Mining & Quarrying Solutions
SERVICES & SOLUTIONS FOR AUSTRALIAN INDUSTRY

www.bsc.com.au

Tomorrow’s Technology Today.
Formerly known as Bearing Service Pty Ltd and established in 1921, BSC is the premier and most experienced Bearing and PT product distributor in Australasia. Proud of its Australian owned heritage, we are primarily engaged in the supply of Bearings and Power Transmission products. Today, BSC employs around 350 permanent staff and operates over 50 branches in all states around Australia.

The BSC product range is the largest of its type and is supported by a large distribution network of more than 100 computer-linked branches and authorized distributors to ensure that our broad stock range is available in all areas throughout Australasia including PNG, New Caledonia, Fiji, Solomon Islands, etc. Comprehensive bulk stock and accounts are managed using an IBM AS400 server platform.

Over the years BSC has built a reputation as a respected supplier of quality products and services. Since 1995 BSC has been licensed as a Quality Endorsed Company (QEC4475) and regularly audited and certified by SAI Global Limited to comply with the requirements of AS/NZ ISO 9001:2008 for the procurement, warehousing, distribution and sale of a wide range of bearings, power transmission and associated products.

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At BSC, we deliver the products and engineering services to keep your operation running.

We have the motor that powers machinery and the gearboxes that keep processes moving at precise speeds. Our couplings are the critical link, where power from the motor transfers to these gearboxes to reliably drive the operation. Our bearings keep our customers’ systems rolling, and rugged engineered belts and chain keeps material moving.

Our Engineering Services specialists work closely as part of your team. We design innovative solutions that move raw materials reliably and efficiently through every stage of the mining process. Understanding how your system is built and works translates into all important uptime.

Mining operations across Australia extracting every kind of material, rely on BSC every day.
Total Drive Package - Case Study

BSC has the ability to design, select and supply a total drive package utilising the disc brake incorporated onto the output coupling and supply the total drive complete with a base plate.

Problem
A major hard rock quarry has a very large extraction pit. For this reason the frequency of scrap metal from drill and blast operations, mobile equipment and other sources passing through the plant is quite high. Therefore there are numerous magnets and metal detectors installed throughout the crushing and screening plant, to avoid damage to crushers.

Conveyor 101, is the first main conveyor located after the primary jaw crusher. It has a large magnet installed, along with a metal detector.

Whenever foreign steel objects pass through the metal detector, the PLC shuts down the conveyor belt motor and the conveyor comes to a stop under its own momentum. Unfortunately due to the plant setup, whereby the conveyor is short and on an incline, the location where steel comes to rest is at a point where plant operators need to remove guarding and climb up onto the belt.

Each metal detect results in 10-15 minutes downtime, of which 5 to 8 minutes involves removing this guard and climbing onto the conveyor. On average there are at least 3 metal detects per day during normal operation.

Options to reduce the time taken retrieving metal off the belt needed to be investigated, as this is a considerable downtime each year.

Engineering Considerations
Safer and more ergonomic ways to reach the belt at metal stops were initially investigated.

The only 2 options were to build a catwalk along the side of the conveyor, or a collapsible stairway from the existing catwalk above.

With no room alongside the conveyor to build a catwalk, and because collapsible stairs have a safety risk element, it was clear these options were not feasible.

As access to the conveyor is not restricted past the gate (into the tunnel), it was discussed that if the belt was able to stop sooner after a metal detect, there would be no need to remove guarding and climb up onto the conveyor.
Solution

After collecting all relevant data for CV101, BSC Engineering Services quoted on a suitable hydraulic disc brake. Requirements for this option to be feasible meant that the belt has to stop within 2 meters after a metal detect, where access to the belt only requires opening the tunnel gate.

After calculating fully loaded belt momentum and inertia, a suitable hydraulic brake system incorporating a 610mm diameter disc brake was proposed. The installed location would be between the gearbox output shaft and the head drum.

Calculating the belt to stop within 1.3 metres with this brake installed made this option feasible in reducing the time taken to retrieve metal off the conveyor belt.

As the current drive utilised an older worm gearbox with belts (which was running at 67% efficiency), it was jointly decided to change this arrangement to a more efficient bevel helical gearbox (rated at 97% efficiency).

Benefit

After discussions with plant operators, it was agreed that if the retrieval location was 1 to 2 metres after the detector in the tunnel, this would save at least 5 minutes each metal detect. Using an average of 3 metal detects per day, this correlates to 75 minutes downtime saved during a 5 day production week, or $6250 (downtime cost of $5000 per hour).

It can be seen that the hydraulic disc brake system will pay for itself in 2.4 weeks. Projected savings every 3 months thereafter are between $50,000 and $60,000, or $200,000 per year. This figure becomes even more substantial when there are more than 3 metal detects per day. For example if there were 5 metal detects every day for a year, there would be a saving of $420,000 in downtime costs.
BSC’s Engineering Services

As one of Australia’s largest suppliers of bearings, sealing and power transmission products, BSC recognises the positive impact that our specialised products and services can, and do, have in helping our customers become more sustainable across economic and environmental objectives.

BSC has been actively working with our customers to achieve these outcomes for several years and we have achieved a level of experience and market leadership demonstrated with significant success across all market segments.

BSC Engineering Services provide specialized capabilities through condition monitoring programs including vibration analysis, thermography, and oil analysis.

Complementary corrective services such as laser alignment, balancing, ultrasonic leak detection, fitting and installation services, and major refurbishment services of bearings and mechanical equipment, ensure maximum plant up time.

We take things a step further, and not only provide you with the condition of your plant, but partner your business in root cause analysis projects to develop solutions to recurring issues. Add to this our sustainability program to reduce energy consumption and greenhouse gas emissions, whilst improving profitability and competitiveness; and utilize our range of tailored on-site training courses, and BSC are an integral part of your team.

**Coal Mine Wash Plant**

**CASE STUDY**

BSC conducts routine condition monitoring for a large coal mine wash plant. On our condition monitoring data collections, our findings indicated vibrations had significantly increased for both motor and pump bearings which warranted serious concern. The main water pump provides water to the plant and should this pump prematurely fail, it would consequently shut the plant.

BSC Engineering Services recommended that the machine be taken out of service for maintenance including an inspection of the coupling and alignment review. After our inspection our findings confirmed our analysis report that the couplings were out of alignment as indicated in the initial reading.

BSC laser aligned the shafts to the required tolerance in accordance with the manufacturer’s application specification and rotating speed.

This application is now running much cooler, quieter and prevented a most unwanted premature failure. Using condition monitoring prevented an unwanted break down and consequent downtime estimated at a value of $100k per hour, an estimated 6-8 hours to change out the pump, saving $600,000 to $800,000.
Predictive Maintenance PdM Program

For Asset Optimization.

Predictive maintenance PdM aims to find measures of machinery condition and use them to prevent breakdowns. Establishing trends allows accurate pinpointing of machinery problems and their severity. Increasing up time on machines is the primary aim, while reduced likelihood of secondary failures and less unnecessary maintenance are additional benefits.

Condition Monitoring is most frequently used as a Predictive or Condition-Based Maintenance technique. Condition Monitoring uses advanced technologies in order to determine equipment condition, and potentially predict failure.

BSC’s Predictive Maintenance Program utilises Azima DLI technology. Azima DLI is a world leader in condition monitoring services to industry delivering a wide range of technologies and services that reduce maintenance costs whilst ensuring maximum equipment reliability.

The BSC – Azima Watchman Remote is a robust, automated monitoring and diagnostic service that links our customers’ critical equipment with our best systems engineers and analysts via automated alarms and advanced internet technologies 24/7. When an alert occurs our analysts are called into action immediately reviewing detailed machine data to assess condition and recommend the most cost effective actions available. Remote program benefits include reduced failure risk and allows for just-in-time maintenance of equipment.

Our expertise spans all areas of condition based maintenance, including:

- Vibration analysis
- Onsite data collection
- Lubrication analysis
- Infrared thermography
- Laser alignment
- Failure analysis
- In situ balancing
- Installation
Vibration Analysis

This is the predominant technology employed in condition monitoring to determine the condition of various mechanical components and hence be able to make a prediction on service life expectancy and urgency of repairs.

It is a non-invasive technique which collects vibration data from machines under normal operating conditions. Vibration readings are typically taken at bearing locations following accepted industry practices and conventions. This raw waveform data is then transformed into a spectral format and analyzed with proprietary software which allows analysis to take place.

Vibration Analysis provides the best indication of machine condition and the presence of faults as it can detect imbalance, misalignment, looseness, bearing and gear defects, lubrication problems, resonance, and cavitation, amongst others. Trending data over time allows wear severity and progression to be monitored, improving the predictive capabilities.

A high degree of skill and training is required to be able to interpret vibration data. As such reports are tabled in non technical terms and use a traffic light system to illustrate the severity of the fault detected. Green suggests monitoring is within allowable limits, amber means a fault/issue has been identified and requires some attention or further monitoring, whilst red indicates a severe fault which requires immediate attention to avoid equipment failure.

Limitations of this technology are largely related to the frequency and operating conditions under which the data is collected. Occasionally faults can develop quickly and failures occur before the next scheduled survey. Identifying critical equipment and understanding their maintenance history will assist in developing an appropriate program.

CASE STUDY

Aglime producing Quarry

A quarry with multiple sites across Australia produce Aglime; a product used mainly in agriculture as a nutrient booster for soils.

For most sites the production can be broken down into 4 fundamental processes; extraction, crushing, washing/drying and grading. BSC’s Engineering Services division provides condition monitoring services to multiple sites.

In Traralgon BSC provides vibration analysis services on a frequent basis. On a recent vibration survey completed on site, a misalignment was picked up on a roller mill fan. The roller mill is responsible for crushing the raw limestone into smaller more easily graded samples for their chemical composition and granulometry. The accepted lime stones are then crushed further and heated in various kilns to produce the final product.

The roller mill fan was beginning to show signs of a misalignment fault. These faults had been tracked for a few months beforehand and had now progressed to the stage where corrective action was required.

BSC was able to conduct a laser alignment on the fan during a scheduled downtime of the roller mill as the mill cannot operate without the fan. Upon completion of the alignment the fault ceased and the roller mill was able to return to normal production.

Had the alignment fault been allowed to persist the potential for significant collateral damage would have been high. Equipment costs alone would have exceeded $10k.
Infrared Thermography

Using a camera designed to capture heat energy in the infra-red (IR) spectrum, abnormal temperature conditions in machines and electrical devices can be identified.

