

STEEL CORD BELT



Totally new. Totally Australian

The new Fenner Dunlop plant in Kwinana, WA has the largest, most modern steel cord belt manufacturing line in the world



Fenner Dunlop Conveyor Belting Australia, a member of the worldwide Fenner Group, has developed a multi-million dollar steel cord belt manufacturing facility at their Kwinana site in Western Australia.

The new plant features a state of the art Siempelkamp production line incorporating the largest press and creel ever built by Siempelkamp.

Built to meet the growing demand for high quality steel cord belting, particularly in the iron ore industry, the plant is the first belting factory ever built in Western Australia and is

ideally located to service the local market as well as developing markets in Asia, Africa, India and South America as well as Europe.

Not only does the new Facility expand the Fenner Groups' existing steel cord belt manufacturing capacity but it meets the need for a wider choice of locally manufactured belting for Australian end users.

Product development and technical transfer between Fenner's four steel cord manufacturing sites will be a key part of the new sites contribution to the Group and belt users globally.

Now for the first time, the Total Package

FENNER  DUNLOP
CONVEYOR BELTING AUSTRALIA

Steel cord belt
Rubber ply belt
Solid woven belt
Splicing materials
Installation and splicing
Maintenance and condition monitoring.

Manufacturing capability at the Kwinana, WA plant

Plant statistics

Site – 4.63 ha

Building – 15,000 square metres

Press line – 160 metres

Press dimensions – 18.5 metres long x 3.5 metres wide (the world's largest)

Pressure delivery – 156 cylinders delivering a total curing force of 25,000 tonnes

Creel – 520 cable drums (the largest ever built by Siempelkamp)

Tension control – Clamper and tensioner (the largest ever built by Siempelkamp) capable of maintaining equal tension over 264 cables to within +/- 2%

Product statistics

Maximum belt width produced – 3200mm

Maximum roll weight – 70 tonnes

Maximum package size – 8.5 metres long x 4 metres high x 4 metres wide

Features and benefits

High capacity. High belt speeds and deep troughing keep materials moving.

Longevity. Combination of high strength and outstanding flexibility produces longer lasting belts.



Straight tracking. Belts are pre-tensioned during manufacture with alternating S and Z twists cords.

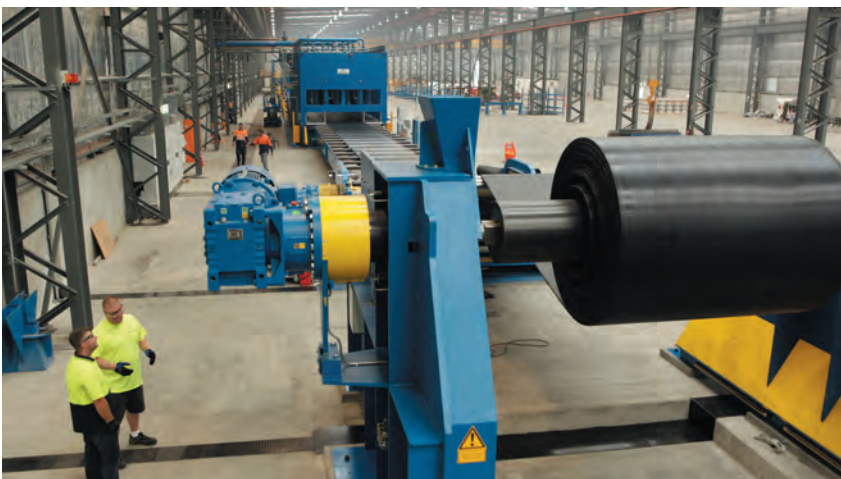
Minimum load disturbance. High tensile strength means transfer points are reduced or eliminated and loads go smoothly, without surges, over the idlers.

Unsurpassed quality . More than for any other belt type, the quality and technical compliance of steel cord belting is directly the result of the quality and control possible from the manufacturing equipment.

With the most advanced and best engineered production line in the world the plant produces product that represents a major step forward in the supply of steel cord belting to all users.

