

TSUBAKIMOTO CHAIN CO.

Headquarters

Nakanoshima Mitsui Building
3-3-3 Nakanoshima, Kita-ku
Osaka 530-0005, Japan
Phone : +81-6-6441-0011
Facsimile : +81-6-6441-0489
Internet:
<http://tsubakimoto.com/>

Chain Division

Chain Sales Department
1-3 Kannabidai 1-chome
Kyotanabe, Kyoto 610-0380, Japan
Phone : +81-774-64-5023/4
Facsimile : +81-774-64-5212

For further information please
contact the Chain Division.

Global Associated Partners:

NORTH and SOUTH AMERICA

U.S. TSUBAKI, INC.

301 E. Marquardt Drive
Wheeling, IL 60090-6497
U.S.A.
Phone : +1-847-459-9500
Facsimile : +1-847-459-9515

TSUBAKI of CANADA LIMITED

1630 Drew Road
Mississauga, Ontario, L5S 1J6
Canada
Phone : +1-905-676-0400
Facsimile : +1-905-676-0904

TSUBAKI BRASIL

REPRESENTAÇÃO COMERCIAL LTDA.
R. Pamplona, 1018 - CJ. 73/74
Jd. Paulista - 01405-001
São Paulo - S.P. Brazil
Phone : +55-11-3253-5656
Facsimile : +55-11-3253-3384

EUROPE

TSUBAKIMOTO EUROPE B.V.

Aventurin 1200, 3316 LB Dordrecht
The Netherlands
Phone : +31-78-6204000
Facsimile : +31-78-6204001

TSUBAKIMOTO U.K. LTD.

Osier Drive, Sherwood Park
Annesley, Nottingham
NG15 0DX U.K.
Phone : +44-1623-688-700
Facsimile : +44-1623-688-789

ASIA and OCEANIA

TSUBAKIMOTO SINGAPORE PTE. LTD.

25 Gul Lane
Jurong
Singapore 629419
Phone : +65-6861-0422/3/4
Facsimile : +65-6861-7035

TSUBAKIMOTO SINGAPORE PTE. LTD.

INDIA LIAISON OFFICE
Suite No. 312, 39/12, Haddows Road
Nungambakkam
Chennai - 600006, India
Phone : +91-44-28303112
Facsimile : +91-44-28303102

TSUBAKIMOTO (THAILAND) CO., LTD.

999/9 The Offices at Centralworld
10th Floor, No. 1001, Rama 1 Road
Pathumwan, Bangkok 10330 Thailand
Phone : +66-2-264-5354/5/6
Facsimile : +66-2-251-3912

TSUBAKI AUSTRALIA PTY.

LIMITED
Unit E, 95-101 Silverwater Road
Silverwater, N.S.W. 2128
Australia
Phone : +61-2-9704-2500
Facsimile : +61-2-9704-2550

TAIWAN TSUBAKIMOTO CO.

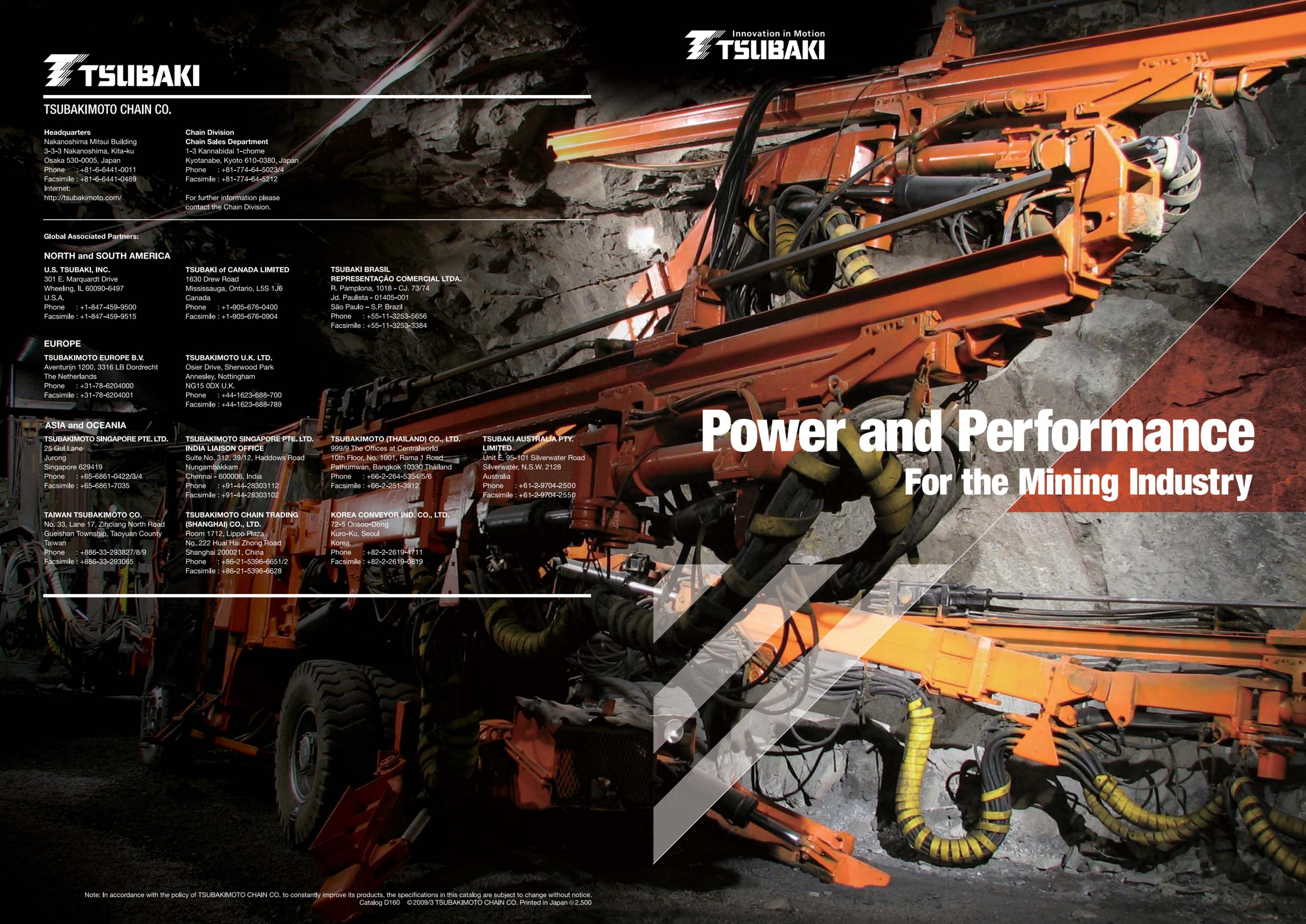
No. 33, Lane 17, Zihciang North Road
Gueishan Township, Taoyuan County
Taiwan
Phone : +886-33-293827/8/9
Facsimile : +886-33-293065

TSUBAKIMOTO CHAIN TRADING

(SHANGHAI) CO., LTD.
Room 1712, Lippo Plaza
No. 222 Huai Hai Zhong Road
Shanghai 200021, China
Phone : +86-21-5396-6651/2
Facsimile : +86-21-5396-6628

KOREA CONVEYOR IND. CO., LTD.

72-5 Onsoo-Dong
Kuro-Ku, Seoul
Korea
Phone : +82-2-2619-4711
Facsimile : +82-2-2619-0819



Power and Performance For the Mining Industry



Providing Innovative Solutions for the Global Mining Community

Innovation in Motion

At TSUBAKI we know customers want the best. Indeed, we take pride in our ability to deliver an extensive product line up that satisfies these high expectations. We are also aware that each and every one of our customers has unique requirements. Therefore, we believe that in coming years there will be an increase in demand for products that can be readily applied to customers' global operational strategies. In other words, we foresee a rise in the need for highly customized products.

Our focus is on providing our customers around the world with concrete solutions by developing products to suit different countries, regions, and business environments.

Innovation in Motion. With an eye on future trends and lifestyles, we are committed to taking on the challenge of technical innovation. Based on our brand message, which incorporates that commitment and is shared by all Group members around the world, the Tsubaki Group provides solid support for the global business activities of its customers. You can count on Tsubakimoto.

Global Network

The Tsubaki Group includes 28 production locations and 35 group companies worldwide. Our production and sales networks are more fully developed than ever.

Global Alliances

We continue to aggressively pursue operational alliances, mergers, and technical alliances with companies in Japan and throughout the world.

TSUBAKI Global Business

Best Source/ Best Supply

Through global development of our network, we constantly seek the best combination of regions based on product distribution and market feedback.

Global Marketing

With a keen grasp on the needs of customers, we use the Group's comprehensive strengths to commercialize products rapidly.

TSUBAKI Technology



Technological Solution Provider

Located in Kansai Science City, the Kyotanabe plant epitomizes our wide spectrum of cutting-edge technological solutions. Our aim is to develop this environmentally friendly facility into the world's number one chain plant. Furthermore, Kyotanabe's Technical Center plays a vital role within the Tsubaki Group through its R&D activities and dissemination of information.

In fact, the Kyotanabe facility itself is a concrete realization of our concept of amalgamating the Company's R&D and production functions. By coordinating leading edge manufacturing equipment and distribution logistics, the plant's new concurrent production line aims to improve productivity and realize high product quality.

The resulting manufacturing system allows us to deliver new products to market quickly and at low cost.

The Kyotanabe plant is an excellent example of a facility built on the foundation of TSUBAKI's technological expertise.

Our Technical Center maintains the overall quality of the TSUBAKI brand

We regard everything, including marketing, development, design, production, sales, and maintenance, as essential elements of TSUBAKI quality. Reflecting this philosophy, the Technical Center oversees and coordinates each respective stage as part of an integrated system. The technical center is a creative organization with an array of resources and capabilities at its disposal to facilitate the achievement of unmatched quality. These include the research and development of basic technologies, product evaluation using advanced analysis and simulation technologies, production engineering to enhance efficiency, quality assurance, and intellectual property that can be leveraged in the planning of technological strategies. By directly incorporating feedback from our customers into these R&D activities, the center is able to arrive at extremely precise technological solutions. The center will continue to produce a range of TSUBAKI brand products and services that will lead the way in the next generation of technologies.



Simulating chain movement through structural analysis

Enhancing our base technology and IT capabilities to tackle next-generation issues

Two types of chains, those used for power transmission and those used for conveyance, represent the core of TSUBAKI technology. By developing and specializing the technology involved in these two key areas we have created operations for automotive parts, power transmission products and materials handling systems. All of these operations share three basic technologies; materials technology, processing technology, and evaluation technology. Common to all of our products is the soundness of these basic technologies and our tireless application of new technologies. This pride and commitment to technological excellence is evident throughout our operations. For example, we capitalize on the benefits offered by engineering plastic to the fullest extent in our production of automotive parts and chains. In our materials handling systems, we also employ advanced, noncontact electric power supply and linear motor technologies. Similarly, our chrome free surface treatment technology reflects a farsighted, unified approach to technological and environmental issues. Furthermore, at a time when IT is becoming ever more ubiquitous, we are developing and commercializing equipment-monitoring systems that can be accessed through the Internet.



Cutting-edge materials analysis with an electron probe micro analyzer (EPMA)

Our strategy for technology is to serve global needs

Our fully developed worldwide operational presence enables us to immediately provide the technology different customers need around the world. As well as designing manufacturing systems for customers around the world, we use technology exchanges and up-date meetings with international subsidiaries to maintain close collaboration on technical issues throughout the TSUBAKI network. Moreover, we are able to develop products and offer solutions that anticipate needs by exchanging information on markets and customers in respective countries. These efforts include frequent videoconferences that allow real time, international exchanges of information. For example, our X-Lambda Chain, which has a wear-life five times longer than our standard Lambda Chain, is a direct result of such global collaboration.



Testing a timing chain drive system

By passing on its technical know-how and through technological innovation, TSUBAKI is achieving higher levels of product quality

As a company that places product quality above all else, we give the highest priority to handing on technical know-how to the next generation and to technological innovation. How do we create an environment that encourages technological innovation? In our view, the answer is to provide employees with thorough training in basic technology. We have therefore established a technical school and a processing technology training center. The role of the center is to ensure that the next generation of workers inherit the superior technical skills and knowledge we have cultivated since the company was established in 1917. We also hold an annual technology forum for presentations of technological achievements and publish the technology journal "TSUBAKI Technical Review". It is our belief that actively developing human resources is essential to realize even higher quality and to develop new products.



Videoconference with an overseas subsidiary



Employees study basic technology at our technical school

TSUBAKI Solution

Power and Performance For the Mining Industry

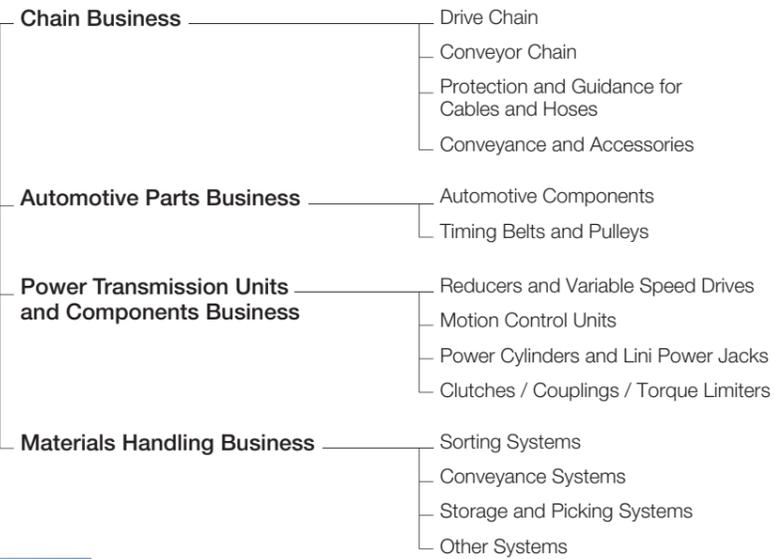
All of the products in the power transmission and materials handling fields were originally conceived as solutions for our customers.

If you have concerns about improving productivity or developing competitive products, come and talk it over with us.

We have developed the systems and components below by listening to our customers and customizing our technologies.

In response to increasingly pressing environmental preservation issues and the need for further IT integration, speed, and cost reduction, we will apply our advanced mechatronics technology and systems development capability to provide your company with the best solution. Let's work together on solving your next problem.

Tsubakimoto Chain



Drive Chain



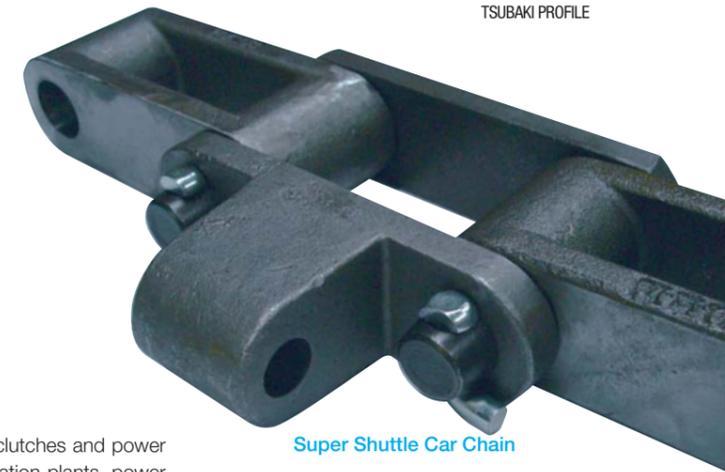
Timing Chain Drive



Gear Motor and Hypoid Motor



Linisort



Super Shuttle Car Chain

Mining with TSUBAKI

The Tsubaki Group is the leading manufacturer of mining chains, cam clutches and power cylinders which are used in underground, above ground mines, preparation plants, power stations and port facility applications.

