XQ™ wireline coring rods provide the ultimate performance and longevity, featuring innovative self-aligning, double-start threads, enabling automated make and break without wedging or jamming.
STAND-OFF GAP
EXCESSIVE OR INSUFFICIENT/
DOES NOT CLOSE UPON
MAKE-UP/DIFFICULTY
BREAKING OUT/LEAKAGE
STAND-OFF GAP EXCESSIVE OR INSUFFICIENT/DOES NOT CLOSE UPON MAKE-UP/ DIFFICULTY BREAKING OUT/LEAKAGE

Wrench-snug gap (with grease) should be, 0.4-2.4 mm (1/64”-3/32”). Wrench should capable of closing gap. Use hydraulic tools (chuck, head) to apply minimum make-up torque.

CAUSES:
» Insufficient make-up torque.
» The rod shoulders have stabbing or handling damage. Boxes or threads are worn or deformed due to setup, debris, hammering or overload.
» Rods are of different manufacture.

CORRECTIVE ACTIONS:
Verify make-up torque. Clean and inspect boxes, threads, and accessories (e.g. adapter subs) for wear, damage, or debris. Discard damaged rods. Replace thread compound. Separate all rods by manufacturer and do not intermix.
CRACKED PIN/ CRACKED BOXES
CRACKED PIN/ CRACKED BOXES

CAUSES:
» Rod joints not closed due to insufficient make-up torque.
» Rod shoulders damaged. Boxes or threads are worn/deformed due to setup, debris, hammering or overload.
» Top drive sub worn (See Subs).
» Loads above the fatigue strength of joint due to deviations, caves, damage, twisting, or depth.
» Stress corrosion caused by fluid pH, salt content (brine), high temp, chlorine, fluorine, and/or sulfides.

CORRECTIVE ACTIONS:
BOX END VERTICAL
CRACK/ HEAT
CHECK CRACKING
BOX END VERTICAL CRACK/HEAT CHECK CRACKING

Vertical cracks on box caused by friction between rods and casing or hole, independent of tubing type, steel grade, or applied heat treatment. Often seen with a bright, polished area and thin cross-section

CAUSES:
» No rod lubrication.
» Excess drilling loads or excess hole deviation.
» Rod twisting (polished along length of rod).
» Stress corrosion caused by fluid pH (acidic or basic), salt content (brine), high temperature, chlorine, flourine and/or sulfides.

CORRECTIVE ACTIONS:
Inspect boxes with wear gauge and retire worn rods. Fix lost circulation and improve lubrication with grease or mud additive. Adjust rpm to reduce vibration. Use chemical/mud to reduce corrosive conditions.
THREAD WEAR AND GALLING
Material has adhered to the mating surface and pulled away. Same material and hardness create highest wear.

**CAUSES:**
- Wear due to damaged rods or accessories.
- Thread compound has failed.
- Front flank wear reduce feed rate and/or increase rotation at make-up.
- Back flank wear increases feed rate and/or reduce rotation at make-up.

**CORRECTIVE ACTIONS:**
Clean/inspect rods and accessories. Discard damaged ones. Replace or upgrade thread compound. Adjust make-up settings. Upgrade to XQ™ rods.
SHOULDER FLARED/
THREAD JUMPING
SHOULDER FLARED/THREAD JUMPING

CAUSES:
» Box life exceeded.
» Box bulging due to overload.
» Box or pin shoulder flared due to overload.
» Pin edge rolled due to overload.

CORRECTIVE ACTIONS:
Clean/inspect/measure rods and accessories. Discard if damaged or worn. Replace or upgrade thread compound. Verify/reduce make-up torque. Upgrade to XQ™ rods.
MIDBODY WEAR
CAUSES:
» Lost circulation.
» Broken ground contacting rod.
» High side loads due to excess deviations.
» Oversized or ‘cave’ sections allowing string to twist.
» Temporary or permanent rod twisting; polishing or heavy wear in a spiral pattern.

