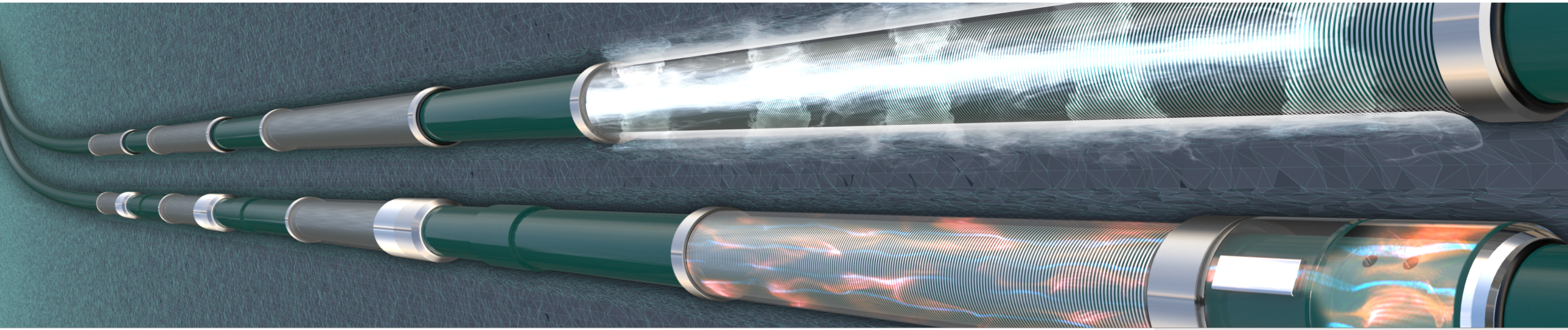


Maximize production and recovery through optimized thermal conformance while simplifying operations

EQUALIZER Dart flow control device

The Baker Hughes EQUALIZER™ Dart flow control device (FCD) maximizes production and recovery by optimizing conformance of the steam chamber in SAGD wells, and simplifies operations.

The EQUALIZER Dart enhances bitumen recovery by managing the drawdown between well pairs, promoting steam chamber conformance with a consistent and uniform thermal-flow-pattern and minimal steam-to-oil-ratio (SOR).

MAXIMIZE PRODUCTION AND ULTIMATE OIL RECOVERY

Maximizing production and ultimate recovery rate is key in steam assisted wells to achieve return-on-investment.

Preferentially choking back production of steam, as well as low subcool sections provides a more uniform temperature and production profile. Consequently, better steam chamber conformance is rapidly achieved, increasing cumulative oil production (COP), while reducing cumulative steam-oil ratio (CSOR). Steam/gas breakthrough is also prevented, maintaining well integrity while more of the injected steam's latent heat is transfered to the reservoir increasing the thermal efficiency of the process.

SIMPLIFY YOUR OPERATIONS

The EQUALIZER Dart FCD features a compact design for simplified operations and less operating expense. Its slim construction and limited external diameter maximize well radius usage allowing a larger liner base pipe size. The optimized design also maintains near full pipe strength while enabling the largest string installation in any given hole size. This leaves more room for the inclusion of additional instrumentation, such as fiber lines, and for complex workover operations.

The EQUALIZER Dart FCD can be installed as part of the initial liner completion, or can be custom retrofitted for your specific application, reducing start up time and additional drilling costs. The Dart FCD also increases the thermal efficiency of the process, decreasing operating costs.

HOW IT WORKS

Steam-assisted gravity drainage (SAGD) and cyclic steam injection (CSS) wells often experience uneven steam conformance due to inadequate fluid production control, tortuous trajectories, reservoir heterogeneity, and steam breakthrough. Inflow control devices (ICDs) designed for conventional reservoirs have typically been used in these

