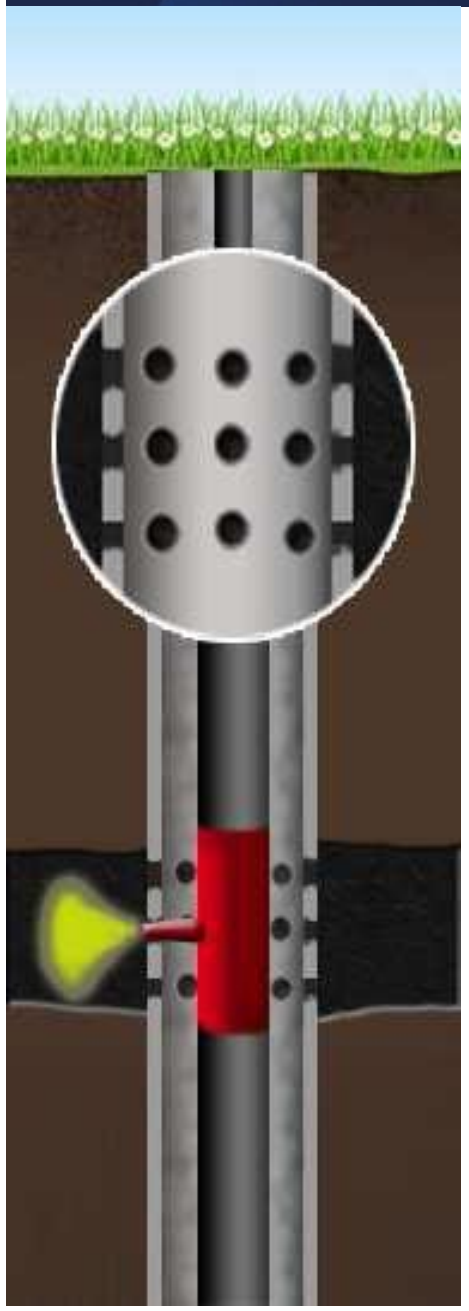
DDI Group of Companies

DRILLING INNOVATION LLC

Effectiveness tested by Customer

Hydro-mechanical Perforator



Hydro-Mechanical Perforator

Hydromechanical Perforator uses mechanical punch to pierce casing by high-pressure focused-water jet to create perforation tunnels in the formation pay zone.

The technology allows to form unstressed in the casing string of 0,35 in2 (225 mm2) hole, through which a stream of jetting flow out the punch cavity in the bottomhole zone up to 1.5 meters, depending on the formation type.

The characteristics of the perforation performed (specific opening area, the depth of penetration into the formation, the amount of impact on the column) erosion perforating technology outperforms all known types of shaped charges and allows to achieve a high hydrodynamic connections of the well and formation while maintaining the integrity of the cement in the annulus.

The number of holes required is not limited to one meter.

Technology application

- Technology of hydro-mechanical perforation is used since 2012 in Russian Federation on the **Rosneft** and **Lukoil** oil fields.
- 10-20 operations/wells per month.

Working parameters

- Pressure for casing perforation – 3500 – 3750 Psi (230-250atm)
- Working time for 1 hole – 50-100sec
- Pressure for creating the perforation tunnel in formation – 2200 Psi (150atm)
- Working time for the tunnel – 3-5min
- Effective number of holes – 6 per 1 meter

It is required to perform the work in the well:

- workover rig
- cementing unit
- geophysical team for setting in the desired depth

The device running to the perforated interval on the tubing, geophysical methods tied to the interval of the perforation, cementing unit is in the operating position by supplying fluid to the hammer pressurized.

Oil, industrial water, hydrochloric acid and so forth can be used as a working fluid.

Applicable:

- In vertical and horizontal wells
- In the production casing with diameter from 4” (102 mm) to 7” (168 mm)
- In oil production and in water-injection wells
- For steel grades: JSS, KSS, M65, L80-1, N80, N80Q (APISpecSCT)

The main advantages

- The absence of high-explosive and accordingly impact force on the casing;
- Cleaning the bottomhole formation zone from pollutants;
- Creating a reliable hydrodynamic connection between well and formation;
- The possibility of pumping the acid and fluids directly through the perforator.

Hydromechanical Perforator allows

- Save the integrity of the behind-casing cement;
- Clean the bottom hole area from contaminants (drilling mud, chemical reagents after methods of enhanced oil recovery);
- Add extra interlayers into the work;
- Qualitatively open the reservoirs with poor quality cement, with the close proximity of aquifers, after repair and isolation works to prevent vibration of the casing.

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Thanks for your attention!