



Electrical Solutions  
for the  
**Metals and Mining Industry**

Thomas & Betts. Your best connection for innovative solutions.

***Thomas & Betts***

***Capital spending on iron ore alone is expected to exceed \$45 billion in the Americas during 2011–2015.***

***Source: Brazilian Mining Association (IBRAM)***



# Challenge and commitment

Today's metals and mining operations must remain competitive and profitable while facing:

- Price volatility and global economic uncertainty
- Challenges to find quality resources
- Resource nationalism
- Labor and regulatory concerns
- Risks to — and from — the environment

As new mining, processing and metallurgical equipment with complex and sensitive electrical systems controls and automation replaces older equipment, MRO expenses are rising with increasing maintenance time, technical support and power costs. Metals and mining operations require a high sustainability level from their electrical systems, because any kind of shutdown can be costly.

Mining and metallurgy workers, machinery and processing equipment are often deployed in remote locations and harsh environments. The industrial processes involved with metals and mining operations are strongly dependent on the use of natural resources that need to be conserved. In order to maintain profitability in the today's volatile market — and meet labor, political and environmental challenges — operations must minimize costs while maximizing availability, quality, flexibility and throughput.

The metals and mining market is also driven by the demand to find quality resources, which are becoming more and more difficult to find. Operations demand uptime from electrical systems to meet not only demand for base and precious metals, but a mix of products as

well. If your operation frequently experiences downtime and can't meet that demand, globalization will cause customers to seek an operator who can.

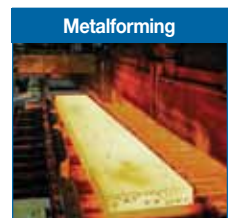
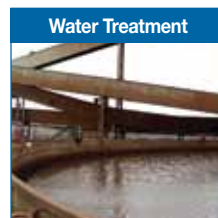
Government regulation is also a major concern. Resource nationalism, a term that describes a country's government asserting control over its natural resources from a metals or mining operation, looms as a threat in some parts of the world. Other risks also exist in the political landscape, such as permitting and taxation volatility. Increasingly stringent safety and environmental standards must also be addressed, and Thomas & Betts solutions can help you meet these regulatory demands and continue operations.

Thomas & Betts provides electrical system solutions to metals and mining operations that:

- Minimize operation and maintenance costs
- Maximize plant availability and throughput
- Ensure safety for personnel, machinery, materials and property
- Conserve natural resources and reduce emissions
- Save energy

Our solutions enable metals and mining operators to increase sustainability, meet market demand, comply with safety and environmental regulations and enhance revenues.

## Metals & Mining Applications



# Delivering value through system solutions based on engineering innovation

## Our Value Commitment

Vehicles, machinery and processing plants used in mining and metallurgy make extensive use of electrical systems that need to operate reliably in harsh conditions to meet high demands. Thomas & Betts is committed to helping you meet these unique challenges with electrical solutions and services that deliver value. These include:

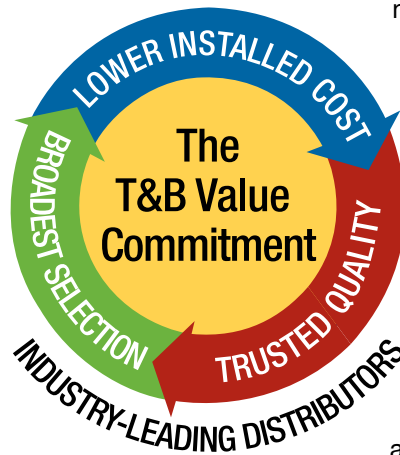
**T&B Engineered solutions** — Our products are designed to perform dependably during continuous operation, in wet or submerged areas, hazardous area environments and around high-vibration equipment. They also withstand harsh chemicals and extreme temperatures.

**Tested reliability** — Our products are rigorously tested for use in highly corrosive environments, with proven results in thousands of installations.

**Expert support** — Thomas & Betts trained sales representatives and technical experts are available at every stage of a project, from planning and site preparation through construction and MRO.

**Training and certification** — We conduct training programs on specific products and systems and work closely with all accredited electrical industry associations. Contact us for details.

**Product availability** — Our industry-leading distributor network assures you of reliable and on-time delivery. This global electrical product support system ensures that our solutions are available when and where you need them.



## Product Platforms

Thomas & Betts provides electrical packages that maximize plant availability and optimize lifecycle operation and maintenance costs. These solutions ensure the safety of personnel and machinery and preserve the quality of your power supply and electrical installation.

**Wire and Cable Management** — Thomas & Betts invented the Ty-Rap® cable tie in 1958 and continues to lead the world in innovative wire and cable management. OEMs, panel builders, contractors and maintenance personnel depend on Thomas & Betts electrical boxes, cable ties, weatherproof enclosures, cable tray and modular metal framing to do the job right and help reduce installation time and costs.

**Cable Protection Systems** — Thomas & Betts Cable Protection Systems provide unsurpassed protection for wire and cables in the most demanding applications. They encompass industry-leading flexible conduit systems, PVC-coated conduit and fittings recognized as the standard in many applications across the globe and explosion-proof conduit systems meeting worldwide standards for hazardous locations.

**Power Connection and Control** — For reliable connection and intelligent control of electrical power, Thomas & Betts mechanical and compression connectors, grounding products, medium-voltage cable accessories, high-voltage fuses, vacuum interrupters, reclosers and capacitor switches are specified worldwide in the industrial, construction and utility markets.

