Enhancing Profit and Production with Pro-Rod™ Coiled Rod
Elevating the Potential of Artificial Lift Production.

Dover Artificial Lift, part of Dover Energy, offers a comprehensive line of artificial lift equipment, accessories and services strategically designed to drive the operational excellence of each of our clients. We provide industry-leading systems and components engineered to enhance the profitability of gas lift, plunger lift, rod lift, progressing cavity pump applications and surface production, as well as state-of-the-art software and products in the well automation, analysis, and optimization space.

As an organization dedicated to the needs of our clients, we place a consultative service and support approach at the forefront of our operations. Driven by a team of veteran artificial lift experts, our mission is to deeply understand the complex production challenges faced by well operators on a daily basis, and provide them the exact set of tools needed to meet them as efficiently and effectively as possible.

Strengthened by the vast global footprint and tradition of excellence of our parent company, the Dover Corporation, we are able to ensure that the products we provide – and more importantly – the people who make up our organization, are the best in the artificial lift industry.
Reduce Maintenance. Increase Production. Enhance Profit.

Pro-Rod™ delivers the most convenient and cost effective coiled rod and rod handling systems. Pro-Rod™ is the industry's largest coiled rod manufacturer, with world-class facilities in Canada, the United States, and the Middle East.

Coiled rod is manufactured as a one-piece, continuous rod string that effectively connects the bottom-hole pump to the prime mover at the surface. With only two connections, one at the top and one on bottom of the rod string, all other connections are eliminated for a uniform rod diameter. Costly well maintenance interventions due to couplings are significantly reduced. Coiled rod’s uniform and flexible nature makes it the most effective and efficient choice for rod strings in deviated, slant, or directional wells.

Our coiled rod is manufactured using the highest quality domestic steel available and is subject to the industry’s most rigorous quality assurance program. Pro-Rod™’s proprietary high-quality, fully quenched and tempered coiled rod is available in the size and grade required to meet your needs.

REDUCE LIFT COSTS
An estimated 75% of rod string failures occur within the coupling and forged upset areas. By eliminating the couplings, Pro-Rod™’s offerings can drastically reduce the associated costs of rod string maintenance, tubing replacement and costly well downtime.

INCREASE PRODUCTION
Removal of the couplings from a rod string creates a uniform flow area for fluid in the production tubing and eliminates pressure loss experienced across couplings, increasing both pump efficiency and production.

REDUCE SERVICE COSTS
Our coiled rod injector, the X-celerator™ has the unique ability to work in conjunction with most primary methods of well servicing for artificial lift. At pull/run speeds of over 100 ft/min. trips times and potential hazards are significantly reduced vs conventional sucker rod through the controlled, mechanized and safe deployment of coiled rod. You can expect reduced well service costs through coiled rod deployment efficiencies and fewer well interventions.
Bringing the benefits of coiled rod to your oil field, simply and efficiently

Coiled rod technology has been available since the 1960’s but remained a relatively minor segment of the market due to the significant logistical obstacles it once presented for well operators. Recent advances in the equipment used to install and maintain coiled rod-equipped wells, coupled with an increased availability of third-party coiled rod installation services, have removed the cost-prohibitive barriers of entry, revolutionizing the utilization of coiled rod in the industry.

Pro-Rod™, along with partner company C-Tech, has been at the forefront of these recent advances. With state-of-the-art installation and servicing equipment, and coiled rod manufactured with industry-leading steel strength and quality, oil producers can now leverage coiled rod in any type of well, in a manner that ensures optimal production and drastically reduces well maintenance costs.

The Benefits of Coiled Rod

**INCREASED PRODUCTION**
- Unrestricted flow and decreased pressure drops across couplings creates more production.
- Removal of rod coupling-piston effect facilitates laminar flow.

**REDUCE WELL DOWNTIMES AND MAINTENANCE**
- Eliminating couplings prevents an estimated 75% of rod string failures.
- Coiled rod distributes side loadings and reduces tubing wear.
The Pro-Rod™ Advantage

Pro-Rod™ has earned the reputation as the industry-leader in the coiled rod market with our commitment to solving client challenges.