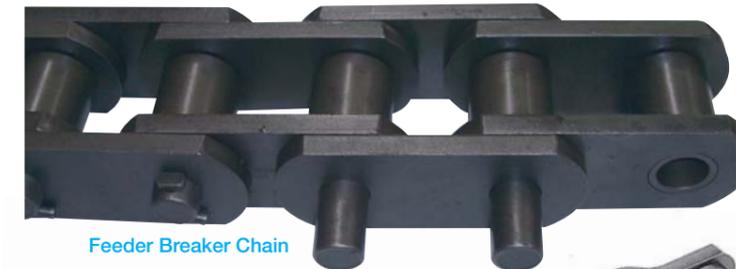
We currently manufacture many different sizes of mine chains for several major OEMs. This relationship enables us to design upgrades for the chain in the mining equipment to meet the ever-changing needs of the industry.

We use alloy-grade steels, heat-treated to precise specifications and assembled with the heavy press-fits required to withstand the punishment of today's more powerful, high production mining equipment.

Our complete line of mining chains includes Super Shuttle Car Chain, Feeder Breaker Chain, as well as various chains which are widely used in drill rigs, rotary breakers, reclaimers, face/roof drilling, under cutters, continuous miners, prep plants, roof support machines, and continuous haulage systems.

To better service your industry, nearly all of the mining related chains are in-stock and ready for immediate shipment.

The Tsubaki Group is also proud to provide a wide variety of in-house designed sprockets, which are required in all chain applications, as well as other related products such as our highly reliable and strictly tested cam clutches and power cylinders, One-Touch Inspection Door®, etc. Furthermore, as the Tsubaki Group prides itself on its ability to answer customer's demanding needs through innovative customization of its products, we are able to manufacture made-to-order chains and attachment configurations, sprockets, etc., for your individual requirements. Please consult your local TSUBAKI representative for further details.



Feeder Breaker Chain



Heavy Duty Drive Chain



ULTRA SUPER Series



Lambda Chain



BS Series

TSUBAKI Environmental Action Plan

Helping to create an environment in harmony with people and our planet. With its focus on manufacturing, TSUBAKI takes a unique approach to the challenges of environmental conservation.

Principle

The TSUBAKI Group believes that environmental conservation is a critical challenge facing humanity. We will remain mindful of environment in all our operations and contribute to the world through our workmanship.

Environmental Policy

- We will acknowledge the environmental impact of our operations, products, and services.
- In the interests of environmental conservation, we will use our creativity to exhibit industry leadership in reducing our environmental load.
- We will create a management system for environmental conservation and will promote pollution control and continual improvement.
- We will strictly comply with environmental laws, rules, and regulations and will seek to develop good relationships with our stakeholders.
- Through environmental training and in-house public relations, we will work to enhance awareness of environmental conservation among all TSUBAKI Group employees.

We are applying the collective expertise of the TSUBAKI Group to an Environmental Action Plan that takes a global perspective.

Did you know that many of TSUBAKI's eco-friendly products are part of our daily lives?

Accredited with ISO 14001 Certification for Our Environmental Management System

- All TSUBAKI Group workplaces in Japan have acquired ISO 14001 certification; a growing number of TSUBAKI Group workplace outside Japan are doing so as well.

Ongoing Efforts to Reduce Our Environmental Impact

- We are reducing CO₂ emissions resulting from our energy consumption.
(Photo: Our Kyotanabe Plant boasts highly advanced facilities.)
- We are implementing recycling and waste-reduction initiatives.

Ensuring Strict Compliance with Environmental Laws and Regulations

- We are instituting management systems at all our workplaces to ensure full compliance with local laws and regulations.

Initiatives Targeting Eco-Friendly Products

- Our adoption of green procurement encompasses outsourcing of processing, production materials, and consumables.
- We incorporate environmentally friendly design into the product development stage.
- We are eliminating hazardous chemicals from our products.

Environmental Training, Public Relations & Other Initiatives

- We are enhancing our environmental website and are providing timely information about our operations.



Reducing CO₂ emissions with a highly efficient cogeneration system.



This heat exchange system cools our injection molding equipment with heat from an electrical generator.



Plastic Chain



Linisort-V



NEP Chain

Eco-Friendly Products

Reduce, Reuse and Recycle are the "three R's" of environmental conservation. We develop products and technologies that contribute widely to environmental conservation.

Recyclable Plastic Chain

By collecting and recycling used plastic chains, we are promoting resource conservation and the adoption of recycling.

Linisort Sorting Systems

Linisort systems incorporate linear motors that provide silent, eco-friendly sorting. In addition to featuring a compact configuration, low weight, and low energy consumption, these systems are designed for environmentally friendly disassembly, part sorting, collecting and recycling.

Eco Chain Series

NEP chain is highly corrosion-resistant chain with a surface coating free from designated hazardous chemicals (RoHS Directive compliant). This product series also includes our Lambda Roller Chain, which offers superior oil-free and long-life characteristics; plastic roller chain, which features low-noise operation achieved with our proprietary engineering plastics technology; and stainless steel water processing chain, a field-proven product that has earned an excellent reputation after decades of successful use in wastewater treatment facilities throughout Japan.



Products for the Environmental Market

Water Treatment Facilities and Equipment

Our sewage treatment facilities and equipment help maintain the water quality in water treatment facilities throughout Japan.

Conveyors for the Environmental Market

Our conveyance devices for environmental facilities are used in applications such as waste incineration and processing of industrial waste, household refuse, and sludge. And with equipment provided by TSUBAKIMOTO Bulk Systems Corporation and TSUBAKIMOTO Mayfran Inc., we provide metal conveyance and coolant processing equipment for metal machining and processing applications. Clearly, our conveyor products are meeting the needs of the environmental market.



TSUBAKI Global Network

Wherever you are in the world, our production and sales network is able to provide your business with the immediate support it needs.

A manufacturing infrastructure that lets you forget international borders. The large scale on which TSUBAKI's services operate makes sure your global business ventures are successful. Through 28 production centers and 35 Group companies worldwide, we will deliver full back-up and rapid response to your local needs anywhere on the globe.



U.S.Tsubaki, Inc. (UST)



Tsubaki of Canada Limited



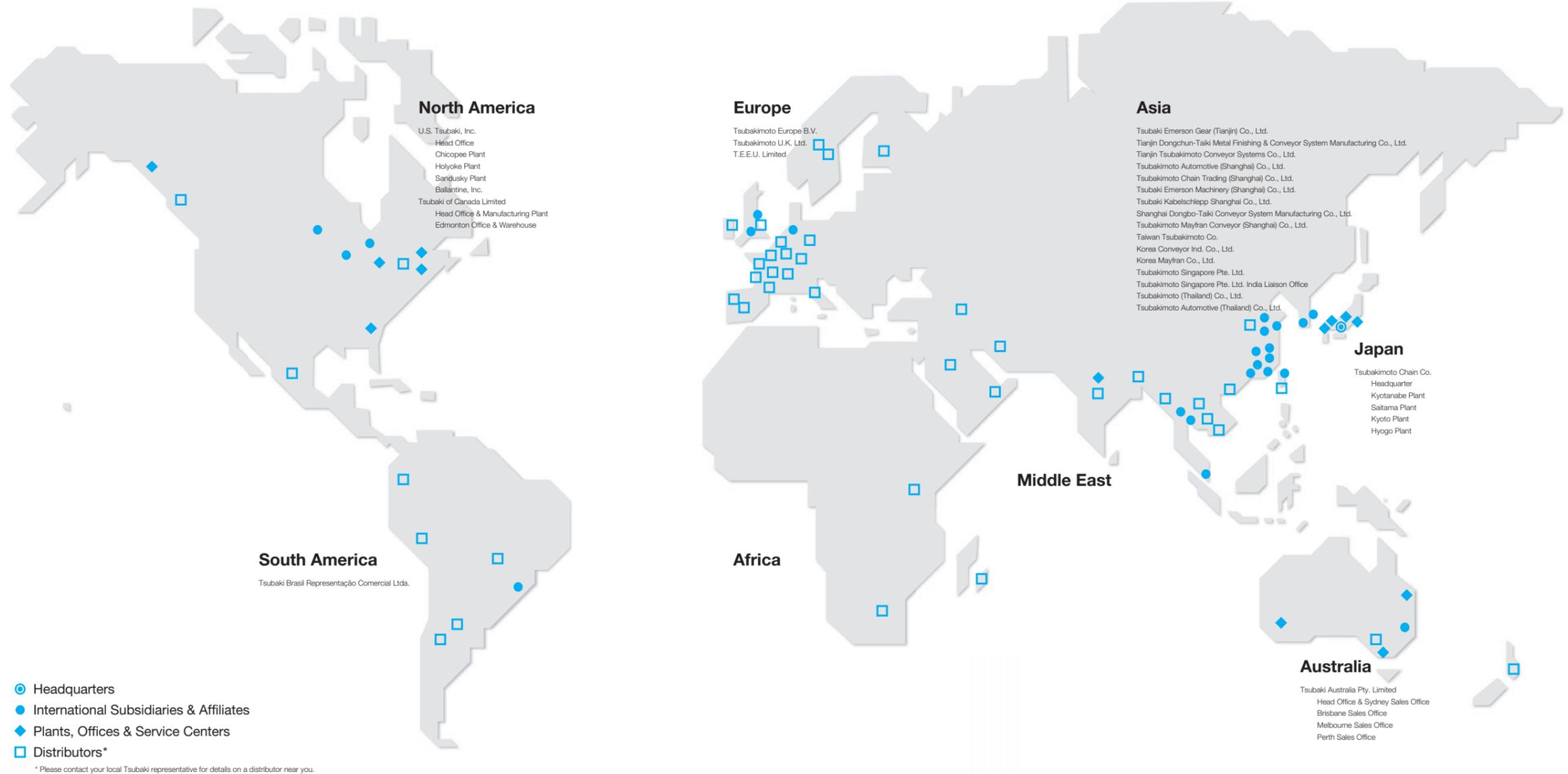
Tsubakimoto Europe B.V.



Korea Conveyor Ind.Co.,Ltd.



Tsubakimoto Automotive(Shanghai)Co.,Ltd.



GLOBAL NETWORK



UST Portland Plant UST Holyoke Plant UST Sandusky Plant UST Chicopee Plant

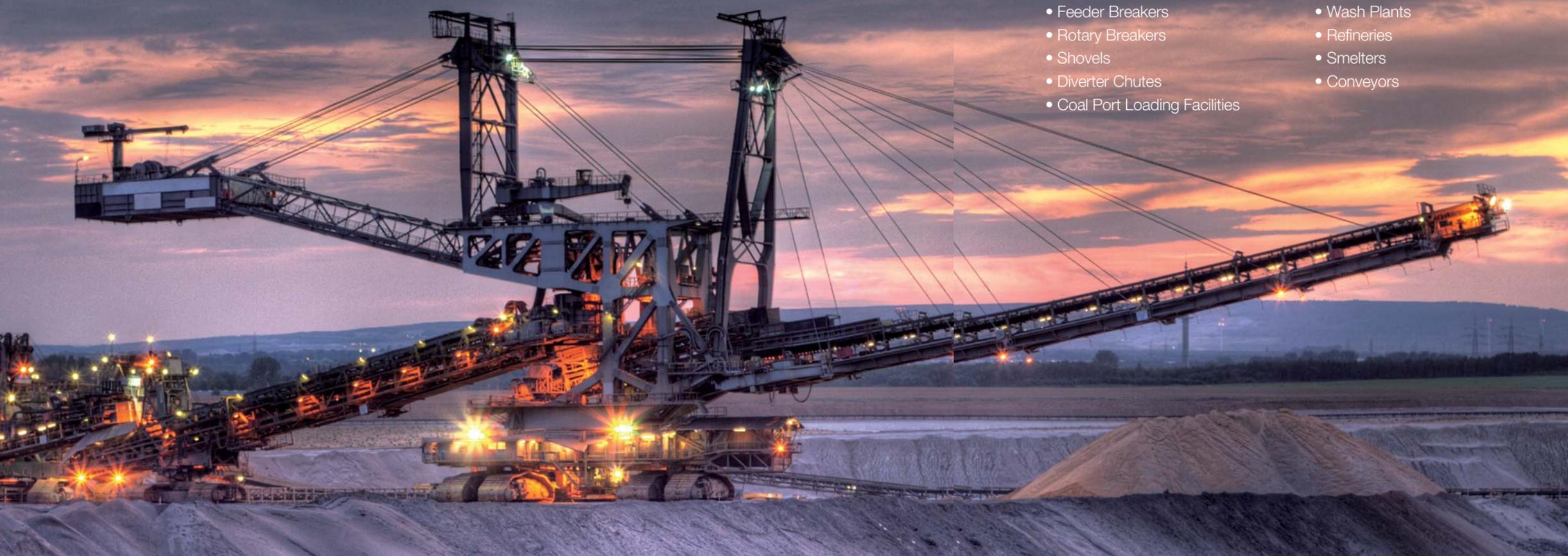


Tsubakimoto Singapore Pte. Ltd. Tsubakimoto Automotive(Tailand) Co., Ltd. Taiwan Tsubakimoto Co. Tsubaki Australia Pty. Limited

To access profitable material deposits located near the surface, heavy machinery and blasting techniques are used to remove overburden soil and rock which would normally impede extraction of materials. Depending on the material extracted, the ore or raw mineral is conveyed to a processing plant where it is either washed, beneficiated, concentrated or refined to achieve the saleable product.

As the extraction and processing of the raw material is done in the most demanding of environments, components on the machinery used needs to excel in these conditions. For these applications TSUBAKI offers a wide variety of tried and tested heavy duty roller chains, conveyor chains, reclaimer chains, engineering class sprockets, back stops, electric actuators and protection devices for use on equipment or in plants such as

- Drill Rigs
- Feeder Breakers
- Rotary Breakers
- Shovels
- Diverter Chutes
- Coal Port Loading Facilities
- Rail Loading Stations
- Wash Plants
- Refineries
- Smelters
- Conveyors



Surface Mining

DRILL RIGS (Pg.15) / **ROTARY BREAKERS** (Pg.19)
FEEDER BREAKERS (Pg.21) / **RECLAIMERS** (Pg.23)
CHPP (Pg.27) / **TANDEM DRIVE ROAD GRADERS** (Pg.29)
MINING SHOVELS (Excavators) (Pg.29) / **CONVEYORS** (Pg.47)
DIVERTER CHUTES AND FLOP GATES (Pg.51)



- 1 DRILL RIGS**
Super Chain Series (Pg.16), APP Specification (Pg.17),
Super Long Length Formation for Large Size Roller Chain (Pg.18)
- 2 ROTARY BREAKERS**
Heavy Duty Drive Chain (Pg.20)

- 3 FEEDER BREAKERS**
Feeder Breaker Chain (Pg.22),
Special Corrosive Resistant Surface Treatment (Pg.22)
- 4 RECLAIMERS**
Stack Reclaimer Chain (Pg.24)
- 5 CHPP**
RS® Roller Chain 'G7' (Pg.28), Lambda Chain (Pg.28)

- 6 ROAD GRADERS**
Super Chain Series (Pg.16)
- 7 MINING SHOVEL**
Heavy Duty Drive Chain (Pg.20), RS® Roller Chain 'G7' (Pg.28)
- 8 STACKER**
Cam Clutch, Back Stop (Pg.47)
- 9 BUCKET WHEEL RECLAIMER**
Heavy Duty Drive Chain (Pg.20), Cam Clutch (Pg.47)
- 10 HOPPER BIN**
Power Cylinder (Pg.52)
- 11 STOCK PILE CONVEYOR**
Cam Clutch (Pg.47), Power Cylinder (Pg.52)

Surface Mining



Drill Rigs

Drill rigs create deep surface holes which are then filled with explosives and blasted to allow for the removal of the overburden. Other applications include extracting core samples for exploration purposes. To overcome the heavy shock loads associated with this type of drilling, TSUBAKI offers the Super Chain Series: HT Series, SUPER Series, SUPER-H Series, ULTRA SUPER Series. To protect against pitting corrosion, TSUBAKI offers APP surface treatment which is highly effective in outdoor environments. To help create a safer work environment, TSUBAKI provides the TSUBAKI Super Long Length Formation for Large Size Roller Chain, allowing for a continuous length chain void of any connecting links in the entire length of the chain.

