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KnowledgeBase:
Land-Based Drilling

Setting the standard with safe, reliable electrical products, people, procedures and proficiencies – delivering advantage you can use every day.

COOPER Crouse-Hinds



End-to-end product solutions with start-to-finish expertise support.



When building a drilling platform, you need every advantage you can get to deliver safe, high-quality product solutions.

Cooper Crouse-Hinds created a resource of products, expertise, innovation and industry commitment to help you build and power drilling platforms safely and effectively. As part of your design and project management team, we offer the knowhow, ideas and the product insights to:

- Improve platform performance
- Speed construction
- Reduce risk



Expert advice that addresses business realities

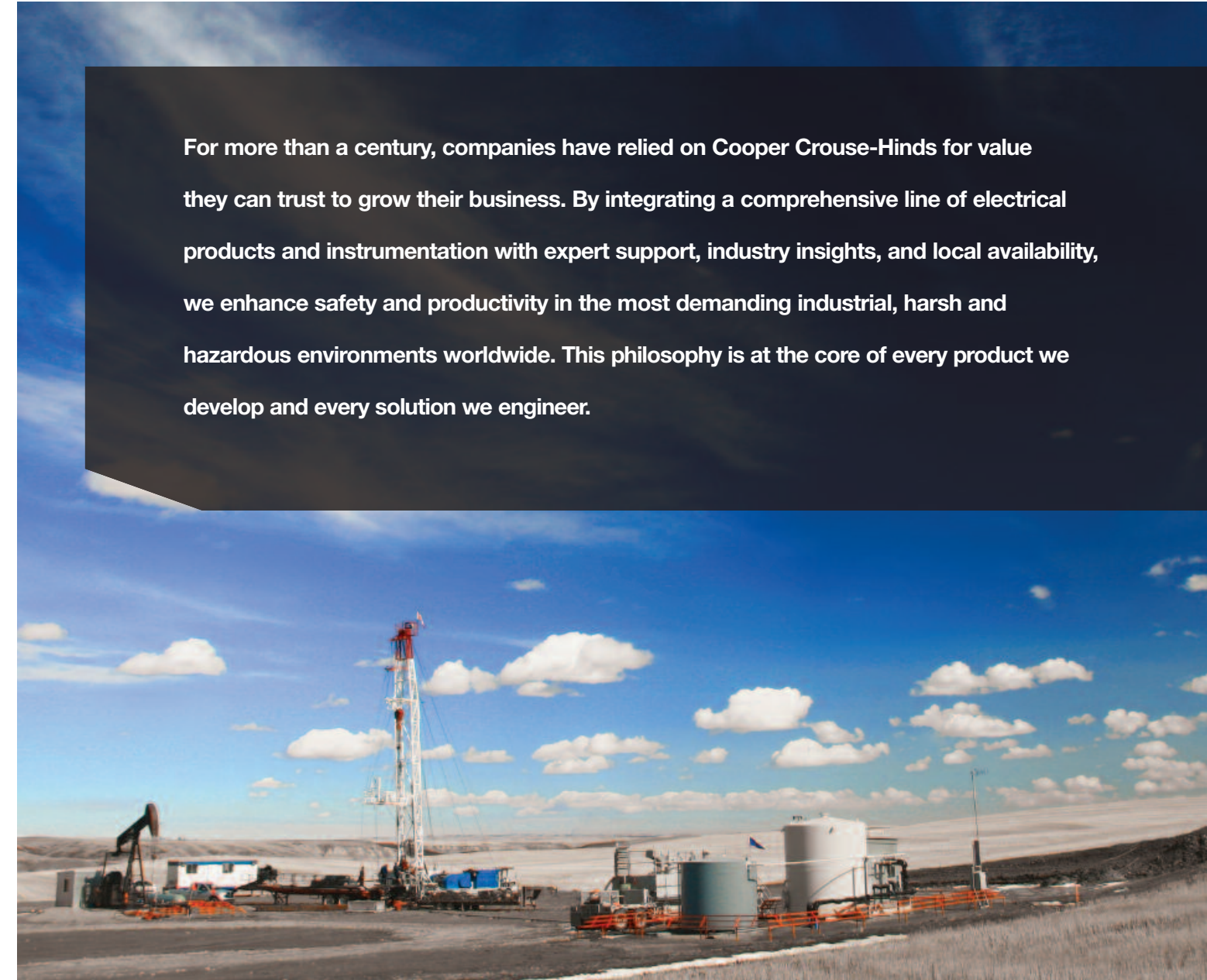
With over 100 years of experience, Cooper Crouse-Hinds has the resources to offer expert advice and help you optimize the performance, efficiency and installation challenges of your platform's electrical and lighting systems.

