

# TIMKEN

An offshore oil rig is silhouetted against a vibrant sunset sky. The sun is a bright yellow-orange orb on the horizon, casting a warm glow over the scene. The rig's complex structure, including cranes and a tall derrick, is clearly visible against the bright background. A semi-transparent blue rectangular box is overlaid on the left side of the image, containing white text.

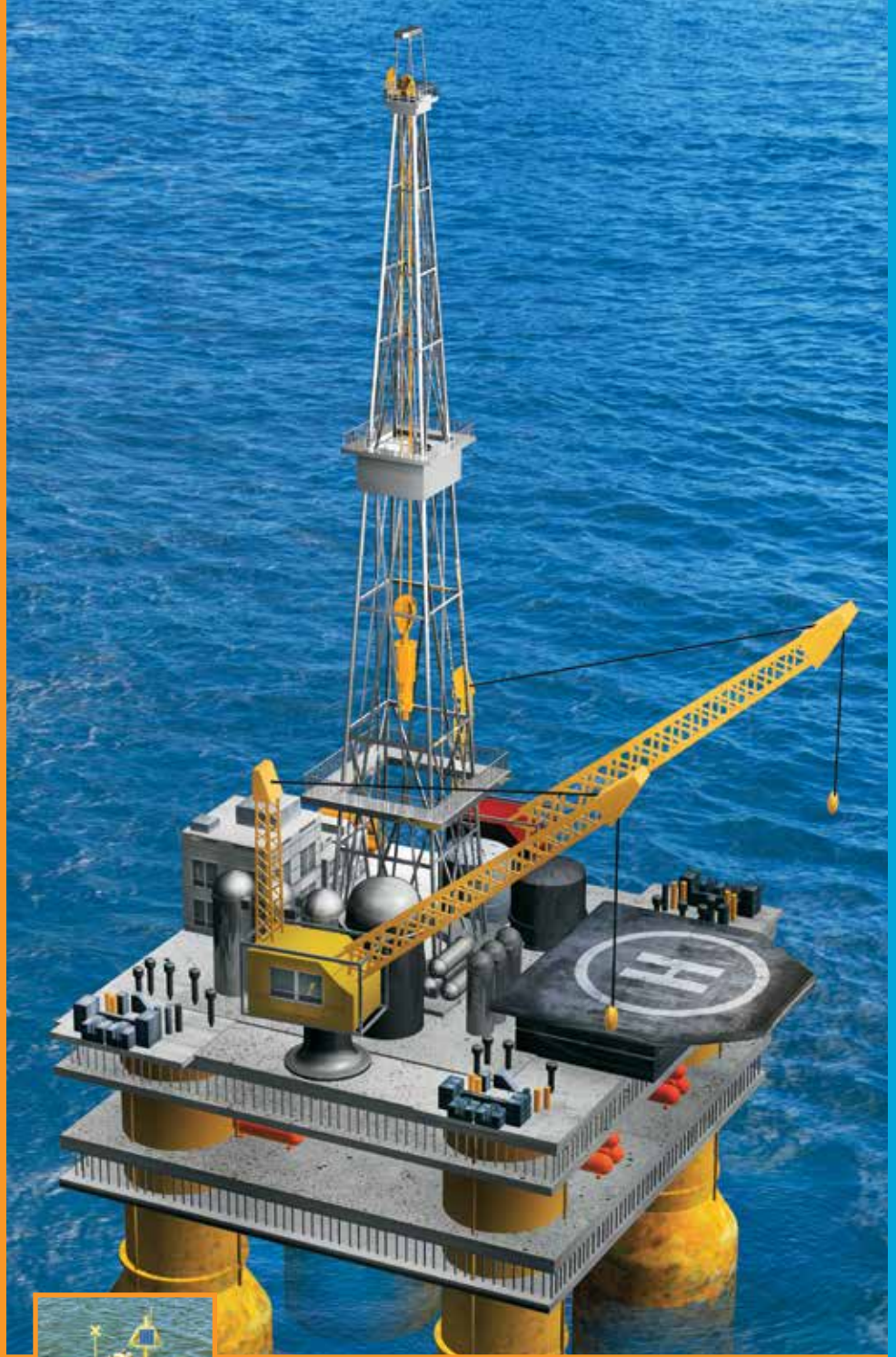
TIMKEN SOLUTIONS FOR  
THE OIL AND GAS INDUSTRY  
TECHNICAL EXPERTISE  
THAT **RUNS DEEP**

## INCREASING RELIABILITY AND UPTIME – ON LAND AND AT SEA

Financial stakes are high when a single land rig costs \$10 million. The stakes are even higher in offshore operations, where rigs can cost more than \$500 million. Protecting that investment depends, in part, on precision-engineered bearings and power-transmission solutions that help keep your equipment running continuously, safely and reliably.

