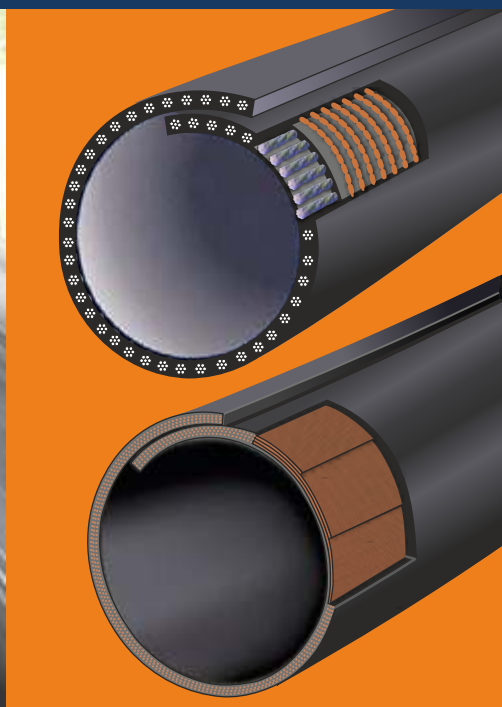
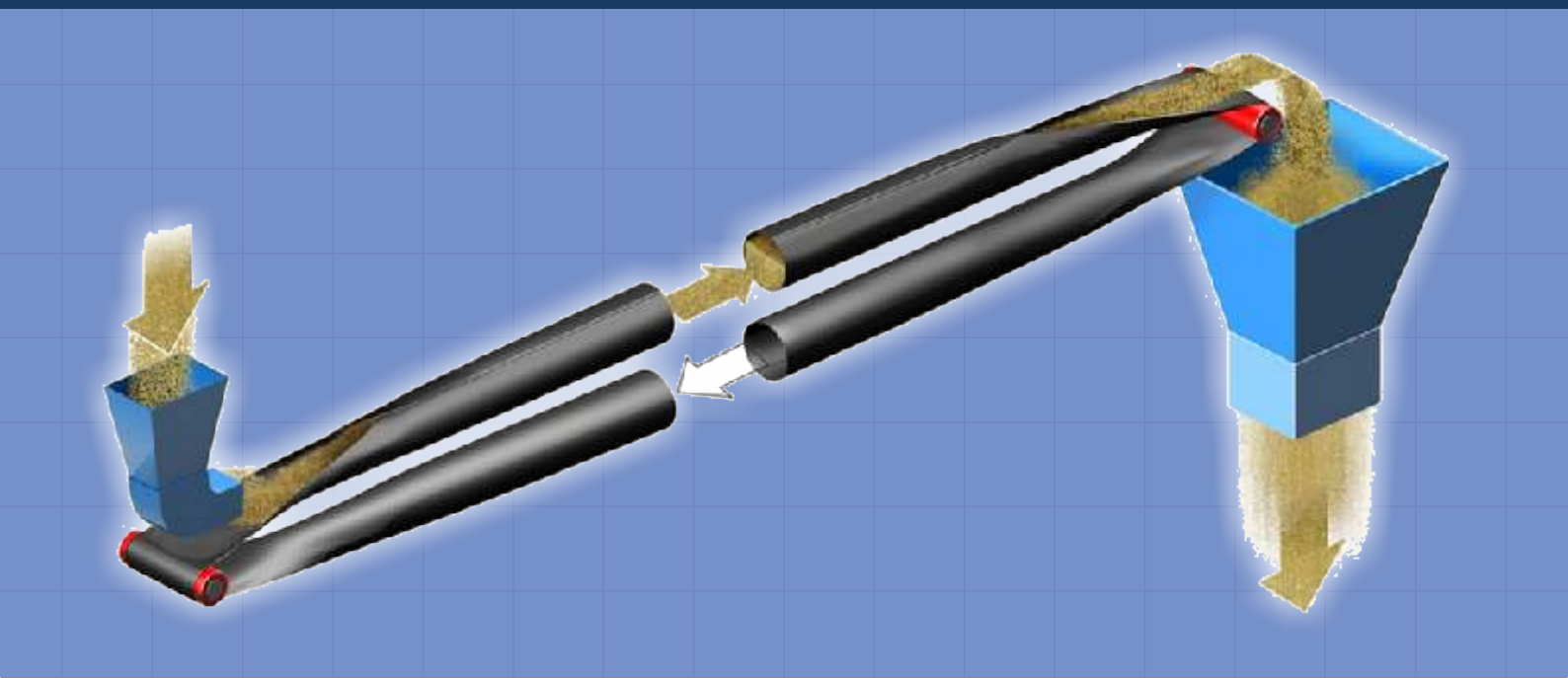
PIPE CONVEYOR BELTS

