Electrical Solutions for Pulp and Paper Processing Facilities
The U.S. paper products manufacturing industry encompasses roughly 3,500 companies with combined annual revenue of approximately $170 billion. Major product segments include paperboard containers, coated papers, tissue products, stationery, diapers and paper bags. Paper companies often focus on specialty products and serve smaller geographical areas to increase profitability.
Challenge and commitment.

Today’s pulp and paper producers must remain competitive and profitable while facing challenges such as:

- Higher energy, raw material, transportation, insurance and environmental-remediation costs
- Increased environmental and worker safety legislation implemented by EPA and OSHA
- Foreign competition — including Chinese government-subsidized exports — entering the U.S. market and placing pressure on operating margins
- Generally flat market demand and excess global capacity in many commodity market segments

Surviving and thriving under these market conditions requires commitment to finding new ways to increase operational efficiencies, leading to the following trends:

Lifecycle Costing — Investors are pressing paper companies for higher profits, reducing the amount of available cash for reinvestment. This drives the need to specify longer-lasting, high-performance equipment and electrical systems. Because machinery and maintenance costs can be very high, new processing lines are engineered and procured based on lifecycle cost — which factors in not just acquisition, but installation, operation, maintenance, reliability, energy consumption and scrap rate costs — rather than simply on lowest initial purchase price.

Recycling and Sustainability — Legislation is driving an increased use of recycled paper, which has been a challenge for pulp and paper processing.

Plug-and-Play Power Systems — To avoid or minimize production downtime, many pulp and paper processors use plug-and-play power systems to keep individual equipment and processes running while performing maintenance in another processing area.

Lights-Out Warehousing — Many pulp and paper processing companies are using automation and robotics to increase operational efficiencies and safety in their warehouses.

Renewable Energy — Energy consumption can contribute as much as 20% of the production costs in pulp and paper processing. Rising costs for fossil fuels and electricity have caused many paper mills to install their own power-generation systems, now even using their own biomass byproducts for steam, heat and power.

Alternative Fuel Production — The wood waste from pulp processing can be converted into second-generation bioethanol fuel. As technology advances, this becomes a more realistic option for pulp processors to increase their profits.

Plant electrical equipment supplies, distributes and controls the power that drives pulp and paper manufacturing processes. Thomas & Betts provides pulp and paper processing electrical system solutions that:

- Increase your Overall Equipment Effectiveness (OEE)
- Extend the life of your electrical system by up to 300%
- Decrease electrical system changeover and downtime by 40–50%
- Reduce product scrap and provide a safer workplace for your employees

These solutions enable pulp and paper processors to increase operational efficiencies and revenues, plant sustainability and personnel and environmental safety.
Delivering value through system solutions based on engineering innovation.

Our Value Commitment

Pulp and paper processors must meet demanding production and delivery schedules while working to improve manufacturing processes and plant flexibility. Key business drivers are increasing personnel and environmental safety, operational efficiencies, profitability and sustainability. Thomas & Betts is committed to helping you meet the unique challenges encountered in pulp and paper processing with electrical solutions, services and systems that deliver value. These include:

**T&B Engineered solutions** — Our products are designed to perform dependably under conditions such as constant moisture and liquid ingress, harsh chemicals, extreme temperatures, ultraviolet exposure, hazardous areas, high vibration and continuous operation.

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

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

**Training and certification** — Thomas & Betts conducts training programs on specific products and systems and works closely with 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

For over a century, Thomas & Betts has provided pulp and paper companies with electrical system solutions to help protect their employees and assets, while increasing operational efficiency and revenues.

**Wire and Cable Management** — T&B 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 T&B electrical boxes, cable ties, weather-proof enclosures, cable tray and modular metal framing to do the job right and help reduce installation time and costs.

**Cable Protection Systems** — T&B 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 oil and gas applications and explosion-proof conduit systems meeting worldwide standards for hazardous locations.

