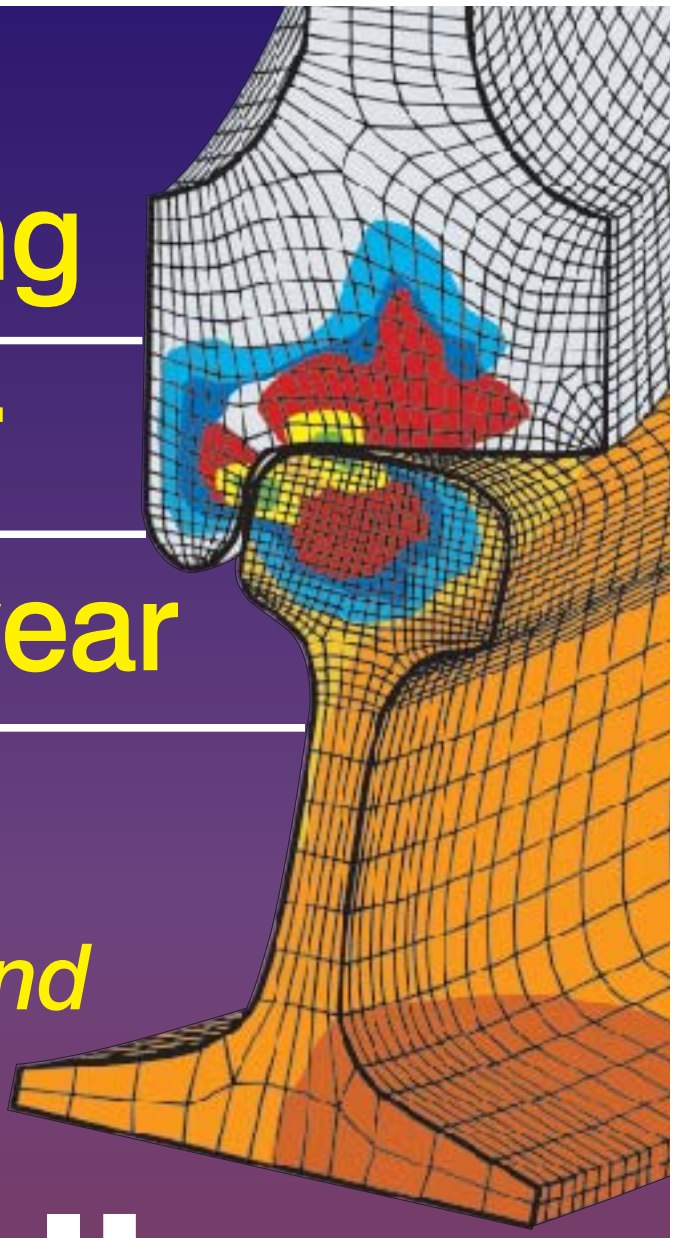
Stop greasing

Cut rail wear

Cut flange wear



Reduce squeal and get long life with

Hilube liners

Specialised low friction low maintenance railway bearing materials

- Reduce maintenance
- Reduce wear to wheels, flanges, tyres and rails

For over 30 years, VescoPlastics have developed and supplied speciality bearing materials for railways.

Ultra low friction Hilube 10 and Hilube 20 were specially developed for rolling stock applications such as centre bowl liners and pedestal liners (also known as horn cheek guides or axle box guides).

By replacing metal components that require frequent greasing with self lubricating materials, metal to metal wear is dramatically reduced.

Stop wear

Wear parts that operate with low friction improve performance of rolling stock and reduce wear on rails, wheels, flanges and tyres, in particular wheel-rail wear is reduced.

Stop noise

Operation with Hilube 10 and Hilube 20 is smooth and can reduce noise and squeal problems.

Stop greasing

Self lubricating Hilube 10 and Hilube 20 eliminate the need for greasing - reducing maintenance and contamination.

The ultra-low friction of Hilube 10 and Hilube 20 gives the following advantages:

- Smoother movement of the train especially when entering and exiting curves.
- Greatly extended life.
- Low wear to metal counter surfaces, reducing rail, wheel and flange wear.
- Lower maintenance for rails, wheels and axle bushes.
- Reduced noise and rail squeal.