Full package support. Fenner Dunlop, with their existing extensive product range and Service

network are the only manufacturer of steel cord belting that are able to support their complete range with factory trained and accredited installation, maintenance and product monitoring teams to ensure maximum performance outcomes will be gained by all Fenner Dunlop clients.



Apex steel cord belt range

Belt constructions

The specifications listed are typical of those manufactured by Fenner Dunlop but by no means an exhaustive list of the total plant capability.

Specially developed or application specific specifications and construction variations to allow splicing compatibility within existing conveyor systems are available upon request.

For further details contact your Fenner Dunlop Conveyor Belting Australia representative.

Transverse reinforcement

For severe applications, protection from ripping and penetration can be provided with a range of breakers and rip protection cords.

Contact your Fenner Dunlop Conveyor Belting Australia representative for a recommendation.

	Designation (kN/m)	Minimum cover thickness (mm)	Cord diameter (mm)	Cord spacing (mm)	Belt mass Standard (kg/m ²)	Belt mass Grade S (kg/m ²)	Belt thickness (mm)
AS1333 Constructions	ST500	4	2.6	13.8	14.1	16.3	10.6
	ST560	4	2.8	13.8	14.7	16.9	10.8
	ST630	4	3.0	13.8	15.2	17.4	11.0
	ST710	4	3.1	13.8	15.5	17.6	11.1
	ST800	4	3.4	13.8	16.4	18.5	11.4
	ST900	4	3.8	15.3	17.2	19.3	11.8
	ST1000	4	4.0	15.3	17.9	20.0	12.0
	ST1120	4	4.2	15.3	18.4	20.5	12.2
	ST1250	5	4.5	15.3	21.8	24.4	14.5
	ST1400	5	4.8	15.3	22.7	25.3	14.8
	ST1600	5	5.5	17.3	24.4	27.0	15.5
	ST1800	5	6.0	17.3	25.9	28.5	16.0
	ST2000	5	6.4	17.3	27.2	29.8	16.4
	ST2240	5	6.8	17.3	28.8	31.4	16.8
	ST2500	6	7.4	19.4	32.4	35.4	19.4
	ST2800	6	8.0	19.4	34.3	37.4	20.0
	ST3150	6	8.6	19.4	36.8	39.9	20.6
	ST3550	7	9.2	19.4	41.3	44.8	23.2
	ST4000	7	9.8	19.4	43.7	47.2	23.8
	ST4500	8	10.4	19.4	48.7	52.7	26.4
Fixed Pitch Constructions	ST5000	8	11.0	19.4	51.2	55.2	27.0
	ST5600	9	11.8	19.4	57.4	61.8	29.8
	ST6300	9	12.8	20.0	61.1	65.5	30.8
	ST800	4	3.2	12.0	14.7	16.9	11.2
	ST1000	4	3.8	12.0	16.0	18.2	11.8
	ST1250	4	4.0	12.0	16.6	18.7	12.0
DIN / ISO Constructions	ST1600	5	4.6	12.0	20.3	22.9	14.6
	ST2000	5	5.2	12.0	21.8	24.4	15.2
	ST2500	5	5.6	12.0	22.9	25.6	15.6
	ST1000	4	3.6	12.0	17.3	19.5	11.6
	ST1250	4	4.4	14.0	19.6	21.7	12.4
	ST1600	5	5.2	15.0	24.1	26.7	15.2
	ST2000	5	5.2	12.0	25.4	28.0	15.2
	ST2500	5	6.8	15.0	30.0	32.6	16.8
	ST3150	6	7.6	15.0	35.7	38.7	19.6
	ST3500	6	8.2	15.0	38.2	41.2	20.2
	ST4000	6	8.6	15.0	40.2	43.1	20.6
	ST4500	7	9.6	16.0	45.9	49.3	23.6
	ST5000	8	10.6	17.0	51.6	55.5	26.6
	ST5400	8	11.0	17.0	53.5	57.4	27.0