Timken delivers these benefits through technical expertise, quality products, world-class availability and delivery, and experience dating back to the beginning of the oil and gas industry. This deep knowledge makes Timken a leading authority on friction management and power transmission technologies for oil and gas applications.

Our full range of products and services is backed by Timken technical expertise and experience to help strengthen your operations and enhance your efficiency. We continue to develop new precision-engineered solutions for our customers and meet needs for high quality that delivers improved reliability, durability and power transmission capability.



**Cranes**



**Riser tensioners**



**Mooring buoys**

## AN ORIGINAL LEADER IN ENGINEERED SOLUTIONS

Timken is a technical leader with more than 70 years of oilfield experience and countless solutions to our credit. In fact, we influenced the industry's first rigs, designing swivel main bearings and tapered roller bearings for crown and traveling blocks. Our designs continued to advance as drilling operations evolved to include higher capacity rotary drilling technology. Timken solutions have always focused on generating increased safety, drill stem mass, and mud pump flow rates, along with the associated power transmission efficiency and reliability requirements for mechanical equipment.

Demand is now greater, stakes are higher, and advancing technology pushes application limits even further. Timken works closely with rig builders and operators to understand new system design and operational requirements. Each time we increase bearing load ratings that rely on new design, material or process technologies, the benefits help optimize application performance in your oil and gas operations.

## OFFSHORE AND LAND RIG APPLICATIONS



Crown blocks



Traveling blocks



Top drives



Swivels



Drawworks



Mud pumps



Rotary tables



Drill bits



Frac pumps/trucks

### COMMITMENT TO ON-TIME DELIVERY

Customers constantly tell us that on-time delivery and world-class availability are at the top of their "must have" list. We closely monitor industry demand and adjust our own product availability and inventory to meet those needs. Ask your Timken representative for more details.

### ADDITIONAL EQUIPMENT

- Hoists
- Shale shakers
- Mud motors
- Jack-up drives

## TOP DRIVE SYSTEMS

Top drives are the workhorses of a rig, withstanding extreme loads, variable environmental conditions and continuous application demands. Timken offers bearing solutions that can manage these challenges, while making operation and maintenance easier for many equipment sizes and types of installations.

Timken® thrust bearings are the bearings of choice for top drive systems because they can manage high thrust loads while providing high load-carrying capacity in a compact envelope. To handle ever-increasing loads, you can rely on Timken® DuraSpexx® Power Rating Series tapered thrust bearings for an even higher performance alternative.

Reliable top drive gearboxes are mission-critical for rig uptime. Many original equipment manufacturers repeatedly specify Timken® tapered, cylindrical and spherical roller bearings for their long life, reliability and variety of available configurations.



**Timken® DuraSpexx®  
Power Rating Series  
Tapered Thrust Bearing**



**Tapered Roller  
Bearings**



**Cylindrical Roller  
Bearings**



**Spherical Roller  
Bearings**

### TIMKEN SOLUTION: Timken® Power-Dense Bearings Handled 500-Ton Loads on Top Drive

Drill strings continue to lengthen to accommodate horizontal drilling techniques and greater vertical drilling depths. Operators require heavier-wall drill pipe more than ever. These factors translate into more weight that must be supported by a rig's top drive. To help one original equipment manufacturer address this issue, Timken experts specified Timken® DuraSpexx® Power Rating Series tapered thrust bearings. DuraSpexx bearings feature enhanced materials, surface finishes and optimized internal geometries designed to increase bearing ratings, load capacity and life.

By making the switch, the OEM improved its high-volume top drive performance without making major changes to its existing equipment design. The company was able to insert a DuraSpexx bearing with a 504-ton load capacity into a position that previously managed only 383 tons. This 31 percent increase can allow operators to drill farther and still have confidence that the equipment can do the job.

