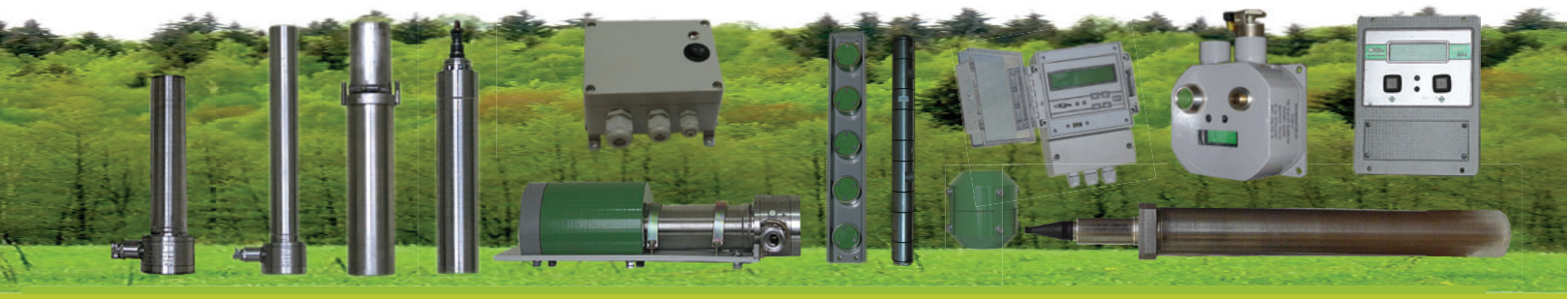
ECOPHYSPRYBOR

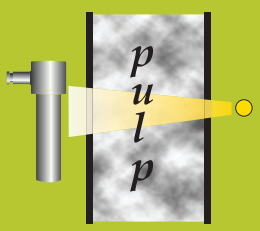
Devices for Non-Contact Control and Measurement of the Technological Process parameters in the Industry



"NTC Ecophyspribor" is a pioneer in the development of new environmentally-friendly radio isotopic methods of control and measurement of process parameters and is engaged in the manufacture of process control devices for non-contact process control and measurement (density meters, level gauges, continuous level gauges, thickness meters, concentration, media interface etc).

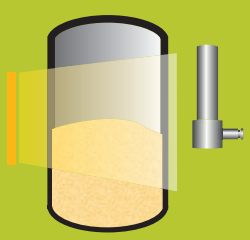
Founded in 1997, our enterprise applies for the non-contact process control and measurement the environmentally-free radio isotopic technology using "micro-active" sources of ionizing radiation with the activity of less than the minimum significant activity level pursuant to the existing IAEA radiation safety standards and regulations.

The products of Ecophyspribor are patented.



Density measurement

of liquid media and slurries in pipelines, channels and reservoirs



Alarm indication

of level and boundary surface of liquid and loose media

Continuous measurement

of level and boundary surface of liquid and loose media

Environmentally-free *isotopic technologies Ltd.*

"EPT Ltd."

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ADVANTAGES OF OUR DEVICES

- completely non-contact;
- compact design;
- no motion parts;
- maintenance-free;
- indispensable when operating with various media such as:

• Toxic, aggressive and biologically hazardous;
• Corrosive and abrasive;
• Molten and cryogenic;
• Radioactive, with high or variable level of radioactivity;
• Foams, suspensions and slurry;
• Powders and other highly dispersed loose substances;
• Slurry, ore, fusion mixtures and alike;
• Without limitation of pressure and temperature inside a controlled object.

In contrast to its conventional radio isotopic analogues, our devices use natural and artificial gamma radiation sources which activities do not exceed the minimum significant activity levels pursuant to the applicable IAEA radiation safety standards and regulations. Therefore, they are not subject to the supervision by the State Nuclear Supervision Authority, State Sanitary Epidemiological Supervision Authority and Ministry of Home Affairs that are confirmed by appropriate documents.

Our devices:

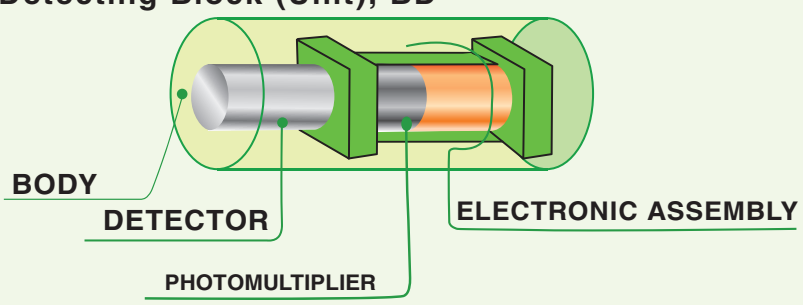
• do not generate a radiation background;
• do not require a special radiation shield;
• do not pollute the environment;
• do not require specially prepared and certified premises and personnel;
• do not create problems during dismantling of the equipment.

