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Rubber and Ceramic Lagging

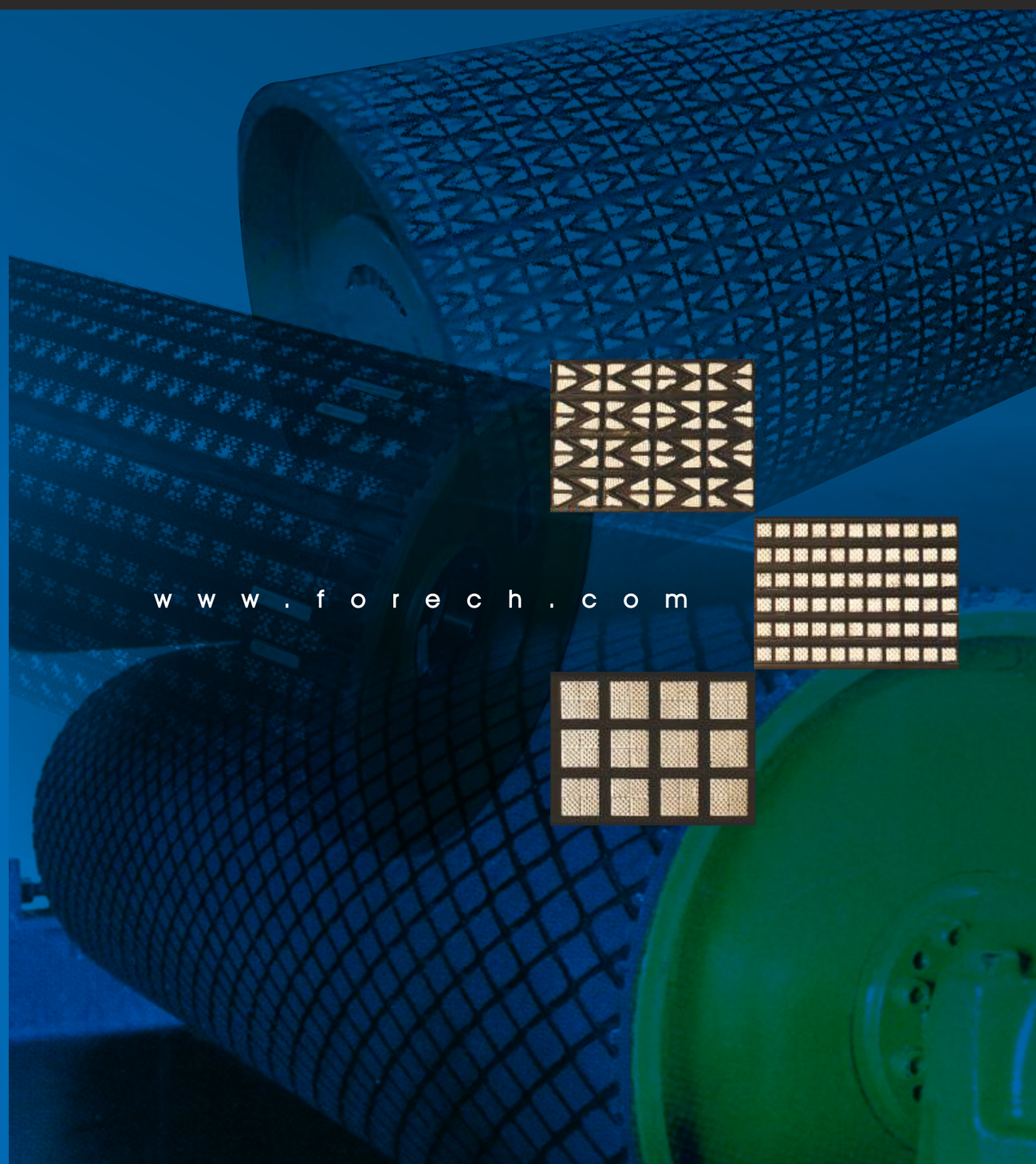
Forech Mining & Construction International LLP

Registered Office
'Hilton House' S-23, Green Park Extension,
New Delhi-110016
Phone : +91-11-26960868, 26961275, 26514019
Fax : +91-11-26862373, 26534269
Email : info@forech.com

Branch Office
Chennai
G-1, "Hayagreeva", 85 Velachery Main Road
Guindy, Chennai-600032
Phone : +91-44-22352902
Telefax : +91-44-22351585
Email : chennai@forech.com

Kolkata
Merlin Links, 1st Floor, 1 G&F, 166-B S.P. Mukherjee Road
Kolkata-700026
Phone : +91-33-40605557 / 40605558
Phone/Fax : +91-33-24632234
Email : kolkata@forech.com

Works
- Village & P.O. Rai, Distt. Sonepat, Haryana-131029
  Phone : +91-130-2366571, 2366572
  Fax : +91-130-2366384
  Email : rai@forech.com



Why Pulley Lagging?

