

HALLIBURTON



DepthStar[®]

Tubing retrievable safety valve (TRSV)

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Helps eliminate setting depth constraints, increase reliability, and reduce CAPEX

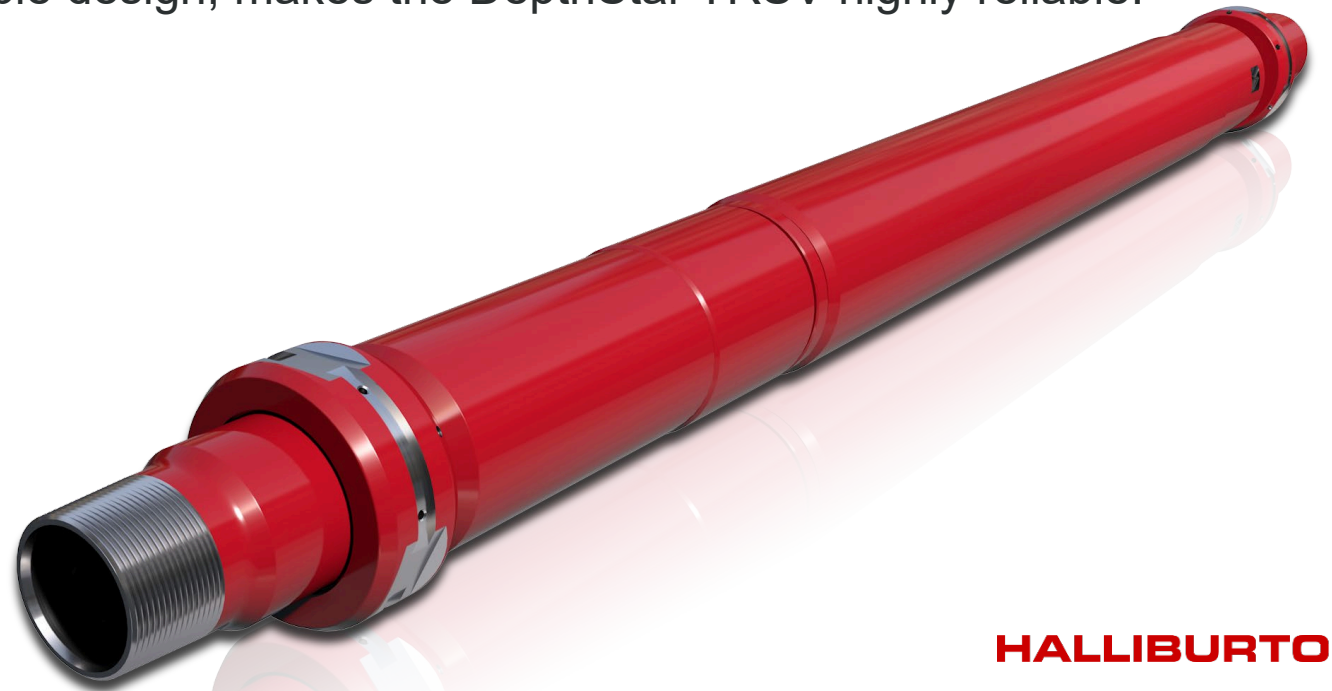
**FUNCTIONS COMPLETELY
INDEPENDENT OF WELL PRESSURE;**

IDEAL SOLUTION FOR:

- Deepwater
- Ultra-deepwater
- High-pressure/high-temperature (HP/HT)
- Gas storage applications



Unique and patented magnetic coupling technology allows the hydraulic actuator to be positioned outside the tubing wellbore. This makes the DepthStar TRSV the worlds first safety valve containing no moving actuator seals within the tubing wellbore. This reduction in leak paths, combined with an intrinsically simple design, makes the DepthStar TRSV highly reliable.