## MUD PUMPS

Subject to heavy loads, high temperatures, extreme debris and constant vibration, mud pump components can wear out quickly – driving up the cost of operation. Components specifically designed for these tough conditions can lengthen service life, extend maintenance intervals and improve productivity.

Timken® tapered, cylindrical and spherical roller bearings reduce friction for greater operational efficiency. And, Timken engineers have worked closely with mud pump manufacturers for years to understand their needs and help overcome their challenges. That's why many major manufacturers and drilling contractors select Timken time and again for all four bearing locations in their mud pumps.

For chain used in mud pumps and other oilfield applications, the American Petroleum Institute (API) sets rigorous quality standards. Timken Drives' registration to API Spec Q1, combined with its ISO 9001 compliance, certifies a world-class quality system. According to ISO, this certification shows "demonstrated ability to consistently provide products that meet customer and applicable statutory and regulatory requirements."



**Spherical Roller Bearings**



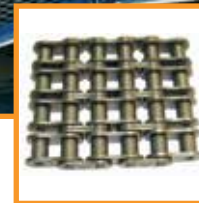
**Tapered Roller Bearings**



**Cylindrical Roller Bearings (single-row)**



**Cylindrical Roller Bearings (two-row)**



**Timken Drives® Chain**

## TIMKEN STOCKS BEARINGS FOR MUD PUMPS

The intense demands on a mud pump require a reliable source of quality replacement bearings to help keep it running. With so many different bearing positions and configurations in a single mud pump, it's nice to know you can get every bearing you need, when you need it, from a single supplier. In fact, Timken delivers one of the widest product ranges in the industry, with world-class availability to keep you in stock with tapered, cylindrical and spherical bearings for your next scheduled maintenance check.



**Timken Drives® Chain**

### TIMKEN SOLUTION: High-Quality Chain Minimizes Service Calls

Timken Drives® chain meets the requirements of the American Petroleum Institute (API) for oilfield applications, including mud pumps, drawworks and rotary tables. OEMs often prefer our high-quality API chain because it helps minimize warranty claims and service calls on their equipment. In addition, we provide chain in cut-to-length sections, on demand – so manufacturers can save on labor costs and don't have to carry the high cost of inventory.

## CROWN AND TRAVELING BLOCKS

Situated high in the air, crown and traveling blocks are among the most challenging and dangerous pieces of equipment to install and maintain on a rig. In particular, relubricating in these positions is especially hazardous.

That's why Timken® tapered roller bearings have long been a mainstay in this mission-critical application. Top manufacturers and operators consistently rely on Timken as their go-to provider.

With more than 110 years of leadership in tapered roller bearing manufacturing, Timken is the trusted authority on bearings for crown and traveling blocks.



**Tapered Roller Bearings**



**Timken® Sheave Pac® Bearing Assemblies**

### **TIMKEN SOLUTION: Timken® Sheave Pac® Puts Safety First**

While equipment performance and uptime are constantly on the minds of oil and gas professionals, worker safety is what counts the most. OEMs and contractors continually look for new solutions to help reduce the need for maintenance personnel to make the perilous climb – sometimes daily – to relubricate bearings in the crown and traveling block positions.

With input from both rig operators and OEM product designers, Timken experts developed the Timken® Sheave Pac® bearing assembly, which demonstrates superior sealing abilities that help keep the bearing lubricated for the entire duty cycle.

The Sheave Pac bearing assembly can eliminate the need for relubrication and ongoing maintenance between rebuilds. This vastly increases worker safety and helps reduce the amount of time a rig remains in lockdown for routine repairs. Assemblies are fully pre-set, pre-greased and sealed, which reduces the risk of improper bearing setting, contamination and potential damage during handling. In addition, advanced sealing technology helps keep grease in and harmful contaminants out.

Sheave Pac bearing assemblies are interchangeable with current industry-standard bearing assemblies and seals – so maintenance personnel can simply replace them in the existing envelope and turn their attention to safer, more value-added work.

## DRAWWORKS

Extreme loads and constant wear characterize the brutal operating environment of a typical drawworks system.

Timken® spherical and cylindrical roller bearings are well-suited to these applications, due to optimized internal geometry and improved surface finishes that increase bearing performance. Spherical roller bearings can also manage high radial loads even when misalignment, marginal lubrication and contamination are present – all common challenges in a drawworks system.