- **Prevents slippage-reduces pulley wear**
- **Prevents material build up on pulley**
- **Reduces chances of mistracking**
- **Reduces damage to the conveyor belt**
- **Allows for easy drainage of water and slurry**

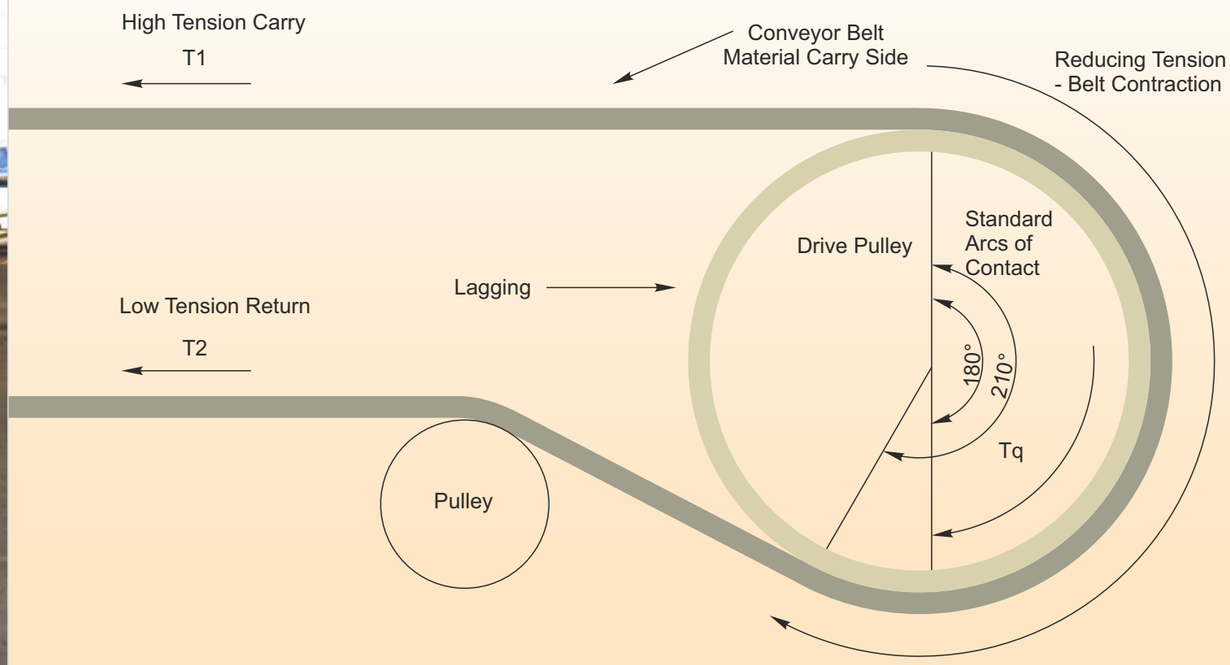
Conveyor Belt when slips causes significant damage to the drive pulley and the belt. Such damages are not only expensive to repair, but also time consuming and cause enormous loss due to down time.

Belts need good traction with the drive pulley to prevent slips that can cause major damage.

The life span of a conveyor system primarily depends on its being suitably equipped for the specific application and the standard of servicing and maintenance. The conveyor systems often have to perform in the most difficult conditions. For example, rain and sludge, which cause slippage between the conveyor belt and pulleys because of the low friction co-efficient between the two.

Forech offers both plain and patterned pulley lagging with specially developed rubber materials and their plain and patterned surfaces have proved to be very effective in water shedding, preventing material build up and controlling belt slippage. All lagging products can be provided with a Bonding Layer for easy installation with cold glues. In addition, Forech also offers a buffed and plain surface to suit your particular needs and budget.

A very special range of ceramic pulley lagging is offered by Forech to provide very high levels of drive and wear resistance for conveyor pulleys that operate in medium to heavy duty applications in wet and muddy conditions.



Patterned Sheet Pulley Lagging

FORECH-HILTON offers a comprehensive range of Patterned Sheet Pulley Laggings to suit every conceivable conveyor installation . The Pulley Laggings offered by FORECH- HILTON are produced in different thicknesses, rubber qualities and patterns to ensure selection of the most appropriate type, to suit all application requirements.

