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KnowledgeBase:
Ethanol Production

Setting the standard with safe, reliable electrical construction products, people, procedures and proficiencies.

COOPER Crouse-Hinds



It takes proven partners to handle the opportunities and risks of a new industry.

Every new ethanol plant helps define the standards of a new energy industry. And it's an industry crowded with stakeholders. You have investors looking for fast, predictable returns. Operators want efficiencies, reliability, safety and minimal labor requirements. Energy consumers are clamoring for alternatives. Government and regulators are creating both incentives and obstacles.

With all those distractions, you still need to design, engineer, build and test safe, reliable and cost-effective plants. You need to be on time and on budget. You need to know which design and product choices make the most sense. And you must be able to get the products and support you need precisely when and where you need it.

That's a lot of challenges. And the challenges don't end when the construction stops. Like we said, it's a new industry. People need to be trained. Procedures developed. Systems and procedures optimized. Standards determined. You need less to worry about and more proven, experienced, innovative resources to count on.

KnowledgeBase for Ethanol Production from Cooper Crouse-Hinds® can help.

Put a century of standard-setting experience to work for you.

For more than a century, companies have come to rely on Cooper Crouse-Hinds for value they can trust to grow their business. By integrating a comprehensive line of reliable electrical products with expert support, industry insights, and local availability, we enhance safety and productivity in the most demanding industrial and commercial environments worldwide. This philosophy is at the core of every product we develop and every solution we engineer.

More than products to help you win.

The Cooper Crouse-Hinds Alternative Fuels team is ready to help you whenever you need us. Highly trained and experienced, our network of representatives and technical experts can deliver in-person training on the selection of products for harsh and hazardous locations in ethanol production. They can help you determine more efficient ways to distribute and control power, configure lighting, and ensure electrical safety.

Lighting for efficiency, productivity and tasks.

You can know with certainty the right way to light each section of your plant for maximum efficiency and usability. Our lighting design experts can create detailed lighting layouts, using the latest lighting planning software and all the latest lighting technologies. From the toughest environments and tightest spaces to cavernous locations and outdoor lighting, we have the products and the experts to light the way.

Value engineering for safety and savings – in construction and maintenance.

There is always a different way to do things. We'll help engineer costs and time out of your construction, maintenance and upgrades. But we're always sure to engineer safety and reliability in.

We have products that install faster, require fewer parts and deliver superior performance. And with low maintenance choices, like longer lasting lamp options and enclosures with epoxy powder coating, you need fewer man-hours each month to remain up and running safely and productively.

A commitment to set new standards for ethanol and more.

The Cooper Crouse-Hinds KnowledgeBase for Ethanol Production is helping more designers, builders and operators succeed in the ethanol industry each day. It's part of our commitment to focus our KnowledgeBase on industries where our experience, expertise and products can make the biggest impact.

You get better products, an even higher service standard and support created precisely for successful ethanol production. That's a standard that's hard to beat.

It's about knowing your challenges inside-out.

Environmental conditions in a typical ethanol production facility.

This typical ethanol processing plant presents both opportunities for enhanced performance and risk of compromised safety. Cooper Crouse-Hinds products and people help you capitalize on the opportunity and mitigate the risk.

Class I, Div. 1&2, Zone 1&2

Explosion protection for flammable atmospheres

Class II, Div. 1&2

Explosion protection for combustible dust in the atmosphere

*Applicable to some facilities

Wet Location: NEMA Type 4, IP56

Protection from windblown dust and rain, splashing & hose-directed water, and external formation of ice