It is common for insurance companies to require 6-12 monthly external audits of all electrical panels. In mechanical systems an IR image can detect issues like bearings running at high temperatures which will then require further investigations to identify the cause such as a lack of lubrication, misalignment, etc.

In electrical systems, issues like overheating electric motors, loose or faulty connectors, excess current draw, overloaded circuits, etc can be identified.

In the thermal image on this page, we can see that the connection for the main cable of one of the phases is operating at temperatures much higher than the other two. This indicates an excessive current draw and on investigation, the company discovered additional equipment had been connected to the circuit without the electrical circuit’s limitations being considered.

IR technology provides thermal images of temperature differentials within the detection field. It is then reliant on human understanding of the image to determine the presence of faults or otherwise.

CASE STUDY

A regional saw mill that processes hard and soft wood timbers for the flooring industry reduces its fire risk by employing BSC Engineering Services to perform 6-monthly thermography analysis and reporting.

A saw mill is a tough environment for both mechanical and electrical equipment. Shock and vibration forces are produced as large logs and timber move through the saw mill process. The vibration can loosen nuts and bolts on connectors and the resulting spark can ignite fine dust particles which invariably enter electrical enclosures. These fires, often fanned by the enclosures cooling system, spread rapidly posing a major threat to equipment and personnel alike.

By conducting regular thermography scans and introducing preventative maintenance procedures to extract dust build up on a regular basis, our customer has not had an electrical fire in over two years. Not only is reducing the fire risk critical, but the program ensures compliance with the customers insurance company policy and reduces premiums and excess liabilities.
Lubrication Management

A key component of an effective predictive maintenance program includes well designed and run lubrication management programs and schedules.

Too often lubrication is assigned to poorly trained and unskilled personnel or left to production personnel. This leads to a myriad of issues including over and under greasing, incorrect grease use and incompatibility issues, wastage and disposal problems and costs, and ultimately reduced component service life.

BSC Engineering Services can assist by auditing your existing practices and develop an integrated lubrication management system. Options include computer based lubrication scheduling, recording and consumption data, colour coded and individual lube point identification, relubrication intervals and quantities calculations, and a ‘consolidate and save’ assessment to reduce the number of lubricants used on site (where possible).

Oil Analysis

Oil analysis is a cost effective method for determining the condition of existing lubricants and hence, predicting remaining service life.

Programs can consist of either in-house or external testing which tests for four major indicators, - base oil degradation, water content, presence of contaminants, and presence of iron particles. As an example, in food plants it is common to have water contamination of gearboxes as a result of daily high pressure washdowns. Even very small concentrations of water will lead to premature bearing and gear failure due to corrosion.

Full spectrographical analysis by approved laboratories can be used to verify findings and for further investigation of oil condition which in turn, can be used as part of root cause failure analysis.
Energy consumption can be reduced up to 40% by analysing inefficient and poorly designed drives and adopting good drive design practices.

The path to becoming an environmentally sustainable manufacturer begins with understanding how much energy you currently use and how you can reduce that consumption. BSC is very active in the reduction of our customers' carbon footprint via the BSC Energy Audit Service (EAS). The program focuses upon the meaningful reduction of energy consumption via power transmission and covers AC motor survey, analysis and upgrade recommendations to premium high efficiency super long life motors, gearbox analysis and upgrade, belt and chain drives analysis and upgrades.

Energy Reduction Program – Energy Audit Service

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Energy Reduction Audit

BSC Engineering Services conducted an Energy Audit at a leading global manufacturer of concrete and aggregates at their Victorian site. The survey of AC electric motors was conducted to improve energy and efficiency.

Quarries are tough environments requiring mining class rated motors. Utilising the BSC super long life High Efficiency motor range provided significant benefits to the customer.

- Energy consumption reduction of 223,778kwh pa.
- Annual CO2 reduction > 321 tonnes.
- Energy saving $31,329 pa.
- Motor life increase of 335%
The SNG series of BSC branded housings are sourced from BSC approved manufacturers. Dimensionally interchangeable with SNA, SNU, SNL, SNH and SN-SSN series.

SNG range available ex stock: 507 to 532.

**MINING SOLUTIONS FOR YOUR CONDITIONS**

<table>
<thead>
<tr>
<th>FEATURE</th>
<th>BENEFIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing BSC Brand</td>
<td>Sourced only on BSC approved manufacturers. Product quality backed by BSC.</td>
</tr>
<tr>
<td>Cast Iron or spheroidal graphite iron</td>
<td>Material option to suit application loads.</td>
</tr>
<tr>
<td>Interchangeable Seal kit options. G, TA &amp; TAC seal types</td>
<td>Enables a variety of sealing arrangements for light to heavy duty contamination applications.</td>
</tr>
<tr>
<td>Cast separation slots at housing split line</td>
<td>Easy disassembly of cap and base</td>
</tr>
<tr>
<td>Cast vertical grooves for foot &amp; shaft centreline location</td>
<td>Enables easy alignment during installation</td>
</tr>
<tr>
<td>Housing cap dowels offset located</td>
<td>Ensures correct fitting of cap and base</td>
</tr>
<tr>
<td>Rib reinforced housing foot</td>
<td>Strengthens the base area for load capacity</td>
</tr>
<tr>
<td>Grease access hole at side of bearing seat. Cap dimpled for lubrication access options, bearing centreline or side</td>
<td>Improved lubrication to Bearings</td>
</tr>
<tr>
<td>Cap Bolts Grade 8.8</td>
<td>Increased cap bolt strength</td>
</tr>
<tr>
<td>Grey = cast iron. Orange = SG iron</td>
<td>Easy to identify to ensure you receive the requested Housing</td>
</tr>
</tbody>
</table>
SSN, SD & CSD Series Taconite Plummer Blocks - Heavy Duty

The SSN, SD & CSD series of BSC branded housings are sourced from BSC approved manufacturers.

Range available ex stock:
- TSSN: 511 to 532 CI 2 bolt
- FSSN: 511 to 532 CI 4 bolt
- TSSND: 511 to 532 SG Iron 2 bolt
- FSSND: 511 to 532 SG Iron 4 bolt
- SD: 3134 to 3148 CI
- SDD: 3134 to 3180 SG Iron
- CSDD: 3168 to 3196 SG Iron

### Feature Benefits

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
</tr>
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<tbody>
<tr>
<td>Housing BSC Brand</td>
<td>Sourced only on BSC approved manufacturers. Product quality backed by BSC.</td>
</tr>
<tr>
<td>Material – Nominate: CI or SG</td>
<td>Range of materials to suit application.</td>
</tr>
<tr>
<td>SSN Cast Iron: 2 bolt cap</td>
<td>4 bolt cap provides a higher strength option when required.</td>
</tr>
<tr>
<td>SSN SG Iron: 4 bolt cap 524-532</td>
<td>Non shaft rubbing sealing plus replaceable positive located seal wear plate. Standard in all SSN, SD and CSD Housings.</td>
</tr>
<tr>
<td>Heavy duty taconite seals</td>
<td></td>
</tr>
<tr>
<td>Machined foot top and ends</td>
<td>Secure bolting &amp; accurate housing location.</td>
</tr>
<tr>
<td>Cast separation pinch slots at housing split line</td>
<td>Easy disassembly of cap and base.</td>
</tr>
<tr>
<td>Central grease access hole &amp; axial seat groove</td>
<td>Ensures lubrication directly into bearing even with floating bearing setup.</td>
</tr>
<tr>
<td>Longitudinal strengthening rib in housing core: SD &amp; CSD Series only</td>
<td>Strengthens the base area under tension and bending forces.</td>
</tr>
<tr>
<td>SSN Solid feet.</td>
<td>Strengthens the foot area under attachment bolts.</td>
</tr>
<tr>
<td>Transverse machined base section on shaft centreline</td>
<td>Positive transfer of loads under compression.</td>
</tr>
<tr>
<td>Cap Bolts Grade B8</td>
<td>Increased cap bolt strength.</td>
</tr>
<tr>
<td>Housing cap dowels offset located.</td>
<td>Ensures correct fitting of cap and base.</td>
</tr>
<tr>
<td>Housing cap and base are match marked for identification</td>
<td>Ensures cap &amp; base are identified as a set during installation.</td>
</tr>
<tr>
<td>Location provisions for VA sensor</td>
<td>Allows ability to monitor Bearing wear.</td>
</tr>
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</table>
Choose the Best Seal for the Operating Conditions

Sealing Arrangement SNG Series
Plummer Blocks Light Duty

<table>
<thead>
<tr>
<th>Sealing Type</th>
<th>TACONITE</th>
<th>LABYRINTH</th>
<th>G Kit</th>
<th>TA Kit</th>
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<tbody>
<tr>
<td>Temperature °C</td>
<td>-40 TO 100</td>
<td>-40 TO 100</td>
<td>-40 TO 100</td>
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<tr>
<td>Linear Speed</td>
<td>UP TO 12 M/S</td>
<td>NO LIMITING SPEED</td>
<td>UP TO 8 M/S</td>
<td>UP TO 7 M/S</td>
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<tr>
<td>Friction Low</td>
<td>**</td>
<td>***</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>Dust</td>
<td>***</td>
<td>**</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>Fine particles</td>
<td>***</td>
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<td>**</td>
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<tr>
<td>Abrasive conditions</td>
<td>***</td>
<td>**</td>
<td>*</td>
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<tr>
<td>Fine water spray</td>
<td>**</td>
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</tbody>
</table>

*1 When housings with G seals require frequent relubrication, linear speeds to 4 m/s and housings with GH feature are recommended.

*2 On assembly of G seal, grease is to be applied between seal lips.

Sealing Arrangement SSN, SD & CSD Series
Taconite Plummer Blocks Heavy Duty

SSN
TACA V-ring seal arrangement

SD & CSD
TACA V-ring seal arrangement

<table>
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<tr>
<th>Sealing Type</th>
<th>TACONITE</th>
<th>TACA Type</th>
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<tbody>
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<tr>
<td>Fine water spray</td>
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### SNG Series Plummer Blocks – Light Duty

<table>
<thead>
<tr>
<th>SHAFT SIZE</th>
<th>SIZE NO.</th>
<th>G-SEAL KIT, OPEN HSG.</th>
<th>G-SEAL KIT, CLOSED HSG.</th>
<th>V-RING SEAL KIT, OPEN HSG.</th>
<th>V-RING SEAL KIT, CLOSED HSG.</th>
<th>TS SEAL</th>
<th>TAC SEAL COVER</th>
<th>TAC O-RING</th>
<th>V-RING</th>
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</table>

### SSN, SD & CSD Series Taconite Plummer Blocks – Heavy Duty

<table>
<thead>
<tr>
<th>SHAFT SIZE</th>
<th>SIZE NO.</th>
<th>COMPONENTS &amp; KITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>SSN51TAC</td>
<td>TAC SEAL ASSY.</td>
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<tr>
<td>55</td>
<td>SSN512TAC</td>
<td>TAC COVER ONLY</td>
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<td>60</td>
<td>SSN513TAC</td>
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<td>SSN515TAC</td>
<td>O-RING CORD SIZE</td>
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<td>70</td>
<td>SSN516TAC</td>
<td>V-RING</td>
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<td>75</td>
<td>SSN517TAC</td>
<td>SEAL PLATE</td>
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<td>BLANK PLATE</td>
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### SSN, SD & CSD Series Taconite Plummer Blocks – Heavy Duty

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<td>SSN532TAC</td>
</tr>
</tbody>
</table>
High performance, compact, economical, double the operating life, limiting speed 20% higher.