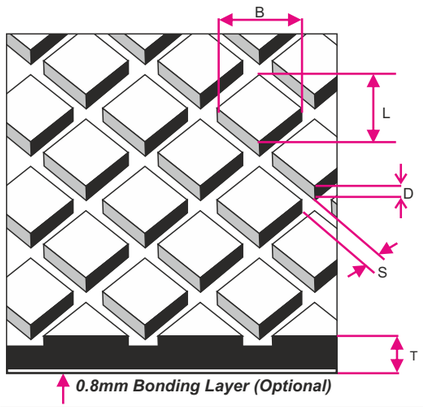
The Sheet Pulley Laggings offered by FORECH-HILTON come with CN Bonding Layers for better adhesion levels as also with buffed surface. The profiled patterns on the top surface, in diamond or square embossing improve belt grip and tracking on conveyors, while reducing belt wear. The Sheet Pulley Lagging is available in various grades of rubber, including FRAS and oil resistant grades.

Forech range of rubber compounds for lagging

S. No.	Properties	Units	Compound Code			
			R-1605	R-1624	R-1625	R-1630
1	Tensile Strength	Mpa	20.0 Min	15.0 Min	15.0 Min	15.0 Min
2	Elongation at Break	%	450 Min	400 Min.	450 Min	400 Min
3	Shore Hardness	°A	60 ± 5	60 ± 5	65 ± 5	65 ± 5
4	Density	g/cm^3	1.10 ± 0.03	1.13 ± 0.03	1.21 ± 0.03	1.15 ± 0.03
5	Abrasion Loss	mm^3	90 Max.	140 Max.	200 Max.	150 Mx.
6	Crescent Tear	N/mm	80 Min.	60 Min.	30 Min.	40 Min.

Fire resistant anti static (FRAS) and oil resistant lagging is also available in approved rubber compound grades

Profile dimensions and range



BENEFITS

- Easy to install
- Minimum wastage and economically priced
- Reduced adhesive use due to Bonding Layer
- Shorter lead times
- Maintains friction grip under unfavourable drive conditions
- Increased friction coefficient between the pulley and the conveyor belt
- Extremely helpful while running in wet conditions
- Prevents dirt build up in pulleys

Profile		Large Diamond	Small Diamond	Mini Diamond	Square Profile
		LD	SD	MD	SP
Profile Diagonal	B	88	47	33	28
Profile Diagonal	L	51	27	17	28
Gap Between the Profile	S	8	6	6	4.5
Depth of Profile	D	6	4	3	3
Minimum Thickness	T	10	8	7	8
Product Width		1500	1000	1000	1800
		2000	1500	1220	
			1600	1500	
			2000	1800	
				2000	
Finish on face		Plain	Plain	Plain	Plain
Finish on the Pulley Side		With Bonding Layer (Adhesive/Tie Gum Layer) Without Bonding Layer - Smooth			
Standard Roll Length (m)		10*	10*	10*	10*
*Length upto 50 m can be supplied on request.					

Patterned Strip Pulley Lagging

STRIP LAGGING

FORECH-HILTON Diamond Profile and Plain Pattern Pulley Lagging Strips have been specially developed for covering of conveyor pulleys.

These easy to use Lagging Strips can be fitted to the Pulleys with the help of cold bonding adhesives in the workshop or at the conveyor site itself, providing extraordinary saving in terms of expenses incurred on account of down time and usage of autoclave. It has been proven that similar adhesion levels can now be achieved with cold bond adhesives as with vulcanization.

FORECH-HILTON Strip Lagging is available in a variety of designs, to suit the various application requirements. These are manufactured with 60 to 65 Durometer rubber compound, having an excellent abrasion resistance. All the designs offered by FORECH-HILTON have excellent water shedding characteristics. Supplied in Roll sizes ranging from 10 to 85 metres in a width of 205mm, they can be custom fitted to any pulley size with minimal wastage.

