



# MillSafe<sup>®</sup> Solutions Product Catalogue

Our Innovation. Your Advantage.



# What We Do

We are a leader in the design, manufacture and supply of mill liners for primary and secondary applications in the global mineral processing industry.

Bradken's focus is to innovate and provide our customers with a high level of engineered solutions that improve mill safety, optimisation and performance.



## Registered Trademarks.

All company names, logos, product names, and identifying marks used throughout this publication are the property of their respective trademark owners. They are used for descriptive purposes only and are protected by the relevant laws of the countries in which the trademarks are registered.



## We'll work with you to understand your operational challenges and provide the smartest solutions with:



### Experience and Knowledge

With over 100 years' experience in the foundry business and with world-class manufacturing facilities located globally, Bradken has the knowledge, expertise and capability to produce fully machined cast iron and steel products from a mass of 0.5 kg (1.1 lbs) up to and over 25,000 kg (65,000 lbs).



### Safety

Bradken products provide comprehensive safety features to reduce risk during installation, operation and maintenance.



### Reducing Costs and Increasing Productivity

Bradken products have been designed and engineered to optimise operational performance and aim to provide our customers with lowered Total Cost of Ownership (TCO).



### Innovation and Design

Leveraging our expertise and experience in wear materials with our innovative technical teams, Bradken can supply unique and tailored packages to deliver high performing solutions.



### Support Services

Global mining and resources companies partner with Bradken because they know we will leverage our extensive design, engineering and in-field support services to solve their specific operational challenges.



### Local Sales and Support Networks

Bradken's global sales and distribution networks supply the world's major mining and industrial regions.



### Sustainability and Environment

Bradken is committed to reducing its impact on the environment through a comprehensive and targeted sustainability plan.



### Equal Opportunities

We value diversity and inclusion in the workplace. We seek to recruit, develop and retain the most talented people from diverse cultures, perspectives, skills and experiences within our workforce.

# Product Range

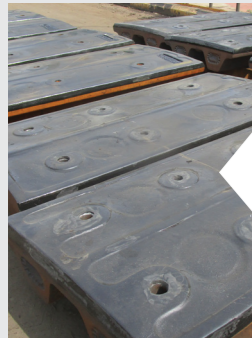
Bradken has developed a range of solutions known as MillSafe®. These solutions improve both the safety and efficiency of the reline process in SAG/AG/Ball mills.

[Read more online here](#)



## MillSafe® Bolting

Bradken's MillSafe® Bolting System is a safer and more efficient solution for liner installation and removal for AG/SAG/Ball mills, removing people from hazardous zones within your grinding mill. Install your liners by bolting them from outside your grinding mill.



## MillSafe® Backing

Bradken's MillSafe® Backing is a replacement for grinding mill rubber sheeting. Designed to remove costly maintenance delays to repair damaged rubber sheeting on grinding mills. Providing a safer relining environment.



## MillSafe® Combined Corner Liners

Bradken's innovative Combined Corner Liner design improves reline safety, significantly reduces reline times and part inventory.



## MillSafe® Liner Location Stripes

Bradken's MillSafe® Liner Location Stripes provide visual guidance to deliver a safer and more efficient liner install.

## Our Vision

### Safety

Develop improved systems through design and technology to remove people from hazardous zones during mill relining.

### Productivity

Implementing smart MillSafe® solutions to reduce reline times and improve equipment availability.