NSK’s HPS™ Spherical Roller Bearings are state-of-the-art material technology bearings, suitable for high speeds and heavy loads. They can enable equipment downsizing and are suitable for a wide variety of applications. Available in EA steel or CAM brass cage.

**Product Details**
- Up to twice the operating life of conventional products
- Up to 20% higher limiting speeds
- Up to 25% higher dynamic load rating
- Compact construction – low running costs
- Improved outer ring surface
- New cage design for improved wear resistance

**Cages**
- Pressed steel cages – special surface treatment
- Brass cages – optimised for high reliability

1. **Pressed Steel Cage**
   - (EA-series)
   - Higher limiting speeds – up to 20% max.
   - Special surface treatment
   - Bore diameter available up to 130mm

2. **Solid Brass Cage**
   - (CAM-series)
   - Higher limiting speeds – up to 20% max.
   - Bore diameter available from 95mm

3. **Rollers**
   - Optimised Surfaces
Long-Life Vibrating Screen
Spherical Roller Bearings

Feature longer life and higher reliability.

NSK’s Long-Life Vibrating Screen Series of Spherical Roller Bearings are engineered specifically to withstand the harsh working environments and frequent vibration of mining, quarrying and construction industries.

Features

- Precision machined tough one piece brass cage, contoured roller pockets.
- Improved surface roughness on rollers & inner & outer ring.
- Special heat treatment rollers, prevent cracks from vibrations & shock loads.
- Self aligning ability with floating guide ring.
- Controlled roller skew.
- Internal radial clearance set at 2/3 ISO standard bearings.
- Outer dimensional tolerances set at 1/2 of ISO standard bearings
- 40mm - 200mm bore diameter.

Benefits

- Twice the service life of conventional bearings
- Reduced maintenance costs.
- High dynamic & static load ratings - load rating increased by 1.25 times.
- Dampened vibration & highly resistant to heavy or shock loads.
- High speed performance & low operating temperature rise.
- Better roller guidance & smooth running - reduced bearing damage from slippage, surface fatigue, flaking.

LONG LIFE TECHNOLOGY – LIFE RATIO

Newly developed spherical roller bearings for vibrating equipment feature longer life and higher reliability.

(Life test results using vibrating equipment simulator)

Based on similar test results, the newly developed bearing showed a twofold increase in life over that of the conventional bearing.

www.bsc.com.au
EMM-VS Series Cylindrical Roller Bearings for Vibrating Applications

NSK’s EMM-VS Series of Cylindrical Roller Bearings for Vibrating Equipment feature a high load-carrying capability, has an innovative outer-ring-guided machined brass cage and a special roller crowning accommodating heavy loads & misalignment.

Features
- High strength & wear resistant machined brass cage.
- One-piece cage gives higher strength under vibrating conditions.
- Special cage pocket profiling helps guide rollers.
- Large cage pocket corners relieve stress concentrations on the cage.
- Special roller crowning to reduce generation of edge loading.
- ISO standard sizes.

Benefits
- High rigidity with enhanced cage strength.
- Improved grease & oil flow in cage pockets.
- Improved lubricant dispersion dampens noise.
- 30% higher load rating compared with conventional bearings.
- Up to twice the bearing life.

Full Complement Cylindrical Roller Bearings for Crane Sheaves

Anywhere wire rope is used for lifting, sheaves are used to guide the rope for heavy duty applications. NSK has available a range of Full Complement Cylindrical Roller Bearings with high performance seals, a highly corrosion resistant phosphate coating and overall fewer parts to improve cost performance. Bearings are available in both DIN 471 and JIS standards.

Features
- Improved contact seals.
- High load rating.
- Highly corrosion resistant phosphate coating.
- Easier grease re-lubrication.
- Bearings pre-greased with Lithium grease.
- Can be fitted with DIN 471 snap rings.

Benefits
- Contact seals prevent ingress of foreign particles or water.
- Increased radial and axial capability.
- Re-lubrication holes for easy maintenance & grease replenishment.
- Can be used in external environments due to coating.

Part numbering
- DIN 471 standard – RS-50xxDSE7NAS5
- JIS standard – RS-50xxDSNRSS
Molded-Oil™ Bearings

Molded-Oil™ Bearings are lubricated with NSK’s original oil-impregnated material, Molded-Oil™, and are suitable for corrosive and dust contaminated environments.

Features

Excellent performance in water and dust-contaminated environments
The bearings are designed to prevent liquids such as water (which can wash the lubricating oil out) and dust from getting inside the bearings. Sealed types can be used in environments exposed to water and dust.¹

Environmentally friendly
Because they are lubricated with minute quantities of oil that exudes from Molded-Oil™, the bearings are able to minimize oil leakage.

Low torque
Packing with Molded-Oil™ after providing the bearing surface with special treatment realises smooth rotation of rolling elements.

Optimal composition and molding methods enable high-speed operation of Molded-Oil™ Bearings
Optimisation of composition and molding method of Molded-Oil™ improves strength and enables high-speed operation of Molded-Oil™ Bearings.¹

¹ Water and dust dramatically accelerate bearing damage. In order to realise stable operation NSK recommend using seals to prevent water and dust from getting in the bearing.

Portion containing mostly polyolefin

Polyolefin is used for packaging food in supermarkets, replacing dioxin generating vinyl chloride.

Portion containing mostly lubricating oil

The lubricating oil is mineral oil based.
Spherical Roller Bearing - CAM Cage Bore 20>260mm

Specifically engineered to withstand the tough working environments of heavy industry. Spherical roller bearings with CAM cage are designed with a precision-machined tough solid brass cage. Highly resistant to heavy or shock loading designed for high speed performance and low operating temperature rise.

Features
- Precision machined tough solid brass cage with contoured roller pockets.
- Symmetric rollers lead to even load distribution along the roller length and to an extended load rating.
- Self-aligning ability with floating guide ring to optimize roller guidance
- Controlled roller skew.
- Outer diameter up to 2500 mm.
- ISO standard dimensions.
- Tapered and Parallel Bore as standard options.

Benefits
- High dynamic and static load ratings.
- Highly resistant to heavy or shock loading.
- High speed performance and low operating temperature rise.
- Better roller guidance and smooth running.

EM Series Cylindrical Roller Bearings

NSK’s EM Series of Cylindrical Roller Bearings feature high load ratings, quiet running with precision machined tough one-piece cage, for all industrial applications.

Features
- Extra capacity internal design.
- High strength & wear resistant one piece machined brass cage.
- Special cage pocket profiling gives accurate roller guidance.
- Large cage pocket corners relieve stress concentrations on the cage.
- Special roller crowning reduces the generation of edge loading.
- ISO compliant dimensions.
- Bore range 25mm and above.

Benefits
- Up to twice the bearing life.
- High cage strength gives good performance in vibrating equipment.
- Improved grease & oil flow in cage pockets.
- Quiet running low noise operation.
- 30% higher load rating compared with conventional bearings.
EW Series Cylindrical Roller Bearings

NSK’s EW Series of Cylindrical Roller Bearings feature high load-carrying capability and high performance pressed steel cage. The EW series is fully interchangeable with ISO standard extra capacity Roller bearings and suitable for a wide variety of industrial applications.

Features
- High strength & wear resistant pressed steel cage. Bore size 25 – 65mm
- Cage pocket design gives superior roller guidance.
- Cage strength increased 1.5 – 2 times.
- Cage symmetry reduces noise.
- Controlled contour rollers.

Benefits
- Up to 30% increase in load rating.
- Longer operating life – up to twice the bearing life.
- Cage strength is greater than major competitors.
- 10 - 25% higher limiting speed than conventional series.
- 30 - 40% noise reduction (3 - 7dB quieter) & vibration reduction.

Deep Groove Ball Bearings

NSK is the World Leader in development and manufacture of deep groove ball bearings. NSK manufacture a full range of deep groove ball bearings. These bearings are the most common type and are used in a wide variety of applications. Not only are they capable of supporting radial loads, but also moderate axial loads in either direction. Due to their low torque, they are suitable for applications where high speed and low power loss is required. They are easy to mount and suitable for many different configurations.

Features
- Cages - Offering a number of different cage types to suit your application needs: steel, solid brass or polymer
- High Quality Steel - Ultra clean steel to extend bearing life by up to 80%
- Advanced Grease Technology - NSK lubricants that can extend grease life and performance
- Super Finished Raceways - Specially honed to minimize noise and improve lubricant distribution and life
- Patented Seals - Provide resistance to contamination in the toughest environments. 
- Electrically insulated ball bearings available
- Outer diameters up to 2500 mm
- Special Electric Motor Internal Clearance – Minimizes running noise.

Benefits
- High Grade Balls - Quiet and smooth operation even at high speed
- Quality Assured - 100% testing ensures total product quality

We have achieved our position over a number of years by pushing this product beyond that of any other manufacturer. By extending the normal boundaries of performance and functionality we are able to offer deep groove ball bearings that extend machine life and provide years of maintenance free service.
QM Blue Brute Bearings
Pre Assembled Units, No Set-up Required

- Assembled to order.
- Double row spherical roller bearing accepts misalignment.
- Choice of 5 primary seals in any combination.
- Machined feet for one-time shaft alignment and easy replacement.
- Snap-on secondary seals are optional.
- Housings manufactured from 75,000 psi tensile cast steel can be rebuilt several times.
- Easily converted to fixed or expansion in the field.
- External nut eliminates axial movement.
- Free or fixed adjustable.
- Eccentric Locking Collar for increased torque.
- Housings can be special ordered with Nickel, Zinc or Urethane coating.
- 2-bolt and 4-bolt pillow blocks available.
- Seals operate on the wide inner ring not the shaft.
- Optional external seal covers.