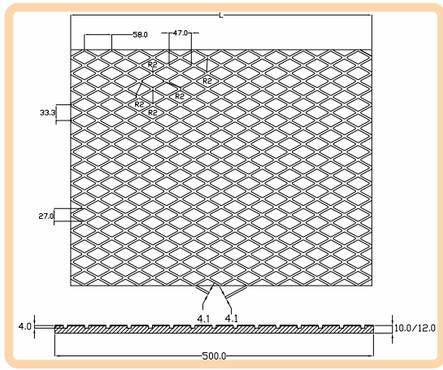
BENEFITS

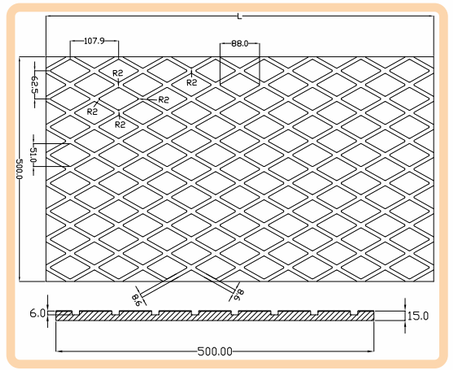
- Easy to fit
- Minimises wastage
- Outstanding wear and abrasion resistance
- Reduced adhesive use
- Reduced labour
- Reduced down time

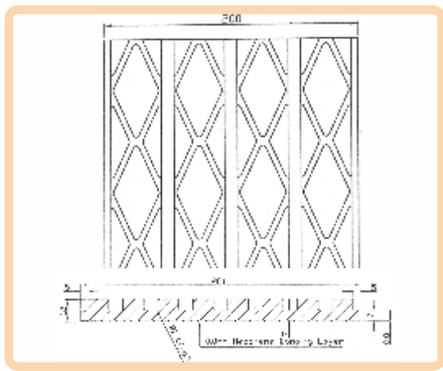
FEATURES

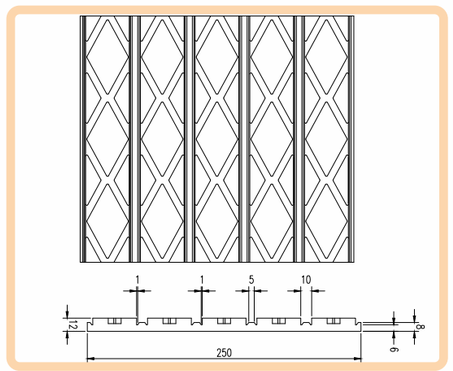
- Supplied in a 205mm wide strip
- Rolls of 10 to 85 metre strips
- Diamond & Plain Pattern
- CN Bonding Layer, Plain or with Buffed Back options

Range of profiles and dimensions

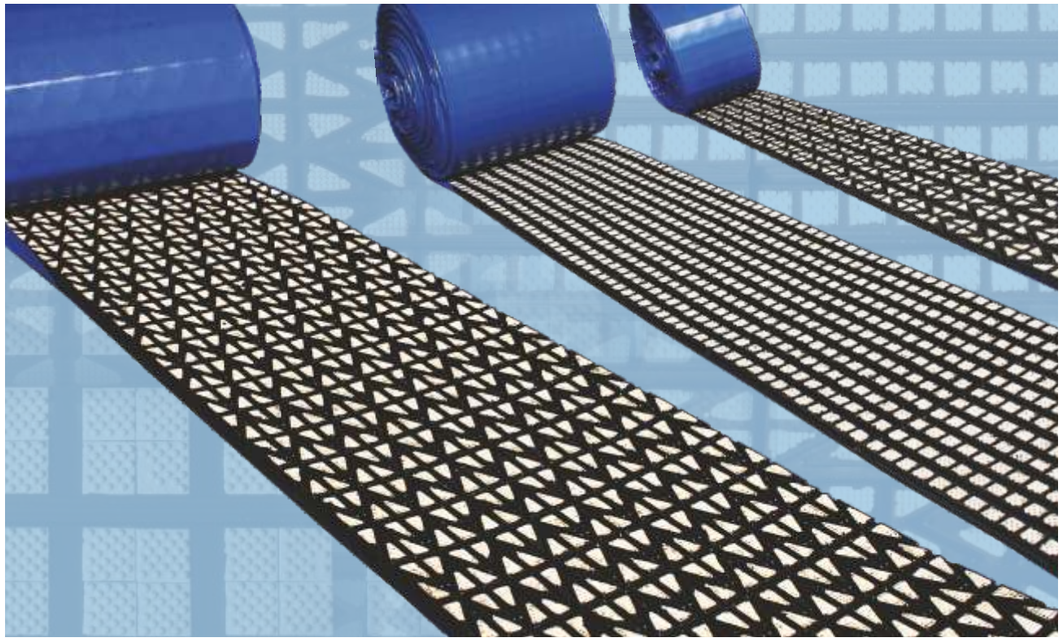








Ceragrip Ceramic Lagging



Typical conditions suited to the use of **Forech CeraGrip ceramic lagging** include wet and dirty conditions where belt slippage is a problem or high tension applications where the wear life of plain rubber lagging is limited.