# MillSafe® Bolting

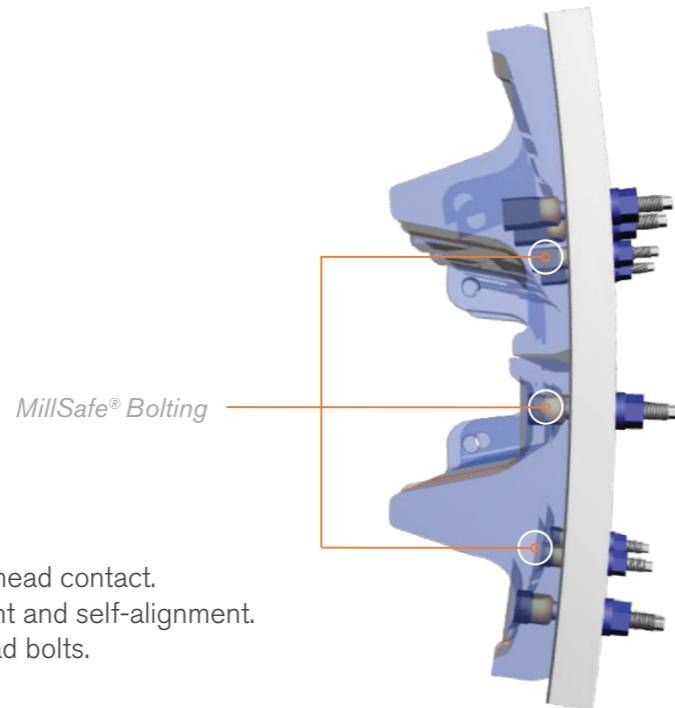
Bradken's MillSafe® Bolting System is a safer and more efficient solution for liner installation and removal for AG/SAG/Ball mills, removing people from hazardous zones within your grinding mill. Install your liners by bolting them from outside your grinding mill.

## METRIC

- M36
- M42
- M48
- M52

## IMPERIAL

- 1.5"
- 1.75"
- 2.0"



### The MillSafe® Bolting System:

- Comes in metric and imperial size of bolts.
- Uses the Bradken Spherical Head design for maximum head contact.
- Has positive bolt head seating with freedom of movement and self-alignment.
- Eliminates point and line loading over traditional oval head bolts.
- Fully interchangeable with spherical forged bolt.

### MillSafe® Bolting main features:



#### Superior Design

The MillSafe® Bolting System uses the Bradken Spherical Head Bolt design to provide optimal contact between bolt and casting. The bolt hole design also accommodates for minor misalignment between bolt, liner and mill shell.



