



SECURE DRILLING SERVICES

SEASHIELD[®] ROTATING CONTROL DEVICES

Enabling closed-loop drilling in all marine environments using the industry's most reliable RCDs

DRILLING & FORMATION EVALUATION
WELL CONSTRUCTION
COMPLETION & STIMULATION
PRODUCTION



Weatherford[®]

DRILL DEEPWATER WELLS SAFER, FASTER, AND COST EFFECTIVELY.

We have a suite of field-proven RCDs for any offshore well.

Your target reservoirs are located below thousands of feet of seawater, buried within clastic, carbonate, or pre-salt formations. Pore-pressure and fracture-gradient windows can be razor thin. The risk of pressure-related hazards—kicks, losses, and influxes—is incredibly high. Left unchecked, these problems can cascade into catastrophic events. In these environments, conventional drilling methods are too risky.

As a result, closed-loop drilling (CLD) uses specialized equipment to enhance control over annular pressure throughout the wellbore and is widely considered to be the new drilling convention. CLD techniques include riser gas handling, early kick and loss detection, managed pressure drilling (MPD), and dynamic well control.

The most critical component of any CLD system is the rotating control device (RCD)—the first line of defense for your wellbore. Without RCDs, CLD would be impossible. The simple addition of an RCD to the standard open-fluid-return system on a rig creates a closed and pressurized drilling system, which delivers key environmental, cost, and safety benefits. As the largest provider of CLD technologies and services in the world, Weatherford offers a completely integrated offshore CLD system that includes our award-winning, API 16-certified SeaShield RCDs.

AWARDS

2015
**World Oil Best Well
Integrity Technology**

Deepwater Closed-Loop Drilling System
(Including the SeaShield Model 7875 BTR RCD)

2011
**OTC Spotlight on
New Technology**

Deepwater Closed-Loop Drilling System
(Including the SeaShield Model 7875 BTR RCD)

2010
**World Oil Best
Deepwater Technology**

SeaShield Model 7875 BTR RCD

5,000-psi (34.5-MPa)

static pressure ratings

Longest-lasting

seal life in the industry

Nitrogen tested

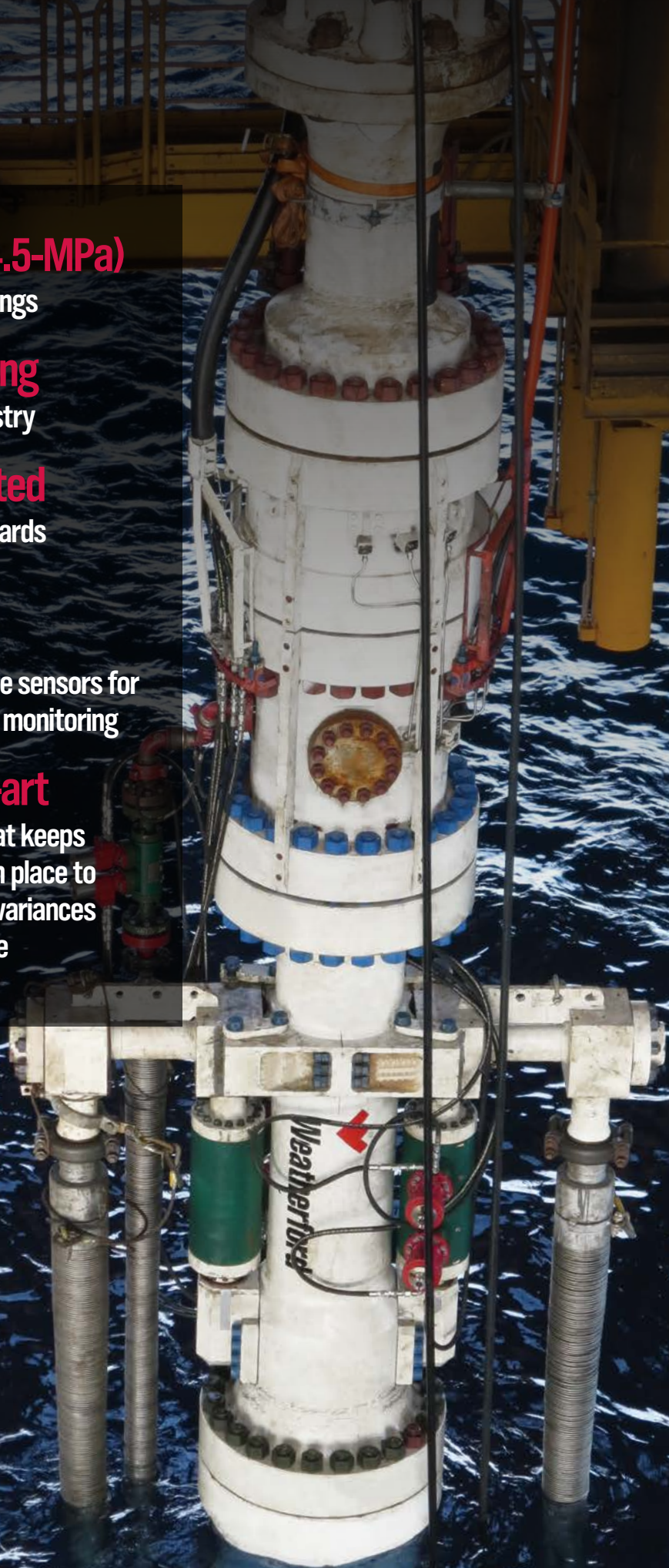
to API 16RCD standards
for a gas-tight seal