A CLOSED SOLUTION OPEN TO ALL INDUSTRIES

WITH STEEL CORD AND FABRIC REINFORCEMENT





FORECH

FORECH INDIA PRIVATE LIMITED

www.forech.com

FORECH-HILTON is the Brand for a group of Companies, focused on meeting the needs of the Mining & Mineral Processing and Construction Industry related to bulk material handling wear protection; servicing and maintaining conveyor belt systems and environment management. The Company now has almost four decades of experience servicing these industries.

The Group started its activities in the year 1972 with initial focus on Conveyor Belts. Gradually, with the induction of new technologies and systems its activities have grown, to cover the rubber based needs of the above industry segment specifically in Crushing, Screening & Material Handling area.

FORECH-HILTON Conveyor Belts are produced at two locations of the company, with a production capacity of 18000 tons / annum. Our products include a comprehensive range of Conveyor Belts, Rubber Lining materials both for Wear and Chemical Resistance, composites made of Metals, Ceramics, Textiles and Rubbers, Repairs and Splicing materials required for the above industrial segment.

The continuous growth which FORECH-HILTON has shown in the past is a result of efficient production processes and keeping a close contact with all the areas where these products are being used. Today the group exports its products to over 50 countries around the world, which constitute to almost 55% of its turnover and endeavours to become a one-stop-shop to meet all the rubber related needs of the mining and mineral processing industry.

Cheyyar, Tamilnadu

The group holds its prominent position in this field on account of a constant search for improvement and further development based on customer needs and responses. In search of excellence the group has also been assisted by global brand leaders in their respective fields of Conveyor Belts, Wear Resistant Components, Rubber Sheeting, Repair and Splicing Systems.

PIPE CONVEYOR BELTS

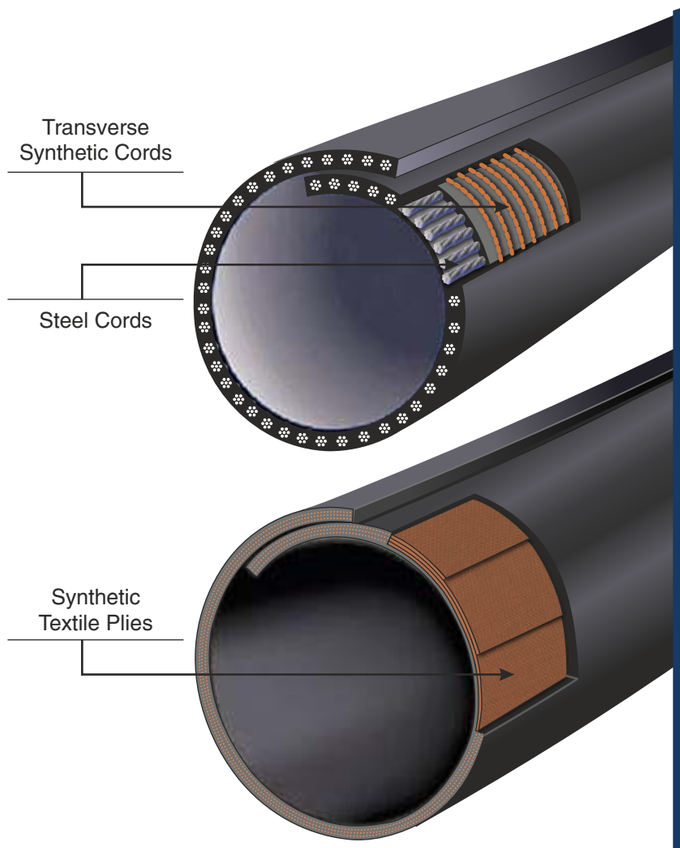
The Pipe Conveyor Belt, during the last decade has revolutionized the way bulk materials that are handled and transported, by adopting an Enclosed Material Transfer Principle. With an over riding stress on maintaining a clean environment and the need for higher flexibility in routing in arduous and difficult terrains, the solution lies in carrying the material by Pipe conveyor Belts.

