

Drill String Services

Integrated service offerings for optimized drilling performance and asset lifecycle



Tuboscope | NOV

Drill String Services

Tuboscope's industry leading technology, experience and integrated suite of service offerings, improves drilling performance and maximizes the return on your investment.

We have spent more than 80 years perfecting our products, services, and training our people to help prevent drill pipe failures. Our dedication has culminated in a series of services and technologies that help identify serviceable pipe, as well as extend the working life of your drill string. With over 200 locations worldwide, we can serve you in a facility, in the field or in a pipe yard, when and where you need us.

Our portfolio of drill string services includes:

- Inspection
- TK™ Corrosion Control
- TCS™ Hardbanding
- Machining
- TracID™ Lifecycle Management

Quality asset management is key to ensure safe, successful and profitable drilling. Our full-service drill string management program gives you confidence in asset performance and reduces your total cost of ownership.

- Worldwide Expertise
- Commitment to Research and Development
- Full Range of Drill String Services

Safety, Quality and Training

Safety

Safety is our core value at Tuboscope and compliance extends beyond the factory floor. In the field and in our facilities, it is our #1 goal to deliver the highest quality while ensuring no harm to personnel or the environment.

Safety training is an ongoing commitment and the Peer to Peer Behavior Based Program is practiced across all facilities. All personnel have stop work authority and receive extensive training along with proper company issued PPE, inclusive of FRC work gear as required on all customer sites. We are active members of PEC Premier, DISA, ISNetworld and other industry safety program monitors. We believe safety is everyone's responsibility.

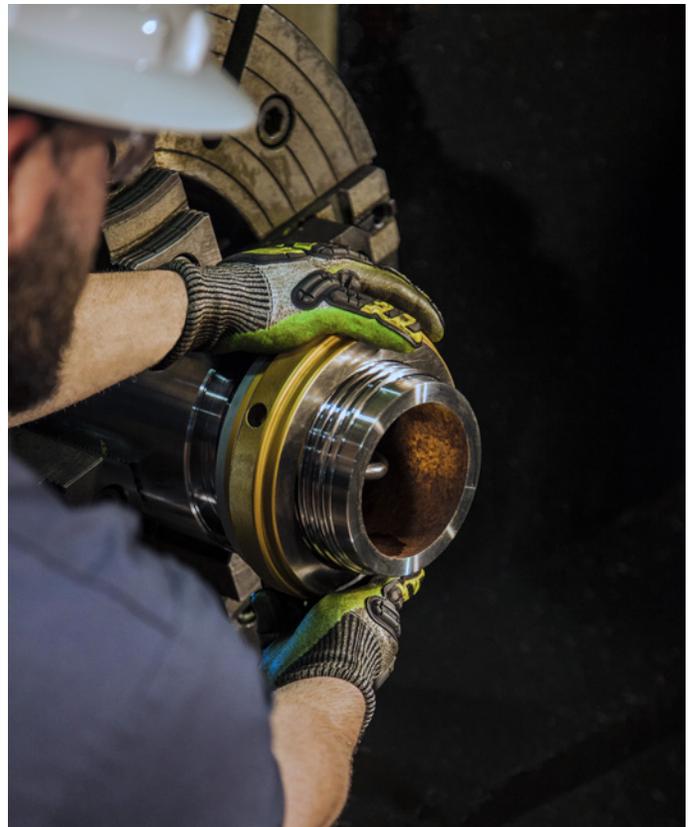


Quality

We pride ourselves on providing unparalleled quality and service to our customers. In our facility or at customer field site locations, quality is always a priority at Tuboscope. All facilities operate in accordance to API and/or ISO requirements, and are closely monitored by our Internal Corporate Quality & Technical Services department. We work daily with our team of ASNT Level III Instructors, QAQC field auditors and operation leadership on continuous improvement programs.

Training

Our team members are highly trained professionals, subject to extensive ASNT and other industry standard training programs. Our programs not only meet all standards, they supersede most requirements. Certified Level II Inspectors carry credentials in the following disciplines: VT, DM, MT, UT and/or EMI. In addition, our inspectors are trained in Lathe Refacing for onsite mobile repair services.



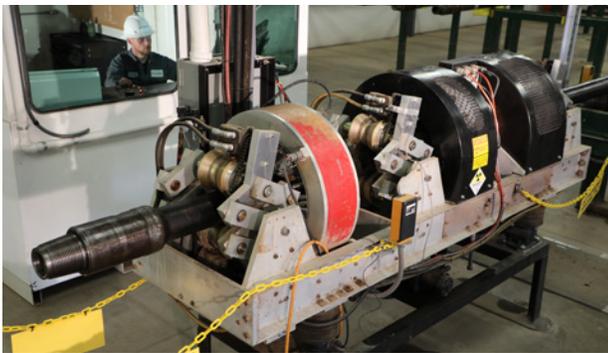
NDT Inspection

We Know Drill Pipe Inside and Out

Drilling tubulars are subjected to cyclic stresses in tension, compression, torsion, and bending, making a thorough inspection program vital to ensure new and used pipe is fit-for-service.

