

# Oil & Gas



## Control every move

- ▶ Directional Control Valves & Regulators
- ▶ Pressure Controls
- ▶ Temperature Switches
- ▶ Level Controls

**Barksdale**

CONTROL PRODUCTS

**CRANE**

Barksdale, Inc./Barksdale GmbH  
A Subsidiary of Crane Co.

# Barksdale

## Oil and Gas - The Challenge today

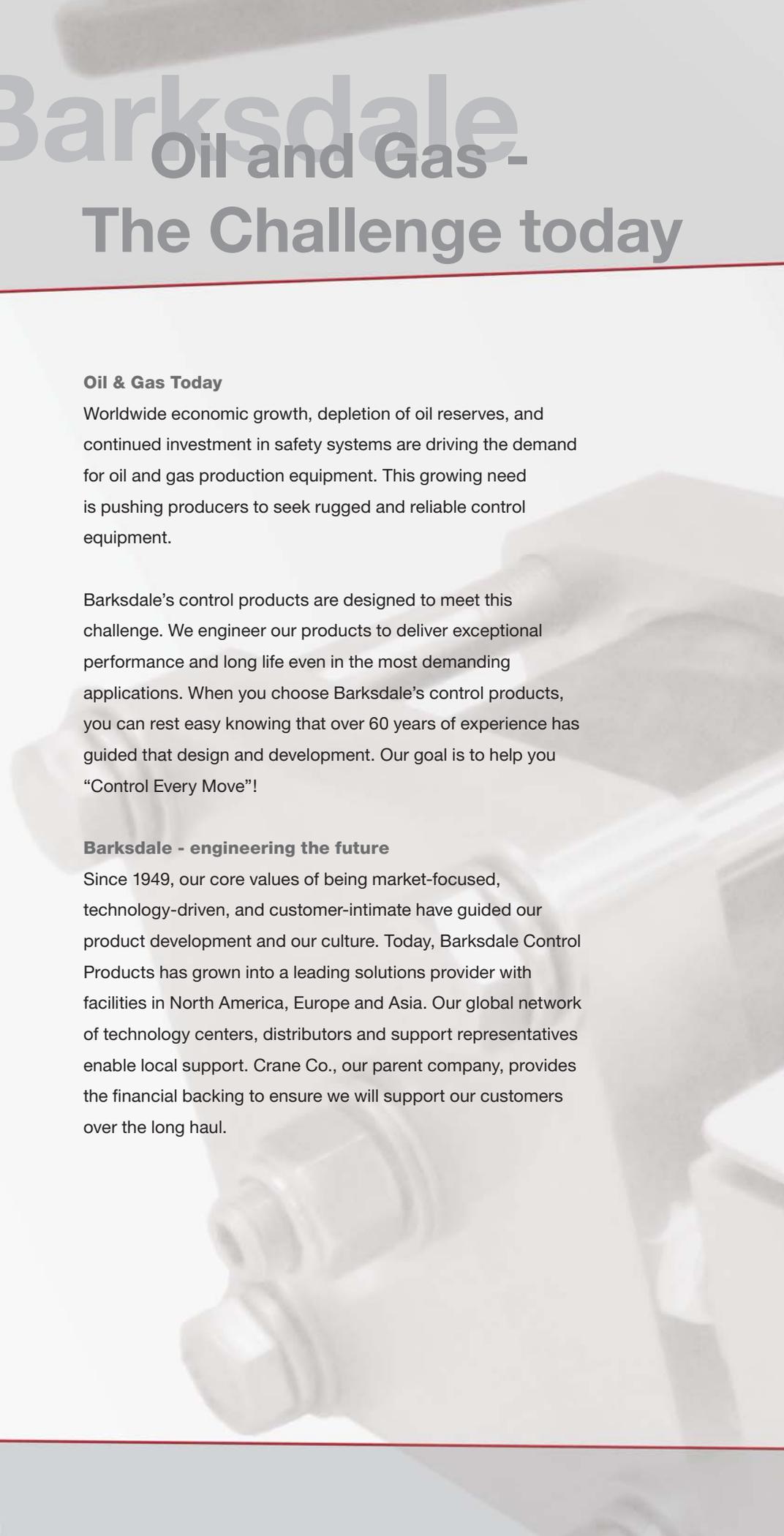
### **Oil & Gas Today**

Worldwide economic growth, depletion of oil reserves, and continued investment in safety systems are driving the demand for oil and gas production equipment. This growing need is pushing producers to seek rugged and reliable control equipment.

