

**ORIENTAL**  
CONVEY | ALL | THE | WAY



**MAKING BONDS**  
**AS STRONG**  
**AS STEEL**

**MAXX** **STEELFLEX**<sup>®</sup>  
Steel Cord Belts



At ORIENTAL we are proud of our heritage of supplying high quality conveyor belts to discerning customers across the globe.

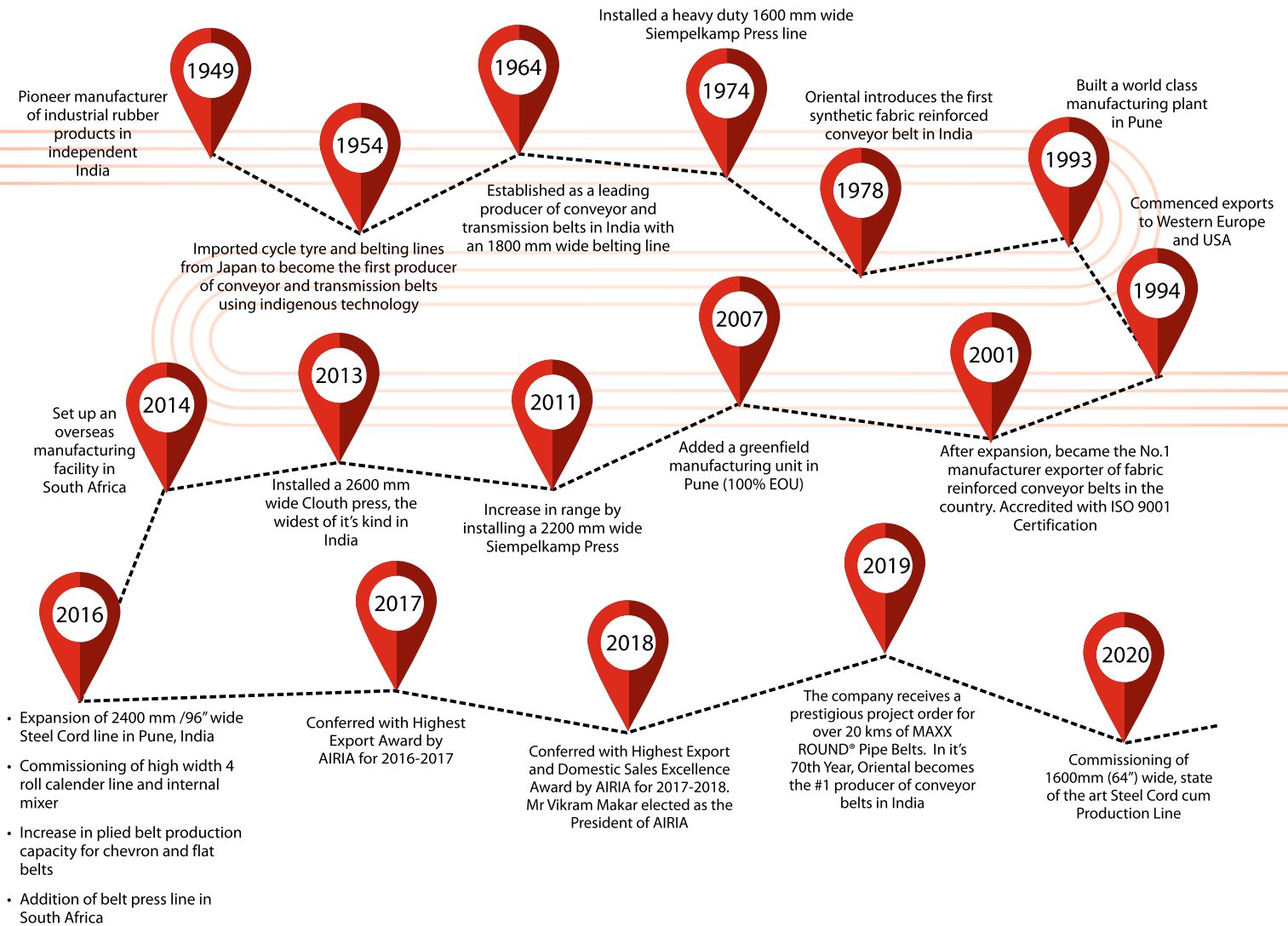
In 1954 when we manufactured our first conveyor belt, to the introduction of the country's first Nylon-Nylon synthetic fabric reinforced belt in 1978, Oriental Rubber has been a pioneer in the design and development of critical applications.