Operating details

Splice details

MINIMUM PULLEY DIAMETERS

Belts operating at 60-100% of allowable working tension

Belts operating at 30-60% of allowable working tension

Designation (kN/m)	Allowable working tension (kN/m)	Elastic modulus (kN/m)	Type A (mm)	Type B (mm)	Type C (mm)	Type A (mm)	Type B (mm)	Type C (mm)
ST500	75	36000	400	315	250	315	250	200
ST560	84	40320	450	360	280	360	280	225
ST630	95	45360	450	360	280	360	280	225
ST710	107	51120	500	400	315	400	315	250
ST800	120	57600	500	400	315	400	315	250
ST900	135	64800	560	450	360	450	360	280
ST1000	150	72000	630	500	400	500	400	315
ST1120	168	80640	630	500	400	500	400	315
ST1250	188	90000	710	560	450	560	450	360
ST1400	210	100800	710	560	450	560	450	360
ST1600	240	115200	800	630	500	630	500	400
ST1800	270	129600	900	710	560	710	560	450
ST2000	300	144000	1000	800	630	800	630	500
ST2240	336	161280	1000	800	630	800	630	500
ST2500	375	180000	1120	900	710	900	710	560
ST2800	420	201600	1250	1000	800	1000	800	630
ST3150	473	226800	1250	1000	800	1000	800	630
ST3550	533	255600	1400	1120	900	1120	900	710
ST4000	600	288000	1400	1120	900	1120	900	710
ST4500	675	324000	1600	1250	1000	1250	1000	800
ST5000	750	360000	1600	1250	1000	1250	1000	800
ST5600	840	403200	1800	1400	1120	1400	1120	900
ST6300	945	453600	2000	1600	1250	1600	1250	1000

ST800	120	57600	500	400	315	400	315	250
ST1000	150	72000	560	450	360	450	360	280
ST1250	188	90000	630	500	400	500	400	315
ST1600	240	115200	710	560	450	560	450	360
ST2000	300	144000	800	630	500	630	500	400
ST2500	375	180000	900	710	560	710	560	450

ST1000	150	72000	560	450	360	450	360	280
ST1250	188	90000	630	500	400	500	400	315
ST1600	240	115200	800	630	500	630	500	400
ST2000	300	144000	800	630	500	630	500	400
ST2500	375	180000	1000	800	630	800	630	500
ST3150	473	226800	1120	900	710	900	710	560
ST3500	525	252000	1250	1000	800	1000	800	630
ST4000	600	288000	1250	1000	800	1000	800	630
ST4500	675	324000	1400	1120	900	1120	900	710
ST5000	750	360000	1600	1250	1000	1250	1000	800
ST5400	810	388800	1600	1250	1000	1250	1000	800

Designation (kN/m)	Splice type	Splice length (mm)
ST500	SINGLE	700
ST560	STEP	700
ST630		750
ST710		750
ST800		800
ST900		850
ST1000		900
ST1120		950
ST1250		950
ST1400		1000
ST1600		1100
ST1800		1150
ST2000		1200
ST2240		1300
ST2500		1450
ST2800	TWO	2300
ST3150	STEP	2400
ST3550		2550
ST4000		2700
ST4500		2900
ST5600	THREE	3500
ST5000	STEP	3650
ST6300	Contact us for recommendation	

ST800	SINGLE	750
ST1000	STEP	800
ST1250	↓	850
ST1600	TWO	1450
ST2000	STEP	1600
ST2500	↓	1700

ST1000	SINGLE	800
ST1250	STEP	900
ST1600	↓	1000
ST2000	TWO	1600
ST2500	STEP	2000
ST3150	↓	2200
ST3500	THREE	2750
ST4000	STEP	2900
ST4500	↓	3150
ST5000	Contact us for recommendation	
ST5400	Contact us for recommendation	

Steel cord splicing methods

Splicing conditions

For the optimum operation of a steel cord belt conveyor highly efficient splices are critical.

To achieve maximum splice efficiency it is necessary to have:

- High quality belting incorporating the highest quality rubber compounding in both the belt covers and bonder rubber.
- Totally compatible, belting manufacturer supplied, fresh, splicing materials
- Correctly designed splice layout
- Competent, factory trained and approved, splicing technicians and equipment

Fenner Dunlop is able to meet all of these requirements because of our extensive service network and RTO status in splicer training.

