

Stream Tracer™ IT Heating System



Stream Tracer™ IT Heating System is an innovative energy-efficient solution that protects wells from build-up of solids, such as wax and hydrates.

The main objective of Stream Tracer™ IT Heating System is to maintain the temperature of the fluid in the wellbore above the temperature of paraffin-wax deposition. This is achieved through the usage of a special flexible skin-effect-based heater placed inside the wellbore. With zones of high and low power, the heater compensates the heat loss of the upstreaming fluid in the wellbore. Placed inside the wellbore, in direct contact with the fluid, it ensures better effectiveness compared to

other electric heating solutions, resulting in up to 50% energy saving. Heating distribution in different power zones decreases the level of fluid overheating and improves the technical and economic indicators of the site.

The length of various heating zones and the linear power of the heater is calculated according to a unique method developed by the R&D center of SST Group, individually for each well, taking into account the extensive list of input data, including the well's flow rate, water cut, reservoir temperature and pressure, gas factor, paraffin content, its crystallization temperature, etc.

Why install Stream Tracer™

- Reliable well protection from wax formation
- Fewer emergency repairs
- Reduced equipment downtime
- Better field performance

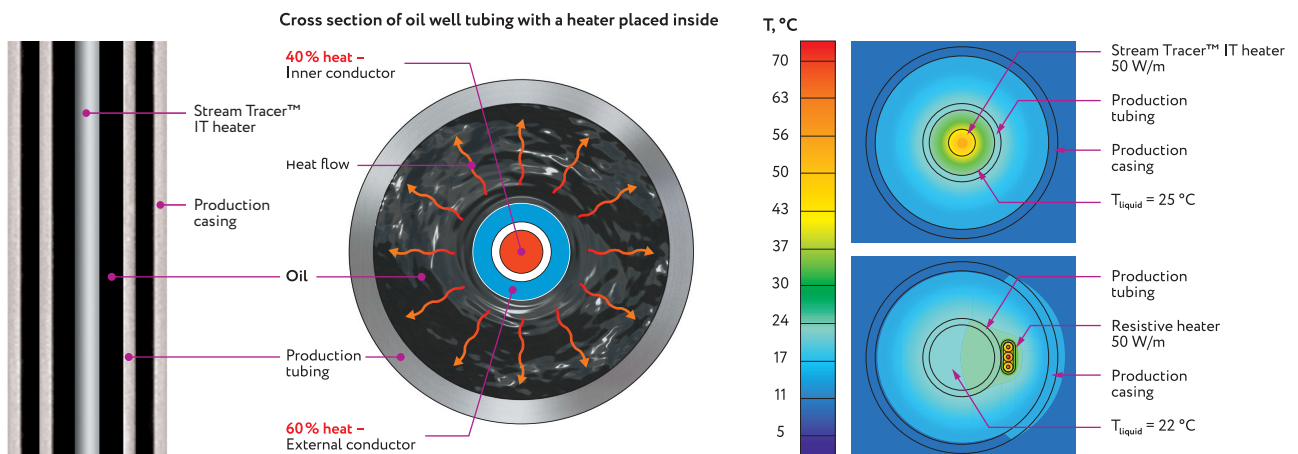
System's advantages

- Automatic operation
- Quick & easy implementation
- Energy-efficient
- Eco-friendly
- Easily transportable

Construction

Stream Tracer™ IT heater has a coaxial design. The outer jacket made of special hydrocarbon-resistant materials provides extra flexibility and mechanical strength ensuring

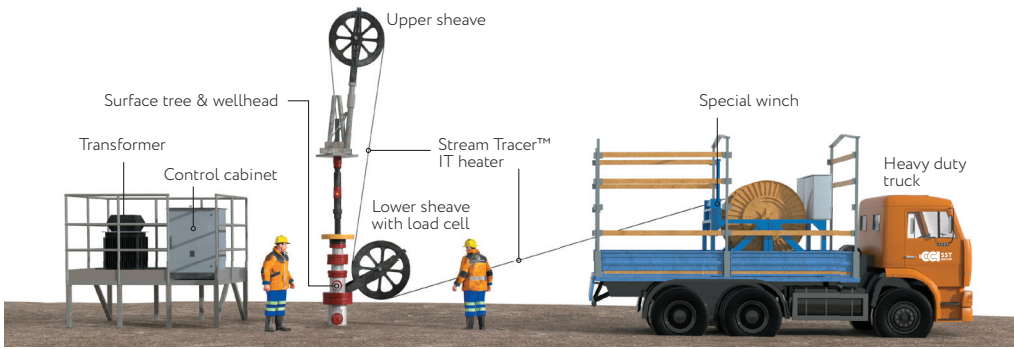
safety of the heart of the heater from the harsh environment. Up to 60% of total heat is generated in the external conductor of the Stream Tracer™ IT heater.