Our proven success in establishing new generation products such as the MAXX ARMOUR® and POWERSAVE® belts has now led to enhancing our range of the MAXX STEELFLEX® belts using steel cord as the high tensile bearing member.

In order to complete our portfolio of belts and meet the demands of our valued customers, Oriental is now offering MAXX STEELFLEX® belts with steel reinforcement upto 2400 mm wide.

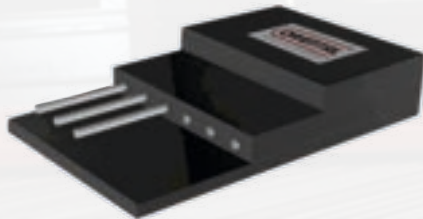
With this addition, we are strengthening our partnership with you....**MAKING BONDS AS STRONG AS STEEL!**

## MILESTONES

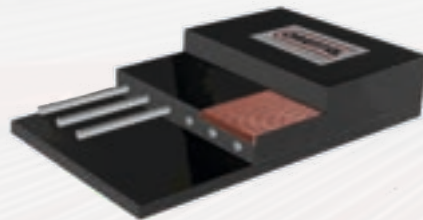


**PRODUCT RANGE**

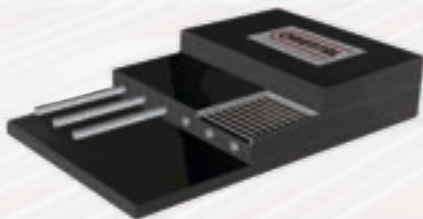
Belts are available with a high tensile heavy duty steel cord in the following variants:



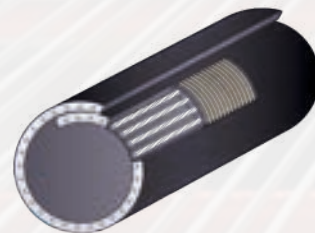
MAXX STEELFLEX<sup>®</sup>  
Steel Cord (ST)



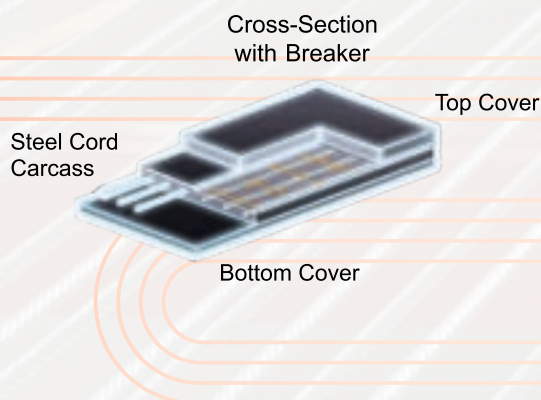
MAXX STEELFLEX<sup>®</sup> FB  
with Textile Rip Stop Breaker



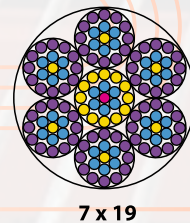
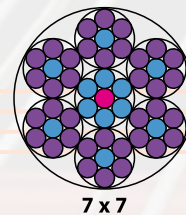
MAXX STEELFLEX<sup>®</sup> IW/IWR  
with Transverse Steel Breaker