Barksdale's control products are designed to meet this challenge. We engineer our products to deliver exceptional performance and long life even in the most demanding applications. When you choose Barksdale's control products, you can rest easy knowing that over 60 years of experience has guided that design and development. Our goal is to help you "Control Every Move"!

### **Barksdale - engineering the future**

Since 1949, our core values of being market-focused, technology-driven, and customer-intimate have guided our product development and our culture. Today, Barksdale Control Products has grown into a leading solutions provider with facilities in North America, Europe and Asia. Our global network of technology centers, distributors and support representatives enable local support. Crane Co., our parent company, provides the financial backing to ensure we will support our customers over the long haul.



# Shear-Seal®

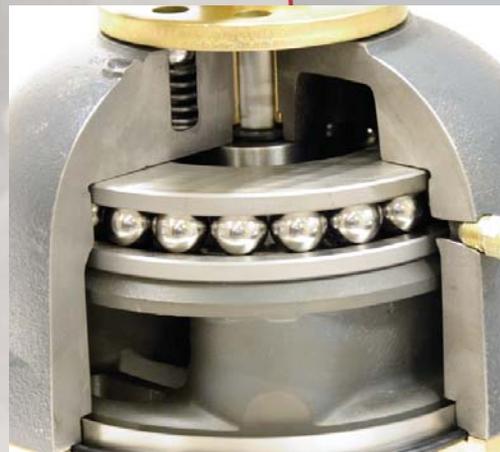
## Barksdale - The Solution

### **Barksdale - Proven Reliability**

For over 60 years, Barksdale's revolutionary Shear-Seal® valve design has been recognized as the industry standard for demanding applications in the Oil & Gas industry. Designed to provide years of trouble-free operation and virtually zero leakage, the Shear-Seal® design uses fluid pressure to maintain a leak-free metal-to-metal seal that improves with use. The shearing action between the rotor & pressure seal continually laps the mating surfaces and prevents contaminants from lodging between the sealing surfaces. The result is a valve that doesn't wear out – but wears in over time, providing you superior control consistently through the entire life of the product.

Our customers rely on genuine Barksdale Shear-Seal® valve technology for their control systems because they know it is the only technology with a proven track record of performance in the most demanding situations. Our Shear-Seal® valve products are designed to thrive in high pressure, high flow, dirty environments where the need for zero leakage is an absolute necessity. They provide a high level of safety, quality and reliability for equipment world-wide.

Today, Barksdale also has a complete line of pressure, level, temperature switches, pressure transducers and electronic control instrumentation to meet the most demanding equipment requirements. Combine this technical expertise with our dedication to exceptional service, and you will find that Barksdale is unmatched as a solutions provider to the industry.



## Upstream

Barksdale has been a product leader providing Shear-Seal® valves and regulators to major oil & gas equipment manufacturers for over 50 years. Our products can be found in applications such as BOP closing units, offshore platforms, pipe injection machines, work-over rigs, oil separators and pumps.

## Midstream

Barksdale is a main component in original equipment manufacturer products in gas distribution in pipe cutting equipment, hydraulic power units, heat tracing equipment, comp

Offshore Platform

Field Operations

BOP Closing Unit

Field Development

Work-Over Rigs

Field Pipeline Gathering

Pipe Cutting Equipment

Heat Tracing

Long Distance Transportation

Explosive Temperature

Hydraulic Power Units

Integral Actuator Control Valve

Pressure Regulator

Stainless Steel Manual Valve

# Engineered to Excel

Barksdale's products meet every challenge

provider to major oil & gas  
rs. You can find Barksdale  
umentation equipment, pipe  
wer units, oil and gas tankers,  
ssor stations and more.

## Downstream

Barksdale is a major component provider to the refinery and  
petrochemical industries. Our products are located on pump  
skids, reservoir tanks, hydraulic power tools, sample systems,  
cooling stations, safety shutdown systems and more.