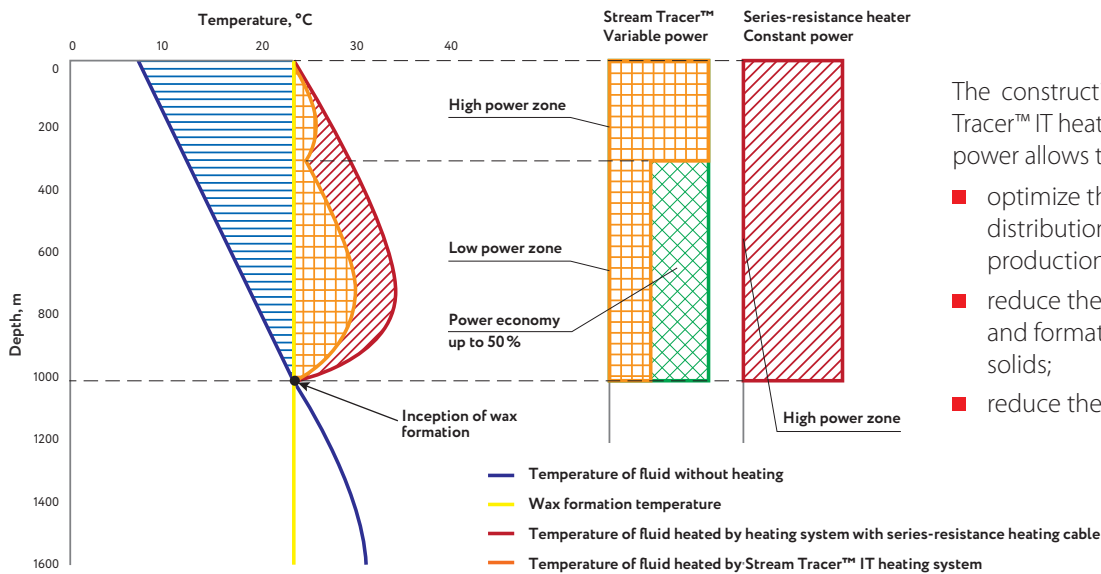
Installation of the Stream Tracer™ IT heater in a well does not require maintenance of the system and is largely based on the principles of wireline operations. A special hoisting unit is used to lower the heater into the wellbore. It is mounted on a mobile vehicle equipped with

a manipulator device. The system includes a heating element, power transformer, heating control station, and a mobile system for the installation and commissioning of the heating cable.

Stream Tracer™ IT Heating System



Energy Efficiency



The construction of the Stream Tracer™ IT heater with distributed power allows to:

- optimize the heat distribution along a production string;
- reduce the fluid overheating and formation of infusible solids;
- reduce the oil viscosity.

The energy-efficiency of Stream Tracer™ IT Heating System is confirmed during the operations at Kazakovskoye field (Russia) of LUKOIL-Perm. The complex provided an increase in temperature of the produced oil at the level of

the wellbore from +7 °C to +22.5 °C. The energy consumption required to maintain optimal oil temperature was reduced by 47 % compared to heating systems based on a series-resistance heating cable.

Technical Data

Supply voltage	up to 1 kV
Max linear power	80 W/m
Heater length	up to 1.7 km
Minimum installation temperature	up to -20 °C
Minimum bending radius*	400 mm
Crushing load	up to 12 kN (at the tripping speed up to 0.25 m/s)
Tensile strength limit	up to 28 kN
Chemical resistance to oil components	high
Maximum external pressure	up to 150 atm
Maximum operating temperature	up to 70 °C
Ingress protection rating	IP68

* Remains in operation after 100 bends in the 400 mm radius at positive temperatures

Certification

Safety and reliability of our solutions in explosive environments is confirmed by certificates of compliance with the Technical Regulations of the Customs Union and by a number of independent certification bodies, such as DEKRA, NANIO CCVE, CSA Group. IECEx, ATEX and VDE certificates (IECEx CCVE 19.0010X, IECEx CCVE 18.0002X, DEKRA 18ATEX0033X) evidence high explosion safety and reliability of our systems.