Typical properties of Hilube 10 and Hilube 20

	Hilube 10	Hilube 20
Friction at 4 MPa (580 psi)	0.11	0.06
Maximum design loading	20 MPa	20 MPa
Operating temperature range	-50^{0}C to 100^{0}C	-50^{0}C to 100^{0}C
Deflection temperature at 1.8 MPa (261 psi)	57^{0}C	57^{0}C
Flexural modulus (dry)	2500 MPa	2500 MPa
Coefficient of thermal expansion	10 x 10^{-5}mm/mm/^{0}C	10 x 10^{-5}mm/mm/^{0}C
Specific gravity	1.25	1.25

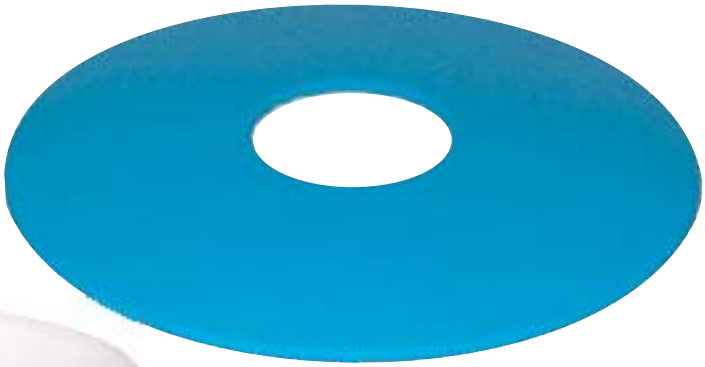
Hilube 10 and 20 replace manganese steel wear parts

Hilube 10 and Hilube 20 internally lubricated materials avoid the need for frequent greasing of manganese metal parts and give a lower wear to bearing and mating surfaces, emit less noise and give a smoother operation.

Hilube wear parts are much easier to install and remove than manganese steel. No welding is required. They can easily be fitted by one person. Because they do not corrode, they are easily removed.

Hilube 10 and 20 replace UHMWPE wear parts

Hilube 10 and 20 have a higher compression strength than UHMWPE so creep problems are avoided and better wear life is achieved.



Hilube 10 bogie liner

Hilube 20 bogie liner

Pedestal liners: Hilube 20

also known as axle box guides and horn cheek guides

Hilube 20 replaces metal pedestal liners with the following advantages

- Ultra low friction
- Improved track and wheel wear
- Low wear to expensive axle bearing boxes

Manganese steel liners have high friction between the axle bearing box and the liner giving aggressive wear to liners and expensive axle boxes. Although regular (and labour intensive) greasing reduces wear, wear occurs to pedestal liners and axle bearing boxes.

But more importantly, metal stick-slip and high friction between the axle box and pedestal liners leads to high wheel wear, flange and track wear.

The hidden costs are very substantial.

The co-efficient of friction of Hilube 20 remains low over the life of the liner, and has been tested and proven in high load applications up to 30 ton axle loads.

Hilube 20 has excellent wear resistance characteristics with minimal wear of pedestal liners and axle boxes. Further, the lateral movement of the wheel set is freed up when using low friction Hilube 20, leading to less wear to wheels, flanges and rails.

Horn cheek guides in Hilube 20

The benefits of low friction Hilube 20 pedestal liners include:

- Extended wear life of over 10 years and over 2,000,000 km.
- Greatly reduced wear to expensive axle boxes.
- Self-lubricating - no maintenance or greasing required.
- Smoother sliding movement between axle and loco or truck frame.
- The axle box is able to slide more freely relative to chassis.
- Noise and squeal reduction.
- No fatigue cracking unlike manganese steel.
- Reduced wear to wheels and flanges.
- Reduced wear to rail track.
- Maintenance and operational cost savings on axle boxes, wheels and rails.
- Reduced rolling resistance leading to locomotive power savings.

Testimonial

'...Railways has used pedestal liners on electric and diesel locomotives manufactured from Hilube 20 since the early 1980's. Originally pedestal liners were made from steel, but these cause aggressive wear (steel on steel) of the axle boxes. This in turn led to the stick-slip phenomenon between wheelset and pedestal liner, with the resultant high tread wear.'