**Safety Technology** — Protecting lives and property requires state-of-the-art technology. Thomas & Betts is a worldwide leader in emergency lighting, and supporting central battery systems and lighting for hazardous locations. Our Safety Technology extends the life of your electrical system and protects your employees and assets.



***Key metals and mining business drivers***

- ***Minimize operation and maintenance costs***
- ***Maximize plant availability and throughput***
- ***Ensure safety for personnel, machinery, materials and the property***
- ***Conserve natural resources and reduce emissions***
- ***Save energy***

# ***T&B Engineered solutions for every application area***

- Power Plant
- Transmission and Distribution Substations
- Mine Electrification and Lighting
- Electrical Control Rooms
- Ore Extraction
- Conveyors
- Beneficiation
- Mineral Processing
- Water and Waste Management
- Smelting and Refining
- Metalforming



At Thomas & Betts, we understand the challenges faced in metals and mining industries. We're focused on providing electrical solutions that address the critical issues in every area of your operation, so you can focus on plant sustainability, cost, quality, flexibility, safety and regulatory compliance across the production cycle. Our family of electrical solutions matches specific application criteria for mining, mineral beneficiation and metal refining processes, ensuring plant-wide quality and reliability of your electrical system. And with the industry's most efficient distribution system, we're prepared to meet your ongoing operation and maintenance needs as well as serve new OEM and construction investments.



## **Metals and Mining Electrical System Issues**

-  **Continuous Operation & Sustainability**
-  **Corrosion & Harsh Environment Protection**
-  **Liquid Ingress Protection**
-  **Safety**
-  **Extreme Temperature Protection**
-  **Hazardous Location Protection**
-  **Power Quality, Efficiency & Reliability**
-  **Grounding & Bonding**



# Continuous Operation & Sustainability

Mining and metallurgy plants need skilled operators and good maintenance management to produce at sustainable yields. But costs associated with unscheduled downtime — replacement of ruined equipment, idle manpower, late-penalty fees, rental equipment expenses and intangibles for dissatisfied customers — can add up quickly.

To avoid cost-prohibitive unscheduled downtime and to enforce safe and environmentally friendly production, most metals and mining facilities choose higher performing electrical materials and products to boost plant availability. Thomas & Betts offers the following solutions to sustain continuous operation safely and at high yields:

- Long-lasting electrical systems to optimize lifecycle costs and capital expenditures
- High-performance electrical systems to withstand harsh environments and increase operational equipment effectiveness (OEE)
- Installation training to help ensure plant sustainability
- Product solutions to standardize your electrical system and ensure that you have the required products available at your local supplier when you need them

## T&B® Fittings

### Liquidtight Nonmetallic, Steel and Stainless Steel Fittings

- For all types of conduit, portable cord and teck cable

### Liquatite® Flexible Metallic and Nonmetallic Conduit

- Ideal for continuous flexing or vibration applications
- Create a liquid-, dust- and oil-tight seal
- Suitable for operating temperatures from -20°C to 60°C



## Russellstoll®

### MaxGard® Interconnection System

- Heavy service amp load
- Ever-Lok® system for durable operations
- Back-up door safety latch



## elastimold®

### Underground Cable Accessories and Arresters

- Underground cable accessories rated for 5 to 35kV applications including elbows, joints and accessories
- Underground arresters

## Blackburn®

### Motor Lead Disconnects

- Quick and easy change-out of electric motors — with no bolting, taping or loose connections
- Available for wire sizes up to 500 kcmil
- Featuring the Color-Keyed® Compression System that ensures proper connections



### T&B® Fittings

Liquatite® Flexible Metallic and Nonmetallic Conduit

### Russellstoll®

MaxGard® Interconnection System

### Elastimold®

Underground Cable Accessories and Arresters

### Blackburn®

Motor Lead Disconnects



**Thomas & Betts electrical packages deliver significant capital and operating cost efficiencies while shrinking the project's development footprint and environmental impact.**

## **Thomas & Betts products for continuous operation & sustainability**

### **Blackburn®**

- E-Z-Ground® Compression Connectors
- Mechanical Grounding Connectors
- Exothermic Welding System
- Compression Lugs and Splices
- Motor Lead Disconnects
- Ergonomic Compression Tools
- KUBE® Power Connectors

### **Carlton®**

- PVC Fittings
- Snap-Loc® Spacers
- P&C® Flex Conduit

### **Elastimold®**

- Underground Cable Accessories and Arresters

### **Emergi-Lite®**

- EMEX Central Battery Systems

### **Hazlux®**

- Explosion-Proof Lighting Fixtures for Hazardous Locations
- HazFlash® M4 Strobe Lighting Fixture

### **Homac®**

- Copper Flood-Seal® Compression Splice Kits
- Substation Connectors

### **Kopex-Ex™**

- Explosion-Proof Conduit and Coupling Systems

### **Lumacell®**

- ARGES Central Battery Systems

### **Ocal™**

- PVC-Coated Conduit and Fittings

### **PMA®**

- Nylon Cable Protection Systems

### **Ready-Lite®**

- Central DC Battery Systems

### **Red•Dot®**

- Code Keeper® Weatherproof While-in-Use Covers

### **Russellstoll®**

- MaxGard® Interconnection Systems

### **Sta-Kon®**

- Nylon-, Vinyl- and Non-Insulated Wire Terminals

### **Superstrut®**

- 316 Stainless Steel, Aluminum, PVC-Coated or Nonmetallic Channel, Hangers and Clamps
- Seismec Bracing System