Typical splice patterns are shown here with dimensional information listed on page 5.

For non listed belt specifications or special requirements please contact your Fenner Dunlop Conveyor Belting Australia representative who will be pleased to source specific recommendations for your application.

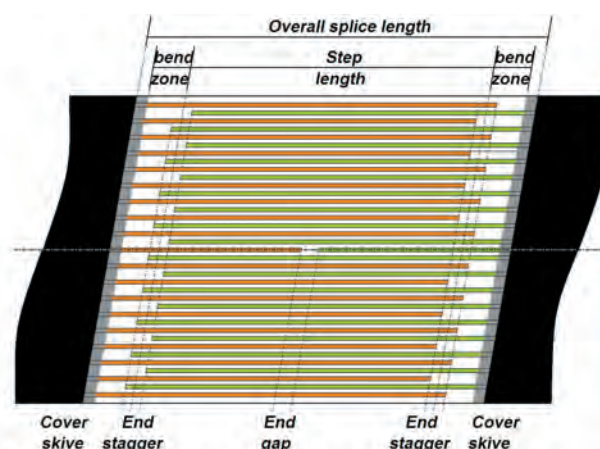
Splicing materials

When ordering splicing materials the following codes apply:

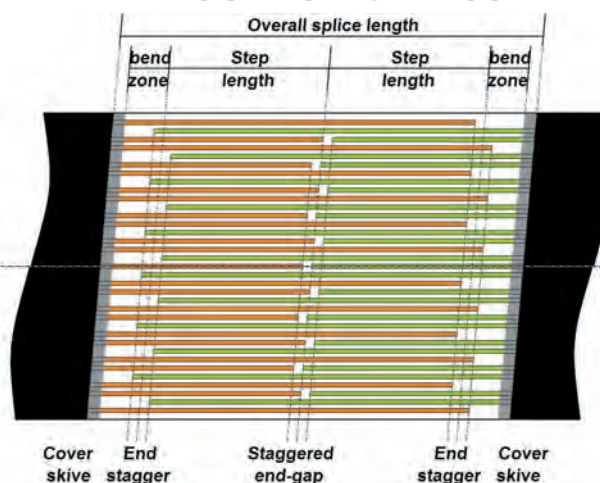
Grade	Cover rubber	Bonder rubber	Solution
M	3525	1525	S19
N	3525	1525	S19
A	3526	1525	S19
S	3533	1530	S17
K	3535	1535	S19

Special grades – M-AR, Super M, Enhanced Ozone resistant, etc refer Fenner Dunlop Conveyor Belting Australia Technical Department for recommendations.

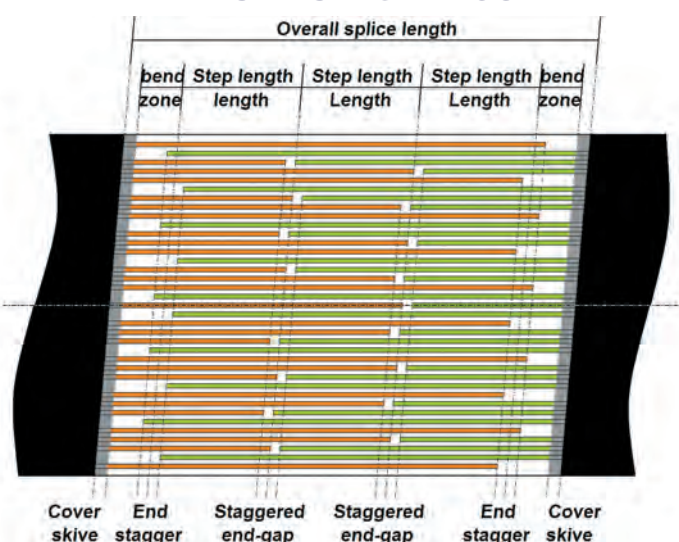
ONE STEP SPICE LAYOUT



TWO STEP SPICE LAYOUT



THREE STEP SPICE LAYOUT



Product testing

The latest equipment in-house supported by Global back-up facilities at Fenner's other steel cord plants in Canada, USA, Sth Africa and Central R&D in UK