Compact Explosion  
Proof Pressure Switch



Level Site



Explosion Proof  
Pressure Switch



Explosion Proof  
Dia-Seal Piston



Explosion Proof  
Transducer



Proof  
Switch



Distribution

Manufacturing

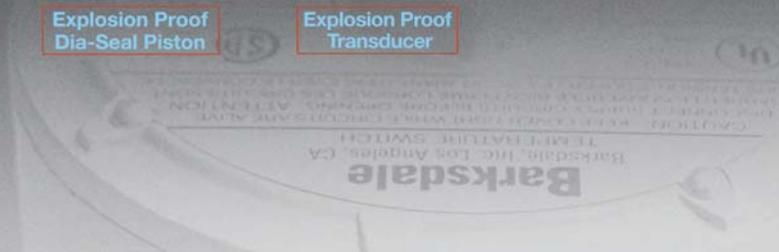
Hydraulic Power Unit

Pump Skids

Cooling Station

Safety Shutdown Systems

Reservoir Tanks



# Land

## Shear-Seal® Valves

Land Application Products				
	Heavy Duty Control Valve	Heavy Duty Hydraulic Regulator	Hydraulic Relief Valve	Low Pressure Air Valve
<b>Port Sizes:</b>	1/4" – 1 1/2"	1/2" – 1 1/2"	3/4"	1/4" – 1/2"
<b>Pressure Range:</b>	0 – 6000 psi	500 – 2800 psi	0 – 5500 psi	0 – 350 psi
<b>Max. Flow Capacity: (@ 40 ft/s)</b>	1/4" – 6 gpm 1/2" – 19 gpm 1" – 50 gpm 1 1/2" – 114 gpm	1/2" – 45 gpm 1" – 70 gpm 1 1/2" – 120 gpm	15 gpm	4.6 gpm
<b>Features:</b>	<ul style="list-style-type: none"> <li>▶ High velocity flow</li> <li>▶ Selector, Bypass &amp; Manipulator flow patterns</li> <li>▶ Tolerates contaminated media</li> <li>▶ Panel mount option</li> <li>▶ Sub-plate manifold option</li> <li>▶ Spring return option</li> <li>▶ SAE porting option</li> </ul>	<ul style="list-style-type: none"> <li>▶ Manual, Air &amp; Hydraulic Failsafe Motors</li> <li>▶ Self adjusting</li> <li>▶ Tolerates contaminated media</li> <li>▶ Self venting</li> </ul>	<ul style="list-style-type: none"> <li>▶ High flow with Zero Leak</li> <li>▶ Multiple resets</li> <li>▶ Metal-to-metal seal</li> <li>▶ Field adjustable or factory set</li> <li>▶ Tamper-proof cap</li> </ul>	<ul style="list-style-type: none"> <li>▶ Multiple flow patterns</li> <li>▶ Tolerates contaminated media</li> <li>▶ Interflow and non-interflow valves</li> <li>▶ Panel mounting</li> <li>▶ Spring return option</li> </ul>
<b>Standard Materials of Construction</b>	<b>Body:</b> Bronze <b>Housing:</b> Ductile Iron <b>Rotor:</b> Stainless Steel <b>Shear-Seal:</b> Stainless Steel <b>Shaft:</b> Stainless Steel <b>O-rings:</b> Buna-N <b>Back-up rings:</b> Teflon®	<b>Body:</b> Phosphate coated alloy steel <b>Wetted Parts:</b> Stainless Steel & Bronze <b>Tower Housing:</b> Phosphate coated alloy steel <b>Flanges:</b> Phosphate coated alloy steel <b>O-rings:</b> Buna-N <b>Back-up rings:</b> Teflon®	<b>Internals:</b> Stainless Steel <b>Housing:</b> powder coated ductile iron <b>Spring:</b> powder coated steel <b>Ball:</b> Tungsten Carbide <b>Back-up rings:</b> Teflon®	<b>Body/Housing:</b> Anodized aluminum <b>Rotor:</b> Hard anodized aluminum <b>Shear-Seal:</b> Brass <b>O-rings:</b> Buna N
<b>Applicable Products:</b>	<ul style="list-style-type: none"> <li>▶ Series 140 &amp; 200</li> <li>▶ Series 920 &amp; 5620</li> <li>▶ Series 3760</li> <li>▶ Series 180</li> </ul> 	<ul style="list-style-type: none"> <li>▶ 20313, F20313, G20313</li> <li>▶ 20415, F20415, G20415</li> <li>▶ 20517, F20517, G20517</li> </ul> 	<ul style="list-style-type: none"> <li>▶ Series 8010</li> </ul> 	<ul style="list-style-type: none"> <li>▶ Series 9000</li> <li>▶ Series 9020</li> </ul> 
<b>Applications:</b>	<ul style="list-style-type: none"> <li>▶ Land-based safety drilling equipment</li> <li>▶ Steel Mills</li> <li>▶ Machinery panels</li> <li>▶ Power generation facilities</li> </ul>	<ul style="list-style-type: none"> <li>▶ Land-based safety drilling controls</li> <li>▶ BOP Control Units</li> <li>▶ Coiled Tube Reels</li> <li>▶ Oil &amp; Gas Panels</li> </ul>	<ul style="list-style-type: none"> <li>▶ Pump system safety</li> <li>▶ Accumulator systems</li> <li>▶ Compressor over-pressure protection</li> <li>▶ Tank protection</li> </ul>	<ul style="list-style-type: none"> <li>▶ Manual control of 2-position cylinder</li> <li>▶ Pilot valve for actuators</li> <li>▶ Gas manifold controls</li> </ul>