Improved

differential pressure sensors for
enhanced pressure monitoring

State-of-the-art

latching system that keeps
bearing assembly in place to
safeguard against variances
in wellbore pressure



WEATHERFORD RCD MILESTONES

Introduction of the SafeShield®
Model 8000 RCD, the first official
RCD in the world

1968

SafeShield **Model 7100** RCD is
used for the first MPD job from a
semisubmersible and the first use of
an RCD to drill a deepwater well

2004

1983–1996

Expansion of the RCD portfolio to suit
large wellbores, high-temperature
geothermal wells, dual-barrier sealing
elements, and enhanced dynamic
pressures

2007

SafeShield **Model 7100** RCD is
used for the first MPD job in the
Gulf of Mexico

Introduction of the large-bore, high-
pressure-rated SafeShield **Model
7800** RCD

Since 1968, we have operated at the forefront of RCD development by continually evolving our technology to keep pace with new drilling complexities while achieving many industry milestones. We've accumulated a solid track record of success in managing wellbore pressure and mitigating risks at drilling rigs around the world.

Introduction of the SeaShield **Model 7875** Docking Station (DS) RCD, the first RCD developed specifically for marine environments

2008

Deployment of the first fully integrated MPD riser assembly below the termination joint on the rig

Installation of the first subsea RCD above the lower marine riser package

2014

Weatherford is the first company to receive the API 16RCD certification

Introduction of the SeaShield **Model 7875** Below-Tension-Ring (BTR) RCD, the first submerged RCD that is integrated into an MPD riser joint and placed below the tension ring

2010

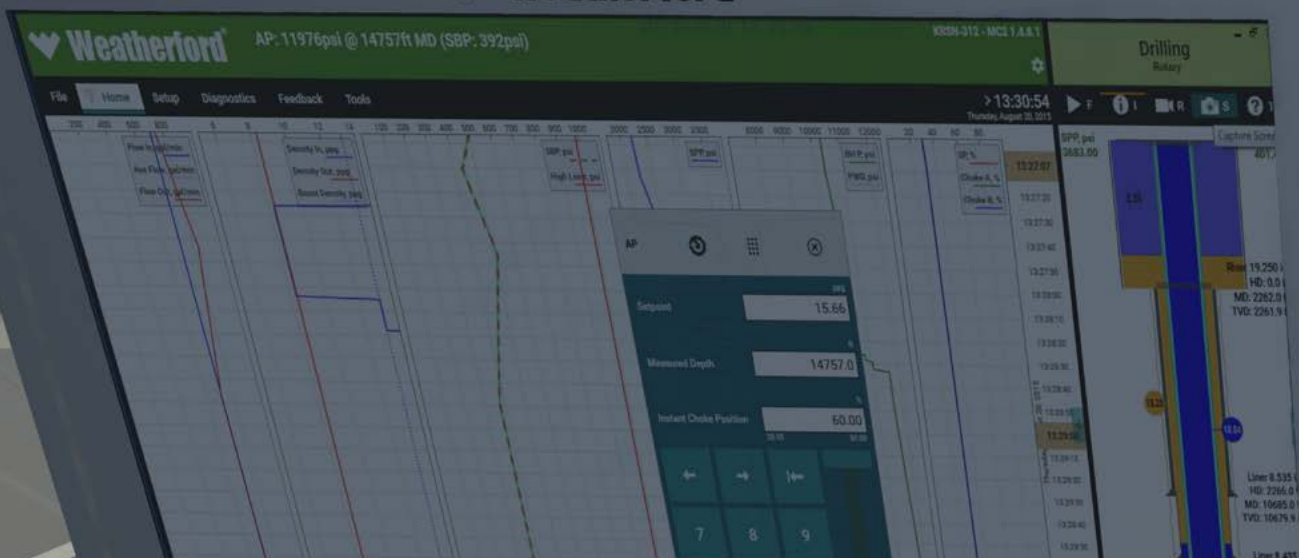
Completion of API testing of RCDs with nitrogen to demonstrate a gas-tight seal

