



MPD-Ready[®]
Managed Pressure Drilling

**Enhancing rigs to meet
complex downhole
pressure related events**

 **NABORS**

MPD-Ready® represents managed pressure drilling (MPD) hardware and controls incorporated into the rig structure. New rigs are coming with the system while the existing rig fleet is being retrofitted.

Nabors recognizes through global operations that complex drilling environments can be represented by non-productive time. By adapting conventional drilling to a closed-loop circulating system, dedicated MPD chokes, mass and density measurement and dual purpose super mud gas separation, Nabors is enhancing drilling rigs to eliminate downhole problems related to:

- Kicks
- Fluid loss
- Wellbore ballooning
- Wellbore breathing
- Stuck pipe
- Slow return on penetration

▶ MPD READINESS MEANS

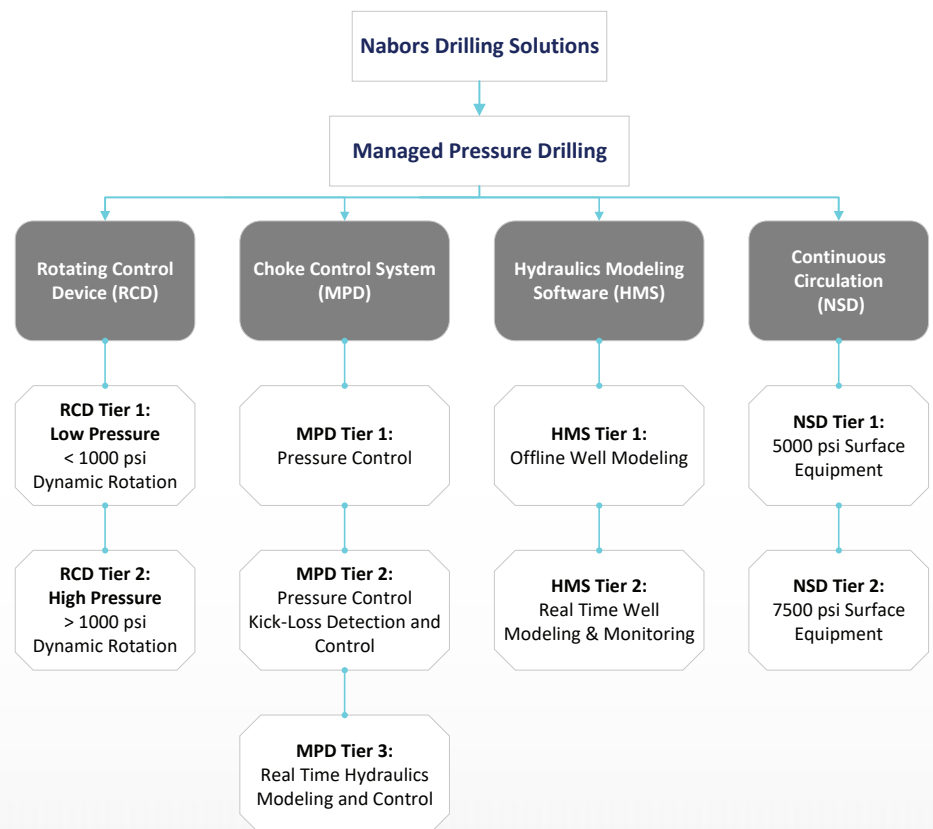
- Elimination of MPD equipment rig up and tearing down
- Drillers take over MPD choke control and avoid additional overall project cost by reducing engineering assessment
- Rig crew trained to handle MPD equipment, including Rotating Control Device
- MPD choke control integrated to the rig modular code
- Improved rig layout design for friendly MPD operation
- No additional/duplicated equipment and compact foot-print
- Effective communication at the rig-site with one rig and service provider

