COMPLEX DEVICE “QUARTA” FOR MEASUREMENT OF OIL CONSUMPTION IN AQUEUS AND OIL MIXTURES AT WELL

Description
Complex device “Quart” for measuring of current (instantaneous) values of volume and mass flow of aqueous-oil mixture (AOM) and oil, temperature, average flow velocity, dynamic viscosity of AOM and percentage of water in AOM has been developed.

Primary converter of two-phase flowmeter (PCF) is a construction combining three apparatuses: ultrasonic velocimeter (UV), original restriction – differential manometer (ORDM), humidity (HM) and temperature (TM) meter. These apparatuses are constructively combined in one block but function independently. Results of measurements of each apparatuses are used in integral algorithm for calculation of volume and mass flow of AOM passing though the flowmeter. The flowmeter is equipped by comprehensive software enabling fast data processing.

Technical specifications

Throughput, m³/hour: 1 – 10
Watering, %: 0 – 30
Pressure, atm.: 15
Ambient temperature, °C: – 40 – +50
Operational temperature of the mixture, °C: +10 – +90
Viscosity, dynamic, kg/m•sec: 0.00116 – 0.03
Density, kg/m³: 700 – 1100
Salinity, % (on weight): 0 – 10
Conjunctive diameter, mm: 50-100
Averaged error, of full scale: oil and water, %: +/- 2
Instantaneous error, of full scale: oil and water, %: +/- 5

Technical appraisal and economic benefits
Some companies (OZNA, "AGAR CORPORATION", "Schlumberger", etc.) offer mobile and stationary complexes meeting a few requirements. However, all of them are characterized by considerable dimensions, weight and cost that impede wide use of such complexes in wells with the debit of ~ (50—100) tons a day. The developed flowmeter serves to equip individual wells or collectors by control units (flowmeter based) for efficient management of oil production and decrease of negative impact on the environment.
Application areas
Complex device “Quarta” may be used in oil production for AOM flow and structure control. Possible adaptation of the device with the view of measuring the flow and structure of other multicomponent mixtures in construction, chemical and other industries.

Development stage
Device design has been completed, two pre-production models have been produced, dynamic and static testing have been carried out in the stand of IT SB RAS, first option of measuring section software and main block of calculation software have been established, the device passport, testing methods, technical description have been developed, calibration stand for aqueous-glycerin mixture has been made.

Patent situation
Materials for patent application have been prepared.

Commercial offers
Herewith we offer to make a contract for production of complex device, humidity meter, ultrasonic flow meter and control and regulation systems based on the developed devices and software.

Estimated cost
Depending on the given parameters of the throughput, humidity, temperature, mixture velocity and pressure the cost of the device can vary from 100 to 500 thousand rubles.

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