'Due to the rolling resistance being higher, more power is required to haul the train along resulting in higher track wear. The co-efficient of friction of the Hilube 20 also does not increase with load and has very good wearing characteristics. The actual movement of the wheelset is much more controlled using the low friction Hilube 20. Considerable saving is experienced because of the extended life of the axle boxes and bearings.'

Commonwealth bogie liner

Hilube 20 is included as the wear surface on this rubber cushioned pedestal liner.

Bogie centre liners: Hilube 10 and Hilube 20

also known as bolster bowl wear liners and centre plate wear protectors

Hilube 10 and Hilube 20 replace metal liners and give the following advantages

- Low friction
- Ease of motion of bogie when cornering
- Reduced wear to wheel, flange and rail

Hilube 10 and Hilube 20 have been fitted in various centre liner configurations to wagon stock on heavy haul lines and general traffic lines.

Centre liners made from metals (for example managanese steel) have high friction, even when regularly lubricated. This turning resistance to movement gives high wear to rails and wheels.

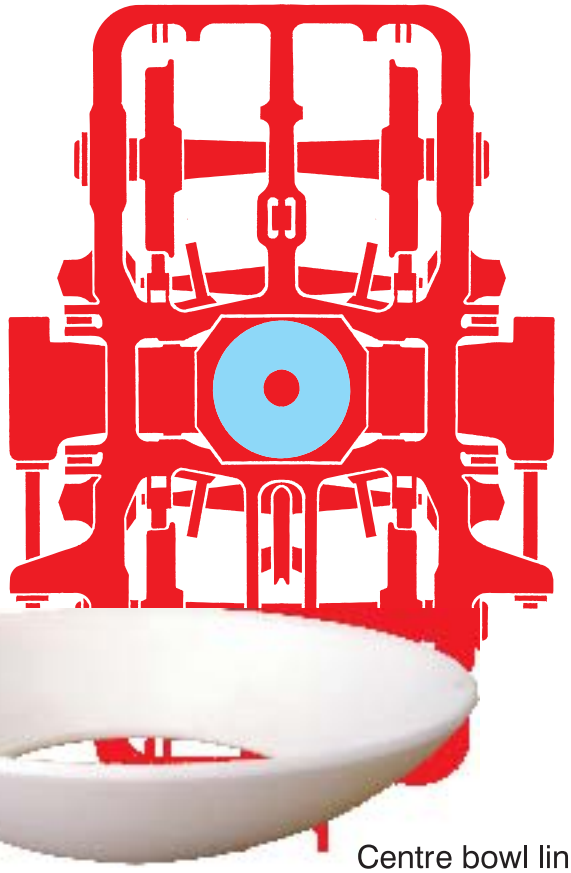
The co-efficient of friction of nylon centre liners, although lower than metals, is still high, requiring substantial force to steer the bogie and leading to high wear rates.

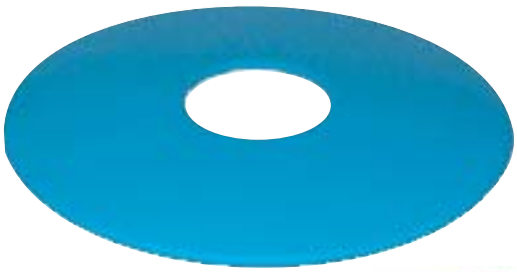
Hilube 10 is internally lubricated giving an ultra low friction without the need for any external lubrication. The co-efficient of friction of Hilube 10 does not increase with load or during long term operation, unlike many oil lubricated nylons. Hilube has been tested on 30 ton axle loads and is suited to even higher axle loads.

Using Hilube 10 liners improves the steering ability which in turn leads to a much lower wear rate on the wheels, flanges, top centre castings and bolster centre bowls. Hilube also has good wearing characteristics. With reduced steering resistance less power is required to haul the train.