2016

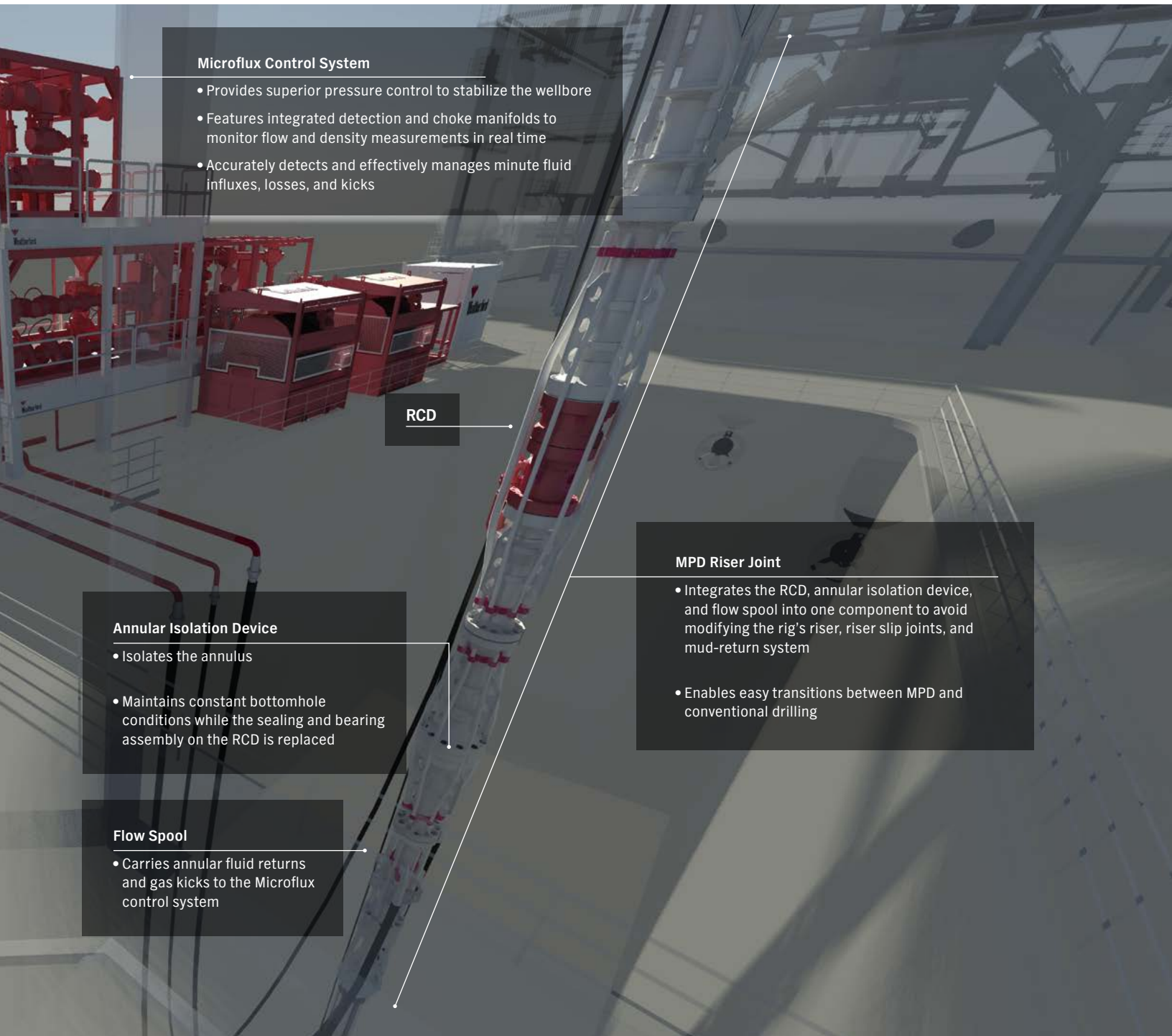
DEEPWATER CLD SYSTEM (SUBSEA BLOWOUT PREVENTER STACK)

OneSync™ Software Platform

- Delivers connected and scalable services tailored to suit project needs
- Features three integrated software suites:
 1. Well planning: multiple engineering modules in a single platform
 2. Simulation: generates predictive what-if drilling scenarios based on well data
 3. Operations: provides well monitoring and enhances capabilities of Microflux control system
- Compatible with other Weatherford drilling solutions



In a deepwater CLD setup, the RCD serves as a barrier between the well and the rig floor. The RCD contains and diverts annular fluid returns and gas kicks from marine risers to the Microflux® control system. This makes the RCD an essential link in the chain of CLD technologies. Our deepwater RCDs are placed below the tension ring and the termination joint for superior integration and to enable rig movement, such as unrestricted rig heave, and emergency-disconnect functionality.



Microflux Control System

- Provides superior pressure control to stabilize the wellbore
- Features integrated detection and choke manifolds to monitor flow and density measurements in real time
- Accurately detects and effectively manages minute fluid influxes, losses, and kicks

RCD

Annular Isolation Device

- Isolates the annulus
- Maintains constant bottomhole conditions while the sealing and bearing assembly on the RCD is replaced