Super Chain Series

ANSI standard roller chains are widely used in various industries. To meet growing industry demands for cost efficiency, stronger and higher performing chains which can replace the corresponding ANSI standard chains are necessary. TSUBAKI offers a line of Heavy Duty-Super and Ultra Super Chains which will solve your specific problems associated with heavy shock loads and other operating issues.

HT Series

HT Series chains have a greater ultimate tensile strength (plus 15-30%) over ANSI standard roller chains by using through hardened pins and link plates of the next larger chain size. These chains also provide greater shock load resistance. The dimensions of the chains are identical to ANSI Heavy Series standard roller chains.

SUPER Series

The dimensions of this series are identical to those of ANSI standard roller chains. Link plates of the SUPER Series have a special design and the pitch holes are critically formed to improve their allowable load by 25-30%. The pins are through hardened for greater shock load resistance.

SUPER-H Series

The thickness of the link plates of SUPER-H Series is the same as that of the next larger size of SUPER Series chains and the pins are through hardened. As a result, the chains have a greater ultimate tensile strength and allowable load than SUPER Series Chains.

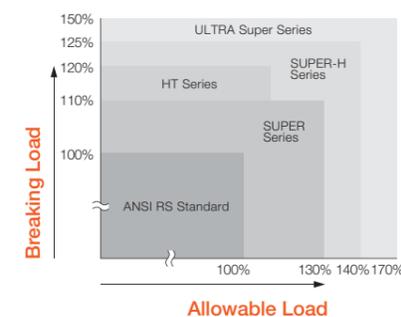
ULTRA SUPER Series

Field test results show that TSUBAKI ULTRA SUPER Series has greater ultimate tensile strength and allowable load than any other roller chain manufactured. As the allowable load is 170% of that of ANSI RS roller chain, using ULTRA SUPER Series allows selection of chain up to two sizes smaller than the suitable standard chain. Excellent for applications where heavy shock loads or space limitations pose problems.

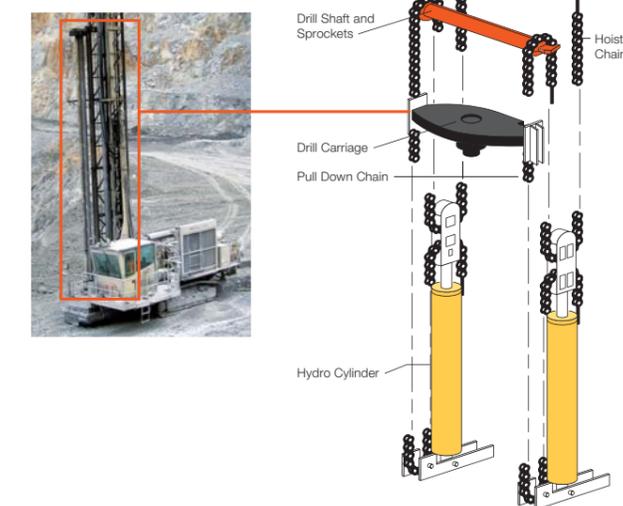


DRILL RIGS

TSUBAKI Super Chain Features



Drilling Machine



If you've had problems such as fatigue breakage of link plates, or generally poor performance, we recommend that you try the TSUBAKI HT Series, SUPER Series, SEPER-H series or the ULTRA SUPER Series where you can dramatically increase the strength of your chain without having to make major modifications to your existing equipment.

Drill Rigs

Corrosion Resistant Roller Chains Surface-Treated Drive Chains APP Specification

Outstanding performance in atmospheres conducive to pitting corrosion.

Pins are treated with a special surface treatment to protect against pitting corrosion that leads to fatigue breaks, thus preventing strength loss. This treatment is highly effective in environments that readily promote corrosion, such as outdoors or coastal applications.

Note: Pitting is a type of localized corrosion affecting metal surfaces. Pits form toward the interior, and if pitting occurs on pin surfaces, that pin can quickly lead to fatigue breakage and chain failure.



Features

No strength loss!
Same as standard steel chain.

Eco-friendly chrome-free!
Special surface treatment does not use hazardous hexavalent chrome.

Example Applications

APP Chains are ideal for atmospheres that readily promote corrosion.
 • Outdoor uses • Coastal or riverside uses • When regular lubrication is difficult



Because equipment is used outdoors, rain can infiltrate equipment, creating conditions that promote pitting corrosion. Also, pitting readily occurs in equipment exposed to salty air or saltwater spray.

Example of fatigue breaks caused by pitting corrosion

Chain: BS160HHHT-2 Equipment: Drill Rig
 Pitting corrosion of the pin due to insufficient lubrication and corrosive atmosphere = Fatigue breakage



Applicable Models

Single/Double Strand RS Roller Chain

Except for the surface-treated pins, dimensions and other specifications are the same as other roller chains.

Single Strand Heavy Duty Roller Chain

(For other models, contact Tsubaki.)

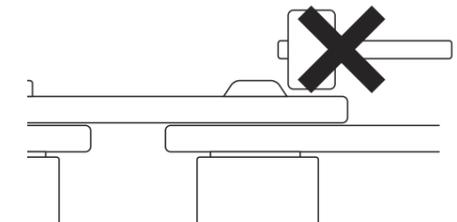
Super Long Length Formation for Large Size Roller Chain

Removes the hassle of connecting chain from the user and contributes to a safe work environment.

As chain size increases, so does the burden of connecting it for the user. By connecting and delivering chain of the desired longer length, we can increase our users' work productivity and help maintain a safe working environment.

Safer

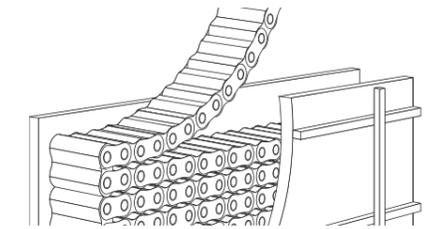
The entire chain is connected, meaning no connection work for the user and more stable product quality.



Simpler

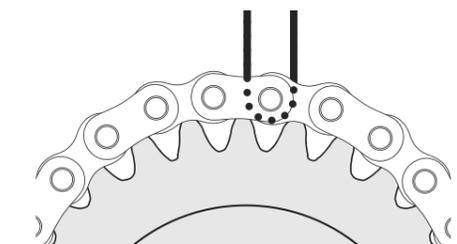
The chain is delivered folded over itself in a special made wooden box for easy removal.

- * Tsubaki can supply wooden boxes using heat treated materials for exports. (Complies with ISPM Guidelines.)
- * Case mark for export can also be affixed to the box.
- * Box is delivered horizontally. Box must stand upright to lift out chain.



More Reliable

Reliable installation - No more worries about on-site connection or twisting.



Super long length formation makes installation safer, simpler, and more reliable.



1 Chain is packaged in a special wooden box and delivered horizontally.

2 Stand wooden box upright when removing chain. (Be careful when standing wooden box.)

3 Chain is packaged folded on top of itself. Attach one end to a crane and lift out for easy removal.

4 Safer, simpler, and more reliable installation to equipment!

User Connects

User Connects

Before...

BUT NOW! Chain over 10m long can be delivered already connected!

Rotary Breakers are large cylindrical tumblers that are used to break feed material into workable sizes. During rotation the material is lifted and dropped inside the structure which causes the material to be broken into pieces. During the rotation, the smaller softer broken pieces pass through the screen openings onto a conveyor belt below and are conveyed to the next stage of processing. The harder rock and uncrushable materials are discharged from the end of the cylinder with the aid of a discharge plough and other methods.

Rotary Breakers

To facilitate the rotation of these large machines TSUBAKI offers their Heavy Duty Drive Chain. Specifically designed for use in oil rigs, power shovels hoists and other heavy duty construction equipment, Heavy Duty Drive Chain is perfectly suited for rotary breakers and other heavy duty applications.

TSUBAKI Heavy Duty Drive Chain

Keep Your Operation Moving with TSUBAKI Heavy Duty Drive Chain

TSUBAKI Heavy Duty Drive Chain is designed to exceed the listed ultimate strength ratings. These ratings are very significant. Chains with greater ultimate strength have higher actual yield and greater fatigue strength. With TSUBAKI Heavy Duty Drive Chain, you get extra reserve strength to withstand high shock loads.

Precision Manufacturing Means Greater Fatigue Strength

TSUBAKI Heavy Duty Drive Chain is built to withstand the most rugged conditions. We use the latest manufacturing and heat-treatment techniques to manufacture every component. Each component is carefully machined to close tolerances to ensure precise pitch control for smooth sprocket/chains interaction. That means longer service life for chain and sprockets.

Add the Power of Alloy

When parts require extra hardness, we use alloy steel to make the components. This provides more uniform core strength, which is particularly important for heavy duty applications. Every TSUBAKI Heavy Duty Drive Chain with an ultimate strength rating higher than 50802.35kg (112,000 pounds) is made entirely of alloy steel. All TSUBAKI Heavy Duty Drive Chains are furnished with alloy steel pins.

Reduced Maintenance Costs and Downtime

TSUBAKI Heavy Duty Drive Chain stands up to the toughest environments for hour after hour of uninterrupted service.

- Optimum strength
- Fatigue resistant
- Pre-tested
- Alloy steel parts
- Press fit construction
- Accurate pitch control

Heavy Duty Drive Chain is produced by U.S. Tsubaki.

**Your equipment is on the line.
Count on TSUBAKI Heavy Duty Drive Chain.**





Feeder Breakers

Feeder Breakers are primary crushers designed to break ore into smaller sizes via a deck and chain conveyor system. The chain conveyor feeds the crushed ore onto belt conveyors where it is sent for further processing or stock piling.

For the conveyor mechanism, TSUBAKI offers our proven Feeder Breaker (Steel Bushed) conveyor chain and flight bars for this application. Sizes include 88.9mm (3.5"), 76.2mm X 101.6mm (3" X 4"), 114.3mm (4.5"), 139.7mm (5.5"), 152.4mm (6") or we can custom make a size suitable for most applications. Also, to help overcome rapid wear from the severe working environments found in the mining industry, TSUBAKI is also proud to provide its industry proven corrosive resistant surface treatment, greatly extending a chain's wear life in even the harshest of conditions.

Feeder Breaker Chain (Steel Bushed Chains)

TSUBAKI Feeder Breaker Chain (also known as Steel Bushed Chain) is especially designed and manufactured to provide excellent service in severe working conditions. Our chains are manufactured to close tolerances with the most modern equipment in the industry. Each component is made from high-quality alloy steels (pins are made of select alloy steel or high-quality carbon steel) and then specially heat-treated to provide maximum performance and long wear life. Joint parts are hardened to provide greater strength and wear resistance. Link plates are hardened to achieve ultra-high strength throughout.

Available Sizes	
88.9mm (3.5")	139.7mm (5.5")
76.2mm X 101.6mm (3" X 4")	152.4mm (6")
114.3mm (4.5")	Custom sizes also available

Feeder Breaker Chains Components

Strong, Tough Pins

Pins are hardened to achieve superior strength and extend wear life. This creates the ideal combination of surface hardness for wear resistance and core toughness to resist impact.

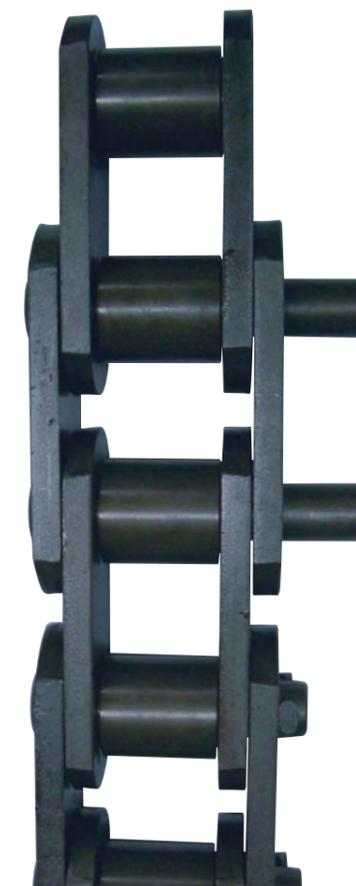
Long-Wearing Bushes

Bushes are manufactured to rigid specifications for optimum wear resistance and strength. Select steels are precision machined to maintain consistently high link plate interference. This results in positive link plate hold and favorable residual stress to resist fatigue. Bushes are case-hardened and heat-treated to extend wear life..

Fatigue-Resistant Link Plates

Link Plates are through-hardened to achieve ultra-high strength. This keeps the chain hanging failure-free, ensuring consistent service life. TSUBAKI has developed superior techniques to ensure hole quality and pitch control. The result is fatigue resistance and premium performance.

Feeder Breaker Chain is produced by U.S. Tsubaki.



FEEDER BREAKERS

Corrosive Resistant Chain Coating Technology Nickel-Plated, Zinc-Plated, UWP, NEP

Combining the proven strength of alloy steel with superior corrosion resistance, these special corrosive resistant surface treatments deliver significantly extended service life for reduced total operating costs. TSUBAKI offers a complete corrosion resistant package that includes roller chain, engineering chain, and sprockets.

If your drive or conveyor chains are exposed to intermittent water, occasional wash-downs, outdoor conditions, even chemicals and salt water, your Chains and Sprockets need to be surface treated to keep your equipment moving.

The advanced performance of TSUBAKI's corrosion resistant surface treatments is the result of a revolutionary mechanical plating system treatment that forms a lasting bond to the steel. It protects the chain and extends the service life by resisting corrosion longer than ever before.

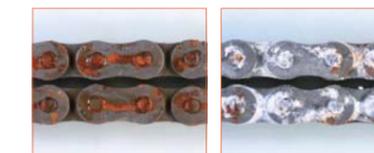
TSUBAKI's corrosion resistant surface treated chains stands up to water better than other types of plated chain.

Corrosion eats up more than chain — it eats up your profits! Choose strong, long-lasting corrosion resistant surface treatment and protect your bottom line. For more information please contact your local TSUBAKI representative.

In-house Salt Spray Test Results



TSUBAKI : 700H
NO RUST Company A : 100H



Company B : 300H Company C : 400H



Reclaimers

Designed to transfer the coal stock pile to the Coal Handling Pre-Plant (CHPP) or to the Coal Loading Facility these machines are operational critical to any CHPP. Demands for product availability and higher feed rates require the power transmission components to exceed the industry standards now and into the future.

