Solid Woven Conveyor Belting

The World’s Leading Conveyor Belt Company

fennerdunlopeurope.com
CONVEYORS - THE BACKBONE OF A MODERN MINING OPERATION

Without efficient conveying, mine production can be severely affected. The efficiency of any conveyor depends largely on the trouble-free working life of the belt itself, yet the conditions under which it has to operate can be extremely arduous, having to resist ripping, impact, abrasion, bacteria, acid, water and general mechanical damage.

With over 60 years experience in the manufacture of conveyor belting, coupled with our innovative leadership in product design, manufacturing, application engineering and technical support plus a total dedication to customer service, Fenner Dunlop is the first choice for conveyor belting products and services.

Fenner Dunlop is the world’s largest manufacturer of conveyor belting for mining and industrial applications. With twelve manufacturing facilities on five continents, Fenner Dunlop is uniquely positioned to provide the most comprehensive conveyor belting service available today.

Fenner Dunlop solid woven belting is manufactured to the same exacting standards in the UK, China, India, South Africa and Australia.

THE ADVANTAGES OF SOLID WOVEN CONVEYOR BELT

Our extensive knowledge of conveyor belt applications, fabric weaving and polymer technology are combined in our market-leading range that has been at the forefront of development for over half a century.

Fenner Dunlop solid woven (monoply) belting, the first choice of countless mines throughout the world, has a number of significant advantages including:

- Fire resistant and anti-static properties which meet the most stringent safety standards in the world
- Greater flexibility, making it easier to trough and track when installed
- A solid woven one piece carcass with no risk of ply separation
- Covers which form an integral bond preventing any form of belt delamination
- High resistance to longitudinal tears
- High dynamic and static vulcanised joint properties
- Excellent retention of mechanical fasteners
- High resistance to impact damage
- Impervious to attack from acid, water, oil, bacteria and chemicals
- High resistance to edge wear
In many respects the carcass is the most important part of a conveyor belt since it provides the tensile strength necessary to move the loaded belt and absorb the impact of material falling on to it, as well as providing the bulk and lateral stiffness required for load support and the strength required for bolt and/or fastener holding.

The Fenner Dunlop solid woven carcass is a highly complex design, utilising warp yarns interlocked and tied into one single mass by means of a uniquely designed binder warp system. Nylon or polyester load bearing warp yarns and nylon or nylon/cotton weft yarns are used. Various combinations of these synthetic and natural fibres ensure that the requirements for impact resistance, belt elongation, flexibility (for troughing and wrapping round small diameter pulleys), load support and fastener retention are met. Where there is a specific need, pile warp yarns may be included to further improve impact resistance. Additional edge reinforcement is included where required.

The solid woven fabric is 100% impregnated with PVC to make the finished carcass. Fenner Dunlop's unique, impregnation system renders the carcass impervious to attack from moisture, dirt, chemicals, bacteria and oils.

The countless options available in the construction of the Fenner Dunlop carcass enables the end user to define specific operational requirements and receive a custom-built belt exactly suited to a specific application.

Following the impregnation process, PVC covers are applied to the top (carrying) and bottom (drive) surfaces of the belt to protect the carcass and extend service life. Cover type, quality and thickness are matched to specific customer requirements.

PVC covers can be formulated to meet any worldwide fire resistance specification and to offer resistance to other hazards, such as oils and chemicals. Special compounds can also be used to give improved abrasion resistance or a higher coefficient of friction.

For use above and below ground and where a higher coefficient of friction is required, rubber covers are vulcanised to the parent belt. These can be fire-resistant if required. Nitrile rubber covers are recommended for short-centre, high trip rate, steep incline (15-22 degrees), high tonnage installations above and below ground, coal preparation plants, coke works and for hard rock conveying applications.

