THERMAL FLOW TOOL

The Thermal Flow Tool (TFT) works on the principle of a thermal anemometer: the TFT sensor is heated-up by the battery current to a temperature higher than the temperature of the surrounding fluid. The fluid flow cools the sensor and thereby changes its active resistance, which is inversely proportional to the average linear fluid velocity. Based on the recorded data the production/injection profile is calculated.

Applications

- Precise determination of fluid flow zones in vertical, deviated, and horizontal wells
- Construction of detailed production/injection profiles related to wellbore flow (spinner replacement)

Advantages

- No mechanical (rotating) parts
- Data quality does not depend on wellbore conditions, fluid viscosity, and trajectory
- Qualitative and quantitative analysis of wellbore fluid flow

Tool Specifications	
Thermal anemometer sensor accuracy	0.3°C
Thermal anemometer sensor sensitivity	0.003°C
Sensor type	Platinum / Exposed
Minimum detectable fluid velocity	1.4 ft/min (0.4 m/min)
Maximum detectable fluid velocity	96 ft/min (30 m/min)
Maximum operating pressure	14,500 PSI (100 MPa)
Maximum operating temperature	150°C (304°F)
Tool OD	1.50/1.65 in (38/42 mm)
Tool length	3.6 ft (1.1 m)
Tool weight	13.2 lbs (6.0 kg)
Connections	15/16 SR
Operational time in memory	Over 70 hrs
H_2S resistance	6% standard (25% optional)
Surface read-out / Memory	Both

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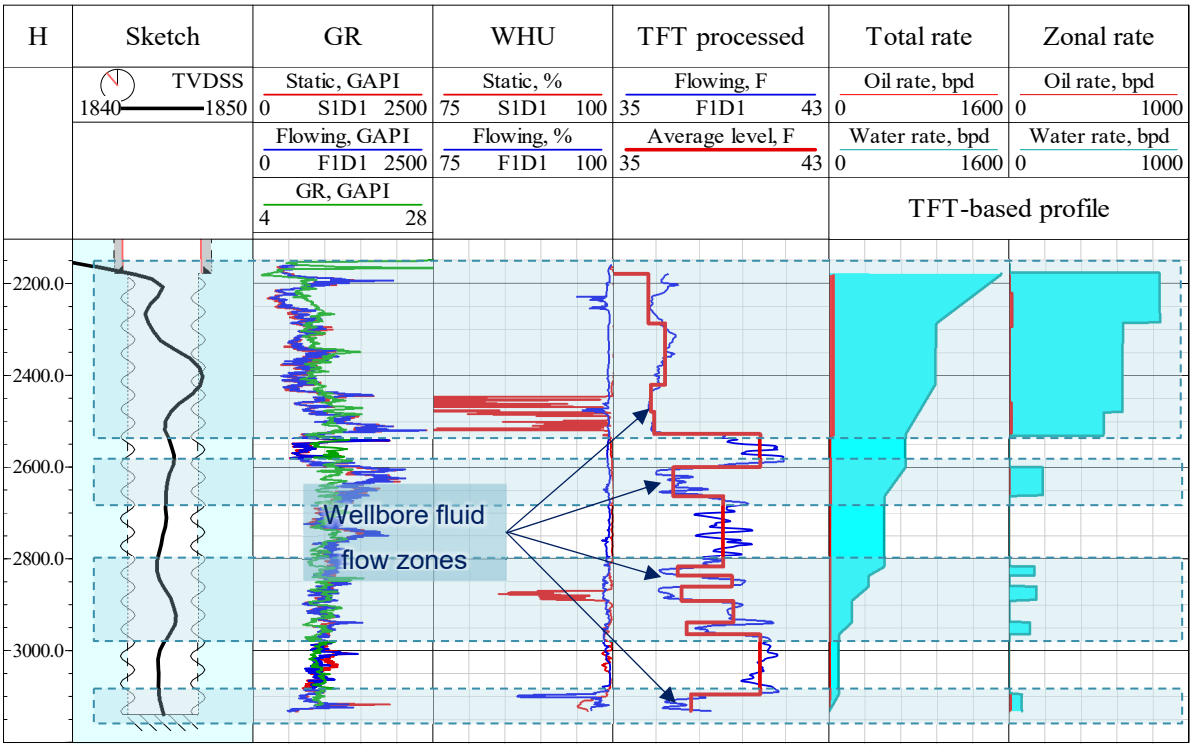
The main advantage of the tool is the absence of rotating elements, making the technology a reliable alternative to conventional spinner-based methods for production logging.

The TFT could be used in polymer injection wells to obtain quality injection profiles, hence conformance.



The principle of TFT data interpretation is similar to the spinner-based method where the apparent velocity curve (same as a TFT-processed curve in the chart above) allows to distinguish zones of fluid flow and construct the production or injection profile.