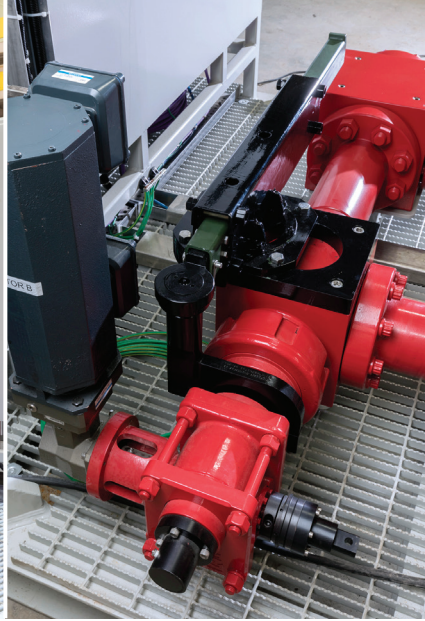
With equivalent circulating density (ECD) and equivalent static density (ESD) being adjusted on demand, it takes just a few seconds to affect downhole conditions in order to maintain constant bottom-hole pressure according to the drilling margin.

MPD packages include a mass flow meter, measuring in gallons rather than barrels, paired with a data-analyzing PLC to detect influxes and losses in a matter of seconds. Understanding wellbore flow

behavior is a game changer for identifying down-hole events early and eliminating risk, reducing cost, and improving overall drilling performance.

By effectively managing ECD through automated MPD, Nabors' customers can utilize a decreased MW and increasing ROP, to reach their total planned depth in less time without incurring major problems. It is our commitment to drill wells safely, economically and efficiently.





Managed Pressure Drilling Services	Tier 1	Tier 2	Tier 3
Manual Control of Chokes	X	X	X
Automatic Control of Surface Backpressure	X	X	X
Trapping Pressure Schedule	X	X	X
Stripping Schedule	X	X	X
Automatic Kick and Losses Detection		X	X
Automatic Control of Stand Pipe Pressure		X	X
Flow Control (Kick and Losses Control)		X	X
Real-Time Hydraulics			X
Automatic Leak-Off Test			X
Automatic Pope Pressure Test			X
Automatic Virtual Mud Weight			X
Automatic Pressurized Mud Cap Drilling			X

Equipment Specification	Equipment Description
Application	Managed Pressure Drilling
Piping and Valves Working Pressure Rating	5,000 psi
Material Class	EE-NL, NACE MR 0175
Design Code	API 6A, PSL-3, PR-1
Temperature Rating	PU -20°F to 250°F
MPD Choke Type	Electric Worm Gear
MPD Choke Working Pressure Rating	5,000 psi
Trim Size	3 in.
Choke Actuation	Servo electric with manual override
Recommended Flow Rating	600 gpm one choke and 1200 gpm two chokes
Length	89.08 in. - 7.42 ft.
Width	81 in. - 6.75 ft.
Height	87.67 in - 7.30 ft.
Gross Weight	10,427 lb.
Automatic Control Mode	Pressure Control and Position Mode

Why choose Nabors MPD-Ready®?

- ▶ An MPD-Ready® rig provides the capability to switch to MPD drilling mode at any time.
- ▶ The rotating control device permanently installed on top of the BOP while the automatic choke control skid with the mass flow meter can be permanently installed at the rig floor level or semi-permanently installed at ground level.
- ▶ The simplicity of the MPD system allows for rig crew handling instead of additional personnel.
- ▶ MPD chokes provides speed and high precision with electric servomotor actuation able to full open/close within < 8 seconds.
- ▶ The value of the rig integration is to have the equipment ready for deployment without need to rig up and rig down, even between rigs moves from pad to pad.
- ▶ Elimination of several traditional costs related to traditional services company.
- ▶ In addition to its construction and assembly services, Nabors provide consulting services, and repair and maintenance through MPD engineering and supervision handled remotely via our Rigline 24/7™ support center.
- ▶ Optimization of well control detection and management.
- ▶ MPD mud flow schematic capable to drill through or by-pass the rig super mug gas separator.
- ▶ Dual redundancy for choke and Coriolis metering pressure surface relieve valve.

Why choose Nabors?

With operations in more than 20 countries, Nabors is one of the world's largest oil and gas drilling contractors. Our vision is to be the driller of choice for customers, investors and employees by focusing on technology, safety and performance.

We not only provide global drilling services for both land and offshore, but we're also a leading provider of drilling equipment, software and

technology. Combined with the experience of our people, we continue to transform the global drilling industry by providing RigtelligenceSM for the Future.

Our goal is to provide our customers with the highest level of excellence and performance – on every rig and well. Every time.