APPLICATIONS

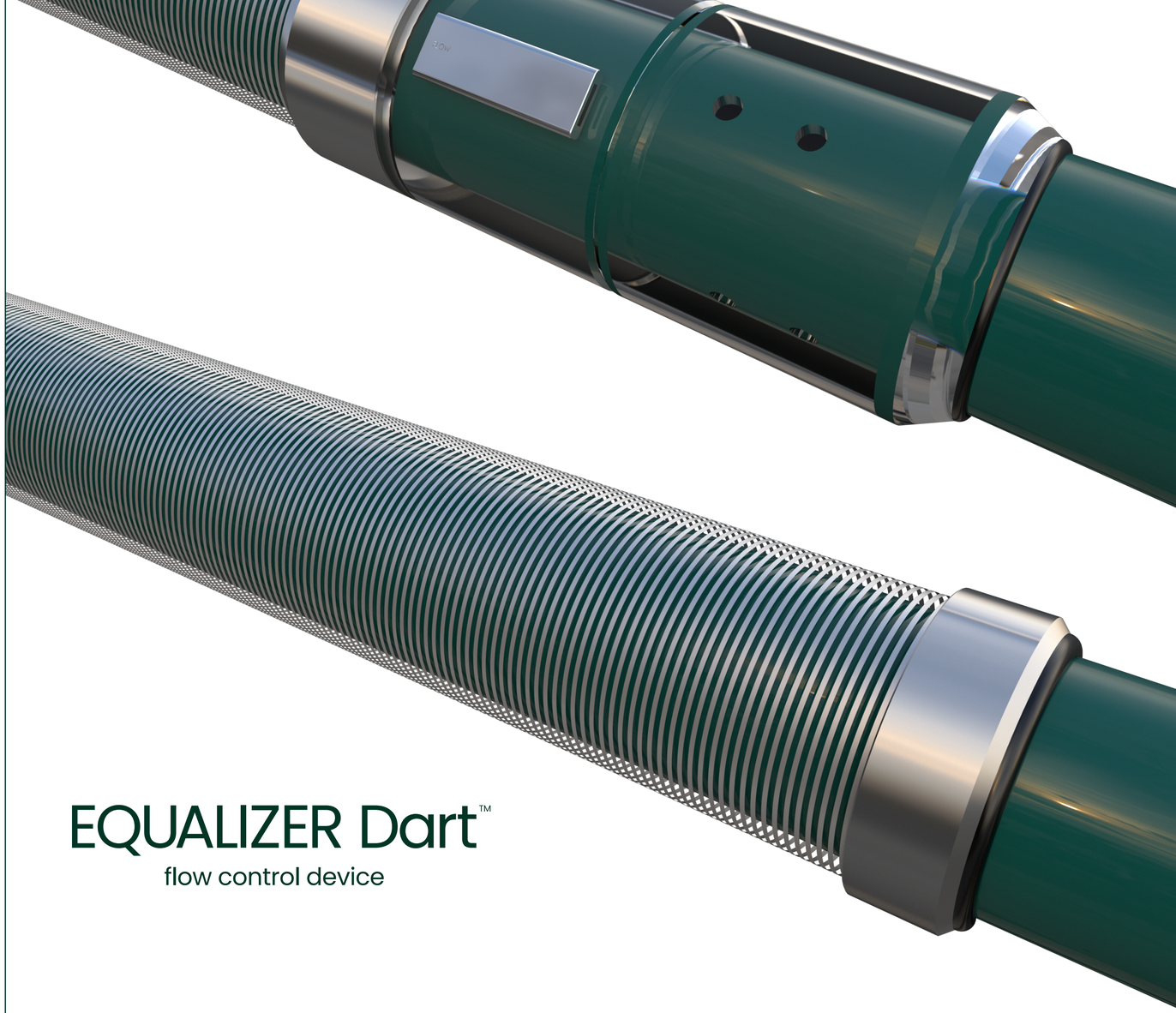
- SAGD producer wells
- Cyclic steam stimulation (CSS) wells
- Sand control and non-sand control environments
- Non-condensable gas (NCG) co-injection operations
- Enhanced SAGD schemes using solvent co-injection or pure solvent injection recovery schemes

BENEFITS

- Maximizes ultimate recovery and recovery rate
- Promotes thermal conformance, preventing steam/gas breakthrough
- Uses less energy and water compared to conventional completions in SAGD well pairs
- Maintains full pipe strength through optimized OD
- Improves subcool control by reacting to low subcooled fluids
- Improves completion integrity and prolongs well life with superior erosion resistance

applications to mechanically control and prevent steam breakthrough to reduce steam-to-oil-ratio (SOR) and increase production, however they are limited. They are not optimized for use in SAGD wells and fail to address subcool and steam breakthrough control efficiently. Erosion and steam damage are more likely with these ICDs, resulting in the steam jetting through instrumentation strings and damage to the casing.

The EQUALIZER Dart FCD is sensitive to steam and preferentially restricts its production, as well as low subcool fluids where steam is not yet present. By restricting steam and low subcool fluid selectively with an FCD, the fluid and heat carried by the injected steam remains in the reservoir—rather than flowing through a path of low resistance—generating a more uniform steam chamber and mobilizing more of the bitumen, accelerating production and increasing resource recovery.



EQUALIZER Dart™

flow control device

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