#### Reducing Cost and Increasing Productivity

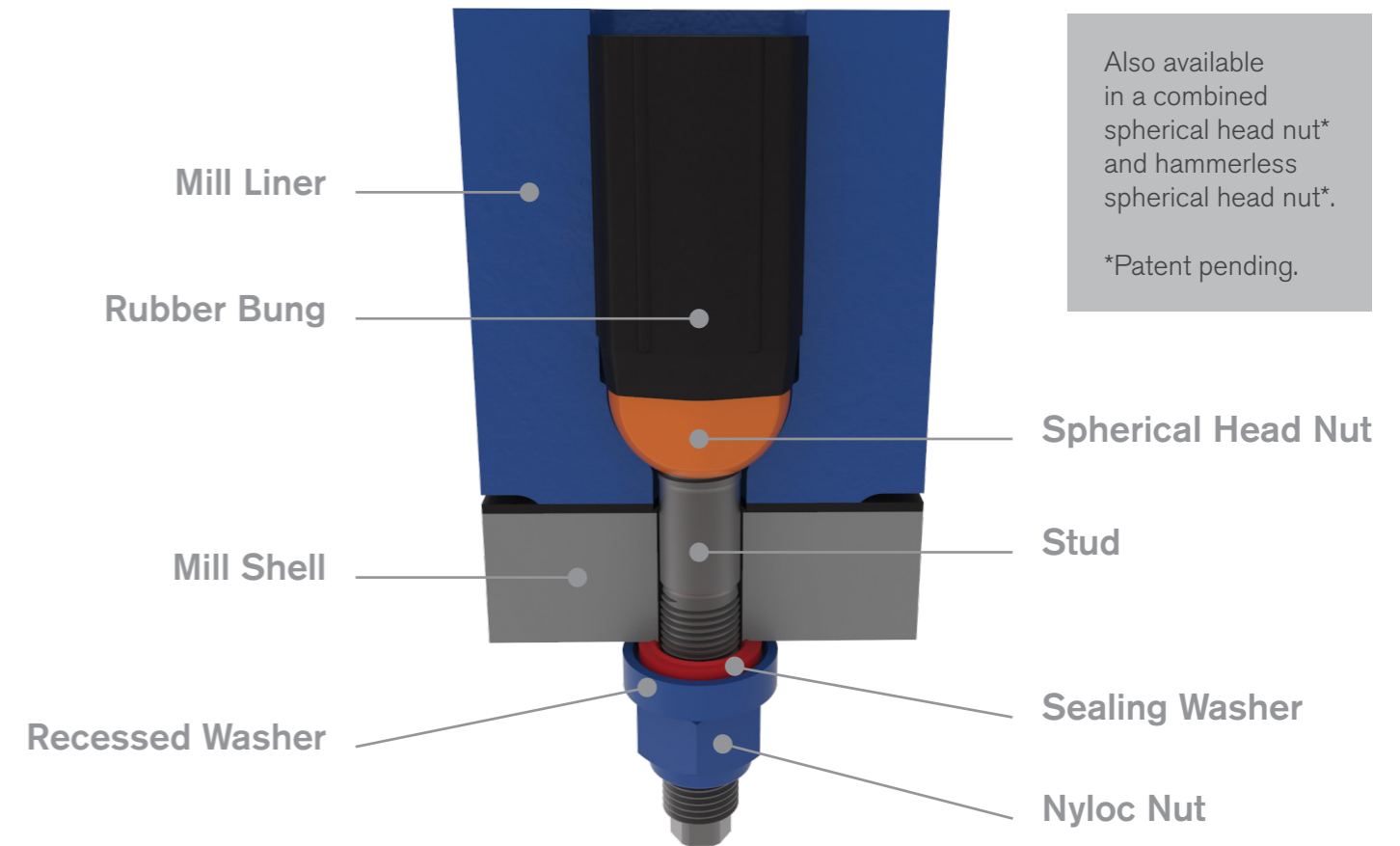
The Bolting System combined with Liner Location Stripes (LLS) delivers a safer and more efficient liner installation and removal, allowing liners to easily separate from the mill shell once the bolt studs are removed from the outside.



#### Improved Safety

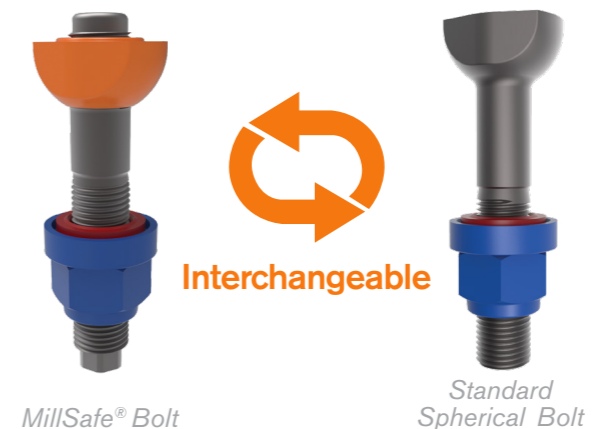
Improved safety by bolting liners from outside the mill and removing people from the dangerous zones inside a grinding mill during the mill relining process.

# MillSafe® Bolting Assembly



## MillSafe® Bolts and Fully Forged Bolts

The Bradken MillSafe® Bolting system adopts the common Bradken Spherical head design, therefore is interchangeable with the fully forged spherical head liner bolts, and no requirement for liner change.



MillSafe® Bolt

Standard Spherical Bolt

# MillSafe® Solutions Bolting Application

Liner positioning is improved with Bradken's MillSafe® Liner Location Stripes (LLS), that aid the mill reline operator to efficiently align and position the mill liner in the correct location on the mill shell wall.

Reline safety is improved with no personnel required near the liners during installation.