We deliver an advantage you can actually see and measure through processes and products that:

- Ensure proper product selection
- Adhere to global certifications and compliances
- Meet deadlines and deliver quality products
- Realize efficiencies in installation
- Reduce operating and maintenance costs

Whether it's photometric lighting layouts or hazardous-location controls, Cooper Crouse-Hinds can recommend safe and efficient products that are focused on helping you build your business and improve performance every day.

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





Worldwide products delivering total-system solutions

In a worldwide marketplace, Cooper Crouse-Hinds provides products that are certified to meet local standards, while performing safely and reliably in the most demanding harsh and hazardous conditions imaginable. From a single source, you can select quality products that can be installed in compliance with multiple electrical standards:

- International Electrical Code (IEC) Standards
- National Electrical Code (NEC) Standards
- Canadian Electrical Code (CEC) Standards

Project management for productivity and communication

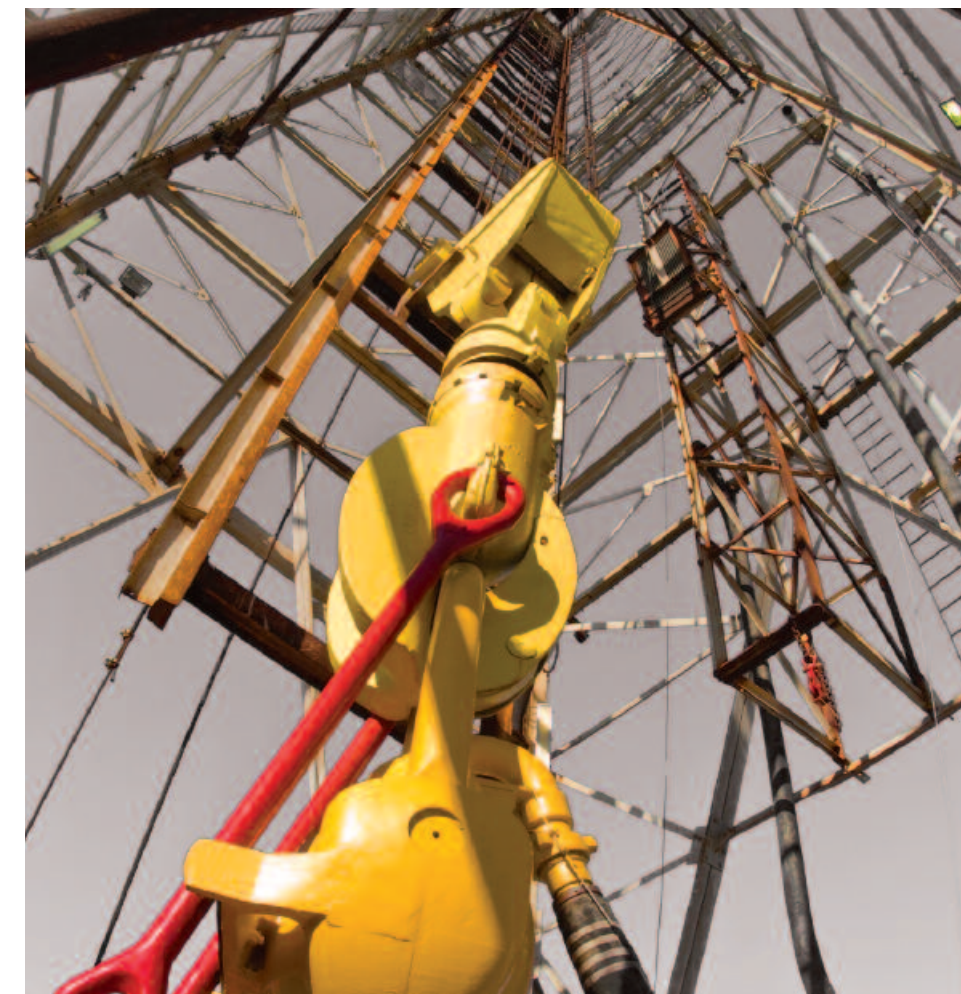
Cooper Crouse-Hinds is a resource you can count on throughout your entire process. Working with distributors, suppliers, and on-site personnel, we help coordinate deliveries, stage assembly and track progress. Our commitment is to support your project from beginning to end. This first-hand knowledge prevents problems from happening and identifies opportunities others might miss.