### **T&B® Fittings**

- Steel, Stainless Steel, Aluminum and Nonmetallic Liquidtight Flexible Conduit Fittings
- Steel, Stainless Steel, Aluminum and Nonmetallic Cord Connectors
- Silver Grip® Tray Cord Fittings
- Wire-Mesh Strain-Relief Cord and Conduit Grips
- XD Expansion/Deflection Coupling for Rigid Conduit
- BlueKote® and Stainless Steel LU® Conduit Bodies
- STAR TECK® and STAR TECK XP® Fittings for Jacketed Metal-Clad and Teck Cables
- Liqueatite® Flexible Metallic and Nonmetallic Liquidtight Conduit



# Corrosion & Harsh Environment Protection

Corrosion, the enemy of electrical systems, costs an estimated \$2.1 billion annually in lost equipment, plus labor and downtime. Problems caused by corrosion include:

- Equipment failure and shortened life
- Poor electrical system reliability caused by high-resistance connections
- Long maintenance repair time due to corroded parts
- Safety hazards and product contamination

Harsh environmental factors inherent in mining and metallurgy applications — such as liquid and dirt ingress, heat, vibration and shock — can greatly accelerate corrosion and cause failures in the electrical and automation systems if not properly addressed. Thomas & Betts solutions are made with corrosion-resistant materials to extend the life and reliability of your electrical system. Our aluminum, stainless steel, specialty alloy, PVC-coated and nonmetallic products are the solutions to your corrosion issues.

## T&B® Fittings

### Stainless Steel, Aluminum and Nonmetallic Fittings

- Star Teck® type 316 stainless steel fittings up to 2 inch hub sizes
- PVC-coated portable cord, cable, and conduit fittings offered in all sizes
- Silver Grip® fittings offered in stainless steel and aluminum for liquidtight installations when using tray cable and portable cord



**T&B® Fittings**  
Star Teck® Cable Fittings



**T&B® Fittings**  
Stainless Steel Liquidtight  
Conduit Connectors



**Ocal™**  
OCAL-BLUE®  
PVC-Coated Conduit



**T&B® Cable Tray**  
Stainless Steel  
Cable Tray



**Ty-Rap®**  
Stainless Steel  
Cable Ties



## Ocal™

### OCAL-BLUE® PVC-Coated Conduit

- PVC-coated, hot-dipped galvanized conduit and threads
- Provides superior corrosion protection against many harmful elements
- Interior blue polyurethane provides corrosion protection around cables

## T&B® Cable Tray

### Stainless Steel and Nonmetallic (Fiberglass) Cable Tray

- Does not channel moisture to electrical equipment, preventing corrosion and failure
- Does not channel corrosive, explosive or toxic gases

## Ty-Rap®

### Stainless Steel Cable Ties

- Strong, fireproof and easy to apply — for safe cable bundling
- Resist corrosion and UV light, with the ability to withstand temperature extremes
- Provide a strong, safe installation with a unique dual-locking mechanism



***At a typical mineral processing plant, energy and operations represent approximately 50% of all costs, followed by maintenance and lost production due to downtime. At Thomas & Betts, we understand mine operators seek to extend periods of operation and still be able to plan for maintenance downtime.***

## **Thomas & Betts products for corrosion and harsh environment protection**

### **Carlon®**

- PVC Fittings
- Snap-Loc® Spacers
- P&C® Flex Conduit

### **Emergi-Lite®**

- Hazardous Location Emergency Lighting and Exit Signs

### **Hazlux®**

- HazCote® Kynar-Coated Lighting Fixtures

### **Homac®**

- Copper Flood-Seal® Compression Splice Kits

### **Kopex-Ex™**

- Explosion-Proof Conduit and Coupling Systems

### **Liquatite®**

- Flexible Metallic and Nonmetallic Liquidtight Conduit

### **Lumacell®**

- Hazardous Location Emergency Lighting and Exit Signs

### **Ocal™**

- PVC-Coated Conduit and Fittings
- OCAL-BLUE® NEMA Type 4X Form 8 Conduit Bodies
- Ocal™ Installation Certification Training

### **PMA®**

- Nylon Cable Protection Systems

### **Ready-Lite®**

- Hazardous Location Emergency Lighting and Exit Signs

### **Red•Dot®**

- Code Keeper® Weatherproof While-in-Use Covers

### **Reznor®**

- Washdown Unit Heater

### **Sta-Kon®**

- Corrosion-Resistant, Nickel-Plated Wire Terminals

### **Superstrut®**

- 316 Stainless Steel, Aluminum, PVC-Coated or Nonmetallic Channel, Hangers and Clamps

### **T&B® Cable Tray**

- Aluminum, Steel, Stainless Steel and Fiberglass Support/Wire Management Systems

### **T&B® Fittings**

- Form 8 Conduit Bodies – Stainless Steel and BlueKote®
- Hubs – Stainless Steel and Aluminum
- Steel, Stainless Steel, Aluminum and Nonmetallic Liquidtight Flexible Conduit Fittings
- Steel, Stainless Steel, Aluminum and Nonmetallic Cord Connectors
- Silver Grip® Stainless Steel Tray Cord Fittings
- Wire-Mesh Strain-Relief Cord and Conduit Grips
- XD Expansion/Deflection Coupling for Rigid Conduit
- BlueKote® and Stainless Steel LU® Conduit Bodies
- STAR TECK® and STAR TECK XP® stainless Steel, Aluminum and PVC-Coated Fittings for Jacketed Metal-Clad and Teck Cables