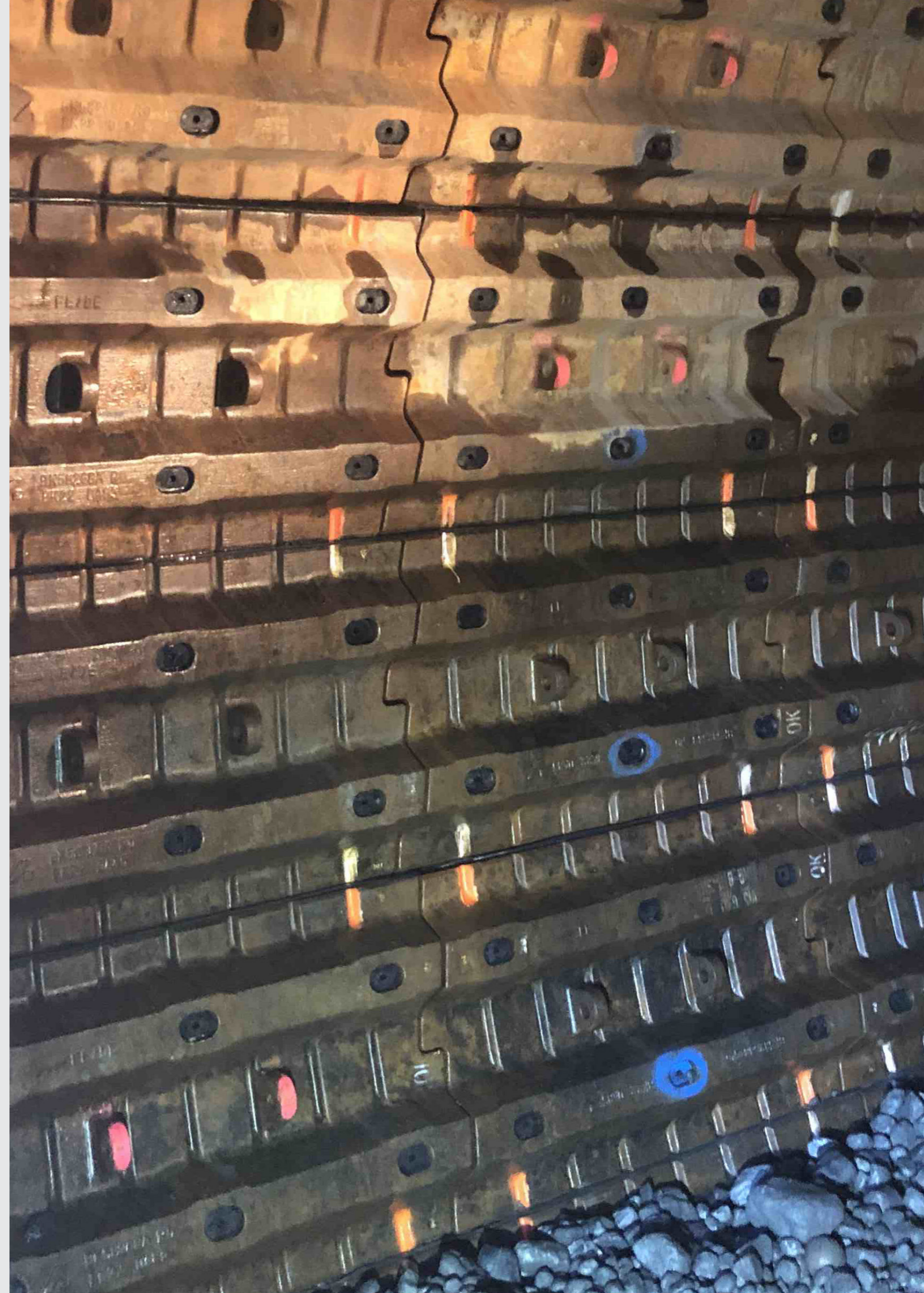
The liners are secured into position by inserting the bolt stud through the mill shell from the outside and into the captive spherical head nut, secured in the mill liner & tightened using the hex head on the end of the stud.

