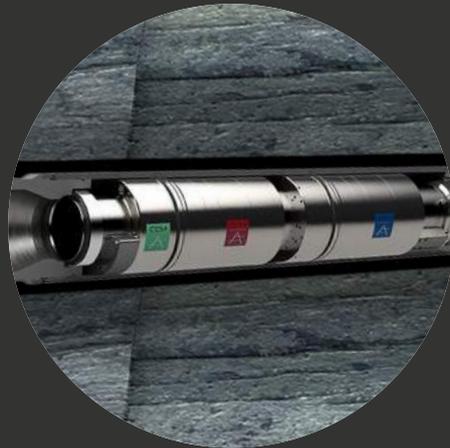


# DAR

TECHNOLOGY  
— BY INNOWELL

The Density Activated Recovery (DAR) technology by Innowell Solutions is based on the ERV<sup>®</sup> invention, which is a patented technology for controlling reservoir inflow along the lower completion of a well.

DAR inflow control technology is unique in that it utilizes density contrasts between fluids to autonomously discriminate between desired and undesired fluids, like oil, gas, water and mud.



# DAR TECHNOLOGY

Unlike existing technologies, the DAR technology imposes negligible pressure drop and works independently of fluid viscosities, pressure conditions, local inflow rates and reservoir properties, thereby making it a Universal Inflow Control System (UICS). Negative consequences of geological uncertainty are eliminated and sustained high oil production can be combined with an insurance against loss of revenues caused by early breakthrough of water and/or gas.

The DAR technology offers a comprehensive suite of products, or “control modules”, for use in the Inflow Control System (ICS). This provides maximum flexibility and the ability to meet even the most demanding inflow control requirements and conditions.



## Water Control Module

The WCM controls undesired water production by closing and reopening on the fly as the local water fraction varies. The Client can specify both the desired flow characteristics ( $\Delta p$  vs.  $Q$ ) for open and closed positions, and also the exact water cuts at which it should close and reopen, which are completely independent of flow rate.



## Gas Control Module

The GCM controls undesired gas production by closing and reopening on the fly as the local gas fraction varies. The Client can specify both the desired flow characteristics ( $\Delta p$  vs.  $Q$ ) for open and closed positions, and also the exact gas-oil ratios at which it should close and reopen, which are completely independent of flow rate.



## Mud Control Module

The MCM provides a bypass for the WCM, GCM and other modules such that during well cleanup, mud will always be allowed to flow directly and unrestrictedly into the basepipe. The MCM also enables bullheading, and it can be configured for wash-pipe free installation by incorporating a temporary check valve.



## Cleanup Control Module

While the MCM allows mud to flow unrestrictedly into the basepipe during cleanup, the optional CCM will sequentially close sections as they become clean, thereby imposing larger drawdown on upstream sections that are still mud-filled. This ensures efficient mud removal all the way to the toe.

Innowell can also offer a Liquid Control Module (LCM) for gas-condensate fields and an Alternating Control Module (ACM) for WAG wells. A fail-safe module can also be included, which can be designed to let reservoir fluids bypass some or all of the other modules. This also enables conversion from oil to gas producer later in the well's life.

In 2018, prototype tests were performed in a state-of-the-art HPHT test facility for inflow control technology in Norway. Testing with real reservoir fluids at reservoir conditions demonstrated excellent results, robustness and repeatability for both water and gas. A DEMO2000 project was initiated in January 2019, which will eventually lead to a pilot test in a real well.

For more information, please visit our website: [www.innowell.no](http://www.innowell.no)