### **Ty-Rap®**

- Coated and Uncoated Stainless Steel Cable Ties
- Ty-Rap Tote® Cable Tie Dispensers and Ergonomic Installation Tools
- Deltec® Outdoor Fastening System



# Liquid Ingress Protection

Liquid ingress protection is a critical element to keeping electrical systems operational. Exposure to water in indoor or outdoor applications, dust in suspension, condensation and accidental spills of machine oils and lubricants can all shorten the life of your electrical system. One drop can be enough to ruin your production, so when specifying electrical components for mining and mineral processing applications, consider the following issues related to liquid ingress:

- Liquid exposure can cause deterioration of electrical connections or short circuits
- Electrical system components designed with round surfaces help to shed contaminants, rather than creating a shelf where they can collect
- Abrasive and corrosive mine waters combined with moisture present extra challenges for liquidtight electrical components in mining and metal applications
- Appropriate product design, materials and labor skills are required to ensure reliability, maintainability and safety of electrical connections subject to liquid and dust ingress

Thomas & Betts electrical solutions offer protection against liquid, moisture and dust ingress.

## Russellstoll®

### DuraGard® Pin-and-Sleeve Connectors

- Not just watertight, but waterproof, mated or unmated
- Tested to 1000 psi for washdown applications
- Full line of 20–60 A (600VAC/250VDC max.) connectors, plugs and receptacles in UL94V-0 flammability-rated, corrosion-resistant, nonmetallic housings

## Ocal™

### OCAL-BLUE® PVC-Coated NEMA Type 4X Form 8 Conduit Bodies

- Double coated inside and out for corrosion protection
- Stainless steel encapsulated cover screws can be hand-tightened — using only 15 in.-lbs. of torque — to achieve the Type 4X watertight rating



**Russellstoll®**  
DuraGard® Pin-and-Sleeve Connectors



**Ocal™**  
OCAL-BLUE® Type 4X Form 8 Conduit Bodies



## T&B® Fittings

### Stainless Steel and Nonmetallic Liquidtight Conduit, Cord and Teck Cable Fittings

- Stainless steel construction resists corrosion
- Rounded gland nut deflects water from connector
- Continuous sealing ring ensures a liquidtight seal

## redodot®

### Code Keeper® Weatherproof Covers

- Rugged aluminum construction resists corrosion
- Cover wet location receptacles to ensure personnel safety

## elastimold®

### Switchgear and Cable Accessories

- Underground cable accessories rated for 5 to 35kV applications including elbows, joints and accessories
- Underground arresters
- Solid dielectric no-maintenance switchgear for application in vault, riser pole and padmount installations from 5 to 35kV



**T&B® Fittings**  
Stainless Steel Liquidtight Conduit, Portable Cord and Teck Cable Fittings



**Elastimold®**  
Switchgear and Cable Accessories



***Metals and mining electrical systems are often directly exposed to liquid, dirt, dust and chemicals. Thomas & Betts offers thousands of high-performing products to protect these systems from liquid and dust ingress.***

## ***Thomas & Betts products for liquid ingress protection***

### **Carlon®**

- PVC Fittings
- Snap-Loc® Spacers
- P&C® Flex Conduit

### **Elastimold®**

- Switchgear and Cable Accessories

### **Emergi-Lite®**

- NEMA-4X Rated Emergency Lighting and Exit Signs

### **Hazlux®**

- Explosion-Proof Lighting Fixtures for Hazardous Locations
- Strobe Lighting Fixtures

### **Homac®**

- Copper Flood-Seal® Compression Splice Kits

### **Kopex-Ex™**

- Explosion-Proof Conduit and Coupling Systems

### **Liquatite®**

- Flexible Metallic and Nonmetallic Liquidtight Conduit

### **Lumacell®**

- NEMA-4X Rated Emergency Lighting and Exit Signs

### **Ocal™**

- PVC-Coated Conduit and Fittings
- OCAL-BLUE® NEMA Type 4X Form 8 Conduit Bodies
- Ocal™ Installation Certification Training

### **PMA®**

- Nylon Cable Protection Systems

### **Ready-Lite®**

- NEMA-4X Rated Emergency Lighting and Exit Signs

### **Reznor®**

- EWHB Wet Environment/Washdown Unit Heater

### **Russellstoll®**

- DuraGard® Pin-and-Sleeve Connectors

### **Sta-Kon®**

- Shrink-Kon® Wire and Connector Insulation Products

### **Superstrut®**

- 316 Stainless Steel, Aluminum, PVC-Coated or Nonmetallic Channel, Hangers and Clamps

### **T&B Fittings®**

- Liquatite® flexible metallic and nonmetallic conduits
- Form 8 Conduit Bodies – Stainless Steel and BlueKote®
- Steel, Stainless Steel, Aluminum and Nonmetallic Liquidtight Flexible Conduit Fittings
- Steel, Stainless Steel, Aluminum and Nonmetallic Cord Connectors
- Silver Grip® Stainless Steel Tray Cord Fittings
- Wire-Mesh Strain-Relief Cord and Conduit Grips
- STAR TECK® and STAR TECK XP® Stainless Steel, Aluminum and PVC-Coated Fittings for Jacketed Metal-Clad and Teck Cables