Operating conditions like this require the best in design and innovation and TSUBAKI is the proven name in the field for delivery on performance and increased profitability to the bottom line.

For these machines TSUBAKI has designed their made-to-order Stack Reclaimer Chain. With a wide variety of options, these chains are specifically designed and manufactured to meet the unique challenges of your operation. To help battle against potential dust build up between bushes and rollers, TSUBAKI is proud to introduce the improved anti-dust capabilities for the Bearing Roller Conveyor Chain. Also widely utilized are TSUBAKI's highly customizable Large Scale Conveyor Chains. With a wide variety of base materials, corrosive resistant coatings, attachments and rollers, TSUBAKI is confident we have a Large Size Conveyor Chain that can meet the unique challenges of your mining site.



Stack Reclaimer Chains

Stack Reclaimers are popular when heavy industrial processes require that large storage piles of raw material are necessary. Reclaimer chain and flight assemblies function like scraper conveyors, less the trough, with flight blades that push material toward a belt feeding conveyor. The reclaimer conveyor's chain with digging flights are supported by rails and structure which span over or across the pile being reclaimed for transfer to plant processes. Chain for this demanding application should provide the longest service life to achieve the best overall value. Chain must have large bearing areas, high hardnesses and deep case depths to provide the best performance. TSUBAKI engineers have used these principles while retrofitting many reclaiming conveyors with chain and sprockets, achieving service life which is longer than O.E.M. chains. For the superior value and performance, TSUBAKI Chain is your best choice.

Note that due to their complex requirements, reclaimer chains are normally manufactured on a made-to-order basis, designed and manufactured to meet the specific unique requirements of each site. Please contact your local TSUBAKI representative to obtain certified prints for design and construction.

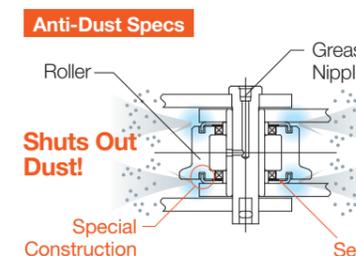


Improved Anti-Dust Capabilities

3x the wear life of Bearing Roller Conveyor Chain Standard Specs

TSUBAKI's Bearing Roller Conveyor Chain Anti-Dust Specification solves the problem of dust causing early wear between bushes and rollers that afflicts standard conveyor chains.

- Exhibits the same performance and efficiency of the Bearing Roller Conveyor Chain, even in dusty environments.
 - Same dimensions as standard R or F rollers and RF Conveyor Chains
- Please contact your local TSUBAKI representative for further details.



Large Size Conveyor Chains

Along with the above mentioned Stack Reclaimer Chain, TSUBAKI is proud to offer its large line up of highly customizable Large Size Conveyor Chains. As these conveyor chains are highly customizable, with a variety of materials and corrosion resistant coatings, attachments, and roller types available to match the unique conditions of your mining site, we here at TSUBAKI are confident that our Large Size Conveyor Chains can meet any challenges your site has to offer. Furthermore, because many of our innovative products are a direct result of answering specific challenges presented by our customers, please do not hesitate to contact your local Tsubakimoto representative if your mining site has unique challenges other chains just can't stand up to.

Please refer to the following pages for information regarding chain base material, corrosion resistant coatings, as well as types of attachments and rollers available.

Features and Benefits

- Made to order custom chains to suit individual applications, and customized upgrades for problem applications.
- Specialized materials and heat treatment applications for every pitch size.
- Matched chain and sprocket assemblies for smooth chain operation.
- Specialized coatings for corrosion resistance, enhancing chain life and reducing maintenance costs.
- Special lube ports and greasing ports for easy maintenance and longer wear life.
- Outboard bearing rollers to reduce wear to the base chain roller.
- Special sealing arrangements for harsh environments to improve wear life.



GA2 Attachment

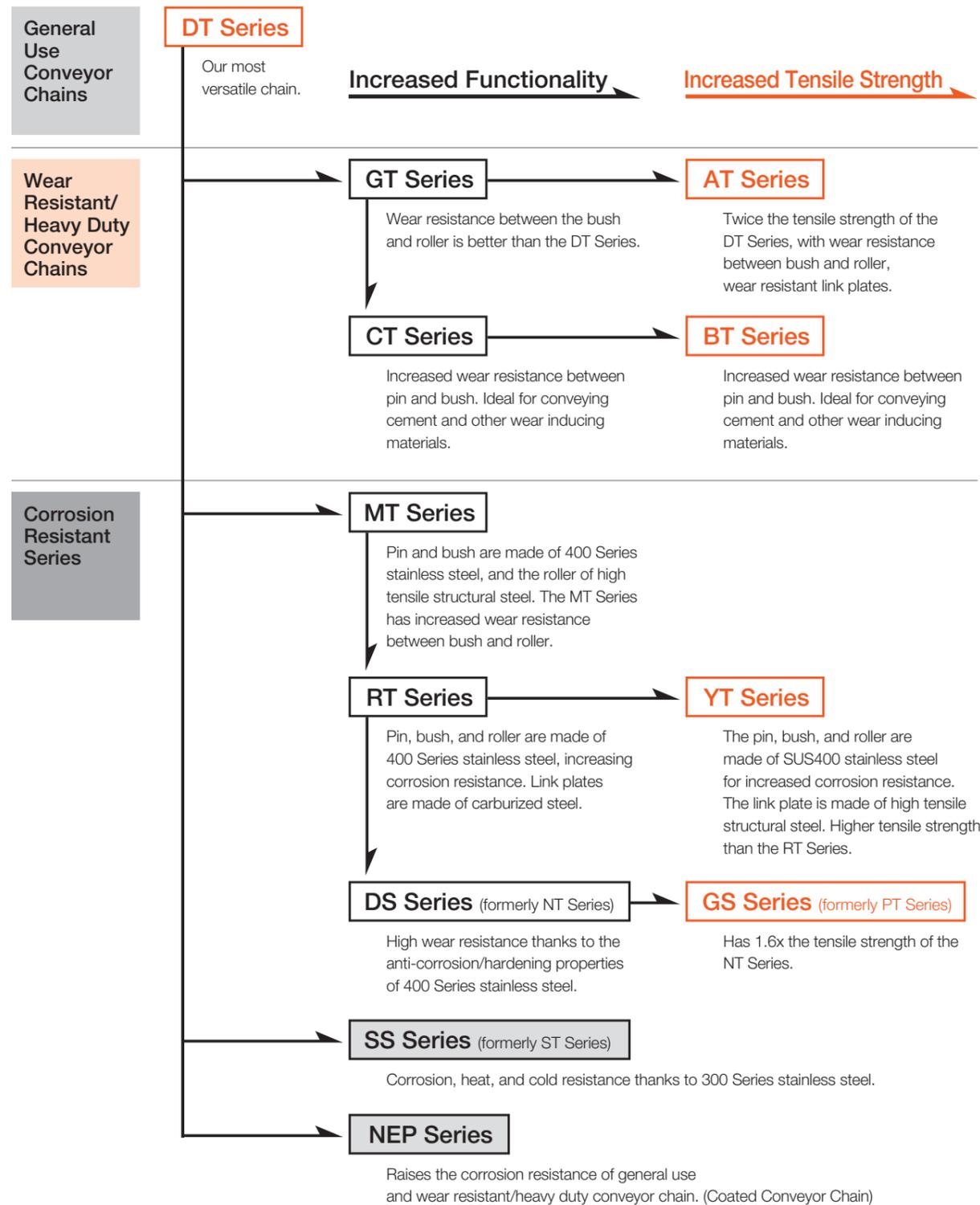


K3 Attachment

Reclaimers – Large Size Conveyor Chains

TSUBAKI's Wide Selection of Large Size Conveyor Chains

Tsubaki Conveyor Chain is made from carbon steel, high tensile structural steel, or stainless steel (300 / 400 Series) parts to satisfy any application.



Attachment Types

Attachments can be placed at any link spacing.

Standard Attachments (A1, A2, K1, K2, GA2, GA4)

Standard attachments are both economical and versatile.

A Attachments

A attachments have a bent link plate on one side. They are referred to as A1, A2, or A3 attachments, depending on the number of bolt holes.

*TSUBAKI may send an A3 attachment for some A1 attachment orders. Contact a Tsubaki representative for more information.

K Attachments

K attachments have a bent link plate on both ends. They are referred to as K1 or K2 attachments, depending on the number of bolt holes.

*TSUBAKI may send a K3 attachment for some K1 attachment orders. Contact a Tsubaki representative for more information.

GA Attachments

GA attachments have holes in the link plate itself. They are referred to as GA2 or GA4 attachments, depending on the number of bolt holes.

Please note that other non-standard attachments and special "Out Board Roller" (OBR) bearings are available. Furthermore, special sealed roller (OBR) long life rollers to suit highly contaminated areas are also available upon request. Please contact your local Tsubakimoto representative for more details.

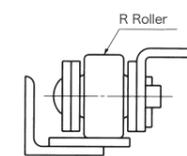


Roller Types

TSUBAKI Conveyor Chains use three basic roller types.

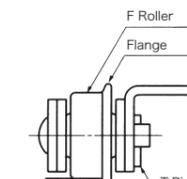
1. R Rollers

The outside diameter of the roller is larger than the height of the link plate. Tsubaki's most basic, versatile roller type. It has a large allowable load and low frictional resistance.



2. F Rollers

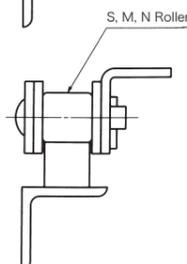
There is a flange on the roller, attached on the T-pin side, that acts as a guide. Flange rollers are a simple way to prevent side oscillation. They are perfect for rough usage conditions and regular slat conveyance. Be careful when using K attachments, as the attachment area may contact the roller flange.

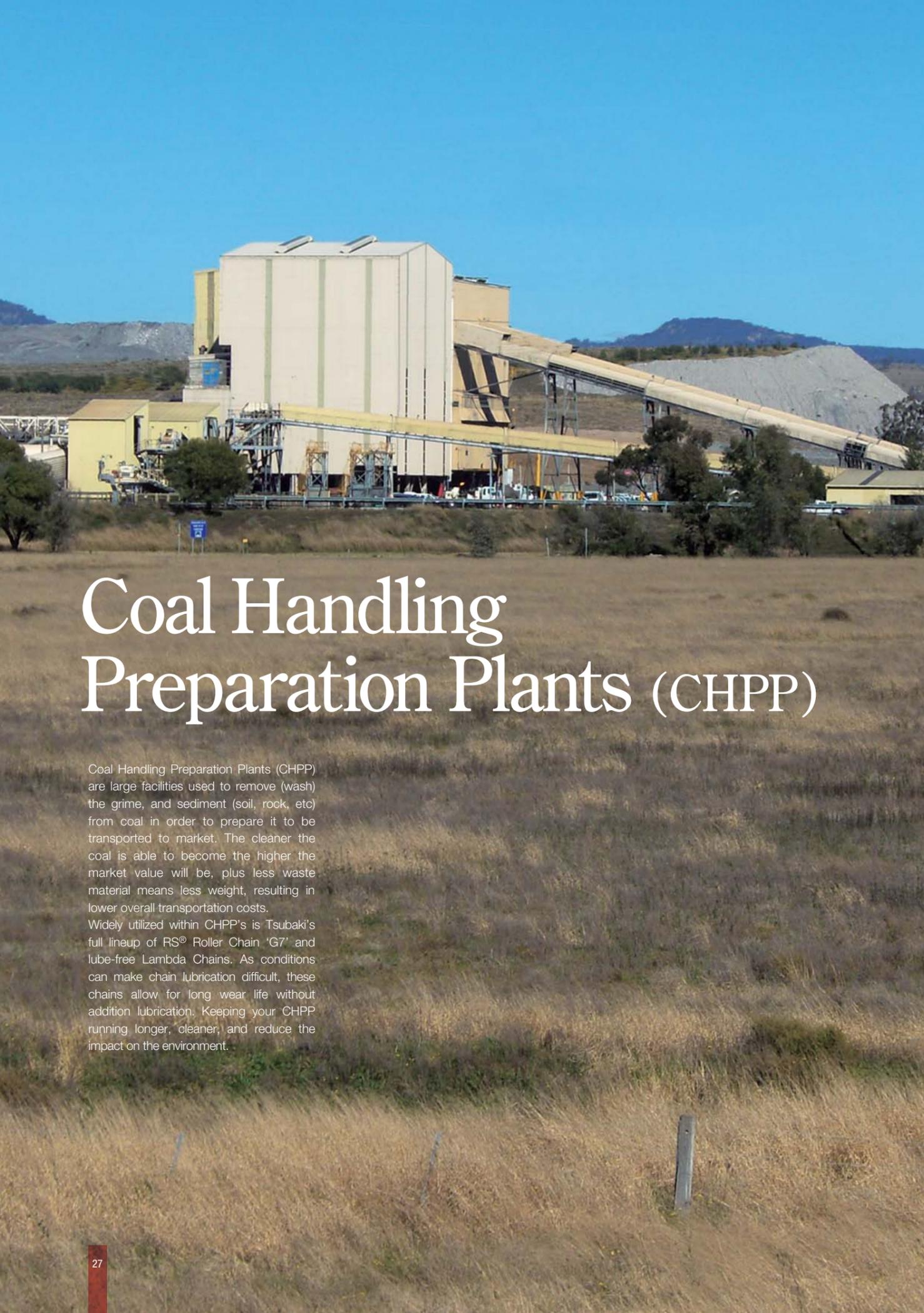


3. S, M, and N Rollers

These rollers are effective in alleviating the shock and wear the chain would normally suffer during sprocket engagement.

S Rollers : The outside diameter of the roller is smaller than the height of the link plate.
M Rollers : The outer diameter of the M Roller is slightly larger than that of the S Roller.
N Rollers : The roller diameter of the M and N rollers are the same, but the pin diameter is larger, increasing its strength. (RF26200N and above)





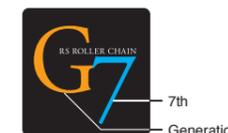
Coal Handling Preparation Plants (CHPP)

Coal Handling Preparation Plants (CHPP) are large facilities used to remove (wash) the grime, and sediment (soil, rock, etc) from coal in order to prepare it to be transported to market. The cleaner the coal is able to become the higher the market value will be, plus less waste material means less weight, resulting in lower overall transportation costs. Widely utilized within CHPP's is Tsubaki's full lineup of RS® Roller Chain 'G7' and lube-free Lambda Chains. As conditions can make chain lubrication difficult, these chains allow for long wear life without addition lubrication. Keeping your CHPP running longer, cleaner, and reduce the impact on the environment.

RS® Roller Chain 'G7'

Pursuing the Ultimate in Quality...

Our 7th model upgrade, celebrating 90 years of quality. Pursuing the ultimate in quality, TSUBAKI has created the world's highest standard of roller chain.



"TSUBAKI" and the "RS" brand are stamped together on the chain. (Applicable sizes: RS40 to RS240)

Smaller Size and a Longer Wear Life

- Twice the life means a dramatic reduction in maintenance costs. (Applicable sizes: RS80 to RS140)
- kW ratings up by 33%.

The world's top-class kW rating is achieved by increasing strength in the M-type connecting link owing to Ring Coin (RC) processing and improvement in the two-pitch offset link. This enables reduction of chain and sprocket sizes (one size down), downsizing equipment. (Applicable sizes: RS80 to RS240)

LG Solid Bush

Patented

TSUBAKI proprietary LG (lube groove) technology has been applied to the inside surface of our cold-forged seamless bush. The combined effect of "seamless + LG" effectively doubles the wear life over previous bushes. (Applicable sizes: RS80 to RS140)



Note: The wear life and kW ratings of sizes RS60 and smaller have not changed.