**Power Connection and Control** — For reliable connection and intelligent control of electrical power, T&B 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. T&B is a worldwide leader in emergency lighting and supporting central battery systems, lighting for hazardous locations and surge protection. T&B Safety Technology extends the life of your electrical system and protects your employees and assets.
Key Pulp and Paper Business Drivers

- Increase operational efficiencies and profitability
- Increase sustainability
- Increase personnel and environmental safety
At Thomas & Betts, we understand the challenges you face in the pulp and paper processing industry today. 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, personnel safety, cost, quality, flexibility, and regulatory challenges across the production cycle. Our family of electrical solutions matches specific application criteria from start to finish inside processing areas, assuring the quality and reliability of your electrical system throughout your facility, from incoming raw materials through shipping of finished goods. And with the industry’s most efficient distribution system, we’re prepared to meet your ongoing MRO, OEM and construction needs today.
Pulp and Paper Processing Facility Electrical System Issues

- Continuous Operation & Sustainability
- Corrosion & Harsh Environment Protection
- Extreme Temperature Protection
- Liquid Ingress Protection
- Safety & Contamination
- Hazardous Location Protection
Continuous Operation & Sustainability

Pulp and paper processing facilities typically operate 24/7. Methods used to avoid extremely high-cost downtime include specifying higher performing equipment and materials to extend electrical system life and reduce lifecycle costs, scheduling preventive maintenance at specific intervals instead of waiting for equipment failure, and the use of plug-and-play power systems to keep individual processes operating while performing maintenance in other areas.

To minimize plant downtime and improve revenues, Thomas & Betts offers you the following solutions:

- Long-lasting electrical systems to extend lifecycle, reduce capital expenditures and maintenance costs and increase Overall Equipment Effectiveness (OEE)
- Installation training certification to help ensure plant reliability
- Qualified technical personnel to assist you in quickly getting your plant back online
- A deep electrical solution offering to standardize your electrical system and ensure that you have the products you need on hand at your local supplier

Sta-Kon Crimped Wire Termination Systems
- Metal insulation grip sleeve included on all nylon terminals for strain relief
- Long barrel selectively annealed for easier crimping and more reliable contact

Industrial UPS Systems
- Developed to UL® standards and designed for a 20-year service life
- Ranges from 10 to 150kVA, incorporating state-of-the-art system topology for higher online system efficiency and longer battery life
- Digital Static Transfer Switch design provides increased redundancy and reliability

Russellstoll MaxGard® Pin-and-Sleeve Connectors
- O-ring-sealed interior components are watertight whether mated or unmated
- Full line of plugs, connectors and receptacles for 30A–400A systems up to 600VAC/250VDC
Production downtime carries a high price tag in terms of man hours, raw material and finished goods.

Thomas & Betts offers electrical system solutions that can reduce downtime by 40–50%.

What is your cost per hour for downtime?

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

**Blackburn®**
- E-Z-Ground® Compression Connectors, Mechanical Grounding and Exothermic Grounding Systems
- Compression Lugs and Splices and Ergonomic Compression Tools
- KUBE® Power Connectors and Motor Lead Disconnects

**Cyberex®**
- Industrial UPS Systems

**Joslyn®**
- Surge Protection Devices

**JT Packard®**
- Electrical and Data System Installation, Inspection and Maintenance Services

**Kindorf®**
- 316 Stainless, Aluminum, PVC-Coated or Non-Metallic Modular Framing Channel, Pipe Hangers and Clamps
- Seismic Bracing System

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

**Reznor®**
- Washdown Unit Heater

**Russelstoll®**
- MaxGard® Pin-and-Sleeve Connectors and Receptacles

**Sta-Kon®**
- Nylon-, Vinyl- and Non-Insulated Wire Terminals
- Corrosion-Resistant, Nickel-Plated Wire Terminals
- Ergonomic Comfort Crimp® Tools
- High-Temperature Wire Joints and Luminaire Disconnects
- Shrink-Kon® Wire and Connector Insulation Products

**T&B® Cable Tray**
- Aluminum, Stainless Steel and Fiberglass Support and Wire Management Systems

**T&B® Fittings**
- Type A Liquidtight Flexible Conduit and Fittings
- Wire-Mesh Strain-Relief Cord and Conduit Grips
- XD Expansion/Deflection Coupling for Rigid Conduit and XJG Expansion Coupling for Rigid Conduit

**Elastimold®**
- High-Voltage Separable Connectors and Solid-Dielectric Switchgear

**Fisher Pierce®**
- Faulted Circuit Indicators

**Joslyn Hi-Voltage®**
- Capacitor Switches and Air Disconnect Switches
Pulp and paper processing involves corrosive agents that cause fast and irreversible deterioration, such as hydrogen peroxide, chlorine or other chemicals used for bleaching pulp, as well as harsh cleaning chemicals, abrasive raw materials, moisture, heat and humidity. According to a study commissioned by the U.S. Federal Highway Administration, corrosion costs the U.S. pulp and paper industry an estimated $6 billion annually.* Production 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

The use of corrosion-resistant materials is critical to extending the life and reliability of your electrical system. Thomas & Betts offers electrical system components in aluminum, stainless steel, specialty alloys, non-metallic and PVC-coated materials as a solution to your corrosion issues. Please refer to page 20 for more information on the resistance of these and other materials to various chemicals.