The Bradken Bolting installation procedure is followed to apply the lubricant and install the rubber sealing washer, recessed hardened steel washer and Nyloc nut.

The bolt is tightened to the correct load, specific to the grade, size of bolt used and lubricant as specified in the bolting installation procedure.

Normal re-torque is completed as per the Bradken bolt installation procedure.

Liner removal is made easy by loosening the bolt stud from the head nut using the hex head on the end of the bolt, removing the bolt stud from outside the mill, this will allow the liner to fall off the mill shell wall and reduce the need to punch in liner bolts.



# MillSafe® Bolting Products



## Stud

Complete with installation Hex drive

### Part Numbers

#### METRIC

- MSSM36X250LC8.8
- MSSM42X250LC8.8
- MSSM48X250LC8.8
- MSSM52X250LC8.8

#### IMPERIAL

- MSS1.5X250SG5
- MSS1.75X250SG5
- MSS12X250SG5

### NAMING DESCRIPTION

**MSS** = MILLSAFE® STUD  
**I** = IMPERIAL  
**M** = METRIC  
**2"** = BOLT DIA  
**X250** = SHANK LENGTH  
**S** = SHORT HEAD  
**(L** = LONG HEAD)  
**G5** = STUD GRADE  
**C8.8** = STUD GRADE



## Bolt (Fully Forged)

### Part Numbers

#### METRIC

- MSBM36X250LC8.8
- MSBM42X250LC8.8
- MSBM48X250LC8.8
- MSBM52X250LC8.8

#### IMPERIAL

- MSB1.5X250SG5
- MSB1.75X250SG5
- MSB12X250SG5

### NAMING DESCRIPTION

**MSB** = MILLSAFE® BOLT  
**I** = IMPERIAL  
**M** = METRIC  
**2"** = BOLT DIA  
**X250** = SHANK LENGTH  
**G5** = STUD GRADE  
**C8.8** = STUD GRADE



## Spherical Head Nut

### Part Numbers

#### METRIC

- MSNSNM36
- MSNSNM42
- MSNSNM48
- MSNSNM52

#### IMPERIAL

- MSNSNI1.5
- MSNSNI1.75
- MSNSNI2

### NAMING DESCRIPTION

**MSN** = MILLSAFE® SPHERICAL HEAD NUT  
**SN** = SPHERICAL NYLOC  
**I** = IMPERIAL  
**M** = METRIC  
**2"** = THREAD DIAMETER



## Rubber Bung

### Part Numbers

#### METRIC

- MSRBM36H100
- MSRBM42H100
- MSRBM48H100
- MSRBM52H100

#### IMPERIAL

- MSRBI1.5H100
- MSRBI1.75H100
- MSRBI2H100

### NAMING DESCRIPTION

**MSRB** = MILLSAFE® RUBBER BUNG  
**I** = IMPERIAL  
**M** = METRIC  
**2"** = THREAD DIAMETER  
**H100** = BUNG HEIGHT



## Combined Spherical Head Nut\*

### Part Numbers

#### METRIC

- MSCNM36H50
- MSCNM42H50
- MSCNM48H50
- MSCNM52H50

#### IMPERIAL

- MSCNI1.5H50
- MSCNI1.75H50
- MSCNI2H50

### NAMING DESCRIPTION

**MSCN** = MILLSAFE® SPHERICAL COMBINED NUT  
**I** = IMPERIAL  
**M** = METRIC  
**2"** = THREAD DIAMETER  
**H** = BUNG HEIGHT

\*Patent pending.



