



# **NON-DESTRUCTIVE TESTING**



PROMPRYLAD LLC



ULTRACON-SERVICE LLC



UkrSRINDT

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**DEAR SIRSI!**

**OKO Association motto: "Turnkey NDT technologies".**

We are trying to solve all the problems, connected with non-destructive testing (NDT). Included to "OKO" Association enterprises have a full range of means for designing, manufacturing, warranty and post-warranty services of different equipment and NDT means, development of techniques and technologies of NDT procedure, training and certification of NDT personnel.

For objects detection we have covered practically all the sphere of NDT methods: ultrasonic, eddy current, visual, penetrant, magnetic particle and acoustic emission. Moreover by the Customer`s request we also provide technical check-up, technical diagnostics (expert evaluation), thickness gauging of base metal and welded joints of equipment.

We can help you, if you decided to carry out non-destructive testing in your own laboratory.

NDT technologies division of Ukrainian Scientific Research Institute for Non-Destructive Testing (UkrSRINDT) is the developer of more than 50 NDT techniques for different items. Up-to-date NDT technologies are used when designing new techniques. The department is equipped with all the necessary equipment for implementation of different testing methods such as ultrasonic, eddy current, acoustic emission, magnetic particle, visual and penetrant. One method or a group of methods is separately chosen for optimum solution to problem. Integrated approach is used for each specific testing task.

We use high-level equipment for NDT techniques implementation. "OKO" Association includes the leaders of domestic engineering in the field of non-destructive testing such as Ultracon-Service LLC and Promprylad LLC. Ultrasonic, eddy current and magnetic particle flaw detectors, hardness testers, thickness gauges, wide range of ultrasonic and eddy current probes and other equipment have worked up Ukrainian market long ago due to its high quality and moderate prices. Also, UkrSRINDT successfully designs high-efficiently Systems of automated NDT at customer`s request. It is both important and useful to show to the customer that if the solution of an assigned testing task was not found with serial equipment, than it is possible to design special-purpose probes and make additions to the instrument software. Manufacturing companies to all delivered equipment hold consulta-

tions on its implementation at a customer's enterprise and carry out starting-up and commissioning of NDT systems.

But unfortunately, it's impossible to produce everything. If it's difficult to solve the testing task using instruments, produced by our companies, "OKO" Association can supply the necessary equipment, made by other producers.

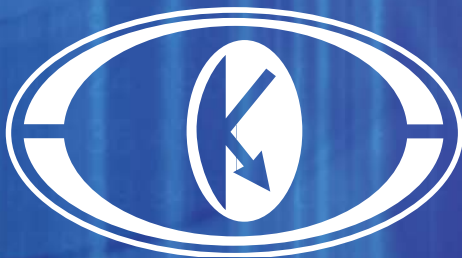
Among such equipment are X-ray units, consumables for magnetic particle and penetrant testing.

Service center of Promprylad LLC provides warranty and post-warranty services for all supplied equipment.

It is well known, that without skillful specialists any, even perfect-made equipment, is just "piece of iron". NDT Training Center of Ultracon-Service LLC, NDT Certification Center of Promprylad LLC and Personnel Certification Center of UkrSRINDT (Accreditation certificate of National Accreditation Agency of Ukraine NAAU No.6O012 dated 14.01.2014) will train NDT specialists of your enterprise and then issue them a certificate in conformity with the acting Regulatory Documentation. We are deeply convinced that only the authors of NDT procedures and designers of NDT instruments can provide proper training for carrying out the testing. We got all research engineers, methodologists, designers, producers of instruments, lecturers and experts together "under one roof". As a result optimal solution of any testing task can be found for the customer!

**OKO Association – technology must be "Turnkey". It is the main principle of our work.**

**OKO ASSOCIATION**



**PROMPRYLAD LLC**



**ULTRACON-SERVICE LLC**



**Ukrainian  
scientific research institute  
for non-destructive testing**



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**NEW**



**SONOCON B ADVANTAGES  
ERGONOMICS**

- Optimal dimensions and display format of 800x480 pixel resolution ensures qualitative data separation and its perception and does not cause excessive eye-strain to NDT inspector.
- Convenient case and small device weight allow to use the flaw detector in enclosed spaces and hard to reach areas.
- All main instruments setting are accessible with keypad shortcuts.
- Call of the most frequently used modes from the keypad or "Quick Access Menu".

**MULTIFUNCTIONALITY**

- Carrying out the flaw detection, thickness gauging, sound velocity assessment in different materials.
- Availability of various flaw detector software versions ("firmware upgrade") for solution of special-purpose testing tasks.
- Results analysis and reports generation PC software.
- Operation with all probe types.

**INDIVIDUAL DELIVERY SET**

- By agreement with the Customer the flaw detector can be completed with different probes, calibration blocks and software for operation in different industrial sectors.



**CE MARKING**  
EN 12668-1 Compliant



**PURPOSE**

**UT Basic software version:**

- Manual non-destructive testing for the presence of defects such as discontinuity and inhomogeneity of the material of finished items, semi-finished products and welded (soldered) joints.
- Measuring the defects depth and coordinates.
- Assessing the sound velocity in different materials.
- Measuring the equivalent defect sizes.
- Measuring the ratio of signal amplitudes, reflected from defects.

**"Thickness gauge +" software version:**

- Measuring the products thickness at one-sided access to them.
- Formation of multi-dimensional files with the thickness measurement results of the testing objects.

**ULTRASONIC  
FLAW DETECTOR  
& THICKNESS GAUGE  
SONOCON B**

**APPLICATION**

- Weld testing in the Power Generation and Petrochemical Industries.
- Precise measurement of thickness in the Automotive Industry.
- Corrosion measurement in the Power Generation and Petrochemical Industries.
- Forgings testing.
- Testing of special-purpose materials in the Aerospace and Automotive Industries.

**MAIN MODES AND OPTIONS**

- Pulsar modes: spike pulser, square wave pulser.
- Automatic algorithms of various probes calibration (straight-beam, angle-beam, rayleigh-wave).
- Mode of automatic building of DGS diagrams simultaneously for three different acceptance diameters.
- DAC modes: building DAC curve according to EN1712, EN1713, EN1714, ASTM E164, ASME, ASME III, JIS 23060, GB11345.
- TCG: dynamic range of 110 dB.
- Mode of Automatic Gain Control (AGC).
- Acoustic coupling control.
- Measurement of echo-signal parameters by the "Scan" of a peak signal (useful while products testing with bad input conditions of ultrasonic vibrations).
- Mode of high-accuracy thickness measurement of a product with the application of a measurement marker.
- "Legs marking" mode (applied during welded joints testing).
- "Peak hold" mode - peak value of the signal envelope accumulation, this mode is useful during small defects search and operation in unstable acoustic coupling conditions.
- Availability of two independent measurement gates with three levels, as well as the system of automatic flaw alarm (light and sound) by each measurement gate.
- Different rectification modes - radio frequency (RF), positive or negative halfwave, full-wave.
- Fast data transmission to PC via USB Flash.
- Result display: A-Scan, B-Scan. C-Scan ("Thickness gauge+" version).
- Testing report in a form of \*.jpg
- Temperature range: from minus 25 to plus 50 °C.

## PURPOSE

Intended for manual and mechanized testing of products to detect defects such as discontinuities and inhomogeneity of materials, items and semi-finished products, welded joints, measurement of signal amplitudes ratio from flaws, flaws coordinates. Tomography function allows reflecting and saving testing results in a form of B-scan with the affixment to the scanning path.

# ULTRASONIC FLAW DETECTOR UD4-76

## UD4-76 FLAW DETECTOR ADVANTAGES

- Operation with any type of piezoelectric transducers.
- Thickness measurement.
- A-scan, B-scan, orthographic views of 3D-scan.
- Synchronization: internal, external from encoder.
- Scanning speed control.
- Rectification: full wave, positive and negative halfwaves and radio frequency (RF) signals.
- Set of gain control functions, including AGC, TCG.
- Interface of automatic calibration of a probe and test piece.
- Mode for operation with DGS diagrams.
- Two independent three-level measuring gates.
- Two additional special-purpose probes.
- DAC curves, automatic plotting of TCG curves by DAC curves.
- Coupling control system.
- ALARM system at all gate levels.
- Bright three-color alarm LED's.
- Mode of current signal overlaying on earlier frozen one ("freeze and live" mode).
- Signals spectrum display.
- Dynamic control of the pulser parameters depending on the probe frequency.
- Reflections highlight mode.
- Special program interface.
- "User" and "Expert" menu modes.
- Voice comments recording referred to all data types.
- Large, high-contrast TFT display.
- Storage and call of testing results.
- Communication with PC via USB.



## ADDITIONAL FUNCTIONS

### • SAFT mode

SAFT algorithm, implemented in the results processing software, allows significantly improve the signal/noise ratio, virtually change the probe angle, with which the testing was carried out.

### • Building the "corrosion map" - "thickness map"

This software function allows to build the thickness map of a tested object by the results of a raster scanning.

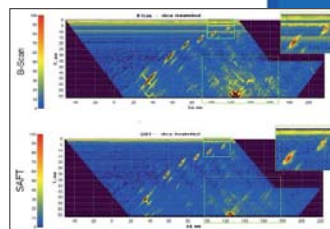
This simplifies the visual perception of testing results and their convenient registration.

### • Radio-frequency signal.

For the high-accuracy measurement of item thickness and flaw coordinates the RF signal is used, providing the measurement step of 0.01 mm.

### • Special program interface mode.

This mode is applied to solve special- purpose tasks while testing different one-type parts or in a case when the part has many testing areas.



EN 12668-1 Compliant

## PURPOSE

- Measuring the flaws coordinates.
- Measuring the different items thickness at one-sided access to them.
- Measuring the echo amplitudes ratio.
- Measuring the equivalent sizes of flaws.
- Evaluating the sound velocity in different materials.

# ULTRASONIC FLAW DETECTOR UD3-71 SMALL-SIZED



UD3-71 ultrasonic flaw detector provides the testing of welded joints and base materials along with thickness measurement of monometals, bimetal in compliance with Regulatory Documentation in various industrial sectors.

## UD3-71 FLAW DETECTOR ADVANTAGES

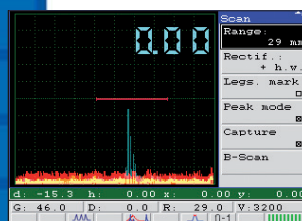
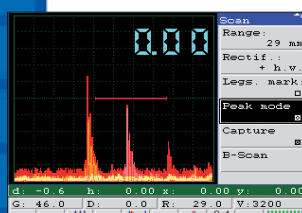
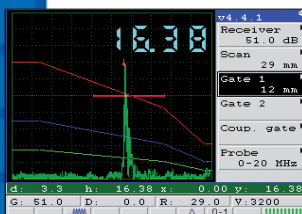
- **MULTIFUNCTIONALITY** – carrying out of flaw detection, thickness gauging, and assessment of sound velocity in the material.
- **MINIMAL DIMENSIONS OF FLAW DETECTOR** - no more than (188 x 107 x 78) mm, assure high ergonomics of the instrument and simplicity of operation.
- **ERGONOMICS** – convenient case, small weight, high-contrast TFT-display, assignment of the most frequently used functions to keypad "hot keys", and usage of a special leather cover for handy and secure holding of the instrument in a hand.
- **INDIVIDUAL DELIVERY SET**

By agreement with the Customer the instrument can be completed with different special - purpose probes, calibration blocks and software for operation in different industrial sectors.