# Offshore Shear-Seal® Valves

Offshore Application Products				
	Actuated Heavy Duty Control Valve	Premium Performance Hydraulic Regulator	High Pressure Stainless Steel Control Valve	Stainless Steel Manual Valve
<b>Port Sizes:</b>	1/4" – 1 1/2"	1" – 1 1/2"	SAE Porting Standard	1/4" – 1/2"
<b>Pressure Range:</b>	0 – 6000 psi	500 – 3300 psi	0 – 10000 psi	0 – 6000 psi
<b>Max. Flow Capacity: (@ 40 ft/s)</b>	1/4" – 6 gpm 1/2" – 19 gpm 1" – 50 gpm 1 1/2" – 114 gpm	1" – 90 gpm 1 1/2" – 140 gpm	1/4" SAE-4 – 6 gpm 3/8" SAE-6 – 6 gpm 1/2" SAE-8 – 6 gpm 1" SAE-16 – 19 gpm	4 gpm
<b>Features:</b>	<ul style="list-style-type: none"> <li>▶ Air or Hydraulic integrated actuator</li> <li>▶ 2 and 3 Positions</li> <li>▶ Selector, Bypass &amp; Manipulator flow patterns</li> <li>▶ Tolerates contaminated media</li> <li>▶ Panel mount option</li> <li>▶ Sub-plate manifold option</li> <li>▶ Straight body mount option</li> <li>▶ SAE porting option</li> <li>▶ Position Indication option</li> </ul>	<ul style="list-style-type: none"> <li>▶ Manual, Air &amp; Hydraulic Failsafe Motors</li> <li>▶ Self Adjusting</li> <li>▶ Tolerates contaminated media</li> <li>▶ Ultra flow</li> <li>▶ Surge dampening</li> <li>▶ API compliant for sensitivity</li> </ul>	<ul style="list-style-type: none"> <li>▶ All Stainless Steel construction</li> <li>▶ NPT porting option</li> <li>▶ Low pressure drop</li> <li>▶ High velocity flow</li> <li>▶ Multiple flow patterns</li> <li>▶ Low handle load</li> <li>▶ Spring return option</li> <li>▶ 0-15,000 psi option</li> </ul>	<ul style="list-style-type: none"> <li>▶ All stainless steel construction</li> <li>▶ Low pressure drop</li> <li>▶ Selector, Bypass &amp; Manipulator flow patterns</li> <li>▶ Rugged design</li> </ul>
<b>Standard Materials of Construction</b>	<b>Body:</b> Bronze <b>Housing:</b> Bronze <b>Rotor:</b> Stainless Steel <b>Shear-Seal:</b> Stainless Steel <b>Shaft:</b> Stainless Steel <b>O-rings:</b> Buna-N <b>Back-up rings:</b> Teflon®	<b>Body:</b> Stainless Steel <b>Wetted Parts:</b> Stainless Steel & bronze <b>Tower Housing:</b> Phosphate coated alloy steel <b>Flanges:</b> Phosphate coated alloy steel <b>O-rings:</b> Buna-N <b>Back-up rings:</b> Teflon®	<b>Body:</b> Stainless Steel <b>Housing:</b> Stainless Steel <b>Rotor:</b> Stainless Steel <b>Shear-Seal:</b> Stainless Steel <b>Shaft:</b> Stainless Steel <b>O-rings:</b> Buna N <b>Back-up rings:</b> Teflon®	<b>Metal parts:</b> Stainless Steel <b>O-rings:</b> Buna N <b>Back-up rings:</b> Teflon®
<b>Applicable Products:</b>	<ul style="list-style-type: none"> <li>▶ A14 &amp; A20</li> <li>▶ H14 &amp; H20</li> <li>▶ A92 &amp; A562</li> <li>▶ H92 &amp; H562</li> <li>▶ A376 &amp; H376</li> <li>▶ A18 &amp; H18</li> </ul> 	<ul style="list-style-type: none"> <li>▶ 20495, F20495, G20495</li> <li>▶ 20597, F20597, G20597</li> </ul> 	<ul style="list-style-type: none"> <li>▶ Series 4140</li> </ul> 	<ul style="list-style-type: none"> <li>▶ Series MAV-101 thru MAV-103</li> <li>▶ Series MAV-201 thru MAV-221</li> </ul> 
<b>Applications</b>	<ul style="list-style-type: none"> <li>▶ Offshore safety drilling equipment</li> <li>▶ BOP Control Units</li> <li>▶ Workover Rigs</li> <li>▶ Chemical Processing Plants</li> </ul>	<ul style="list-style-type: none"> <li>▶ Offshore oil drilling controls</li> <li>▶ BOP Control Skids</li> <li>▶ Pressure sensitive applications</li> </ul>	<ul style="list-style-type: none"> <li>▶ Offshore drilling equipment</li> <li>▶ Gas compression systems</li> <li>▶ Marine umbilical reels</li> <li>▶ High pressure test stands</li> </ul>	<ul style="list-style-type: none"> <li>▶ Oil &amp; Gas control panels</li> <li>▶ Semi-submersible systems</li> <li>▶ High pressure hydraulic skids</li> <li>▶ Different medias available</li> </ul>