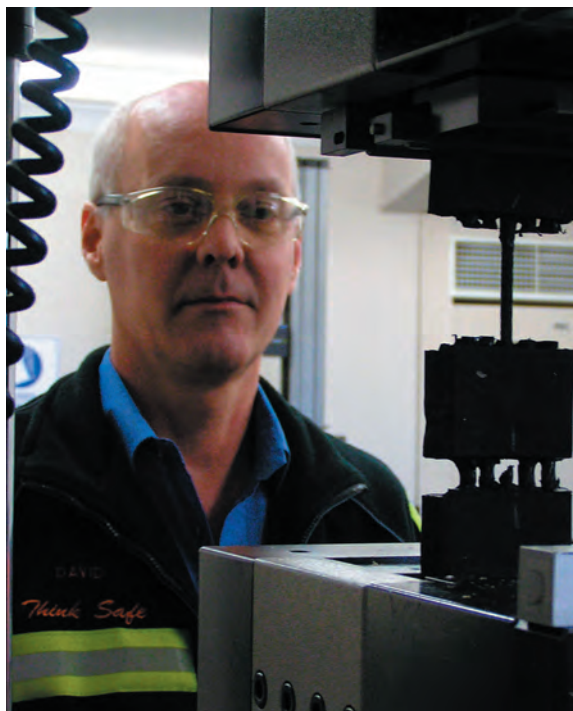
The Fenner Dunlop steel cord manufacturing site incorporates a state of the art product testing and R&D laboratory to ensure product compliance with the strictest local, international and Client nominated product standards.

R&D as well as failure analysis and comparative product testing will form a significant component of the laboratories workload.

Key testing equipment within the laboratory complex includes:

- Instron tensile tester – Satec 600kN hydraulic model
- Instron 8801 Dynamic test unit
- Zwick Abrasion Tester
- Prescott moving die Rheometer and Mooney viscosity test unit
- Air permeability test rig – IDM

In addition, normal laboratory miscellaneous equipment such as slitters, mills, aging ovens etc. mean that the laboratory is fully self contained and capable of all of the development and QC functions appropriate to such a leading edge production facility.



EagleEye™, the intelligent belt monitoring system

EagleEye™ is the most advanced combined rip detection and continuous belt monitoring system in the world.

Utilising Programmable Logic Control (PLC), the system constantly keeps a watchful eye over your conveyor. It gives users instant information about the conveyor belt condition and gives 24/7 protection via the conveyor's control system to sound an alarm or stop the belt should any significant damage occur.



Continuous belt protection

On installation, EagleEye's PLC system runs a 'signature profile' on the complete belt length, used as the bench mark against which the next belt cycle is measured. Any changes to the 'signature profile' are then highlighted on local or remote displays as new damage and assigned a rating, depending on severity. Damage can be accepted after assessing and the information on the damage recorded, a new signature profile is then established. This profile shows changes seen in any area of the belt (splices, cord condition, loops, panels).

Using the pre-set damage level facility, the belt can be automatically stopped or just a warning signal given depending on the severity of the damage.

EagleEye™ rip detection

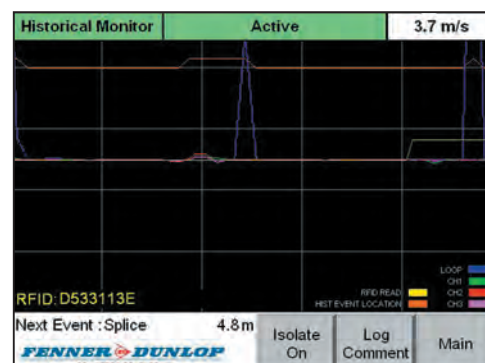
The EagleEye™ system has the capability of giving Rip Detection by either Magnetic Flux Leakage Panels or Conductive Loops or a combination of both.

The location of rip damage and cord condition monitoring is done by a positional algorithm

that utilises any of the following information that is available. RFID (Radio Frequency ID) tags, various types of driven Encoder outputs, event sequences such as splices, loops and panels.