TSUBAKI LUBE FREE Lambda Chains

Tsubaki's LUBE FREE Lambda® Chains were the first in the industry to use a special oil-impregnated bush. Since their launch in 1988, they have been adopted for diverse industries and applications, and their performance has been highly rated.

Lube-free and Long-life

Longer lasting chains made possible by special oil-impregnated bushes.

Compatibility

Compatible with RS Roller Chains.

Operating Temperature

-10°C to 150°C / 14°F to 302°F

Selection

Use the General Selection Method.

Basic Construction

- Lambda Chain (Normal specification)
Black inner and outer ring plates
- Lambda Chain (Nickel-plated specification)
Special nickel plating
(Excluding bushings)

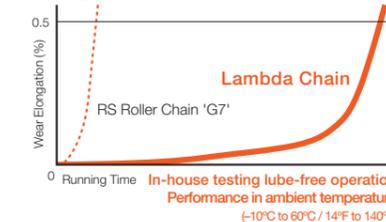


Lambda Chain

Products

TSUBAKI has a wide line-up of lube-free, long life products that help customers reduce costs, while also reducing their impact on the environment. These include Standard Lambda Chain, Surface Treated Lambda Chain (NP/NEP specification) Heavy Duty Lambda Chain, Curved Lambda Chain, BS Lambda Chain, etc. For conveyance needs a wide variety of specialized attachments are also available, please see your local TSUBAKI representative for more details.

More than 7 Times the Wear Elongation Life of RS Roller Chain

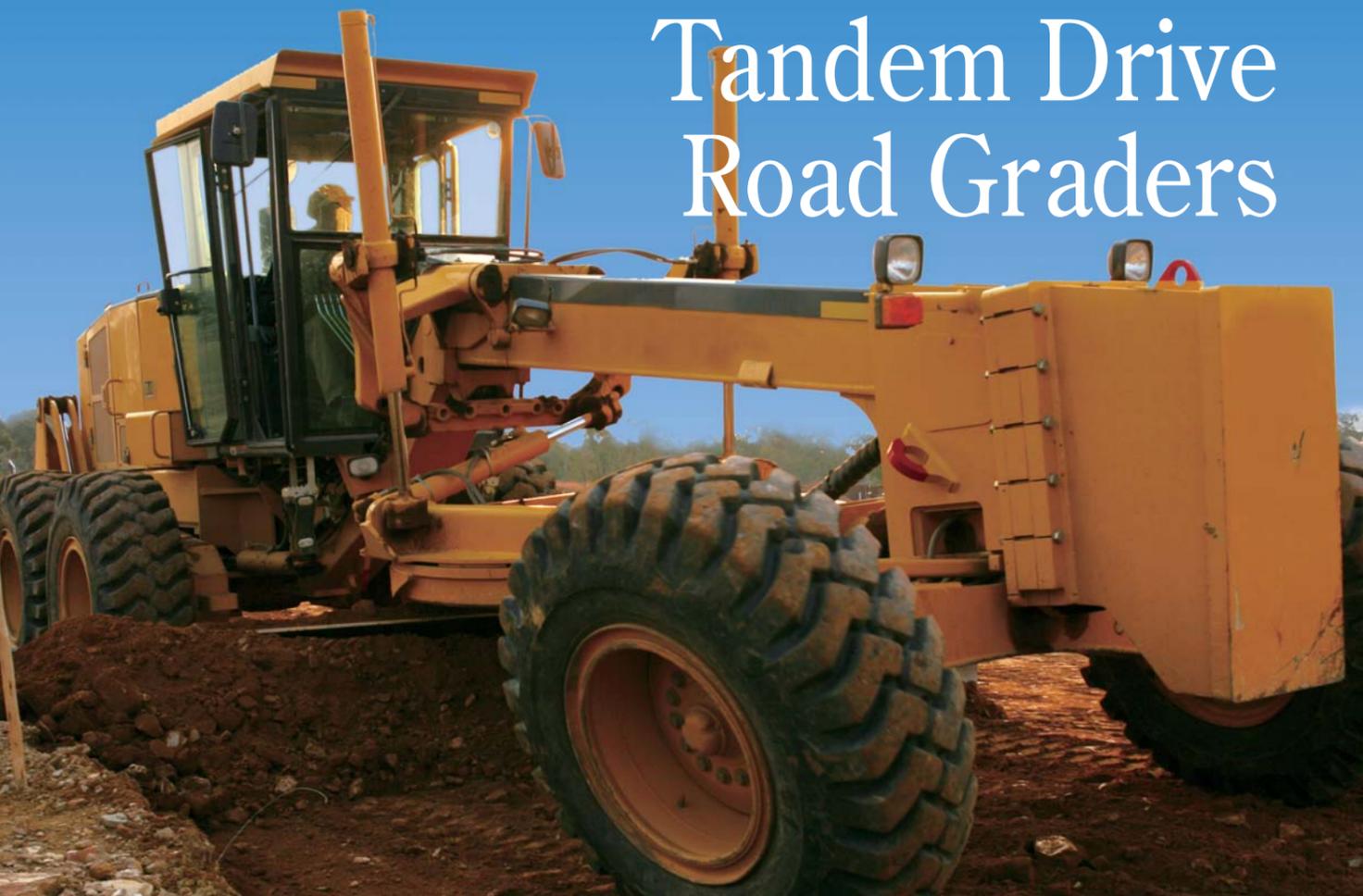


RS120-LMD-1 and RS140-LMD-1 wear elongation life are 2.5 times longer.

Superior Performance through the Combination of Superior Parts

- Special Coated Pin**
For smoother rotation
- High-Performance Sintered Bush**
Impregnated with lubricant
- Ring-Coined Connecting Link (Patented)**
A ring-shaped groove is provided around the connecting link plate hole. This creates positive residual stress that keeps the same strength as the base chain, even with loose fit between pins and holes.

Tandem Drive Road Graders



Tandem Drive Road Graders

Graders are used for leveling out the road ways and keeping things running smooth on the mine site. Their operation is vital to keeping the cost down on wheel loaded equipment such as dump trucks and wheel loaders. TSUBAKI offers a complete range of Tandem drive chain replacement kits to suit nearly every make and model of grader on the market today with specific design features to withstand the shock loads and drive forces these systems produce.

Our Super Series chain products will keep your equipment driving. See page 16 for details.



Mining Shovels (Excavators)



Mining Shovels (Excavators)

Used to move earth, load trucks and excavate relatively smaller areas (compared to bucket wheel excavators) these highly versatile machines are the modern day work horses of almost any mining site the world over.

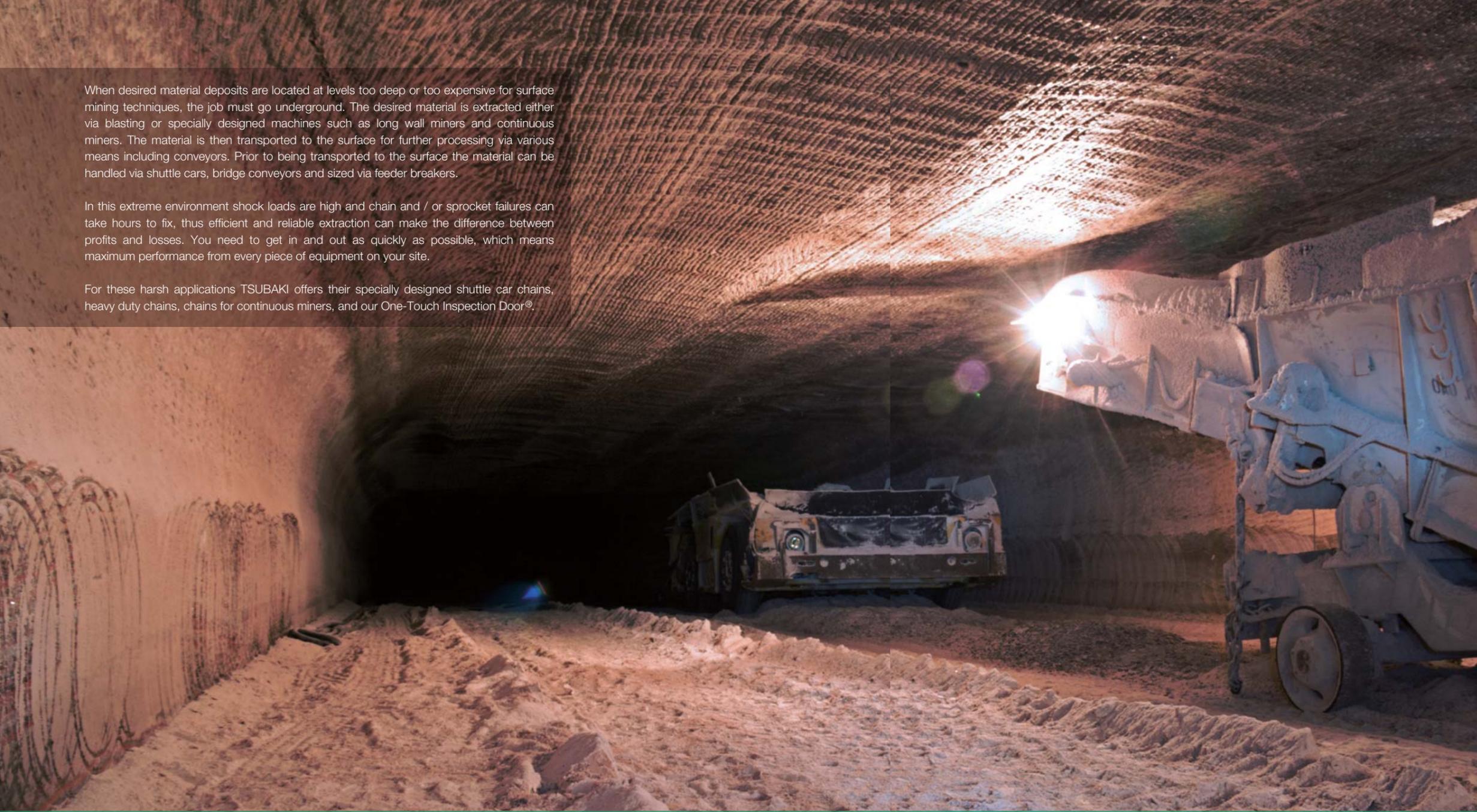
Our RS Roller Chain (Pg. 28) and TSUBAKI Heavy Duty Drive Chain (Pg. 20) are widely utilized and trusted in these core operations. Let TSUBAKI keep your site running, even in the harshest of conditions.



When desired material deposits are located at levels too deep or too expensive for surface mining techniques, the job must go underground. The desired material is extracted either via blasting or specially designed machines such as long wall miners and continuous miners. The material is then transported to the surface for further processing via various means including conveyors. Prior to being transported to the surface the material can be handled via shuttle cars, bridge conveyors and sized via feeder breakers.

In this extreme environment shock loads are high and chain and / or sprocket failures can take hours to fix, thus efficient and reliable extraction can make the difference between profits and losses. You need to get in and out as quickly as possible, which means maximum performance from every piece of equipment on your site.

For these harsh applications TSUBAKI offers their specially designed shuttle car chains, heavy duty chains, chains for continuous miners, and our One-Touch Inspection Door®.



Underground Mining

SHUTTLE CARS (Pg.35) / FACE & ROOF DRILLERS (Pg.37)
 CONTINUOUS MINERS,
 BRIDGE CONVEYORS (JIFFY CONVEYORS) (Pg.37)
 MINE VENTILATION (Pg.39)

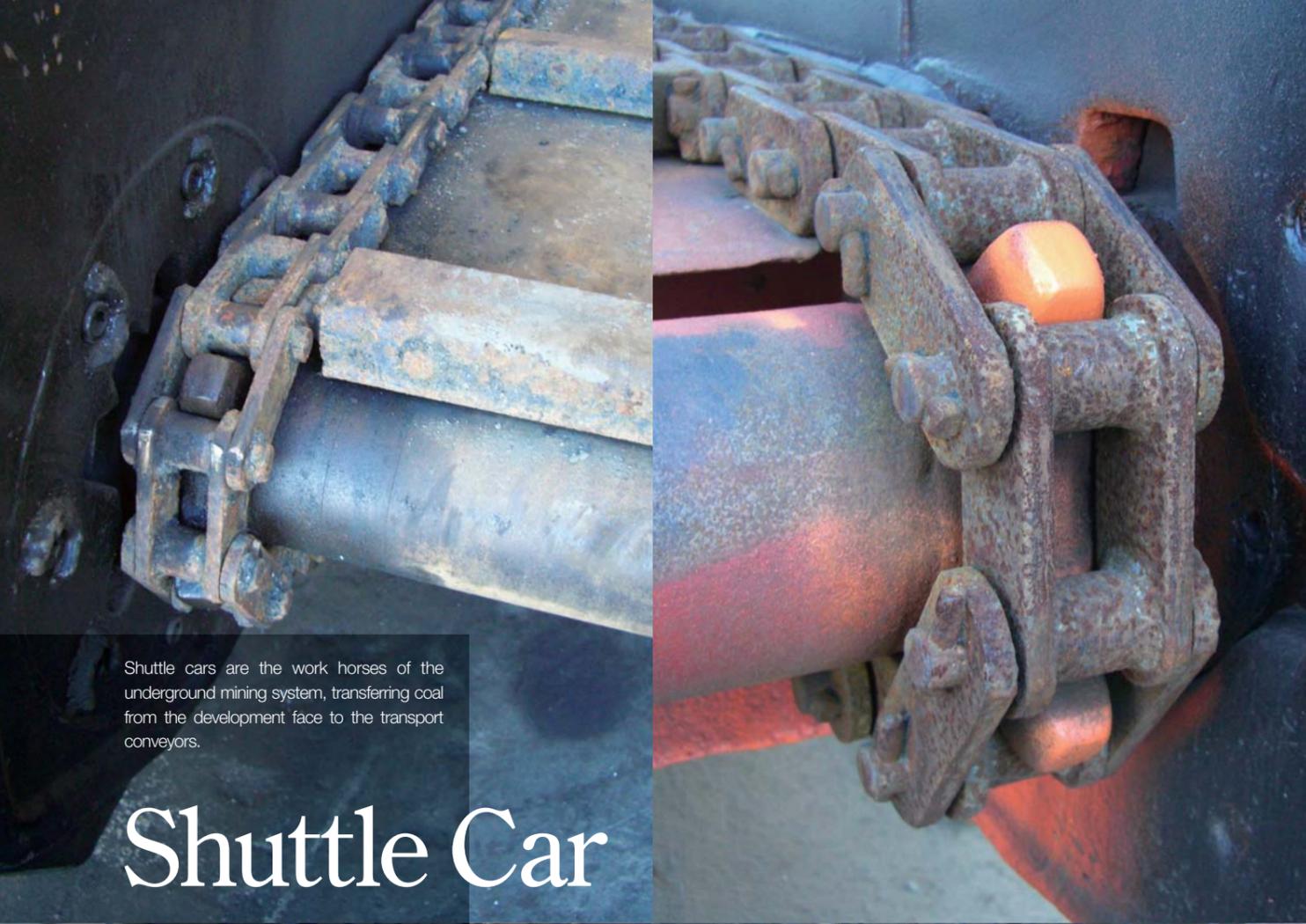


Underground Mining

Underground Mining

- 1 SHUTTLE CAR**
Shuttle Car Chain (Pg.36)
- 2 FACE/ROOF DRILLER**
Heavy Duty Drive Chain (Pg.20)
- 3 CONTINUOUS MINER**
Continuous Miner Chain (Pg.38)
- 4 BRIDGE CONVEYOR**
Bridge Conveyor Chain (Pg.38)
- 5 FEEDER BREAKER**
Feeder Breaker Chain (Pg.22)
- 6 MINE VENTILATION**
One-Touch Inspection Door (Pg.40)





Shuttle cars are the work horses of the underground mining system, transferring coal from the development face to the transport conveyors.