**Ocal**

OCAL-BLUE® PVC-Coated Conduit Bodies
- Cast-iron bodies and covers coated inside and out with 2 mils blue urethane, then exterior coated with 40 mils PVC for double-coated corrosion protection
- Ship with covers and encapsulated stainless steel screws

**T&B® Fittings**

BlueKote® Conduit Bodies
- Triple-layer corrosion protection — including two layers of epoxy coating — stops corrosion in its tracks
- BlueKote® internal surface coating reduces force required to pull wires and offers extra corrosion protection

CorroStall® Aluminum Conduit Boxes
- Made from special copper-free aluminum alloy to resist corrosion far better than standard copper-free aluminum
- Designed and tested to withstand prolonged exposure to corrosive agents and extreme temperatures

Stainless Steel Liquidtight Conduit Fittings
- Type 304 stainless steel construction provides strength, durability and corrosion resistance
- Straight, 45° and 90° angled — UL® Listed Type 3, 3R, 4, 4X for connecting flexible metal conduit to an enclosure

**Ty-Rap®**

Heavy-Duty Coated Stainless Steel Cable Ties
- Marine-grade Type 316 stainless steel, fully coated with low-smoke, halogen-free polyester for use in temperatures from -40° to 150° C
- Quick, easy installation and secure locking
Corrosion can cause unreliable power, high maintenance costs and production downtime. Choosing the right conduit and fitting system can extend the life of your electrical system by up to 300%.

Thomas & Betts products for corrosion & harsh environment protection

Carlon®
• PVC Conduit and Fittings
• Polycarbonate NEMA and JIC Enclosures

Hazlux®
• HazCote® Kynar® Coated Lighting Fixtures

Kindorf®
• 316 Stainless Steel, Aluminum, PVC-Coated or Non-Metallic Modular Framing Channel, Pipe Hangers and Beam Clamps

Kopex-Ex™
• Explosion-Proof Conduit Systems

Ocal®
• PVC-Coated Conduit and Fittings
• OCAL-BLUE® Type 4X Form 8 Conduit Bodies

PMA®
• Flexible Nylon Cable Protection Systems

Red•Dot®
• Code Keeper® Weatherproof While-in-Use Covers

Russellstoll®
• DuraGard® Non-Metallic Pin-and-Sleeve Connectors

Sta-Kon®
• Corrosion-Resistant, Nickel-Plated Wire Terminals

T&B® Cable Tray
• Aluminum, Stainless Steel and Fiberglass Support and Wire Management Systems

T&B® Fittings
• Stainless Steel Form 8 and BlueKote® Conduit Bodies
• XTRA FLEX® Non-Metallic Liquidtight Conduit, Tubing and BULLET® Fittings
• Stainless Steel and Aluminum Hubs
• Stainless Steel and Aluminum Liquidtight Conduit Fittings
• Ranger® Series Stainless Steel and Non-Metallic Liquidtight Cord Connectors
• Silver Grip® Stainless Steel Tray Cord Fittings
• CorroStall® Aluminum Conduit Boxes
• STAR TECK® Stainless Steel and Aluminum Fittings for Jacketed Metal-Clad and Teck Cable

Ty-Rap®
• Coated and Uncoulned Stainless Steel Cable Ties
• Ty-Rap Tote® Dispensers and Ergonomic Installation Tools
The pulping process involves cooking raw materials at elevated temperatures with steam in excess of 200° C. In addition to heat from pulping, drying and other processes, high plant floor usage and industrial lighting fixtures also contribute to increased ambient temperatures around the electrical system. While electrical system challenges in pulp and paper processing usually result from high temperatures, outdoor processes and their electrical systems can be exposed to below-freezing temperatures. Thomas & Betts’ solutions address issues that can result from extreme temperatures, including:

- Components in or near high-temperature processing areas can soften and fail
- Components may melt and destroy other nearby equipment or contaminate pulp or paper products
- Components in extremely high-temperature areas can catch fire and burn
- Thermal expansion and contraction damages conduit systems
- Components can become brittle and fail at low temperatures, particularly in outdoor areas

**PMA® Extreme-Temperature Flexible Nylon Conduit Systems**
- Continuous operating temperatures of -100° to 170° C and excellent fire safety characteristics
- Good flexibility and high impact resistance even at low temperatures

**T&B® Fittings**

*ATX Liquidtight Flexible Metal Conduit and High-/Low-Temperature Fittings*
- Suitable for operating temperatures from -60° to 150° C
- Flammability rating of UL94-HB and UL94V-2
- Conduit features standard flexible metallic core with temperature-resistant elastomeric outer jacket

*Sta-Kon® High-Temperature Ring Terminals*
- Rated for temperatures up to 150° C, 600V maximum
- UL94V-0 fluoropolymer insulation

**T&B® Fittings**

*XD Expansion/Deflection Coupling*
- Ideal for use in conduit runs subject to movement due to external forces or temperature changes
- Suitable for use indoors, outdoors, direct buried or embedded in concrete
- Watertight, flexible neoprene outer jacket — ideal for use in harsh environments

*Ty-Rap® Extra-High Temperature Nylon Cable Ties*
- For use in temperatures from -40° to 150° C
- Features “The Grip of Steel”® stainless steel locking device and offers infinite adjustability

*Heavy-Duty Stainless Steel Cable Ties*
- For use in temperatures from -80° to 538° C
- Available in both Type 304 and Type 316 stainless steel

**Ty-Rap®**
- Extra-High Temperature Nylon Cable Ties
- Heavy-Duty Stainless Steel Cable Ties
- PMA® Extreme-Temperature Flexible Nylon Conduit Systems
Thomas & Betts products for extreme temperature protection

**PMA®**
- Flexible Nylon Cable Protection Systems

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

**T&B® Fittings**
- ATX High-/Low-Temperature Flexible Metallic Liquidtight Conduit
- XD Expansion/Deflection Coupling for Rigid Conduit and XJG Expansion Coupling for Rigid Conduit

**Ty-Rap®**
- Coated and Uncoated Stainless Steel Cable Ties
- Extra-High Temperature and Flame-Retardant UL94V-0 Nylon Cable Ties
- Ty-Rap Tote® Dispensers and Ergonomic Installation Tools

With processes involving steam in excess of 200° C, pulp and paper processing facilities require electrical system solutions designed to withstand extreme temperatures.
Liquid Ingress Protection

Liquid exposure is a given in pulp and paper processing due to the wet nature of the operations, from pulping to slurry.

When specifying electrical systems for pulp and paper processing facilities, consider the following issues relating to liquid exposure:

- Liquid ingress can deteriorate or short out an electrical system immediately or over time
- Electrical system components designed with round surfaces help to shed liquids and contaminants, rather than creating a shelf where they can collect

Thomas & Betts offers you electrical system solutions that protect against liquid, moisture and dust ingress.

**T&B® Fittings**

**Liquidtight Conduit Fittings**
- Provide a water- and oil-tight seal where flexible metal conduit enters a box or enclosure
- Rounded gland nut deflects water from connector
- Continuous sealing ring ensures a liquidtight seal
- Available in straight, 45° and 90° angled versions

**Type A Liquidtight Flexible Non-Metallic Conduit and Fittings**
- Create a liquid-, dust- and oil-tight seal
- Ideal for continuous flexing applications
- Suitable for operating temperatures from -20° to 60° C
- Fittings available in non-burning, non-dripping thermoplastic, steel and stainless steel materials

**Ocal®**

OCAL-BLUE® PVC-Coated Type 4X Form 8 Conduit Bodies
- UL® Listed Type 4X and NEMA 4X rating for excellent protection in wet or high-pressure washdown areas, as well as harsh outdoor environments
- Stainless steel encapsulated cover screws can be hand-tightened — using only 15 in-lbs of torque — to achieve the 4X watertight rating
- Double coated for superior corrosion protection

**Russellstoll®**

DuraGard® Pin-and-Sleeve Connectors
- Not just watertight, but waterproof, mated or unmated
- Tested to 1,000 psi for washdown applications
- Full line of 20–60A (600VAC/250VDC max.) connectors, plugs and receptacles in UL94V-0 flammability-rated, corrosion-resistant, non-metallic housings