The benefits of low friction Hilube flat liners, cup liners and centre rings include

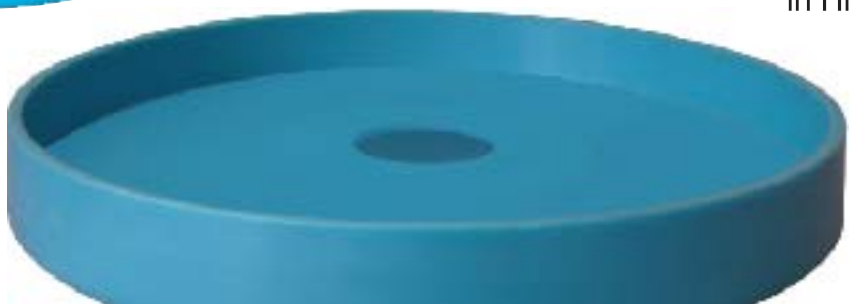
- Extended wear life of over 10 years.
- Self-lubricating - no oil or grease required.
- Greatly reduced wear to horizontal face of bolster centre bowl and wagon top centre casting.
- Smoother operation as a result of low static and dynamic co-efficients of friction.
- Reduction of the vertical force operating between bolster and frame.
- Easy and quick drop-in installation - no welding required.
- Noise and squeal reduction.
- Maintenance and operational cost savings on wheels, rails and bolsters.





Bogie centre liner in Hilube 10

Centre bowl liner in Hilube 20



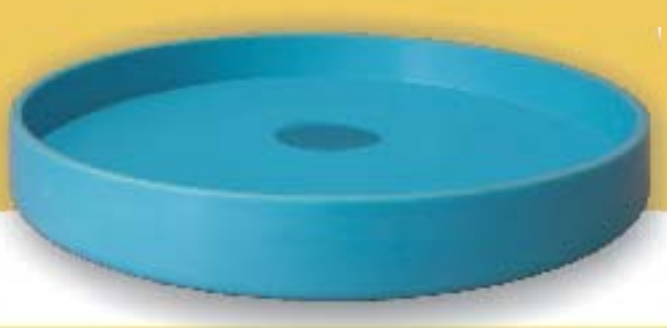
Bogie cup liner in Hilube 10

Ore wagon in sub-zero conditions

Hilube 10 centre liners were fitted to heavy haul iron ore wagons operating in the Arctic. Hilube liners accomodated temperatures of -40^{0}C and below - while still maintaining ultra low friction characteristics.

Testimonial

'...Railways fit cup liners manufactured from Hilube 10 to all wagon stock on their heavy haul lines. This policy has been expanded to general traffic lines'.



Side bearer guides

Hilube 10 and Hilube 20 used for side bearer guides on passenger cars.

Ultra-low friction allows for less noise and squeal, smoother operation and more comfortable ride along with lower wear and lower maintenance.

Testimonial

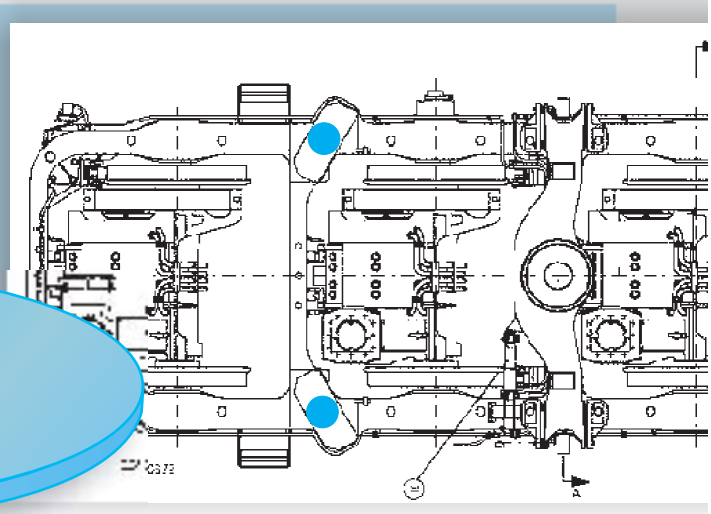
'As discussed..., XP 2203 flange wear with Hilube 20 trial side bearer pads is currently lower than average for that type of XPT car, namely

1.5 mm/10 000 km compared with the average of 2.5 mm/10 000 km for April/May 2009'