MAXX STEELFLEX<sup>®</sup> ROUND  
Pipe Belts with steel cord reinforcement



The latest  
**steel cord line**  
in the **country !**



**SPECIAL COVER GRADES**



Wear Resistant



Heat Resistant



Fire Resistant



Oil Resistant



Energy Saving



**MAXIMUM  
RATING  
UP TO  
ST 7500 KN**

## BELT SELECTION CHART

Type	Rated Break Strength	Minimum Cord Diameter	Cord pitch	Approx Carcass Weight	Reference elongation at 1/7th minimum breaking strength	Min Cover Thickness	Min Drive Pulley Diameter (60-100% load factor)	Elastic Modulus
UoM	N/mm	mm	mm	kg/m <sup>2</sup>	%	mm	mm	N/mm
ST 500	500	2.8	14	5.3	0.1-0.3	4	500	35000
ST 630	630	2.8	11	5.8	0.1-0.3	4	500	44100
ST 800	800	3.2	12	6.7	0.1-0.3	4	500	56000
ST 1000	1000	3.6	12	8	0.1-0.3	4	630	70000
ST 1250	1250	4.3	14	9.7	0.1-0.3	4	630	87500
ST 1400	1400	4.5	14	10.3	0.1-0.3	4	800	98000
ST 1600	1600	5.2	15	12.1	0.1-0.3	4	800	112000
ST 1800	1800	5.1	13.5	12.4	0.1-0.3	4	800	126000
ST 2000	2000	5.1	12	13.2	0.1-0.3	4	800	140000
ST 2250	2250	5.2	11	14.2	0.1-0.3	4	800	157500
ST 2500	2500	6.8	15	17.8	0.1-0.3	5	1000	175000
ST 3150	3150	7.4	15	20.3	0.1-0.3	6	1250	220500
ST 3500	3500	8	15	22.5	0.15-0.3	6	1250	245000
ST 4000	4000	8.6	15	26	0.15-0.3	7	1250	280000
ST 4500	4500	9.4	16	28	0.15-0.3	7	1400	315000
ST 5000	5000	10.4	17	31.4	0.15-0.3	8	1600	350000
ST 5400	5400	10.8	17	32.9	0.15-0.3	8	1600	378000
ST 6300	6300	11.8	17	39.5	0.15-0.3	9	1800	441000
ST 7100	7100	12.8	18	48.5	0.15-0.3	9	1900	497000
ST 7500	7500	Please contact Oriental's technical service division			0.15-0.3	10	2000	525000

### Notes

The above values are based on ISO 15236. Other combinations are also offered on request.

The above values are given for the design purpose only.

Oriental reserves the right to change these values without notice, in tune with technical development.

2.2 For calculation of belt weight, consider weight of 1 mm thick cover = 1.11kg/m<sup>2</sup> for M grade ; = 1.26 kg/m<sup>2</sup> for FR grade.

## COVER GRADE SELECTION

Cover Type	Standard & Grade	Min. Tensile Strength (MPa)	Min. Elongation at break (%)	Max. Abrasion loss (mm <sup>3</sup> )	Application characteristics	Reference Material
General Purpose	DIN- X	25	450	120	Suitable for conveying large lumps, sharp edged rugged material	Iron ore, coal, lignite, copper ore, limestone rock etc.
	SANS-M	25	450	120		
	AS-M	24	450	150		
	IS-M24	24	450	150		
	BS-M24	24	450	150		
	ISO-H	24	450	120		
	DIN-Y	20	400	150		
	SANS-C	20	400	150		
	JIS-S	18	450	200		
	SANS-N	17	400	150	suitable for conveying moderately abrasive material	sand, wood chips etc
	AS-N	17	400	200		
	IS-N17	17	400	150		
	BS-N17	17	400	150		
	RMA1	17	400	150		
	ARPM RMA I	17	400	125		
	DIN-Z	15	350	250		
	ISO-L	15	350	200		
	RMA2	14	400	200		
ARPM RMA II	14	400	175			
Abrasion Resistant	DIN-W	18	400	90	Cut & gouge with super abrasion resistance properties	sharp big lumps with abrasive fine & granular materials
	ISO-D	18	400	100		
	HAR	18	400	90		
	SAR	17	400	70		
	AS-A	17	400	70		
Fire Resistant for over ground application	ISO-Ka	20	400	200	Excellent resistance to flame propagation & low burning rate.	Coal, Minerals & ores
	FR-IS	17	350	175		
	FR-ISO 340	15	350	175		
	FR-SANS F	15	350	110		
	FR-DIN K	15	350	175		
	FR-DIN S	15	350	175		
	FRAS-F	15	350	175		
	FR-CAN CSA-C	15	350	175		
FR-MSHA-2G	15	350	175			
FR for under ground application	MSHA-BELT	15	350	110	suitable for underground coal conveying	Coal
	FRUG-AS	15	350	100		
Heat Resistant	IS HRT1	12.5	350	250	suitable for medium temperature upto 150°C	coke, casting sand, clay etc.
	IS HRT2	12.5	350	250		
	DIN T	12.5	350	250		
Oil Resistant	IS-OR	12	250	175	suitable for oily materials, high degree of chemical resistance.	oil treated fertilizers, oil coated products, other abrasive materials
	AS-Z	12	250	175		
	DIN-G	12	250	175		