## SEALING PROTECTION AND OPERATING CONDITIONS

- Sealing protection - IP65.
- Ambient temperature - minus 30 to plus 45°C.

**CE**  
CE MARKING  
EN 12668-1 Compliant



## MAIN MODES AND OPTIONS

- "TCG" and "DAC" modes for plotting the time corrected gain curve and DAC curve.
- "AGC" mode of automatic gain control.
- Mode for operation with DGS diagrams.
- "Legs marking" mode (indispensable during welded joints testing).
- "Peak" mode (indispensable during small defects search, operation in unstable acoustic coupling conditions).
- Rectification: full wave, positive and negative halfwaves and radio frequency (RF) signals.
- Availability of two independent measurement gates, each having automatic three-level flaw alarm system (ALARM).
- Possibility to create special - purpose interfaces to solve certain tasks when performing ultrasonic testing.
- Accurate measurement of product thickness (with manual choice of position of a measuring pointer).
- Measurement of operating frequency of applied probe.
- Selection of information display modes: A-scan, B-scan.
- Fast data transfer to PC and their analysis in "Ultra UDx-7x" program application with the possibility of testing report storing and printing.



## PURPOSE

TOFD PRO System is intended for mechanized testing of welded joints using Time-of-Flight Diffraction (TOFD) technique. The System assures the solution of the following tasks - testing the welded joints of:

- flat objects;
- tubes of medium and large diameters (with min. outer diameter of 600 mm);
- spherical and cylindrical oil and gas tanks (with min. diameter of 10 m).

## THE BEST SOLUTION FOR HIGH-QUALITY ULTRASONIC TESTING OF WELDS.

# TOFD PRO SYSTEM

### CONFIGURATIONS

#### OF TESTED WELDED JOINTS:

- Profile types: CRC- Evans, single J groove weld, single V groove weld, double V groove weld, X- welds, etc.
- Conventional wall thickness: from 6 mm (0.25 inch).
- Tube material: standard carbon steels.
- Testing with up to 4 pairs of TOFD probes according to standards CEN/TS 14751:2004, EN 583-6:2000 Non-destructive testing.  
Time of Flight diffraction technique as a method for defect detection and sizing.
- Detection of defects of various orientation (longitudinal, transverse), precise determination of a depth and length of defects, high sensitivity from its corner position.
- Testing scheme fully covers the groove area and the whole volume of a welded joint.
- Testing the whole volume of the welded joint per one scanning cycle.

### THE SYSTEM SOFTWARE INCLUDES

#### THE FOLLOWING PAGES (MODULES):

##### The "Object" page ensures:

- Selecting the test object geometry and setting up its geometrical dimensions.
- Selecting the type of test object material.
- Selecting the type of weld bevel and setting up of all geometrical dimensions.

##### The "Scanner" page ensures:

- Selecting the scanner.
- Setting up the scanner type: manual, motor-operated.
- Setting up the spatial position of TOFD- transducers pair relative to the origin of the coordinate system.
- Using of up to 4 TOFD transducer pairs.
- Carrying out the encoder calibration.

##### The "TOFD setup" page ensures:

- Selecting the type of TOFD probes, TOFD wedges, setup of their parameters.
- Setting up the PCS - the distance between the index points of TOFD transducers and their shift relative to the welded joint axis.
- Calculation and graphic plotting of the following parameters when using the TOFD Calculator:
  - Spatial resolution ( $R$ );
  - Scanning-surface dead zone ( $D_{ds}$ );
  - Backwall dead zone ( $D_{dw}$ );
  - Locus curve;
  - Beam Spread.

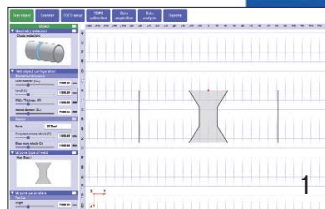


Figure 1. Object.

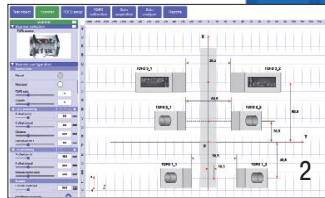


Figure 2. Scanner.

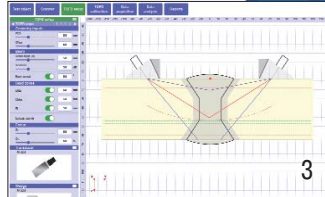


Figure 3. TOFD setup.



Figure 4. Data analysis.

**CEN/TS 14751:2004 Compliant**  
**EN 5836:2000 Compliant**



## PURPOSE

The OKO-22M-EMA ultrasonic multi-channel flaw detector is an independent electronic device and is designed for application in in-line and off-line high-performance systems (automated multi-channel NDT Systems), transportable systems (mechanized NDT systems) or for manual testing.

Due to the flaw detector is designed in a form of a standalone device with the connection to the PC via Ethernet port, several EMA channels can be connected to the PC via Switch unit. This allows to create EMA multi-channel testing systems.

**THE BEST INDUSTRIAL SOLUTION FOR IN-LINE AND IN-SERVICE SYSTEMS.**

## EMA ULTRASONIC MULTI-CHANNEL FLAW DETECTORS

## OKO-22M-EMA V.2, OKO-22M-EMA PRO

EMA Transducers

### TRANSDUCERS SPECIFICATIONS

Catalog number	Frequency, MHz	Probe angle, °	Working surface size, mm	Connector type	Connector position
EMAT0.5-0	0.5	0	20 x 20	2Lemo00/BNC	cable
EMAT0.5-90	0.5	90	20 x 20	2Lemo00/BNC	cable
EMAT1-0	1.0	0	20 x 20	2Lemo00/BNC	cable
EMAT1-45	1.0	45	20 x 20	2Lemo00/BNC	cable
EMAT1-90	1.0	90	20 x 20	2Lemo00/BNC	cable
EMAT2-0	2.0	0	20 x 20	2Lemo00/BNC	cable
EMAT2-45	2.0	45	20 x 20	2Lemo00/BNC	cable
EMAT2-90	2.0	90	20 x 20	2Lemo00/BNC	cable
EMAT4-0	4.0	0	20 x 20	2Lemo00/BNC	cable
EMAT4-45	4.0	45	20 x 20	2Lemo00/BNC	cable
EMAT4-90	4.0	90	20 x 20	2Lemo00/BNC	cable
EMAT5-0	5.0	0	20 x 20	2Lemo00/BNC	cable
EMAT5-45	5.0	45	20 x 20	2Lemo00/BNC	cable
EMAT6-0	6.0	0	20 x 20	2Lemo00/BNC	cable
EMAT8-0	8.0	0	20 x 20	2Lemo00/BNC	cable

\* Working surface size and dimensions of EMA probes can be performed at the customer's request. Available high temperature EMAT modification.

### THE OKO-22M EMA MAIN SPECIFICATIONS

#### TCG

- Depth \_\_\_\_\_ entire gain range;
- Number of points \_\_\_\_\_ up to 20;
- Minimum time step between TCG points \_\_\_\_\_ 1 us;
- Maximum slope \_\_\_\_\_ 46 dB/us;

#### DATA PORTS

- Ethernet (for communication with PC).

#### CONNECTORS

- 2 pairs of lemo00 connectors for connecting the EMAT to the receiver of EMA channel;
- 2 BNC connectors (one connector for the first pulser, second connector for the second pulser);
- 1 lemo connector for Encoder connection;
- 1 Power connector;
- 1 Ethernet connector for transmitting the data to PC;
- 1 Trigger connector is used either for synchronization between EMA channels, or for EMA channel metrological verification.

#### A/D CONVERTER

- 10 bit, 80 MHz.

#### PULSER

- Initial pulse filling frequency (Selection of a frequency filling is determined by the testing task. Available 2 channels with different frequencies); \_\_\_\_\_ 0.5, 1, 2, 4, 8 MHz; (Up to 8 MHz available as an extra option);
- Type of initial pulse \_\_\_\_\_ Toneburst, Waveform
- Number of periods \_\_\_\_\_ 2 - 6;
- Pulser amplitude \_\_\_\_\_ up to 2000 Vpp;
- Pulse energy \_\_\_\_\_ depends on a filling frequency;
- Pulse repetition frequency (PRF) \_\_\_\_\_ from 50 to 1000 Hz (OKO-22M-EMA PRO 2000 Hz);

#### RECEIVER

- Gain adjustment \_\_\_\_\_ 28 dB to 68 dB (gain step 0.1, 0.5, 1, 2 dB).
- Filter \_\_\_\_\_ 0.5, 1, 2, 3, 4, 5, 6 MHz (Selection of a frequency filling is determined by the testing task. Available 2 channels with different narrow band filter);
- Delay \_\_\_\_\_ from 0 to 1000 mm in steel (sound velocity 3230 m/s);
- Range \_\_\_\_\_ from 1 to 6000 mm in steel (sound velocity 3230 m/s);
- Number of averages \_\_\_\_\_ 2 / 4 / 8 / 16 / 32;
- Data presentation \_\_\_\_\_ A-Scan; B-Scan; C-Scan;

#### GATES

- Two independent gates per channel Amplitude and time measurements;
- Two levels per gate.

## PURPOSE

The OKO-22M-UT ultrasonic multi-channel flaw detector is a standalone electronic unit and is intended for application in high-performance automated multi-channel NDT Systems, transportable systems (mechanized NDT systems) or for manual testing.

Available in several flaw detector models that are different in a volume of built-in functions for results processing.

**THE BEST INDUSTRIAL OEM SOLUTION FOR IN-LINE AND IN-SERVICE NDT SYSTEMS.**

## ULTRASONIC MULTI-CHANNEL FLAW DETECTORS

**OKO-22M-UT** Standart,  
**OKO-22M-UT** StandartMX,  
**OKO-22M-UT PRO**

Due to the flaw detector is designed in a form of a standalone device with the connection to the PC via Ethernet port, the several UT channels can be connected to the PC via Switch unit. This allows to create UT multi-channel testing systems.

Technical capabilities of the flaw detector allow to use it both in stationary-type and rotary testing systems.