During the years 2000–2009, electrical accidents were the leading cause of fatalities in the U.S. mining industry, accounting for 6% of all deaths. Electrical injuries in mining are also disproportionately deadly, with 1 out of every 22 such injuries a fatality compared with an average of 1 out of every 203 for all other types of injuries.\*

Safety in metal and mining industries encompasses personnel, vehicles, machinery, the material and also the mine, with issues such as roofing and ground sustainability. Common hazards requiring preventive safety measures in these industries include:

- Fire or explosion
- Electrical shock from exposed wiring, lightning or improper grounding
- Release of toxic materials
- Temperature extremes
- Heavy vehicles and projection of debris
- Large equipment and bulk conveyor systems
- Drilling, climbing, hoisting and excavation machinery

Thomas & Betts products address safety concerns in mining and metal processing workplaces.

\* Source: U.S. Occupational Safety and Health, <http://www.cdc.gov/niosh/mining/topicspage1.htm>

## Ty-Rap®

### Flame-Retardant Cable Ties

- Perfect for low-smoke applications
- UL94V-0 flammability rating
- For use in temperatures ranging from -46°C to 140°C



**Ty-Rap®**  
Flame-Retardant  
Cable Ties



**Emergi-Lite®/Lumacell®/ Ready-Lite®**  
Nexus® Emergency Lighting  
Management System



**EZCODE®**  
Safety Labels, Tags, Signs  
and Barricade Tapes



**Russellstoll®**  
GSUL Safe Ground  
Indicator System



**Russellstoll®**  
Safety  
Interlocks



## EMERGI-LITE® / LUMACELL® / READY-LITE®

### Nexus® Emergency Lighting Management System

- Remote monitoring of the real-time status of the entire emergency lighting and exit sign system
- Provides high quality data that is not subject to human error

## E-Z-CODE®

### Safety Labels, Tags, Signs and Barricade Tapes

- Help to ensure personnel and workplace safety, as well as regulatory compliance
- Highly visible and long-lasting materials
- Custom labels, tags and signs available
- Barricade and burial marking tapes in a variety of materials and colors

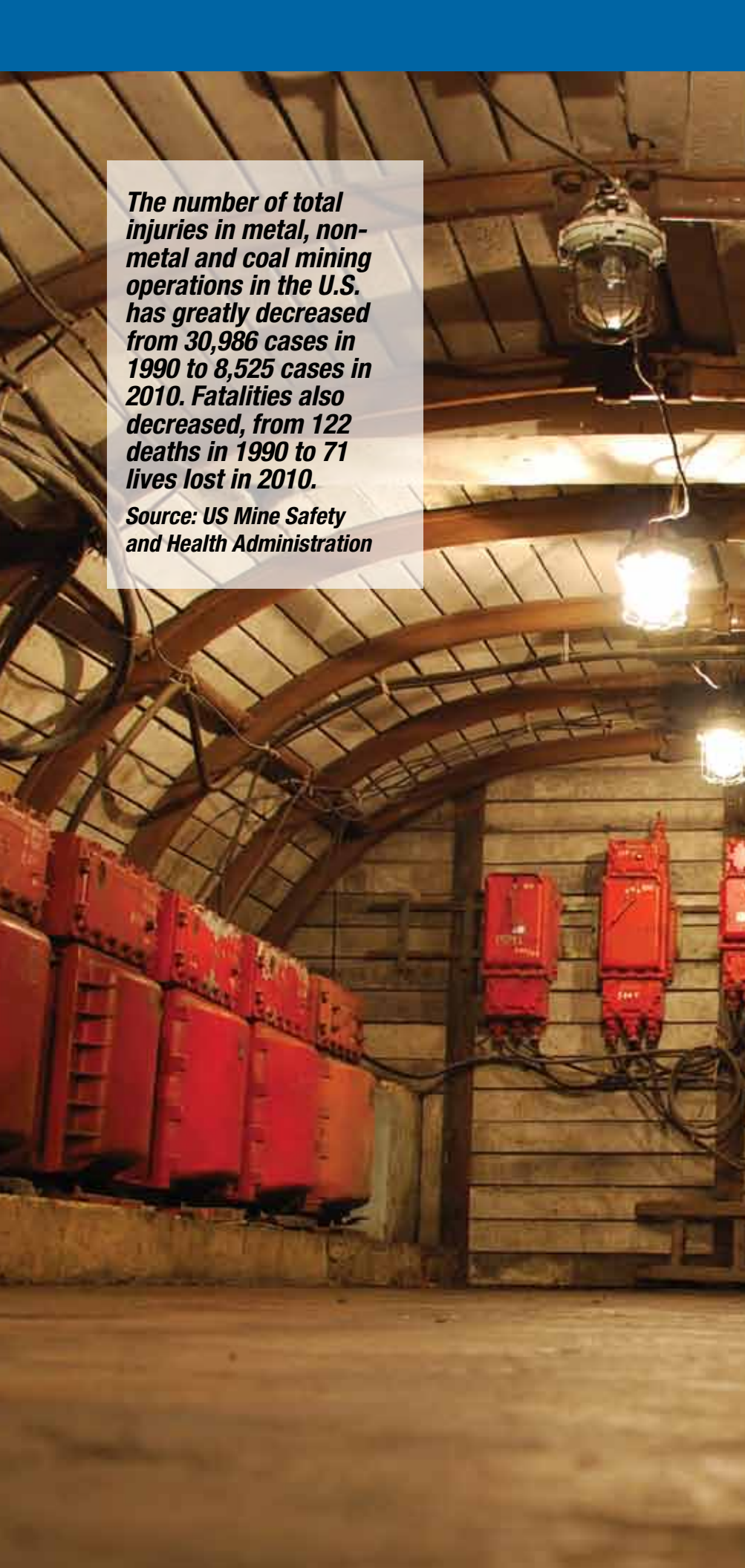
## Russellstoll®

### GSUL Safe Ground Indicator System

- Prevents operation of pumps without a safe ground
- Lights indicate the establishment of a safe ground

