

## Integrated Automated Systems "VOLNA"

### Constituents:

- high-precision / flowmeter "STRUYA"
- analyzer / flowmeter "KOUN"



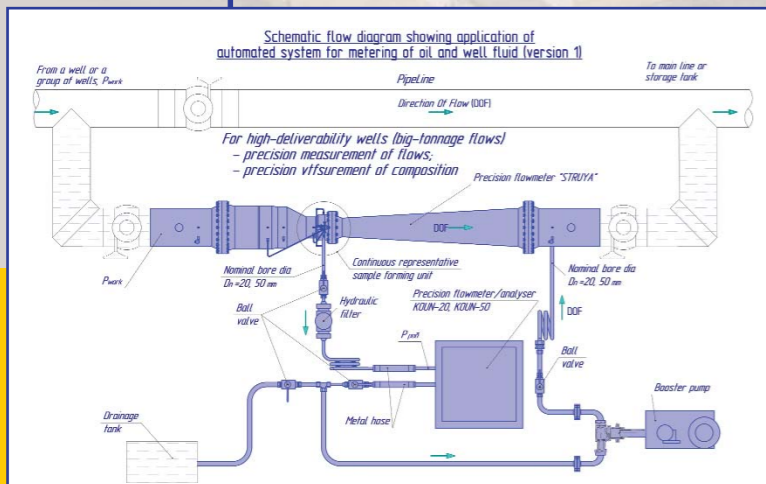
The systems are designed for in-line measurements of oil and gas flow and quality parameters.

### Operation principle:

Flow of crude oil passes through "STRUYA" /flowmeter inserted directly in a main pipeline.

1. Pressure difference is formed in the middle portion of the apparatus. Imprecision of the pressure difference formed is less than 0,05%. Thus, flow measurement accuracy directly depends on accuracy of differential flow sensors and computing circuit applied.
2. A representative sample is formed. "STRUYA", as representative sample conditioner, has the Certificate of Compliance with Russian State Standard GOST 2517 for oil sampling.
3. The thus formed representative sample passes through analyzer/flowmeter "KOUN" and returns back to the main pipeline. "KOUN" makes it possible to perform real-time high-precision measurements of:
  - viscosity
  - density
  - water cut
  - carbon content
  - gas-oil ratio
  - aliphatics-to-aromatics ratio
4. At customer's option, the "VOLNA" system may be additionally equipped for determining minor-concentration admixtures:

- mass fraction of H<sub>2</sub>S,
- mass fraction of paraffins,
- mass fraction of methyl / ethyl mercaptanes,
- mass fraction of chloroorganic compounds,
- mass fraction of mineral chlorides,
- saturated vapor pressure,
- fractional yield,
- etc.



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## Automated Systems for In-Line Determining Quantitative and Qualitative Characteristics of Gas, Water, Oil-Containing Liquids, Oil and Petroleum Products



### MANUFACTURING AND SUPPLY

- Flow meters / sample conditioners "Struya"
- Nuclear magnetic resonance (NMR) based analyzers of fluids "KOUN-YAMRAN"
- Automated instruments for determining quality parameters/ low-concentration admixtures
- Automated systems for flow metering and measuring compositional parameters of crude oil "Volna"