Corrosive Areas

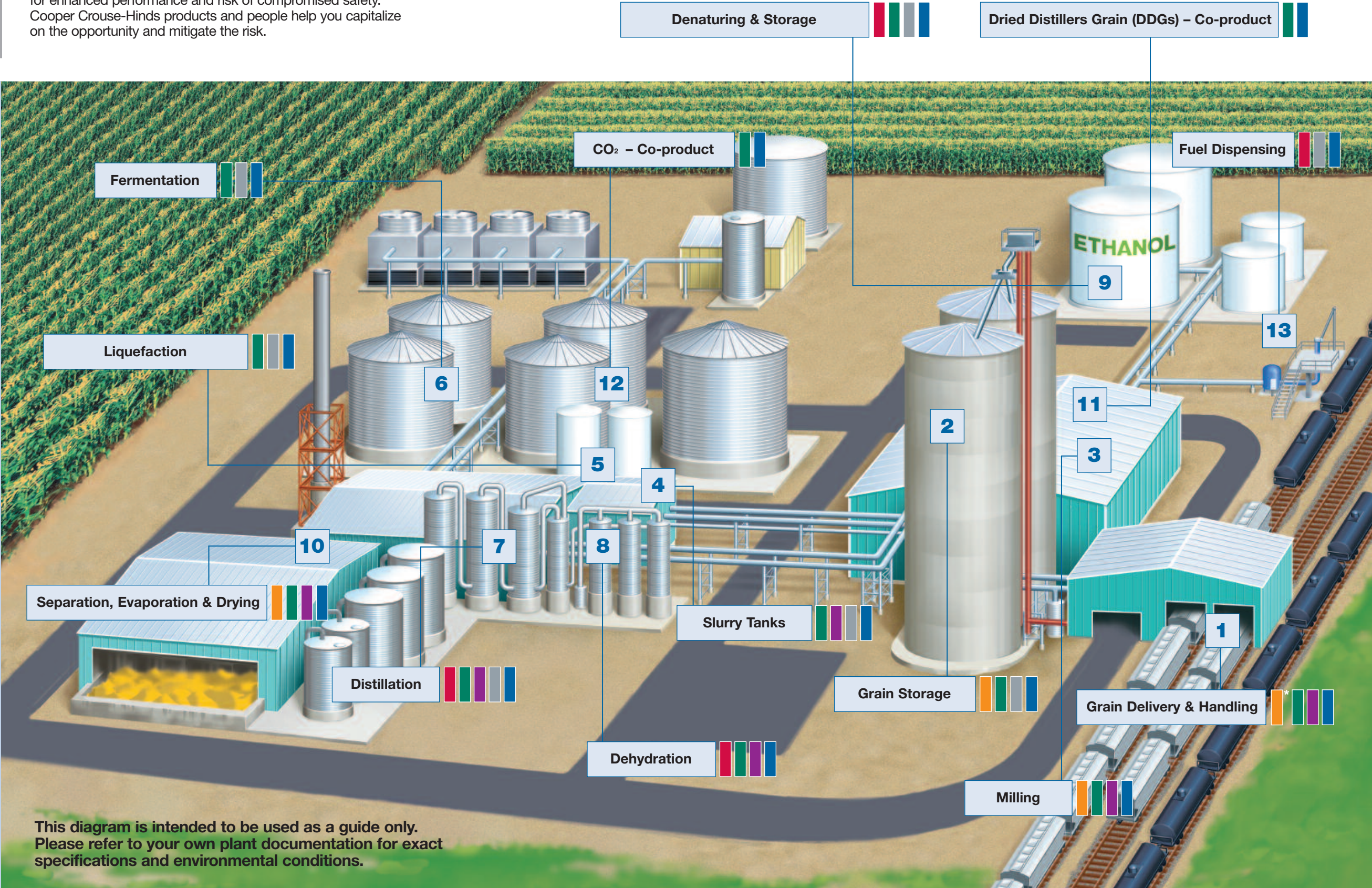
From chemicals, atmospheres and water

Space Constraints

Areas with low ceilings, tight spaces and limited footprint potential

Industrial

Areas prone to dirt, grime, vibration, hard use and abuse



This diagram is intended to be used as a guide only. Please refer to your own plant documentation for exact specifications and environmental conditions.

Products powering advantage in ethanol production.



Here’s what our products can do for you.

With more than 100,000 proven, quality products, your Cooper Crouse-Hinds Ethanol Production KnowledgeBase team has more options than anyone else in the business.