Shuttle Car

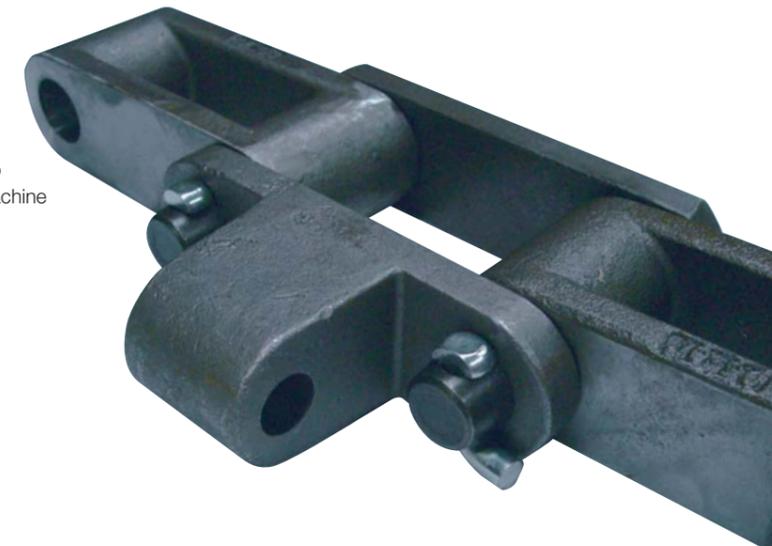


These machines load and unload hundreds of tons of coal per shift and operate around the clock in the harshest of environments. Critical to the output of the mining operations, operators demand the most of the equipment and components and Tsubaki has been a proven partner for decades and continues to lead the way in product materials and service.

TSUBAKI Shuttle Car Chain

Increase Your Shuttle Car's Dependability with Tsubaki's Rugged Shuttle Car Chain

As the world's leading manufacturer of rugged chains designed exclusively for the mining industry, Tsubaki manufactures the traditional 3.07" pitch and the latest and most common 4.1" pitch Super Shuttle Car Chain for use on new or existing shuttle cars. Tsubaki Shuttle Car Chain will provide two major benefits to your mining operations: Reduced maintenance costs and safer machine service.



Designed for the Optimum Wear Life

The two key design features of the Shuttle Car Chain are: all steel construction of specially selected materials and heat treatment for the optimum wear life. This specially designed product provides you with the increased values, savings, and performance for your Shuttle Car applications. For more details please contact your local Tsubaki representative.

Available Sizes
2.609"
3.075"
4.1"



Face & Roof Drilling



Face and Roof Drilling

Face and roof drillers are the first machines into newly opened areas to sure up the roof and walls and make it safe, and having TSUBAKI as a partner to get this job done is all that much easier. Whether you are drilling for the next blast or setting in roof bolts our products work in the under ground with you.

For this application TSUBAKI chains are specified by major OEMs and replacement parts specialists for performance and reliability, which makes your choice even easier. With special Heavy Duty Drive Chains (Pg.20) and surface coating (Pg.17,22) to prevent corrosion and failure the TSUBAKI chain line up is second to none.



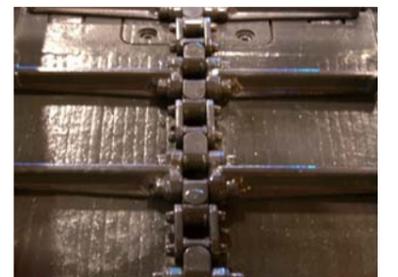
Continuous Miner & Bridge Conveyor (Jiffy Conveyor)



Continuous Miner

Continuous miners are large machines that work directly in the coal face, scraping material from the wall/ceiling with their giant teeth set on rotating steel drums. Being able to mine well over 30 tonnes of coal per minute, these machines are the heart of modern underground mining.

Working at the coal face is exactly what we are doing and TSUBAKI is currently developing a chain that will incorporate over 90 years of knowledge and success to bring to the market a high performance chain that will extract greater profits for your operation.



Bridge Conveyor

These units are the transfer systems of the continuous miners and operate at high speeds and discharge rates, so the chains used on these machines must be equal to the operations demands. That's why mine sites around the world specify TSUBAKI as their partner, as our name is synonymous with performance under pressure.

Available types of Bridge Chain.

- Standard Bridge Chain
- Heavy Duty Bridge Chain
- Extended Pin Bridge Chain

Please contact your local TSUBAKI representative for more details.



ONE-TOUCH INSPECTION DOOR®

Durable and trouble free
 Dust and rain tight
 Easy to open
 Easy to install

Patented Design >>



ONE-TOUCH INSPECTION DOOR is a dust and rain tight inspection and service door for conveyors, as well as processing and handling equipment. These pre-fabricated units are ready to-go for ease of use on the jobsite. Once in place, ONE-TOUCH INSPECTION DOOR allows for quick and simple inspection without the need for special tools: just lift the lever! No bolts to loosen and no covers to misplace. One touch is all it takes...it's that simple.

You can't build better access to your equipment. In-house fabrications are an expensive and labor-intensive proposition. They are clumsy and hard to open. Bolts are difficult to loosen, and easy to lose. That costs time and money. In-house fabrications just can't stand up to the rigors of most in-plant operations.

ONE-TOUCH INSPECTION DOOR® is a registered trademark of Tsubaki Conveyor of America, Inc.

EASY ACCESS TO YOUR EQUIPMENT

Put ONE-TOUCH INSPECTION DOOR® to work today!

ONE-TOUCH INSPECTION DOOR was specifically designed to last, indoors and out. In fact, it has a three part, **patented design**.

1. The framework is made of high quality mild steel or stainless steel to ensure durability and long service life.
2. The strong, long lasting hinges and self locking handles open and close easily.
3. The specially designed gaskets withstand temperatures of -70°C to 287°C (-95°F to 550°F) and ensure a tight fit against water and dust.

Best of all, ONE-TOUCH INSPECTION DOOR installs quickly to existing equipment, without detailed dimensioning or costly structural changes.

Select the door that is right for your operation. We offer Standard ONE-TOUCH INSPECTION DOORS in regular and high-neck styles in a variety of sizes. Standard doors are available in mild steel for general applications or stainless steel for extra corrosion resistance. Polyethylene, epichlorhydrin, or silicon rubber gaskets seal tight in temperatures from -70°C to 204°C (-95°F to 400°F). Large ONE-TOUCH INSPECTION DOORS are available in mild steel for general applications or stainless steel for high corrosion resistance. Large doors come with neoprene rubber or silicon rubber strip gaskets to meet your operating temperatures from -62°C to 287°C (-80°F to 550°F).

We also offer other sizes and materials on a made-to-order basis. Do you need a different size or extra handles? We can work with you on special requirements, including types of materials for casings and levers, unique sizes, as well as placement of hinges.

ONE-TOUCH INSPECTION DOORS® are produced by U.S. Tsubaki.



SAFETY FEATURES

LOCKOUT

A simple padlock can be used on any ONE-TOUCH INSPECTION DOOR to prevent entry to equipment.



PROTECTIVE SCREEN

A protective screen for visual inspection is available for immediate shipment for some styles (special order for other styles). Meets OSHA standards.



IT'S AS EASY AS 1 - 2 - 3!

Easy access is at your fingertips.



1. Position the door.

Place the door frame at the appropriate site and tack weld it into position. Then solidly weld the frame to the surface.



2. Cut the inside hole.

Open the door and carefully torch burn the center to create the access area.



3. Complete installation.

After the area has cooled, attach the lever, apply the gasket, and place the safety warning label in a prominent position.

Although TSUBAKI was born and built through development and innovation of chain technology almost 100 years ago, chain is definitely not our only world class product. To facilitate and support our many lines of high class and highly reliable chains, we here at TSUBAKI have gone the extra mile to independently design and manufacture our own line of top-grade carbon steel, alloy, and stainless steel sprockets for use with our chains in a wide variety of industries, including mining.

Also, as safety on the work site is of highest priority to TSUBAKI, we have developed our revolutionary series of Cam Clutches and Back Stops. Utilized in various applications and industries, the highly refined construction of these unassuming devices provides safety on the job site by allowing freewheeling or overrunning in one direction, and backstopping in the other, protecting both your equipment and employees.

Furthermore, for applications where linear motion is required, such as flop gates, opening and closing of roofs and doors, etc., TSUBAKI is proud to provide their full line-up of compact and self-contained power cylinders. Utilized in industries such as mining, power stations, ports, etc., these extremely sturdy units may even be operated from remote locations, further increasing the safety and efficiency of your site.



Drive It, Hold It, Lift It

Safety and Efficiency Enhancing Products

SPROCKETS (Pg.43) / CAM CLUTCHES, BACK STOPS (Pg.47)
 POWER CYLINDERS (Pg.51)



Drive It, Hold It, Lift It



To allow for reliability in the harsh environments of the mining industry, chains and sprockets must consistently work together smoothly, so buying them from the same source makes sense.

Our sprockets are built from top-grade carbon steel to offer long wear life, resist abrasion, and withstand heavy shock loads. Alloy and stainless steel sprockets are also available for extra corrosion resistance and food-grade applications.

Sprockets

You get long service life and reliable performance, turn after turn, time after time, even in the harshest of environments. And it's all part of the TSUBAKI Advantage: reliable premium products that don't just perform, they outperform the competition. All the while saving you money.

Sprocket Options

TSUBAKI can manufacture sprockets to meet your specific needs. The results are sprockets designed to maximize the life of your chain. Chains and sprockets must work together, so buying them from the same source makes sense. When chains and sprockets articulate correctly, the life of the chain is extended. That means long term savings and real value for your application. TSUBAKI sprockets can be made in a variety of grades of carbon, stainless, and alloy steels, as well as other metals. Since chain loadings are distributed over all engaged sprocket teeth, tooth breakage or distortion is not normally a problem. It is seldom necessary to use special high strength material. Diameter, pitch, and the number of strands of the sprocket determine the specific grade of carbon steel used. Many of our wide range of carbon steel sprockets are heat treated as a standard. For other sprockets, heat-treating can be specified as an option. Heat-treated carbon steel provides long wear life and resists abrasion.

The hardening process of small diameter, small pitch sprockets is usually a one step procedure using electrical induction heat-treating. Large diameter, large pitch sprockets are usually heat treated using direct flame hardening. These methods are used to provide high hardness at the wear areas of each tooth maintaining a ductile tooth core that is tough and resilient. The hubs and bore remain soft to permit reworking.

Split Construction

Split sprockets allow for easy maintenance of sprockets and machinery because the sprocket can be removed from the shaft without having to disassemble everything around the sprocket. Most TSUBAKI sprockets can be supplied as A, B or C Style (hub combinations) split sprockets. Split A Style sprockets (without hubs) can be supplied with bolt holes or mounting brackets to attach to shafts or drums. B and C style (with one or two hubs) are supplied with TSUBAKI's standard Type I or Type II split hubs, or custom Made-to-Order hubs. Split sprockets that cannot be welded are made with oversized hubs to allow for the bolts that hold the sprocket together. Welded split sprockets are manufactured with TSUBAKI's standard or custom split hubs.

Segmental Rim

Segmental rim sprockets and traction wheels are split rings (two or more pieces) that generally fasten by bolting to a standard hub body. Segmental rims are usually applied when ease of replacement is desired because the chain, shaft, and bearings do not have to be disturbed during sprocket replacement. When downtime is critical in an operation, consider segmental rim sprockets and traction wheels. Adjustable rim sprockets are also available from TSUBAKI. The adjustability of these sprockets allows for precise alignment of multiple sprockets along a shaft. Segmental rims are made of special steel plate material and may be heat treated (option) to high hardness levels to achieve long service life. Hardened teeth resist abrasive wear common in operation. Consult TSUBAKI Technical Support when material being conveyed is cement, ash, or other high hardness material. Special sprocket tooth hardness is necessary to resist wear from abrasive material.

Lightening Holes

Available on request for a wide variety of sprockets. Please contact your local Tsubakimoto representative for more details.

Mud Relief

In applications where material build up may be a problem, the bottom of the tooth pocket can be beveled on the side to allow the material to "squeeze" out. This reduction of contact area is not critical because the pressure on the bottom of the pocket is very light in horizontal conveyors. Other relief styles may be necessary for vertical conveyors.



TSUBAKI's Custom Bore Sprocket



Slots for Adjustment Bolts



Segmental Rim Sprocket

Adjustable Segmental Rim Sprockets



Quad Sprocket with Lightening Holes



Sprockets

Our Capabilities

- Made-to-Order capabilities:
Specializing in high quality Roller Chain and Engineering Class sprockets.
- Short lead times.
- Over 30 years of manufacturing experience.
- ISO 9001:2008 Registered.
- Heat treating: Induction, flame, carburizing/case hardening, etc.
* Effective hardness depth maintained in sprockets
- CNC machining for special machined tooth profiles.
- Robotic and submerged arc welding.
- Flame and laser cutting.
- Finishes including paint, powder coat, and black oxide.
Stress relieving sprockets
Balancing sprockets
Certificates (material/welding) available upon request
- Max Size Dia. : Solid = 2286mm (90")
Segments = 3200mm (126")



Engineering Class Sprockets

Engineering Options

- Split Sprockets
- Segmental Hub & Rims
- Lightening Holes
- Mud Relief
- Installation & operation manuals available.

Custom Products

- Solid, welded, and custom machined sprockets.
- Mounting, lightening, adjustment, and safety lockout holes.
- Split and Segmental Rim Sprockets.
- Mounting methods including straight bores, taper bush styles, drum mountings, splines, Power-Locks and other keyless devices, and much more.



Engineering Class Sprocket with Flat Sided Teeth

Materials and Coatings

- On request, we can manufacture any sprocket from alloy steels (4140, QT-400) materials.
- Coatings for anti-corrosion and anti-wear are available, including nickel, zinc, chrome, and others.

Popular Products

- Coal Reclaimer Sprockets
- Drilling Sprockets
- Shuttle Car Sprockets
- Feeder Breaker Sprockets
- Oil Field Multi-Strand Sprockets



Made-to-Order Split Sprocket

Engineering Class Sprocket Teeth Options

- All Engineering Class sprockets can be provided with "gap tooth" profiles in order to accommodate chain attachments.
- TSUBAKI's standard Engineering Class non-drive style sprockets are manufactured with "Low Profile" teeth. The teeth are not higher than the chain sidebar height to allow for chain attachments. Special flat profile teeth can be designed to clear attachments on long pitch sprockets.
- "High Profile", or "Long Tooth" sprockets are available on request. The sprocket teeth project out through the top of the chain.