For chain-driven drawworks, Timken provides a complete offering of roller chain that meets API requirements, and resists fatigue and wear. Customers can order chain cut to the exact length required for the job to avoid scrapping chain.

Timken offers a full package of products to help support improved uptime in the drawworks, and, more importantly, build a high level of confidence that the equipment can handle the job.



**Spherical Roller Bearings**



**Cylindrical Roller Bearings**



**Timken Drives® Chain**



**Timken Drives® Chain**

### TIMKEN SOLUTION: Timken Drives® Chain Doubles Wear Life

Timken extends the same quality and engineering in its bearings to related products like chain. The proof is in our customer loyalty. We are now the preferred drawworks chain provider to many rig operators.

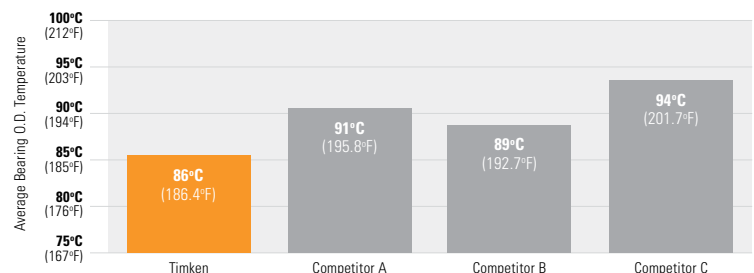
As an example, one operator previously used a competing chain on 50 well service rigs. But, the chains wore out prematurely and pins broke frequently. To address the costly problem, Timken supplied 120-2C API roller chain, and trained the customer's oil rig teams in proper chain maintenance procedures. After installing the Timken Drives roller chain, the operator reduced pin failures and doubled wear life. Now, this rig operator uses only Timken Drives chain for drawworks changeouts – no substitutes.

### TIMKEN SOLUTION: Cooler than the Competition

Timken® spherical roller bearings help equipment manufacturers and end users build and operate leaner, more reliable equipment that reduces operating costs. These power-dense bearings help equipment manufacturers downsize their designs while improving performance. For operators, our spherical roller bearings can require less maintenance, as cooler operating temperatures contribute to longer bearing service life.

How is this possible? Lower operating temperatures increase bearing life by increasing lubricant life. For example, a 5°C/9°F decrease in operating temperature can translate to a 9 percent increase in bearing life. In comparison tests, Timken spherical roller bearings ran at consistently lower temperatures than same-size competitive brands.

#### Test Results





## ROTARY TABLES

For land and offshore rigs utilizing rotary table technology, Timken offers the following solutions:

- Timken® Precision Cylindrical Roller Bearings
- Timken Drives® Roller Chain
- Timken® Ball Thrust Bearings
- Timken® Tapered Roller Bearings

## OFFSHORE AUXILIARY EQUIPMENT

Riser tensioners, jack-up gear boxes, mooring buoys, cranes and blowout preventers are other challenging applications on oil rigs. Timken solutions designed to operate reliably and improve uptime include:

- Timken® Sheave Pac® Bearing Assembly
- Timken® Spherical Roller Bearings
- Timken® Tapered Roller Bearings
- Timken® Cylindrical Roller Bearings



## FRAC TRUCK PUMPS

Timken solutions for hydraulic fracturing equipment include:

- Timken® Tapered Roller Bearings
- Timken® Spherical Roller Bearings
- Timken® Cylindrical Roller Bearings
- Timken® Roller Housed Units



**Housed Unit Round Flange Cartridges**

### TIMKEN SOLUTION:

#### Timken® Urethane Seals Help Protect Bearings in Hydraulic Fracturing Operations

Spherical roller bearing housed units are used in blender truck augers to combine sand and chemicals used in the hydraulic fracturing process. Insufficient seals allow contaminants to seep inside the bearing housings, seriously damaging the bearings and interrupting drilling operations.

The solution: Timken® round flange cartridges with urethane seals. Each seal snaps over the void on the back of the housing to help block contaminants. Timken® urethane seals are excellent in moist and dirty applications because they are resistant to chemicals, corrosion and abrasion.



## INDUSTRY-LEADING BEARING LINEUP



### Cylindrical Roller Bearings

The full range of Timken cylindrical roller bearings includes single- and double-row configurations. The EMA series offers greater performance than the leading high-performance industry cylindrical bearings based on Timken testing.