Forech ceramic pulley lagging provides the best grip for your drive pulley. The ceramic inserts in the lagging surface provide both high friction and high wear resistance-providing the best protection for your pulley and belt in the most demanding conditions. Ceramic pulley lagging is ideally suited for wet and muddy conditions where belt slippage can be a major problem.

The high co-efficient of friction of the ceramic tile inserts with the belt also allows for belt tension to be reduced. This also improves the life of the belt, as well as that of the other belt components as they come under less stress.

The surface of the lagging is profiled similar to that of profiled rubber pulley lagging. This allows for effective drainage.

Forech Ceramic Lagging is offered as easy to install strips. These come with a bonding layer backing, or a buffed surface as per your needs and budget.

Ceramic tiles embedded in rubber, are also supplied in Fire Resistant Anti Static (FRAS) approved grades of rubber compound for underground applications.

Coefficient of Friction

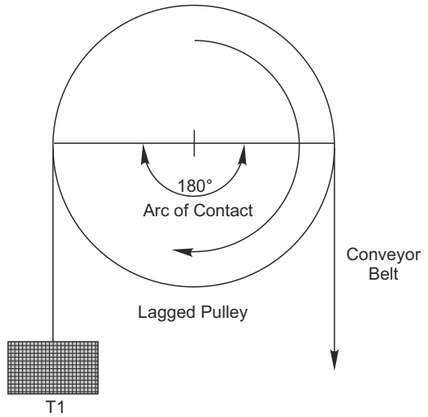
The maximum tension T1, generated in any conveyor belt is the tension which is required to be imparted on the belt in order to transmit, through traction, at the belt-pulley interface, the tension, Te, necessary to overcome all the system resistances and convey the desired through put at stipulated operating parameters in the diagram. The residual tension T2, is responsible for maintaining the integrity of the belt run and limits the inter-idler sag of the belt to permissible limits. The three tension values are related through mathematical equations, namely.

$$T1 - T2 = Te, \text{ and } T1/T2 = e^{\mu\varnothing}$$

μ = Coefficient of friction between belt and pulley, $\varnothing$ = Arc of contact between belt and pulley

The value of μ is determined using the dynamic test rig as shown below. A section of belt is wrapped around a pulley (180 degree Arc of Contact) with a constant load on one end. A motor applies a torque force to the pulley. At a threshold torque the pulley begins to rotate.

Test Rig for Determining Coefficient of Friction



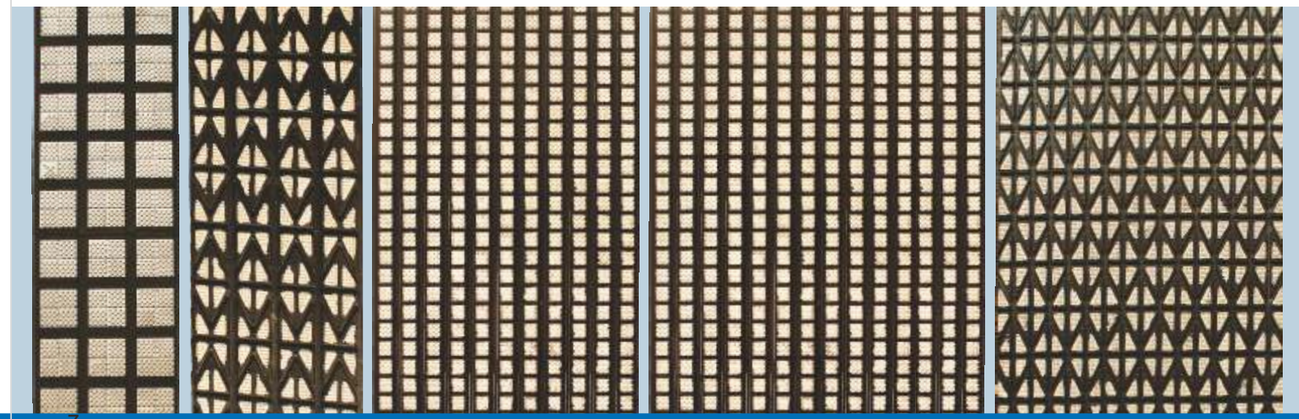
From the second relationship in the diagram ($T1/T2 = e^{\mu\varnothing}$) we see that the tension on the belt (T1) increases significantly as coefficient of friction (μ) increase. Increasing the coefficient of the friction therefore has the following benefits:

- Reduced belt tension required
- Reduced slip and therefore less wear on belt and lagging.
- Reduced load on shaft and bearings

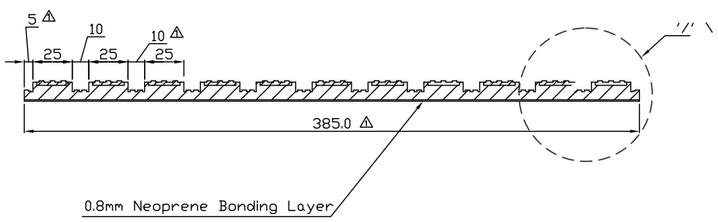
The frictional force is significantly increased in the ceramic lagging due to the mechanics of the dimples. However care has been taken that this does not damage the conveyor belt.

Comparison Table for Co-efficient of friction

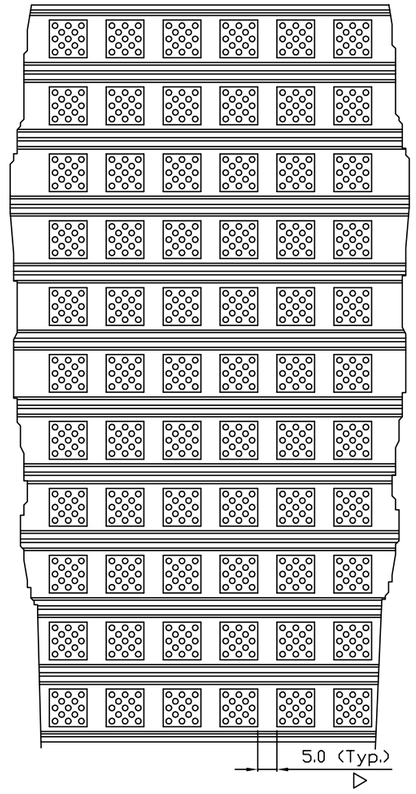
Co-efficient of Friction	Bare Steel Pulley	Rubber Lagging	Ceramic Lagging
Dry	0.25	0.50	0.75
Wet	0.15	0.35	0.55

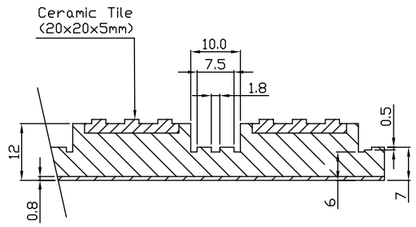


Ceragrip Lagging with Square Ceramic Tiles Profile



All Dimensions are in mm





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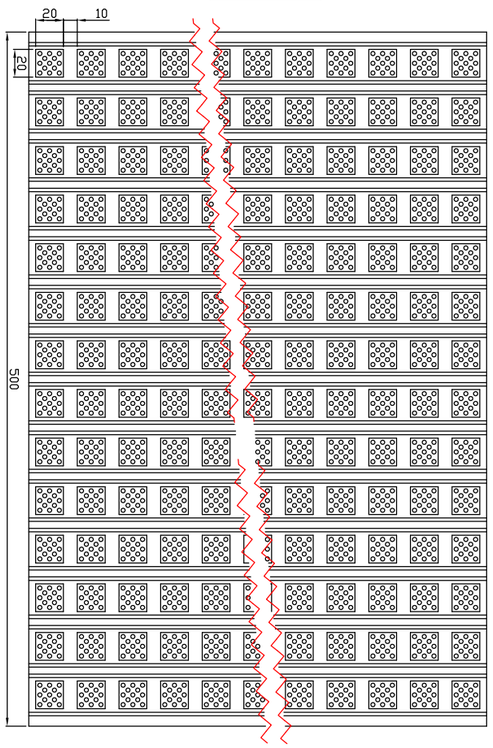
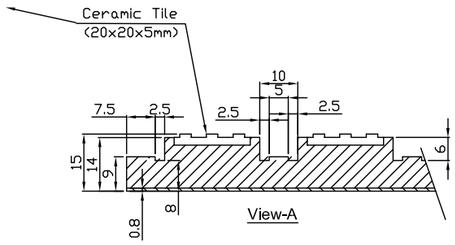
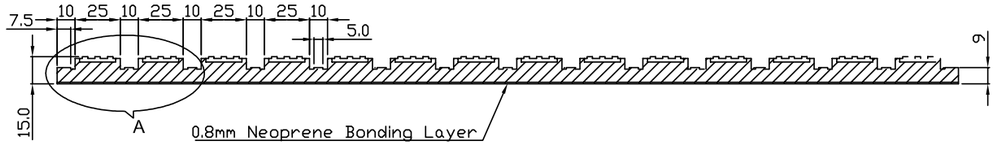
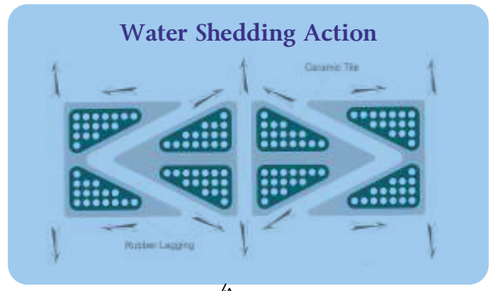
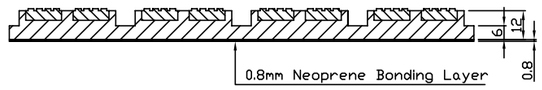


