

Open hole Drill-stem tester

AGIP-K and AGIP-M Hydrodynamic Logging and Formation Testing Equipment



SCOPE OF APPLICATION

AGIP-K

- Oil and gas open holes

AGIP-M

- Oil and gas open holes
- Oil and gas cased wells

ОСОБЕННОСТИ

AGIP-K

Tool modular design enable to operate in two modes:

- formation testing in one trip, taking one representative sample of fluid with a volume of 500 mL and measuring reservoir pressure;
- hydrodynamic logging, involving multiple surveys (up to 40) of reservoir pressure;

AGIP-M

- dual packer module, enabling to isolate the desired interval with two inflatable packers;
- optical fluid analyzer for separation of sampled fluids by its fractional composition;
- flow control module, flow rate monitoring during fluid sampling;
- pump-out module, providing fluid sampling out of formation and pumping it out into borehole;
- multisampler module, containing six chambers to take representative fluid samples for PVT-analysis;
- crystal quartz and piezometric pressure gauges – to measure reservoir and hydrostatic pressure;
- single-probe module, the probe being designed as side-wall pad
- multi-probe module, multiple probes being designed as side-wall pads, containing drawdown probe and two logging pressure probes: horizontal and vertical

ADVANTAGES

- Easy operation
- Possibility to operate with any logging system produced in Russia
- At the start of well stimulation, the maximum drawdown enables to recover residual fluid from the near zone of formation, which stay immobile in well operation, and further to evaluate reservoir saturation behavior based on it
- Lifting of oil and gas samples to surface in a sampler
- Cost of equipment and downhole services are 10-100 times less than similar foreign services

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TECHNICAL SPECIFICATIONS

Measured pressure range	0,1–80 MPa/ 14.5-1600 psi
Accuracy	0,2 % of whole scale
Resolution	700 Pa/ 100 psi
Temperature range	5–120 °C/ 41-248 °F
Standard volumes to determine the rate of fluid loss in GDC mode (hydrodynamic control)	0.01; 0.1; 0.45; 0.2 Liter
Formation samples volume in FT mode (formation testing) depending on number of pipes (n) screwed in a sampler	7 x n
Initial applied bottomhole pressure for inflow stimulation from reservoir	0,1 MPa/ 0.1 psi
Number of tests per trip in GDC mode - when filling two sampling chambers - when filling a small sampling chamber	no less than 30 up to 40
Hole size	140–280 mm/ 5.51-11 in
Tool length	up to 6150 mm/ 242 in
Tool diameter	100±5 mm/ 3.94±0.2 in
Tool weight	up to 224 kg/ 533.5 lbs
Inflow pressure in fractions of hydrostatic pressure when sampling chambers are filled: - small chamber - 1st chamber - 2nd chamber - 3rd chamber	0,4–0,5 0,23 0,55 0,64



Case Study No.1

SAMPLING IN OPEN HOLES

Task: Perform hydrodynamic control and sampling

For reservoir and net pay zones detection and determination of saturation character of given intervals in open hole it was needed a reliable method.

Sediments type is terrigenous argillaceous-carbonate material.

Solution: AGIP-K Wireline formation tester tool

AGIP-K of modular design provide hydrodynamic logging with recording of temperature and pressure at given depth (GR depth correlation). Its three sampling chambers with pressure differential of up to 0,27–0,3 from hydrostatic pressure enable logging of low-permeability beds.

The measurement output data is permeability of given interval. Further sample (0.5 l) trip out in a sealed chamber allow providing PVT-analysis in a lab.

The tool can operate in formation tester mode as an option with sealed sample of 7-14 l in volume.

Result: Coherence with open hole data

Static tests were performed at 14 depths. Mobility parameters, calculated by pressure build-up curve, correspond well with the measured curves of open hole at these depths.

Samples were sent to the client's lab for further analysis.

Advantages

- Easy operation
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Key benefits

Tool modular design enable to operate in two modes:

- formation testing, taking one sealed sample of 7-14 liters in volume
- hydrodynamic logging, involving multiple surveys of inflow stimulation from intervals of interest, measuring temperature and pressure
- GR depth correlation

Location: Russia

Well: Vertical



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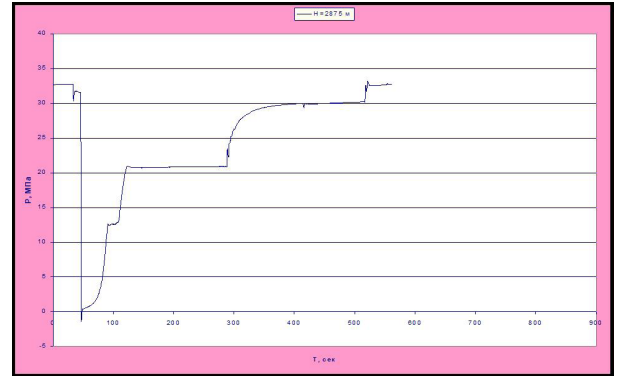
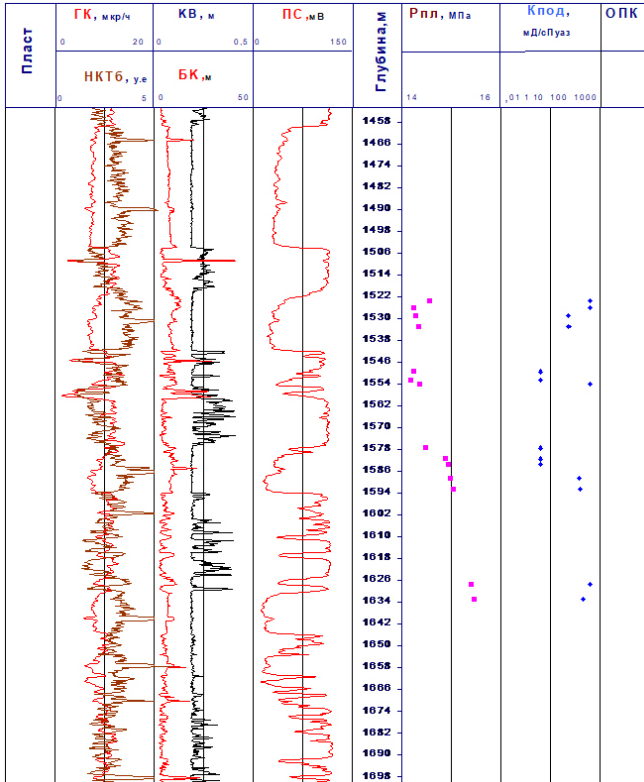


Figure 2. Example of pressure build-up recorded in one of logging depth (stationary logging)

Figure 1. GDC-FT logging data of oil well

Track 2-4: Open hole data

Track 5: Formation pressure

Track 6: Mobility factor calculated on pressure build-up



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