- Designs provide the option to manage axial loads in either one or both directions, or permit axial float in two directions.
- Surface finishes on the EMA series help optimize predicted bearing life, based on the operating lambda ratio that indicates surface fatigue.
- Sizes: 60 mm ID to 1,800 mm OD (2.4 in. ID to 70.9 in. OD).

*Applications: mud pumps, drawworks, top drives, gear boxes, hoist equipment, crown and traveling blocks, rotary tables, mooring buoys, frac pumps*



### Timken® Housed Units

Our housed units feature robust sealing options - enhancing bearing protection in debris-filled, contaminated or high-moisture environments. Options include:

- Spherical roller bearing solid-block housed units (bore sizes: 35 mm to 180 mm; 1 7/16 in. to 7 in.).
- Spherical roller bearing split-block housed units (bore sizes: 20 mm to 500 mm; 1 3/8 in. to 19 1/2 in.).
- Type E tapered roller bearing housed units (bore sizes: 35 mm to 125 mm; 1 1/4 in. to 5 in.).
- Ball bearing housed units (bore sizes: 17 mm to 75 mm; 1/2 in. to 3 15/16 in.).



### DuraSpexx® and DuraSpexx® Power Rating Series

DuraSpexx Power Rating Series leverages Timken technical capabilities for heavy-load applications, including oil field equipment. Designed to last longer than traditional bearings, DuraSpexx Power Rating Series help optimize reliability, reduce downtime and increase useful life.

- Enhanced materials help reduce inclusion-related damage.
- Surface finishing options can reduce peeling and fatigue in high-temperature and thin lubricant film environments.
- Engineered profiles are designed to distribute stress more evenly under high loads and/or misalignment.
- Power Rating Series accommodates higher levels of performance, compared to DuraSpexx®.
- Sizes: Up to 2,137 mm OD (84 in. OD). Custom sizes available.

*Applications: top drives*



### Tapered Roller Bearings

Timken is the industry authority for tapered roller bearing quality and performance. Benefits include:

- Reduced energy consumption through enhanced surface finishes and optimized internal geometry.
- Longer bearing life and greater reliability due to positive roller alignment.



### Spherical Roller Bearings

Timken spherical roller bearings can manage high radial loads, even in challenging conditions, including misalignment, marginal lubrication, contamination, extreme speeds and critical application stresses.

- Higher load and speed ratings reflect enhanced performance levels due to optimized internal geometry and improved surface finishes.
- Slotted cage made of hardened steel improves lubrication flow to provide lower operating temperatures and increased bearing life.
- Timken spherical roller bearings offer a 17 percent increase in average thermal speed ratings over previous designs.
- Sizes: 25 mm ID to 1,800 mm OD (1.0 in. ID to 70.9 in. OD).

*Applications: drawworks, mud pumps, gear boxes, top drives, frac pumps*

- Optimized bearing performance through application-specific endplay and preload conditions.
- Sizes: 32 mm OD to 1,829 mm OD (1.25 in. OD to 84 in. OD). Custom sizes available.

*Applications: top drives, gearboxes, mud pumps, crown and traveling blocks, drawworks, riser tensioners, rotary tables, frac pumps*

## RELATED PRODUCTS



### Couplings

Timken Quick-Flex® elastomeric couplings are designed to operate in harsh environments, providing durability while requiring minimum maintenance.

- Easy to install, handle up to 2 degrees of misalignment and require no lubrication.
- Interchangeable with most other comparably sized couplings, regardless of type.
- Offer four insert choices for varying torque needs and temperature ranges.
- Cast-steel rigid couplings are also available.

*Applications: motor to gearbox, gearbox to driven equipment, motors to pumps, and any drive shaft to a driven shaft*



### Chain

Timken manufactures chain that performs well in demanding environments, and is built to precise specifications for strength and optimal wear life.

- Offering includes a complete line of precision roller chain, attachment chain, engineered chain and corrosion-resistant chain.
- For the oil and gas industry, we provide chain that meets API requirements and coiled tubing injector chain.

*Applications: drawworks, rotary tables, mud pumps, mobile rigs, power tongs (spinners), lift pumps and directional drilling*



### Lubricants

Timken developed application- and environment-specific lubricants based on advanced knowledge of tribology and anti-friction bearings. High-temperature, anti-wear and water-resistant additives offer superior protection in challenging environments.



