage conditions



X



X

Issues	Causes	Solutions
1. The belt runs to one side in a particular section of the conveyor.	A. Crooked conveyor frame in the affected section. B. Problem with the rollers in the affected section. C. Cake buildup on the pulleys or rollers in the affected section. D. Roller rotation problem on the conveyor. E. Problem with the pulleys.	A. Straighten the frame in the affected section and adjust the vertical and horizontal positions. B. Adjust the horizontal and vertical angles to align with the belt's running direction. If the problem persists, tilt the roller in the affected section toward the belt's running direction (less than 2 percent). C. Install or repair cake removal or cleaning devices. D. Repair or replace rollers and check stud bolts. E. Repair pulleys in the affected section.
2. A particular section of the belt zigzags regardless of the location on the conveyor.	A. Straightness problem in the spliced section. B. Curvature of the belt in the affected section.	A. Resplice the belt, if the affected section of the belt comes into contact with the conveyor frame. If the problem is not so severe, observe and take measurements as needed. B. Replace a section of or the entire belt if the problem is severe. Install guide rollers.
3. The entire belt zigzags across the entire conveyor.	A. Crooked conveyor frame in the affected section. B. Uneven (off-center) loading of the material on the belt. C. Tilted carrier or return roller. D. Edge wear resulting in exposed carcass. E. Troughability problem of the belt.	A. Make sure the conveyor frame is level and properly supported. Check the entire conveyor frame for straightness. B. Redesign the chute so that the load is centered on the belt. C. Adjust the horizontal and vertical angles of all rollers. D. Repair the damaged section of the edge or replace the entire belt. Address the causes of the damage. E. If the problem persists even after the break-in period, replace the belt with one with different specifications.
4. The top cover rubber is damaged.	A. Mismatch between exit velocity of materials and belt speed. B. Chute located too high above the belt. C. Loading materials stuck between the skirt and belt. D. Loading materials stacked on the return side, rubbing against the belt. E. Material buildup on rollers or pulleys. F. Problems with scraping and/or skirting rubber. G. Problems with impact, return, or carrier rollers.	A. A significant difference between the exit velocity of materials and belt speed will cause the top cover rubber to wear down faster when loading materials onto the belt. Make sure the exit velocity of materials is matched to the belt speed. B. Install a feeder belt or bar screen. Lower the angle of the chute. Use a movable bar. C. Reduce the distance between impact rollers. Increase the take-up weight. D. Adjust the angle of the chute and repair the line. E. Check and repair the scraper. F. Using an old belt may cause the belt to wear down quickly during operation, therefore replace with skirt rubber. G. Perform regular maintenance and repairs on rollers. Replace old rollers.
5. There is excessive wear on the bottom cover rubber.	A. Belt slips off drive pulley. B. Rotation problems in rollers. C. Wear from loading materials jamming the conveyor.	A. Review the take-up operation and weight. Install rubber lagging on the drive pulley. Increase the contact angle of the snap pulley. B. Perform regular maintenance and repairs on rollers. Replace old rollers. C. When materials spill over and get jammed under the tail pulley, check the status of the skirt, impact roller, and/or V-Cleaner.