# Guide Electronic Pressure Control

	Explosion Proof Electronic Pump Control Switch	Explosion proof Transducers	Intrinsically Safe Transducers	Nonincendive Transducers
<b>Pressure Range:</b>	0 to 6,000 psi (412 bar)	Vacuum to 10,000 psi (690 bar)	Vacuum to 10,000 psi (690 bar)	Vacuum to 10,000 psi (690 bar)
<b>Typical Life:</b>	100M cycles	100M cycles	100M cycles	100M cycles
<b>General Advantage:</b>	Programmable dead-band Delay feature	Continuous analog output Voltage and current output	Continuous analog output Voltage and current output	Continuous analog output Voltage and current output
<b>Hazardous Location Approvals:</b>	<ul style="list-style-type: none"> <li>▶ ATEX Certified</li> <li>▶ Explosion proof housing</li> </ul>	<ul style="list-style-type: none"> <li>▶ cULus Explosion proof</li> <li>▶ UL Approved</li> <li>▶ Class I, Groups A, B, C &amp; D</li> <li>▶ Class II, Groups E, F &amp; G</li> <li>▶ ATEX Certified Flame proof "d"</li> </ul> <div style="text-align: center;">  </div>	<ul style="list-style-type: none"> <li>▶ cULus Intrinsically Safe for Div 1</li> <li>▶ Class I, Groups A, B, C &amp; D</li> <li>▶ Class II, Groups E, F &amp; G</li> <li>▶ ATEX Certified Intrinsically safe "ia"*</li> </ul> <div style="text-align: center;">  </div> <p style="text-align: center; font-size: small;">*445 only</p>	<ul style="list-style-type: none"> <li>▶ cULus Nonincendive for Div 2</li> <li>▶ Class I, Groups A, B, C &amp; D</li> <li>▶ Class II, Groups E, F &amp; G</li> </ul> <div style="text-align: center;">  </div>
<b>Applicable Products:</b>	<ul style="list-style-type: none"> <li>▶ UDS7-BX</li> </ul> 	<ul style="list-style-type: none"> <li>▶ 423X</li> <li>▶ 425X</li> <li>▶ 426X</li> </ul> 	<ul style="list-style-type: none"> <li>▶ 443</li> <li>▶ 445</li> <li>▶ 446</li> </ul> 	<ul style="list-style-type: none"> <li>▶ 433</li> <li>▶ 435</li> <li>▶ 436</li> </ul> 
<b>Applications</b>	<ul style="list-style-type: none"> <li>▶ Oil &amp; gas pipelines</li> <li>▶ Refineries</li> <li>▶ Petrochemical plants</li> <li>▶ Pulp and paper mills</li> <li>▶ Coal &amp; oil fired power plants</li> <li>▶ Cement plants</li> <li>▶ Gas transfers for fuel systems</li> </ul>	<ul style="list-style-type: none"> <li>▶ Oil &amp; gas pipelines</li> <li>▶ Oil patch</li> <li>▶ Petrochemical plants</li> <li>▶ Refineries</li> <li>▶ Coal &amp; oil fired power plants</li> <li>▶ Cement plants</li> <li>▶ Gas transfers for fuel systems</li> <li>▶ Gas panels</li> <li>▶ Gas mixing systems</li> </ul>	<ul style="list-style-type: none"> <li>▶ Oil &amp; gas pipelines</li> <li>▶ Oil patch</li> <li>▶ Petrochemical plants</li> <li>▶ Refineries</li> <li>▶ Pulp &amp; paper mills</li> <li>▶ Coal &amp; oil fired power plants</li> <li>▶ Cement plants</li> <li>▶ Gas transfers for fuel systems</li> <li>▶ Gas panels</li> <li>▶ Gas mixing systems</li> </ul>	<ul style="list-style-type: none"> <li>▶ Oil &amp; gas pipelines</li> <li>▶ Oil patch</li> <li>▶ Petrochemical plants</li> <li>▶ Refineries</li> <li>▶ Pulp and paper mills</li> <li>▶ Coal &amp; oil fired power plants</li> <li>▶ Cement plants</li> <li>▶ Gas transfers for fuel systems</li> <li>▶ Gas panels</li> <li>▶ Gas mixing systems</li> </ul>