From the harsh and hazardous categories we invented and continue to lead, to innovative lighting and safety products, we can help make you more competitive. Here are some of the ways our safe, reliable products can deliver advantage for you.

Plugs and Receptacles:

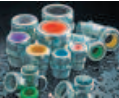
Rugged construction, extensive configurations, custom capabilities and numerous interlocked designs define Cooper Crouse-Hinds as the leading source for NEC and IEC Plugs and Receptacles that provide safe and reliable solutions for fixed and portable power applications in industrial and hazardous environments.

Product Solutions	Env. Conditions	Plant Location
 ENR & ENP NEMA Configured Plugs and Receptacles offer a factory-sealed chamber that encloses the potential arcing components between two explosionproof threaded joints – no additional seals are required. A one-piece molded gasket seals the cover plate and ENP plug, providing full environmental protection at the receptacle face. Molded-in contact design provides superior interior contact reliability and a top-hinged cover design with 45° downward angle provides superior protection in damp, wet, and dirty locations.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Space Constraints Industrial	1, 3, 10, 11, 12
 Arktite® Plugs & Receptacles with Krydon® or copper-free aluminum construction offer corrosion resistance for long life. A unique patented strain relief design prevents stress from reaching wire terminations at the contacts. Sealing gaskets at all critical points inside Arktite plugs and receptacles protect against dust, dirt, mud, water, and corrosive contaminants. Arktite plugs and receptacles are keyed for a perfect match in the molded one-piece insulator housing. Available for 30, 60, & 100A service with a complete choice of wire termination methods, and are completely interchangeable with all comparably rated metallic Arktite products.	Wet Locations Corrosive* Industrial	All
 WSR/WSRD Interlocked Arktite Receptacles with enclosed disconnect switches are used as a service outlet for portable or fixed electrical equipment. The enclosure, handle, and other exterior parts are corrosion resistant. For maximum safety, the spring door receptacle at the bottom of the unit is mechanically interlocked with the switch operating mechanism. The switch cannot be closed until the plug is fully inserted and the plug cannot be withdrawn or inserted unless the switch is open. With the switch open, accidental plug withdrawal is prevented by the interlock mechanism. Withdrawal can only be accomplished by activation of the interlock release lever located on the receptacle.	Wet Locations Corrosive* Industrial	All

* In non-metallic

Fittings:

Time-tested, innovative conduit fittings, cord connectors and cable glands from Cooper Crouse-Hinds move power where you need it simply and safely in any electrical installation.