CORRECTIVE ACTIONS:
Inspect rods. Retire worn twisted rods. Fix lost circulation and improve lubrication with grease or mud. Adjust rpm to reduce vibration. Review hole survey and recut hole as needed. Grout to correct oversized or collapsed sections.
MIDBODY CRACKS
Surface damage combined with drilling loads causes fatigue cracking. Care should be taken when handling rods to prevent damage.

**CAUSES:**
- Damage deeper than 1/32” or 0.8mm larger damage causes earlier failures.
- Spiral pattern due to damage and torque load.
- T shape pattern due to excess clamping pressure.

**CORRECTIVE ACTIONS:**
Inspect rods and discard if damaged. Check rod handlers, foot clamps, and chucks for excess clamping pressure.
ROD TWISTING
The drill string has twisted into a spiral shape, increasing friction, vibration, and torque. Rods show polishing/wear in a slow, spiral pattern about 1/4 revolution/rod.

**CAUSES:**
- Lost circulation: fluid dampens vibration and reduces friction.
- Oversize hole or ‘cave’ section: larger annulus, creates more space for rods to twist.
- Excess deviation: causes more friction, a contributor to twisting.
- Excess vibration: adjust speed up or down by as little as 50 rpm to avoid natural frequency.

**CORRECTIVE ACTIONS:**
Inspect rods. Retire worn twisted rods. Fix lost circulation and improve lubrication with grease or mud. Adjust rpm to reduce vibration. Review hole survey and recut hole as needed. Grout to correct oversized or collapsed sections. Do not exceed deviation ratings. Place deviations towards bottom of string.
# Deviation

## Deviation Guidelines

**Maximum Degrees Per Rod Length**

<table>
<thead>
<tr>
<th>Material</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARQ™TK</td>
<td>2.0 deg</td>
</tr>
<tr>
<td>BXQ™/BRQ/BRQTK</td>
<td>1.5 deg</td>
</tr>
<tr>
<td>BQ™</td>
<td>1.2 deg</td>
</tr>
<tr>
<td>NXQ W-WALL™/NRQ/NRQ</td>
<td>1.0 deg</td>
</tr>
<tr>
<td>NQ™</td>
<td>0.8 deg</td>
</tr>
<tr>
<td>HXQ W-WALL/HRQ</td>
<td>0.8 deg</td>
</tr>
<tr>
<td>HQ/PHD/PHD W-WALL</td>
<td>Not Recommended</td>
</tr>
</tbody>
</table>
DEVIATION

Guidelines are provided to keep rod stress below the fatigue limit. Higher deviations guarantee the rods will wear prematurely, twist, or fail in fatigue.

**ACTIONS:**

- Survey every 3m in bend to get an accurate measure of the deviation rate.
- Use software to calculate deviation or Dog Leg Severity. It is not the dip and azimuth added together.
- Limit the rate of deviation. The deviation per rod length should not be exceeded rather than the deviation per 30m (100ft).
- Deviation should be further limited with increasing hole depth.
- Recut or ream out any sections that exceed deviation or add significant torque.
- Place bends as close to bottom as possible to limit stress.
SUBS, TOP DRIVE CONSIDERATIONS
Top-drive subs are made and broken many times during tripping, while rod only sees one. Subs are softer, so their shoulders wear faster. Subs are stiffer, causing higher stress and strain. The difference in stiffness, can cause rod box fatigue cracks when mated to a worn top-drive sub.

**ACTIONS:**

» Use subs with larger OD’s than the rod, bullnose guides and pin case hardening to minimize wear.

» Replace top-drive subs often and use separate subs for drilling (less wear) and tripping (more wear).

» Check Sub Fit: make-up a locking coupling or un-used rod box to sub, wrench-snug (with grease), and check gap, 0.4-2.4 mm (1/64”-3/32”). If no gap, or if joint feels loose, replace the adapter.

» Check Sub Shoulder Wear: After fit test, wrench fully closed. If shoulder is not closed (visible gap) or has deformed (visible change in profile), then replace the adapter.
NEW DRILL ROD APPEARANCE
NEW DRILL ROD APPEARANCE

The color of the mid-body depends on cold draw lubricant, furnace atmosphere (gas), temperature of annealing, and rust preventative. Color differences between lots is common.