Hilube 20 used for loco mount bearings

Tri-mount bogie support pads

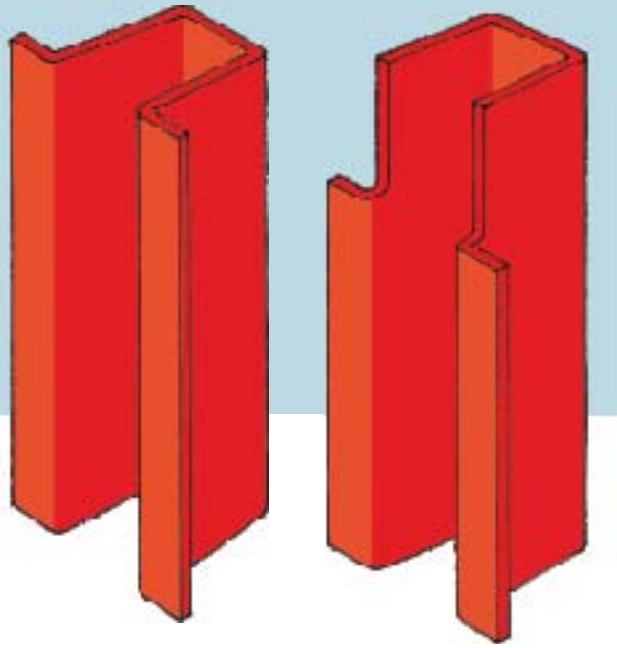
Hilube 10 used on tri-mount support pads are particularly easy to install if sized correctly, as they may simply be tapped into place.



Brake-beam guides Vescolene UltraRed

Problems with metal brake beam guides

Excessive wear occurs between the brake beam and the guide causing the brake shoe to be applied unevenly to the wheel. Both the guide and the brake shoe wear unevenly leading to their premature replacement.



The benefits of Vescolene brake beam guides

- Increased life of brake shoe, guide and beam
- Uneven wear eliminated on brake beam guide and brake shoe
- Brake beam runs true maintaining correct contact between brake shoe and wheel
- Optimum braking efficiency
- Smoother brake beam release eliminates brake shoe drag on wheel
- Maintenance and operational cost savings on brake shoes, wheel and track

Coupler guides

Advantages of Vesco Polycap coupler guides

- Eliminate wear to mating surfaces
- Less weight than metal parts
- Simple installation
- Long life

Stop greasing and solve wear problems with Vesconite and Vesconite Hilube

Vesconite is a specialised **bushing** material made from internally lubricated polymers. Proven since the 1960's as an exceptional bushing material in demanding conditions, Vesconite gives low wear even in dirty or unlubricated conditions.

Available as machinable bushing stock, rods, plates and finished bushings

Up to ten times the life of bronze

- Internally lubricated Vesconite and Vesconite Hilube reduce or even eliminate the need for greasing.
- Bronze must be lubricated regularly and does not survive dirty and wet conditions.
- Vesconite survives wet and dirty conditions, giving up to ten times the life.

Better than steel

- Steel must be lubricated.
- Steel causes high wear to pins and shafts.

Better than nylons

- Vesconite does not swell or soften in water.
- Nylons lose up to 60% of their strength in wet conditions leading to creep problems.
- Nylons swell up to 3% in humid or moist conditions, closing up clearances and risking seizure.
- Nylons tend to wear shafts and pins which are expensive to replace.
- Vesconite gives a much longer wear life than nylon bushings.

Handbrake systems

Train handbrakes are easier to use and more efficient with Vesconite Hilube

Over time, handbrakes with metal bushes tend to stiffen and even seize because of lack of lubrication, dirt getting into the bushings and corrosion.

Vesconite Hilube works well even when not greased.

Vesconite Hilube replaces bronze for main drive bearings in trams

Excessive wear to motor axle bearings and shafts can cause accelerated wear of axles, motor pinions and drive gear systems.