### SPECIFICATIONS

• Pulsar	mode Spike pulser, Square-Wave pulser (OKO-22M-UT PRO)
• Pulse Voltage (SQ mode)	120 - 300 V in steps 10 V with tolerance 10%
• Pulse falling/rising time	5 ns
• Pulse Width (SQ mode)	20 - 500 ns in steps 10 ns with tolerance 10%
• PRF (SQ mode)	15 - 2000 Hz in steps 5 Hz, 3 automatic modes: Auto Low, Auto Med, Auto High, Manual
• Pulse Voltage (spike mode)	Low (100 V), High (400 V)
• Pulse energy (spike mode)	Low (30 ns), High (100 ns)
• PRF (spike mode)	15 - 10000 Hz in steps 5 Hz, 3 automatic adjustment modes: Auto Low, Auto Med, Auto High, Manual (OKO-22M-UT PRO)
• Damping	50, 62, 150, 400 $\Omega$ (OKO-22M-UT PRO)

### RECEIVER

• Gain	0 to 110 dB adjustable in steps of 0.2, 0.5, 1, 2 dB
• Receiver input impedance	400 $\Omega$ ±5%
• Receiver bandwidth	0.2 - 27 MHz (-3 dB)
• Digital filter setting	Customizable filters set (0.2-10 MHz; 2.0-21.5 MHz; 8.0-26.5 MHz; 0.5-4 MHz; 5-15 MHz; DC-10 MHz) (OKO-22M-UT PRO)
• Rectification	Full wave, positive halfwave, negative halfwave, RF
• Amplitude measurement	0-110%
• Reject	0-80% FSH
• Units	Millimeters, inch or microseconds
• Range	1 to 6000 mm
• Velocity range	1000 to 10000 m/s in steps of 1, 10, 100, 1000 m/s
• Thickness measurements range	0.6 to 6000 m/s
• Probe angle	0° to 90° in steps 0.1°, 1.0°, 10°

### DIGITAL SPECIFICATION

• ADC	10 - bits with the sampling rate 100 MHz
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### GATES

- Measurements gates – 2 fully independent three-level gates for amplitude and TOF measurement.
  - Additional gate for immersion testing.
  - Additional gate of the Automatic Gain Control (AGC)
- Gate Start Variable over entire range
- Gate Width Variable over entire range
- Gate Height Variable from 2 to 100% FSH

### MEASUREMENT SPECIFICATION

- Result display A-scan, B-scan, C-scan, D-scan, TOFD-scan.
- DAC/TCG – Dynamic range is up to 110 dB.
  - Number of points is 32.
  - Building TCG curve by DAC
- DGS – Automatic building of up to 3 curves for different equivalent diameters
  - Calibration at calibration blocks and testing objects
  - Building DGS curve by DAC

### CONNECTORS

- Probe connector 2 BNC or 2 Lemo 1S
- USB port USB-2.0 (OKO-22M-UT PRO)
- Ethernet +
- Alarm output + (OKO-22M-UT PRO)
- Encoder 1 Lemo (with the option of two encoders operation)
- Number of channels 1 - 8 (OKO-22M-UT StandartMX)

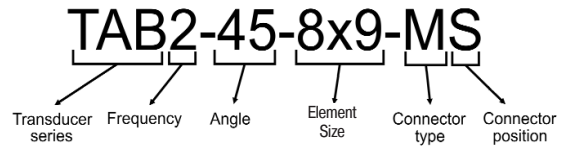
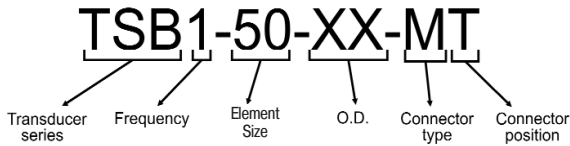
# ULTRASONIC PROBES for FLAW DETECTION AND SIZING

## Transducer series

## Description TSB

<b>TSB, TS</b>	Single element straight beam contact transducer
<b>TSD, TGI</b>	Double element straight beam contact transducer
<b>TAB</b>	Single element angle beam contact transducer
<b>TWS, WS</b>	Single element straight beam contact transducer and wedge for interchangeable designs

For example:

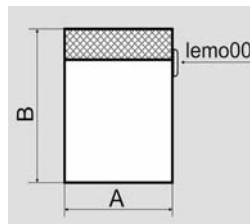
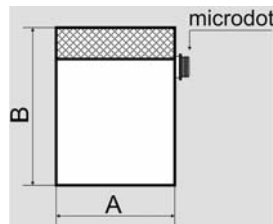
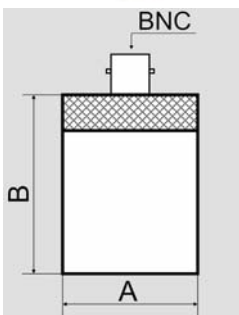


## CONTACT TRANSDUCERS

### Straight Beam Probes (single element)

#### Transducer dimensions

Element size		A,		B,	
mm	in	mm	in	mm	in
4	.187	6	.250	12.5	.50
		8	.312	12.5	.50
6	.250	8	.312	12.5	.50
		10	.375	12.5	.50
10	.375	12	.475	16	.65
16	.500	16	.625	24	1.0
20	.750	24	.900	32	1.25
24	1.00	30	1.15	32	1.25



#### General specifications

Catalog number	Frequency, MHz	Element dia.		O.D. (A),		Type of case	Connector type	Connector position	
		mm	in	mm	in				
TSB1-50-MS*	1.0	12	.500	16	.625	Stainless steel	Microdot/lemo00/BNC	Top/side	
TSB1-75		20	.750	24	.900	Stainless steel	Microdot/lemo00/BNC	Top/side	
TSB1-100		24	1.00	30	1.15	Stainless steel	Microdot/lemo00/BNC	Top/side	
TSB2-25	2.25	6	.250	10	.375	Stainless steel	Microdot	Top/side	
TSB2-37		10	.375	12	.475	Stainless steel	Microdot/lemo00	Top/side	
TSB2-50		12	.500	16	.625	Stainless steel	Microdot/lemo00/BNC	Top/side	
TSB2-75		20	.750	24	.900	Stainless steel	Microdot/lemo00/BNC	Top/side	
TSB2-100		24	1.00	30	1.15	Stainless steel	Microdot/lemo00/BNC	Top/side	
TSB5-25		5.0	6	.250	8	.312	Stainless steel	Microdot	Top/side
TSB5-25-37**			6	.250	10	.375	Stainless steel	Microdot	Top/side
TSB5-37	10		.375	12	.475	Stainless steel	Microdot/lemo00	Top/side	
TSB5-50	12		.500	16	.625	Stainless steel	Microdot/lemo00/BNC	Top/side	
TSB10-18	10.0		4	.187	6	.250	Stainless steel	Microdot	Top
TSB10-18-31		4	.187	8	.312	Stainless steel	Microdot	Top/side	
TSB10-25		6	.250	8	.312	Stainless steel	Microdot	Top/side	
TSB10-25-37		6	.250	10	.375	Stainless steel	Microdot	Top/side	
TSB10-37		10	.375	12	.475	Stainless steel	Microdot/lemo00	Top/side	

\*connector type: M - microdot; L - lemo00; B - BNC;

\*\*connector position: T - top; S - side; \*\*outside diameter of transducer

# CONTACT TRANSDUCERS

## Angle Beam Probe (single element)

### Transducer dimensions with "microdot" connector

Element size		D,		L,		E,		Thread size
mm	in	mm	in	mm	in	mm	in	
6	.250	12.0	.450	14.0	.540	8.5	.335	3/8" - 32 UNEF
8	.375	16.0	.590	18.0	.690	11.2	.440	1/2" - 28 UNEF
10	.500	18.0	.700	18.0	.710	12.0	.460	5/8" - 24 UNEF

### Transducer dimensions with "lemo00" connector

Element size.		D,		L,		E,		Thread size
mm	in	mm	in	mm	in	mm	in	
6	.250	12.5	.50	25.0	1.0	19.0	.75	3/8"-32 UNEF
8	.375	12.5	.50	25.0	1.0	19.0	.75	1/2"-28 UNEF
10	.500	12.5	.50	25.0	1.0	19.0	.75	5/8"-24 UNEF

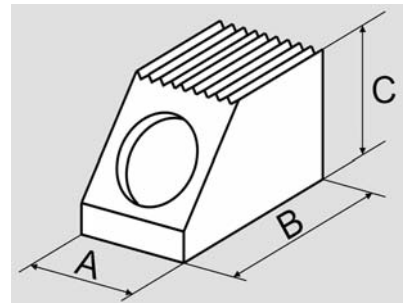
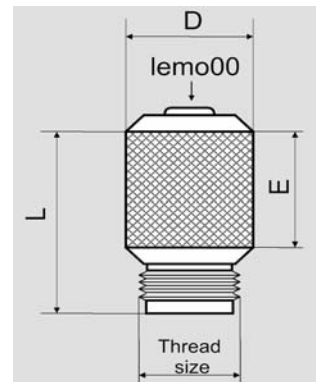
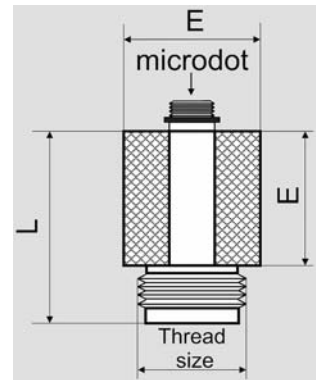
### General specifications

Catalog number	Frequency, MHz	Element dia.		Connector type	Connector position
		mm	in		
TWS1-37-M*	1.0	10	.375	Microdot/lemo00	Top
TWS1-50		12	.500	Microdot/lemo00	Top
TWS2-25	2.25	6	.250	Microdot/lemo00	Top
TWS2-37		10	.375	Microdot/lemo00	Top
TWS2-50		12	.500	Microdot/lemo00	Top
TWS2-25	5.0	6	.250	Microdot/lemo00	Top
TWS2-37		10	.375	Microdot/lemo00	Top
TWS2-50		12	.500	Microdot/lemo00	Top
TWS10-25	10.0	6	.250	Microdot/lemo00	Top
TWS10-37		10	.375	Microdot/lemo00	Top

\* connector type: M - microdot; L - lemo00

### Wedge dimensions

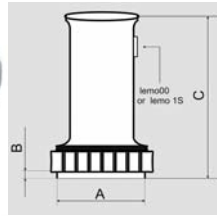
Catalog number	Element size		A,		B,		C,		Refracted angle in steel
	mm	in	mm	in	mm	in	mm	in	
WS25-45	6	.250	14.0	.54	19.0	.74	12.0	.48	45
WS25-60			14.0	.54	21.0	.83	14.0	.54	60
WS25-70			14.0	.54	25.0	.98	14.5	.57	70
WS25-90			14.0	.54	28.5	1.12	16.0	.64	90
WS37-45	8	.375	15.75	.62	21.0	.83	45	.55	45
WS37-60			15.75	.62	27.5	1.08	60	.64	60
WS37-70			15.75	.62	30.7	1.21	70	.70	70
WS37-90			15.75	.62	36.0	1.41	90	.72	90
WS50-45	10	.500	19.0	.75	28.0	1.1	14.0	.55	45
WS50-60			19.0	.75	33.0	1.31	16.0	.64	60
WS50-70			19.0	.75	36.0	1.43	18.0	.70	70
WS50-90			19.0	.75	41.0	1.62	18.0	.72	90



# CONTACT TRANSDUCERS

**Straight Beam Probe with ceramic face (single element)**

**Case dimensions**



Element size		A,		B,		C,	
mm	in	mm	in	mm	in	mm	in
10	.375	13	.375	2.2	.08	43.5	1.7
12	.500	15	.570	2.2	.08	43.5	1.7
20	.750	23	.900	2.3	.12	50.6	2.0
24	1.00	28	1.1	3.2	.12	56.0	2.2

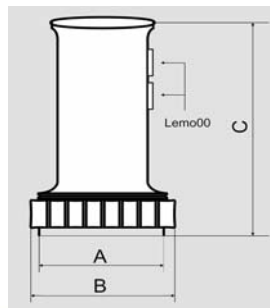
**General specifications**

Catalog number	Frequency, MHz	Element size		Type of case	Connector type	Connector position
		mm	in			
TS2-10C*	2.0	10	.375	Plated brass	Lemo00	Side
TS4-10C	4.0	10	.375	Plated brass	Lemo00	Side
TS2-12C	2.0	12	.500	Plated brass	Lemo00	Side
TS4-12C	4.0	12	.500	Plated brass	Lemo00	Side
TS2-20C	2.0	20	.750	Plated brass	Lemo00	Side
TS4-20C	4.0	20	.750	Plated brass	Lemo00	Side
TS1-24C	1.0	24	1.00	Plated brass	Lemo1S	Side
TS2-24C	2.0	24	1.00	Plated brass	Lemo1S	Side
TS4-24C	4.0	24	1.00	Plated brass	Lemo1S	Side

\* material of the face transducer: C - Ceramic

# CONTACT TRANSDUCERS

**Straight Beam Probes with replaceable membrane (dual element)**



**Case dimensions**

Element size		A,		B,		C,	
mm	in	mm	in	mm	in	mm	in
∅20	∅.750	24	.9	35.5	1.32	52.5	2.0
6 x 20	.250 x .750	30	1.2	44.5	1.75	57.0	2.24

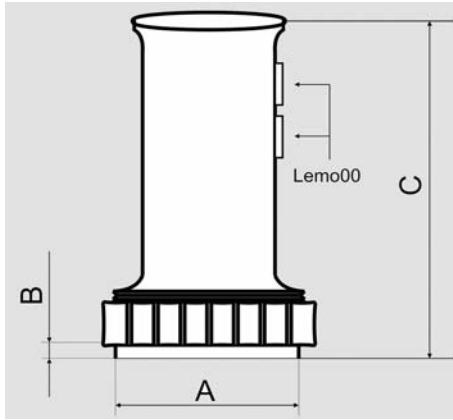
**General specifications**

Catalog number	Frequency, MHz	Element size		Type of case	Connector type	Connector position
		mm	in			
TSD2-20F*	2.0	∅ 20	∅ .750	Plated brass	Lemo00	Side
TSD4-20F	4.0	∅ 20	∅ .750	Plated brass	Lemo00	Side
TSD2-24F	2.0	6 x 20	.250 x .750	Plated brass	Lemo00	Side
TSD4-24F	4.0	6 x 20	.250 x .750	Plated brass	Lemo00	Side

\* material of the face transducer: F - flexible.