More Benefits
- Increased bearing service life
- Extended maintenance intervals
- Lower running temperature
- Lower vibration and noise levels
- Greater throughput of machine
- Improved product quality
- Simplified / faster assembly procedures
- No adjustment of clearance for eccentric lock

Our housings will drop into existing bolt centres and base to centre height with no modifications required.

Interchanges
Dimensionally interchanges with:
- SN / SAF Split Cap Units
- Browning
- Morse
- Dodge
- Link-Belt
- Rexnord
- SKF
- Sealmaster

QM Blue Brute Bearings
Pre Assembled Units, No Set-up Required
Locking Styles
Perhaps you are replacing an existing bearing and you already know what kind of locking style you need. Or maybe you’re looking for a more durable bearing than what you’ve been using. Either way, you’ll be glad we offer four locking styles.

Eccentric Lock
A reduced eccentric offset results in more mechanical advantage. This series provides a secure lock that is guaranteed not to release from a properly prepared shaft.

Concentric Lock [set screw]
Two set screws at 60° provide maximum holding with minimal run out and simple installation. Available in single or double collar configurations.

Tapered Adapter Lock
We use a 2300 series adapter rather than a 300 series adapter for increased shaft contact. This design excels in applications where shaft centering is an issue.

V–Lock® Double Tapered Lock [QM Bearings exclusive]
Easy to install and remove, the QM Bearings exclusive V–Lock® locking mechanism (patent pending) evenly distributes force on the shaft, virtually eliminating fretting corrosion on properly prepared shafts.

Seals
An ineffective seal can quickly ruin any bearing and suddenly increase the total cost and inconvenience of your purchase. Think of seals as inexpensive insurance to protect your bearing investment. QM recognizes the importance of well designed seals and offers 17 seal choices. Consult BSC for guidance on how to choose the best seal combination for your application:

- Double lip: nitrile (B) and Viton® (C)
- Triple lip: nitrile (M), Viton® (N) and urethane (O)
- High-speed labyrinth Teflon (T)
- Mechanical labyrinth steel (ML)
- Closed end covers (Urethane or Steel)
- Open end covers (Urethane or Steel)
- Contamination collars (CC)
- Flange backing plates (UFP and CFP)
- Piloted flange backing plates (Y)

Case Study
A leading South Australian crushing and waste recycling and processing company were experiencing issues with failed bearings.

The main conveyor tail drum bearing assembly was the commonly used ‘SN’ type arrangement and failing every 3 months due to the ingress of contaminants – the operating environment is particularly harsh. Every 3 months production would stop for 2 hours whilst the failed bearings were replaced, and every 3 months had to purchase new bearing stocks.

BSC inspected the application and immediately identified this as one requiring the unique combination of a heavy duty unit with superb sealing capabilities. The answer was obvious – the Blue Brute QJMSN15J075S with Triple Lip sealing is designed for these conditions and has the added bonus of the seals running on the inner ring of the bearing (no wear on the tail drum shaft). When change-out is required the Brute’s factory pre-set clearance turns a 2 hour job into 20 minutes.

The Blue Brute Bearings have now been in for 8 months, are operating perfectly, and are expected to last over two years. That’ll be a minimum 8:1 success ratio.
Interchanges with standard SN/SNG/SD units.

A Proven Product with Proven Cost Savings

Improving productivity and production performance ensures you remain competitive. Keeping plant equipment operational for longer is critical to keeping your competitive edge. Downtime caused by either scheduled maintenance or through failures can be expensive. Cooper Split Bearings dramatically reduce downtime and production losses in trapped, cramped and inaccessible locations.

<table>
<thead>
<tr>
<th>SOLID BEARING VERSUS COOPER SPLIT BEARING COSTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid Bearing</td>
</tr>
<tr>
<td>100%</td>
</tr>
<tr>
<td>90%</td>
</tr>
<tr>
<td>80%</td>
</tr>
<tr>
<td>70%</td>
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<tr>
<td>20%</td>
</tr>
<tr>
<td>10%</td>
</tr>
<tr>
<td>0%</td>
</tr>
</tbody>
</table>

- Re-installing adjacent machinery
- Downtime cost
- Maintenance cost
- Installation cost
- Adapter sleeve cost
- Bearing cost

Improving productivity and production performance ensures you remain competitive. Keeping plant equipment operational for longer is critical to keeping your competitive edge. Downtime caused by either scheduled maintenance or through failures can be expensive. Cooper Split Bearings dramatically reduce downtime and production losses in trapped, cramped and inaccessible locations.
Evaluate Your Own Cost Saving Potential using Cooper Bearings

Typical example shown in blue

<table>
<thead>
<tr>
<th>COST SAVING COMPARISON</th>
<th>CURRENT BEARING</th>
<th>YOUR OWN COST SAVING</th>
<th>COOPER BEARING</th>
<th>YOUR OWN COST SAVING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cost of Bearing</td>
<td>$4,487</td>
<td></td>
<td>$7,937</td>
<td></td>
</tr>
<tr>
<td>2. Estimated time of bearing change</td>
<td>16 hours</td>
<td>2 hours</td>
<td>2 hours</td>
<td></td>
</tr>
<tr>
<td>3. Number of people to replace bearing</td>
<td>2</td>
<td>2</td>
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<tr>
<td>4. Maintenance cost per person, per hour</td>
<td>$100</td>
<td>$100</td>
<td>$100</td>
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<tr>
<td>5. Production loss cost per hour</td>
<td>$18,750</td>
<td>$18,750</td>
<td>$18,750</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TO FIND THE COST SAVINGS</th>
<th>CURRENT BEARING</th>
<th>YOUR OWN COST SAVING</th>
<th>COOPER BEARING</th>
<th>YOUR OWN COST SAVING</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Crane rental per hour (average cost)</td>
<td>$500</td>
<td></td>
<td>N/A</td>
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</tr>
<tr>
<td>A. Labour cost for Outage (line 2 x line 3 x line 4)</td>
<td>$3,200</td>
<td></td>
<td>$400</td>
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</tr>
<tr>
<td>B. Production loss for Outage (line 5 x line 2)</td>
<td>$300,000</td>
<td></td>
<td>$37,500</td>
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</tr>
<tr>
<td>C. Labour cost plus Production Loss (line A plus line B)</td>
<td>$300,200</td>
<td></td>
<td>$37,900</td>
<td></td>
</tr>
<tr>
<td>D. Equipment rental for Outage (line 6 x line 2)</td>
<td>$8,000</td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>E. Bearing + labour + production loss + crane rental cost (line 1 plus line C plus line D)</td>
<td>$315,687 (per 6 months)</td>
<td>$45,837</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comparison Difference | $631,374 | $45,837
Annual Total Savings | - | $585,537

Subtract the value of line E on the left from the value of line E on the right to establish the savings achieved by specifying Cooper

Quarry - Conveyor

On a large conveyor a quarry changed out the head drum bearings every year. Not a simple task for the maintenance crew not to mention the constant risk of breakdown and the full day shut that comes with it. Problem 1 inferior sealing leads to ingress of contaminants and premature bearing failure. Problem 2 bearing change out requires a full day shut, removal (and possible damage) to a shaftmount gearbox and other components.

BSC recommended Cooper Split Bearings with superior seals will last longer and allow, faster easier change out, without the need to remove other components on the shaft, re-align pulleys or risk of gearbox damage.

The customer made his purchase after his own cost saving calculation came to over $145,000. These savings figures are generated from extended bearing life and reduced maintenance downtime. Cost savings were not the only reason the customer went with this solution. He placed great value on peace of mind. Cooper Split Bearings limit his exposure to expensive down time.
Tapered Roller Bearings for Heavy Industries

- Increased Load Carrying Capacity
- Longer Bearing Life
- Super Clean Air-Melt Steel
- Debris Resistance
- Bearing Repair Capabilities

Timken develops solutions for every aspect of a mining operation, including customised bearings designed specifically for mining equipment like the massive haul trucks. These trucks are in constant motion, pausing only to collect or dump a load of ore.

In addition to the enormous radial loads on the bearings, they also experience axial loads as the trucks turn and corner. And, the bearings must support these loads while being subjected to the constant swirl of abrasive dust and grit.

Even standard Timken® tapered roller bearings provide a level of debris resistance that is superior to most of our competitors’ debris-resistant products. But for the most severe environments, and in applications where downtime is unacceptable, Timken offers a line of debris-resistant bearings.

These bearings start with super-clean, air-melt steel, free from inclusions that could lead to premature bearing failure. Timken steel creates bearings with increased load-carrying capacity, debris resistance and longer bearing life.

The bearing components are machined with customized geometries. Then, they undergo proprietary finishing processes to provide enhanced fatigue performance in the thin-lubricant-film environments, such as those found in mining.

Finally, special surface coatings and finishes are applied to further deter abrasive damage - bruising, pitting and grooving - that can lead to component wear and reduced bearing life.
Kaydon Slewing Ring Bearings

In shovels, excavators, longwall miners, and other mining equipment, bearings are crucial to reliable performance. For repeatable precision with minimal downtime, specify rugged slewing ring bearings from Kaydon Bearings Division. These precision bearings come in diameters up to 240 inches (6.1m), with radial capacities to 4,000,000 lbs. and thrust capacities to 18,000,000 lbs. Standard configurations include 4-point contact ball, 8-point contact ball, cross-roller, and 3-row roller bearings. Most Kaydon slewing ring bearings can be provided with integral, induction-hardened gearing on the inner races or outer races. Paint and zinc thermal spray coatings are available for corrosion resistance, as well as Kaydon’s exclusive Endurakote® plating to fight wear as well as corrosion.

In addition to its wide range of standard configurations, Kaydon is a leading developer of advanced custom bearings to meet customers’ specific application needs.

TR series
The TR series has three independent rows of rollers oriented to the load direction, resulting in the highest capacity for any given diameter. The top and bottom rows transmit moment loading, while the middle row transmits radial load. It is available in O.D.s up to 240” (6.1m).

XT series
XT Series bearings feature a rectangular cross-section with deep-groove gothic arch raceways and maximum ball complement. The resulting 4-point contact assures you of exceptional moment, thrust and radial load capacities. The XT is available with O.D. up to 240” (6.1m).
When the bearings in mining machinery are worn and need replacing, Kaydon can remanufacture them to like-new condition for a lot less than the price of a new replacement bearing. Turnaround is faster than new replacement delivery, too.