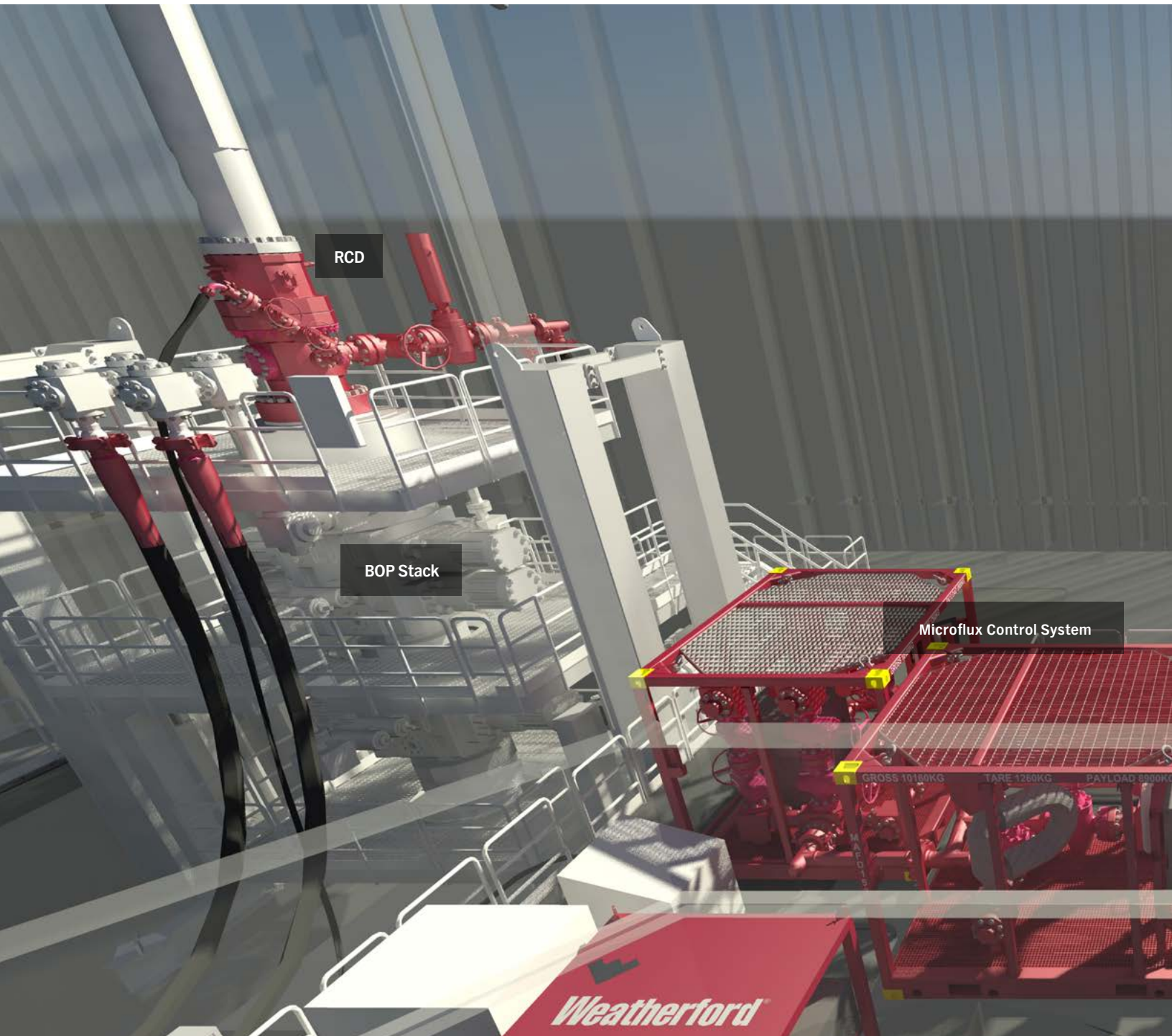
Flow Spool

- Carries annular fluid returns and gas kicks to the Microflux control system

MPD Riser Joint

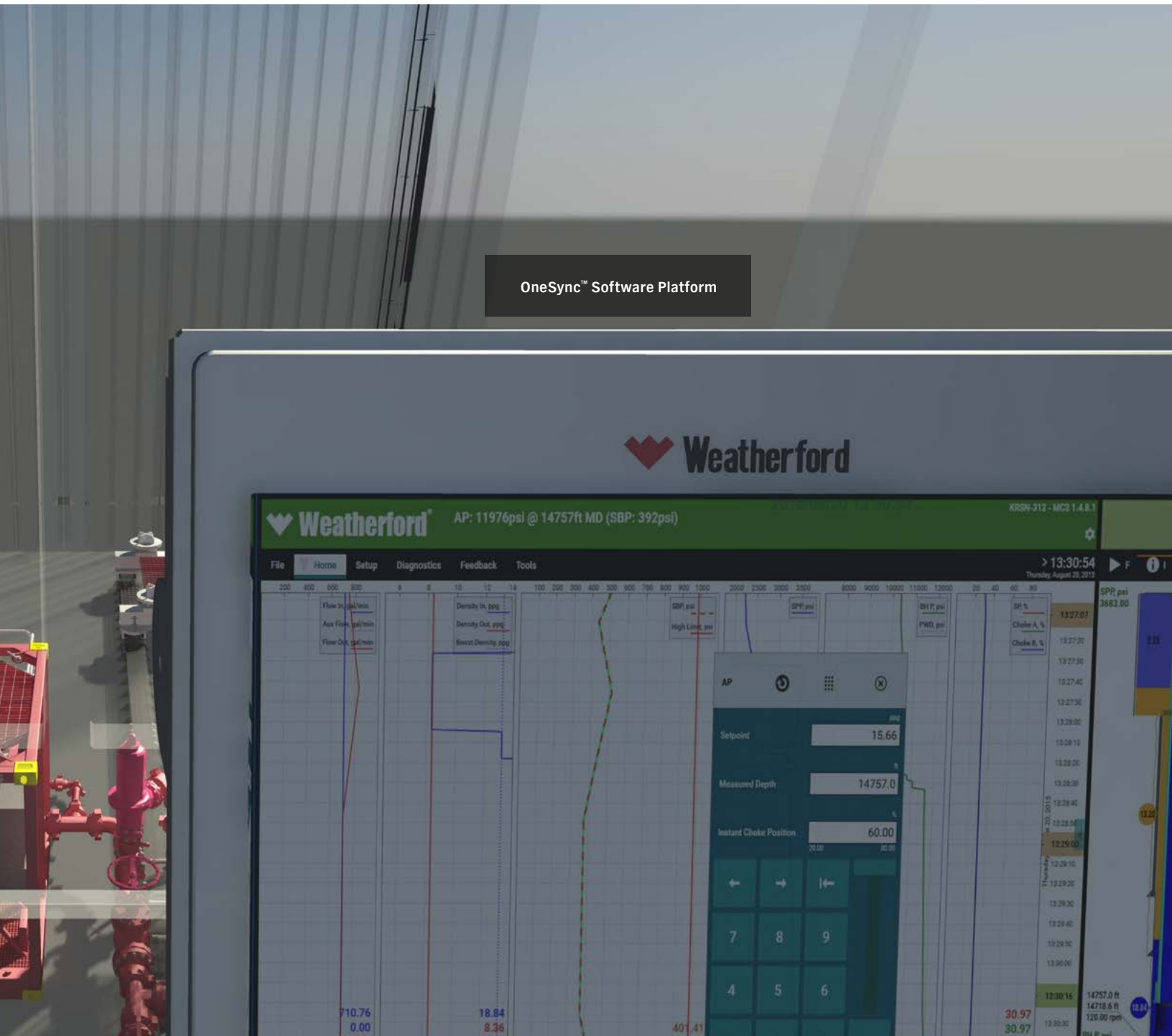
- Integrates the RCD, annular isolation device, and flow spool into one component to avoid modifying the rig's riser, riser slip joints, and mud-return system
- Enables easy transitions between MPD and conventional drilling

OFFSHORE CLD SYSTEM (SURFACE BLOWOUT PREVENTER STACK)



In an offshore setup, the RCD is mounted above the blowout preventer (BOP) stack on the rig floor. The top flange of the RCD is mounted to the bell nipple to enable conventional drilling using the mud-return system on the rig.

OneSync™ Software Platform



THE SEASHIELD RCD PORTFOLIO

Our SeaShield RCDs are built for rugged marine conditions and virtually any offshore application. However, SeaShield RCDs can also be adapted to meet your specific needs. To demonstrate our ability to meet the most rigorous performance standards, our SeaShield RCDs all feature the API 16 monogram. Furthermore, our Model 7875 BTR RCD is the first and only field-proven deepwater RCD available on the market today.

Bearing Assembly

The bearing assembly enables deployment of the RCD through most rotary tables.

Sealing Elements

