

## Intelligent inspection tool of **KOD-4M** type: In-line pipeline examination with high accuracy, travel speed and service quality.

Defectosopes (intelligent tools) 'KOD-4M-1420, 1220' implement the method of **transverse magnetization** of gas pipeline' parts to detect the stress corrosion cracks of longitudinal orientation.

The system of measurements and collected data processing provides obtaining of spatial distribution of magnetic field discrete function in the nearby area of the internal pipe surface. Collected data contains information about condition of gas pipeline walls material. Further analysis of magnetic field distribution, carried out with the help of special mathematical methods, provides identification of defects and their classification in accordance with size (depth and length), surface orientation and type.

High resolution of the tool is based on the multi-channel (512 channels) measuring system and high frequency information sampling. Achieved resolution makes it possible to analyze with good quality even comprehensive combinations of flaws through the pipe material (**the colonies of cracks, corrosion + cracks, mechanical stress concentrators + cracks, welded joint + flaws**).

Basing on the inspection data the accurate information about flaws location can be obtained, i.e. whether the defects are on the internal or

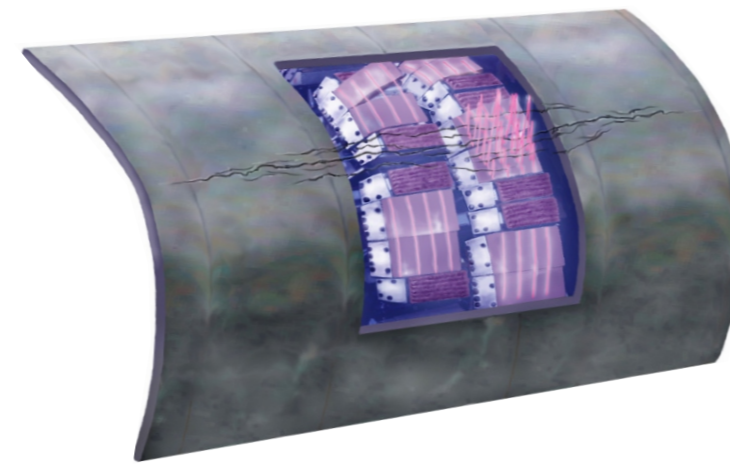
external surface. The following defects and items listed below may be detected and localized as well as some physical parameters:

General corrosion, pitting corrosion, **longitudinal main cracks, colonies of cracks (stress-corrosion cracking)**, technological flaws (scabs and scratches), cracks in the longitudinal welded joints, dents;

Technological objects (valves, fitted non-standard pipe pieces ('roll'), incisions, end caps, etc.);

**Pipes assortment, wall thickness, magnetic permeability of the pipe material, pipe length, orientation of the longitudinal joints;**

The telemetric information about parameters of motion is available as well (speed of motion, rotation, are passed distance, time of motion, temperature inside the tool, acceleration of the defectoscopes during motion is measuring in three directions, information about condition of the power supply unit).

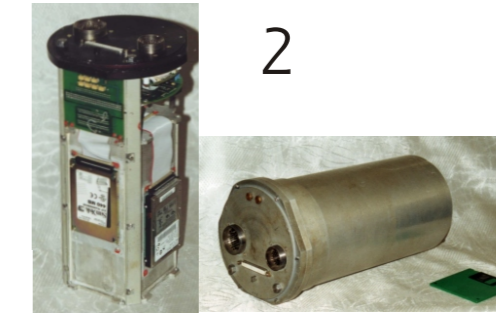


Transverse orientation of the magnetic systems provides detection of the flaws distributed along and trough the pipe with high accuracy

### TECHNICAL SPECIFICATIONS OF INTELLIGENT TOOL «KOD-4M»

Wall thickness measuring range	<b>11 to 21 mm</b>
Range of depth evaluation of defects like:	
- Internal surface longitudinal crack	<b>0,15 T to 0,8 T*</b>
- External surface longitudinal crack	<b>0,2 T to 0,8 T*</b>
- Corrosion cavern on both surfaces	<b>0,2 T*</b>
- Longitudinal crack in the area of welded joint	<b>0,3 T*</b>
Maximal length of inspected pipeline	<b>150 km</b>
Efficient traveling speed	<b>3 to 4 m/sec</b>
Rated traveling speed	<b>1 to 6 m/sec</b>
Maximal pipeline operating pressure	<b>80 bar</b>
Minimal passed through section (narrow spot)	<b>0,9 D**</b>
Minimal passed through pipeline bend radius	<b>3 D**</b>
Continuous operation time	<b>16 h</b>
Operating temperature range	<b>-20 to +45°C</b>

(\* ) T pipeline wall thickness  
(\*\* ) D pipeline diameter



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1. This figure presents **512** sensors assembled along the circle. The number of sensors provides collection of valuable information enough to detect minimal defects' parameters. At the same time, the magnetic system (also possible to see in the figure) provides required level of pipe material magnetization.

2. The module of on-board data acquisition and processing with capacity of **20 to 60 GByte**. Such module capacity is sufficient to carry out continuous recording and processing of data transferred from all sensors of measuring system.

3. The Marker system are located on the ground' surface over the trace of pipeline. The system provides location of the pipe and defects positioning with high accuracy.