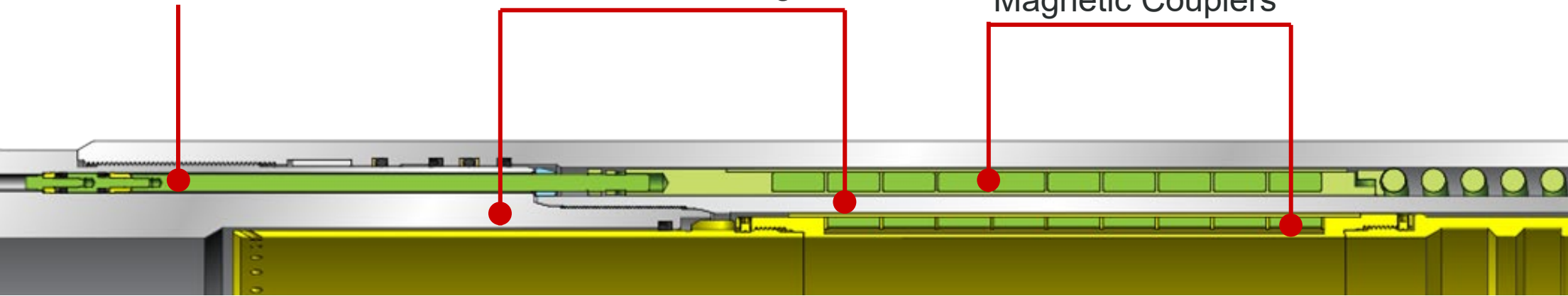
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DepthStar[®] TRSV

Tubing Pressure
Isolated Piston

Pressure Housings

Magnetic Couplers

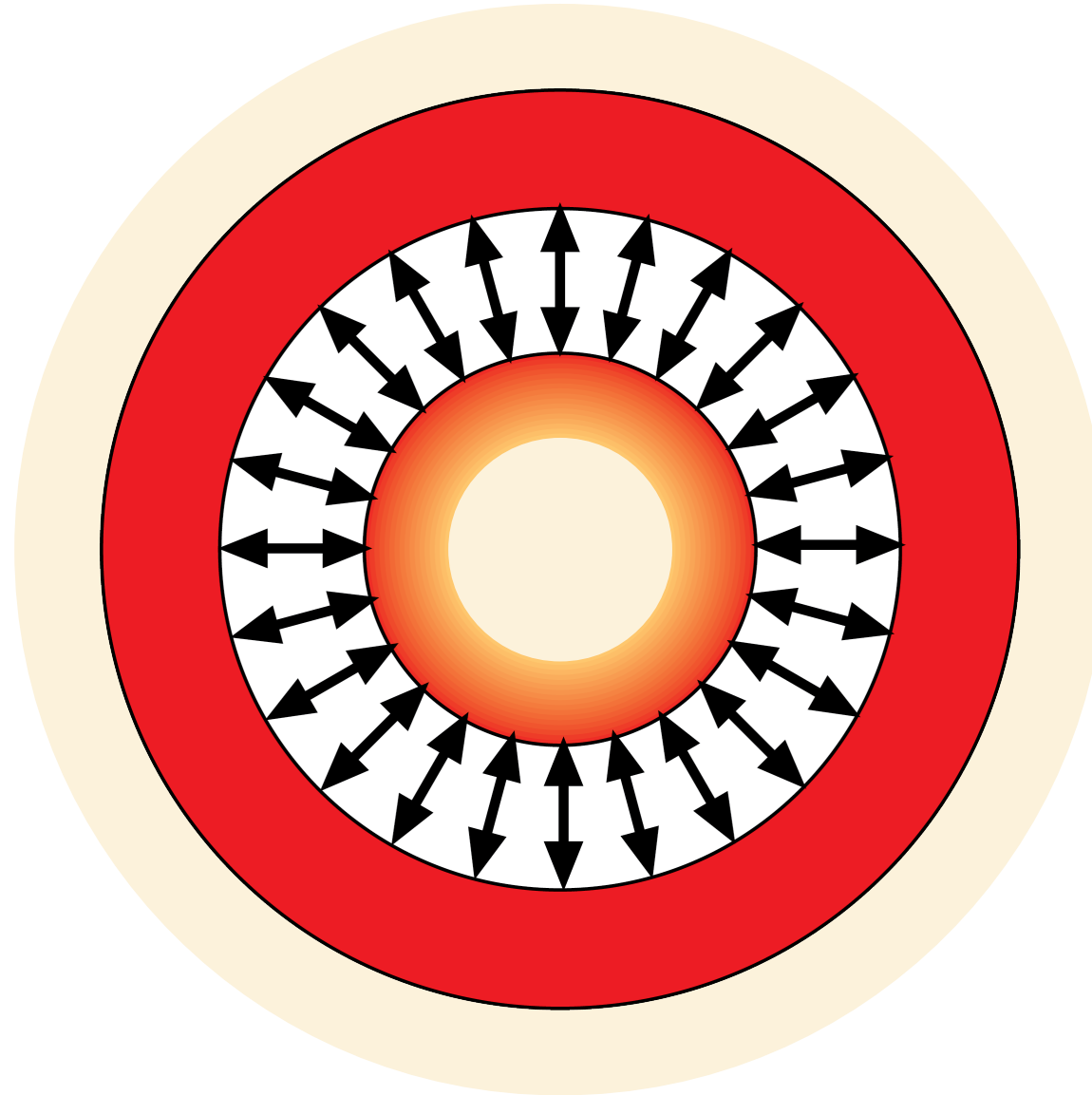


- Piston actuator isolated from the wellbore fluids
- Primary magnet cylinder outside the main TRSV body hydraulically actuated by the operating piston
- Secondary magnet cylinder moved by the magnetic attraction between the two cylinders