Understanding your needs for availability, affordability

Availability: Our comprehensive product portfolio is backed by a highly trained global sales, service and distribution network, ensuring products are available where and when you need them.

Affordability: Cooper Crouse-Hinds products are engineered for total lower cost, giving you:

- Longer life
- Easy installation
- Reduced maintenance



Safety and reliability that sets the standard from installation through ongoing performance.

This illustration spotlights many of the common environmental challenges you face when designing, constructing and running a land-based drilling platform. We understand that every platform presents unique challenges and opportunities, so we offer customized solutions for each drilling customer.

Environmental Conditions

Industrial

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

Space Constraints

Areas with low ceilings, tight spaces and limited footprint potential

Wet Locations

Protection from wind-blown dust and rain, splashing and hose-directed water and external formation of ice

Class I, Div 1/Zone 1

Explosion protection for areas with flammable gases or vapors normally in the atmosphere

Vibration

Locations that need products designed to withstand continuous movement and may require maintenance and repair

Class I, Div 2/Zone 2

Protection for areas where flammable gases or vapors may be present

Corrosive Areas

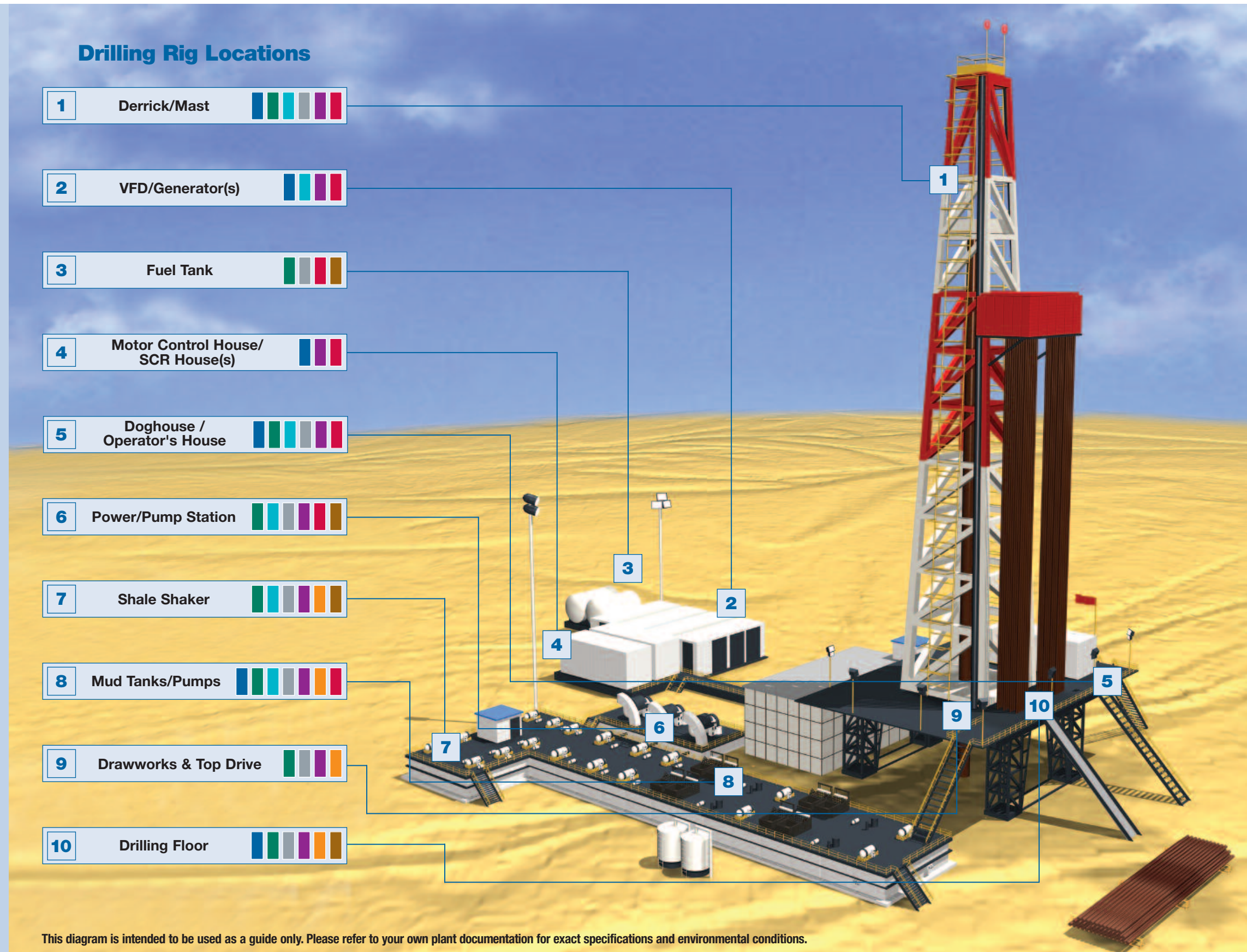
From chemicals, atmospheres and water

Class II/Zone 21 & 22

Protection for areas where ignitable dusts may be present

Drilling Rig Locations

- 1 **Derrick/Mast**
- 2 **VFD/Generator(s)**
- 3 **Fuel Tank**
- 4 **Motor Control House/ SCR House(s)**
- 5 **Doghouse / Operator's House**
- 6 **Power/Pump Station**
- 7 **Shale Shaker**
- 8 **Mud Tanks/Pumps**
- 9 **Drawworks & Top Drive**
- 10 **Drilling Floor**



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

Here's what our products can do for you.

With more than 100,000 proven, quality products, your Cooper Crouse-Hinds Drilling 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. Using the drilling illustration as a reference, the following product pages list possible environmental conditions and drilling application locations.

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.