### Safety Interlocks

- 30 A and 50 A ranges and polarizations to 480VAC
- 22kA interrupt capacity breaker
- UL94V-0, NEMA Type 4X



**The number of total injuries in metal, non-metal and coal mining operations in the U.S. has greatly decreased from 30,986 cases in 1990 to 8,525 cases in 2010. Fatalities also decreased, from 122 deaths in 1990 to 71 lives lost in 2010.**

**Source: US Mine Safety and Health Administration**

## **Thomas & Betts products for safety**

### **Blackburn®**

- E-Z-Ground® Compression, Mechanical and Exothermic Grounding Systems
- Compression Lugs and Splices
- Ergonomic Compression Tools
- Color-Keyed® System Training

### **Emergi-Lite®**

- Hazardous Location Emergency Lighting and Exit Signs
- Nexus® Emergency Lighting Management System

### **E-Z-CODE®**

- Danger/Warning Labels and Signs, Industrial/Wire Markers, Barricade/Burial Tape

### **Fisher Pierce®**

- Faulted Circuit Indicators

### **Hazlux®**

- HazFlash® M4 Strobe Lighting Fixture

### **Homac®**

- Copper Flood-Seal® Compression Splice Kits

### **Joslyn Hi-Voltage™**

- Capacitor Switches and Air Disconnect Switches

### **Kopex-Ex™**

- Explosion-Proof Conduit and Coupling Systems

### **Lumacell®**

- Hazardous Location Emergency Lighting and Exit Signs
- Nexus® Emergency Lighting Management System

### **PMA®**

- Nylon Cable Protection Systems

### **Ready-Lite®**

- Hazardous Location Emergency Lighting and Exit Signs
- Nexus® Emergency Lighting Management System

### **Red•Dot®**

- Code Keeper® Weatherproof While-in-Use Covers

### **Russellstoll®**

- GSUL Safe Ground Indicator System and Safety Interlocks

### **Sta-Kon®**

- Luminaire Disconnects

### **Superstrut®**

- Seismic Bracing System

### **T&B® Fittings**

- Star Teck XP® Explosion-Proof Teck Cable Fittings
- Tray Star® Explosion-Proof Cable Fittings for Tray Cable and Flexible Metal Conduit
- Steel, Stainless Steel, Aluminum and Nonmetallic Liquidtight Flexible Conduit Fittings and Cord Connectors
- Lquatite® Type ZHLA and ACEA Non-Halogen, Low-Smoke, Flame-Retardant Flexible Conduit

### **Ty-Rap®**

- Extra-High Temperature and Flame-Retardant UL94V-0 Nylon Cable Ties
- Ty-Rap Tote® Cable Tie Dispensers and Ergonomic Installation Tools
- Deltec® Outdoor Fastening System



# Extreme Temperature Protection

Outdoor and indoor machinery and process equipment at metal processing, coal and cement plants must stand up to extreme temperatures, UV radiation, humidity and corrosive substances. Electrical systems must perform in these harsh conditions and be protected against condensation, water and sludge. Whether you're operating a conveyor belt in snowy longitudes or in tropical zones, a high-temperature slurry pump or a furnace application, Thomas & Betts electrical solutions address issues that can result from extreme temperatures, including:

- Repeated thermal expansion and contraction damaging conduit systems and electrical connections
- Components softening and failing due to high temperatures
- Components melting and destroying other nearby equipment
- Components near flames catching fire and burning
- Components becoming brittle and failing at low temperatures
- Condensation occurring due to rapid temperature changes, stressing electrical systems

## Ty-Rap®

### Extra-High Temperature Nylon Cable Ties

- For use in temperatures from -40°C to 150°C
- Feature "The Grip of Steel®" stainless steel locking device and offer infinite adjustability

### Heavy-Duty Stainless Steel Cable Ties

- For use in temperatures from -80°C to 538°C
- Available in both Type 304 and Type 316 stainless steel
- Quick, easy installation and secure locking



## T&B® Fittings

### Liquatite® Type ATX Flexible Metallic and Nonmetallic Conduit

- Supports operating temperatures from -60°C to 150°C (up to 165°C intermittent)
- Flammability rating of UL94-HB
- Standard flexible metallic core with temperature-resistant elastomeric outer jacket

## Sta-Kon®

### High-Temperature Wire Joints and Terminals

- Rated for temperatures up to 150°C, 600V maximum
- Molded, one-piece nylon construction for electrical insulation, rated UL94V-2

## PMA®

### High-Temperature Nylon Conduit and Fittings

- Offer good fire protection (flammability and smoke generation)
- Provide high impact strength even at low temperatures
- Also resistant to weather