Product Solutions	Env. Conditions	Plant Location
 Form 7 Conduit Outlet Bodies act as pull conductors and provide openings for making splices and taps. Form 7 Condulet® outlet bodies approach conduit in size – for neat, compact installations. Covers have wedgenut attachments that provide clear, unobstructed cover openings. Covers with integral sealing gaskets reduce installation time and costs.	Wet Locations Space Constraints Industrial	All
 GUA, EAB, EAJ Series Hazardous Location Conduit Outlet Boxes protect conductors and provide openings to pull conductors and make splices and taps. They offer a standard neoprene “O” ring gasket on the cover to meet NEMA 3 and 4 requirements. Cast ears on covers make for easy removal and tightening.	Class I, Zone 1&2 Class II, Div. 1&2 Industrial	1, 7, 8, 9, 10, 13
 EYS, EYD, EZS, EZD Sealing Fittings restrict the passage of gases, vapors or flames from one portion of an electrical installation to another. They also keep explosions within a sealed off enclosure. Sealing fittings are required at each entrance to an enclosure that houses an arcing or sparking device when used in Class I, Division 1 and 2 locations. EYS fittings are available for both horizontal and vertical installations.	Class I, Zone 1&2 Class II, Div. 1&2 Industrial	1, 7, 8, 9, 10, 13
 Chico® SpeedSeal™ Compound fills the entire fitting, automatically separating conductors. It eliminates the time-consuming and tedious task of packing fiber to separate conductors. It reduces a 50-minute operation to 5 minutes, saving considerable labor on every sealing fitting installed.	Class I, Zone 1&2 Class II, Div. 1&2 Industrial	1, 7, 8, 9, 10, 13
 FS/FD Cast Iron or Aluminum Boxes are used where wiring devices or special arrangements of conduit hubs or entrances are required. FS/FD bodies have standard hub arrangements or can be custom drilled to specifications. Boxes are available in single, two, three, four and five gang and two gang tandem bodies.	Wet Locations Space Constraints Industrial	7, 8, 9, 10, 13
 CGB Cord and Cable Fittings provide means for passing cord or cable into an enclosure or through a bulkhead, while forming an environmental seal. They are typically used with portable cord and types MV (unarmored), PLTC, SE (round), TC and UF cables.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Space Constraints Industrial	All
 Myers™ Scru-tite™ and Ground Hubs terminate electrical conduit to the wall of an enclosure. They are resistant to a variety of chemicals, including acetic, citric and salt water and are available in zinc, aluminum or stainless steel. They come with a special “O” ring Viton (75) that protects them against chemicals.	Class I, Zone 1&2 Class II, Div. 1&2 Industrial	All
 EAHC and EFHC Luminaire Hangers are for use in hazardous areas to suspend explosionproof pendant luminaires from the conduit system and function as both a conduit outlet box and a luminaire hanger. GUFX outlet bodies are used with luminaire canopies, union hubs and nipple covers for mounting EVM and EVLP luminaires. These outlet bodies are easy to install and the interior is easily accessible for making splices or taps.	Class I, Zone 1&2 Class II, Div. 1&2 Industrial	1, 3, 10

Industrial Lighting:

Advanced lighting technology, expert Cooper Crouse-Hinds support, global certifications and an unmatched selection of proven solutions combine to deliver superior illumination, increased safety and the lowest possible cost of ownership in the most demanding industrial and hazardous location applications.

Product Solutions	Env. Conditions	Plant Location
 The versatile Champ® Industrial Lighting Family delivers a broad range of wattages, lamp sources, compliances, optics and accessories. These luminaires are ideal in areas where ignitable concentrations of flammable gases or vapors will be present due to abnormal, unusual or accidental conditions or combustible dust.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Corrosive Industrial	All
 Champ-Pak™ Wall Pack is the first low-profile wall pack designed specifically for hazardous areas. These wall-mounted luminaires are suitable for any area with adverse conditions such as dust, dirt, moisture, vibration, high pressure hose down and high thermal ambient. The precise design of its glass refractor minimizes fixture depth while providing uniform glare-free illumination.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Corrosive Space Constraints Industrial	2, 4, 5, 6, 7, 8, 9, 10, 13
 The Champ FMV Floodlight Family offers industry-leading ease of installation features, including a removable ballast tray, prewired with terminal blocks, and substantial room for wiring. These floodlights provide wide, powerful beams in a variety of lamp sources and wattages and come with a continuous silicone gasketing that ensures wet location rating integrity.	Wet Locations Corrosive Industrial	2, 4, 5, 6, 7, 8, 9, 13
 Vaporgard™ Series Incandescent Luminaires are used indoors or outdoors in industrial locations requiring enclosed and gasketed fixtures due to moisture, dirt, chemicals, vibration or rough usage. Their instant-on capability makes them ideal for building entrances. Instead of time-consuming screws, a shock-absorbing socket strap is keyhole slotted and removes quickly for easier wiring.	Corrosive Industrial	7, 8, 9, 10, 13
 The EVM Hazard-Gard® Factory-wired HID Luminaire feeds power through a “wireless” connection block which serves as a mechanical seal between conduit and ballast compartments. This eliminates the need for an external, field-installed seal for faster installation.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Corrosive Industrial	7, 8, 9, 10, 13
 EVLP Low Profile HID Hazard-Gard Luminaires are used indoors or outdoors where flammable or explosive vapors or gases are present. Their long life reduces maintenance costs and their two start Acme threaded construction assembles and installs easier.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Corrosive Space Constraints Industrial	7, 8, 9, 10
 The MEDC line's vast variety of visual and audible signaling devices are designed specifically for harsh environments where there is a risk of explosion from flammable atmospheres. They help you communicate better, regardless of the conditions to keep your equipment and personnel safe.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Corrosive Space Constraints Industrial	3, 4, 5, 6, 7, 8, 9, 10, 13
 Light-Pak™ N2LPS & ELPS Emergency Lighting systems provide reliable illumination during power failures. They are ideal for wet or corrosive conditions, grain processing and handling or storage facilities where the presence of flammable gases and vapors, combustible dusts or easily ignitable fibers and flying is commonplace.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Corrosive Industrial	1, 10