We provide the necessary inspections for all drilling operations, including deviated and horizontal wellbores. Our comprehensive drill pipe inspection program identifies defects related to manufacturing, handling, or drilling that could lead to costly downtime or failures. Inspection techniques include traditional Ultrasonic Testing (UT) and Phased Array to determine API specified wall thickness and Electromagnetic Inspection (EMI) to detect service related defects.

With our mobile and in-plant services, we provide the quality inspections you need to maximize the life and performance of your drill string.



Truspec™ and Sonoscope™ Inspection Systems

- Electromagnetic Inspection (EMI)
- Full circumferential coverage
- Cross sectional area (CSA)
- Measures wall thickness variations
- Locates service induced defects
- Classifies tube condition



Endsonic™ Inspection Tool

- Ultrasonic Testing (UT)
- Shear wave for detection of fatigue cracks
- Compression wave for detection of internal pits and wall loss



Multiple Dimensional Tool Joint Checks

Box End

- Outside diameter
- Shoulder width
- Tong space
- Counter bore diameter
- Seal width
- Bevel diameter

Pin End

- Inside diameter
- Tong space
- Neck length
- Bevel diameter

A hardband and coating evaluation is always performed during drill pipe inspections.

Corrosion Control

Tube-Kote™ Drill Pipe Coatings

Tube-Kote Drill Pipe Coatings provide superior returns on your drill pipe investment. The comprehensive line of TK™ internal plastic coatings include epoxy phenolic, epoxy novolac and the latest thermoplastics, all designed to address operating needs of specific downhole conditions.



Benefits

Corrosion Control

Corrosion pitting and associated fatigue can result in washouts and twist-offs that can shut down drilling operations. Internal plastic coatings improve drill string performance in even the most aggressive environments.

Wear Prevention

Engineered abrasion resistant coatings reduce wear issues from wire line and coiled tubing intervention operations.

Hydraulic Improvements

The smooth surface of coated drill pipe reduces friction and increases hydraulic efficiencies. In completion strings, higher flow rates help remove mud films during displacement to completion fluids. These reduced pumping pressures can decrease the loss of completion fluids into the formation.

Prevention of Scale Deposits

Internal plastic coatings are beneficial in drilling and workover applications by eliminating the buildup of harmful scale. A clean internal surface of drill pipe protects against formation contamination and maintains hydraulic efficiency.



TK™-34

Field proven
industry standard

TK-34XT

Industry-leading
abrasion resistance in
drilling environments

TK-34P

Improved H₂S and
organic acid resistance

TK-340XT

Enhanced abrasion resistance
with greater flexibility and
chemical performance

Our drill pipe coatings withstand all temperatures commonly encountered during drilling — provided circulation is maintained. Frequent coating evaluations are recommended to improve the longevity of the drill string. These visual evaluations ensure the integrity of the coating. Field case studies have proven that proper coating evaluations and re-coating programs have enabled certain drill strings to drill up to 900,000 feet while maintaining pipe integrity.

TCS Hardbanding

Your single source for the most comprehensive package of oilfield tubular services — worldwide

Tuboscope is the only oilfield hardbanding service company that offers a single source for wire manufacture, wire sales, new pipe application and reapplication worldwide. With mobile and fixed units strategically located around the world, TCS™ Hardbanding is available in all major oilfield markets.

TCS Titanium

TCS Titanium is formulated to provide high stress abrasion resistance along with unmatched resistance to cracking and spalling. Titanium carbides on their own are approximately 40% harder than tungsten carbide. The TCS Titanium microstructure exhibits smooth round particles, which help prevent galling problems on metal-to-metal contact. This combination gives a superb balance between abrasion and crack sensitivity that results in both reduced tool joint wear and casing wear.

TCS-XL

TCS-XL is a high-performance niobium carbide hardband product with increased performance and welding characteristics when compared to competitive niobium carbide products. When applied over TCS-Ti, the blend of both chemistries delivers exceptional durability and performance.

TCS-8000

TCS-8000 is our original casing friendly chromium carbide hardbanding introduced over 20 years ago. While not recommended for the horizontal drilling environment, TCS-8000 is still the most casing friendly hardbanding available.