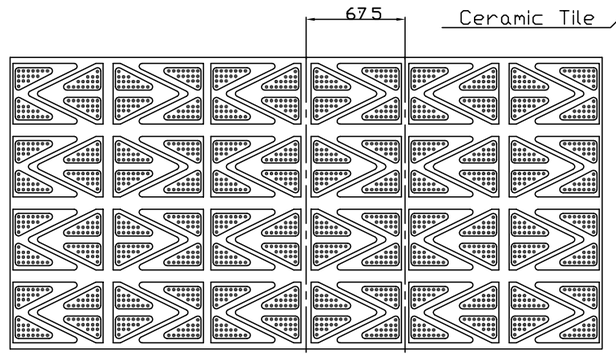


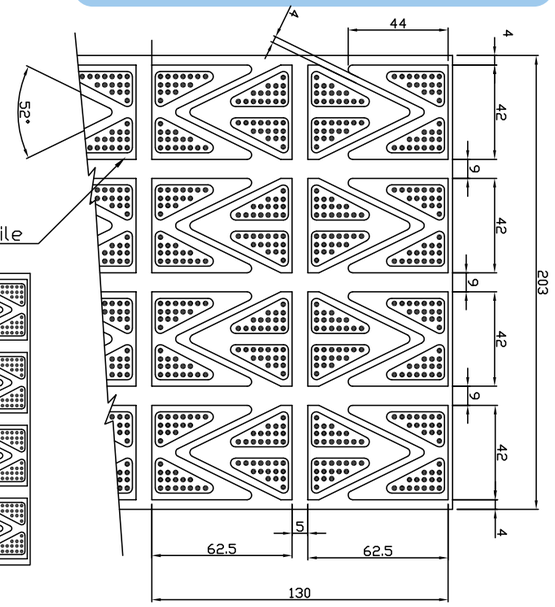


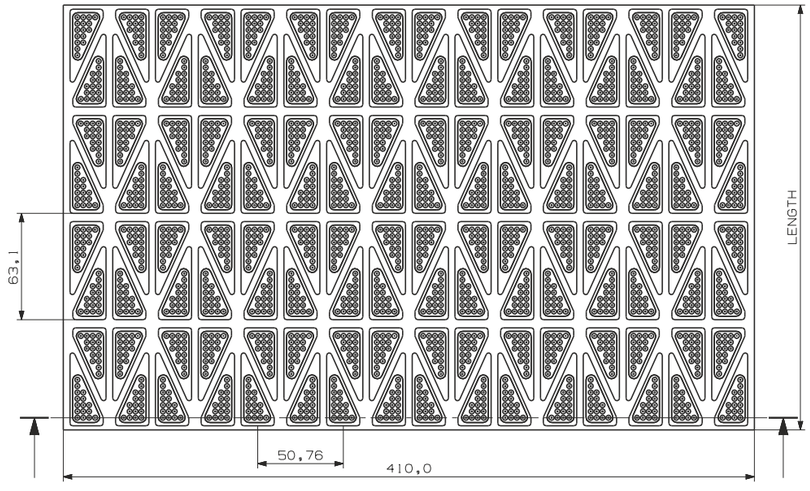
Ceragrip Lagging with triangular Ceramic Tiles Profile