The dual-barrier elastomeric sealing elements in the bearing assembly rotate with the drillpipe, maintain a tight seal, and contain returning fluids in the annulus as the drillpipe passes through the RCD. This process enables you to safely divert hazards.

Latching Assembly

The latching assembly in the interior profile of the body secures and releases the bearing and sealing element assembly. A locking mechanism in the latching assembly provides a means for remotely locking and unlocking the bearing assembly and accessories such as a protective sleeve, logging adapter, and snubbing adapter. This eliminates the need for personnel to loosen and tighten the locking mechanism from beneath the rig floor, which enhances safety.

**SAFESHIELD MODEL
7800 RCD***



**SEASHIELD MODEL
7875 DS RCD**



**SEASHIELD MODEL
7875 BTR RCD**



RCD MODEL	RIG TYPE	APPLICATIONS	PRESSURE RATINGS
SafeShield Model 7800 RCD*	Jackup rigs Tender rigs	<ul style="list-style-type: none"> - MPD - Underbalanced drilling (UBD) - Early kick/loss detection - Improvement of health, safety, and environmental (HSE) practices - Abnormally pressured aquifers - Extended-reach horizontal wells - Two-phase flow - Riser-gas mitigation - Shallow-gas formations 	Dynamic pressure: 2,200 psi (15.17 MPa) Static pressure: 5,000 psi (34.47 MPa)
SeaShield Model 7875 DS RCD	Jackup rigs Tender rigs		Dynamic pressure: 1,500 psi (10.34 MPa)
SeaShield Model 7875 BTR RCD	Semisubmersibles Drillships		Static pressure: 5,000 psi (34.47 MPa)