## Hammerless Spherical Head Nut\*

### Part Numbers

#### METRIC

- MSLNM36H50
- MSLNM42H50
- MSLNM48H50
- MSLNM52H50

#### IMPERIAL

- MSLNI1.5H50
- MSLNI1.75H50
- MSLNI2H50

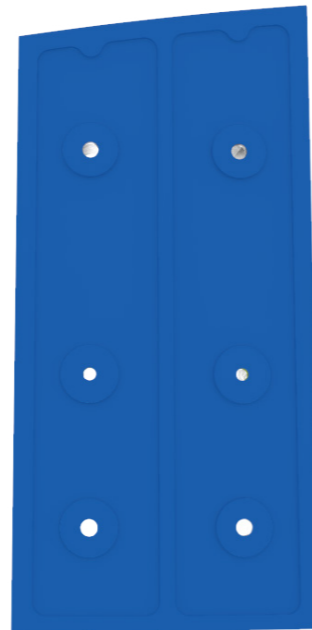
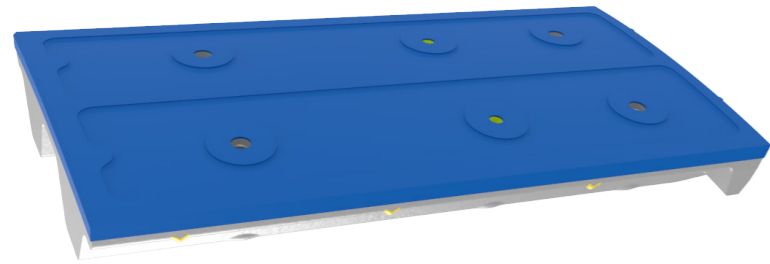
### NAMING DESCRIPTION

**MSLN** = MILLSAFE® SPHERICAL LOCK NUT  
**I** = IMPERIAL  
**M** = METRIC  
**2"** = THREAD DIAMETER  
**H** = BUNG HEIGHT

\*Patent pending.

# MillSafe® Backing

Bradken's MillSafe® Backing is a replacement for grinding mill rubber sheeting. Designed to remove costly maintenance delays to repair damaged rubber sheeting on grinding mills. Providing a safer relining environment.



## The MillSafe® Backing System:

- Chemically bonded to the fit-face and side-faces of the mill liners and provides an even mating surface and support for accurate liner installation.
- Eliminates trapped concentrate under rubber sheet, resulting in liner and bolt failures.
- New liners are always installed onto a clean steel mill shell.
- Excludes the need to place rubber strips for liner spacing, providing even vertical spacing for liner alignment.

## MillSafe® Backing main features:



### Reliability and Quality

The MillSafe® Backing provides a solvent free, low viscosity elastomer backing material with outstanding abrasion resistance for grinding mill liners. The MillSafe® Backing application maintains a chemical grip throughout its total life cycle.



### Reducing Cost and Increasing Productivity

MillSafe® Backing eliminates costly unscheduled downtime and site maintenance costs for repair of rubber strip and sheet backing material that has dislodged from the liners or mill shell and can increase point loading during installation.



### Material Application

MillSafe® Backing is applied to the cast steel liners using a highly accurate spray dispenser delivering a consistent and even application including robotic technology. The MillSafe® Backing application quality control is verified using an ultrasonics thickness gauge and robotic scanning.



## Focus on Our Customers

Bradken MillSafe® Backing can be applied to the fit face of all cast steel mill liners to ensure an accurate and even 6 mm seating surface during liner installation onto the internal grinding mill shell wall.

The MillSafe® Backing application provides superior bonding qualities to prevent fork lift damage to the liner backing material during transport to the mine site and around the mill deck.

MillSafe® Backing has eliminated costly unscheduled downtime and site maintenance costs for the installation or repair of rubber strip and sheet backing material that has dislodged from the liners before liner installation.



## Application

Bradken MillSafe® Backing is applied to the cast steel liners using a highly accurate spray dispenser machine with a consistent even application including robotic technology.

The elastomer polymer material has superior bonding characteristics to adhere to the clean cast steel surface and maintain its chemical grip throughout its total life cycle.

The MillSafe® Backing application quality control is measured using an ultrasonics thickness gauge and scanning technology.