# CONTACT TRANSDUCERS

## Straight Beam Probes (double element)



### Case dimensions

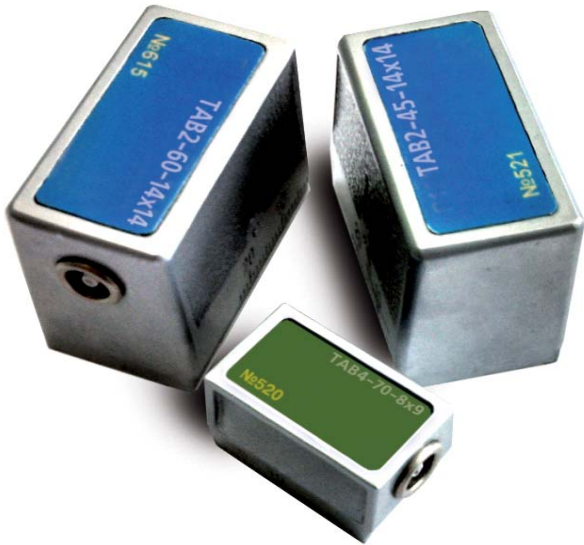
Element size		A,		B,		C,	
mm	in	mm	in	mm	in	mm	in
∅10	∅.375	13.2	.52	9.0	.35	50.4	1.98
∅12	∅.500	15.4	.60	9.0	.35	50.4	1.98
∅20	∅.750	24.0	.94	9.0	.35	59.0	2.32
7 x 18	.275 x .750	29.0	1.14	10.0	.40	66.0	2.60
6 x 20	.250 x .750	29.0	1.14	10.0	.40	66.0	2.60

### General specifications

Catalog Number	Frequency, MHz	Element size		Type of case	Connector type	Connector position
		mm	in			
TSD2-10	2.0	∅ 10	∅ .375	Plated brass	Lemo00	Side
TSD4-10	4.0	∅ 10	∅ .375	Plated brass	Lemo00	Side
TSD5-10	5.0	∅ 10	∅ .375	Plated brass	Lemo00	Side
TSD2-12	2.0	∅ 12	∅ .500	Plated brass	Lemo00	Side
TSD4-12	4.0	∅ 12	∅ .500	Plated brass	Lemo00	Side
TSD5-12	5.0	∅ 12	∅ .500	Plated brass	Lemo00	Side
TSD2-20	2.0	∅ 20	∅ .750	Plated brass	Lemo00	Side
TSD4-20	4.0	∅ 20	∅ .750	Plated brass	Lemo00	Side
TSD5-20	5.0	∅ 20	∅ .750	Plated brass	Lemo00	Side
TSD2-24	2.0	7 x 18	.275 x .750	Plated brass	Lemo00	Side
TSD4-24	4.0	6 x 20	.250 x .750	Plated brass	Lemo00	Side
TSD5-24	5.0	6 x 20	.250 x .750	Plated brass	Lemo00	Side

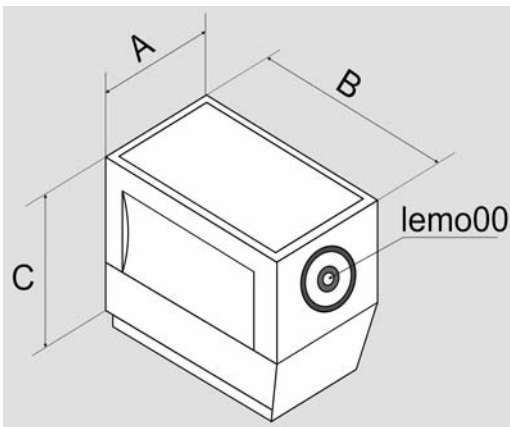
# CONTACT TRANSDUCERS

## Angle Beam Probes (single element)



### Case dimensions

Element size mm	A,		B,		C,	
	mm	in	mm	in	mm	in
8 x 9	16.5	.65	28.5	1.12	22.0	2.0
14 x 14	21.2	.83	37.5	1.47	30.7	1.2
22 x 22	31.6	1.24	56.0	2.2	44.0	1.73



### General specifications

Catalog number	Frequency, MHz	Refracted angle, °	Element size		Type of case	Connector type	Connector position
			mm	in			
TAB2-45-8x9	2.0	45	8 x 9	.315 x .350	Plated brass	Lemo00	Side
TAB2-60-8x9	2.0	60	8 x 9	.315 x .350	Plated brass	Lemo00	Side
TAB2-70-8x9	2.0	70	8 x 9	.315 x .350	Plated brass	Lemo00	Side
TAB4-45-8x9	4.0	45	8 x 9	.315 x .350	Plated brass	Lemo00	Side
TAB4-60-8x9	4.0	60	8 x 9	.315 x .350	Plated brass	Lemo00	Side
TAB4-70-8x9	4.0	70	8 x 9	.315 x .350	Plated brass	Lemo00	Side
TAB2-45-14x14	2.0	45	14 x 14	.550 x .550	Plated brass	Lemo00	Side
TAB2-60-14x14	2.0	60	14 x 14	.550 x .550	Plated brass	Lemo00	Side
TAB2-70-14x14	2.0	70	14 x 14	.550 x .550	Plated brass	Lemo00	Side
TAB4-45-14x14	4.0	45	14 x 14	.550 x .550	Plated brass	Lemo00	Side
TAB4-60-14x14	4.0	60	14 x 14	.550 x .550	Plated brass	Lemo00	Side
TAB4-70-14x14	4.0	70	14 x 14	.550 x .550	Plated brass	Lemo00	Side
TAB2-45-20x22	2.0	45	20 x 22	.860 x .860	Plated brass	Lemo00	Side
TAB2-60-20x22	2.0	60	20 x 22	.860 x .860	Plated brass	Lemo00	Side
TAB2-70-20x22	2.0	70	20 x 22	.860 x .860	Plated brass	Lemo00	Side
TAB4-45-20x22	4.0	45	20 x 22	.860 x .860	Plated brass	Lemo00	Side
TAB4-60-20x22	4.0	60	20 x 22	.860 x .860	Plated brass	Lemo00	Side
TAB4-70-20x22	4.0	70	20 x 22	.860 x .860	Plated brass	Lemo00	Side

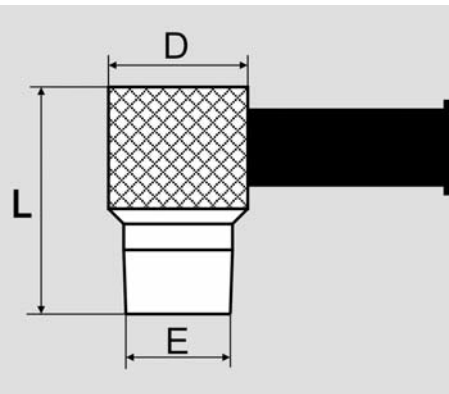


# CONTACT TRANSDUCERS

**Straight Beam Probes  
(dual element, integral  
cable transducers) for  
Thickness gauges**

## Case dimensions

Element size		D,		L,		E,	
mm	in	mm	in	mm	in	mm	in
3	.125	16	.60	26.0	1.0	10.0	.40
6	.250	16	.60	28.0	1.2	12.0	.50
8	.500	16	.60	28.0	1.2	15.5	.60

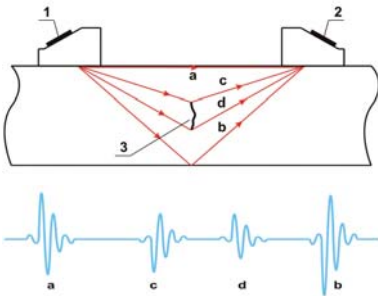


## General specifications

Catalog number	Frequency, MHz	Element size		Type of case	Connector type	Connector position
		mm	in			
TGI2.5-12-L*	2.5	3	.125	Stainless steel	Lemo00/BNC	cable
TGI5-12-B*	5.0	3	.125	Stainless steel	Lemo00/BNC	cable
TGI10-12	10.0	3	.125	Stainless steel	Lemo00/BNC	cable
TGI2-25	2.25	6	.250	Stainless steel	Lemo00/BNC	cable
TGI2.5-25	2.5	6	.250	Stainless steel	Lemo00/BNC	cable
TGI5-25	5.0	6	.250	Stainless steel	Lemo00/BNC	cable
TGI10-25	10.0	6	.250	Stainless steel	Lemo00/BNC	cable
TGI2-50	2.25	12	.500	Stainless steel	Lemo00/BNC	cable
TGI2.5-50	2.5	12	.500	Stainless steel	Lemo00/BNC	cable
TGI5-50	5.0	12	.500	Stainless steel	Lemo00/BNC	cable

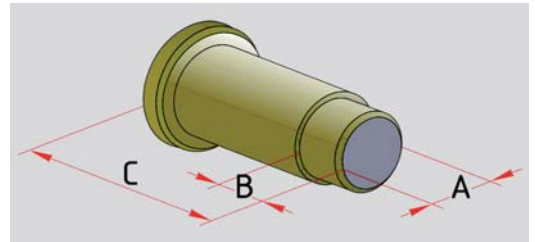
\*connector type: L - lemo00; B - BNC

# TOFD TRANSDUCERS AND WEDGES



- 1. Transmitter
- 2. Receiver
- 3. Internal crack

- a - lateral wave;
- b - back wall echo;
- c - diffracted signal from the top tip;
- d - diffracted signal from the bottom tip