**Ty-Rap®**  
Extra-High Temperature  
and Stainless Steel Ties

**Liquatite®**  
ATX Liquidtight Flexible  
Metal Conduit

**Sta-Kon®**  
High-Temperature Wire  
Joints and Terminals

**PMA®**  
High-Temperature Nylon  
Conduit and Fittings





**Thomas & Betts products provide equipment installed in remote areas and in extreme temperatures a high degree of production safety over a long service life. Our product technology helps avoid downtime to the greatest possible extent.**

## **Thomas & Betts products for extreme temperature protection**

### **E-Z-CODE®**

- Danger/Warning Labels and Signs, Industrial/Wire Markers, Barricade/Burial Tape

### **Kopex-Ex™**

- Explosion-Proof Conduit and Coupling Systems

### **PMA®**

- Nylon Cable Protection Systems

### **Sta-Kon®**

- High-Temperature Wire Joints and Terminals

### **T&B® Fittings**

- High-Temperature Flexible Metal Liquidtight Fittings
- Liqueatite® Type ATX Flexible Metallic and Nonmetallic Conduit

### **Ty-Rap®**

- Stainless Steel Cable Ties
- Extra-High Temperature and Flame-Retardant UL94V-0 Nylon Cable Ties



# Hazardous Location Protection

The Canadian Electrical Code® (CEC®) defines hazardous locations as areas where the possibility of explosion and fire is created by the presence of flammable gases, vapors, dust, fibers or flyings. In metals and mining facilities, hazardous locations include areas where substances in suspension, mine gases or fuels and chemicals may be present.

To protect both your facility and your employees, Thomas & Betts offers a wide variety of high-performance, explosion-proof solutions designed to prevent or contain an explosion in classified hazardous locations.



## Hazlux®

### Hazardous Location Lighting

- Explosion-proof fixtures for Class I, II and III hazardous locations
- Enclosed, gasketed and rated NEMA 4X, IP66 and UL1598 for wet and marine locations

## T&B® Fittings

### Star Teck XP® Explosion-Proof Teck Cable Fittings

- Easy to fill, integral sealing chamber and disconnecting design requires minimal cable preparation
- Benchmark for ease of installation in hazardous locations
- Provides grounding continuity of cable armor

### Tray Star® Explosion Proof Tray Cable and Flexible Conduit Fittings

- Offers all of the advantages of Star Teck XP® for tray cable and flexible metal conduit applications

## EMERGI-LITE® / LUMACELL® / READY-LITE®

### Emergency Lighting and Exit Signs for Hazardous Locations

- Emergency lighting
- Self-powered exit signs
- Combination units - emergency lighting and exit signage

## Russellstoll®

### MaxGard® Explosion-Proof Interlocked Receptacles

- Copper-free, cast-aluminum, epoxy-coated housing
- O-ring-sealed interior components ensure watertight protection whether connections are mated or not
- Explosion-proof systems for 30 A, 60 A and 100 A



**Hazlux®**  
Hazardous Location Lighting



**T&B® Fittings**  
Star Teck XP®  
Explosion-Proof  
Teck Cable Fittings



**Emergi-Lite® / Lumacell® / Ready-Lite®**  
Hazardous Location Emergency Lighting



**Russellstoll®**  
MaxGard® Explosion-Proof  
Interlocked Receptacles



## **Thomas & Betts products for hazardous location protection**

### **Emergi-Lite®**

- Hazardous Location Emergency Lighting and Exit Signs

### **E-Z-CODE®**

- Danger/Warning Labels and Signs, Industrial/Wire Markers, Barricade/Burial Tape

### **Hazlux®**

- Explosion-Proof Lighting Fixtures for Hazardous Locations
- Strobe Lighting Fixtures

### **Kopex-Ex™**

- Explosion-Proof Conduit and Coupling Systems

### **Lumacell®**

- Hazardous Location Emergency Lighting and Exit Signs

### **Ready-Lite®**

- Hazardous Location Emergency Lighting and Exit Signs

### **Reznor®**

- EXUB Explosion-Resistant Electric Unit Heaters

### **Russellstoll®**

- MaxGard® Pin-and-Sleeve Connectors and Explosion-Proof Interlocked Receptacles
- GSUL Ground Indicator System

### **T&B® Cable Tray**

- Aluminum, Steel, Stainless Steel and Fiberglass Support/Wire Management Systems

### **T&B® Fittings**

- Explosion-Proof Boxes, Elbows, Fittings and XP Explosion-Proof Flexible Couplings
- STAR TECK® and STAR TECK XP® Fittings for Jacketed Metal-Clad and Teck Cables

*Miners often work in the presence of gases, heat sources and machinery. That is why we engineer our products for faster service, additional longevity and reliability in hazardous locations.*

# **Power Quality, Efficiency & Reliability**

The loss of a single data record can mean the permanent loss of a process batch — or the loss of millions of dollars every minute. In this critical industry, the need for stable power is paramount. Count on Thomas & Betts products for Power Quality, Efficiency & Reliability.

Our power solutions provide the peace of mind that comes from knowing your equipment is safe and secure from the consequences of unpredictable power. By designing the world-class standard in power equipment, Thomas & Betts has become a leader in custom-designed digital static transfer switches, power distribution and uninterruptible power systems.

From the clean environment of a data center to the harsh conditions of an offshore oil platform, Thomas & Betts products meet the challenge of providing clean, dependable electric power to the oil and gas industry.