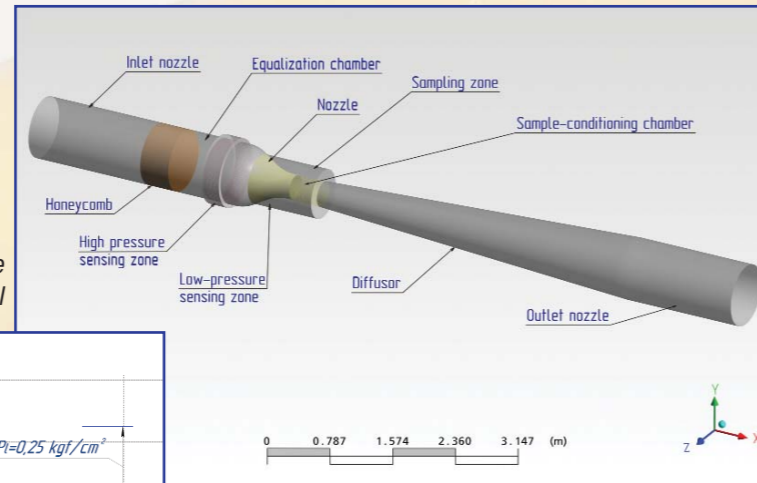
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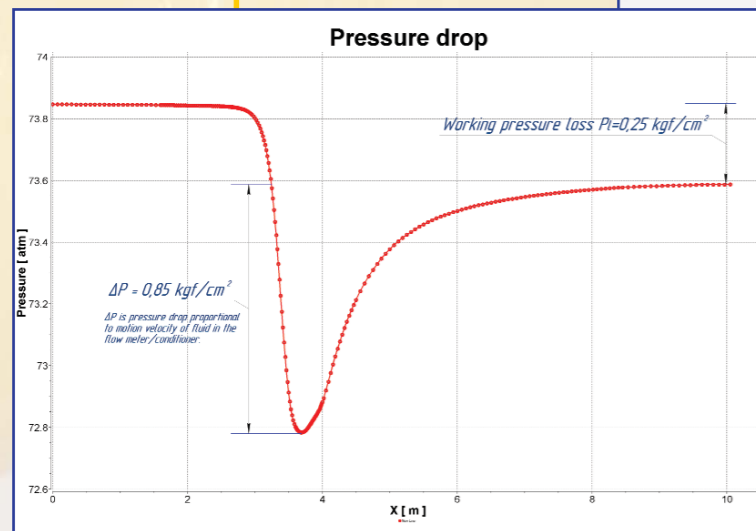
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## FLOW METER / SAMPLE CONDITIONER "STRUYA"



Solid-state  
3D mathematical model



Hydrodynamic pressure loss in the fluid path

### Parameters of working fluid:

- Viscosity = 250 cSt,
- Density = 950 kg/m<sup>3</sup>
- Velocity v = 3 m/s

### CERTIFICATE OF COMPLIANCE No. 07.000.0261

#### PRODUCTS

Device for measurement of oil flow rate in a pipeline, forming and taking representative samples for qualitative analysis "Struya-80/100/300/500"

Batch of 10 units, Serial numbers 1-10

#### MANUFACTURER

OOO NPP "High Engineering Technologies"  
21 Arhitekтора Vlasova street, bldg.3, Moscow  
1117335, Russia

#### CERTIFICATE IS ISSUED TO

OOO NPP "High Engineering Technologies"  
21 Arhitekтора Vlasova street, bldg.3, Moscow  
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## KOUN-YAMRAN IN-LINE FLOW METERS AND ANALYZERS OF COMPOSITION AND PROPERTIES OF ANY HYDROCARBON LIQUIDS

- Easy to build into process lines of petrochemical facilities
- Full-automatic instrument providing intelligible output information
- A great number of monitored parameters and quality characteristics of product
- No contact with and destructive impact upon liquid under examination
- Reproducibility is provided by integrated calibration system in the process of normal operation
- Needs no consumable materials and interference of personnel
- Uniformity of magnetic field in the measuring volume of 10<sup>-6</sup> to 10<sup>-7</sup>

### Crude and stock oil, petroleum tailings

- Density
- Viscosity
- Flow velocity
- Water content
- Hydrogen content
- Carbon content
- Distillation characteristic
- Aromaticity
- Paraffins content
- Cokeability

### Light-oil products

- Fragment composition
- Distillation characteristic
- Gelling point
- Octane number
- Cetane number
- Aniline point
- Paraffins content
- Naphtenes content
- Arenes content
- Water content

### Individual compounds and mixtures, water-organic compositions and multiphase systems

- Elemental composition
- Structural formula
- Isotopic composition
- Position-specific isotopic distribution
- Structural-group composition
- Fractional analysis
- Isomeric composition
- Phase composition

### CERTIFICATE OF COMPLIANCE No. POCC RU.ME67.A04639

#### PRODUCTS

Measurement system "Analyzer/flowmeter "KOUN-50"  
Standard Specification TY-4215-001-13349253-2006  
Batch - 10 units

#### MANUFACTURER

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