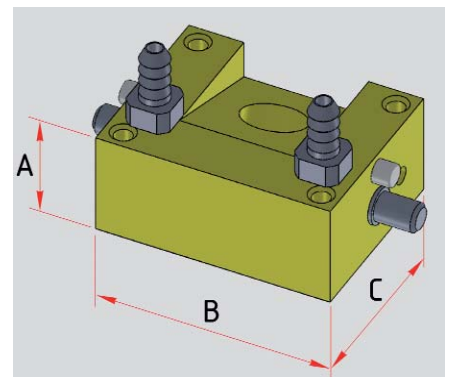


## TOFD transducers specification

Catalog number	Frequency, MHz	Element size		Object thickness,		A,		B,		C,	
		mm	in	mm	in	mm	in	mm	in	mm	in
TWS10-3-TOFD 3/8"	10	3	.125	10-15	.390-.600	10	.375	6.5	.256	28	1.1
TWS10-6-TOFD 3/8"	10	6	.250	15-35	.600 - 1.4	10	.375	6.5	.256	28	1.1
TWS5-6-TOFD 3/8"	5	6	.250	15-50	1.4 - 2.0	10	.375	6.5	.256	28	1.1
TWS5-12-TOFD M16	5	12	.500	50-100	2.0 - 4.0	16	.625	8	.315	33	1.3
TWS3-12-TOFD M16	3	12	.500	100-200	4.0 - 8.0	16	.625	8	.315	33	1.3
TWS2,5-12-TOFD M16	2.5	12	.500	200-300	8.0 - 6.0	16	.625	8	.315	33	1.3
TWS2,25-12-TOFD M16	2.25	12	.500	200-300	8.0 - 6.0	16	.625	8	.315	33	1.3
TWS3-8-TOFD M16	3.0	8	.325	100-200	4.0 - 8.0	16	.625	8	.315	33	1.3
TWS2,5-8-TOFD M16	2.5	8	.325	100-200	4.0 - 8.0	16	.625	8	.315	33	1.3
TWS2,25-8-TOFD M16	2.25	8	.325	100-200	4.0 - 8.0	16	.625	8	.315	33	1.3

## TOFD wedges specification

Catalog number	Refracted angle, °	A,		B,		C,	
		mm	in	mm	in	mm	in
WS45 L-3/8"-TOFD	45	15	.570	32	1.26	25	.984
WS50 L-3/8"-TOFD	50	15	.570	32	1.26	25	.984
WS60 L-3/8"-TOFD	60	15	.570	32	1.26	25	.984
WS70 L-3/8"-TOFD	70	15	.570	32	1.26	25	.984
WS45 L-M16-TOFD	45	15	.570	32	1.26	25	.984
WS50 L-M16-TOFD	50	15	.570	32	1.26	25	.984
WS60 L-M16-TOFD	60	15	.570	32	1.26	25	.984
WS70 L-M16-TOFD	70	15	.570	32	1.26	25	.984



## PURPOSE

The UTG-8 is a precision Ultrasonic thickness gauge. Based on the same operating principles as SONAR, the UTG-8 is capable of measuring the thickness of various materials with accuracy as high as  $\pm 0.001$  inches, or  $\pm 0.03$  millimeters. The principal advantage of ultrasonic measurement over traditional methods is that ultrasonic measurements can be performed with access to only one side of the material being measured.

# ULTRASONIC THICKNESS GAUGE UTG-8

## DISTINCTIVE FEATURES:

- Plastic case.
- Size \_\_\_\_\_ 125 W x 70 H x 35 D mm.  
This is a small-sized portable thickness gauge, which operates on three "AAA" batteries (alkaline) for 200 hours.
- Compact for transportation and operation.
- Warranty \_\_\_\_\_ 18 months.

## APPLICATION:

- Corrosion & Pitting, Tube & Pipe, Tanks, Boilers, Glass, Various Applications.



## UTG-8 SPECIFICATIONS

### PHYSICAL

- Weight \_\_\_\_\_ 176 g
- Size \_\_\_\_\_ 125 W x 70 H x 35 D mm
- Operating Temperature \_\_\_\_\_ 20 to 50 °C
- Case \_\_\_\_\_ Plastic
- Keypad \_\_\_\_\_ Sealed membrane, resistant to water and petroleum products.
- Power Source \_\_\_\_\_ Three "AAA" size, 1.5 volt alkaline or 1.2 volt NiCad cells.  
200 hours typical operating time on alkaline, 120 hours on NiCad.
- Display \_\_\_\_\_ FSNT/POSITIVE Liquid-Crystal-Display,  
size 30 mm (Height) x 25 mm (Width)

### MEASURING

- Range \_\_\_\_\_ 0.025 to 19.999 inches (0.6 to 500 mm)
- Resolution \_\_\_\_\_ 0.001 inch (0.01 millimeter)
- Accuracy \_\_\_\_\_  $\pm 0.001$  inch (0.01 millimeter),  
depends on probe material and conditions
- Sound Velocity Range \_\_\_\_\_ 0.0492 to 0.3930 in/ms  
(1250 to 10000 m/s)

**ULTRACON-SERVICE LLC**  
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Kiev, Ukraine, 04071  
Tel./Fax:+380 44 531-37-26(27)  
E-mail: office@ndt.com.ua



[www.ultracon-service.com.ua](http://www.ultracon-service.com.ua)

"VD3-81 Eddycon" flaw detector refers to the means of defects assessment and detection and is intended for the manual testing by eddy current technique for the presence of surface and subsurface defects such as discontinuities of material (cracks, laps, cissing, fine cracks, etc.).

## EDDY CURRENT FLAW DETECTOR VD3-81 EDDYCON SMALL-SIZED

### VD3-81 EDDYCON ADVANTAGES

- Possibility to suppress from the gap influence and inhomogeneity of electromagnetic properties of testing object.
- Storing of a great number of setups and testing results in the flaw detector memory.
- Specialty application-dependent software.
- Mode of two-way communication with PC via USB-port.
- Possibility of conditional assessment of defects length.
- LED and Sound flaw ALARM.
- Simplicity in operation due to the user-friendly interface.
- Small mass-dimensional indexes.

### SPECIFICATIONS AND SERVICE FUNCTIONS

- Possibility of defects detection with the depth \_\_\_\_\_ from 0.1 mm and width \_\_\_\_\_ from 0.002 mm.
- Operating frequencies adjustment \_\_\_\_\_ from 50 Hz to 12 MHz.
- Generator output voltage (double amplitude) \_\_\_\_\_ from 0.5 V to 6 V.
- Gain adjustment \_\_\_\_\_ from 0 to 30 dB.
- Preamplifier adjustment \_\_\_\_\_ from minus 6 to plus 40 dB.
- Changing the ECP signal phase (range of signal turn \_\_\_\_\_ from 0 to 360° with a step of 0.1°; 1°; 10°).
- Samples frequency \_\_\_\_\_ up to 8 kHz.
- Digital signal filtering (there are 5 filter types: Lowpass, Highpass, Bandpass, Differential, Averaging).
- Eddy current signal display:
  - a) complex plane (XY) - allows to detect defects among interferences by analyzing the signal waveform;
  - b) formation of a mix of two frequencies can be used for suppression of interfering factors and reduction of their influence on testing results  
(for mixing an operator can select one of 4 algorithms: summation, subtraction, summation with horizontal inversion, summation with vertical inversion).



### APPLICATION

- **AIRCRAFT** (testing of aeronautical engineering parts (wheel disks, cover-ring, turbine blades, multilayered constructions, holes of various kinds, etc.).)
- **OIL-AND-GAS** (testing of pipelines, turbine blades of gas-distributing station (GDS), pressure vessels, etc.).)
- **CHEMICAL** (testing of pipelines, industrial tanks, etc.).)
- **POWER** (testing of steam generator pipes by internal bobbin eddy current probes, (I/D ECP), collectors etc.).)
- **ENGINEERING** (testing of rods, wire, metal-wares, forming rolls, sheet metals etc.).)
- **RAIL TRANSPORT** (testing of rail components and railcar units (parts of wheelsets and axlebox unit, load trolley, refrigerated carriages and coaches, automatic coupler, etc.).)





# EDDY CURRENT FLAW DETECTOR EDDYCON C

## EDDYCON C ADVANTAGES

- Possibility to measure the conductivity of non-ferrous materials and paint thickness.
- Storage of a great number of setups and testing results in the flaw detector memory.
- Mode of two-way connection with PC via USB port (for inputting the information from the flaw detector memory into PC and possibility of this data printing as well as setups loading from PC into the flaw detector memory).
- Possibility of conditional defect depth and length evaluation.
- Removable storage battery.
- Time of continuous battery operation is 8 hours.
- Automatic LED and sound flaw alarm.
- Operation simplicity due to the intuitive interface.
- Small mass and dimension parameters.
- Access to main instrument functions with one button press.

## SPECIFICATIONS AND SERVICE FUNCTIONS

- Defects detection with depth \_\_\_\_\_ from 0.1 mm and width - from 0.002 mm.
- Operating frequencies adjustment \_\_\_\_\_ 10 Hz to 16 MHz.
- Generator output voltage (peak to peak) \_\_\_\_\_ from 0.5 V to 6 V.
- Gain adjustment \_\_\_\_\_ from 0 to 30 dB.
- Preamplifier adjustment \_\_\_\_\_ from minus 6 to plus 40 dB.
- Changing of ECP signal phase (the range of signal turn \_\_\_\_\_ from 0° to 360° with a step of 0.1°; 1°; 10°).
- Samples frequency \_\_\_\_\_ up to 10 kHz.
- Digital signal filtering (there are 5 filter types: Lowpass, Highpass, Bandpass, Differential, Averaging).
- Eddy current signal display:
  - a) complex plane (XY) - allows to detect defects among interferences by analyzing the signal waveform;
  - b) formation of a mix of two frequencies can be used for suppression of interfering factors and reduction of their influence on testing results (for mixing an operator can select one of 4 algorithms: summation, subtraction, summation with horizontal inversion, summation with vertical inversion).
- Two color schemes.
  1. "Light" - for operation with faint outer lighting;
  2. "Dark" - for operation with intense outer lighting to increase the display contrast.
- Time of flaw detector operation mode setup is up to 1 minute.
- "Persistence" (adjustable time for the screen clearing - 0.1 s and 0.5 s, 1 s, 2 s, 3 s, 4 s).
- Built-in clock and calendar.
- Screen backlight and screen brightness control.
- Congestion control of input channel.
- Battery life indicator.
- Possibility of eddy current rotary scanner connection for the testing of openings and special-purpose scanners.
- User-friendly multi-language interface.
- Time of continuous flaw detector operation with the fully charged battery \_\_\_\_\_ at least 8 hours.
- Total average life \_\_\_\_\_ at least 10 years.
- Flaw detector is powered from the built-in storage battery with rated voltage \_\_\_\_\_ of 12 V and capacity of 4500 mA-h.
- Weight of flaw detector with a storage battery \_\_\_\_\_ no more than 0.9 kg.
- Overall dimensions of the flaw detector are no more than 230 x 135 x 98 mm.

## EDDYCON C DISTINCTIVE FEATURES

- Color high-contrast TFT display.
- ALARM system: 4 three-color LEDs, sound alarm.
- Possibility of operation in two-frequency mode.
- Simplified procedure of instrument calibration on standard calibration blocks.
- Possibility of encoder and eddy current rotary scanner connection.
- Possibility of quick signal/noise ratio measurement.
- USB master.