The Pipe Conveyor Belt assumes the shape of a normal troughed belt during its loading and discharge points but assumes an enclosed profile in the shape of a pipe during its forward and return runs. With the aid of specially designed idler system, the belt is transformed from a troughed profile to a pipe profile and vice versa.

Forech make pipe conveyor belts are most innovative in its design which ensure the optimal performance and reliability protecting the environment from the deleterious effects of noxious pollutants, is cost effective and has the lowest operating cost for per tonne of material handled.

The pipe belts are utilised successfully in a wide variety of industries for carrying steel sintered ore, iron ore pellets, cement-limestone and hot clinker, sized coal (from port to the coal handling plant), lignite, chemicals, fertilisers, quarry, bauxite, copper ore, grains, chemicals and petcoke.

THE CARCASS



Forech has perfected the technology of supplying steel cord reinforced pipe conveyor belts and synthetic fabric reinforced pipe conveyor belts upto a maximum width of 2500 mm which translates to an inner diameter of 700 mm with adequate overlap. Various combinations are available depending on conveying path configurations.

Steel cords are specially designed, open type and zinc coated. The fabric can either be Nylon (NN) or Polyester (EP) which is manufactured with a special weave according to the application.

Advantages

- The environment is adequately protected against the toxic hazards of pollution.
- The material being carried is protected against rain , dust abnomal temperature fluctuations and wind.
- The wastage and spillage is greatly eliminated resulting in lower maintenance and operating costs.
- The levels of noise emission are reduced.
- The total length of conveyor is significantly reduced by elimination of transfer points in a narrow terrain and the combination of multi ple conveyors to one.
- The belt can negotiate vertical, horizontal and 3 – dimensional curves with sharp radii.
- The structural cost is greatly reduced by eliminating the canopy on top of the conveyor structure.
- Material can be conveyed at inclinations up to 35° without carry back.
- Constraint of space is overcome to a great extent.

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COVER GRADES

Forech can manufacture Pipe Belts with all types of cover grades – General Purpose, Fire Resistant, Heat Resistant, Oil Resistant, Fire Resistant – Oil Resistant conforming to IS, DIN, AS, SANS, ISO and Canadian Standards. Both Bottom and Top covers are also Ozone Resistant. Forech recommends LRR (Low Rolling Resistance) covers on the bottom.

SPLICING

Standard hot vulcanising technique is recommended for Forech pipe conveyor belts with Forech make of splicing kits under Forech's supervision by splicing experts.

FORCES ACTING ON THE BELT

The most important aspect of a pipe conveyor belts is a perfect relationship between the major belt parameters – pipe diameter, overlap percentage with respect to the belt width and the belt transverse stiffness. The major forces are the contact forces between the belt and the idler rolls. If the contact forces are too low or there is loss of contact between the belt and the idler rolls then the belt is not stiff enough and might not be able to keep its pipe shape and collapse. If the contact forces are too high and the belt is too stiff, it might draw too much power than rated while in operation. Other important aspects that need to be addressed while designing a pipe belt is the tendency of the belt to deflect from its assigned path and its tendency to buckle and twist at curves.