IEC	NEC	Product Photo	Product Solutions	Env. Conditions	Plant Location
•	•		Motors Starters - GHG 635 Series <ul style="list-style-type: none"> Protects against overload and phase failure Quick and easy installation with the innovative break-line cover, allowing full wire access Switch handle provides clear indication of switch position, ensuring safe operation Global compliances and certifications 	Wet Locations Vibration Corrosive Areas Space Constraints Class II/Zone 21 & 22	2, 6, 7, 8, 9
	•		PowerPlus™ Panelboards <ul style="list-style-type: none"> Ideal solution to protect lighting and heat tracing circuits Nearly infinite configurations for numerous applications Factory-sealed design reduces installation cost by eliminating the need for external seals Reliable peace-of-mind performance 	Wet Locations Vibration Corrosive Areas Class I, Div 2/Zone 2 Class II/Zone 21 & 22	2, 4, 5, 6, 10
•	•		EJB Junction Boxes <ul style="list-style-type: none"> Used as junction or pull box in threaded rigid conduit systems Rated for damp, wet, dusty, corrosive and hazardous areas Ideal in applications with frequent or heavy rain, water, spray, moisture and humidity Available with ATEX certification when specified 	Wet Locations Vibration Corrosive Areas Class I, Div 2/Zone 2 Class II/Zone 21 & 22	2, 4, 5, 8, 10
•	•		D2Z Panelboards <ul style="list-style-type: none"> Non-metallic factory sealed panel for protection of lighting and heat tracing circuits Ideal for indoor or outdoor applications in Zone 1, Div 2 areas Global compliances and certifications Unique design allows for panels with more than 42 circuits Completely wired, ready for connection to terminal blocks 	Wet Locations Corrosive Areas Class I, Div 1/Zone 1 Class I, Div 2/Zone 2 Class II/Zone 21 & 22	4, 5, 6, 10

Signaling:

The Cooper MEDC line, available through Cooper Crouse-Hinds, offers hazardous location solutions for routine and emergency audible and visual signaling.

IEC	NEC	Product Photo	Product Solutions	Env. Conditions	Plant Location
•	•		MEDC Lamps & horns <ul style="list-style-type: none"> Improves visual and audible communication in case of an emergency Designed specifically for harsh environments with an explosion risk from flammable atmospheres Keeps equipment and personnel safe, indicating when a fire or gas leak has occurred 	Industrial Wet Locations Vibration Corrosive Areas Space Constraints Class I, Div 2/Zone 2 Class II/Zone 21 & 22	1, 2, 4, 5, 7, 10

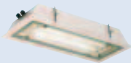






Plugs and Receptacles:

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.

IEC	NEC	Product Photo	Product Solutions	Env. Conditions	Plant Location