CE MARKING  
EN 13860-1 Compliant

## PURPOSE

The EDDYCON D universal eddy current flaw detector is designed to solve a wide range of tasks of eddy current flaw detection in such industries as:

- **AIRCRAFT** - testing of aeronautical engineering parts (wheel disks, covering, turbine blades, multilayered constructions, holes of various kinds, etc.);
- **OIL-AND-GAS** - testing of pipelines, turbine blades of gas-distributing station (GDS), pressure vessels, etc.;
- **CHEMICAL** - testing of pipelines, industrial tanks, etc.;
- **POWER GENERATION** - testing of steam generator pipes by inner bobbin eddy current probes, collectors etc.;
- **MACHINE BUILDING** - testing of rods, wire, metalwares, forming rolls, sheet metals, etc.;
- **RAILWAY TRANSPORT** - testing of rail components and car units (parts of wheel pair and axlebox unit, load trolley, refrigerated carriages and coaches, automatic coupler, etc.).

The flaw detector is an eddy current high-performance channel that is connected to stationary PCs, portable laptops or tablets and using specially configured software or OEM applications creates high-performance systems for non-destructive testing.

## THE BEST INDUSTRIAL OEM SOLUTION FOR IN-LINE AND IN-SERVICE NDT SYSTEMS

# EDDY CURRENT MULTI-CHANNEL FLAW DETECTOR EDDYCON D

### THE FLAW DETECTOR ADVANTAGES AND DISTINCTIVE FEATURES

- High performance due to the flaw detector multi-channeling.
- Capability to combine several EC channels when creating the automated testing systems.
- High frequency measurement.
- Data transmission via Wi-Fi channel.
- Ethernet port for two-way communication with PC.
- Rotary scanners connection.
- Up to 2 encoders connection.
- Availability of multi-functional software for flaw detection of various test objects (testing the pipe body, rolled products, wheelsets, rails, bars, wires, etc).

### THE EDDYCON D MAIN SPECIFICATIONS

#### ENVIRONMENTAL SPECIFICATIONS

- Protection level ..... IP 64;
- Environment humidity ..... from -10° to +45 °C;
- Atmospheric pressure ..... from 84 to 106,7 kPa;
- Atmospheric pressure ..... (93 ± 3) % at 25 °C;
- Full average life of the flaw detector ..... not less than 10 years.

#### INPUTS/OUTPUTS

- Ethernet ..... available;
- Synchronous input ..... available;
- Headphones ..... available;
- Encoder input ..... available.

#### GENERATOR

- Output voltage (double amplitude) ..... 0,5; 1; 2; 4; 6 V, Peak-Peak;
- Frequency range ..... from 10 Hz to 16 MHz;
- Synchronization type ..... internal, from encoder, from rotary ECP.

#### RECEIVER

- Gain ..... from 0 to 70 dB with a step 1, 10 dB
- Added gain ..... from 0 to 30 dB
- Input signal ..... up to 0.5 V from Peak to Peak
- Digital filters ..... 3 digital filters: High-frequency, Low-frequency, Bandpass.
- Overall dimensions ..... not more than 293 x 37 x 141 mm;
- Weight ..... not more than 1 kg;
- Number of EC probes connected to one EC channel ..... up to 32;
- ECP connectors ..... Lemo 12, Lemo00;
- Power ..... 12 V DC power;
- Time for operating mode setup ..... up to 1 min;
- Warranty ..... 1 year.





## PURPOSE

By advance approval with the Customer our company manufactures and certifies calibration blocks for operating in all production sectors.

# ULTRASONIC AND EDDY CURRENT CALIBRATION BLOCKS

## BLOCKS FOR ULTRASONIC TESTING

- Ultrasonic calibration blocks V1 and V2 according to ISO 7963, B.S. 2704, DSTU 4002-2000.
- Enterprise calibration blocks (SOP) with the notch type reflectors for parameters setup of ultrasonic flaw detectors while welds testing according to SOU-NMPE40.1.17.302:2005, VSN 012-88, RD 22-205 and No. 23 SD-80, etc.

## BLOCKS FOR EDDY CURRENT TESTING

- **Calibration blocks for metric thread testing.**  
Intended for setting up the eddy current flaw detectors.
- **Calibration blocks for surface defects detection (of irregular shape).**
- **SOP2353.10**  
Intended for setting up the eddy current flaw detectors and for surface defects detection in aluminum alloys. It can be applied for testing the multilayer constructions in aviation.
- **KSOP2353.12**  
Intended for setting up the eddy current flaw detectors and subsurface defects detection in bolt and rivet holes while working with the eddy current rotary scanner. Reproduces the most frequently occurring defects, such as solid crack along the whole generatrix and also a crack developing from the hole corner.





## EDDY CURRENT PRODUCTION PROBES STANDARD COMPLIANT EN13860-2

№	ECP type	Sizes of working surface,		Operating frequency, dimensions, kHz	Overall dimensions, mm	Detected flaws
		in	mm			
1	SS1.5M05DA0	.200	∅ 5	500 - 2000	∅ 13 x 35	Surface defects in different conductive materials (e.g. aluminum alloys, ferromagnetic and austenitic steels.)
2	SS650K06DA0	.250	∅ 6	500 - 1500	∅ 13 x 35	
3	SS400K07DA0	.275	∅ 7	300 - 600	∅ 13 x 35	
4	SS300K08DA0	.325	∅ 8	200 - 400	∅ 13 x 35	
5	SS340K09DA0*	.350	∅ 9	250 - 400	∅ 13 x 35	
6	SS170K13DA0*	.525	∅ 13	100 - 250	∅ 13 x 35	
7	SS50K15DA0	.570	∅ 15	50 - 150	∅ 15 x 50	
8	SS10K33DA0	1.3	∅ 33	1 - 100	∅ 33 x 50	
9	SU450K3A6x8A0	.250 x .325	6 x 8	900 x 1700	∅ 12,5 x 130	Surface cracks in rectangular grooves of products made of ferromagnetic and austenitic steels, etc.
10	SU450K05DA0	.200	∅ 5	400 - 600	∅ 12,5 x 70	Surface cracks in aluminum alloys, ferromagnetic and austenitic steels, etc.
11	SU450K5A05DA0	.200	∅ 5	400 - 600	∅ 12,5 x 135	
12	SU1.8M3.5DS01	.140	∅ 3,5	1000 - 1900	∅ 9,6 x 55	Surface cracks in aluminum alloys, titanium alloys, etc.
13	SU1.8M3A3.5DS01	.140	∅ 3,5	400 - 600	∅ 9,6 x 160	
14	SU450K05DA4	.200	∅ 5	750 - 1100	∅ 15 x 170	Surface cracks, pores, corrosive damages in aluminum alloys, ferromagnetic and austenitic steels, etc.
15	SU300K08DA0	.325	∅ 8	100 - 450	∅ 35 x 150	
16	SU350K6x0.5DA1	.250 x .020	6 x 0,5	350 - 600	∅ 12 x 61	Testing for the presence of surface cracks in a metric thread with a step of 2 mm made on products of ferromagnetic material. Used with the SKV-MR-01 scanner.
17	SU350K6x0.5DA2	.250 x .020	6 x 0,5	350 - 600	∅ 12 x 61	Testing for the presence of cracks in a metric thread with a step of 4 mm made on products of ferromagnetic material. Used with the SKV-MR-02 scanner.
18	SU350K6x0.5DA3	.250 x .020	6 x 0,5	350 - 600	∅ 12 x 61	Testing for the presence of surface cracks in metric thread with a step of 6,35 mm made of ferromagnetic material. Used with the SKV-MR-03 scanner.
19	SU350K6x0.5DA4	.250 x .020	6 x 0,5	350 - 600	∅ 12 x 61	Testing for the presence of surface cracks in a metric thread with a step of 1,5 mm made on products made of ferromagnetic material. Used with the SKV-MR-04 scanner.
20	SU350K6x0.5DA5	.250 x .020	6 x 0,5	350 - 600	∅ 12 x 61	Testing for the presence of surface cracks in a metric thread with a step of 5,08 mm made on products of ferromagnetic material. Used with the SKV-MR-05 scanner.
21	RO1.7M5A*X*DFD0 from .125 ∅3.1 to ∅25.4			1000-3500	-	Rigid probe in a metallic housing. Detection of surface defects in holes of parts made of aluminum alloys, ferromagnetic and austenitic steels.
22	RO1.7M5A*X*DFD0 from .125 ∅3.1 to ∅25.4			1000-3500	-	Sliding probe in a plastic housing. Detection of surface defects in holes of parts made of aluminum alloys, ferromagnetic and austenitic steels.
23	SU30K16DD0	.625	∅ 16	30 - 200	∅ 50 x 55	Special-purpose probe for detection of surface cracks in fencing epees, made of austenitic steels.

\* - probes in protective case with the wearproof protector.

New types of probes can be developed according to the Customer's requirement specifications.

**UKRAINIAN  
SCIENTIFIC RESEARCH INSTITUTE  
FOR NON-DESTRUCTIVE TESTING**

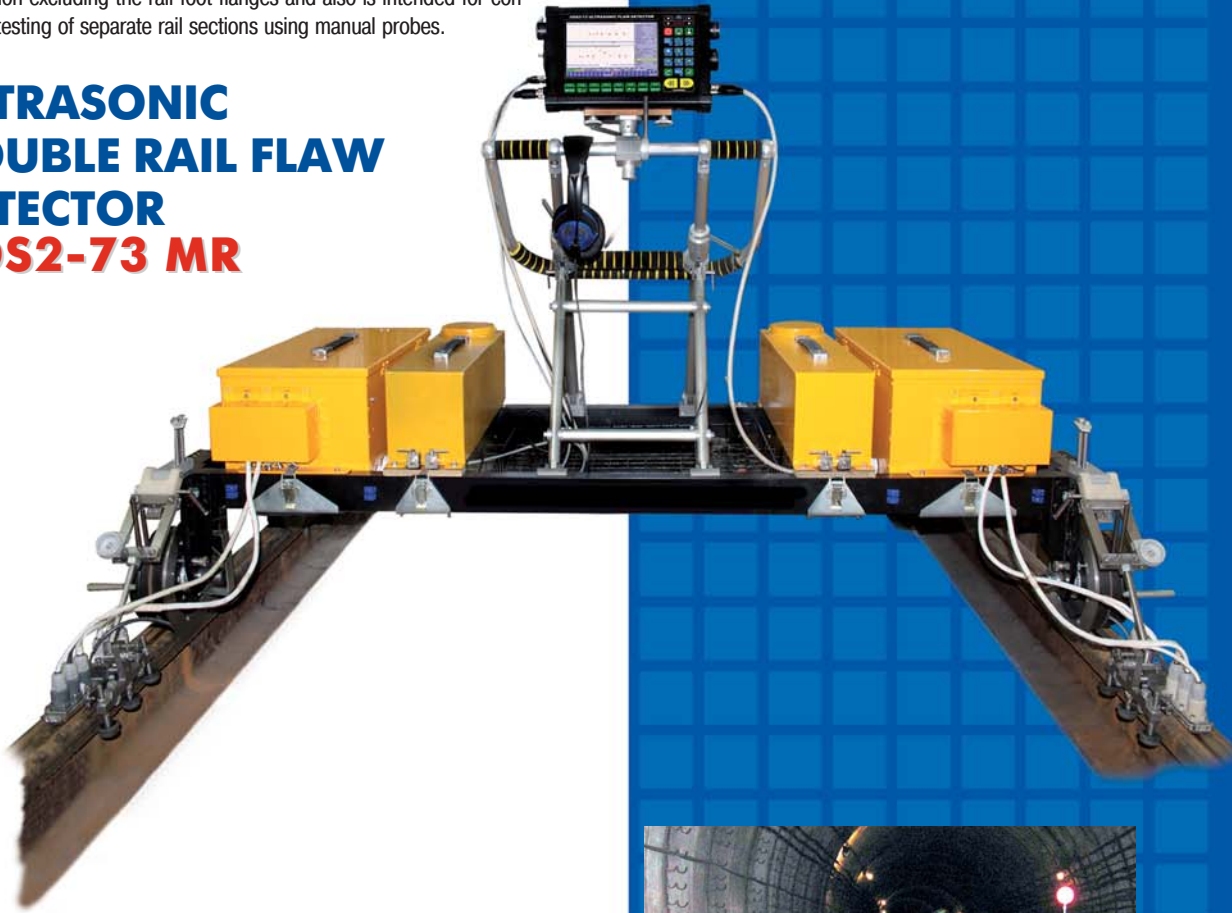
**8, Naberezhno-Lugova Str.,  
Kiev, Ukraine, 04071  
Tel./Fax: +380 44 531-37-26(27)  
E-mail: office@ndt.com.ua**



## PURPOSE

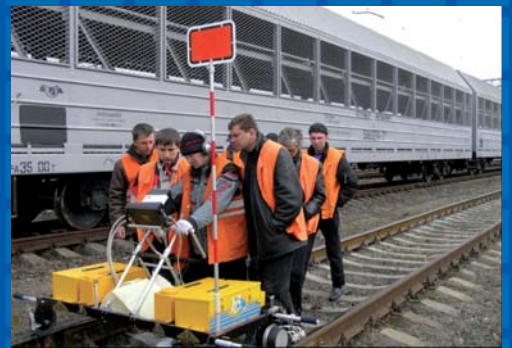
Double rail flaw detector is capable of testing both rails of the railway track at a time for defects detection along the running surface and entire rail section excluding the rail foot flanges and also is intended for conformity testing of separate rail sections using manual probes.