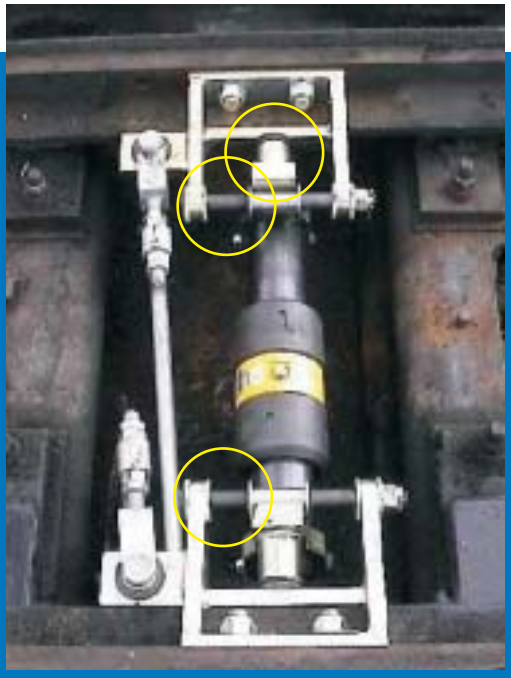
Wear to drive bearings will result in misalignment that can lead to excessive wear and failure of motor bearings and damage to motors.

Testimonial

'Start of the testing: 27.07.2005, thickness: 6.3mm +-0.1mm
Testing to date: 19.04.2008, thickness: 6.2mm
Distance travelled: 110 961 km
Remarks: Plate of conical pan is very good, without cracks, and very little groove
Decrease thickness: 0.1mm
Used material appears very good.'

Rail turnout systems

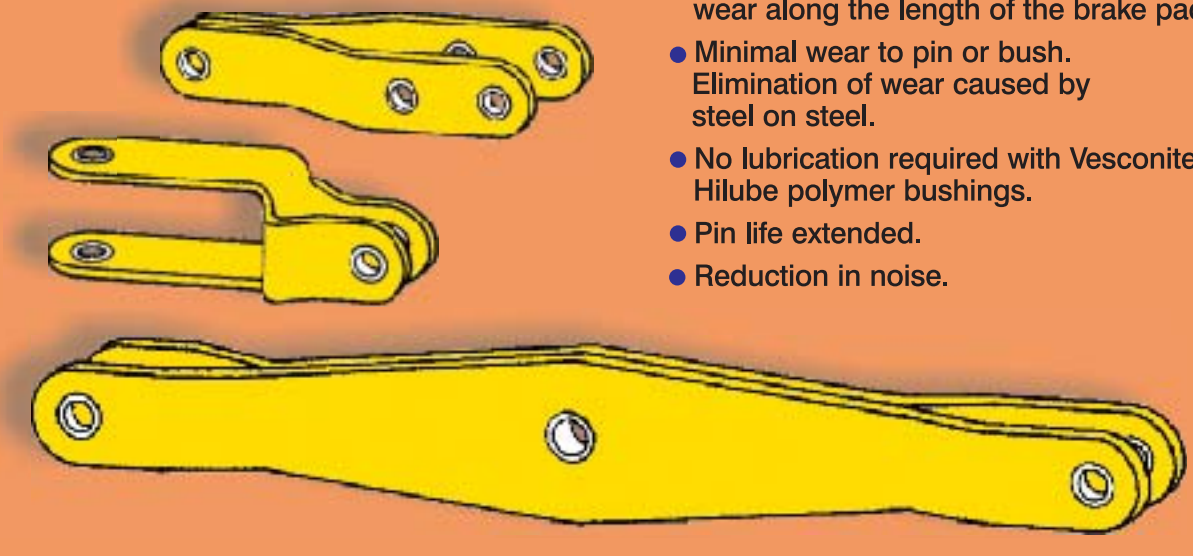
Rail turnout systems are subject to harsh environmental operating conditions of rain, sun and dirt. To carry out regular greasing is labour intensive. Internally lubricated Vesconite Hilube bushings fitted to these systems operate smoothly - no greasing or maintenance is required.



Brake rigging bushings

Vesconite Hilube bushings, no lubrication, long pin life, improved braking efficiency, low friction

Traditionally steel bushings have been fitted to train brake riggings, and are associated with substantial wear resulting in expensive maintenance.



Self lubricating Vesconite Hilube replaced steel bushings in brake rigging levers in freight wagons in long term comparative tests. These showed the following improvements.

- Improvement in braking efficiency as a result of lower friction against pin.
- Improvement in brake pad life with even wear along the length of the brake pads.
- Minimal wear to pin or bush. Elimination of wear caused by steel on steel.
- No lubrication required with Vesconite Hilube polymer bushings.
- Pin life extended.
- Reduction in noise.