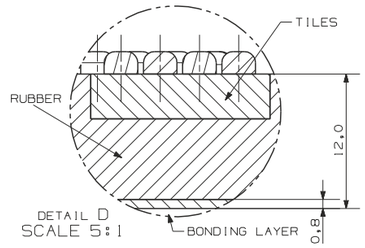


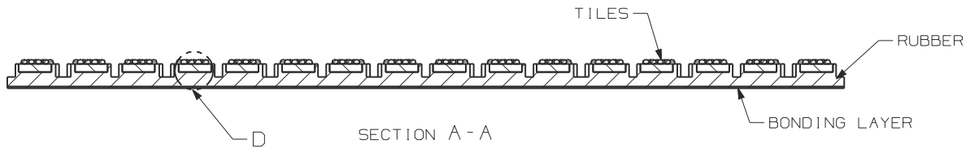










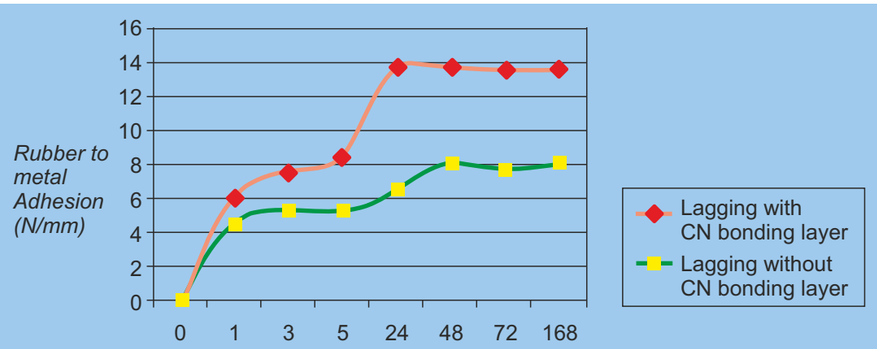


CeraGrip Ceramic Lagging Features:	CeraGrip Ceramic Lagging Benefits:
✓ Square/Triangular Tiles with Raised Dimples	Improved traction as dimples grip belt Improved belt tracking due to positive grip Reduced belt tension required due to increased co efficient of friction.
✓ 92% Aluminium Oxide tile material	Extreme wear resistance
✓ Rubber Compound blended with CN polymers	Outstanding adhesion: - Rubber to Ceramic - Rubber to Metal - Rubber to Rubber
✓ Low Sulphur rubber compound	Minimal change in rubber hardness with age
✓ Ceramic Tiles fully encapsulated and chemically bonded to rubber on 5 sides	Tiles more resistant to cracking or “pull out”
✓ Special Rubber compound to meet FRAS and MSHA requirements	Suitable for use in underground mines
✓ Supplied in 205, 385 and 418mm wide Strip forms with bonding layer and buffed back surfaces	Easy to install with less joins
✓ Supplied in continuous rolls of upto 10 metres long or as ordered	One product suits all pulley face widths
✓ Can be supplied as individual strips with rubber section at each end of Ceramic section	For customers who prefer a rubber edged pulley lagging

Ceramic Tile Specifications	
Aluminium Oxide (min) Al_2O_3	92%
Density (g/cc)	3.65
Hardness (R 45 N)	79 min.
Cold Crushing Strength (Mpa)	2050 min.
Flexural Strength at Room Temp. (Mpa)	240 min.
Water absorption	0%
Test	**Specification**
Abrasion by impingement	0.05 grams max.
Abrasion by Rubbing	0.1grams max.

Base Rubber Specification	
Compound Code	**R-1608**
Polymer	SBR
Specific Gravity	1.13 +/– 0.03
Shore Hardness °A	60 +/– 5
Elongation at break % Min.	450%
Tensile Strength	17.5 N/mm^2
Abrasion Loss	150 mm^3 at 10N

Summary Results of Pulley Lagging Adhesion Tests



Pulley Lagging Selection Chart				
Criteria	**Plain Sheet Lagging**	**Diamond Sheet Lagging**	**Rubber Strip Lagging**	**Ceramic Strip Lagging**
Dry Performance	Very Good	Excellent	Excellent	Excellent
Wet Performance	Average	Very Good	Very Good	Excellent
Wear Life	Very Good	Very Good	Very Good	Excellent
Ease of Installation	Good	Good	Excellent	Excellent
Fire Resistance	Yes	Yes	Yes	Yes
Drainage Grooves	No	Yes	Yes	Yes

Hot Bonding of precured Rubber & Ceramic Lagging

Forech Lagging is also available, and is specially manufactured strips that allows it to be hot bonded onto pulleys. This unique innovation allows for press cured strip lagging to now have the additional advantage of hot bond to the steel pulley. The high physical properties that are achieved from a press-cured sheet, manufactured under heavy tonnage, can now be incorporated in a hot bond application, thereby achieving the greatest possible bond strength.