# Guide Mechanical Pressure Switches

	Diaphragm	Bourdon Tube	Dia-Seal Piston	Piston
<b>Pressure Range:</b>	Vacuum to 150 psi (10 bar)	15 psi (1 bar) to 18,000 psi (1,240 bar)	Vacuum to 1,000 psi (70 bar)	10,000 psi (689 bar)
<b>Typical Life:</b>	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles	2,500,000 cycles
<b>General Advantage:</b>	Lower dead-band: 2%- 7%	Stable & durable during continuous cycling	Less vulnerable to leakage (when compared to piston switches)	Fast response to pressure changes
	Typically higher accuracies	Higher operating pressures	Typically more economical	Typically longer life
<b>Hazardous Location Approvals:</b>	<ul style="list-style-type: none"> <li>▶ UL &amp; CSA for Div 1 Explosion proof</li> <li>▶ Class I, Groups B, C &amp; D</li> <li>▶ Class II, Groups E, F &amp; G</li> <li>▶ ATEX Certified Flame proof "d"</li> <li>▶ IP65</li> </ul> 	<ul style="list-style-type: none"> <li>▶ UL &amp; CSA for Div 1 Explosion proof</li> <li>▶ Class I, Groups B, C &amp; D</li> <li>▶ Class II, Groups E, F &amp; G</li> <li>▶ ATEX Certified Flame proof "d"</li> </ul> 	<ul style="list-style-type: none"> <li>▶ UL &amp; CSA for Div 1 Explosion proof</li> <li>▶ Class I, Groups B*, C &amp; D</li> <li>▶ Class II, Groups E, F &amp; G</li> <li>▶ Class III*</li> <li>▶ ATEX Certified Flame proof "d"</li> <li>▶ KGS*</li> <li>▶ NACE*</li> </ul>  <p>* 9671X &amp; 9681X only</p>	<ul style="list-style-type: none"> <li>▶ UL &amp; CSA for Div 1 Explosion proof</li> <li>▶ Dual sealed for DIV 1 &amp; DIV 2 applications</li> <li>▶ Class I, Groups B, C &amp; D</li> <li>▶ Class II, Groups E, F &amp; G</li> <li>▶ Class III</li> <li>▶ ATEX Certified Flame proof "d"</li> <li>▶ KGS</li> <li>▶ NACE</li> </ul> 
<b>Applicable Products:</b>	<ul style="list-style-type: none"> <li>▶ D1X/D2X</li> </ul> 	<ul style="list-style-type: none"> <li>▶ B1X/B2X</li> </ul> 	<ul style="list-style-type: none"> <li>▶ P1X</li> <li>▶ 9671X</li> <li>▶ 9681X</li> </ul> 	<ul style="list-style-type: none"> <li>▶ 9692X</li> </ul> 
<b>Applications</b>	<ul style="list-style-type: none"> <li>▶ Pump &amp; compressor monitoring</li> <li>▶ Hydraulic power units</li> <li>▶ Oil &amp; gas</li> <li>▶ Food &amp; beverage</li> <li>▶ Utility &amp; power generation</li> <li>▶ Mining</li> </ul>	<ul style="list-style-type: none"> <li>▶ Power plants</li> <li>▶ Water pumps</li> <li>▶ Blowout preventers (BOP)</li> <li>▶ Pneumatic devices</li> <li>▶ General industrial applications</li> <li>▶ Oil and gas applications</li> </ul>	<ul style="list-style-type: none"> <li>▶ BOP closing units</li> <li>▶ Safety panels</li> <li>▶ Pipelines</li> <li>▶ Chemical and petrochemical plants</li> <li>▶ Pulp and paper mills</li> <li>▶ Pump and gas compressors</li> <li>▶ Turbines</li> <li>▶ Oil &amp; gas applications</li> </ul>	<ul style="list-style-type: none"> <li>▶ BOP closing units</li> <li>▶ Safety panels</li> <li>▶ Pipelines</li> <li>▶ Chemical and petrochemical plants</li> <li>▶ Pulp and paper mills</li> <li>▶ Pump and gas compressors</li> <li>▶ Turbines</li> <li>▶ Oil &amp; gas applications</li> </ul>