Tailor-made, low stretch Fenner Dunlop belting is also suitable for a variety of specialist applications, including bucket elevators and similar installations where take-up is limited. Other application-specific belts can be designed and custom built with the assistance of a Fenner Dunlop engineer, ensuring the correct selection of belt construction and covers every time.
THE FENNER DUNLOP BELT RANGE

PVC (FR)
Meeting or, in many cases, exceeding the fire-resistance and anti-static requirements of all worldwide safety standards, PVC belting is designed primarily for use underground and in other potentially hazardous situations. PVC compounds, with cover thicknesses of up to 4mm, can be varied to suit any specific application. PVC belting has a proven superior service life in coal mining and similar applications where high, continuous output depends on belt reliability.

The PVC covers give excellent cleaning properties and, together with the advantages of a solid woven carcass, provide a belt ideal for conveying coal, potash, phosphate, fertiliser, salt, gypsum and clay, as well as for use in the timber industry and other applications where moist, sticky materials are handled.

PVG (FRSR)
Where a high level of fire resistance is required, together with special cover properties more readily achievable with synthetic rubber compounds, PVG belt is the ideal solution. This is PVC belt with the addition of single or double nitrile rubber covers of up to 6mm thick. Increased belt life, steep gradient and high trip rate conveying are the main advantages of PVG. It is generally used on high tonnage drift and trunk conveyors as well as in power stations and coal preparation plants.

SR
Where there is no requirement for fire resistance SR, a rubber-covered belt for conveying abrasive or difficult minerals, is an ideal solution. A durable rubber cover, compounded for maximum abrasion resistance up to 6mm thick, combined with our PVC impregnated solid woven carcass has proven ideally suited to high impact installations such as the conveying of aggregates and similar hard, sharp materials.
CUSTOMISED CONVEYOR BELTING

SPECIAL CARCASS PROPERTIES
Carcass designs can be customised to include one or more of the following features:

- Increased fastener holding efficiency for high speed/tonnage applications
- Improved lateral stability to further enhance resistance to longitudinal splitting on high capacity/deep trough conveyors
- High tear and rip resistance for arduous applications where belts are difficult to align and maintain
- Additional carcass mass to allow belts to negotiate small radius catenary curves which would normally require steel cord belt (to prevent the belt lifting off the structure under no load conditions)
- The ability to operate at temperatures in excess of 90°C (the normal limit for standard constructions)
- Improved edge wear protection for extensible and similar applications

SPECIAL COVERS
Certain applications require conveyor belts with special properties and our highly experienced in-house research and development team has developed a range of PVC compounds for covers, all of which are available with fire-resistant properties, including:

- Easy clean covers for handling wet, sticky materials such as chalk, clay and lignite
- High coefficient of friction covers for additional grip on pulleys and load retention on inclines
- Covers suitable for low temperature and arid environments
- Leach resistant covers

HI-VIS
High Visibility (Hi-Vis) yellow covered belting provides improved safety and inspection capabilities, particularly on underground conveyors. The enhanced visibility of the yellow covers significantly improves the sighting of the conveyor’s moving parts and structure against the belt, allowing easier inspection and making the conveyor itself more conspicuous. In use in the UK, Scandinavia and Canada, the advantages of Hi-Vis belting have been recognised by engineers as a useful feature in improving safety around conveyors - always an area of concern.

Hi-Vis belting is a product innovation driven by the need for improved safety and is especially advantageous on man-riding conveyors, making the belt edges and conveyor moving parts more obvious to the rider.

Belting is also available in a range of other colours to assist in belt identification.
Externally assessed to ISO 9001:2008, the Centre of Excellence is constantly seeking ways to make product and process improvements as well as researching new manufacturing techniques and materials. It is staffed by experts in engineering, chemistry, polymers and textile technology.

A key function of the Centre of Excellence is the continual testing of products to ensure that the very highest standards are met. Conveyor belting, particularly for use in underground applications, is subject to rigorous safety testing in our state-of-the-art facilities to ensure that all belts meet the most stringent requirements. Our in-house dynamic performance testing ensures that every belt is fit for purpose.

**QUALITY TESTING**

All Fenner Dunlop belting is produced within our Quality Management System which is compliant with ISO 9001:2008. As part of this system, the quality of all belt is verified prior to despatch by a programme of comprehensive testing.