**Note:** Special Grades available on request.

**COVER THICKNESS:**

Minimum cover thickness of a steel cord belt should not be less than 0.7 times the cord diameter. Grade of the top cover is a function of the characteristic of the material to be conveyed and the operating condition of the conveyor. Additional thickness is therefore generally required which is guided by the following table as given in DIN 22101.

**COVER LAYERS**

Determination of the standard values for additions to the minimum thickness of carrying side cover layers				
Characteristics and their assessment			Sum of assessment values	Addition to minimum thickness, mm (standard values)
Loading conditions	Favourable	1	5 to 6	0 to 1
	Average	2		
	Unfavourable	3		
Loading frequency	Low	1	7 to 8	1 to 3
	Average	2		
	High	3		
Maximum particle size	Small	1	9 to 11	3 to 6
	Average	2		
	High	3		
Bulk density	Low	1	12 to 13	6 to 10
	Average	2		
	High	3		
Abrasive ness	Low	1	14 to 15	> 10
	Average	2		
	High	3		

**Example:** Let us consider a conveyor system where the parameters are as follows:

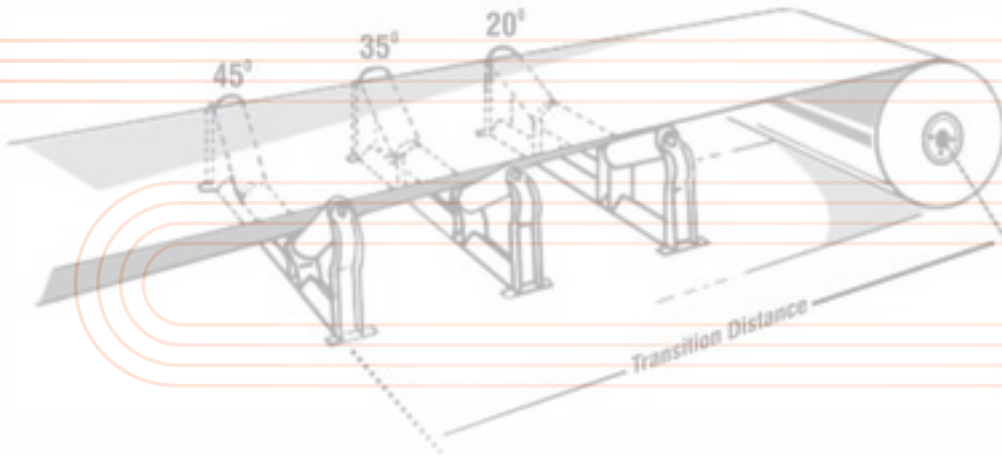
Parameters	Characteristics	Assessment Values
Loading Condition	Average	2
Loading Frequency	High	3
Maximum Particle Size	Small	1
Bulk Density	Average	2
Abrasive ness	Average	2

The sum of assessment value is therefore 10, which falls in the group of 9-11.

A minimum of 3-6 mm of cover thickness should therefore be added to the minimum carry cover thickness (which is 0.7 times of cord diameter or 4 mm whichever is higher).

### TRANSITION DISTANCE

The distance between the terminal pulley and the first fully troughed idler at lead end or tail end of the conveyor should be adequate so that the edges of the belt are not overstressed. Design values for transition distance are given in the following table.