**Code Keeper® Weatherproof While-in-Use Covers**
- “Extra-duty” metallic weatherproof while-in-use covers
- Alloy A380 aluminum and stainless steel springs for increased corrosion resistance and durability

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**T&B® Fittings**
- Liquidtight Conduit Fittings

**T&B® Fittings**
- Type A Liquidtight Flexible Conduit and Fittings

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

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

**Red•Dot®**
- Code Keeper® Weatherproof While-in-Use Covers
Thomas & Betts products for liquid ingress protection

Carlon®
- Polycarbonate NEMA and JIC Enclosures

Ocal®
- PVC-Coated Conduit and Fittings
- OCAL-BLUE® Type 4X Form 8 Conduit Bodies

PMA®
- Flexible Nylon Cable Protection Systems

Red•Dot®
- Code Keeper® Weatherproof While-in-Use Covers

Reznor®
- Washdown Unit Heater

Russellstoll®
- DuraGard® Non-Metallic Pin-and-Sleeve Connectors

Sta-Kon®
- Heat-Shrink Terminals, Ergonomic Comfort Crimp® Tools and Disconnect Installation Tools
- Shrink-Kon® Wire and Connector Insulation Products

T&B® Fittings
- Type A Liquidtight Flexible Conduit and Fittings
- ATX High-/Low-Temperature Liquidtight Flexible Metal Conduit and Fittings
- Stainless Steel Form 8 and BlueKote® Conduit Bodies
- XTRA FLEX® Non-Metallic Liquidtight Conduit, Tubing and BULLET® Fittings
- Stainless Steel and Non-Metallic Liquidtight Conduit Fittings
- Ranger® Series Stainless Steel and Non-Metallic Liquidtight Cord Fittings
- CorroStall® Aluminum Conduit Boxes
- STAR TECK® Fittings for Jacketed Metal-Clad and Teck Cables

Ty-Rap®
- Coated and Uncoated Stainless Steel Cable Ties
- Ty-Rap Tote® Dispensers and Ergonomic Installation Tools

What NEMA/IP ratings are required to prevent liquid ingress into electrical systems in your facility?
Safety & Contamination

Safety in pulp and paper processing includes potential injury to personnel, product and the environment. These include:

- Electrical shock from exposed wiring
- Personal injury from rollers, cutting blades and other equipment
- Exposure to harsh chemicals, steam and extreme temperatures
- Contamination of pulp and/or paper product
- Hazardous waste and emissions from chemicals used in pulping, bleaching, cleaning, water treatment and other operations

Thomas & Betts offers product solutions designed to perform in the harshest of environments to protect your employees and prevent contamination of your product. And since up to 70% of paper mill losses can be attributed to human error,* Thomas & Betts can provide onsite electrical safety training to help you establish Best Practices for the use and application of our products in your processing operation.


Russellstoll®

DuraGard® Safety Interlocks

- Circuit breaker interlocked outlet
- NEMA 4X, UL94V-0, high-impact thermoplastic housing
- 30A and 50A ranges and polarizations to 480VAC
- 22kA interrupt capacity breaker

EMERGI-LITE® / Lightalarms™

Emergency Exit Lighting

- Designed to withstand damp, corrosive conditions
- Safe for use in explosive environments
- Energy efficient with long, low-maintenance service life

EZCODE®

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

Ty-Rap®

Low-Smoke Fluoropolymer Cable Ties

- Suitable for use in air-handling spaces
- UL94V-0 flammability rating
- Flame retardant with low smoke density

Detectable Nylon Cable Ties

- Detectable by X-ray equipment and by metal detectors set as low as 1.5mm ferrous sphere setting
- Bright blue color allows easy visual detection, especially on white paper processing systems
- Buoyant polypropylene version available for liquid-processing applications
- Smooth, notchless body sheds contaminants
How have EPA and OSHA regulations affected your company?

Do you use metal detectors or vision detection systems to prevent product contamination?