Since 1998 thousands of conventional radio isotopic devices in non-contact measurement and control systems in various industries have been replaced by our products. Sanitary-epidemiological certificates are available for all manufactured devices.

OPERATION PRINCIPLE: It is based on the registration of a change in the flux of ionizing radiation caused by a change in the level, thickness or density of a controlled material.

BASIC COMPONENTS:

Detecting Block (Unit), BD



BD-7
(PB Exdl/1 ExdIICT6)

A series of Detecting Unit (BD) versions with varying sensitivity and designs are offered.

• Data Processing Block (Monitor Unit), BOI

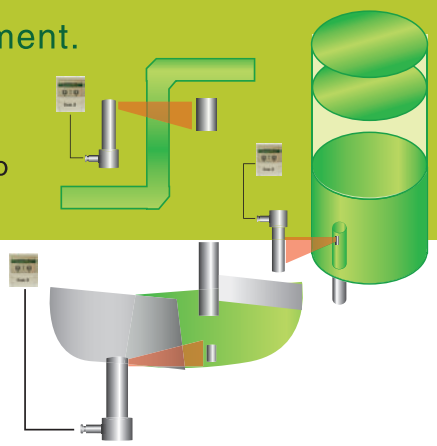
It converts a sequence of pulses in coming to its input into standart current or relay output signals associated with the input average pulse frequency via functional dependences determined electronically. It is fitted with an energy-dependent timer and a galvanically isolated interface. It is manufactured as a dust/water /fire/explosion-proof version (IP65).

Emitter/Radiation Source:

In various applications the gamma radiation of the radiation-free source of Na-22, the natural background or the gamma radiation of chemical potassium compounds with the natural concentration of the isotope Potassium-40 are used. The commonly used point source of Na-22, when installed externally, is located in the mounting assembly with a maximum size of 140 mm and when installed inside a vessel, an embedded pipe with a diameter of 40 mm is used. The extended source is assembled of several point sources.

Density measurement

Non-contact density gauge (density meter) IPB-1K, No. 23816-08 in the state register of measurement equipment.



Our devices are indispensable for non-contact measurement of density of liquid media and slurry in industrial pipelines, channels and reservoirs and are easy to install and maintain.
Standard current signal (0-5 mA) or (4-20 mA) enables to connect the equipment to the I&C System (Automatic Control System) of the enterprises.
The lack of contact between the components of the device and controlled material enables to use a density meter to control the pipelines filled with:

- Corrosive, abrasive, aggressive, toxic, biologically hazardous materials;
- Molten and cryogenic substances;
- Foams, suspensions, slurry, powders, sludge, fusion mixtures.

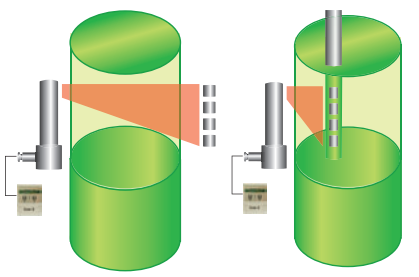
Power consumption, VA	max. 10
Allowable range of ambient air temperature, ^{o}C	
- for the Detecting Unit	- 40 to + 70
- for the Data Processing Unit	0 to + 50
Version of the Detecting Units are: • Dust/water-proof • Fire/explosion-proof (**PB ExdI/IExdIICT6**) • mechanical protection – **IP65**	

Range of density measurement, kg/m^3	from 300 to 2,500
External pipeline diameter, m	0.05 to 0.5
Limit of the basic absolute measurement error, kg/m^3	6 to 20
Standard current output signal	0-5 mA or 4-20 mA
Digital information of the average controlled density is indicated on LCD monitor	

Media level and boundary surface measurement

Non-contact Level gauge (Level meter) IUB-1K, No. 26117-09 in the state register of measurement equipment

For continuous level measurement tasks different solutions depending on specific conditions (material properties, dimensions, capacity, wall thickness, ease of instalment of equipment, etc) are used and media boundary surface measurement tasks are solved similarly with a procedure of density calculation by addition of the procedure of calculation of density in the course of processing of results of measurement.