Issues	Causes	Solutions
6. The belt carcass is damaged.	A. Loading material is too large, causing significant impact. B. Loading material trapped between a pulley and the belt. C. Material build-up on a pulley disfigured the belt. D. Reduced safety factor due to startup overload or significant take-up weight. E. Belt is jammed in the carrier roller. F. Inadequate transition length between a pulley and the trough carrier. G. Rips and tears in the belt from zigzagging and rubbing against the frame. H. Bending fatigue caused by small pulley diameter.	A. Install a feeder belt or bar screen. Perform repairs and maintenance on the impact roller. B. Perform repairs and maintenance on the scraper or cleaner. C. Perform repairs and maintenance on the scraper or cleaner. D. Check the belt specifications and take-up weight. E. Adjust the distance between the carrier rollers. Check the total thickness of the belt and number of plies. F. Check the trough transition length. G. Identify the causes of the zigzagging of the conveyor belt and resolve the issue. H. Replace pulleys with ones with a larger diameter and review the belt specifications to make sure they match the pulley diameter.
7. The edge side of the belt is damaged.	A. Edge wear from the belt zigzagging or running to one side. B. Tripper issue.	A. Identify the causes of the zigzagging of the conveyor belt and resolve the issue. Increase the space between the belt and conveyor frame. B. Perform regular maintenance and repairs.
8. The spliced area zigzags on the conveyor belt or the spliced area is damaged.	A. Bad finishing. B. Bad splicing. C. Poor working conditions. D. Splicing standards (splicing method, vulcanization time) were not followed. E. Belt was misaligned during splicing. F. Bending fatigue caused by small pulley diameter.	A. Attach cover rubber and perform sanding. B. Inspect splicing materials and methods. Repair the spliced area or resplice the belt. C. Remove dust or materials that create dust before operating the conveyor. D. Resplice the belt. E. Repair or resplice the belt. F. Replace pulleys with ones with a larger diameter and review the belt specifications to make sure they match the pulley diameter.
9. The take-up touches the ground due to the size of the belt.	A. Problem with take-up length. B. Belt too elongated.	A. Ensure suitable take-up length for the belt carcass. Cut off the elongated portion and resplice the belt. B. Review the belt's safety factor and take-up weight. Cut off the elongated portion and resplice the belt.
10. The belt breaks while carrying materials.	A. Low safety factor. B. Instantaneous overload from loading materials becoming jammed between the belt and a pulley. C. Belt damage caused by sharp materials loaded on the belt.	A. Review the safety factor. B. Install a cleaner and perform inspections to remove the cause of the problem. C. Redesign the chute unit to dampen the impact.
11. There is a lengthwise rip in the belt.	A. Steel sheets or other sharp objects jammed in equipment, such as a roller or the chute. B. Loading of sharp objects.	A. Do not load sharp objects onto the conveyor belt. Inspect the tears and perform partial repair, partial removal and replacement of the belt, or replacement of the entire belt. B. Replace with a rip-protection belt.
12. Materials spill over because of belt sag between rollers.	A. Inadequate take-up weight. B. Belt load resulting from a deviation of the belt specifications and thickness from the optimal standards.	A. Recheck the take-up weight. B. Review belt specifications and replace with an optimal belt.

Relation between Roll Diameter Belting, Belt Length and Belt Thickness

$$D = \sqrt{\frac{4}{\pi} t\ell + d^2}$$

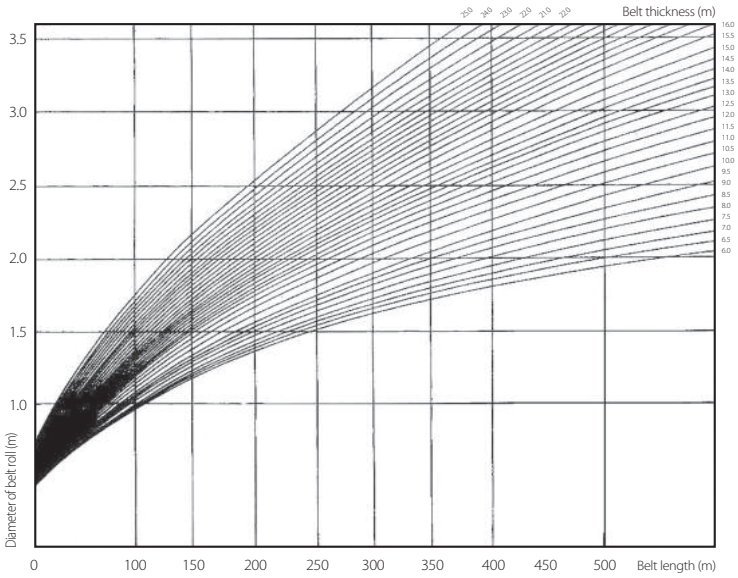
Diameter of belt roll (m)

Box diameter (m)