Kaydon remanufactures some 1,500 slewing ring bearings each year. We can give new life to any bearing up to 6.1m (20 ft.) in diameter, regardless of design, configuration, or original manufacturer. These remanufactured bearings meet or exceed OEM specs and come with a full one-year warranty. Yet they cost much less and can be delivered sooner. This is the result of a full-time remanufacturing program with dedicated machining capacity. Highlights include:

- Thorough inspection of torque, radial and axial clearances, gear wear, etc.
- Disassembly so the races can be cleaned
- Document rolling element, raceway, plug, and seal data
- Measure hardness of bearing and raceways
- Non-destructive testing for cracks or defects
- Engineering analysis of all bearings
- Formal analysis reports for all inspections
- Precision grinding of races
- New rolling elements, seals and lubricant
- Final inspection and documentation

The Kaydon remanufactured bearings program offers substantial savings with no trade-off in quality or performance.
Gain Extra Power and Extra Life

Selecting higher power rated belts can have two advantages, the more power you have the longer belt life achieved and secondly the higher the power rating the less belts required to run the drive.

Improving belt life or reducing the number of belts required can be as simple as replacing wrapped belts with raw edge.

Raw Edge belts have up to 20% more belt cord than a wrapped v-belt of the same size. More cords more power, more life.

Compare the difference and reduce belt cost, downtime and improve drive efficiency.

### Power to Life Relation Chart

<table>
<thead>
<tr>
<th>Power Capacity Increase</th>
<th>Belt Life Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>15%</td>
</tr>
<tr>
<td>10%</td>
<td>31%</td>
</tr>
<tr>
<td>15%</td>
<td>50%</td>
</tr>
<tr>
<td>20%</td>
<td>65%</td>
</tr>
<tr>
<td>30%</td>
<td>100%</td>
</tr>
<tr>
<td>40%</td>
<td>140%</td>
</tr>
</tbody>
</table>

### Specific Replacement Options & Benefits

<table>
<thead>
<tr>
<th>Product Change</th>
<th>Extra Power</th>
<th>Increased Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace Blue Label with Super II</td>
<td>21%</td>
<td>68%</td>
</tr>
<tr>
<td>Replace Blue Label with Gold Ribbon</td>
<td>25%</td>
<td>83%</td>
</tr>
<tr>
<td>Replace Power Wedge BL with Power Wedge Cog</td>
<td>38%</td>
<td>136%</td>
</tr>
<tr>
<td>Replace Blue Label with Power Wedge Cog</td>
<td>139%</td>
<td>510%</td>
</tr>
</tbody>
</table>

Note: Carlisle Power ratings are based on 25,000 hours of laboratory test life and years of field experience.

Bearing and hub loads should be checked before upgrading belts using Carlisle Drive Engineer software.
Carlisle Super II V-belts outlast wrapped belts up to 6 times longer.

A large Aggregate Plant using wrapped construction v-belts was constantly having to change out the V-belt drives on their shaker screens. Belts would only last 2-4 weeks on average depending on the volumes being processed. The constant changing of belts was a huge problem in belt costs, maintenance time and down-time.

The maintenance supervisor was introduced to Carlisle Super II V-belts. It was explained that the unique construction of Super II has the characteristics of wrapped construction but the performance of raw edge would make them ideally suited for the off & on load cycles generated by the shaker screen drive. After 8 weeks no belts had failed and the Super II was proving to be a great success. The original set of Super II was eventually replaced after 18 weeks in operation. Performing over 4 times longer than the wrapped construction belt.
ASE STUDY

An Improved Crusher Drive Saving $1700 Annually

Standard wrapped V-Belts were lasting up to 6 weeks on a Fine Sediment Crusher. The cost of the continual maintenance and shut down of the machine was a large factor in the annual maintenance budget for the plant. The abrasive environment was considered the main root cause for the failures.

With the drive information supplied by the site, we were able to use the Carlisle Drive Engineer 3.1 program to analyze the drive. The change from the original “B” section to the high power SPBX3000 Cogged Raw Edge belts ensured that the drive had sufficient capacity for all situations. With the new drive, tensioning was also pointed out as the probable culprit of some of the failures.

The drive was installed and run, with the New Carlisle SPBX3000 running for nearly 9 months, more than 6 times longer than the original set up. The plant noticed that the drive no longer required maintenance due to belt problems. The improved up-time and reduced maintenance meant time could be invested in other problem areas. Altogether a saving for the plant of more than $1700 annually.

Gold Ribbon Cog Belts

The “Gold Ribbon Cog” belt sets the benchmark for performance, efficiency of all classical v-belts. Unique construction characteristics include special stress relieved fabric, Raw edge side walls, HI Modulus cords, stiflex neoprene rubber compounds and precision moulded cogs.

These superior materials and design enable the Gold ribbon cog belt to significantly outlast ordinary wrapped belts. Carlisle Gold Ribbon Cog Belts will operate in a wide range of load capacities and speeds.

Gold Ribbon Cog belts is your guaranteed source of savings. Available in cross sections AX, BX, CX & DX.

Banded Belts

Carlisle offer a range of banded belt constructions specifically designed for those drives that may experience pulsating loads, shock loads, or stalling characteristic where single belt set drives have a tendency to turnover or roll in the drive. The special double fabric tie band located on the top permanently bonds the individual belts together ensuring smooth operation and improves dampening of vibrations and shock loads. The banded belt construction will eliminate belt turnover and ensure a perfect balance of power transfer.

Banded belts are available in Super Blue, Super Wedge, Gold Ribbon Cog, Power Wedge Cog and Aramax Wedge Band construction and available as standard in 2-5rib sets, wider belts are available on request.

Fine Sediment Crusher

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In the quarrying industry there isn’t too much that lasts the desired life due to the extremely dusty and abrasive nature of the process. A Victorian quarry customer was experiencing excessive wear to the hammers on two Kumbee crushers due to the speed of the drive. This speed was also causing production difficulties.

BSC Engineering Services took a 5 groove “B” section belt drive and redesigned it to a 3 groove drive using Raw Edge Power Wedge SPB belts and pulleys. Utilising information from the “Carlisle Drive Design Program” we were able to change the speeds of the hammers to better suit the application. On these particular drives, we were able to provide the customer with a $1,966.00pa, per drive, energy consumption reduction with the increased efficiency of the Carlisle Power Wedge Cogged Belts.

The nett saving for the customer in parts, labour and production totalled $102,995.
Improve Drive Efficiency using Carlisle Drive Design Software

Carlisle Drive Engineer is a new generation of design and analysis software that assists end users and design engineers to improve efficiency, drive life and their overall knowledge of belt drives.

- Includes both drive design and drive analysis sections for both V-belts and timing belts.
- Provides information on belt power ratings, service factors, belt sizes, pulley dimension, bush information, hub loads and belt tension information.
- In short, basically everything you need to know so you can achieve the most efficient system and belt life on your drives.
- Includes Carlisle PowerMiser Drive Efficiency software and catalogues.

**Crusher Drive**

A BSC basalt, hard rock, quarry customer wanted to change the product grading to achieve a finer grade of crushed product and improve the quality of output.

Using BSC Drive Engineer engineering advice and product support, we were able to achieve this by changing the ratio of the pulleys on the belt drives to slow down the grader. Having successfully slowed the grading process down, the quarry was able to produce a much better quality of finished fines. The customer was extremely happy with the outcome and signed-off a Costdown confirming the added value to the site at $142,000 to date.

**Crusher**

The efficient running of the crusher was being hampered with the constant failure of the V-Belt drive. The new belts would turn over very shortly after being fitted and in some instances, the belts would flap around and knock each other off.

With some drive belt sets lasting less than 2 weeks, the plant was in need of some help. BSC Engineering Services checked the pulleys for wear, and the drive pulley was found to be severely worn. The drive and driven pulleys were 14 grooves and very expensive to replace. The next step was the actual drive load, when checked this was found to be around 63kW. Original belt series was C section, upgraded by the supplier to SPC section, but resulted in massive over belting of the drive. This over belting was the major cause of the drive failures.

The Carlisle Drive Engineer software identified that with the low start-up and running power, the dropping of the amount of drive belts from 14 to 7 or 8 would provide a more effective drive. The previous supplier failed to train the service staff on correct belt fitting and tension resulting in the poorly maintained drive belts.

BSC also implemented a plant training program. With correct tools and drive information, the drive belt life was extended substantially. An annual saving of $32,000 was estimated.
**DiAMOND**

**APPLICATIONS** | DRILL RIGS | ROAD GRADERS | COAL HANDLING AND PREP PLANTS

**High Strength (HS) Drive Chain**

Produced in accordance with ASME/ANSI B29.1 and API certification. These chains are designed for the rigors of high loads. Pins are through hardened to provide higher working capacity and resistance to fatigue.

**DiAMOND**

**APPLICATIONS** | WASH PLANTS

**RING LEADER® O-Ring Chain**

ANSI Sealed O Ring Chain is designed for applications that don’t permit regular lubrication. Constructed with O-rings that seal a special formulated lubrication into every joint. O-rings also help seal out and protect internal surfaces from dirt, contaminants and moisture.

**EWART**

**APPLICATIONS** | ROTARY BREAKERS | BALL MILLS | EXCAVATORS

**Heavy Duty Drive Chain**

Offset steel drive chain is suited to Heavy Loads at low speed. Available from 2” to 6” pitch, with a max allowable chain pull of 18,140 Kg. Provides optimum performance for fatigue and wear life.

**APPLICATIONS** | BUCKET ELEVATORS | SCRAPER CHAINS

**Combination, Steel Bushed & Pintle Chain**

Conveying and Bucket elevating. Bushed and combination chains are Rollerless, providing excellent performance in harsh environments, such as Grit /Coal/ Cement.

**RENOld**

**APPLICATIONS** | WASH BOX | RECLAIMER | FEEDER/BREAKER | SHUTTLE CAR CONVEYOR AND APRON CONVEYOR CHAINS

**ACE Conveyor Chains**

BS, ISO, DIN (Imperial & Metric pitch) chain, with or without attachments. Manufactured to world class standards and offers a comprehensive range of standard and Special chains to suit specific applications and environments.
The Simplicity of Quick-Flex Couplings Beats Other Coupling Designs

A Quick-Flex coupling, consisting of two coupling hubs, elastomeric insert and cover, offers advantages not offered by other coupling designs such as jaw, grid, gear, chain, tire or disc couplings.