### TAKE UP

Main function of the take up is to maintain adequate tension throughout the entire stretch of the conveyor belt during its operation and also in the idle condition. The length of the take up is dependent upon the elongation of the conveyor belts. The total elongation of the steel cord belt including permanent and elastic elongation is limited to 0.3%.

The take up length is calculated as

$$T_1 = 0.3\% \text{ of C-C distance of conveyor}$$

It is however advisable to keep some extra length in the take up for any additional splice required.

Belt width in mm	Transition Distance (mm)								
	Pulley Not Lifted			Pulley lifted to 1/3 depth			Pulley lifted to 1/2 depth		
	Transition Distance (mm)			Transition Distance (mm)			Transition Distance (mm)		
	20 °	35 °	45 °	20 °	35 °	45 °	20 °	35 °	45 °
800	1200	2080	—	1000	1720	—	800	1280	—
1000	1500	2600	3300	1250	2150	2700	1000	1600	2000
1200	1800	3120	3960	1500	2580	3240	1200	1920	2400
1400	2100	3640	4620	1750	3010	3780	1400	2240	2800
1600	2400	4160	5280	2000	3440	4320	1600	2560	3200
1800	2700	4680	5940	2250	3870	4860	1800	2880	3600
2000	3000	5200	6600	2500	4300	5400	2000	3200	4000
2200	3300	5720	7260	2750	4730	5940	2200	3520	4400
2400	3600	6240	7920	3000	5160	6480	2400	3840	4800



## VERTICAL CURVES:

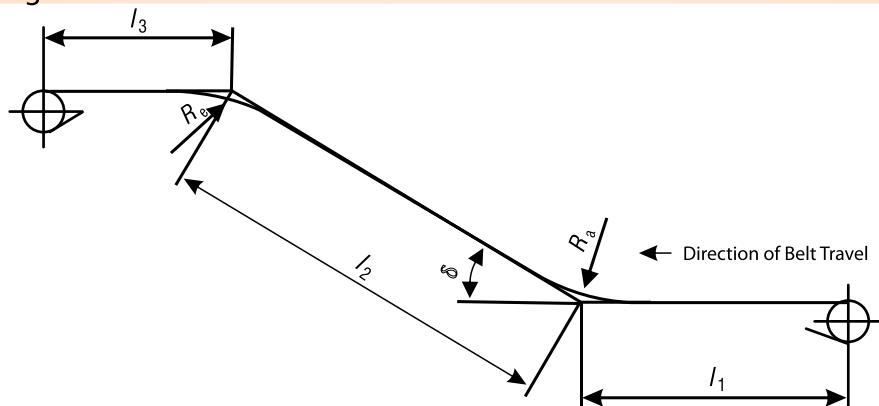
Vertical curves in belt conveyors are most commonly used to negotiate the bends or to get access to the next conveyor for discharge. However it is to be ensured that there is no lifting of the belt from the idlers or there is no undue stress at the edge of the belt.

**CONCAVE CURVE:** The design values for the minimum radius of curvature are derived from the following equation:

$$Ra = \frac{Ta}{m \cdot g \cdot \text{Cos } \delta}$$

Where

- Ra = Minimum radius of curvature in meter
- Ta = Maximum tension at the point of curve in Newton (N)
- m = weight of conveyor belt in kg/m
- δ = Angle of inclination



Conveyor installation with concave and convex transition curves

**CONVEX CURVE:** The design values for the minimum radius of curvature for conveyor with three-part-equal-length idler arrangement are as per the following table:

Belt width in mm	Minimum radius of curvature in meter		
	Troughing angle		
	20°	35°	45°
800	30	49	61
1000	37	62	76
1200	44	74	91
1400	52	86	107
1600	59	99	122
1800	66	111	137
2000	74	123	152
2200	81	136	167
2400	88	148	183

## RIP PROTECTION

### RIP CHECK BREAKER

On request by the customer, Oriental MAXX STEELFLEX® is embedded with high strength textile weft fabric, to protect the belt from through cut. It hinders the penetration of foreign material into the conveyor belt and acts as a barrier against ripping.