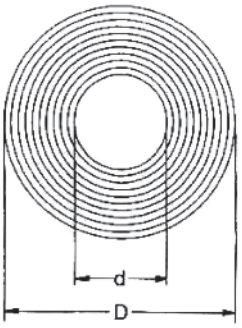
Belt thickness (m)

Belt length (m)

Belt thickness	Box diameter
6.0 ~10.0mm	150mm
10.5 ~ 20.0mm	300mm
20.5 ~ 25.0mm	400mm



Formula for Calculating the Length of a Roll of Belting



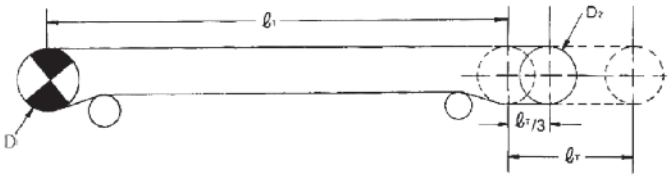
$$L = (d + \frac{(D-d)}{2}) \pi \cdot N$$

L : Belt length
d : Box diameter
D : Diameter of belt roll
N : Number of coils in roll
Ex: D=3M d=0.4M N=60

$$L = (d + \frac{(D-d)}{2}) \pi \cdot N = (0.4 + \frac{(3-0.4)}{2}) 3.1416 \times 60 = 320(m)$$

Formula for Calculating Belt Length

Screw Take-up



1) When mounted with an endless belt

$$L = 2\ell_1 + \frac{\pi}{2}(D_1+D_2) + 2(\ell_T/3) + \text{Compensation length}$$

Where: ℓ_1 : Conveyor length (m)
D_1 : Drive pulley diameter (m^o)
D_2 : Tail pulley diameter (m^o)
ℓ_T : Take-up stroke (m)
ℓ_T When the measurement is unknown,
fabric belt ····· $\ell_T/3$ = 25mm
ST belt ····· $\ell_T/3$ = 50mm

Compensation length:
The following is applied
when the contact angle
between the pulley and belt (θ) is over 90°.
Compensation length per pulley = $\theta \times \pi \times t$
where t = conveyor belt thickness (m)

2) Onsite endless conveyor belt system

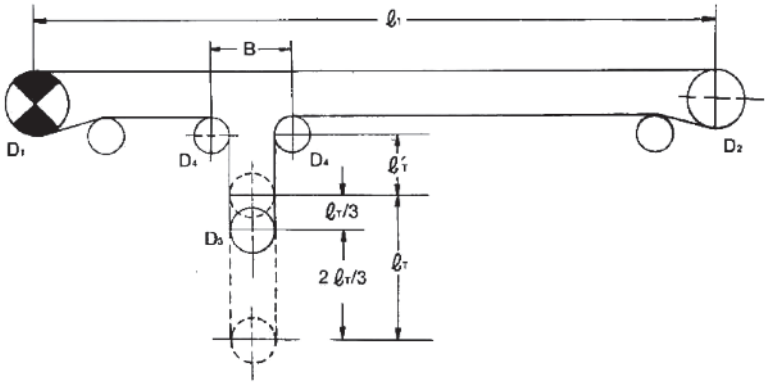
$$L = 2\ell_1 + \frac{\pi}{2}(D_1+D_2) + 2(\ell_T/3) + \ell_1 \times n + \text{Compensation length}$$

ℓ_1 : Length of endless belt (m)

n : Number of endless belts

Compensation length for belt sag: a length that includes the mounted belt sag between rollers; 0.3% of belt length

Gravity Take-up



1) Conveyor mounted with an endless belt

$$L = 2\ell_1 + \frac{\pi}{2}(D_1+D_2+D_3+D_4) + 2\ell'_T + 2(\ell_T/3) - B$$

2) Onsite endless conveyor belt system

$$L = 2\ell_1 + \frac{\pi}{2}(D_1+D_2+D_3+D_4) + 2\ell'_T + 2(\ell_T/3) - B + \ell_1 \times n + \text{Compensation length for belt sag}$$

Where: D_3 : Take-up pulley diameter (m$^{\varnothing}$)

D_4 : Bend pulley diameter (m$^{\varnothing}$)

ℓ'_T : Center-to-center distance between take-up pulley and bend pulley (m)

B : Center-to-center diameter of bend pulleys (m)

Belt Length for Calculation

- For a mounted endless conveyor belt, the belt length is expressed to the nearest 0.01 meters (rounded up).