### Seals

Timken® seals help keep contaminants out and lubrication in. For a wide range of applications, Timken offers grease seals, oil seals and advanced bearing isolators in imperial and metric sizes. Timken also features sheave and excluder seals for use with Timken sheave bearing sets. CST, CE and CS style seals are available for use with Timken bearing sets used in sheaves, pulleys, crown block and traveling blocks.



### Lubrication Systems

Timken offers a wide variety of single-point and centralized multi-point lubrication systems designed to consistently distribute grease into machine operations. These canisters can be filled with Timken lubricants or many other types of commercial lubricants and mounted in place with a full line of Timken accessories. Timken continues to expand its range of centralized lubrication solutions to help improve oil and gas equipment performance around the world.

## SERVICES

Even the most seasoned, skilled maintenance teams can use additional support to keep operations running at full capacity. Timken experts work in the field, and in the shop, to help you maximize equipment life and solve maintenance issues quickly.



### Condition Monitoring

Identify potential system issues before failure occurs with Timken condition monitoring solutions, which evaluate bearing condition, lubrication quality and machine vibration. Customized programs can reduce maintenance and capital expenses while increasing productivity, uptime and safety. Products include a variety of handheld devices and online systems for periodic or continuous monitoring.



### Maintenance Tools

Timken maintenance tools make installation, removal and service safer and easier. Choose from a variety of induction heaters, impact fitting tools, and hydraulic and mechanical pullers. Timken field specialists are available to conduct training on proper tool usage and maintenance procedures.



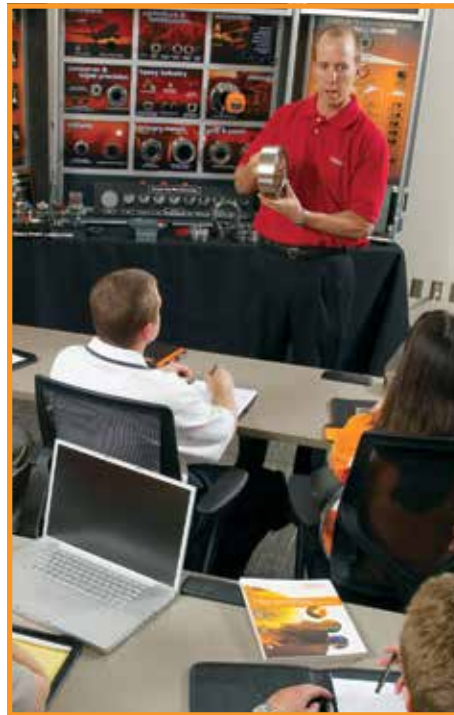
### Gearbox Repair

Timken Gears & Services (TGS) is well-known for its dedication to quality and its commitment to providing some of the longest-lasting gearboxes in the industry. With deep knowledge of a wide range of industrial gearbox types, the team can assist with top drive gearbox repairs. Repairs are made in regional service centers, or technical and field service teams can perform gearbox inspections and repairs at drilling sites.



### Service Engineering

Timken service engineers take their expertise directly to customer locations, helping ensure equipment is installed properly and operates effectively. They also deliver customized training for maintenance teams.



## TRAINING AND CERTIFICATION FOR YOUR EMPLOYEES

### Maintenance Training

Timken service engineers provide the premier bearing maintenance training programs in the oil and gas industry. Timken maintenance training covers all bearing types, is 100-percent technical in scope, and includes both pre-tests and post-tests to assure that students understand the concepts presented. Timken training is modular, and customizable to suit your operation's specific needs. Seminars range from two hours to three days long. To encourage trained maintenance professionals to remember and apply the coursework – providing long-term value to operators, Timken service engineers can return later to conduct a Timken Bearing Certified Audit. Timken also offers training for optimal selection, applications and maintenance of chain.



Offshore and onshore drilling customers bring Timken their greatest challenges. Timken engineers provide extensive technical expertise and field experience to help discover and extract oil and gas resources efficiently, safely and responsibly.

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# TIMKEN

The Timken team applies their know-how to improve the reliability and performance of machinery in diverse markets worldwide. The company designs, makes and markets high-performance mechanical components, including bearings, gears, chain and related mechanical power transmission products and services.

[www.timken.com](http://www.timken.com)

Stronger. Commitment. Stronger. Value. Stronger. Worldwide. Stronger. Together. | Stronger. By Design.