Quick-Flex couplings are direct replacements for virtually all comparably sized couplings in use. Quick-Flex couplings require no lubrication and are easy to install and maintain. Once the two coupling hubs, insert and cover are installed for the first time, the coupling hubs do not need to be moved again for the life of the equipment. The straight-forward design means there is no possible interference between the coupling hubs if the insert fails. Plus, the urethane insert can be easily changed without moving the hubs or shafts.

Lower your maintenance costs with one of the most rugged coupling designs available for a wide range of applications today.

Benefits
- Never needs lubrication
- Easy to replace urethane insert without moving hubs
- High torque ratings (up to 1,670,825 in-lbs)
- Shaft sizes from 1/2” to 11-1/4”
- Hubs not damaged by insert failure
- High speed capacity (up to 5,000 RPM)
- Fewer loose pieces reduced inventory lines
- Shock loads absorbed while accepting misalignment up to 20,000 horsepower
- Compact
- Lower cost
- Available in standard, high torque and ultra high torque elements
- Reduced downtime

Choose from four inserts for varying torque needs and temperature ranges up to 350°F (177°C). Extend shaft separation 1” to 120” by ordering standard and double-ended spacer couplings. Stainless steel versions are available for harsh and food processing environments. Select standard covers for high RPM applications and split covers for high torque applications.
Gearing

Shaft Mounted gear reducers.
Twin tapered bush design ensures ease of drive installation and removal. Motorised and non motorised versions are available.

Shaft Couplings

Heavy duty gear, grid and disc couplings.
- Gear coupling torque ratings to 8,190,000 Nm
- Grid coupling torque ratings to 932,000 Nm
- Disc coupling torque ratings to 320,920 Nm

Shaft Locking Assemblies

The economical and safe alternative to splined, keyed and shrink connection.
- Provide keyless hub-to-shaft mounting
- Easy to install and dismantle
- Available in a comprehensive range of types and bore sizes

Air Motors

Air motors offer a unique form of drive and have many advantages not found in other prime movers.
- Vane air motors are available in power ratings from 0.5 kw to 9.5 kw
- Radial Piston motors are available in power ratings from 4.7 kw to 23 kw
- Air motors are Intrinsically safe in hazardous environments (e.g. mine, petro-chemical etc)
Brakes

Drum and disc brakes for industrial and mining applications. Catering for most combinations of brake actuation.

- Direct acting brakes may be specified with pneumatic, hydraulic, mechanical or electro-hydraulic actuation
- Spring applied (fail-safe) calipers are also available
- Braking forces for a single caliper range from 290N to 730,000N
- Electro-Hydraulic Drum brakes range from 160 mm to 630 mm diameter drum
- Electro-Hydraulic Disc brakes range from 355 mm to 1250 mm diameter disc

Fluid Couplings

Constant and delayed filling fluid couplings are available.

- A delayed fill series is available with special patented oil circuit designed to start up large inertia machines and is rated up to 810 kw at 1500 rpm
- Variable fill fluid couplings are available for electric motors and internal combustion engines
- Power ratings up to 3,500 kW at 1200 rpm for electric motors and up to 1000 kW at 1000 rpm for internal combustion engines

Pneumatic Clutches & Brakes

Provide the high speed acceleration and deceleration that are essential in modern process equipment.

- Slip torque ratings range from 72 Nm to 1,204,000 Nm
- Bore capacities from pilot bore to 430 mm
- Comprehensive range of types available

One-Way Mechanical Overrunning Clutches & Backstops

For indexing, overrunning and holdback/backstopping applications.

- Torque ratings from 2.5 Nm to in excess of 1,700,000 Nm
- Available in a comprehensive range of bore sizes and types
Selecting a high efficiency motor will help reduce your energy consumption and CO2 emissions.

WEG’s W22M range of high efficiency motors provide the latest in motor technology and reliability with a high efficiency, typically exceeding the values for high efficiency motors mandated by AS/NZS 1359.5-2004.

The W22M Mining Motor is specifically designed for the arduous environment of mining. The W22M Mining Motor has the following features:

- FC200 high density cast iron frame with solid integrated feet and IP66 rating. Solid construction with high ingress protection.
- Class H insulation with Class B temperature rise. High thermal reserve ensuring long life.
- A service factor of up to 1.25 suitable for continuous overload of 115% at 40°C or operation with a service factor of 1 at an ambient 55°C.
- VSD compatible, spike resistant WISE® insulation with optional shaft earth brush kit and insulated bearing housing, from 280 frame, on the NDE allowing the use of standard bearings for motors driven by VSD.
- Cast iron fan & fan cowl for high resistance to impact.
- NU series cylindrical roller bearings on high tensile 4140 shaft from 225 frame for high radial load capacity.
- E3 efficiency – AS/NZS1359.5-2004 High Efficiency with optional Super High Efficiency E3+. Reducing energy consumption and your carbon footprint. The W22M is also designed with a flat efficiency curve from 75% to 100% load to maximise energy savings in applications where the motor is operating underloaded.
- High Locked Rotor Torque values providing the ability to start high inertia loads. With competitors designs as efficiency is increased, the available locked rotor torque can be be reduced. WEG have ensured that the W22M maintains high values of locked rotor torque to ensure minimum risk of motor stalling.
- Patented W3Seal® consisting of a V-ring, talconite labyrinth and O-ring seal form 90 frame and above providing maximum protection against ingress of contaminants.
- Thermistors, space heaters & SPM sensor provisions from 225 frame for additional motor longevity.
A quarry located North of Melbourne had an old slip-ring motor and liquid resistance starter. When purchased as new, the motor and starter were current technology in motor starting. The motor needed to be changed over. Both the replacement cost and overhaul cost of the motor to maintain the same technology were prohibitive.

BSC proposed a solution to replace the slip-ring motor and liquid resistance starter with the latest in motor design, the WEG W22M mining spec motor and robust motor starting and protection with the WEG SSW07 soft starter.

The W22M is specifically designed for harsh applications such as quarries with a service factor of 1.25, IP66 rating, class H insulation, taconite labyrinth seals, roller bearings, high tensile steel shaft and, E3 level high efficiency.

Additional features included as standard are:

- Finished in paint plan 203A (synthetic alkyd primer and top coat)
- IP66 Protection
- Auxiliary terminal box from 160 frame
- For thermistors and heaters flush through regreasing system from 160 frame
- Low noise fan
- Multi position terminal box
- Removable gland plate on terminal box from 225 frame

WEG also provide a range of aluminium motors, medium voltage motors and hazardous location motors.

The SSW07 is a robust starter providing a kick start with either a voltage ramp of current limit start, rated to 55deg ambient with integral bypass contactors.

The cost of the 110kW 6p motor and starter were well within the budget expectation of site. Additionally, the high efficiency of the W22M mining spec motor is estimated to save the site $1730 and 18.5 tonne of CO2 per annum. The fact that both motor and starter were in stock in Melbourne meant the timetable to change out the old technology was not delayed by long lead times.

Being specifically designed for harsh applications like quarrying, the W22M is expected to provide a long service life. The SSW07 soft starter will ensure smooth acceleration and reduced mechanical stress on start up, as well as reduced ventilation requirements within the electrical cabinet.
The CFW11 VSD from WEG incorporates state of the art technology for control of three phase induction motors. Suitable for a wide range of applications, with excellent performance providing increased productivity and an improvement in the quality process in which it is used.

The CFW11 comes with the following features:

- From 1.5kW to 370kW in single drives construction and from 315kW to 2000kW in modular drive construction (CFW11M), the CFW11 has one of widest power ranges available for Low Voltage VSD. The CFW11 is available in 400V or 690V versions.
- Nominal ambient temperature of 50°C with a maximum rating of 60°C, suitable for the harsh environments.
- Available in either normal duty or heavy duty ratings, up to 200% starting torque with 150% starting torque on request or higher on request.
- Enclosure ratings of IP21 or IP54 providing flexibility of installation in either cabinets or switchrooms.
- Open or closed loop speed control or torque control for control of a pump or for multi-drive conveyor systems that require load sharing. Combined with the patented Optimal flux® that reduces the operating temperatures of the W22M by up to 11%, unprecedented motor performance is easily achievable.
- Expandable, modular I/O and communication system that can be modified to suit your application needs. Communications options for either Profibus DP, CANopen, DeviceNet, Ethernet TCP/IP, Modbus RTU.
- Onboard USB port and for PC connectivity with SuperDrive G2 software. Programming, commissioning, troubleshooting, trending is quick and simple.
A quarry located in central Victoria was upgrading a dust conveyor. BSC were supplying the 15kW helical bevel geared brake motor for the conveyor however the quarry also required a starter with reversing capabilities.

BSC proposed a solution of robust motor starting and protection with the WEG SSW07 soft starter combined with external keypad and two WEG CWM series contactors for forward and reverse operation. The SSW07 is a robust starter providing a kick start with either a voltage ramp of current limit start, rated to 55deg ambient with integral bypass contactors. The addition of the external keypad provides access to parameters to configuring special starter operation like forward and reverse. The CWM series general purpose contactors are selected for AC3 operation are compact and reduce panel space.

The helical bevel geared brake motor was replacing an old shaft mount unit with a belt drive and motor started with a Direct On-Line (DOL) starter. Now being a direct drive application, the system required a smoother acceleration and the SSW07 soft starter reduces mechanical stress on start-up, reducing the possibility of damage to the conveyor, with sufficient capacity to allow the motor to provide the necessary torque to start a loaded conveyor.

With BSC’s ability to supply everything from the head drum pulley bearing back to the coupling, gearbox, motor and motor controller, ensures the quarry has peace of mind in a single sourced solution. BSC engineered the solution and sourced the appropriate products for the application.

**WEG SSW06 Soft Starter**

The microprocessor controlled, fully digital SSW06 soft starter provides excellent acceleration and deceleration control.

- Available from 10A to 1400A in three wire, or 2600A in 6 wire, the SSW06 is available in 400V or 690V versions.
- Various motor starting modes including Voltage Ramp, Kick Start, Current Limit, Pump Control, Current Ramp and Torque Control provide flexibility for various applications.
- Integral bypass contactors up to 820A reduce power losses and installation costs.
- Built in Modbus RTU with optional Profibus DP or DeviceNET for PLC communications.
- Full graphical HMI that provides parameter copy functions and remote mounting capability.
- PC connectivity with SuperDrive G2 software. Programming, commissioning, troubleshooting, trending is quick and simple.