  Ex.) A calculation result of 22.423 meters is expressed as 22.43 meters

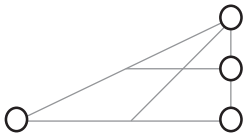
- For an onsite endless conveyor belt system, the belt length is expressed to the nearest 0.05 meters (rounded up).

  Ex.) A calculation result of 22.423 meters is expressed as 22.5 meters.

Data Inquiry Form Of Conveyor Belt

NO. _____ Date :

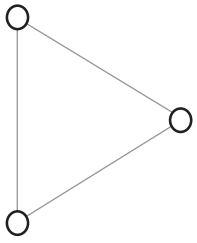
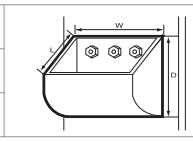
Company name			Application		
Name NO.			Use conditions		
Belt width(mm)		*	Belt length (mm)		
Transport materials	Name	*	Take-up specification	Type	
	Shape (mm)	*		Space(m)	*
	Specific gravity (t/㎥)			Weight (kg)	
	Temperature (℃)	*		Location	* Head, Tail Midpoint, Around Head, Around Tail
	Attributes		Carrier	Roller	1, 2, 3, 4, 5
	Moisture Content	* Yes No		Trough angle(deg.)	* 0°, 10°, 20°, 30°, 45°, 50°, 60°
Transport specifications	Length (m)	*		Installed interval(m)	
	Incline (deg.)	*	Return	Roller	1, 2, 3
	Horizontal length (m)	*		Trough angle(deg.)	0°, 10°, 20°, 30°
	Vertical length (m)	*		Installed interval(m)	
	Incline length (m)		Tripper	Yes, No	* Yes No
	Belt speed (m/min)	*		Type	
	Transport volume (t/h)	*		Quantity	
Drive specification	Type	Tandem, Tandem single, Single snap, Single	Pulley diameter	Drive(mm)	*
	Location	Head, Tail, Middle, Around Head, Around Tail		Head(mm)	
				Tail(mm)	
	Pulley surface	Rubber lagging, No lagging		Take-up(mm)	
				Tripper(mm)	
				Snap(mm)	
	Belt bending degree (deg.)	* 180, 200, 210, 220, 240, 360, 380, 400, 420	Loading conditions	Head (m)	
				Angle (deg.)	
	Motor (kw)			Impact roller	Yes No
				Number of loading places	
Line sketch					
* Currently used belt	Producer name				
	Specifications				
	Damage status				
Other required information					



* Marked items are essential.

Data Inquiry Form Of Bucket Elevator Conveyor Belt

NO. _____ Date :

Company name			Application		
Name NO.			Use conditions		
Belt width(mm)		*	Belt length (mm)		
Transport materials	Name	*	Belt sketch		
	Shape (mm)	*			
	Specific gravity (t/㎥)				
	Temperature (℃)	*			
	Attributes				
	Moisture Content	* Yes No			
Belt speed (m/min)		*			
Transport volume (t/h)		*			
Pulley distance (m)(C to C)		*			
Incline degree (deg.)		*			
Bucket dimension	Width (W)(mm)	* 	Loading method		Lift up, Flow in
	Protrusion(L)(mm)		Pulley diameter	Top pulley (mm)	*
	Depth (D)(mm)			Bottom pulley (mm)	*
	Weight (kg/ea)	*		Type	Head, Tail
	Attached interval (mm)	*	Drive	Pulley surface	Rubber lagging, No lagging
	Number of attachments (each)	*		Belt bending degree (deg.)	
	Size of bolts used (ea)	*		Motor output	
	Number of bolts used (ea)	*			
	Capacity (kg/ea)	*			
* Currently used belt	Producer name				
	Specifications				
	Damage status				
Other required information					

* Marked items are essential.