Typically this testing will include:

- Dimensional measurements
- Warp and weft tensile strengths
- Tear strength
- Elongation
- Cover adhesion
- Small scale safety tests (laboratory flame and electrical resistance)
- Abrasion resistance
- Transverse stability

**PRODUCT TESTING**

Our UK facility is the worldwide Centre of Excellence for Fenner Dunlop solid woven conveyor belting, operating at the forefront of research and development.

- Accelerated life testing on both the belt and related jointing methods
- Field problem simulation
- Troughing/transition distance evaluations
- Product and material development testing
- Specific belt testing to individual customer requirements

**DYNAMIC PERFORMANCE TESTING**

It is necessary to ensure that every belt will perform flawlessly throughout its operating life and that the jointing technology used, be it mechanical fasteners or vulcanised splices, performs as expected.

Our testing facility is equipped with a range of dynamic test rigs enabling us to perform:

- Accelerated life testing on both the belt and related jointing methods
- Field problem simulation
- Troughing/transition distance evaluations
- Product and material development testing
- Specific belt testing to individual customer requirements
SAFETY TESTING

The Fenner Dunlop approach to fire safety testing is based on the premise that a belt should never be the cause of a fire, should be difficult to ignite, and if ignited by an external fire source, should not propagate the fire.

Whilst fire resistance specifications vary from country to country, belts can be formulated to meet any fire performance specifications in the world. The tests carried out on conveyor belts to assess their compliance with fire safety standards are associated with four particular hazards.

1. DRUM FRICTION TEST

The danger associated with a stalled belt and a driven rotating drum or pulley resulting in frictional heat build up.

A test piece of conveyor belt, suitably mounted and tensioned, is wrapped half way around a rotating steel drum, simulating a stalled belt. The test is continued at specified tensions for a given time period, or until the belt breaks. The presence, or absence, of flame or glow is noted and the temperature of the drive drum is measured. This test has probably been the major single contributor to mine safety in respect to conveyor fire prevention.

2. LABORATORY FLAME TEST

The possibility of igniting the considerable mass of a conveyor belt with a relatively small ignition source.

This hazard is usually assessed by the application of a small "Bunsen" type flame to a belt sample and observation of the effect. The time taken for all flame and/or glow to self-extinguish is noted.

3. GALLERY FIRE TEST

The possibility of a belt, ignited from a larger ignition source, spreading the fire to other areas (often referred to as fire propagation).

This hazard can only be assessed by a gallery fire test, which utilises a sample length of conveyor belt supported by a steel trestle placed in a cabinet of specified dimensions. A continuous flow of air is drawn through the cabinet whilst the sample of belt is ignited at one end by a gas burner for a defined period of time.

Upon removal of the flame source the length of undamaged belt is quantified by physical measurement and/or mathematical means. Fenner Dunlop’s in-house test facility is constructed in accordance with EN 1288-1 (Section 6) Mid Scale Fire Propagation Test and is the only one operating in the UK.

4. ELECTRICAL RESISTANCE TEST

The possible build-up and subsequent discharge of static electrical charge on moving conveyors.

Electrical resistance is determined by passing a current of specified voltage between electrodes placed on the surface of the belt. The internationally recognised acceptance criteria for electrical conductivity is a maximum resistance of $3.0 \times 10^8$ Ohms ($300\text{M}$ Ohms). Fenner Dunlop’s PVC and rubber compounds are specially formulated to ensure that belts are sufficiently conductive to avoid the build up of static electricity.
SAFETY & QUALITY ASSURANCE

SAFETY

Fenner Dunlop conveyor belting meets the safety requirements of all the major mining nations and has been tested and/or approved by the appropriate national authorities, including:

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>APPLICABLE STANDARD</th>
</tr>
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<tbody>
<tr>
<td>Australia</td>
<td>AS 4606</td>
</tr>
<tr>
<td>Belarus</td>
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Fenner Dunlop solid woven conveyor belting for use underground can be manufactured to all relevant international standards.

QUALITY ASSURANCE

In accordance with the requirements of our major customers, the planning, design, manufacture and quality control procedures of Fenner Dunlop have been assessed to ISO 9001:2008, the International Standard for assessment of a manufacturer’s quality system.