	•		Metallic Arktite® <ul style="list-style-type: none"> Used to supply power to portable electrically operated devices such as motor-generator sets, compressors, heating/cooling units, welders, lighting systems and similar equipment with power requirements from 20 to 400 amps Copper-free aluminum construction, ideal for harsh environments Arc-snuffing design enables large power loads to be disconnected under load without an arc flash (up to 200 amps) 360° split pin contact reduces heat rise and eliminates arcing Tri-Lock™ cord grip's three clamps provide even gripping and superior cord clamping for better handling 	Industrial Wet Locations Vibration Corrosive Areas Space Constraints Class I, Div 1/Zone 1	2, 4, 5
	•		Non-Metallic Arktite® <ul style="list-style-type: none"> Proprietary Krydon® construction for corrosion and moisture resistance in applications with power requirements up to 100 amps Unique patented strain-relief design prevents stress from reaching wire terminations at contacts Sealing gaskets at all critical points protect against dust, dirt, mud, water and corrosive contaminants Interchangeable with all comparably rated metallic Arktite products 	Wet Locations Vibration Corrosive Areas Space Constraints	3, 8, 9, 10
	•		ENR & ENP Series <ul style="list-style-type: none"> True explosionproof protection for power requirements up to 20 amps Factory-sealed chamber encloses potential arcing components between two explosionproof threaded joints ENP plugs connect to standard U-ground NEMA/EEMAC configuration 5 & 6 receptacles, eliminating the need for separately equipped portable units for hazardous and non-hazardous environments One-piece molded gasket seals cover plate and ENP plug, providing full environmental protection at receptacle face 	Industrial Vibration Space Constraints Class I, Div 1/Zone 1 Class I, Div 2/Zone 2	1, 2, 3, 4, 7, 8, 9
	•		FSQC & EBBR Series <ul style="list-style-type: none"> Interlocked units with dead front receptacles ensure connection cannot be made or broken under load, increasing safety and protection Metallic and non-metallic Arktite plugs can be used with both FSQC (30-60 amps) & EBBR (30-100 amps) series to provide ultimate flexibility of portable equipment used throughout the rig FSQC units are interlocked with switches and the EBBR series is interlocked with circuit breakers for added protection 	Industrial Wet Locations Vibration Corrosive Areas Space Constraints Class I, Div 1/Zone 1 Class I, Div 2/Zone 2 Class II/Zone 21 & 22	4, 7, 8, 10
	•		eXLink® Connectors <ul style="list-style-type: none"> Complete system for connecting and disconnecting electrically Reduces installation time, providing maintenance and labor savings Enhances reliability and decreases downtime Rated up to max. 16 A and up to 400 V 	Industrial Wet Locations Vibration Corrosive Areas Space Constraints Class II/Zone 21 & 22	1, 10
	•		IEC 309 Ex-Plugs and Sockets Series GHG 511 to GHG 515 <ul style="list-style-type: none"> Used to supply power to portable electrical devices with power requirements of 16 - 125 amps Glass-fibre reinforced polyester construction offers reliability in temperatures from -20 degrees C to +55 degrees C Innovative construction offering cable strain relief and new coding system 	Wet Locations Vibration Corrosive Areas Class I, Div 2/Zone 2	4, 7, 9