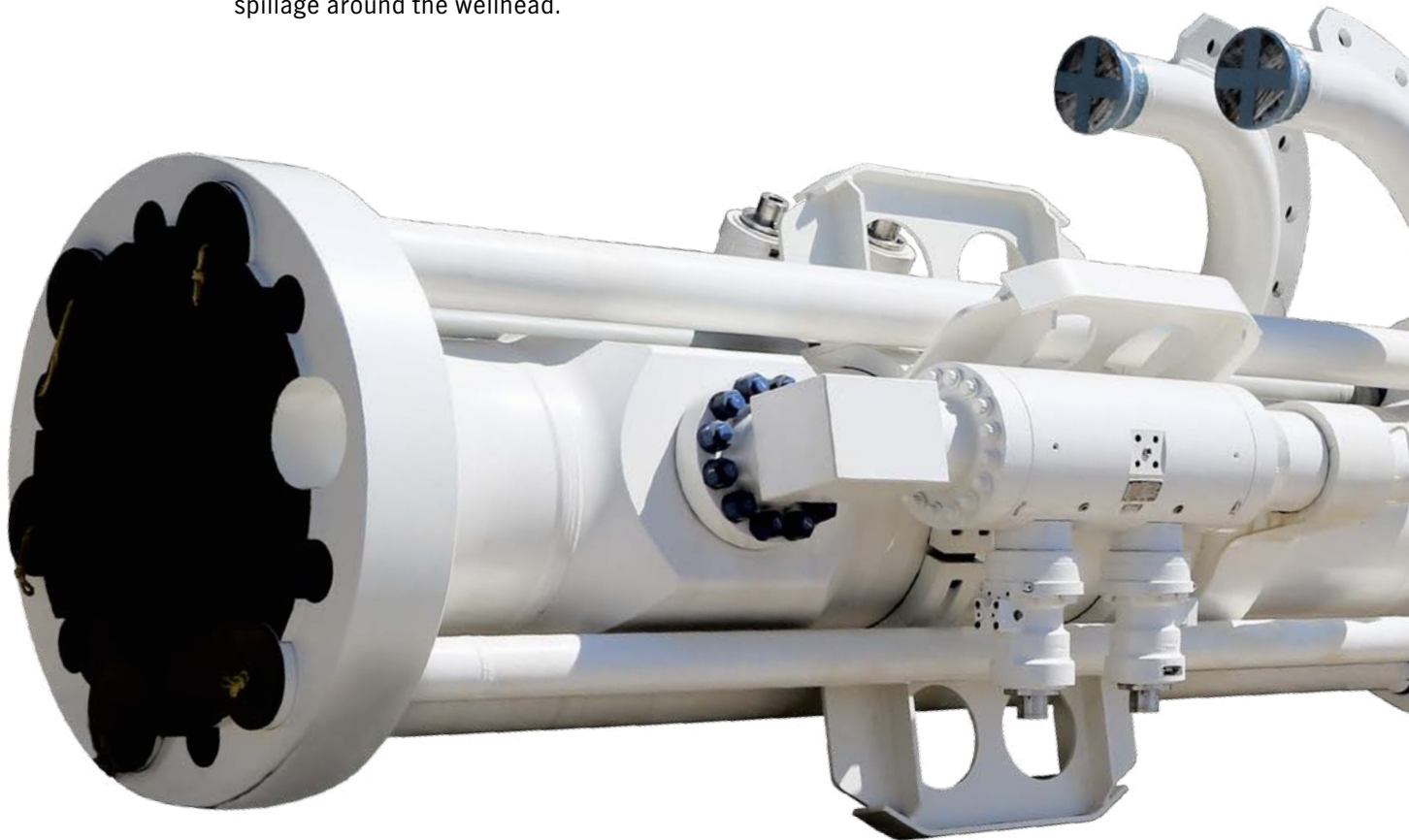
*The Model 7800 RCD is part of the SafeShield portfolio of RCDs for land-based applications, but it can be used in offshore applications.

THE SEASHIELD RCD ADVANTAGE

SeaShield RCDs are beneficial for any offshore or deepwater drilling operation, especially when the risks of kicks, shallow gas, and variable pressure exist. In these conditions, RCDs help to protect your personnel, equipment, time, budget, and the environment.

Improve Efficiency

- SeaShield RCDs enable using CLD techniques in challenging offshore and deepwater formations, which means drilling to total depth takes less time and requires fewer trips.
- RCDs contain and divert fluids and gas kicks to a return system, where potential problems are detected and fixed promptly. This prevents well-control incidents and associated nonproductive time that can derail your drilling schedule.
- The sealing element of SeaShield RCDs wipes drillpipe clean while it is tripped out of the well. This eliminates unnecessary steps in the drilling process for cleaning pipe and minimizes the potential for fluid spillage around the wellhead.