The system approved under the above standard has been accepted by the USA Mines Safety and Health Commission. A similar assessment of Fenner Dunlop has been carried out by the Canadian Federal Energy Mines and Resources Department against the Canadian Standard CAN3Z299, 1-78 Quality Assurance Programme Requirements and by the Spanish LOM Authority.

<table>
<thead>
<tr>
<th>BELT DESIGNATION</th>
<th>WARP STRENGTH</th>
<th>WEFT STRENGTH</th>
<th>BELT THICKNESS*</th>
<th>BELT WEIGHT*</th>
<th>MINIMUM RECOMMENDED DRUM DIAMETERS</th>
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<tr>
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<td>20</td>
<td>22.6</td>
<td>1500</td>
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</table>

* Nominal values for specific belt constructions with 1+1 PVC covers

Specification sheets detailing the actual data for any belt type supplied can be forwarded on request. For thicker covers add 1.3kg/m²/mm for PVC and 1.4kg/m²/mm for nitrile covers.
BELT DESIGNATION

Belts can be produced to various tensile specifications, using either polyamide (nylon) or polyester base warp yarn. Some markets still prefer to specify belt types based on tensile strength expressed in lbs/in width, whilst others opt for the preferred ISO nomenclature expressed in N/mm. The table on page 8 shows typical figures for minimum warp and weft strengths, belt thickness and weight for a selection of belt types, based on 1mm PVC covers. For thicker covers, add 1.3 kg/m²/mm for PVC covers and 1.4 kg/m²/mm for nitrile covers.

Alternative constructions are available which give values higher than those in the table. This is particularly relevant to weft strength, where special yarns/designs may be recommended for improved properties such as fastener holding, load support and weft stability.

The use of such special yarns may increase the belt weight and thickness which could be critical for shipping purposes or underground transportation. A Fenner Dunlop engineer should always be consulted where this is likely to be an issue.

BELT WIDTH

Any width up to 2000mm can be manufactured. Whilst we recommend customers to follow the ISO range of preferred widths, non-standard widths can be supplied. Slit-edge belting is also available upon request.

BELT THICKNESS

When considering cover thickness, please be aware of the high textile content of solid woven and the properties afforded by the increased carcass bulk compared to rubber plied belting. Consequently, thinner covers may generally be chosen than would normally be associated with an equivalent plied product, the enhanced textile density of a solid woven carcass providing the necessary load support and resistance to impact.

BELT WEIGHT

Customers should be aware that lower belt weights may be advantageous on long conveyors as a means of reducing power consumption. High lift conveyors can incur a correction for slope tension which may be avoided by careful belt selection to minimise weight, resulting in considerable cost savings on certain applications, for example drift conveyors.

DRUM DIAMETERS

The drum diameters quoted are the minimum generally recommended. Given specific information regarding wrap configurations, tensions, belt speeds and jointing methods, it may be possible to recommend smaller drums.

ROLL LENGTHS

Customers are asked to specify their maximum acceptable roll diameters and weights so that belts can be supplied in the most suitable roll lengths to avoid unnecessary joints. Belts can normally (subject to safe working limits in our factory) be produced in any required roll size to suit handling and transit to site.

Single, double or special double coiled rolls can be supplied with fasteners fitted if required. Short belts can be spliced into endless loops as part of the manufacturing process.

The relationship between roll length and diameter is given by the formula:

\[ L = \frac{D^2 - d^2}{K \times t} \]

\[ D = \sqrt{K \times L \times t + d^2} \]

Where,
\[ L = \text{length of belt (m)} \quad d = \text{core diameter (mm)} \]
\[ D = \text{rolled belt diameter (mm)} \quad t = \text{thickness of belt (mm)} \]
\[ K = 1275 \text{ (constant)} \]

BELT STRETCH

The unique design and manufacturing process of solid woven belt allows both permanent and elastic stretch to be kept to a minimum. With numerous carcass designs available in both nylon and polyester yarns, it is impracticable to indicate all stretch figures. Further details can be provided on request.

OPERATING FACTOR OF SAFETY

With good quality mechanical fasteners or vulcanised joints a factor of safety of 10:1 is generally acceptable. However we would be pleased to confirm the recommended belt construction and acceptable safety factor for any specific application on receipt of the necessary conveyor details.