Since pipe belt has to constantly flatten itself at receipt and discharge before forming a pipe again, this calls for a higher degree of fatigue resistance. The pipe belt also has to negotiate horizontal and vertical curves and has to maintain the pipe shape without a trace of ovality.

Minimum radius of curvature for horizontal and vertical curves

R - Outer Ø x 300 for fabric pipe belts.
R - Outer Ø x 600 for steel cord pipe belts.

Minimum Transition Distance

X - Outer Ø x 30 for fabric pipe belts.
X - Outer Ø x 60 for steel cord pipe belts.

TESTING EQUIPMENTS

To ensure that the customer gets a perfect pipe conveyor belt, a sample with the ordered specification is manufactured first and subjected to all routine tests that are valid for a troughed belt. Apart from the above, specific tests relevant to the satisfactory operation of a pipe belt are conducted as follows :

1. **d/D Test :** where "d" is the diameter of the pipe in the Y plane and D is the diameter of the pipe in the X plane. Also known as the aspect ratio test. The ratio should be within a prescribed limit with the addition of longitudinal incremental load. This test checks the design of the belt with respect to its circularity.

2. **Six idler load test :** Electronically reads and records the lateral and vector forces on the six idler. Checks the stiffness of the belt and provides a fair indication of whether excess power would be drawn from the drive motor while in operation.

3. **Fatigue Testing Machine :** A sample of the pipe belt is subjected to a maximum number of 1,00,000 cycles of opening and closing operation. The troughablity is subsequently measured to ensure that it lies within a specified value. The difference of troughability value between each roll is also measured and kept to a minimum value to maintain consistency. A typical troughability value for a ST Pipe belt is 0.35 +/- 0.03.

Commercial production is taken up only when the samples have exhibited satisfactory results.

SELECTION TABLE

Nominal pipe diameter (mm)	Belt width (mm)	Conveyed quantity (m3/hr)@ 1m/sec at 75% fill factor	Conveyed quantity (m3/hr)@ 1m/sec at 60% fill factor	Maximum lump size (mm)
150	600	45	36	40
200	700	85	68	60
210	750	95	75	65
220	800	100	80	70
250	1000	130	104	80
300	1100	190	150	90
350	1300	260	205	110
400	1500	340	270	130
450	1600	430	345	140
500	1850	530	425	160
550	2000	640	510	180
600	2200	760	605	200
650	2400	895	715	210
750	2500	1190	950	230

The figures are approximate and apply to normal operating conditions for the purpose of design only. Forech reserves the right to alter the values in line with technological upgradation.

IMPORTANT ASPECTS OF A PIPE CONVEYOR BELT

1. In transition distance near head pulley, the belt transforms from a pipe shape to troughed shape. In case the belt is badly deformed the edge of the belt dips into the material being transported and causes spillage when it opens up at head pulley. A high rigidity belt is an option that can be examined.

2. Often a pipe belt can twist while in operation. The belt edge overlap near 12'0 clock position is important to be studied and idler arrangement has to be fine tuned to prevent twisting.

3. Quite often the pipe belt draws excessive power. The transverse stiffness of the belt has to be examined and rationalised. Now a days VFD (Variable Frequence Drives) are used along with the drive motors in a pipe belt circuit to reduce the power drawn.

4. A pipe belt consumes more power compared to a troughed belt due to its indentation rolling resistance against 6 idlers. The indentation rolling resistance is caused due to the hysteresis energy loss of the visco elastic deformation of the belt bottom cover. A Low Rolling Resistance (LRR) belt whose recipe Forech has developed and perfected gives a lower hysteresis energy loss compared to a conventional belt bottom cover. A LRR cover therefore draws less power than a normal cover.

5. Theoretically buckling of a pipe belt occurs when a certain degree of negative tension is generated. The alignment of the belt and the placement of idlers have to be fine tuned to avoid the occurrence of negative tension.

Precise power simulation for long distance pipe conveyors

Monitoring system of twisting and automatic alignment device

High speed conveyors

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FUTURE DEVELOPMENTS

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