Benefits of TCS Casing Friendly Hardbanding

TCS Titanium and TCS - XL

- Superior casing wear protection
- Crack free and non-spalling
- Low coefficient of friction
- Extended tool joint life
- High stress abrasion resistance
- Unlimited reapplication in the field

Tungsten Carbide Hardbanding – Non-Casing Friendly

Tungsten carbide is the original drill pipe hard facing protection. Tuboscope applies various mesh sizes of crushed and spherical tungsten that is extremely effective in bottom-hole assemblies that normally operate in an open hole environment. All operational areas have the capability to apply center wear pads.



All TCS products can be applied in the field over used and worn hardbanding if no voids (spalling) or visible cracking is present.

When and Where you Need it

Combining qualified personnel with our mobile equipment turns your drill site into our work site. Tuboscope cuts the time necessary to get you back up and running by delivering hardbanding services on new or used drill pipe and heavy-weight/drill collars when and where you need it. In addition to the application of our proprietary hardbanding, we have the capability to apply most competitive hardband products.

Machining

Machining Services include Thread Repair and the manufacture of drilling accessories with the most up-to-date CNC machinery, inspection and gauging practices. Tuboscope machine shops are strategically located in major oilfield markets around the world.

Thread Repair

Tuboscope performs thread repair services on API rotary shouldered connections and proprietary connections, including Grant Prideco™.

Connection Repairs:

- Drill pipe
- Drill collars
- Heavy weight drill pipe
- Tubing (premium threads)
- Casing repair and coupling
- Mod Acme (standard and modified Acme connections)
- Subs
- Stabilizers
- Kellys

Manufacturing

All drill string accessories are manufactured from new materials per API or customer specifications and include a material certificate for traceability. A full line of sub stock and forged, high-strength top drive saver sub blanks with mill test reports (MTR) is inventoried at all locations.



Standpipe and Manifold Fittings

Fittings are manufactured and machined from ASTM A487 high grade carbon steel. Available in a variety of designs, we offer fittings with welded or threaded connections that are compatible with all types of pump manifolds and mud line systems. 5 in. and 6 in. fittings are designed and rated for 5,000 to 7,500 PSI WP. Most 2, 3 and 4 in. fittings are designed and rated for 5,000 or 10,000 PSI WP. All sizes and configurations are suitable for sour gas.





Know what it is,

where it is,

where it's been,

and the state it's in

to use it well

and use it often

TracID Lifecycle Management

Confidence...Clarity...Cost Savings

The comprehensive TracID™ lifecycle management system brings together offerings from NOV brands Grant Prideco™, Tuboscope and M/D Totco™, to provide an all-in-one asset management solution. Combining RFID technology with proprietary software solutions, the TracID™ system provides unmatched accuracy and efficiency when tracking your assets downhole and around the world.



Tubular Integrity Management Program

Tubular Integrity Management Program (TIMP) is a Cloud/Web based condition monitoring system for tubular conditions. This program allows for the storage of history condition, connections and tubes, corrective actions and performance improvement programs. When fully implemented various customers have realized significant savings with reduced cost of repairs and/or purchasing tubulars due to excessive wear.

Grant Prideco

TracTags are installed during manufacturing or retro-fitted into existing Grant Prideco premium rotary shouldered drilling components. All asset information synced to the tag is then accessible for the remaining life of the pipe via TracID's software solutions.

TracTag™ RFID Technology Benefits

- Provides unique, scannable ID
- Withstands up to 400°F (202°C)
- Pressure rated to 22,500 PSI (1550 Bar)
- Service life greater than 10 years
- Ex certification: Zone 1
- No impact on tool joint integrity

In addition to TracTags, we offer a variety of durable tags and plates for different types of equipment.



Tuboscope TruData™ Inspection and Reporting Database

With TruData™ inspection and reporting database, customers can effectively monitor the status of their fleet to identify problems, prevent improper care and handling, and ensure proper fit-for-purpose application of drill stem components. The TruData™ database offer comprehensive reporting and data management, as well as built-in connectivity with our TracTag™ RFID technology to provide:

- Full documentation and traceability
- Asset history
- Detailed summary reports
- Condition monitoring
- Remaining life analysis

Max Track™ Cloud-Based Asset Tracking Integration

NOV's Max Track™ cloud-based asset tracking brings asset identification, location, evaluation, and management into a single, comprehensive platform accessible from anywhere. The system automatically imports data from the TruData™ database and third-party inspection reporting systems for any assets using TracTag™ RFID technology. A simple search or scan retrieves individual asset records with last known location and status, manufacturing specifications, location, service history, and other information.