# ULTRASONIC DOUBLE RAIL FLAW DETECTOR UDS2-73 MR



## ADVANTAGES OF FLAW DETECTOR

- Rail complete sounding (excluding the foot flanges), due to the flaw detector multi-channeling.
- Built-in standard setups for channels operation.
- Defining the traveled distance and speed during the complete testing.
- Real-time display of testing results in B-scan mode (by 4 channels).
- Sounding and storing the information in every millimeter of traveled distance via all channels is provided in the flaw detector.
- Recording the testing results at different sensitivity levels.
- Registration of all testing results and advanced capabilities of data analysis.
- Application of the flaw detector with the base sounding scheme allows to detect all types of fatal defects, appearing while rail track maintenance.
- Assigning of GPS tags to testing results using GPS tracker.



EN 12668-1 Compliant

## UDS2-73MR MAIN SPECIFICATIONS

- Overall dimensions of flaw detector without a handle and with one ultrasonic unit \_\_\_\_\_ no more than (1040 x 1640 x 1130); in transport position \_\_\_\_\_ no more than (900 x 2060 x 600) mm;
- Equipped flaw detector weight \_\_\_\_\_ no more than 75 kg;
- Keypad \_\_\_\_\_ English, Russian;
- Languages \_\_\_\_\_ English, Russian;
- Number of multiplexer units (MUX) \_\_\_\_\_ 4;
- Number of ultrasonic channels \_\_\_\_\_ 28 channels;
- Connectors \_\_\_\_\_ BNC, RS-19;
- Data storage \_\_\_\_\_ Flash-card;
- Independent power source \_\_\_\_\_ NiMH storage battery with rated voltage 12 V and rated capacity 17 A·h;
- Operation time \_\_\_\_\_ 8 hours;
- Flaw detector consumed electric power \_\_\_\_\_ no more than 30 V·A;
- Time of flaw detector operation mode setup \_\_\_\_\_ no more than 15 sec.;
- Display type \_\_\_\_\_ 800 x 480 pixels;
- Screen dimensions (width, height, diagonal) \_\_\_\_\_ 155 x 95 mm, 180 mm (7,5 inch);
- Warranty \_\_\_\_\_ 1 year.

### INTERFACES

- USB \_\_\_\_\_ USB-A (host), USB-B (slave);
- Trigger \_\_\_\_\_ available;
- Headphones \_\_\_\_\_ available;
- Encoder output \_\_\_\_\_ 1 axis encoder line.

### MAIN METROLOGICAL PERFORMANCES

- Temporal instability of sensitivity of flaw detector reception path \_\_\_\_\_  $\pm 0.5$  dB for 8 hours of continuous operation;
- Protection level in operation \_\_\_\_\_ IP 64;
- Ambient temperature \_\_\_\_\_ from minus 40° to plus 50° C;
- Atmospheric pressure \_\_\_\_\_ from 84 to 106.7 kPa;
- Relative humidity \_\_\_\_\_ (93  $\pm$  3) % at a temperature of 25 °C;
- Full average flaw detector lifetime \_\_\_\_\_ no less than 10 years;
- Non-failure operation \_\_\_\_\_ no less than 0.9 for 2 000 h.

### PULSER

- Initial pulse type \_\_\_\_\_ short pulse of negative polarity;
- Initial pulse frequency - one channel mode \_\_\_\_\_ 250 Hz; complete mode \_\_\_\_\_ no more than 1000 Hz;
- Amplitude \_\_\_\_\_ 180 V;
- Duration \_\_\_\_\_ 60  $\pm$  10 ns;
- Rising edge duration \_\_\_\_\_ no more than 20 ns;
- Synchronization type \_\_\_\_\_ from the initial pulse, from the encoder.

### RECEIVER

- Gain \_\_\_\_\_ from 0 to 100 dB with a step of 0.1, 1, 10 dB;
- Input signal \_\_\_\_\_ no more than 2 V from peak to peak;
- Input resistance of reception path \_\_\_\_\_ no more than 300  $\Omega$ ;
- Digital filter \_\_\_\_\_ 1 standard digital filter \_\_\_\_\_ with a centre frequency of 2.5 MHz.

### SETUPS MODE

- Measurements \_\_\_\_\_ mm
- Testing range \_\_\_\_\_ from 0 to 1000 mm, with a step of 1, 10, 100 mm
- Velocity \_\_\_\_\_ from 2000 m/s to 8000 m/s, with a step of 1, 10, 100, 1000 m/s
- Probe zero \_\_\_\_\_ from 0 to 60  $\mu$ s, with a step of 0.1, 1  $\mu$ s.
- Range delay \_\_\_\_\_ from 0 to 1000  $\mu$ s, with a step of 1, 10, 100  $\mu$ s
- Refracted angle \_\_\_\_\_ from 0 to 90°, with a step of 10, 100

### ALARM system

- Sound ALARM systemsound - separate for each rail and common (for a group of channels) range of pulse frequency setup of sound indicator of alarm system is from 0.5 to 5 kHz, with setup resolution 100 Hz
- Light ALARMlight - separate for each rail and common (via all sounding channels); visual by the screen - separate for each rail and each channel.

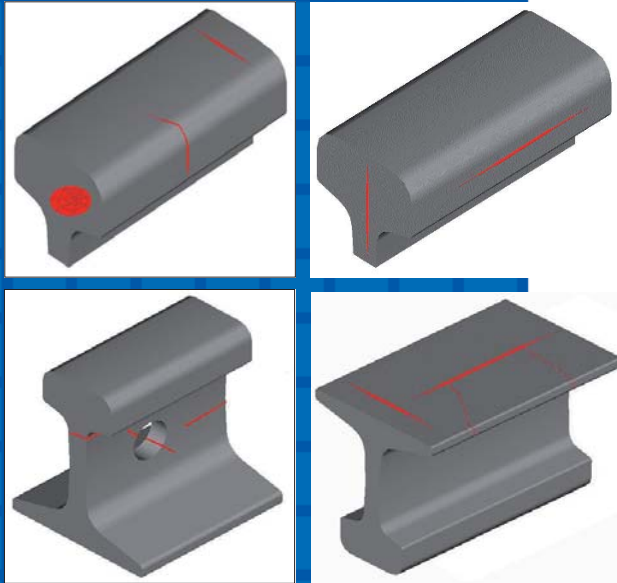


Fig. 1. Examples of defects types detected

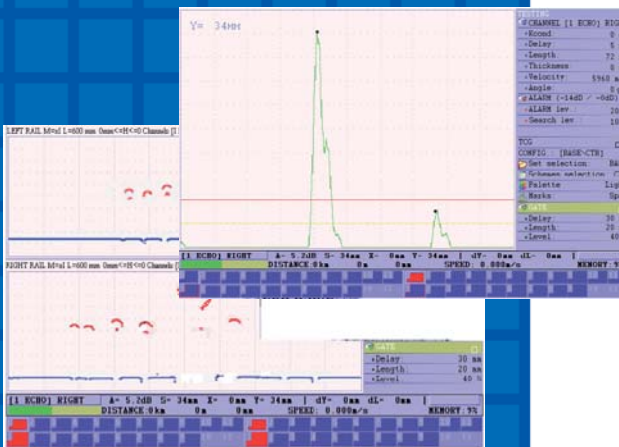


Fig. 2. Displaying the testing results in A-scan and B-scan modes on the flaw detector screen

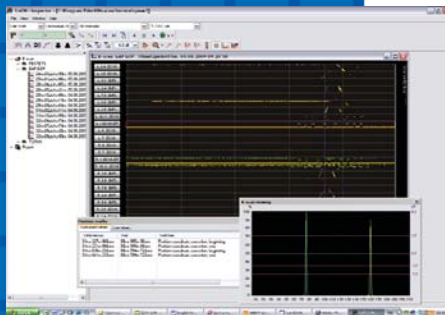


Fig. 3. Testing results analysis software

## PURPOSE

The UDS2-77 single rail flaw detector is capable of testing only one of the rails at a time for defects detection along the running surface and entire rail section excluding the rail foot flanges and also is intended for conformity testing of separate rail sections and welds using manual probes.

# ULTRASONIC SINGLE RAIL FLAW DETECTOR UDS2-77

## ADVANTAGES OF THE FLAW DETECTOR

- Rail complete sounding (excluding the foot flanges), due to the flaw detector multi-channeling.
- Built-in standard setups for channels operation.
- Defining the traveled distance and speed during the complete testing.
- Real-time display of testing results in B-scan mode (by 4 channels).
- Sounding and storing the information in every millimeter of traveled distance via all channels is provided in the flaw detector.
- Recording the testing results at different sensitivity levels.
- Registration of all testing results and advanced capabilities of data analysis.
- Application of the flaw detector with the base sounding scheme allows to detect all types of fatal defects, appearing while rail track maintenance.

## UDS2-77 MAIN SPECIFICATIONS

- Overall dimensions of flaw detector without a handle and with one ultrasonic unit and power unit \_\_\_\_\_ no more than (1040 x 1640 x 1130), \_\_\_\_\_ in transport position - no more than (900 x 2060 x 600) mm;
- Equipped flaw detector weight \_\_\_\_\_ no more than 21 kg;
- Keypad \_\_\_\_\_ English, Russian;
- Languages \_\_\_\_\_ English, Russian;
- Number of multiplexer units (MUX) \_\_\_\_\_ 4;
- Number of ultrasonic channels \_\_\_\_\_ 14 channels;
- Connectors \_\_\_\_\_ BNC, RS-19;
- Data storage \_\_\_\_\_ Flash-card;
- Independent power source \_\_\_\_\_ NiMH storage battery, \_\_\_\_\_ with rated voltage 12 V and rated capacity 17 A·h;
- Operation time \_\_\_\_\_ 8 hours;
- Flaw detector consumed electric power \_\_\_\_\_ no more than 30 V·A;
- Time of flaw detector operation mode setup \_\_\_\_\_ no more than 15 sec.;
- Display type \_\_\_\_\_ 800 x 480 pixels;
- Screen dimensions (width, height, diagonal) \_\_\_\_\_ 155 x 95 mm, 180 mm (7,5 inch);
- Warranty \_\_\_\_\_ 1 year.