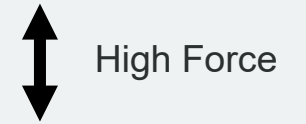
Magnetic Coupler

CROSS SECTION OF THE MAGNETIC COUPLER

Magnetic coupler design enables force to be focused where it is needed, between the two sleeves, while eliminating force on the OD and ID of the coupler.



LEGEND

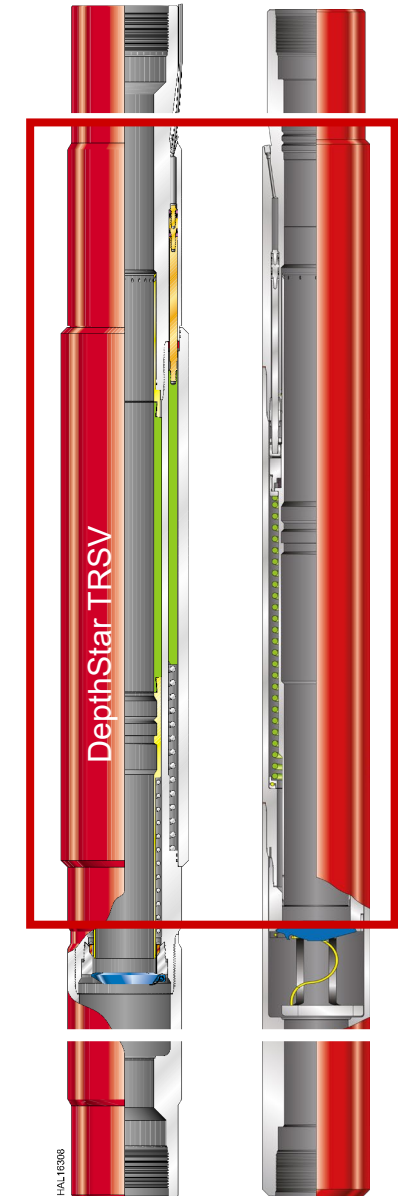
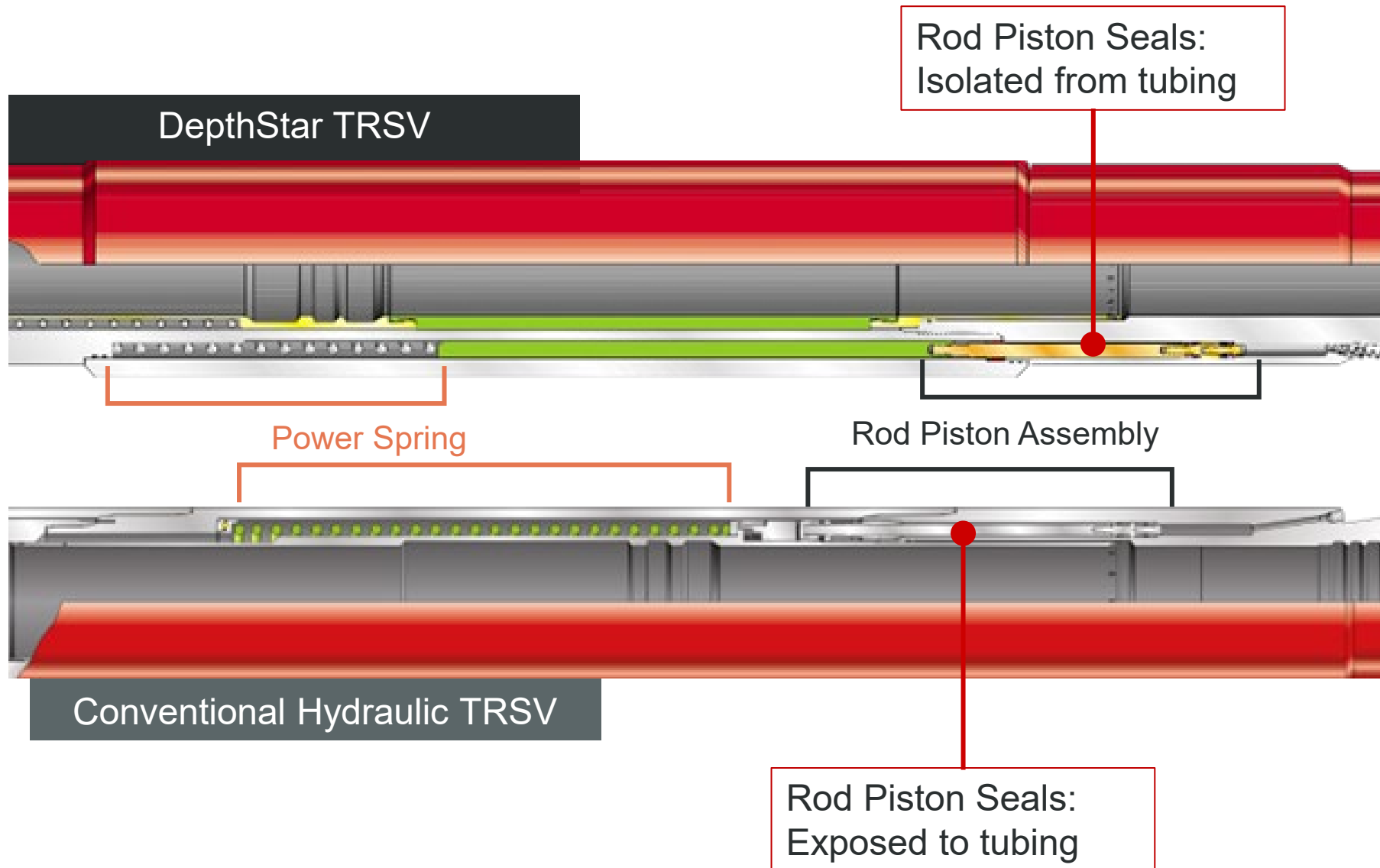