OPERATING TEMPERATURE RANGE

Above 90°C PVC softens and the belt properties change. PVC belt is therefore not recommended for conveying materials above this temperature. Standard belts can be used in cold climates down to -10°C. Where applicable, cold weather details should be supplied to ensure that belting with suitable coefficient of friction and flexibility characteristics is specified.

FITTED FASTENERS

Mechanical fasteners to customer requirements can be pre-fitted in the factory. Please advise when ordering the belt.

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Conventional vulcanising presses are used for this process, in conjunction with a variety of polymeric jointing materials developed for maximum joint efficiency. This type of splice enables good quality joints to be made with strengths approaching that of the parent belt. Hot vulcanising offers certain advantages, including:

- The highest joint strength possible
- A reduced risk of tearing at the splice area
- A smooth joint area for superior performance under scrapers, ploughs, deflectors and minimal impact over pulleys and idlers
- Operation through automatic weighing devices and magnetic separators
- Reduced maintenance
- Resistance to moisture and harmful chemicals
- Superior resistance to abrasion
- Easier cleaning
- Reduced spillage

The thick, high textile content of the solid woven carcass, combined with the superior PVC impregnation produced by our unique process, gives excellent fastener holding properties. A wide range of fasteners including Mato, Goro, Titan and Flexco are suitable for use with solid woven conveyor belting. Mechanical fasteners are appropriate in conditions where:

- Belts are replaced frequently
- Belts and conveyors are extended regularly
- Emergency jointing or repairs are required
- Take up travel is limited

The following mechanical fasteners can be fitted as standard.

**MECHANICAL FASTENERS**

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**NOTE:** All polymeric vulcanising materials deteriorate with age. Most materials have an effective life of six months and unsatisfactory splices may result from using old materials. Storage in warm conditions may reduce effective life further. This warning applies to all splicing materials, regardless of supply source or belt types. We would be pleased to advise further on the storage of such materials.
INFORMATION, PACKAGING & STORAGE

FINAL INSPECTION
Before shipping, belts are 100% inspected. Double coils and Special Double Coils can be supplied if there are height constraints. At this point, the customer’s preferred mechanical fasteners can be fitted.

STORAGE OF CONVEYOR BELTING
Belting should be stored coiled with the central axis horizontal. Rolls may be stacked several rolls high providing the resultant pressure does not collapse or distort the centres.

Conveyor belting should be stored and handled in accordance with the guidelines outlined in the following standards:- ISO 2230 - Vulcanised rubber – Guide to storage, ISO 5285 – Conveyor belts – Guide to storage and handling.

Particular attention should be paid to the following.

TEMPERATURE
Ideally the storage temperature should be below 25° C though temperatures up to 40° C can be tolerated. The effects of low temperatures are not permanently detrimental though below 0° C belts become stiffer and care should be taken when handling at and below this temperature. When rolls are removed from storage at low temperatures for immediate use, their temperature should be raised to approximately 20° C throughout before being put into service.

LIGHT
Conveyor belting should be protected from sunlight, in particular direct sunlight and strong artificial light with a high ultra-violet content.

OZONE
As ozone can be particularly damaging to vulcanised rubber, storage rooms should not contain any equipment capable of generating ozone such as high voltage electrical equipment, electric motors or other equipment which may give rise to electric sparks or electrical discharges. Combustion gases and organic vapours should be excluded as they may give rise to ozone via photochemical reactions.

PACKAGING
Belting requiring long term storage should be bound with steel or high tenacity plastic or textile straps and protected with waterproof plastic material. A supporting centre core of suitable dimensions manufactured from wood or steel should be specified at the time of order.
BELT SELECTION

Full details of the installation should be given to Fenner Dunlop engineers for them to cross-check calculations and give the most economic and reliable belt recommendation. It is essential to have some information on the belt tensile requirement, belt length and width and the material being conveyed.