# Guide

## Mechanical Temperature Switches

	Remote Bulb & Capillary and Local Mount	Remote Bulb & Capillary and Local Mount (Heat Trace Specific)	Compact Temperature Switch
<b>Temperature Range:</b>	-50°F (-45°C) to 600°F (315°C)	-50°F (-45°C) to 600°F (315°C)	-50°F (-45°C) to 600°F (315°C)
<b>General Advantage:</b>	Installed on the pipe/vessel or up to 25 feet capillary	Installed on the pipe/vessel or up to 25 feet capillary	Compact size
<b>Hazardous Location Approvals:</b>	<ul style="list-style-type: none"> <li>Available with thermowell &amp; armor</li> <li>▶ UL Approved for Div 1 Explosion proof</li> <li>▶ Class I, Groups B*, C &amp; D</li> <li>▶ Class II, Groups E, F &amp; G</li> <li>▶ CSA Approved for Div 1 Class III</li> <li>▶ ATEX Certified Flame proof "d"</li> </ul>  <p>* UL only</p>	<ul style="list-style-type: none"> <li>Available with thermowell &amp; armor</li> <li>▶ UL, CSA &amp; FM for Div 1 Explosion proof</li> <li>▶ Class I, Groups B, C &amp; D</li> <li>▶ Class II, Groups E, F &amp; G</li> <li>▶ Class III</li> <li>▶ ATEX Certified Flame proof "d"</li> <li>▶ NEPSI (China)</li> <li>▶ GOST (Russia)</li> </ul> 	<ul style="list-style-type: none"> <li>Local and remote mount versions</li> <li>▶ UL &amp; CSA for Div 1 Explosion proof</li> <li>▶ Class I, Groups A*, B, C &amp; D</li> <li>▶ ATEX Certified Flame proof "d"</li> <li>▶ NACE</li> </ul>  <p>* UL only</p>
<b>Applicable Products:</b>	<ul style="list-style-type: none"> <li>▶ T1X/T2X</li> <li>▶ L1X</li> </ul> 	<ul style="list-style-type: none"> <li>▶ TXR</li> <li>▶ TXL</li> </ul> 	<ul style="list-style-type: none"> <li>▶ T9692X</li> </ul> 
<b>Applications</b>	<ul style="list-style-type: none"> <li>▶ Oil &amp; gas</li> <li>▶ Heat tracing</li> <li>▶ Printing machinery</li> <li>▶ Compressors</li> <li>▶ Process equipment</li> <li>▶ Machine tools and industrial equipment</li> </ul>	<ul style="list-style-type: none"> <li>▶ Heat tracing</li> <li>▶ Hydraulic power units</li> <li>▶ Combustion engines</li> <li>▶ Compressors</li> <li>▶ Machine tools and industrial equipment</li> <li>▶ Process equipment</li> </ul>	<ul style="list-style-type: none"> <li>▶ Offshore platforms</li> <li>▶ Safety panels</li> <li>▶ Chemical plants &amp; refineries</li> <li>▶ Compressor skids</li> <li>▶ Instrument panels</li> <li>▶ Hazardous location applications</li> </ul>

# Hazardous Location Reference

## General Information

Hazardous (classified) locations, as defined in the National Electric Code (NEC), are locations where fire or explosion hazards may exist due to the presence of flammable gases, vapors or flammable liquids, combustible dusts, or ignitable fibers or flyings. Protection against explosion in hazardous locations requires that all equipment that could be exposed to the flammable or combustible atmospheres be of a type suitable for installation in such locations. The Classes and Groups for which equipment has been Listed or Classified are shown in the individual Listings and Classifications under the respective categories and are marked on the equipment itself.