Are electrical systems located in high-traffic areas of your plant?
Hazardous Location Protection

The National Electrical Code® (NEC®) 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 pulp and paper processing facilities, hazardous locations may be present due to gases or chemicals, which fall under NEC® Class I, due to the presence of combustible dust, which falls under NEC® Class II, or from the presence of fibers and flyings from wood processing, classified as NEC® Class III. Typical hazardous locations include:

- Lumber yard/wood chipping
- Chemical processing and storage

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

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 30A, 60A and 100A

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
Explosion-Proof Conduit Outlet Boxes
- For use in the following classified Hazardous Locations: Class I Division 1 and 2, Group C, D; Class II Division 1, Groups E, F, G; Class III Division 1 and 2
- Compact design saves space
- Ductile iron body and copper-free aluminum cover for durability

Kopex-Ex™
Explosion-Proof Conduit Systems
- Designed to meet UL®, CSA, IECEx and ATEX standards for hazardous environments
- Approved for use in Zones 1, 2, 21, 22, Class I Division 1 and Class II Division 2 hazardous locations
- Complete system includes metallic and non-metallic conduit, fittings, stopping plugs, thread converters and accessories

Emergi-Lite®/Lightalarms™
Emergency Exit Lighting
- Designed to withstand damp, corrosive conditions
- Safe for use in explosive environments
- Energy efficient with long, low-maintenance service life
Thomas & Betts products for hazardous location protection

Cyberex®
• Industrial UPS Systems

Emergi-Lite®/Lightalarms™
• Emergency Exit Lighting

Hazlux®
• Hazardous Location Lighting

Kopex-Ex™
• Explosion-Proof Conduit Systems

Russellstoll®
• MaxGard® Pin-and-Sleeve Connectors and Explosion-Proof Interlocked Receptacles

T&B® Fittings
• Explosion-Proof Outlet Boxes, Elbows and Sealing Fittings for Rigid Conduit
• XP Explosion-Proof Flexible Couplings
• STAR TECK XP® Explosion-Proof Fittings for Jacketed Metal-Clad and Teck Cables

Do you have explosion risks from dust, fibers and flyings, flammable gases, liquids or chemicals?
# Harsh Chemicals Used

## Chemical Resistance Performance Rating

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<th>Chemicals</th>
<th>A</th>
<th>B</th>
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<tr>
<td>Overall</td>
<td>Best</td>
<td>Better</td>
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<td>Poor</td>
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## Chart

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<tr>
<th>Material</th>
<th>316 Stainless</th>
<th>304 Stainless</th>
<th>Aluminum</th>
<th>Brass</th>
<th>Cast Iron</th>
<th>Nylon</th>
<th>PVC</th>
<th>PVC Coated</th>
<th>Kynar®</th>
<th>Polycarbonate</th>
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<tr>
<td>Phosphoric Acid (Crude)</td>
<td>A</td>
<td>B</td>
<td>D</td>
<td>B</td>
<td>B</td>
<td>A</td>
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<td>A</td>
<td>A</td>
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<tr>
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<td>D</td>
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<td>Sulfuric Acid (10-75%)</td>
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### Notes

- **316 Stainless**: A = Best, B = Better, C = Good, D = Poor
- **304 Stainless**: A = Best, B = Better, C = Good, D = Poor
- **Aluminum**: B = Best, C = Better, D = Good, D = Poor
- **Brass**: D = Best, N/A = Better, D = Good, D = Poor
- **Cast Iron**: D = Best, D = Better, D = Good, D = Poor
- **Nylon**: B = Best, B = Better, B = Good, B = Poor
- **PVC**: A = Best, B = Better, A = Good, A = Poor
- **PVC Coated**: A = Best, B = Better, A = Good, A = Poor
- **Kynar®**: A = Best, B = Better, A = Good, A = Poor
- **Polycarbonate**: B = Best, A = Better, D = Good, A = Poor

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*Kynar® is a registered trademark of ARKEMA, Inc.*

The information in this chart has been supplied to Thomas & Betts by other reputable sources and is to be used ONLY as a guide in selecting equipment for appropriate chemical compatibility. Thomas & Betts does not warrant that the information in this chart is accurate or complete or that any material is suitable for any purpose. Before permanent installation, test the equipment with the chemicals and under the specific conditions of your application. Ratings of chemical behavior listed in this chart apply at a 48-hour exposure period. Thomas & Betts has no knowledge of possible effects beyond this period.
T&B Engineered Solutions

For Pulp and Paper Processing Maintenance and Repair Operations (MRO)

• Blackburn® Motor Lead Disconnects and KUBE® Flag and Tee Connectors featuring the Color-Keyed® Compression System that ensures proper connections
• Russelstoll® MaxGard® and DuraGard® Pin-and-Sleeve Connectors
• T&B® Fittings ATX High-/Low-Temperature Liquidtight Flexible Metal Conduit and Fittings