Where the T1 figure (Tension at Drive Head) is known it should be used as the basis for initial belt selection. Otherwise at least the following information should be given to enable this figure to be calculated:

1. Centre distance of conveyor (m)
2. Belt speed (m/s)
3. Peak loading (t/hr)
4. Belt width (mm)
5. Material carried
6. Angle of trough
7. Type of drive (number of drive pulley, angle of wrap, and whether steel or rubber lagged) and take up arrangement (e.g. gravity, load sensed or fixed)
8. Net changes in elevation (rise or fall between loading point and delivery point in metres) and maximum gradient (degrees)
9. If known, details of idlers (type of bearings, style of idlers, idler diameters, and pitch)

Alternatively, installed motor power can be used as a rough guide together with belt speed which must be provided. Actual power consumed whilst running fully laden is more relevant than installed power. Details of the installation should be given to Fenner Dunlop engineers for them to cross-check calculations and give the most economic and reliable belt recommendation. It is essential to have some information on joint efficiencies enable lower factors of safety to be considered in certain circumstances. Fenner Dunlop will be pleased to advise on specific installations. Once the appropriate belt has been selected, drum diameters should be checked against the minimum recommended values.

BELT TENSION CALCULATIONS

The Fenner Dunlop formulae on these pages will give fairly accurate results for many similar formulae exist for calculating power requirements all of which are acceptable when correctly applied. It is important however, that attempts are not made to transpose factors and constants from sources other than this brochure into the Fenner Dunlop formulae, otherwise inaccuracies are likely.

The power required to drive a conveyor is comprised of the sum of three separate power elements:-

(a) Power to move load horizontally.

\[ \frac{2.72 \times L \times F \times (C+46)}{1000} \text{ kW} \]

(b) Power to move empty belt.

\[ \frac{9.81 \times F \times G \times (C + 46) \times 5}{1000} \text{ kW} \]

(c) Power to elevate load.

\[ \frac{2.72 \times L \times H}{100} \text{ kW} \]

\[ F = \text{Centre distance (m)} \]
\[ C = \text{Friction factor (see below)} \]
\[ G = \text{Inertia factor (Table 3)} \]
\[ H = \text{Change in elevation (m)} \]
\[ S = \text{Belt speed (m/s)} \]

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The total power required: = (a)+(b)+(c)

where:-

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F - Normally 0.022 can be used but this may be reduced to 0.018 for well engineered and maintained applications or increased up to 0.030 for poor conveyor installations.

\[ T_1 = \frac{K \times P}{S} \]

where:-

\[ K = \text{Drive factor (Table 4)} \]
\[ P = \text{Total power requirement (kW)} \]
\[ S = \text{Belt speed (m/s)} \]

Once this tension figure has been determined it must be divided by the belt width (metres) such that the tension can be expressed in kilonewtons per metre. The appropriate belt type can then be established. Belt selection is based upon the traditional 10:1 factor of safety which has proved satisfactory over many years of field experience. Nowadays, however, modern synthetic fibres, advanced belt designs and improved joint efficiencies enable lower factors of safety to be considered in certain circumstances. Fenner Dunlop will be pleased to advise on specific installations. Once the appropriate belt has been selected, drum diameters should be checked against the minimum recommended values.
Belt Wizard is a powerful mathematical modelling tool used by Fenner Dunlop engineers to ensure compatibility of the specified conveyor system with Fenner Dunlop Solid Woven belting. The system calculates all relevant parameters, including tensions, power requirements, transition distances and load capacity as in the example below. These are presented in a report form which can be supplied to the end user in either pdf or hard copy format. Please consult your Fenner Dunlop representative for further details.