Range of level measurement, m	up to 2.0
Limit of the basic absolute error, m	0.05
Standard current output signal	0-5 mA or 4-20 mA
Digital information of the average controlled level is indicated on LCD monitor	
Diameter of process vessel, m	
- the source is outside the vessel	0.5 to 3.0
- the source is inside the vessel	any

Power consumption, VA	max. 10
Allowable range of ambient air temperature, ^{0}C	
- for the Detecting Unit	- 40 to + 70
- for the Data Processing Unit	0 to + 50
Version of the Detecting Units are: • Dust/water-proof • Fire/explosion-proof (**PB ExdI/ExdIICT6**) • mechanical protection – **IP65**	

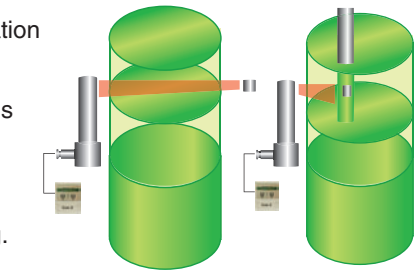
Non-contact Level indicator/switch (position level gauge) BPU-1KM

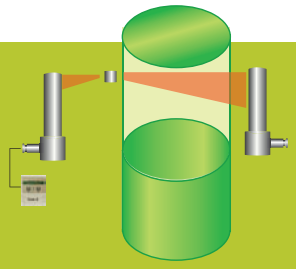
The following solutions for the tasks of indication of levels of filled vessels and loaded tanks are available:

• Classical version:
An emitter and a Detecting Unit are placed on the opposite (by diameter and chord) sides of a controlled vessel. When the level of a controlled material is changed, the flow of registered radiation is changed due to screening.

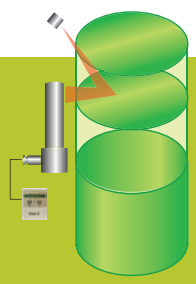
• Version with two Detecting Units:
It is used for reservoirs of larger diameters (if the distance between Detecting Units and Emitter is more than 5 m) or in case of variable radiation properties of a controlled material or background radiation.

• Reflection version
Emitter and Detecting Unit are placed on one side of a controlled vessel. When the level of a controlled material is changed, the flow of registered radiation is changed due to back scattering.





Design of Detecting Units: - dust/water/fire/explosion-proof (**PB ExdI/IExdIICT6**), **IP65**	
Max. indication error, mm	± 25
Main output signal	dry relay contacts
Power consumption, VA	max. 10
Allowable range of ambient air temperature, ^{0}C	
- for the Detecting Unit	- 40 to + 70
- for the Data Processing Unit	0 to + 50



NEW DEVICES AND APPLICATIONS

Non-contact surface density gauge (thickness gauge) IPP-1K

It is used for continuous non-contact measurement of surface density (thickness) of sheet material at a flow line production on the various technological facilities used in chemical, metallurgical, pulp-and-paper and other industries

Range of measurement of surface density, g/m^2	20 to 800
Limit of the basic error with averaging time 100 s	3.0 + 0.03P*$_{mes}$
Range of ambient air temperature, ^{0}C	5 to 50
Power consumption , VA	6

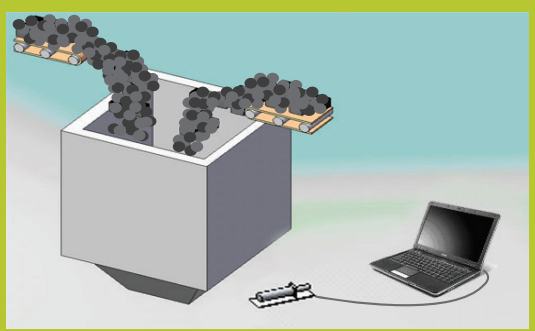
* P mes - measured value of surface density

Surface density gauges of soil, aggregate, concrete, and full depth asphalt, IPPG-1KM

It is a portable device with an autonomous power supply from a charged battery. The operation principle of the device is based on the registration of changes in the flux of gamma radiation back scattered by a controlled medium. The range of density measurement is 1,000-2,800 kg/m3 . The limit of absolute measurement error is 50 kg/m3

Non-contact Level gauge (Level meter) for the large vessels/tanks, IUB-1K-M

The operation principle of the device is based on the registration of changes in the flux of the muonic component of the cosmic radiation when passing through a controlled material. It is preferable to install the detector outside under a controlled vessel. It is allowed to install it externally sideways or in vicinity of a bottom of a controlled vessel.
Metrological characteristics of the device are specified at carrying out of tests on various facilities.



Data Processing Unit of dust/water/fire/explosion-proof (mine) design

It is intended for installation directly in dust/water/fire/explosion premises, including in mines.
The dust/water/fire/explosion protection class of this device is PB ExdIICT6.

ECOPHYSPRYBOR
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" EPT Ltd."
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