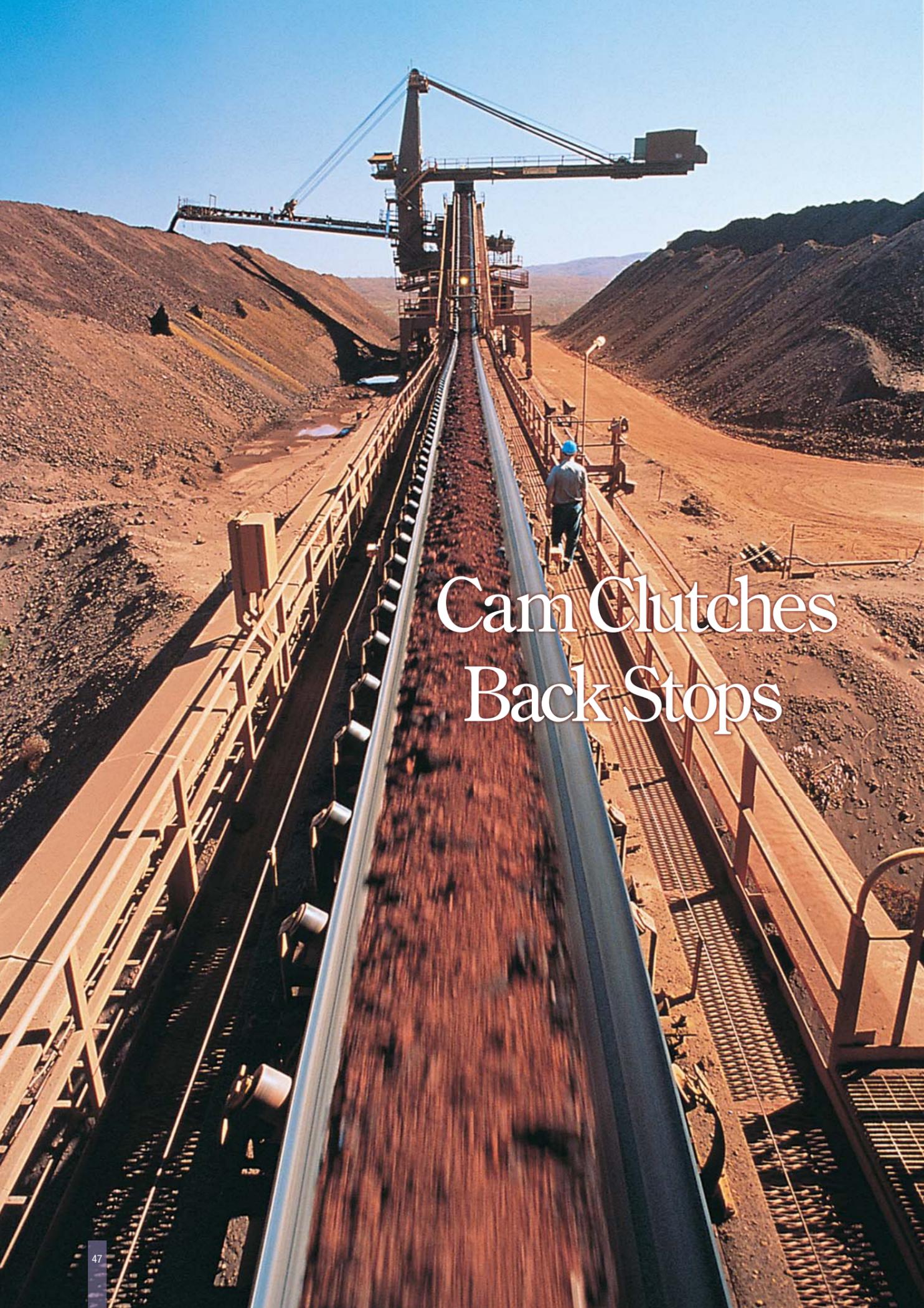


Shipping Methods

- Special shipping methods can be provided, such as custom crates and kits.



- Sprockets are produced by Tsubaki of Canada



Cam Clutches Back Stops

TSUBAKI Cam Clutches

Mining and conveying go hand in hand and in a business where transferring product up into CHPP facilities and stock pile reclaim pads is vital to your business, you want to know that you have the right equipment to hold the load to prevent the conveyor from running backwards.

TSUBAKI brings to the market a Mining series of Cam Clutches with a greater torque capacity size-for-size than other clutches, with a full complement of cams on our HS model which provides maximum load transmitting members per given diameter. The most versatile and complete cam selection there is.

Reliable, tough, field-proven. TSUBAKI precision formed cams are “non roll-over-type” with superior durability against shock loads. With cams and races always in contact, you get instantaneous hold reverse without backlash.

Used either on the head shaft pulley or on the motor intermediate shafts or connected to the system via couplings, TSUBAKI has the Cam Clutch to get the job done and handle the pressure of your mining site.



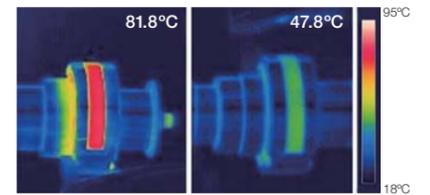
Typical Applications

The BS series Cam Clutch was developed for the inclined belt conveyor and bucket elevators used for the mining and other industries. This specialized Cam Clutch for back stopping applications features superior load withstanding and dust protection abilities.



Superior Cam Design

With the design of the TSUBAKI clutch you will be running with less energy and heat due to the cam design reducing the effects of friction compared to the roller ramp design. The image on the right shows the roller ramp with a much higher running temperature, this occurs due to the roller ramp design which allows for centrifugal forces of the rollers to increase the temperature of the clutch. This temperature increase causes premature failure of the oil seals and reduces the wear life which leads to clutch failure.



Roller Ramp Clutch Tsubaki Cam Clutch
** 1600 rpm at ambient temperature 19.2°C **

Special Design Features

1. Self Lubrication Function

When the inner race over runs, the rollers also rotate so the cam and roller cage orbit around the inner race outer circumference at a low speed. Grease in the cam and roller cage spreads completely throughout the insides of the Cam Clutch due to the orbital motion, thus maintaining good lubrication.

2. Sliding Speed Diminishing Function

The actual sliding speed of the cams and the inner race is reduced due to the orbital motion of the cam and roller cage, so the wear on the cams is diminished, and a longer overrunning wear life is possible.



Cam Clutches Back Stops

TSUBAKI Cam Clutch - Mining Line Up

MG Series

A proven field performer used on the intermediate shaft or pulley head on small discharge conveyors and transfer conveyor chutes.

This rugged model comes in either grease or oil filled configurations to suit your needs with series of different sealing and operating conditions.

Typical applications are small discharge conveyors and gearbox backstopping



BR Series

This unique product incorporates a very special design to lift off and no contact with the Inner and Outer race is possible when in the over running operation. This is due to centrifugal force and is the reason why this type of Cam Clutch is known as a *Lift Off Type*.

Suitable for "Overrunning high-speed inner race/low speed engaged outer race" or "Backstopping-high speed inner race overrunning"

Typical applications are dewatering pumps and filtration pumps



BS Series

A proven field performer for low speed high torque applications. TSUBAKI has developed a Cam Clutch that has Instantaneous Hold Back, Low Noise, Easier Maintenance, Longest Life and Compactness.

This product is ideally situated on the head shaft pulley to prevent any roll back of the conveyor if power failure or system failure occurs.

Typical applications are Incline and Decline conveyor assemblies



BS-HS Series

The next generation in Cam Clutch design that takes the best of all our designs and suits the applications with higher speeds then suited to our BS series and require greater loads. Our new design incorporates a Cam Cage with a full compliment of cams and bearing supported races to give optimum load capacities and running performance.

With a design that often allows for one size down selection compared to our BS series, this unit is the leading edge product.

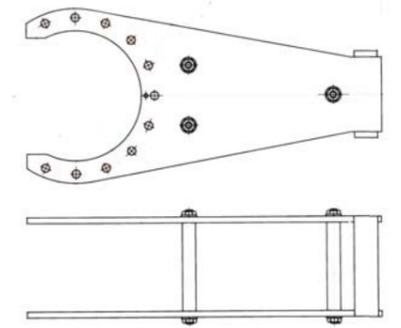
Typical applications are the new super conveyor systems with large loads and high speeds.



Cam Cage

Torque Arms for Cam Clutches

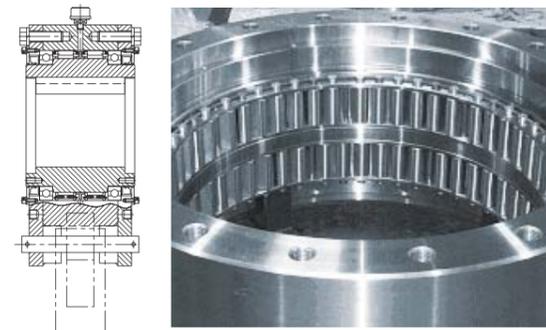
Torque arms stop the rotation of the outer race. A variety of torque arms are available for BS and other series of Cam Clutches. Please consult your local Tsubakimoto representative to find a appropriate torque arm for your application.



BS220TA - BS450TA

Special Design Versions Available

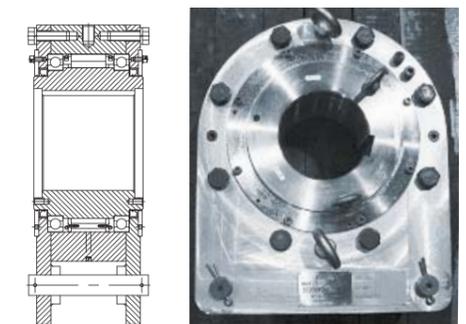
Double Camcage model
(BS160WHS~BS350WHS)
(BS160W~BS350W)



A Double Cam Cage is a standard specification in BS425HS and BS450HS.

If the conveyor needs higher torque capacity in Cam Clutch sizes BS85 to BS350 and BS160HS to BS350HS, this can be achieved by adding another cam cage to the design to provide the required backstop holding capacity. Please contact your local Tsubakimoto representative for more details.

BS-HS series MA model

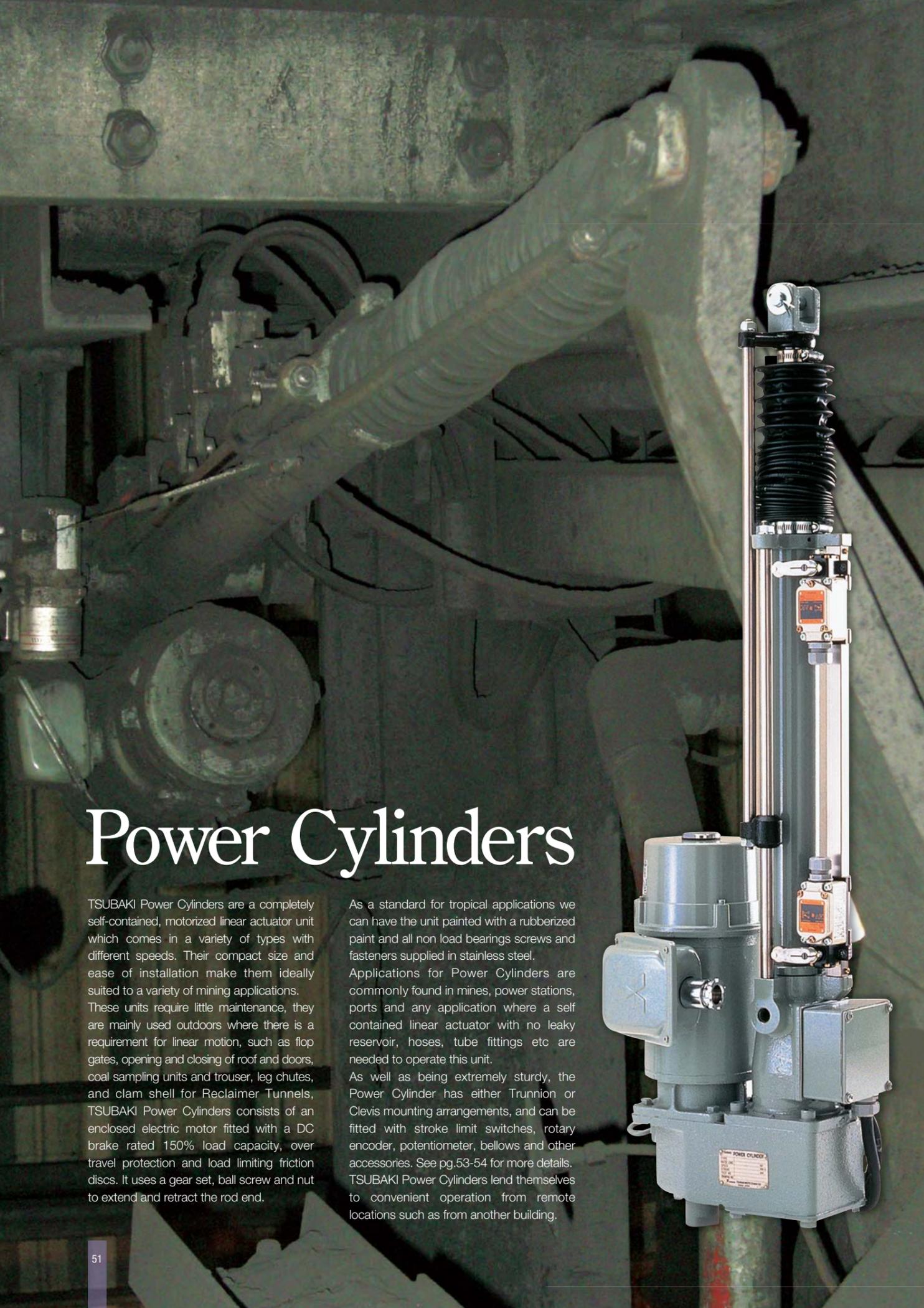


The special flanges mounted on both sides the MA type Cam Clutch allow for easy replacement of previous units. Also, to reduce costs, this Cam Clutch as been designed to be used with the previous torque arm as is.

Safety Covers

Safety covers for Cam Clutches are available. These safety covers protect the unit while preventing hands, clothes, etc, from getting entangled in the rotating portion of the Cam Clutch. The safety cover shown here is for the BS Cam Clutch.





Power Cylinders

TSUBAKI Power Cylinders are a completely self-contained, motorized linear actuator unit which comes in a variety of types with different speeds. Their compact size and ease of installation make them ideally suited to a variety of mining applications. These units require little maintenance, they are mainly used outdoors where there is a requirement for linear motion, such as flap gates, opening and closing of roof and doors, coal sampling units and trouser, leg chutes, and clam shell for Reclaimer Tunnels, TSUBAKI Power Cylinders consists of an enclosed electric motor fitted with a DC brake rated 150% load capacity, over travel protection and load limiting friction discs. It uses a gear set, ball screw and nut to extend and retract the rod end.

As a standard for tropical applications we can have the unit painted with a rubberized paint and all non load bearings screws and fasteners supplied in stainless steel. Applications for Power Cylinders are commonly found in mines, power stations, ports and any application where a self contained linear actuator with no leaky reservoir, hoses, tube fittings etc are needed to operate this unit. As well as being extremely sturdy, the Power Cylinder has either Trunnion or Clevis mounting arrangements, and can be fitted with stroke limit switches, rotary encoder, potentiometer, bellows and other accessories. See pg.53-54 for more details. TSUBAKI Power Cylinders lend themselves to convenient operation from remote locations such as from another building.



TSUBAKI POWER CYLINDERS

What are Power Cylinders ?

There are three categories of linear actuators: the hydraulic cylinder, the pneumatic cylinder, and the electro mechanical cylinder which is a POWER CYLINDER.

Following is a spec and cost comparison table for those three cylinders.