Reduced Cost and Lead Times

**CHALLENGE:** Over 50% of coiled rod cost was previously associated with shipping and transportation, resulting in a higher total landed cost for customers.

**OUR SOLUTION:** Pro-Rod™ has developed a manufacturing presence in Canada, the USA, and the Middle East to counteract these high shipping costs and lengthy lead times. Localized manufacturing ensures that prompt service and support is readily available, regardless of location.

Manufacturing Quality

**CHALLENGE:** Consistent product quality and a product selection to meet customer needs.

**OUR SOLUTION:** Pro-Rod™’s rigorous internal quality assurance program guarantees that our rods is constantly measured and tested during various phases of the manufacturing process. This ensures that each rod string we produce is free from defects and fits the exact specifications of the well in which it will be installed. Coupled with our commitment to use only the highest grades of domestic steel, our products offer maximum fatigue life and corrosion resistance.

Partnerships Provide Entire Solution

**CHALLENGE:** Coiled rod installation and servicing requires additional knowledge and investment.

**OUR SOLUTION:** In order to help their coiled rod operations achieve maximum profitability, we assist and educate our customers regarding application, installation and service processes. Together with our partner, C-Tech, Pro-Rod™ offers expert advice, application consultation, and access to effective coiled rod services to all of our customers worldwide.
**CASE STUDY**

**The Case for Pro-Rod™**

Pro-Rod™ works with a major Canadian heavy oil producer for drastically increased mean time before system failures, substantial service cost savings and enhanced production.

**UNDERSTANDING THE CHALLENGE**

Reduce well intervention frequency in their CHOPS (Cold Heavy Oil Production with Sand) wells. The harsh conditions of the wells in question caused excessive tubing and rod string wear, especially in the rod coupling area. This led to frequent interventions, high service costs and less than optimal well production. Average mean time between system failures was roughly 9 months, much shorter than ideal or possible.

**IDENTIFYING THE RIGHT SOLUTIONS**

Pro-Rod™ replaced the traditional conventional coupled rod with coiled rod. Pro-Rod™ was installed into 1,500 wells, initially as a pilot study. Due to the documented early success of the product and service model, the company elected to convert 3,500 producing wells and install all new drills to Pro-Rod™ coiled rod.

The service model warranted the deployment of 20 C-Tech X-celerators™ (coiled rod injectors) directly into the company’s service equipment fleet over time. C-Tech also provided X-celerators™ to third party contractors to ensure full and on-going coverage for this producer. This model alleviated the inconvenience and service delays typically associated with coiled rod-driven production. The pilot also proved that the servicing of coiled rod was much more efficient compared to conventional coupled rod.

**DELIVERING RESULTS**

In the wells monitored by the pilot, net well service costs were reduced by $1,600 per well, per month, for a total field-wide savings of $2.4 million per month.

The mean time between system failure was improved by 33%, from 9 to 12 months. This represented significant savings due to a decrease in service costs.

The average time for the first intervention on a new well was improved by 200%, from 3 to 9 months. This decrease in site downtime improved overall production by 10%, or 258 barrels per month per well.
Coiled Rod Specifications

Pro-Rod™ offers a wide variety of coiled rod products and sizes designed to meet the unique challenges of any well utilizing a Progressing Cavity or Rod Lift pumping system. Additional products available upon request.

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<tr>
<th>Physical Properties - Quenched and Tempered</th>
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<tbody>
<tr>
<td>Pro-Rod Type</td>
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<tr>
<td>Grade</td>
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<tr>
<td>Tensile, ksi (MPa) min.</td>
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<tr>
<td>Yield, ksi (MPa) min.</td>
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<td>Hardness, Rc</td>
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<tr>
<th>Maximum Service Torque ft-lbs (N-m)</th>
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<tr>
<td>Rod Size</td>
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<tr>
<td>13/16&quot; (20.6 mm)</td>
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<tr>
<td>7/8&quot; (22.2 mm)</td>
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<tr>
<td>1&quot; (25.4 mm)</td>
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<tr>
<td>1 1/8&quot; (28.6 mm)</td>
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- Carefully crafted chemical properties provide improved corrosion resistance.
- High quality steel ensures maximum fatigue life, strength and durability.
- Various sizes and grades available to cater to any type of well conditions.