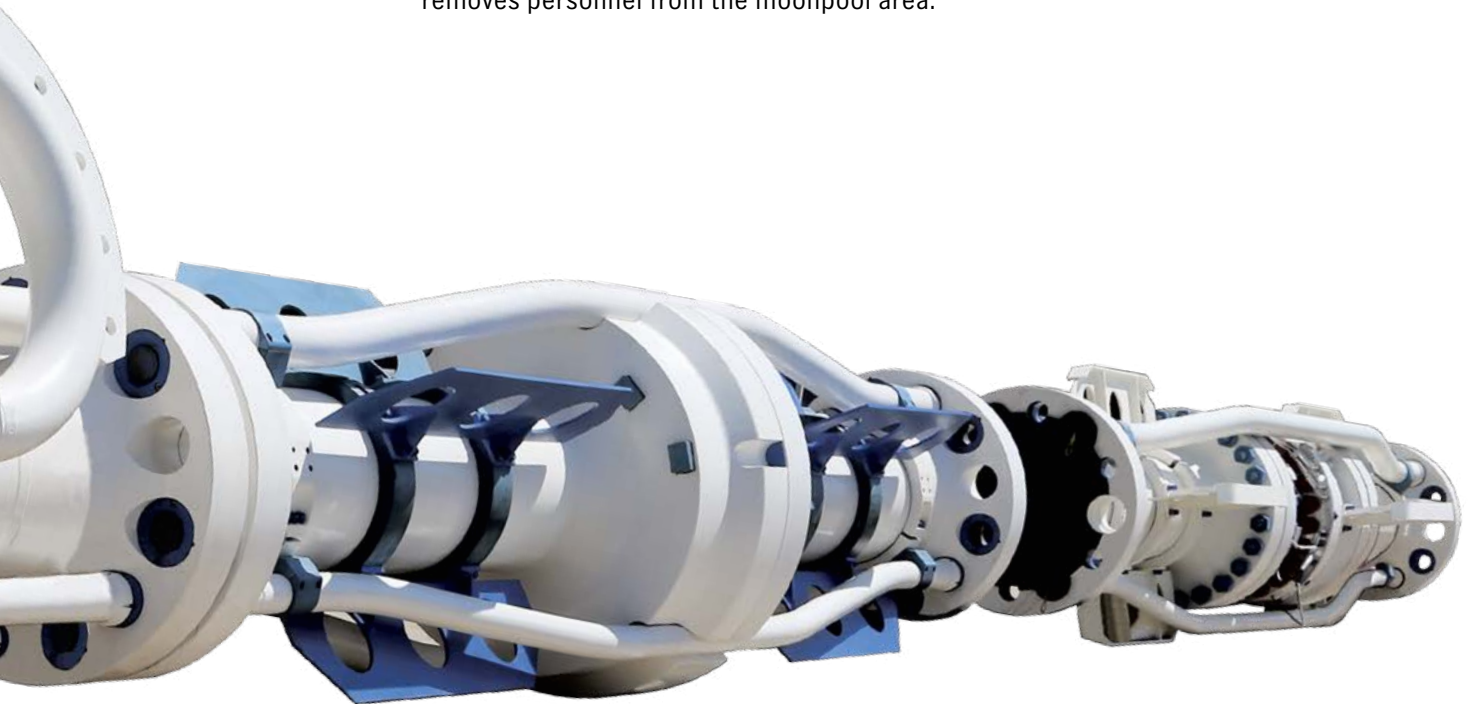


Reduce Costs and Optimize Return on Investment

- SeaShield RCDs help you manage fluid and gas influxes effectively—without problems becoming catastrophic and devastating to your project economics. The cost of incorporating a SeaShield RCD into your offshore rig is insignificant compared to the potential consequences of not having one.
- The daily operational cost for an offshore rig can easily exceed US \$1 million per day. Faster, incident-free drilling means lower costs.
- RCDs enable the use of lower mud weights in high-pressure environments, which minimizes mud volume and costs.
- Reservoirs that would otherwise be impossible to access are now open for business. With an RCD, your drilling prospects are much less limited, and that means more opportunity for profit.

Enhance Safety

- As an effective deterrent to drilling hazards such as blowouts, SeaShield RCDs protect the environment surrounding your well, your equipment, and the crew.
- RCDs divert toxic gas, including hydrogen sulfide, away from the rig floor to protect personnel.
- RCDs prevent gas influxes from ascending above the BOP and entering the riser—a serious safety hazard.
- The capability of the SeaShield RCD bearing assembly to hydraulically latch onto the RCD body reduces manual handling of equipment and removes personnel from the moonpool area.



When integrated into an MPR riser joint, the SeaShield Model 7875 BTR RCD enables users to easily transition between MPD and conventional drilling operations, without any modifications to the riser, riser slip joints, or mud-return system on the rig. This saves both time and costs.