**Conveyor**

A quarry located in central Victoria was upgrading a dust conveyor. BSC were supplying the 15kW helical bevel geared brake motor for the conveyor however the quarry also required a starter with reversing capabilities.
Industrial Gearboxes

- **Industrial Units**
- **Helical Inline gearboxes**
- **Helical Bevel gearboxes**
- **Helical Parallel Shaft gearboxes**

The Nord range of German designed and manufactured gearboxes provide high precision, quality products. The first to design and patent the Unicase principle, Nord manufacture the gearboxes with the casings machined in a single stage, integrated bearing seats and seals, to provide greater mechanical strength with no separating joints and no sealing surfaces subject to torque. The Nord Unicase design provides greater higher axial and radial load ratings.

Nord are the only supplier of industrial gearboxes in Unicase design.

Helical Inline up to 160kW, 23kNm
Helical Bevel up to 200kW, 50kNm
Parallel Shaft up to 200kW, 100kNm
Industrial units up to 1MW, 200kNm

**Features**

- High precision, Unicase housing providing quiet, leak free operation with increased mechanical strength and operational safety, longer running life, higher torque ratings and higher axial and radial load capacity.
- High-compounded steel, case hardened gearing providing reduced wear and long life.
- Suitable for use with either mineral or synthetic oil for various conditions and environments.
- Foot or flange mounting with solid or hollow shafts provide flexibility in mounting.
- Optional IEC adapter for motor fitment or W adapter for input shaft.
- Optional paint coatings suitable for various climatic conditions.
- Various sealing options (NBR, Viton or labyrinth) for improved operation and extended life in dusty and aggressive environments.
- Where the application dictates higher oil temperatures, optional oil coolers and gearbox cooling arrangements are available.
- Unique NSD coating, optional, polyurethane resin with 316 stainless steel for superior corrosion protection in outdoors and marine environments with the added benefit of chip-resistant increased hardness.
- AUTOVENT™ spring loaded breather with labyrinth seals against dirt and moisture while still allowing the gear case to breathe during start up and cool down.
BSC Total Lubrication

In the most demanding conditions of mining engineering it’s hard work keeping vital equipment on line 24 hours a day, 7 days a week, avoiding the ever present threat of “downtime”. When faced with heavily loaded conditions, dusty, dirty, harsh or chemical environments mining engineers need to be able to choose a lubricant they can count on.

BSC’s comprehensive range of high performance lubrication products are engineered to meet and exceed OEM specification, assist in maintaining equipment reliability, as well as extending service life of critical components. Our partnerships are globally recognised lubrication brands and products including Dow Corning® and Molykote® Speciality Lubricants and Sealants, Castrol Industrial, Australian manufacturer Gulf Western Oil, providing the capacity to deliver lubrication systems, engineering services and plant management expertise.

BSC aims to provide lubrication solutions through a comprehensive and “balanced” lubrication product range backed by BSC lubrication engineering and global technical resources.

Services & Solutions for Australian Industry

Lubrication Management System

The BSC lubrication partnerships offer a wide range of consultation services which includes but is not limited to: lubrication management systems designed to suit the customers and plant requirements, site evaluations, on site audits, staff training, colour coding matrix systems, lubrication dispensing and transfer equipment, automatic lubrication system design restoration, and fault finding, temperature data logging services tailored to client requirements.

Castrol’s expertise in Lubricant technology has been developed through years of experience working closely with the Australian Mining, Construction and Earthmoving sectors.

The Castrol range of specialised mining and industrial greases, hydraulic, driveline, compressor and rock drill oils, are designed to provide consistent reliability thus achieving:

- Optimum component performance
- Extended maintenance intervals
- Increased productivity
- Decreased maintenance costs

Gulf Western Oil

Gulf Western is well known as an Australian manufacturer with a range of product focused on providing lubrication solutions within the Mining, Earthmoving, Construction and Transport Industries.

Gulf Western’s heavy duty Diesel Engine Oils are widely used within these market segments. The Top Dog XDO range is specifically manufactured to meet most modern OEM requirements of American, European, and Japanese manufacturers including, Mack, Cummins, Caterpillar, Volvo, Mercedes, Western Star, Kenworth, Isuzu, and MAN.

Gulf Western production facilities meet the ISO9001 quality endorsed management system, and products are rigorously tested to comply with SAE, CMA, API and AMG guidelines. Coolant manufacturing procedures also meet TS 16949 ensuring they are approved for use in Australian mining.

Top Dog XDO

The Top Dog XDO range is a tried, tested and proven performer in this field providing:

- Extended drain intervals for more up time.
- Superior sludge and soot control.
- Greatly reduced engine wear/ Extended engine life
- Versatility in suiting mixed fleet covering diesel, petrol and stationary engine requirements.

www.bsc.com.au
Automatic Lubricators

Engineering and Mechanical maintenance within the mining industry can be improved and downtime reduced with the use of automatic lubricators and systems.

Plant and equipment where regular lubrication is difficult due to access or operational environments can “lose out” on the maintenance cycle with resulting costly failures and loss of production. BSC meet this lubrication need with our range of cost effective automatic lubricators / lubricating systems.

**GreaseMax**

- Single point, steel bodied, chemically operated automatic lubricator units. Available in 1, 3, 6, 12 month cycles.
- Excellent output pressure for longer feed lines (up to 2M).
- Proven design, reliable safe operation with minimal time loss in installation and replacement
- Economical unit price. Cost effective continuous low maintenance.

**MEMOLUB**

- Autonomous multi point electro mechanical lubricator (up to 8 lubrication points).
- Powerful positive displacement piston pumps provide efficient distribution of lubricant.
- Low cost cartridge replacement.
- Long distance performance - used remotely up to 8meters from lubrication point.
- Provides improved plant lubrication organization
- Memolub One is a newly improved, replaceable cartridge, single point lubricator. Unique pumping system tested to over 60,000cycles. Can be set to lubrication programs over 1, 3, 6, 12 month periods. Remote mount up to 4 meters from lubrication point.

**Molykote® D 321R – Dry Film AFC**

- Quick air drying “paint like” product. Excellent adhesion to load bearing surface. No pick up of contaminants.
- High Load carry capacity (exceeds yield point of many metals), High Temperature range (-180°C + 450°C). Excellent lubricant for assembly and running in processes.
- Reduces fretting wear.
- Ideally suited for slow speeds. Intermittent operation and oscillating movement.
- Very low friction
- Long term lubrication

**Molykote® P37 Metal Free – Anti Seize Paste**

Odourless, Non Hazardous formulation Ultra pure, non metal, avoids concentrations of Nickel, Lead, Sulphur, Chlorine and Fluorine.
- Extremely high temperature range (-40°C to +1400°C).
- Suitable for use with Stainless Steel/Heat resistant steel fasteners. Resists binding between substrates.
- Low scatter of pre-tensioning force on assembly.
- Excellent sealing and facilitation of non destructive disassembly without thread deformation.

Trusted Performance. Smart Lubrication.
No matter how difficult or harsh the environment, the Molykote® and Dow Corning® range of specialty greases, anti seize pastes, antifriction coatings, oils, silicone compounds and Silastic® sealants are designed to tackle the toughest lubrication and sealant challenges and deliver performance!

The dusty, dirty, aggressive and tough environments of the mining industry provide many problems and applications, where dust and dirt infiltration prove standard lubrication ineffective.

Molykote® AFC’s (anti-friction coatings), specialised anti-seize, assembly and grease pastes, provide solutions to many lubrication problems met in these environments.

Some versatile maintenance “Tool Box” products in this range include:

**Molykote® D 321R – Dry Film AFC**

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<th>PERFORMANCE &amp; BENEFITS</th>
<th>AEROSOLS AVAILABLE EASE OF APPLICATION</th>
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<td>165LT</td>
<td>1122</td>
<td>excellent adhesion</td>
<td>1122</td>
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<td>G4700 PAO</td>
<td>PAO shock vibration</td>
<td>D321-R or M400</td>
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<td>protect/seals</td>
<td>HSC (Conductive A/Seize)</td>
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<tr>
<td>Corrosion Protection - Mechanical</td>
<td>Metal Protector Plus</td>
<td>In storage equip.</td>
<td>protection</td>
<td>Metal Protector Plus</td>
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<tr>
<td>Slewp Rings</td>
<td>165 LT D321R(Dry all)</td>
<td>1122</td>
<td>excellent adhesion</td>
<td>1122 D321R</td>
</tr>
<tr>
<td>Electrical Installation - Corrosion Protection</td>
<td>4 Compound</td>
<td>Insulates</td>
<td>protect/seals</td>
<td>1000 Antiseize Aero alternative</td>
</tr>
<tr>
<td>Hydraulic Connections</td>
<td>P74 (metal free)</td>
<td>resists seifretting</td>
<td>PAO shock vibration</td>
<td>1122</td>
</tr>
<tr>
<td>Gear Box and Final Drives</td>
<td>M 55 Plus Mineral Oil as an additive</td>
<td>aids wear noise</td>
<td>PAO shock vibration</td>
<td>1122</td>
</tr>
<tr>
<td>Gear Drives / Atom gears</td>
<td>Longterm 10 (grease packed)</td>
<td>L1146 ISO 460 PAO</td>
<td>High Temp long drain intervals</td>
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<tr>
<td>Chains</td>
<td>MKL-N</td>
<td>HI penetration/adhesion</td>
<td>M400</td>
<td>1122</td>
</tr>
<tr>
<td>Chain - 100% Dry Lube</td>
<td>D321-R</td>
<td>P74 (metal free)</td>
<td>resists seifretting</td>
<td>G Rapid Plus</td>
</tr>
<tr>
<td>Hydraulics</td>
<td>M5S Plus Oil / Additive reservoir</td>
<td>aids wear reduction</td>
<td>PAO shock vibration</td>
<td>1122</td>
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<tr>
<td>Electrical Protection</td>
<td>4 Compound</td>
<td>Insulates</td>
<td>protect/seals</td>
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</tr>
<tr>
<td>Pins and Bushes</td>
<td>Longterm 2 Plus (High Load)</td>
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<td>PAO shock vibration</td>
<td>D321-R or M400</td>
</tr>
<tr>
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<td>Longterm 2 Plus (High Load)</td>
<td>G4700 PAO</td>
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<tr>
<td>Brake Components</td>
<td>P74 (metal free)</td>
<td>CU7439 Plus</td>
<td>Hi temp / heavy</td>
<td>CU7439 Plus</td>
</tr>
<tr>
<td>Assembly</td>
<td>G-N Plus</td>
<td>P74 (metal free)</td>
<td>resists seifretting</td>
<td>G Rapid Plus</td>
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<tr>
<td>End Rollers (often submerged)</td>
<td>Longterm 2 Plus (High Load)</td>
<td>excellent wash out resistance</td>
<td>D321-R or M400</td>
<td>1122</td>
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<tr>
<td>Rollers</td>
<td>Longterm 2 Plus (High Load)</td>
<td>G4700 PAO</td>
<td>PAO shock vibration</td>
<td>D321-R or M400</td>
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<tr>
<td>Automated Lubrication Systems</td>
<td>Longterm 2 Plus (High Load)</td>
<td>G4700 PAO</td>
<td>PAO shock vibration</td>
<td>D321-R or M400</td>
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<tr>
<td>Electrical Connection Protection</td>
<td>4 Compound</td>
<td>Insulates</td>
<td>protect/seals</td>
<td>1122</td>
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<tr>
<td>Assembly</td>
<td>G-N Plus</td>
<td>P74 (metal free)</td>
<td>resists seifretting</td>
<td>G Rapid Plus</td>
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<tr>
<td>Plain Bearings</td>
<td>Longterm 2 Plus (High Load)</td>
<td>G4700 PAO</td>
<td>PAO shock vibration</td>
<td>G4500</td>
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<tr>
<td>Plain Bearings</td>
<td>Longterm 2 Plus (High Load)</td>
<td>G4700 PAO</td>
<td>PAO shock vibration</td>
<td>G4500</td>
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<td>Corrosion</td>
<td>Metal Protector Plus</td>
<td>PAO shock vibration</td>
<td>Metal Protector Plus</td>
<td>G Rapid Plus</td>
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<tr>
<td>Electrical Connection Protection</td>
<td>4 Compound</td>
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<td>protect/seals</td>
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<tr>
<td>Pneumatic Systems - Dynamic O-Rings</td>
<td>55 M</td>
<td>reduces seal wear</td>
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<td>1122</td>
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<tr>
<td>Pneumatic Systems - Stationary O-Rings</td>
<td>111 Compound</td>
<td>lubricates/ protect/seals</td>
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<tr>
<td>Wash Down Areas (Wet)</td>
<td>111 Compound</td>
<td>Non curing sealant</td>
<td>1122</td>
<td>1122</td>
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<tr>
<td>Bearings</td>
<td>Longterm 2 Plus (High Load)</td>
<td>G4700 PAO</td>
<td>PAO shock vibration</td>
<td>D321-R or M400</td>
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<tr>
<td>Chains - Light Duty</td>
<td>Omegimiss</td>
<td>Light oil load carry white solids</td>
<td>Omegimiss</td>
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<td>Chains - Heavy Duty</td>
<td>MKL-N</td>
<td>HI penetration/adhesion</td>
<td>MKL-N</td>
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<tr>
<td>Chains 100% Dry Lubrication</td>
<td>D321-R Dry Lube Dirty Applics.</td>
<td>D321-R</td>
<td>Non curing sealant</td>
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<td>Corrosion Protection</td>
<td>Metal Protector Plus</td>
<td>PAO</td>
<td>Metal Protector Plus</td>
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<tr>
<td>Chemical Resistance</td>
<td>FS 3451</td>
<td>HP 870/ HP300</td>
<td>Resists Chem/Solvent/Gas</td>
<td>1122</td>
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<tr>
<td>Cables - Grease Lubrication</td>
<td>165 LT Dry Lube Dirty Applics.</td>
<td>D321-R</td>
<td>Non curing sealant</td>
<td>1122</td>
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<tr>
<td>Water (Potable NSF 61 Certified)</td>
<td>111 Compound</td>
<td>lubricates/ protect/seals</td>
<td>1122</td>
<td>1122</td>
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<tr>
<td>Gas Cock - Natural Gas or LPG</td>
<td>1102 Gas Cock Grease</td>
<td>FS 3452 HP300</td>
<td>Resists Chem/Solvent/Gas</td>
<td>1122</td>
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<tr>
<td>Rotary Screw Compressors</td>
<td>L 4646 (POE)</td>
<td>L 4646 (POE)</td>
<td>Extended Oil Drain Hours</td>
<td>1122</td>
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<tr>
<td>Anti Seize</td>
<td>P74(Metal free)</td>
<td>P37</td>
<td>Unita Pure No Binding S/5 alloys</td>
<td>1122</td>
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<tr>
<td>General Sealant Application</td>
<td>Silastic /32 Sealant</td>
<td>Acetate</td>
<td>Premium Performance Sealant</td>
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<tr>
<td>Neutral Cure Sealant</td>
<td>Silastic 1074 Sealant</td>
<td>Acetate</td>
<td>Premium Performance Sealant</td>
<td>1122</td>
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<tr>
<td>Electrical / Non Corrosive Sealant</td>
<td>Dow Corning 738/748 Sealant</td>
<td>Neutral</td>
<td>Seals Sensitive elect. Equip.</td>
<td>1122</td>
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<tr>
<td>Flexible Sealant Application</td>
<td>Dow Corning 736 Sealant</td>
<td>Acetate</td>
<td>extra high temp range</td>
<td>1122</td>
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<tr>
<td>Specialised Plastic Sealants</td>
<td>Dow Corning 739 Sealant</td>
<td>Acetate</td>
<td>adheres seals plastic substrates</td>
<td>1122</td>
</tr>
</tbody>
</table>

The above is designed only as a general guide to Molykote® & Silastic Speciality Products by Dow Corning. Selection Catalogues PDS & MSDS available on request.
Loctite® Fixmaster® Rapid Rubber Repair

- Ultra-fast cure 2-part urethane – functional in 2 hours at 22°C
- Easy to apply - convenient gun dispensing & self mixing nozzles
- Work-life 2-3 minutes at 22°C
- 360% elongation
- 82 Shore D hardness - outstanding wear resistance
- Maximise productivity & reduce costs
- Typical applications:
  - Conveyor belt repair
  - Rubber liner rebuild

96675 RAPID RUBBER REPAIR CARTRIDGE, 400ML (CONTAINS 2 STATIC MIX NOZZLES)
98783 RAPID RUBBER REPAIR GUN
39663 RAPID RUBBER REPAIR STATIC MIX NOZZLES (6 PACK)
96677 RAPID RUBBER REPAIR KIT CONTAINS CARTRIDGE, CLEANER & ETCHING AGENT.
99626 FIXMASTER® FLEX ETCHING AGENT

Loctite® Fixmaster® Flex 80 Putty

- Trowelable 2-part urethane repair
- Functional in 8 hours at 22°C
- Work-life 10 minutes at 22°C
- 350% elongation
- Resists abrasion, impact and corrosion
- Outstanding wear resistance
- Typical applications include:
  - Conveyor belt repair
  - Lining pipe elbows
  - Re-profiling pump liners

PART NO: 97423 PACK SIZE: 454G
FIXMASTER® FLEX ETCHING AGENT
PART NO: 99626
FIXMASTER® FLEX PRIMER & CLEANER
PART NO: 39636

Loctite® Heavy Duty Anti-Seize

- Reduced OH&S risks - NON-HAZARDOUS
- Eliminate multiple risk phrases associated with commonly-used nickel, aluminium and copper based anti-seizes, e.g. harmful, irritant, sensitisation, possible carcinogen
- Green Chemalert rating
- Metal-free calcium/graphite formulation
- Can be used on all alloys
- Excellent lubrication and torque-tension control
- 1315°C temperature rating

Loctite® 771 Nickel Anti-Seize

- Copper free formulation
- Extreme chemical resistance
- Recommended for stainless steel and other metal fittings
- Prevents corrosion, seizing and galling in harsh chemical environments
- Temperature range -290°C to +13160°C

Loctite® Silver Grade Anti-Seize

- Heavy duty, temperature resistant
- Petroleum based lubricant compound fortified with graphite and metal flake
- Will not evaporate or harden in extreme cold or heat
- Use in assemblies up to 8700°C

<table>
<thead>
<tr>
<th>Product</th>
<th>Part No.</th>
<th>Pack Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixmaster® Rapid Rubber Repair</td>
<td>96675</td>
<td>400ML</td>
</tr>
<tr>
<td>Fixmaster® Flex 80 Putty</td>
<td>97423</td>
<td>454G</td>
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<tr>
<td>Heavy Duty Anti-Seize</td>
<td>51606</td>
<td>510G Brush Top Can</td>
</tr>
<tr>
<td>771 Nickel Anti-Seize</td>
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<td>28GM Tube</td>
</tr>
<tr>
<td>Silver Grade Anti-Seize</td>
<td>76756</td>
<td>200GM Aerosol</td>
</tr>
</tbody>
</table>

- Risk phrases
Loctite® Nordbak® Wearing Compound

- Large ceramic beads
- Ideal for medium to large particle ores/bulk/lump (>3mm)
- Minimum recommended thickness 6mm
- Typical applications include:
  - Chutes
  - Bucket Wheels
  - Hoppers
  - Feeder boxes

Loctite® Nordbak® Pneu Wear

- Small ceramic beads
- Ideal for small particle ores/fines (<3mm) and slurries
- Can be trowelled into small gaps
- Typical applications include:
  - Chutes
  - Discharge pipes
  - Elbows
  - Centrifuge baskets

Loctite® Nordbak® High Impact Wearing Compound

- Rubber modified for increased impact resistance
- Large ceramic beads
- Minimum recommended thickness 6mm
- Typical applications include:
  - Impact chutes
  - Deflector plates
  - Hoppers
  - Feeder boxes
  - Cross beams vibrating screens

Loctite® Nordbak® Fast Set Steel Putty

- Functional cure in ten minutes – fast emergency repairs that reduce downtime
- Steel filled system – cures to a metal-like finish
- Non-sag paste – allows application to overhead and vertical surfaces
- Bonds to steel, cast iron and a wide variety of substrates

Loctite® Nordbak® Brushable Ceramic

- High gloss, low friction coating to protect against turbulence, abrasion and cavitation.
- Seals and protects equipment from corrosion and wear
- Typical applications include:
  - Resurfacing and repairing rudders and pintel housings
  - Repairing cooling pump impellers
  - Resurfacing condensers

Loctite® Nordbak® Crusher Backing Compound

- A 100% solid, two-part epoxy system designed for backing wear metal in crushers and grinding mills
- Dry service temperature range up to 770°C
- High volumetric stability
- High compressive strength = 15,500psi
- Typical applications include:
  - Cone crushers and grinding mills

Part No: 41782
Pack Size: 10kg

Part No: 42087
Pack Size: GREY 1kg Kit

Part No: 42076
Pack Size: GREY 2kg Kit

Part No: 39917
Pack Size: 453g

Part No: 36123
Pack Size: 10kg Kit

Also available: Hi-Impact Crusher Backing Compound
Part No: 36122
Pack Size: 10kg Kit
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