Bradken's MillSafe® Backing can be removed safely from the castings using high pressure water blasting in a controlled environment once returned from the mine site.

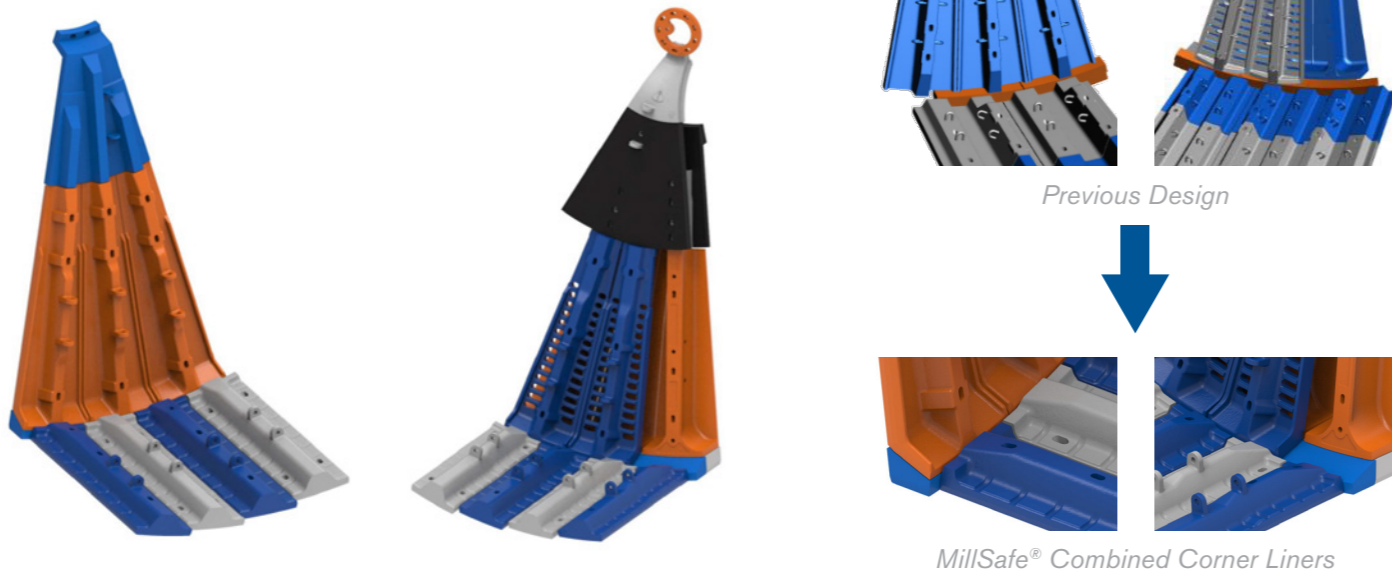
The worn castings can be fully recycled at the foundry and remanufactured.

The MillSafe® Backing waste material is safe to be used as land fill waste or recycled as filler in other manufacturing processes, which we are investigating.

The MillSafe® Backing application has been CSIRO certified to AS/NZS 4020:2005.

# MillSafe® Combined Corner Liners

Bradken's innovative Combined Corner Liner design improves reline safety, significantly reduces reline times and part inventory.



## The MillSafe® Combined Corner Liner System:

- Eliminate loose steel corner liners.
- Remove all risk of injury to reline staff from loose steel corner liners.
- Improve reline time with fewer parts required at major relines.
- Reduce or transfer liner mass over a full mill liner set.
- Protect corner of the mill shell.
- Install shell liners or head liners independently of each other.
- A prerequisite for autonomous relining.

## MillSafe® Combined Corner Liner main features:



### Reliability and Quality

MillSafe® Combined Corner Liners are an innovative design that prevent steel ball entrapment, leading to a reduction in potential safety hazards and liner stress or failure.



### Productivity

MillSafe® Combined Corner Liners provide a reduction in the number of liners required, lowering the reline time, and the ability to reduce or transfer mass over a set of liners.