REAL RESULTS

NORTH SEA

Model 7875 BTR RCD enables using MPD techniques to drill a HPHT well to TD

10 DAYS SOONER THAN PLANNED

and

SAVES US \$7.5 MILLION IN RIG TIME

OFFSHORE BRAZIL

Model 7875 BTR RCD enables floating mud cap drilling through a total-loss zone with

ZERO NPT

and helps to access

HIGH-POTENTIAL RESERVOIRS

OFFSHORE BRAZIL

Model 7875 BTR RCD helps to revive a previously abandoned pre-salt well that now produces

20,000 B/D (3,180 M³)

valued at

US \$2 MILLION PER DAY

OFFSHORE EQUATORIAL GUINEA

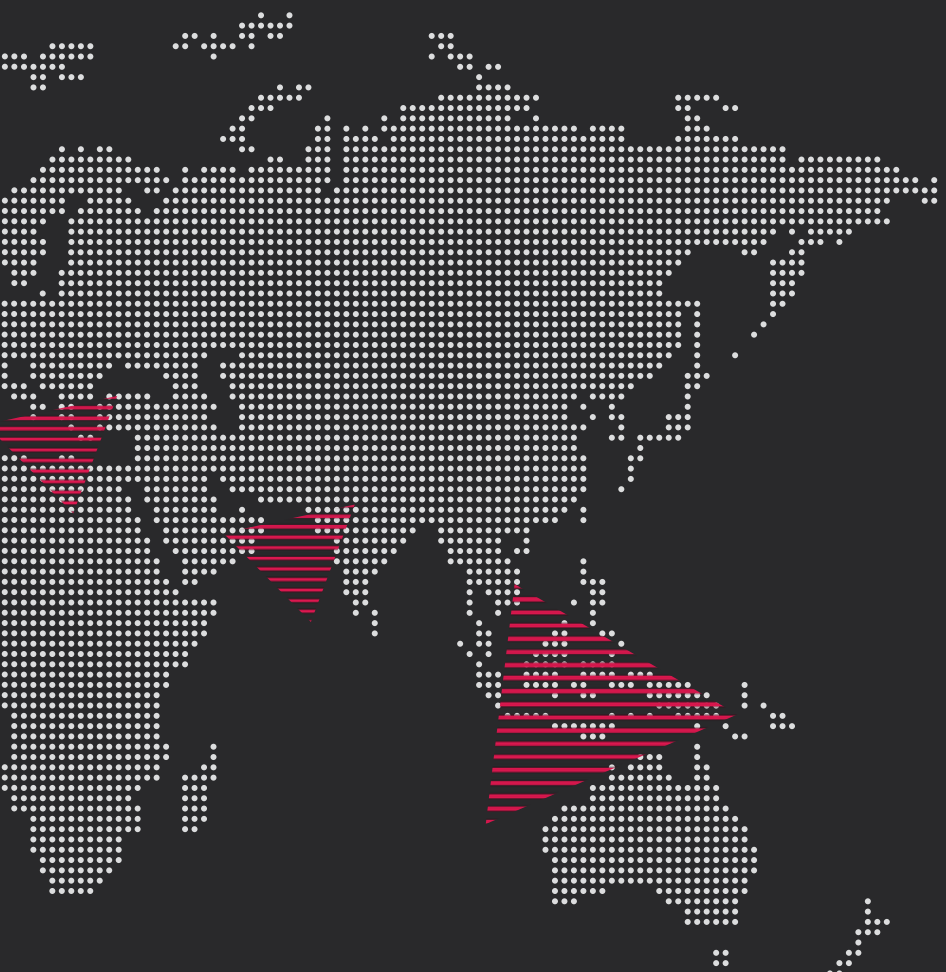
Model 7875 DS RCD enables

EFFICIENT TRANSITIONS

between drilling phases with

ZERO NPT





CASPIAN SEA

Model 7800 RCD enables pressurized mud cap drilling through an otherwise undrillable carbonate formation while

AVOIDING TOTAL LOSSES AND SOUR KICKS

OFFSHORE VIETNAM

Model 7875 DS RCD helps to cycle out a gas kick

WITHIN 2 HOURS
and
SAVES 20 HOURS OF NPT

OFFSHORE BRUNEI

Model 7875 DS RCD sealing elements achieve a lifespan of

74 OPERATING HOURS
per hole section

OFFSHORE MALAYSIA

Model 7875 DS RCD enables

CONTINUOUS DRILLING OPERATIONS
and
SAVES 13 HOURS OF RIG TIME



With our SeaShield series, Weatherford provides an RCD solution for all marine drilling environments, including highly complex deepwater applications. For more information about SeaShield RCDs, as well as our other RCD and MPD technologies, please visit weatherford.com or contact RCDsupport@weatherford.com



weatherford.com



twitter.com/weatherford



youtube.com/weatherford



facebook.com/weatherford

Front cover photo of West Tellus drillship courtesy of Seadrill

Weatherford products and services are subject to the Company's standard terms and conditions, available on request or at weatherford.com. For more information contact an authorized Weatherford representative. Unless noted otherwise, trademarks and service marks herein are the property of Weatherford and may be registered in the United States and/or other countries. Weatherford products named herein may be protected by one or more U.S. and/or foreign patents. Specifications are subject to change without notice. Weatherford sells its products and services in accordance with the terms and conditions set forth in the applicable contract between Weatherford and the client.

Secure Drilling Services is a registered trademark of Weatherford in Indonesia and China. SeaShield is a registered trademark of Weatherford in the US and Canada. SafeShield is a registered trademark of Weatherford in the US, European Union, and Canada. Microflux is a registered trademark of Weatherford in the US.