* One financial unit is equal to 1

	TSUBAKI Power Cylinder	Pneumatic Cylinder	Hydraulic Cylinder
Type	LPTB1000HSL	Bore size 200mm	Bore size 50mm
Thrust load	1,000kg	1,000kg	1,000kg
Stroke	300mm	300mm	300mm
Speed	120mm/sec	120mm/sec	120mm/sec
Cylinder cost		0.4	0.1
System cost	1*	2.5	1.5
Electricity expense		18	6
CO ₂ emission		18	6

This is depending on the conditions of operation and the applications.

Power Cylinder T Series

Thrust force: 2.45kN { 250kgf } ~ 313kN { 32000kgf }

This is a large thrust type Power Cylinder which can be used with AC power source. The Power Cylinder T series can be used across a wide range of applications such as mining, steel, cement, injection molding machines, liquid crystal and semiconductor device. This Power Cylinder can be used outdoors. (IP55) (Higher ratings available upon request)

Two Easy-to Select types

The T series has two types of safety mechanisms which are different from each other. The TB type incorporates a slipping clutch and electric Shock Relay. The TC type is equipped with a thrust detection limit switch, for press stopping.

Wide Variation

A wide range of models are available as standard according to application, thrust and speed. Thrust force can be selected from a range of 2.45kN { 250kgf } to 313kN { 32000kgf } and speed can be selected in a range from 10mm/sec to 120mm/sec.

Reliable Operation

All models adopt a highly efficient ball screw, silent gear, and highly reliable brake motor. All series incorporate a highly reliable safety device which is effective against overload.

Abundance of Options

The stroke adjusting limit switch includes the external and built-in type, and the stroke sensor includes the potentiometer, the rotary encoder, or both.

Endrod Damper

These are an optional unit designed to take vibration away from cylinders.



Power Cylinders

HIGH PERFORMANCE LINEAR ACTUATORS OFFERING EFFICIENT, CLEAN AND QUIET DRIVE..... ENVIRONMENTAL CONSCIOUSNESS

Easy and Economical to Combine with your Equipment

The mechanical type motor driven actuator reduces the need for compressors, piping valves or hydraulic units, making the equipment simpler and more economical. The device can be treated as a motor and allows for simple remote control. Furthermore, the simple construction and long life grease provide for more economical maintenance.

Ready for Outdoor Use (IP55, higher ratings available upon request)

T series, G series, Ultra Heavy Duty series, F series, Battery series

With Electromagnetic Brake Motor

T series, G series, Ultra Heavy Duty series

Battery Powered Actuator

DC motor type
Battery series, F series

Multi Type Actuator

Available for synchronized operation with one motor Multi series.



Jack Type

(Ball screw or trapezoidal screw)
Lini-power jack available by a separate catalog
1.96-980KN
(0.2-100tf)



Internal Position Sensor; Limit Switch Type

Available at your choice for signaling the position of the stroke.
T series, G series, F series

Potentiometer (Analog) or Rotary (Digital) Encoder

Available at your choice for remote control operation.
T series, G series, Ultra Heavy Duty series

Rear Mounting

Trunnion Mount
Clevis Mount
(not available with K2-K4-P-R)

Rod Anti-Rotation Device

Available as made-to-order. If the actuator rod end is free or connected to wire rope, an anti-rotation device for the rod is needed.

T series, G series, Ultra Heavy Duty series

Three Phase Motor with Brake

For precise positioning, and rigid load holding.

T series, G series, Ultra Heavy Duty series

Mounting Type and an End Fitting

Clevis or trunnion mount and I type end fitting are available for T series, G series, Ultra Heavy Duty series
F series -clevis mount only.

Bellows

To be used in dusty areas when needed.
T series, G series, Ultra Heavy Duty series, F series

External Limit Switches

Available at your choice for adjusting the stroke of the actuator
T series, G series, Ultra Heavy Duty series, F series

Press Loaded Stopping Device

For safety and thrust sensing. A combination of disk springs and limit switches is used to provide thrust sensing and press loaded stopping.
T series LPTC type and, G series LPGC type, Battery series



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General Customer Inquiry Sheet

Please circle of fill in the relevant information for your specific enquiry.

Type of Product's	Drive Chain	Conveyor Chain	One-Touch Inspection Door	Cam Clutch / Back Stop	Power Cylinder	Other		
Name of Product's								
Product Application's	Drill Rig	Rotary Breaker	Feeder Breaker	Reclaimer	CHPP	Road Grader	Shovel	Stock Pile Conveyor
	Stacker	Shuttle Car	Face / Roof Driller	Continuous Miner	Under Cutter	Material Conveyance	Other ()	
Full Name	Title and Position							
Company Name	OEM FC							
Company Address								
Contact Info.	Tel:	Fax:	E-mail:					
	Company Home Page:							
Do You Currently Purchase or Use Tsubakimoto Products?	Yes / No	Please Describe Your Firm's Business / Products						
Q1. Conditions of Use (please circle or fill out all appropriate fields)								
Chain Type	Drive Chain	Conveyor Chain: what type of items will be conveyed?						
	Motor:	HP kW	Speed: r/min	Chain Tension:	No. of Links:			
	Ambient Temp.:	°C / °F to	°C / °F	Operation Type:	Continuous Forward & Reverse	Intermittent Other ()		
	Environment	Normal	Water	Acid	Alkali	Metallic Dust	Other ()	Operation Time h/d
Sprocket	Drive () T	Drive Boss Style: A B C	Driven () T	Center Distance	mm/inch			
Cam Clutch/Back Stop Installed to main shaft or reducer ?	Motor:	HP kW	Speed: r/min	Shaft Bore: Ø	Max Torque at Clutch:			
	Ambient Temp.:	°C / °F to	°C / °F	Exposed to:	Key Size:			
	Quantity Required:	Power Source:	Electric	Diesel	Petrol	Other ()		
Power Cylinder (Linear Actuator)	What type of linear actuator are you currently using?			Pneumatic	Hydraulic	Jack	Other ()	
	Name of Equipment:	Stroke:	mm/inch	Speed:	mm/sec inch/sec			
	Working Load: Push Pull	kgf/Lbs kgf/Lbs	Fitting Method:	Trunnion	Clevis	Ambient Temp.:	°C / °F to	°C / °F
	Environment: Moisture / Gas / Dust	Place to be Installed:	Indoors	Outdoors	Power: Phase	Frequency	V Hz	
	Frequency of Operation:	times/min times/day	Remarks:	Optional Parts Required:				

Additional Information (please provide any additional information regarding the above products that you deem necessary.)

Q2. Please provide a layout/photos of equipment, etc., on a separate sheet if possible.

Q3. Additional Comments or Questions

For Safe Use

⚠ WARNING Obey the following points in order to prevent hazardous situations.

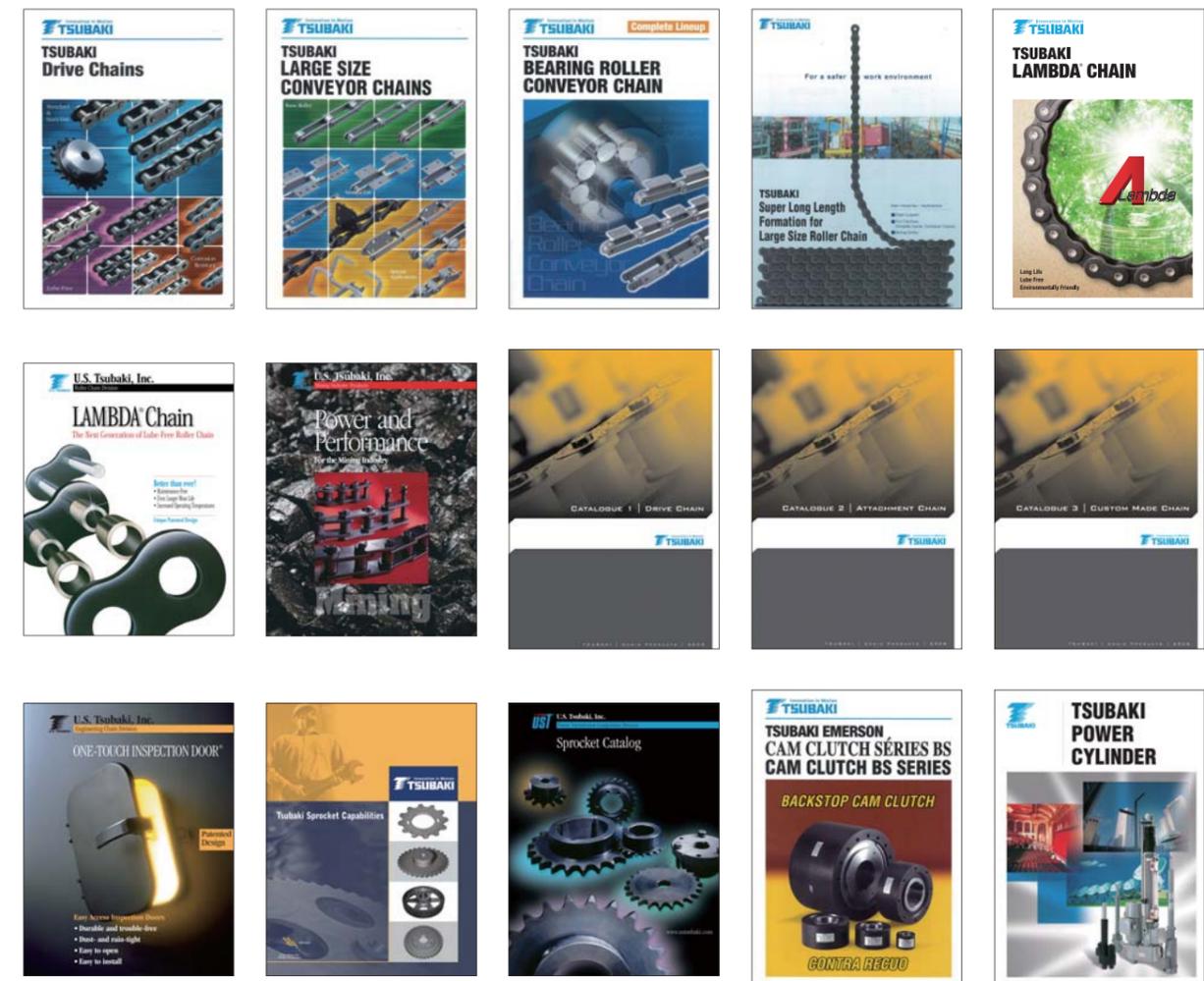
- Do not use chains and accessories (accessories and parts) for anything other than their original purpose.
- Never perform additional processing on the chain.
 - Do not anneal the various parts of the chain.
 - Do not clean the chain with either acid or alkali, as they may cause cracking.
 - Do not electroplate the chain or its parts, as they may cause cracking due to hydrogen embrittlement.
 - Do not weld the chain, as the heat may cause cracking or a reduction in strength.
 - When heating or cutting the chain with a torch, remove the links immediately adjacent and do not use them again.
- When there is need to replace a lost or damaged portion of a chain, always replace the whole chain with a new product rather than replacing only the lost or damaged portion.
- When using a chain on suspension equipment, establish a safety manual, etc., and strictly prevent entry to the area directly below the suspended object.
- Always employ hazard protection devices for the chain and sprocket (safety cover, etc.).
- If a substance that can cause embrittlement cracking (acid, strong alkali, battery fluid, etc.) adheres to the chain, stop using the chain immediately and replace it with a new one.
- During installation, removal, maintenance inspection and lubrication of the chain:
 - Perform the operation according to the instruction manual or this catalog.
 - Always turn off the power switch to the device and make sure that it cannot be turned on accidentally.
 - Anchor the chain and parts so that they cannot move freely.
 - Perform cutting and connecting procedures properly using a press or other special tool.
 - Wear clothing and employ protective devices that are appropriate to the job (safety glasses, gloves, safety shoes, etc.).
 - Only allow experienced personnel to perform chain replacement procedures.
- In order to prevent hazards, damage, or injury when cutting a Leaf Chain, always install hazard protection devices (safety device, etc.) on the suspension equipment employing the Leaf Chain.

⚠ CAUTION Obey the following points in order to prevent accidents.

- Only handle the chain after thoroughly understanding its structure and specifications.
- When installing a chain, inspect it in advance to confirm that it has not been damaged in transport.
- Be sure to perform regular maintenance inspections on the chain and sprocket.
- Chain strength varies according to manufacturer. When selecting a chain based on a Tsubaki catalog, always use the corresponding Tsubaki product.
- Minimum tensile strength refers to the failure point when the corresponding load is applied to the chain once and does not refer to the allowable operational load.

Additional Publications from Tsubakimoto Chain Co.

The following Tsubakimoto Chain Co. product catalogs are also available with more detailed information, such as measurements, etc., for the chains, sprockets, back stops and power cylinders listed in this brochure. Note that not all available publications are listed below, and that not all publications will be available in all regions. Please contact your local Tsubakimoto representative for more details.



TSUBAKI would like to thank the following OEM for their kind photographic contributions to this brochure.

ONTRAK Engineering
 493 Boundary Rd, Maraylya, NSW, 2765
 Australia
www.ontrakengineering.com

Warranty

1. LIMITED WARRANTY

Products manufactured by Seller: (a) conform to the design and specifications, if any, expressly agreed to in writing by Seller; and (b) are free of defects in workmanship and materials at the time of shipment. The warranties set forth in the preceding sentence are exclusive of all other warranties, express or implied, and extend only to Buyer and to no other person. ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY EXCLUDED.

2. NON-RELIANCE

Buyer is not relying upon any advice, representations or warranties (except the warranties expressly set forth above) of Seller, or upon Seller's skill or judgment regarding the Seller's products. Buyer is solely responsible for the design and specifications of the products, including without limitation, the determination of suitability for Buyer's application of the products.

3. CLAIMS

- (a) Any claim relating to quantity or type shall be made to Seller in writing within 7 days after receipt of the products; any such claim made thereafter shall be barred.
- (b) Any claim under the above-stated Limited Warranty shall be made to Seller in writing within three (3) months after receipt of the products; any such claim made thereafter shall be barred.
- (c) Seller's liability for breach of warranty or otherwise is limited to repair or replacement, at Seller's option, of non-conforming or defective products. Buyer waives all other remedies, including, but not limited to, all rights to consequential, special or

incidental damages, including, but not limited to, damages resulting from personal injury, death or damage to or loss of use of property.

- (d) Repair, alteration, neglect or misuse of the products shall void all applicable warranties.

4. INDEMNIFICATION

Buyer will indemnify, defend and hold Seller harmless from all loss, liability, damage and expense, including attorneys' fees, arising out of any claim (a) for infringement of any patent, trademark, copyright, misappropriation of trade secrets, unfair competition or similar charge by any products supplied by Seller in accordance with the design or specifications furnished by Buyer, or (b) arising out of or connected with the products or any items into which the products are incorporated, including, but not limited to, any claim for product liability (whether or not based on negligence or strict liability of Seller), breach of warranty, breach of contract or otherwise.

5. ENTIRE AGREEMENT

These terms and conditions constitute the entire agreement between Buyer and Seller and supersede any inconsistent terms and conditions, whether contained in Buyer's purchase order or otherwise, and whether made heretofore or hereafter. No statement or writing subsequent to the date hereof which purports to modify or add to the terms and conditions hereof shall be binding unless consented to in writing, which makes specific reference hereto, and which has been signed by the party against which enforcement thereof is sought. Seller reserves the right to change these terms and conditions without prior notice.