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.

IEC	NEC	Product Photo	Product Solutions	Env. Conditions	Plant Location
•	•		Fluorescent Luminaires – eLLB20 <ul style="list-style-type: none"> Recessed luminaires for flush or surface mounting are ideal for area illumination around the trailer area Instant-on for areas requiring lamps to reach full illumination immediately Solutions for both indoor and outdoor applications Global offering with ATEX certified product family 	<ul style="list-style-type: none"> Industrial Vibration Space Constraints Class I, Div 2/Zone 2 	2, 4
•	•		Floodlight – Champ® FMV Family <ul style="list-style-type: none"> Floodlights offering high ambient performance for security and safety lighting in process areas such as the tank and mast platform locations Luminaires have high power factor for energy-efficient operation and optional circuit conductor sizing Easily adjusted to aim light where needed Wide range of wattages, from 50-1000W, satisfy any specification 	<ul style="list-style-type: none"> Wet Locations Vibration Corrosive Areas Space Constraints Class II/Zone 21 & 22 	3, 6, 7, 10
•	•		LED Obstruction Light Fixtures <ul style="list-style-type: none"> Used to mark obstructions on structures in hazardous environments Uses 20% of the energy of typical incandescent technology LED light source provides as much light as many 100W HID fixtures, using only 46 watts of power Resistant to shock and vibration making them ideal for drilling masts FAA certified and Class I Division 2 approved 	<ul style="list-style-type: none"> Industrial Wet Locations Vibration Corrosive Space Constraints Class I, Div 2/Zone 2 	1
•	•		EVFDR Fluorescent Luminaires <ul style="list-style-type: none"> Low-profile fixture with cool light and natural color rendition for continuous and uniform illumination from 32-110W Easy mounting for limited head room in hazardous areas Fast relamping without tools saves time and money Shock mounts and spring-loaded sockets offer vibration resistance 	<ul style="list-style-type: none"> Wet Locations Vibration Corrosive Areas Space Constraints Class I, Div 1/Zone 1 Class II/Zone 21 & 22 	3, 6, 7, 9
•	•		nLLK Fluorescent Luminaires <ul style="list-style-type: none"> Non-metallic 17 or 32W fluorescent luminaires for general illumination, ideal for indoor or outdoor applications Holds up in the most demanding physical and environmental conditions Meets codes and standards throughout the world, simplifying product specification for multinational users 	<ul style="list-style-type: none"> Industrial Vibration Corrosive Areas Space Constraints Class I, Div 2/Zone 2 Class II/Zone 21 & 22 	5, 6
•	•		eLLK Fluorescent Luminaires <ul style="list-style-type: none"> 18W or 36W luminaires used for illumination in hazardous area where moisture or corrosion may be a problem One lamp failure will not affect remaining lamp operation IP66 NEMA 4X rated and ATEX certified 	<ul style="list-style-type: none"> Industrial Vibration Corrosive Areas Space Constraints Class I, Div 1/Zone 1 Class I, Div 2/Zone 2 Class II/Zone 21 & 22 	5, 6
•	•		FVS Fluorescent Luminaires <ul style="list-style-type: none"> Compact 40W fluorescent luminaires for task-oriented lighting, used where a cool efficient light source is required Instant on, they reach full illumination immediately Fast-latch™ closure provides quick and easy access for relamping and maintenance without tools 	<ul style="list-style-type: none"> Industrial Vibration Corrosive Areas Space Constraints Class I, Div 2/Zone 2 Class II/Zone 21 & 22 	5, 6