Remote Steel Cord Conveyor Belt Monitoring System

Via Virtual Private Network (VPN) access or satellite remote access, data is downloaded, analysed and an electronic report is sent to advise the location of damage within your belt with millimetre precision. This remote monitoring capability enables you to request scanning at any given time.



Operators monitor screens

For ease of operation, the system's monitor screens are embedded into the mine-wide PLC network displays. It provides a Visual Trace of the belt's movement, in real time, and highlights any damage that has occurred.

The Tracking window shows the speed of the belt, in metres per second, and the distance any given point has travelled past the MFL Sensor. The New Damage window highlights any new damage that has occurred following the belt's signature profile. This window also provides information on the date damage occurred, its position, its severity and ongoing development.

Belt installation and splicing services

Belt installation and splicing services

Fenner Dunlop has over 45 years experience providing conveyor maintenance to a wide range of mining clients supplying labour, equipment and materials. Our Philosophy has been developed to maximise our ability to fit in with our clients' systems and needs to ensure their equipment is maintained to optimum and practical levels. We offer:

- Emergency breakdown callout service
- Scheduled maintenance
- Full time site presence
- Remote location service contracts
- Project installations
- Specialised change outs systems and procedures for reduced down time
- Splicing innovation (having developed new splicing methods for greater life)
- Local presence from service branches located close to our clients throughout Australia
- The highest standard of equipment - all fully certified, calibrated and maintained to the optimal level of performance
- Fully trained and nationally accredited Service Staff



Mechanical Services

At Fenner Dunlop we believe mechanical components play a big part in the efficient running of a conveyor system and in maximising the life of the conveyor belt. Hence we have become experts in providing practical cost effective solutions for bulk materials handling offering:

- Dedicated mechanical service teams operating independently of our belt service crews, supporting the mining industry
- Conveyor cleaner supply, installation, inspections and servicing
- Conveyor system aligning and tracking
- Condition monitoring and carry back testing
- Load point design checks and impact bed installations
- Complete pulley refurbishment and manufacture.



Technical Services

Not happy with just maintaining the system after the fact, Fenner Dunlop offers a range of services to assist with initial design and predictive maintenance such as:

- Conveyor design
- Conveyor inspections with automatic reporting including a summary showing areas needing urgent attention
- Belt mapping service
- Financial reporting on Whole Of Life cost and \$/ton highlighting details of areas of high spend
- Non-destructive testing such as belt thickness testing incorporating predictive belt life details to aid planning of conveyor belt change outs and maintenance budgeting
- Independent splicing QA
- Belt pull calculations to help ensure the safe and controlled installation of conveyor belting.

Fenner Solidwoven PVC belting

Revesby, NSW



Meeting the fire resistance and antistatic requirements of all current safety standards Fenner Solidwoven PVC belting manufactured at our Revesby plant offers exceptional conveying performance at a highly economical rate.

Designed primarily for underground coal mining applications Fenner Solidwoven PVC belting is ideally suited for longwall and more traditional mine environments.

The PVC cover and carcass formulations combined with Fenner's unique fabric designs produces belting which is not only fire safe, but tough enough to handle the difficult conditions encountered in underground mines.

Smooth, long wearing and easy cleaning covers make maintenance and belt cleaning a straightforward and manageable process.

High plasticizer loadings ensure premature hardening and cracking of the belt covers will not occur and so a long trouble free performance life can be assured with no increase in maintenance or belt cleaning needs for the belts operating life.

The Fenner Range is comprehensive and, when combined with the Apex neoprene ply belt and steel cord Range, ensures that the full spectrum of miners' needs both now and into the future are covered by the best belting products available – all manufactured by Fenner Dunlop Conveyor Belting Australia here in Australia.