High Force



No Force

DepthStar[®] vs. Conventional Hydraulic TRSV



DepthStar[®] TRSV – A Complete Solution

ACTUATOR REMOVED FROM WELLBORE

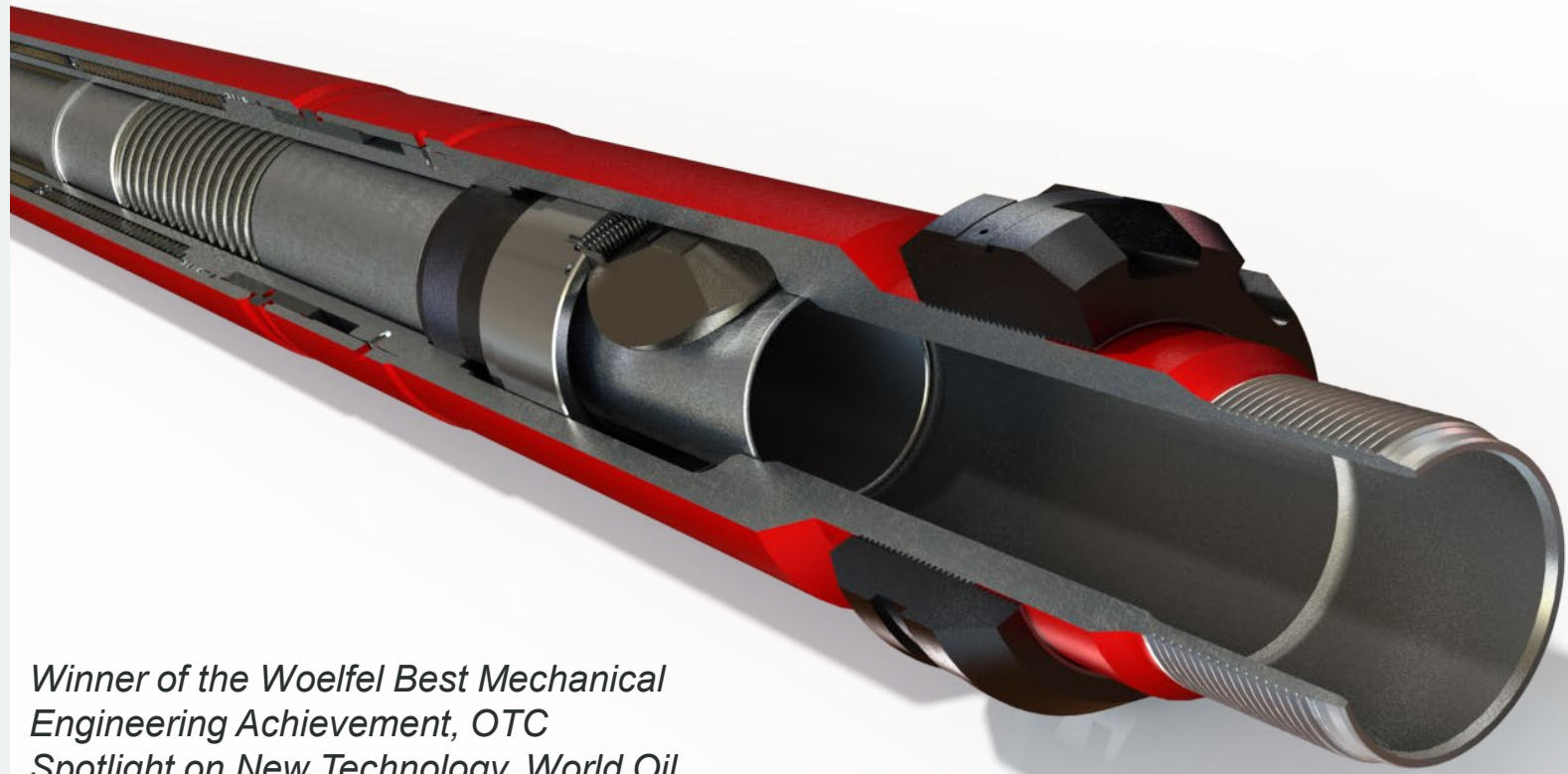
Proven TRSV Rod Piston Actuator

ENHANCED RELIABILITY

No moving seals and 100% MTM within wellbore

LOW OPERATING PRESSURE

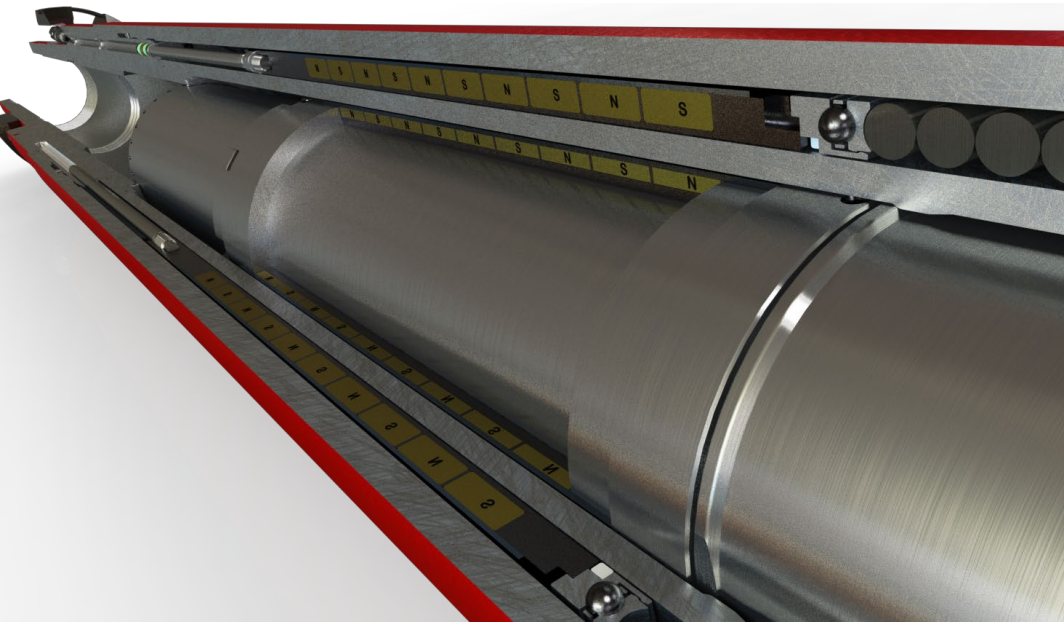
Operates independent of depth and wellbore pressure



Winner of the Woelfel Best Mechanical Engineering Achievement, OTC Spotlight on New Technology, World Oil Best Completion Technology and Energy Institute Technology Awards

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Tests Performed to Evaluate Magnetic Coupler



- ✓ 15 separate tests specifically related to the magnetic coupler
- ✓ All tools performed normally, with no affects from the magnetic coupler

TESTS PERFORMED:

- Electric Coils
- Perforator Detonator
- Collar Locator
- Thermal Multi-decay Logging Tool
- Memory Gauge
- Metal Shavings
- DPU
- Reservoir Monitor Tool Elite
- Firing Head
- Hostile Gamma Neutron Tool
- TEC Line
- Fiber Optics Cable