CAUSES:

» Color of Q&T ends: Darker and bluish due to oxide formed cooling in air.
» Color of Pin Harden: Darker and bluish due to oxide formed cooling in air.
» Color due to RP: Adds gloss; color may appear slightly more yellow or amber.
» Color of thread compound: Adds a light grey color to threads.
Lubricating and Cleaning

Brushing makes it better
Boart Longyear™ drill rod threads are coated with thread compound (lubricant) for shipment from the factory. For initial use, it is not needed to remove this thread compound unless contamination has occurred.

**CAUSES:**

» Clean and re-lubricate threads with 50% zinc particulate grease. It has a higher friction factor (higher torque capacity) than other thread compounds.

» Cover both thread and shoulder surfaces. Use a 40 to 50 mm (1.5 to 2 in) brush to apply.

» Lubricate the rod body with grease to reduce hole friction, drilling torque and midbody wear.
STORAGE AND TRANSPORTATION

HE MAY BE FAST BUT WE'RE FURIOUS!
STORAGE AND TRANSPORT

**ACTIONS:**

» For Transit: Load rods on at least three cross members and tie down with a chain or strap at cross members.

» Storage of Drill Rods: Clean and grease the threads before storing. Store rods horizontally on a minimum of three cross supports more than 30cm (12in) from ground.

» If rods are temporarily stacked vertically, provide a wooden or rubber base to protect ends, especially when handling lengths of 6m (20ft) or more.

» Corrosion inhibitor on the body is recommended for long term storage.
ROD JOINT
MAKEUP

WHAT A MISFIT!
ROD JOINT MAKEUP

Wireline rods and casing make-up by slowly rotating the pin clockwise into the box (right hand threads).

CAUSES:
» Make-up joints at a very low rotation (e.g. 10 rpm or less) to avoid applying extraneous torque due to the inertia of the drill head.
» Adjust the feed rate to match the rod thread pitch (e.g. 3.5 tpi for RQTK, 3 tpi for Q/RQ, 2 tpi for XQ) while maintaining light compression on the joint to maximize thread wear.
» Do not allow tension, or excessive rotation speed, as this wears the thread load flanks.
» If the stand-off gap, 0.4-2.4 mm (1/64”- 3/32”), is outside specification see STAND-OFF GAP EXCESSIVE/DOES NOT CLOSE UPON MAKE-UP.
GAUGING

» 3547010 Gauge, BQ/BRQ/BXQ R/B OD Wear
» 3547011 Gauge, HQ/HRQ/HXQ R/B OD Wear
» 3547027 Gauge, NQ/NRQ/NXQ R/B OD Wear
» 5003593 Gauge, PHD R/B OD Wear
Outer Diameter Should Wear Gauge:
The ‘box’ or female end of the drill rod is subject to abrasive wear. As the shoulder wears, the load capacity of the joint is reduced. This ‘go/no-go’ gauge determines whether the shoulder has retained 60% of its thickness at the thinnest point. If not, the rod should be retired, and the entire rod string inspected.
REVERSE FLANK THREAD WEAR GAUGES

- 5008766 Gauge, BRQ R/B Thread Wear
- 5008852 Gauge, BXQ R/B Thread Wear
- 5008768 Gauge, NRQ R/B Thread Wear
- 5008857 Gauge, NXQ R/B Thread Wear
- 5008770 Gauge, HRQ R/B Thread Wear
- 5008862 Gauge, HXQ R/B Thread Wear
REVERSE FLANK THREAD WEAR GAUGES

Box threads accept virtually all of the normal wear. This ‘go/no-go’ gauge measures whether the load flank has retained its original shape.

CAUSES:
» Mate the gauge with the box threads so that the shoulders are not in contact.
» Slide the gauge along the threads until the shoulders mate.
» Try to pry the gauge off the threads. If the gauge cannot be removed (without ‘unthreading’), the thread is intact. If the gauge is removable, the thread has been deformed. The make and break set up is incorrect, or the joint has been overloaded and load capacity reduced. Retire rod and inspect the entire rod string.
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