Designation	Strength (kN/m)	Thickness (mm)	Weight (kg/m ²)	PULLEY DIAMETERS		
				High T (mm)	Low T (mm)	
Drive/Head/ HT Bend	LTU	Tail				
FR5000	875	11.0	13.9	500	400	355
FR6500	1140	11.7	14.7	630	450	400
FR8000	1400	13.4	17.0	750	500	450
FR9000	1600	14.7	18.5	800	630	600
FR10000	1750	14.7	18.5	800	630	600

Apex and Dunlop Plied Rubber Belting

West Footscray, Victoria

At Fenner Dunlop our philosophy is to supply precisely the right belt for the application – not just the stock belt that's closest to the required specifications.

Our plant is purpose-designed to manufacture cost-effective custom-made conveyor belting, offering clients maximum production flexibility.

Fenner Dunlop can provide unmatched experience and expertise to help ensure you make the correct belt selection, with significant savings and maintenance costs.

Constant R&D programs in Australia ensure you have access to the latest technology in belt design and manufacture. And, because Fenner Dunlop Australia is part of the Fenner Dunlop Conveyor Belting Division, access is both unlimited and global.

Product range

Maximum belt width 2100mm
Maximum belt gauge 38mm (1.5 inch)

Reinforcing Fabrics

(A) POLYESTER/NYLON (PN or EP)

Standard Weave

PN150 – PN800

Crow's Foot Weave (CFW)

(Super high tear strength)

PN350 – PN630

Double Weave

(High impact resistant and fastener holding)

PN450 – PN630

(B) Nylon/Nylon (NN or PP)

NN140 – NN500

(C) Polyester/Polyester (PP or EE)

(Acid resistant fabric)

PP150 – PP400

(D) Cotton/Cotton (BB or CC)

CC65 – CC80



Cover Rubber Grades

Grade	Main Properties
FRAS-S	Underground coal mine certified, high abrasion resistant, anti-static made to AS4606
FRAS-EF	Moderate to high fire resistant and anti-static
FRAS-F	Moderate to high fire resistant
FRAS-E	Anti-static version of N
FRAS-DEF	High abrasion resistant EF grade
FRAS-K	Moderate fire resistant, anti-static with excellent abrasion resistance
FRAS-KD	High abrasion resistance K grade
FRAS-KSOR	Some oil resistance K grade
M	High abrasion resistant and heavy impact resistance
MA	Heavy impact resistance and superior abrasion resistant
M Super	Superior impact/abrasion resistance
XCG	Special cut and gouge resistant
A	Superior abrasion resistant
N	General purpose abrasion/impact resistant
ORS	Oil resistant
SOR	Mild oil resistance
HTN	Heat and oil resistant nitrile
HRNR	Low to medium heat resistance natural rubber
CRHR	Medium to high heat resistance
EPT/GP	High to very high heat resistance
EPT/S	Ultra high heat resistance

Additional ozone resistant is available on request

Packing Options

Belt rolls can be manufactured to 4.1m diameter and 25 tonne weight capacity. This is then inspected, tested and delivered to your site on one of the following core options:

Steel plate reinforced wooden core
Fully enclosed wooden drum
Steel core
Full steel spider reel
Full steel spider reel with enclosed sides
Full steel round reel

Australia-wide network



MANUFACTURING PLANTS

West Footscray

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Fax (07) 4054 5260

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Fax (07) 4936 1255

Mt Isa Region

Fenner Dunlop Conveyor Services
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Wedgefield WA 6724
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Fax (08) 9172 5373

Karratha

Fenner Dunlop Conveyor Services
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Karratha WA 6714
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Fax (08) 9183 8552

SOUTH AUSTRALIA

Adelaide

Fenner Dunlop Conveyor Services
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Fax (08) 8347 1087

Whyalla

Northern Belting Specialists
Shiell Street
Whyalla SA 5600
Phone (08) 8644 0322
Fax (08) 8644 1533

NEW SOUTH WALES

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Fax (02) 9832 2400

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Unanderra NSW 2526
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Fax (02) 4272 9223

Hunter Region

Fenner Dunlop Conveyor Services
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Beresfield NSW 2322
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Fax (02) 4966 0742

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Fax (07) 3348 9772

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Fax (03) 6435 1929

Hunter Region

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Fax (02) 4970 4061

Melbourne

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Fax (03) 9768 3370