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.

IEC	NEC	Product Photo	Product Solutions	Env. Conditions	Plant Location
•	•		GUA, EAB, EAJ Series Hazardous Location Conduit Outlet Boxes <ul style="list-style-type: none"> Protect conductors and provide openings to pull conductors and make splices and taps 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. 	<ul style="list-style-type: none"> Wet Locations Vibration Corrosive Areas Space Constraints Class I, Div 1/Zone 1 Class I, Div 2/Zone 2 Class II/Zone 21 & 22 	6, 7, 9, 10
•	•		CGB Cord, and Cable Fittings <ul style="list-style-type: none"> Passes cord or cable into an enclosure or through a bulkhead, while forming an environmental seal Typically used with portable cord and types MV (unarmored), PLTC, SE (round), TC and UF cables Ideal for non-hazardous areas 	<ul style="list-style-type: none"> Industrial Wet Locations Vibration Corrosive Areas Space Constraints Class I, Div 2/Zone 2 	2, 4, 5, 9
•	•		Cable Glands <ul style="list-style-type: none"> Terminate cable into enclosures for controls and distribution Watertight seal provides ground continuity of cable armor Worldwide certifications offering a global solution High IP ratings, up to IP68 rating, provide maximum protection in wet locations and dust 	<ul style="list-style-type: none"> Industrial Wet Locations Vibration Corrosive Areas Space Constraints Class I, Div 1/Zone 1 Class I, Div 2/Zone 2 Class II/Zone 21 & 22 	1, 2, 3, 4, 5, 6, 7, 9, 10
•	•		Form 7 and Form 8 Condulet® and Outlet Bodies <ul style="list-style-type: none"> Provide flexibility and simplicity for pulling conductors, and making splices and taps Approach conduit in size – for neat, compact installations Wedge nut attachments provide unobstructed cover openings Covers with integral sealing gaskets reduce installation time and costs 	<ul style="list-style-type: none"> Industrial Wet Locations Vibration Corrosive Areas Space Constraints Class I, Div 2/Zone 2 Class II/Zone 21 & 22 	1, 2, 3, 4, 5, 6, 7, 9, 10

Connectors:

Interconnect solutions you can trust in the most challenging conditions. Cooper Interconnect designs and fabricates engineered solutions that offer the best value to the drilling industry.

IEC	NEC	Product Photo	Product Solutions	Env. Conditions	Plant Location
•	•		Roughneck Connectors <ul style="list-style-type: none"> For use with single conductor for 313-777 MCM Cable, 1000 volts AC/DC, rated up to 1135 amps Designed for heavy abuse – resistant to wind, rain, mud & oil Quickly connects and disconnects without any tools Superior safety protection with totally shielded contacts in demanding power distribution applications Color-coded insulators for easy identification that prevents reverse phasing in AC and cross polarization in DC 	<ul style="list-style-type: none"> Industrial Wet Locations Vibration Corrosive Areas Space Constraints Class I, Div 2/Zone 2 Class II/Zone 21 & 22 	2, 4, 5, 6, 9, 10