AutoTally™ automated, real-time pipe tally system

More than just a tally, the AutoTally real-time pipe tally system by M/D Totco, provides usage data to improve pipe management for both owners and operators. With an RFID antenna installed under the rotary table, each tagged asset is recorded as it enters and exits the well, automatically displaying usage and tally history in Max Track. Easily set usage thresholds in Max Track and receive visual threshold notifications on a rig-site display to evaluate assets before using them downhole and identify assets to shuffle into use after each trip.

TracID Benefits

- Extend asset life
- Reduce unnecessary spend
- Choose the right tool for the job with anywhere, anytime access to asset information and usage data
- Save time and improve performance by eliminating misread serial numbers and manual tracking

Associated Services

Rig Component Inspection
Comprehensive Reporting

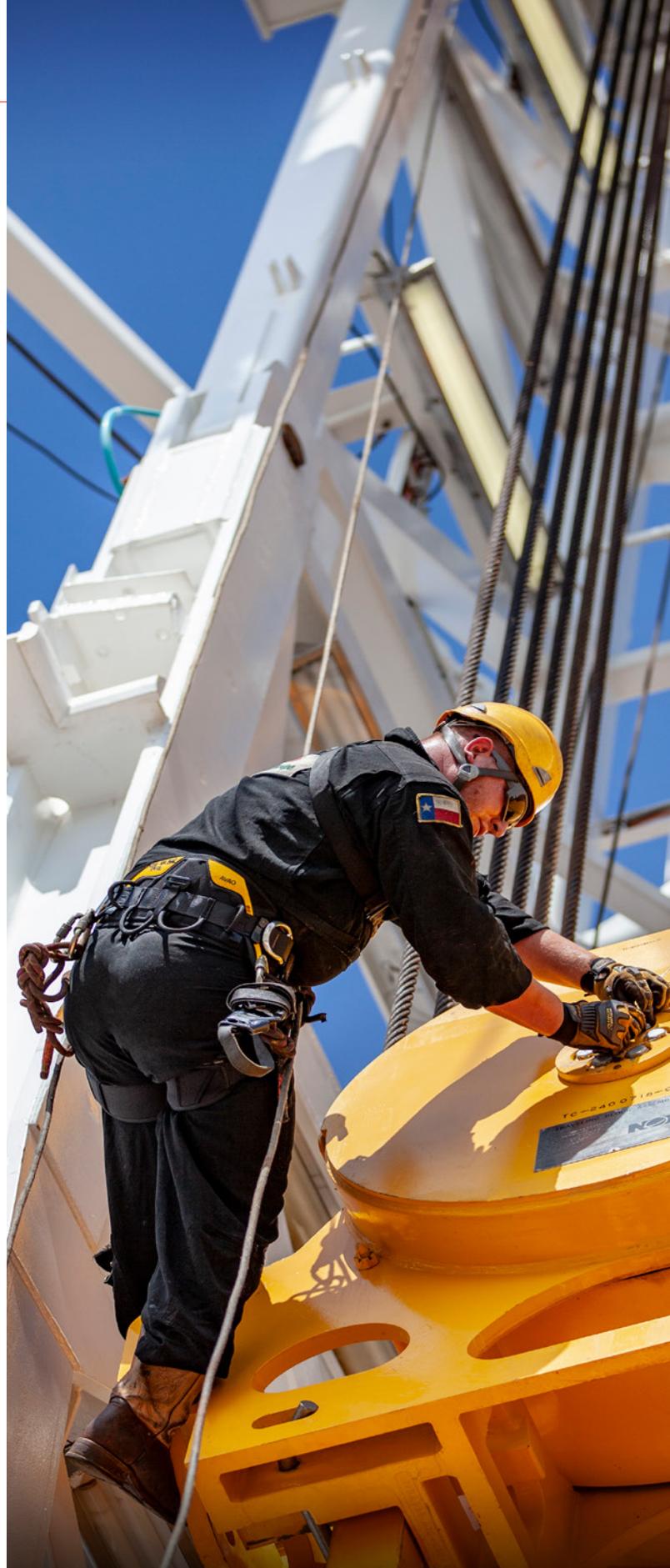
Non-destructive testing is essential to locate potential defects and excessive wear on drilling and production hoisting equipment. Tuboscope follows API recommended practices to ensure rig components are fit for service. Comprehensive reports for risk management programs are provided on rig elements which may include:

- Block-to-Hook Adaptor
- Crown Block
- Drawworks Brake System
- Drilling Hook
- Elevator
- Elevator Links
- Manual Tong
- Motion Compensator
- Rotary Swivel
- Top Drive
- Travel Block
- Wireline Anchor

IntelliServ™ Wired Drill Pipe Services

In addition to API and premium connections, we service all critical components of IntelliServ™ wired drill pipe.

For a list of available service locations, please contact your local Tuboscope representative.





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