### Safety

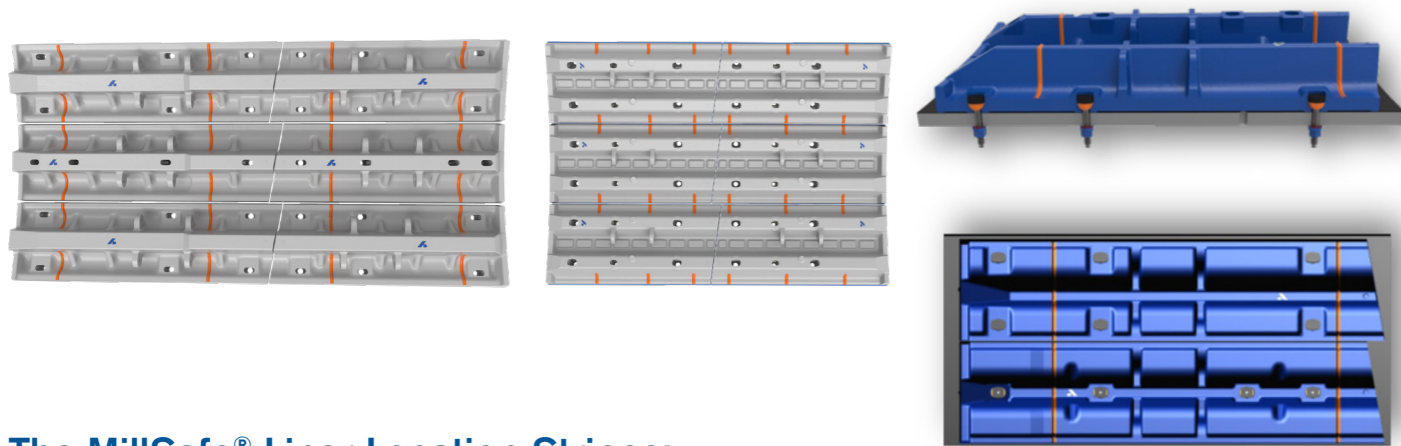
MillSafe® Combined Corner Liners improve the manual handling process through the removal of heavy steel corner liners.





# MillSafe® Liner Location Stripes

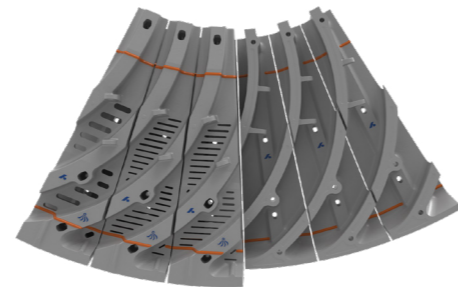
Bradken's MillSafe® Liner Location Stripes provide visual guidance to deliver a safer and more efficient liner install.



## The MillSafe® Liner Location Stripes:

When Bradken mill liners are being placed, the use of MillSafe® Liner Location Stripes enables accurate liner positioning when installing bolting.

- Visible alignment identification.
- Line precision ensured during the casting process.
- Aids the mill reline machine operator to align and position the liner in the correct location on the mill shell wall.
- Enables removal of people from hazardous zones.



MillSafe® Liner Location Stripes

## MillSafe® Liner Location Stripes main features:



### Design

Liner Location Stripes are incorporated into liner casting, to ensure consistency and precision.



### Reducing Cost and Increasing Productivity

Reduces reline time due to alignment accuracy which improves equipment availability.

Stripes enable precise liner placement, resulting in accurate bolt hole alignment.



### Improved Safety

Eliminates the need for people to be in hazardous zones within the mill during the reline process.

Enables semi-autonomous install and alignment.



**Protecting people and  
developing innovative  
safety solutions  
is at the heart of  
everything we do.**



# Contact Bradken globally to find a solution for your business.



**Our Innovation. Your Advantage.**

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