



HDD FIXED-CUTTER PILOT TOOLING

PDC Pilot Bit Operating Guide

A controlled workflow for identification, installation, startup, pilot drilling, retrieval and post-run review.

Document scope

Operating guide for the DRILLNOVA PDC pilot bit family represented by drawings D260410B, D260511B-1, D20260608B-1, D20260724B-1 and D260508B-1.

Model	Drawing OD	Overall length	Connection	Nozzles
4-3/4 in PDC Pilot Bit	120.65 mm	249.4 mm	2-3/8 REG pin	5 x 6 mm
5-1/2 in PDC Pilot Bit - 2-3/8 Connection	139.7 mm	253 mm	2-3/8 API REG	5 x 6 mm
5-1/2 in HDD PDC Pilot Bit - 2-7/8 Connection	139.7 mm	262.3 mm	2-7/8 API REG	6 x 4 mm
8-1/2 in HDD PDC Pilot Bit	215.9 mm	325.7 mm	4-1/2 REG	5 x 6 mm
10 in PDC Pilot Bit	250.8 mm drawing OD	410.7 mm	6-5/8 API REG pin	7 x 6 mm

Important: The supplied drawings define geometry, cutter references, nozzle arrangements and connections. They do not define universal operating torque, rotary speed, thrust, pullback, flow or pressure limits. Those values must be approved for the exact bit, rig, formation and bore plan.



1. Scope and operating principle

This guide applies to the five drawing-controlled PDC pilot bit configurations listed in the Product Data Sheet. A PDC pilot bit removes formation through fixed-cutter shearing while drilling fluid is directed through the nozzles for cooling, cleaning and cuttings transport. Actual performance depends on the matched bit configuration, formation, steering assembly, rig and fluid system.

No universal operating numbers

The supplied drawings contain no approved rotary speed, applied load, torque, flow or pressure values. Use only project-approved limits issued for the exact configuration.

2. Pre-job engineering review

- [] Confirm the current drawing number and revision against the delivered bit.
- [] Confirm nominal pilot diameter and drawing outside diameter.
- [] Verify the bit connection exactly matches the approved housing or drive assembly.
- [] Review formation strength, abrasiveness, variability, inclusions and expected transitions.
- [] Approve the nozzle arrangement against pump capacity, fluid properties and return requirements.
- [] Establish project-specific stop limits for torque, pressure, vibration, steering response and penetration behavior.



3. Receipt and pre-installation inspection

- [] Match product identification to purchase order and approved drawing.
- [] Inspect blades, body, PDC cutters, gauge cutters, backcutters and hardfacing where applicable.
- [] Check nozzles are present, correctly sized and unobstructed.
- [] Inspect the pin connection for impact, corrosion, contamination, galling or damaged threads.
- [] Check sealing shoulders and contact surfaces are clean and undamaged.
- [] Record condition with photographs before installation.

4. Installation

1. **Isolate energy.** Stop the rig and fluid system. Prevent rotation, axial movement and pressure release during installation.
2. **Support the bit.** Use a stable cradle or rated lifting arrangement appropriate to the tool mass. Do not support the bit on the cutters.
3. **Clean interfaces.** Clean and inspect mating threads and shoulders. Use only the approved thread compound.
4. **Align and engage.** Start the connection by hand or controlled slow rotation to prevent cross-threading.
5. **Make up the connection.** Apply the approved procedure and model-specific makeup torque. Do not invent a torque from connection size alone.
6. **Verify fluid path.** Confirm nozzle count and size against the approved hydraulic plan before circulation.



5. Startup and pilot drilling

Before rotation	Confirm personnel are clear, guards are in place, the bore plan is loaded and monitoring channels are active.
Initial circulation	Start circulation under the approved procedure. Check for leakage, blocked nozzles and abnormal pressure response.
Initial rotation	Begin at the approved low-energy startup condition, verify smooth rotation and confirm stable tool response before loading the cutters.
Establish cutting	Increase operating inputs only within the approved plan while monitoring torque, fluid pressure, penetration response, vibration and steering behavior.
During transitions	Expect changes in cutting response when formation changes. Reduce energy and reassess rather than forcing the bit through abnormal behavior.

Stop and investigate if any of the following occur

- Unexpected torque rise, pressure rise, loss of returns or erratic penetration.
- Abnormal vibration, impact, unstable steering response or suspected cutter damage.
- Evidence of connection movement, fluid leakage or nozzle blockage.
- Operating values exceed the project-approved limits.



6. Retrieval, cleaning and post-run review

- [] Stop rotation and pressure, isolate stored energy and support the assembly before disconnecting.
- [] Clean the bit using a controlled method that does not damage cutters or force debris into the connection.
- [] Inspect cutter faces and edges, blade surfaces, gauge area, backcutters, hardfacing, nozzles, body and connection.
- [] Compare wear around the full circumference. Uneven wear can indicate alignment, hydraulic, formation or operating issues.
- [] Record measured condition, photographs, operating history and disposition.
- [] Protect the connection and store the bit in a dry, stable location.

7. Troubleshooting matrix

Observed condition	Check first	Required response
High fluid pressure	Nozzle blockage, incorrect nozzle size, restricted flow path	Stop under the approved procedure; depressurize and inspect.
Low or unstable penetration	Formation change, cutter wear/damage, insufficient cleaning	Review data and tool condition before changing operating inputs.
Abnormal vibration	Damaged cutter, uneven engagement, unstable operating condition	Reduce energy and retrieve if the approved stop criteria are met.
Poor steering response	Formation transition, bit/steering assembly match, cutter condition	Review survey response and the approved bore plan.
Connection leakage or movement	Makeup, shoulder condition, thread damage	Stop. Do not continue until the connection is inspected and approved.

Escalation data

When requesting support, provide drawing number, bit identification, formation, operating history, fluid data, photographs and the observed failure mode.