Control & Apparatus:

Innovative, intelligent NEC and IEC Control and Apparatus solutions from Cooper Crouse-Hinds safely and efficiently control power and protect circuits in explosive, wet and corrosive environments worldwide.

Product Solutions	Env. Conditions	Plant Location
 EGL Static Grounding Indicators ensure safe product transfer, housing the automated pump control and static ground verification system in a compact, space-efficient NEMA 4X explosionproof enclosure. It allows easy interior access, is easy to maintain and offers multiple mounting options. The EGL comes with a rugged stainless steel clamp on a 25 foot cord to safely indicate ground on trucks and rail cars during unloading of bulk materials.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Industrial	1, 9, 13
 EDS and EFS Factory-sealed Control Stations improve safety and reduce installation time and cost by eliminating the need for an external sealing fitting. These factory-sealed control devices are available in pushbutton, selector switch and pilot light configurations.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Space Constraints Industrial	1, 7, 8, 9, 10, 13
 FlexStation™ delivers custom-built control stations with off-the-shelf turnaround times. They offer a complete system of interchangeable control station devices that can be quickly and easily assembled on-site into hundreds of configurations to meet your specific application requirements.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Industrial	7, 8, 9, 10, 13
 EBM Enclosures with Motor Starters or Circuit Breakers feature a semi-clamshell design and external flanged ground joint to make interior components more accessible. Stainless steel hinges allow the cover to swing well out of the way and a versatile, internal operating mechanism allows field adjustments to accommodate popular breakers or disconnect switches. The circuit breaker external operating handle can be padlocked in either “ON” or “OFF” positions.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Corrosive Industrial	7, 8, 9, 10, 13
 EBMC Combination Motor Starter and Circuit Breaker Enclosures are made of rugged, corrosion-resistant, cast copper-free aluminum. It offers simple, straightforward installation of breaker and starter on a pre-drilled mounting plate. A neoprene gasket permanently attached to the cover seals out moisture. Versatile internal operating mechanisms allow for field adjustment to accommodate popular starters and breakers.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Corrosive Industrial	7, 8, 9, 10, 13
 EIB Compact, Cost-effective Circuit Breaker Assemblies are an innovative line of explosionproof motor controls that use an EJB enclosure with a Cutler-Hammer™ circuit breaker. It is available with or without the breakers installed and accommodates breakers from 15 to 100A. An integral cover gasket maintains a NEMA 3, 3R, and 4 rating.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Space Constraints Industrial	10, 11
 N2S Krydon® Control Stations provide superior protection in corrosive and hazardous environments. Their tough Krydon fiberglass-reinforced polyester material lasts longer and is specially formulated to resist damage from heat, ultraviolet rays, and impact. They come with factory-sealed devices suitable for Class I, Div. 2 hazardous installations.	Wet Locations Corrosive Industrial	8, 10, 11
 EJB Junction Boxes are used in threaded rigid conduit systems as a junction or pull box, providing enclosures for splices and branch circuit taps or for housing terminal blocks, relays and other electrical devices in hazardous areas. They are rated for damp, wet, dusty, corrosive and hazardous locations. They are ideal in applications with frequent or heavy rain, water, spray, moisture, and humidity.	Class I, Zone 1&2 Class II, Div. 1&2 Wet Locations Industrial	1, 7, 8, 9, 10, 13