Signal switching systems

Vesconite and Vesconite Hilube can be used in a variety of signal switching systems. Vesconite is low friction and low maintenance and is electrically insulating.

Vesconite and Vesconite Hilube have been used in thousands of demanding applications

Railways

- bogie bushings
- hopper door bushings
- pantograph bushings
- door closure system bushings
- brake rigging bushings
- locomotive weight control bushings
- handbrake bushings
- signal system bushings
- turnout bushings

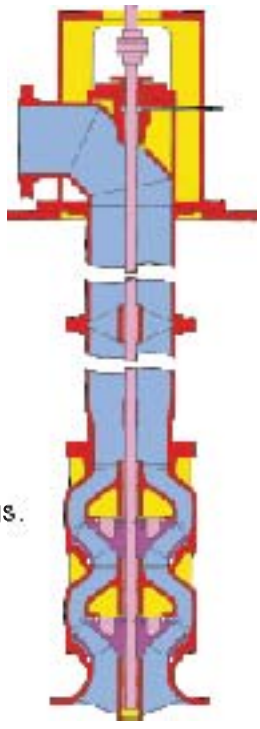
Other industries where Vesconite bushings are used

Materials handling: tail lifts, scissor lifts, conveyors, forklifts, cranes and booms.

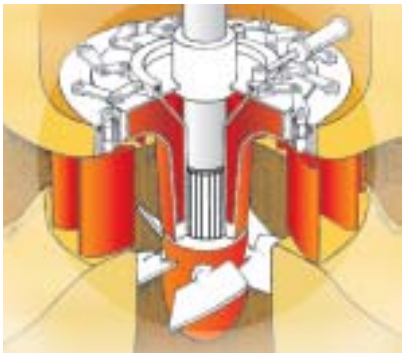
Mining: rock drills, locomotive axle bearings and stacker-reclaimers.

Earthmoving: oscillation and articulation bushings, frame and pivot bushings.

Marine: rudder and propeller shaft bearings, winches, hatch covers, davits and other deck equipment.



Pumps: water lubricated bearings, casing and wear rings, and line shaft bearings.



Hydro power: wicket gate and turbine bearings.

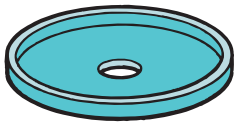
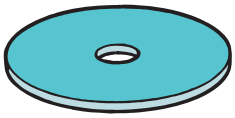
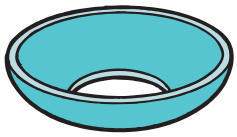
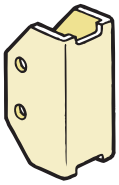
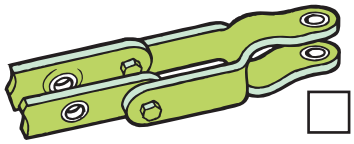
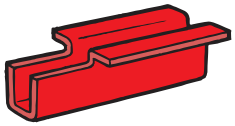
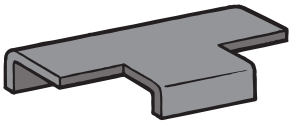
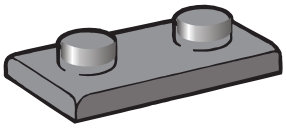
For information, please fax to +27 11 616 22 22

Name: Company:

Telephone: E-mail address:

Questions/applications

I am interested in (please tick)

Centre cup liner ☐ 	Flat liner ☐ 	UIC centre liner ☐ 
Pedestal liner Horn cheek guide Axle box guide ☐ 	Brake rigging systems  ☐	Brake beam guides  ☐
Couplers ☐ 	Couplers ☐ 	Other railway applications

Other railway applications Pantograph bushings ☐ Wagon door hinge bushings ☐ Rail switching systems ☐ Braking systems ☐	**Industrial applications** Marine ☐ Mining ☐ Earthmoving ☐ Other ☐

www.vesconite.com
vesconite@vesconite.com

Telephone

USA	1 866 635 75 96
UK	0800 731 97 45
Canada	1 866 682 3484
Netherlands	08000 223 805
Hong Kong	800 930 211
Brasil	0800 891 87 16

ISO 9001 QUALITY

AVOID METAL TO METAL WEAR