**TABLE 3**

<table>
<thead>
<tr>
<th>BELT WIDTH mm</th>
<th>IDLER DIAMETER</th>
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<tbody>
<tr>
<td></td>
<td>102 mm</td>
</tr>
<tr>
<td>500</td>
<td>29</td>
</tr>
<tr>
<td>600</td>
<td>34</td>
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<tr>
<td>650</td>
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<tr>
<td>750</td>
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<td>1350</td>
<td>61</td>
</tr>
<tr>
<td>1400</td>
<td>67</td>
</tr>
<tr>
<td>1500</td>
<td>61</td>
</tr>
<tr>
<td>1600</td>
<td>69</td>
</tr>
<tr>
<td>1800</td>
<td>73</td>
</tr>
<tr>
<td>2000</td>
<td>81</td>
</tr>
</tbody>
</table>

**TABLE 4 K**

<table>
<thead>
<tr>
<th>ANGLE OF WRAP DEGREES</th>
<th>SCREW</th>
<th>GRAVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BARE</td>
<td>LAGGED</td>
</tr>
<tr>
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<td>LAGGED</td>
</tr>
<tr>
<td>180</td>
<td>2.00</td>
<td>1.84</td>
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<tr>
<td>200</td>
<td>1.87</td>
<td>1.72</td>
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<tr>
<td>210</td>
<td>1.81</td>
<td>1.67</td>
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<tr>
<td>220</td>
<td>1.76</td>
<td>1.60</td>
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<tr>
<td>240</td>
<td>1.66</td>
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<tr>
<td>270</td>
<td>1.55</td>
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<tr>
<td>300</td>
<td>1.46</td>
<td>1.37</td>
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<tr>
<td>360</td>
<td>1.34</td>
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<tr>
<td>420</td>
<td>1.25</td>
<td>1.19</td>
</tr>
<tr>
<td>450</td>
<td>1.24</td>
<td>1.18</td>
</tr>
</tbody>
</table>

**METRICATION** - The following metric/imperial conversion chart provides useful reference:

- Yards to metres x by 0.9144
- Feet to metres = by 0.3048
- Inches to millimetres x by 25.4
- lb/ft² to kgm² x by 16.02
- ft/min to m/s = by 0.197
- lb to kg = by 2.2046
- ton/h to t/hr x by 1.016
- hp to kW = by 0.746
- lbf/in to N/mm = by 5.71
- lbf to Newtons x by 4.4482
- kgf to Newtons x by 9.81
- lb/ft to kgm x by 1.49
- ft² to m² = by 10.76
- kg/cm to N/mm x by 0.981
Fenner Dunlop’s commitment to our customers does not begin or end with the sale of a high quality belt. In addition we offer a comprehensive range of services.

TRAINING
A number of different procedures can be used to splice a solid woven belt and accredited supervision and training, on-site or in-house, ensures that a belt is jointed so as to ensure maximum performance.

SITE SURVEYS & CALCULATIONS
Reports on conveyor systems, belting and Vulcanised or mechanical joints can be produced and we also offer expert assistance to calculate the parameters of any non standard conveyor.

DESTRUCTIVE TESTING & ANALYSIS
Our testing of new belt is extensive. However we can also test used belt to gauge performance in service. A section of belt removed and sent to us can be tested and analysed to check ultimate tensile strength and to check that original design parameters and agreed factors of safety are still being met. We also offer testing for both mechanical and Vulcanised joints.

SITE VULCANISING
Highly qualified splicing teams are fully equipped to carry out splicing work both underground and on the surface anywhere in the world using our extensive range of sectional vulcanising presses.

BELT FITTING
We offer the complete installation of belts or inserts and assistance with developing method statements and risk assessments to ensure that belt changes are completed safely.

DRUM LAGGING
Either in-situ or in our workshops, we can lag drums with rubber, PU or ceramic in different designs and thicknesses, both standard or fire resistant and using hot or cold bonding procedures.

SPLICE MATERIALS
There is a specific splice kit available for every solid woven belt, using the same raw materials used in the production of the belt. Using approved splicing materials and following the approved splice procedure will ensure the highest joint strength and best in-field performance from the conveyor belt.

BELT COILING
Within our factories we have the equipment and capability to coil rolls of belt up to a maximum of 2m wide. Belts can be coiled in a number of ways including Double Coiled and Special Double Coiled when there is limited access, there are height or dimension restrictions or just for ease of installation.

MECHANICAL FASTENERS
Fasteners chosen by or recommended to customers can be supplied and fitted to belts before delivery. Training for on-site fitting can also be arranged.
APPLICATIONS

Coal
Potash
Gypsum
Power Generation
Steep Gradients
Man-Riding
Salt
Timber