The high elongation of the transverse reinforcement is advantageously used to maintain the flexibility of the belt and does not have any adverse effect on the pulley diameter.

### STEEL BREAKER

Insertion of steel breaker as transverse reinforcement greatly enhances the rip resistance of the conveyor belt. High flexibility of the steel breaker does not impair the trough ability of the belt.

### RIP DETECTION SYSTEM

This system is used in combination with sensor loop and a series of transmitter and receiver sets with PLC. The sensor loops are embedded under the carry cover of the conveyor belt at regular intervals. As soon as a rip is detected the PLC commands the motor to stop, further damage to the belt is thus avoided.

### REEL DIAMETER

Belt Length (m)	Reel Diameter (mm)														
	Belt Thickness (mm)														
	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
100	1240	1340	1430	1520	1600	1680	1750	1830	1890	1960	2020	2090	2150	2210	2260
125	1390	1500	1600	1700	1790	1880	1960	2040	2120	2190	2260	2330	2440	2470	2530
150	1520	1640	1750	1860	1960	2060	2150	2230	2320	2400	2480	2550	2630	2700	2770
175	1640	1770	1890	2010	2120	2220	2320	2410	2500	2590	2680	2760	2840	2920	2990
200	1750	1890	2020	2150	2260	2370	2480	2580	2680	2770	2860	2950			
225	1860	2010	2150	2280	2400	2520	2630	2740	2840	2940					
250	1960	2120	2260	2400	2530	2650	2770	2880	2990						
275	2060	2200	2370	2520	2650	2780	2910								
300	2150	2320	2480	2630	2770	2910									
325	2230	2410	2580	2740	2880										
350	2320	2500	2680	2840	2990										
375	2400	2590	2770	2940											
400	2480	2680	2860												
425	2550	2760	2950												
450	2630	2840													
475	2700	2920													
500	2770	2990													
525	2840														
550	2910														
575	2970														

**Note:** It is possible to supply belts in higher length in elliptical reels.



## QUALITY ASSURANCE

ORIENTAL follows a documented quality management system for ensuring reliable and consistent quality. It is certified ISO 9001:2008 quality management system and has NABL accredited laboratory.

Raw materials are procured from selected vendors as per the agreed specification and undergo qualifying tests as per the quality assurance plan before being used.

The recipe of the rubber mix is formulated to achieve the best of physical properties to ensure a long life of the MAXX STEELFLEX® conveyor belt. All the batches from the mixer undergo rheological analysis in the Monsanto rheometer.

Cord pull out test is carried out for steel cords in the universal testing machine before being released for production.

Finished steel cord conveyor belts are visually inspected and tested to verify their conformance with the customer's specifications and their sustainability for the desired application.

Oriental Rubber has the most modern rubber testing laboratory to ensure conformance of the product with the international standards. Important technical parameters are tested in the fully equipped laboratory, some of which are given below.



A. Compounds	D. Pipe Conveyor
Oscillating die rheometer	3-point bend test
Moving die rheometer	Pipe – outward force testing machine
Mooney viscometer	Pipe – Bending test rig
Air circulating ageing oven	Troughability
Swelling	Pipe fatigue test
B. Destructive Tests	Aspect ratio of pipe under load and no load conditions
Load cyclic fatigue test	E. Fire Retardant Tests
10T UTM machine – Rip/Tear resistance	Flame test chamber (ISO/CAN/SANS/AS/IS)
25T cord breaking strength	Drum friction test(ISO/CAN/SANS/AS/IS)
Abrasion tester	Propane midscale gallery test (MSHA)
Troughability	Methane midscale gallery test (SANS)
Scott fatigue test	LOI testing
C. New Generation Belt Test	Antistatic test
Rip Resistance	
Impact Resistance	
Tear Resistance	
Red Hot Coal Bed Test	

Manufacture of the MAXX STEELFLEX® belts are carried out in the latest steel cord line, which ensures equal tension on all the cords during vulcanization. Online records of vulcanization are maintained.

## INDUSTRIES



**Mining**



**Steel**



**Cement**



**Ports**



**Power**



Locations shown are for graphical representation only. Map is not to scale.

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Steel Cord Belts