## **Overhead Switches and Reclosers**

- Capacitor switches for distribution and substations
- Reclosers
- Interrupter accessories for disconnect switches



## **Substation Connectors**

- Superior performance under extreme operating conditions



## **Switchgear and Cable Accessories**

- Solid-dielectric, maintenance-free switchgear for application in vault, riser pole and pad mount installations
- A full line of loadbreak and deadbreak separable connectors, cable joints and cable terminators.
- Developed for 5 to 35 kV distribution systems



## **Faulted Circuit Indicators**

- Fault circuit indicators
- Voltage and current sensors
- Overhead and underground units available



**Elastimold®**  
Solid Dielectric Switchgear



**Joslyn Hi-Voltage™**  
Recloser



**Homac®**  
Substation Connectors



**Fisher Pierce®**  
Faulted Circuit Indicators

*Thomas & Betts' experience in the utility, construction and industrial markets gives you peace of mind when you need quality, highly available electrical power operating safely at the most efficient cost levels.*

**Thomas & Betts products for power quality, efficiency and reliability**

**Blackburn®**

- E-Z-Ground® Compression Connectors
- Color-Keyed® Compression Lugs and Splices
- Exothermic Welding System
- Ground Rods

**Elastimold®**

- High-Voltage Separable Connectors and Solid-Dielectric Switchgear

**Emergi-Lite®**

- EMEX Central Battery Systems

**Fisher Pierce®**

- Faulted Circuit Indicators

**Hi-Tech®**

- Current-Limiting Fuses

**Homac®**

- Copper Flood-Seal® Compression Splice Kits
- Substation Connectors

**Joslyn®**

- Surge Protection Devices

**Joslyn Hi-Voltage™**

- Capacitor Switches and Air Disconnect Switches

**Lumacell®**

- ARGES Central Battery Systems

**Ready-Lite®**

- Central DC Battery Systems

**Russellstoll®**

- Computer System Plugs, Connectors and Receptacles



# Grounding & Bonding

An electrical system includes various pieces of conductive equipment connected together to keep them at the same potential. Static sparking cannot take place between objects that are at the same electrical potential. Thomas & Betts electrical raceway products provide excellent bonding characteristics for the electrical system.

Grounding the electrical system provides a means in which conductive equipment is connected to an earth potential via the grounding electrode. This prevents potential differences and sparking between conductive equipment and grounded structures.



## Blackburn®

### E-Z-Ground® Compression Connectors

- High-conductivity copper and bronze connectors for direct burial, OEM or telecom applications

### Mechanical Grounding Connectors

- High-strength split-bolt connectors for copper-to-copper connections
- Service post connectors for steel structures, fence posts or transformers using one or two cables
- ViceLock® connectors for cable tray, channel and strut applications

### Exothermic Welding System

- Simple, self-contained system to form high-quality electrical connections

### Grounding Components

- Ground Rods
- Metallic Gradient Control Mat
- Electrode Boxes
- Compression Tools and Dies

## BOREAL

### High-Quality Flexible Connectors

- A wide variety of grounding and bonding straps
- Extra-flexible links for heavy-duty applications up to 3600 A
- Standard flexible links for medium-duty applications up to 2350 A

## T&B® Fittings

### Grounding Fittings

- Bond Star® grounding lock-nut for use in data and control applications sensitive to floating voltage differences
- XD expansion/deflection coupling for rigid conduit with internal bonding strap




**Blackburn®**  
E-Z-Ground®  
Compression Connectors

**Blackburn®**  
Mechanical Grounding  
Connectors

**Blackburn®**  
Exothermic Welding  
System

**Boreal™**  
High-Quality  
Flexible Connectors

**T&B® Fittings**  
XD Expansion /  
Deflection Coupling



***An improperly installed or grounded electrical system can cause power failure, which often leads to significant safety, production and operational concerns.***

## ***Thomas & Betts products for grounding and bonding***

### **Blackburn®**

- E-Z-Ground® Compression Connectors
- Mechanical Grounding Connectors
- Exothermic Welding System
- Metallic Gradient Control Mat
- Ground Rods

### **Boreal™**

- High-Quality Flexible Connectors

### **E-Z-CODE®**

- Danger/Warning Labels and Signs

### **Russellstoll®**

- GSUL Ground Indicator System

### **T&B® Fittings**

- STAR TECK® and STAR TECK XP® Fittings for Teck and Jacketed Metal-Clad Cables
- Bond Star® Grounding Lock-Nut
- XD Expansion/Deflection Coupling for Rigid Conduit

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## Visit the Thomas & Betts world of electrical product solutions

Visit our web site for more information about Thomas & Betts solutions and our newest products. For a user-friendly catalogue and competitive part number search, application and technical support and other useful information, go to: [www.tnb.ca](http://www.tnb.ca)

## Industry codes and specifications

All Thomas & Betts products for use in the metals and mining industry meet or exceed applicable industry specifications or codes detailed in the appropriate Thomas & Betts product literature.



## Online CAD library

Thomas & Betts offers free download of two- and three-dimensional CAD models of many of its products in more than 90 native CAD formats at: [www.tnb.com/cadlibrary](http://www.tnb.com/cadlibrary)



All information and specifications contained in this catalogue are subject to change due to engineer design, errors and omissions. Illustrations and diagrams within this catalogue may vary from actual products.

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Wire & Cable Management • Cable Protection Systems • Power Connection & Control • Safety Technology

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