## Classification Definition

North American Division System	International Zone System											
<p><b>Division 1:</b> Where ignitable concentrations of flammable gases, vapors or liquids can exist all of the time or some of the time under normal operating conditions.</p>	<p><b>Zone 0:</b> Where ignitable concentrations of flammable gases, vapors or liquids can exist all of the time or for long periods of time under normal operating conditions.</p>											
<p><b>Division 2:</b> Where ignitable concentrations of flammable gases, vapors or liquids are not likely to exist under normal operating conditions.</p>	<p><b>Zone 1:</b> Where ignitable concentrations of flammable gases, vapors or liquids can exist some of the time under normal operating conditions.</p>											
<p><b>Division 2:</b> Where ignitable concentrations of flammable gases, vapors or liquids are not likely to exist under normal operating conditions.</p>	<p><b>Zone 2:</b> Where ignitable concentrations of flammable gases, vapors, or liquids are not likely to exist under normal operating conditions.</p>											
<p><b>North American Marking</b></p> <p><b>Division System</b></p> <table border="1" style="margin-left: 40px;"> <tr> <td>Class I</td> <td>Div 1</td> <td>Groups A, B, C, D</td> <td>T4</td> </tr> </table> <p>Flammable gas or vapor Area classification</p> <p>Gas group</p> <p>Temperature code</p>	Class I	Div 1	Groups A, B, C, D	T4	<p><b>International Marking</b></p> <p><b>Zone System</b></p> <table border="1" style="margin-left: 40px;"> <tr> <td>Class I</td> <td>Zone 0</td> <td>A</td> <td>Ex</td> <td>ia</td> <td>IIC</td> <td>T4</td> </tr> </table> <p>Flammable gas or vapor Area classification</p> <p>Conformity to US requirements</p> <p>Explosion protected</p> <p>Temperature class Gas group Protection method</p>	Class I	Zone 0	A	Ex	ia	IIC	T4
Class I	Div 1	Groups A, B, C, D	T4									
Class I	Zone 0	A	Ex	ia	IIC	T4						

## Protection Method Comparison

North American Division System		International / ATEX Zone System	
Area	Division Protection Methods	Area	Zone Protection Methods
Div. 1	Explosion proof Intrinsically safe	Zone 0	Intrinsically safe, 'ia'
		Zone 1	
Div. 2	Hermetically sealed Nonincendive Non-sparking	Zone 2	Hermetically sealed, 'nC' Nonincendive, 'nC' Non-sparking, 'nA'

## Gas / Dust Group Comparison

Reference Gas / Dust	North American Division System	International Zone System
Acetylene	Class I, Group A	Group IIC
Hydrogen	Class I, Group B	Group IIC
Ethylene	Class I, Group C	Group IIB
Propane	Class I, Group D	Group IIA
Magnesium	Class II, Group E	-
Coal	Class II, Group F	-
Grain	Class II, Group G	-
Cotton	Class III	-
Fibers Group*	Class III	-

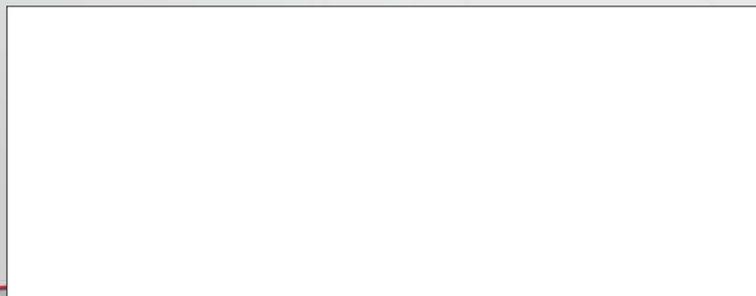
\* No equivalent Zone classification

## Marking According to ATEX Directive 94/9/EC

CE	0081	Ex	II	2	G D	Ex ia	IIC	T4	Ex	tD	A21	IP66	T85	LCIE	08	ATEX	6092	X
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<b>CE</b>	<b>European Community Mark</b> Manufactured according to applicable EC Directives.	<b>IIC</b>	<b>Gas Group</b>		
<b>0081</b>	<b>Notified Body Number</b> For production surveillance (0081 for LCIE)	<b>T4</b>	<b>Temperature Class</b>		
<b>Ex</b>	<b>Marking</b> Specific for equipment to be used in explosive atmospheres	<b>Ex</b>	<b>Explosion Protected</b>		
<b>II</b>	<b>Equipment Group</b> I for Mines II different from Mines	<b>tD</b>	<b>Dust Protection by Enclosure</b>		
<b>2</b>	<b>Equipment Category</b>	<b>A21</b>	<b>Dust Zone 1</b>		
	Mines	Different from Mines ()	<b>IP66</b>	<b>Enclosure Protection</b>	
<b>M1</b>	very high protection	<b>M2</b>	high protection	<b>T85</b>	<b>Surface Temperature Rating</b>
				1 very high protection	2 high protection
<b>3</b>	normal protection for associated apparatus	<b>U</b>	Component	<b>D1</b>	<b>Year of Issuing</b> The last two digits of the year
				<b>ATEX</b>	<b>ATEX Directive</b> 94/9/EC
<b>G, D</b>	<b>Hazardous Atmospheres</b> <b>G</b> for gas, vapor, mist <b>D</b> for dust	<b>E 042</b>	<b>Certification Number</b> Progressive in the year.		
<b>Ex ia</b>	<b>Mark</b> For the specific types of protection according the applicable standard.	<b>X</b>	<b>Supplementary Letter</b> <b>X</b> Particular condition of use		

# Global Presence Global Presence



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