For Pulp and Paper Processing Original Equipment Manufacturers (OEMs)

• Adaptaflex® Flexible Metallic Conduit Systems
• Blackburn® Compression Lugs and KUBE® Flag and Tee Connectors featuring the Color-Keyed® Compression System that ensures proper connections
• EZCODE® Identification Products
• PMA® Flexible Nylon Conduit Systems
• Pos-E-Kon® Rectangular Circuit Connectors
• Sta-Kon® High-Performance Wire Terminals
• T&B® Cable Tray Raceway Systems
• T&B® Fittings Liquidtight Conduit and Cord Fittings
• Ty-Rap® High-Performance Cable Ties and Accessories
### High-quality products to address key issues in pulp and paper processing

<table>
<thead>
<tr>
<th>Thomas &amp; Betts Brands</th>
<th>Products</th>
<th>Continuous Operation &amp; Sustainability</th>
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<td>Blackburn®</td>
<td>E-Z-Ground® Compression Connectors, Mechanical Grounding and Exothermic Grounding Systems</td>
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<td>Compression Lugs and Splices and Ergonomic Compression Tools</td>
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<td>KUBE® Power Connectors and Motor Lead Disconnects</td>
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<td>Carlon®</td>
<td>PVC Conduit and Fittings</td>
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<td>Polycarbonate NEMA and JIC Enclosures</td>
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<td>Cyberex®</td>
<td>Industrial UPS Systems</td>
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<td>Emergency Exit Lighting</td>
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<tr>
<td>EZCODE®</td>
<td>Danger and Warning Labels and Signs, Industrial Markers, Barricade and Burial Tapes and Wire Markers</td>
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<td>Fisher Pierce®</td>
<td>Faulted Circuit Indicators</td>
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<td>Hazlux®</td>
<td>HazCote® Kynar® Coated Lighting Fixtures</td>
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<td>Joslyn Hi-Voltage®</td>
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<td>JT Packard®</td>
<td>Electrical and Data System Installation, Inspection and Maintenance Services</td>
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<td>Kindorf®</td>
<td>316 Stainless, Aluminum, PVC-Coated or Non-Metallic Modular Framing Channel, Hangers and Clamps</td>
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<td>Ocal®</td>
<td>PVC-Coated Conduit and Fittings</td>
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<td>OCAL-BLUE® Type 4X Form 8 Conduit Bodies</td>
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<td>Flexible Nylon Cable Protection Systems</td>
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<td>Ty-Rap Tote® Dispensers and Ergonomic Installation Tools</td>
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Thomas & Betts Specification Guide

Thomas & Betts product guide specifications are available as Microsoft Word documents at www.tnb.com. They follow the CSI three-part format, using section numbers from Master Format® 2010 Update. This enables their simple and seamless incorporation into any CSI compliant electrical specification. Following are products referenced in this brochure:

- **26 05 29.11** Modular Metal Framing System – Kindorf®
- **26 05 33.14** Corrosion-Resistant Conduit Systems
- **26 05 33.18** Weatherproof Boxes and Covers
- **26 05 33.22** Explosion-Proof Conduit Outlet Boxes
- **26 05 33.24** Liquidtight Conduit Fittings
- **26 05 33.32** Jacketed Metal-Clad Cable Fittings
- **26 05 33.54** Industrial-Grade Conduit Bodies
- **26 05 33.55** Industrial-Grade Rigid Fittings
- **26 05 33.56** Explosion-Proof Conduit Outlet Bodies and Fittings
- **26 05 83.11** Wiring Connections: Solderless Crimp Terminals
- **26 05 84** Wire and Cable Fastening
- **26 54 00** Classified-Location Lighting
- **26 27 26.11** Wiring Devices: Metallic Pin and Sleeve
- **26 27 26.12** Wiring Devices: Non-Metallic Pin and Sleeve

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Visit the T&B world of electrical product solutions

Visit our web site for more information about Thomas & Betts solutions and our newest products. For a user-friendly catalog and competitive part number search, application and technical support and other useful information, go to: www.tnb.com

Industry codes and specifications

All Thomas & Betts products for use in pulp and paper processing facilities meet or exceed applicable industry specifications or codes which are detailed in the appropriate T&B 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

American Recovery and Reinvestment Act (ARRA)

Get certification letters for compliant products online at:

www.tnb.com/ARRA