## INTERFACES

- USB \_\_\_\_\_ USB-A (host), USB-B (slave);
- Trigger O \_\_\_\_\_ available;
- Headphones \_\_\_\_\_ available;
- Encoder output \_\_\_\_\_ 1 axis encoder line.

## MAIN METROLOGICAL PERFORMANCES

- Temporal instability of sensitivity of flaw detector reception path \_\_\_\_\_ 0.5 dB for 8 hours of continuous operation;
- Protection level in operation \_\_\_\_\_ IP 64;
- Ambient temperature \_\_\_\_\_ from minus 40° to plus 50° C;
- Atmospheric pressure \_\_\_\_\_ from 84 to 106.7 kPa;
- Relative humidity \_\_\_\_\_ (93 ± 3) % at a temperature of 25 °C;
- Full average flaw detector lifetime \_\_\_\_\_ no less than 10 years;
- Non-failure operation \_\_\_\_\_ no less than 0.9 for 2 000 h.

## PULSER

- Initial pulse type \_\_\_\_\_ short pulse of negative polarity;
- Initial pulse frequency one channel mode \_\_\_\_\_ 250 Hz, complete mode \_\_\_\_\_ no more than 1000 Hz;
- Amplitude \_\_\_\_\_ 180 V;
- Duration \_\_\_\_\_ 60 ± 10 ns;
- Rising edge duration \_\_\_\_\_ no more than 20 ns;
- Synchronization type \_\_\_\_\_ from the initial pulse, from the encoder.



## RECEIVER

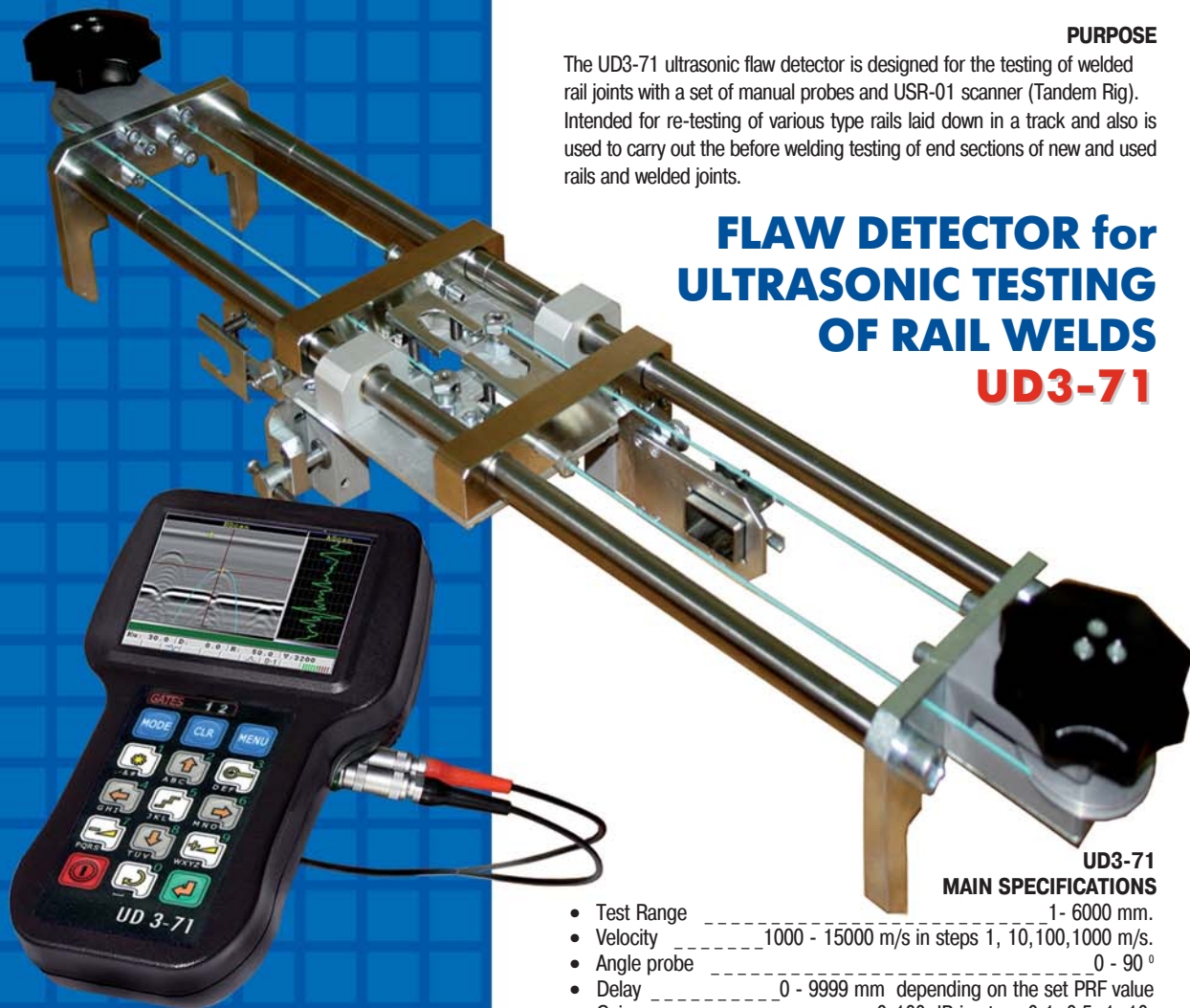
- Gain \_\_\_\_\_ from 0 to 100 dB with a step of 0.1, 1, 10 dB;
- Input signal \_\_\_\_\_ no more than 2 V from peak to peak;
- Input resistance of reception path \_\_\_\_\_ no more than 300 Ω;
- Digital filter \_\_\_\_\_ 1 standard digital filter, \_\_\_\_\_ with a centre frequency of 2.5 MHz;
- Rectifier \_\_\_\_\_ envelope.

## SETUPS MODE

- Measurements \_\_\_\_\_ mm;
- Testing range from 0 to 1000 mm, with a step of 1, 10, 100 mm;
- Velocity \_\_\_\_\_ from 2000 m/s to 8000 m/s, \_\_\_\_\_ with a step of 1, 10, 100, 1000 m/s;
- Probe zero \_\_\_\_\_ from 0 to 60 μs, with a step of 0.1, 1 μs;
- Range delay from 0 to 1000 μs, with a step of 1, 10, 100 μs;
- Refracted angle \_\_\_\_\_ from 0 to 90°, with a step of 100, 1000.

## ALARM system

- Sound ALARM system \_\_\_\_\_ sound - separate for each rail and common (for a group of channels) range of pulse frequency setup of sound indicator of alarm system is from 0.5 to 5 kHz, with setup resolution 100 Hz;
- Light ALARM \_\_\_\_\_ light - separate for each rail and common (via all sounding channels), \_\_\_\_\_ visual by the screen separate for each rail and each channel.



## PURPOSE

The UD3-71 ultrasonic flaw detector is designed for the testing of welded rail joints with a set of manual probes and USR-01 scanner (Tandem Rig). Intended for re-testing of various type rails laid down in a track and also is used to carry out the before welding testing of end sections of new and used rails and welded joints.

# FLAW DETECTOR for ULTRASONIC TESTING OF RAIL WELDS UD3-71

## UD3-71

### MAIN SPECIFICATIONS

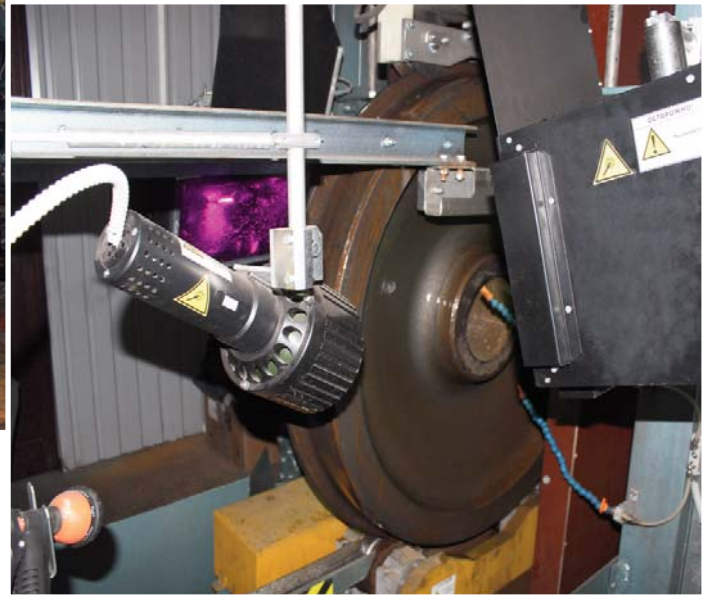
- Test Range \_\_\_\_\_ 1 - 6000 mm.
- Velocity \_\_\_\_\_ 1000 - 15000 m/s in steps 1, 10, 100, 1000 m/s.
- Angle probe \_\_\_\_\_ 0 - 90 °
- Delay \_\_\_\_\_ 0 - 9999 mm depending on the set PRF value
- Gain \_\_\_\_\_ 0-100 dB in steps 0.1, 0.5, 1, 10.
- Rejection \_\_\_\_\_ 0 - 80 % FSH.
- Rectification \_ Full wave, positive half wave, negative half wave, RF.
- Receiver bandwidth \_\_\_\_\_ 0.4 - 20 MHz (- 3 dB).
- Digital Frequency \_0.4, 1, 1.25, 2, 2.5, 3, 4, 5, 6, 7, 8, 10, 15 MHz.
- Test Modes \_\_\_\_\_ Pulse echo and transmit/receive.
- Connectors \_\_\_\_\_ BNC.
- Measurement Gates \_\_\_\_\_ 2 fully independent three-level gates for amplitude and TOFD measurement. \_\_\_\_\_ Special gate of Automatic gain control (AGC).
- Result display \_\_\_\_\_ A-scan, B-scan, simultaneous of up to 5 measured parameters selected by the user.
- DAC/TCG \_\_\_\_\_ number of points is 32. \_\_\_\_\_ Building TCG curve by DAC.
- DGS \_ automatic building of curve for different equivalent diameters calibration at calibration blocks and testing objects. \_\_\_\_\_ building DGS curve by DAC.
- Internal memory \_\_\_\_\_ Micro SD card 8 Gb is used for saving the testing setups and testing results.
- Tandem Technique \_\_\_\_\_ special Test-Rig for tandem technique is provided for the Rail weld joint examination.
- Probe \_\_\_\_\_ complete set of probes are provided for the Rail weld examination.
- Display dimension (W x H, diagonal) \_\_\_\_\_ 70 mm x 50 mm.
- Weight \_\_\_\_\_ 0.8 kg.
- Overall dimensions (H x W x L) \_\_\_\_\_ 200 x 100 x 110 mm.

### ADVANTAGES OF THE FLAW DETECTOR

- High brightness color TFT display.
- Internal memory (Micro SD card 8 Gb) for saving the testing setups and testing results.
- Special Test Rig for Tandem Testing Technique.
- Direct digital display of depth and distance of flaws.
- Compact and light weight (0.9 Kg).



# SERIES OF MAGNETIC PARTICLE TESTING SYSTEMS FOR RAILWAY WHEELS **UMPK-3 and UMPK-5**

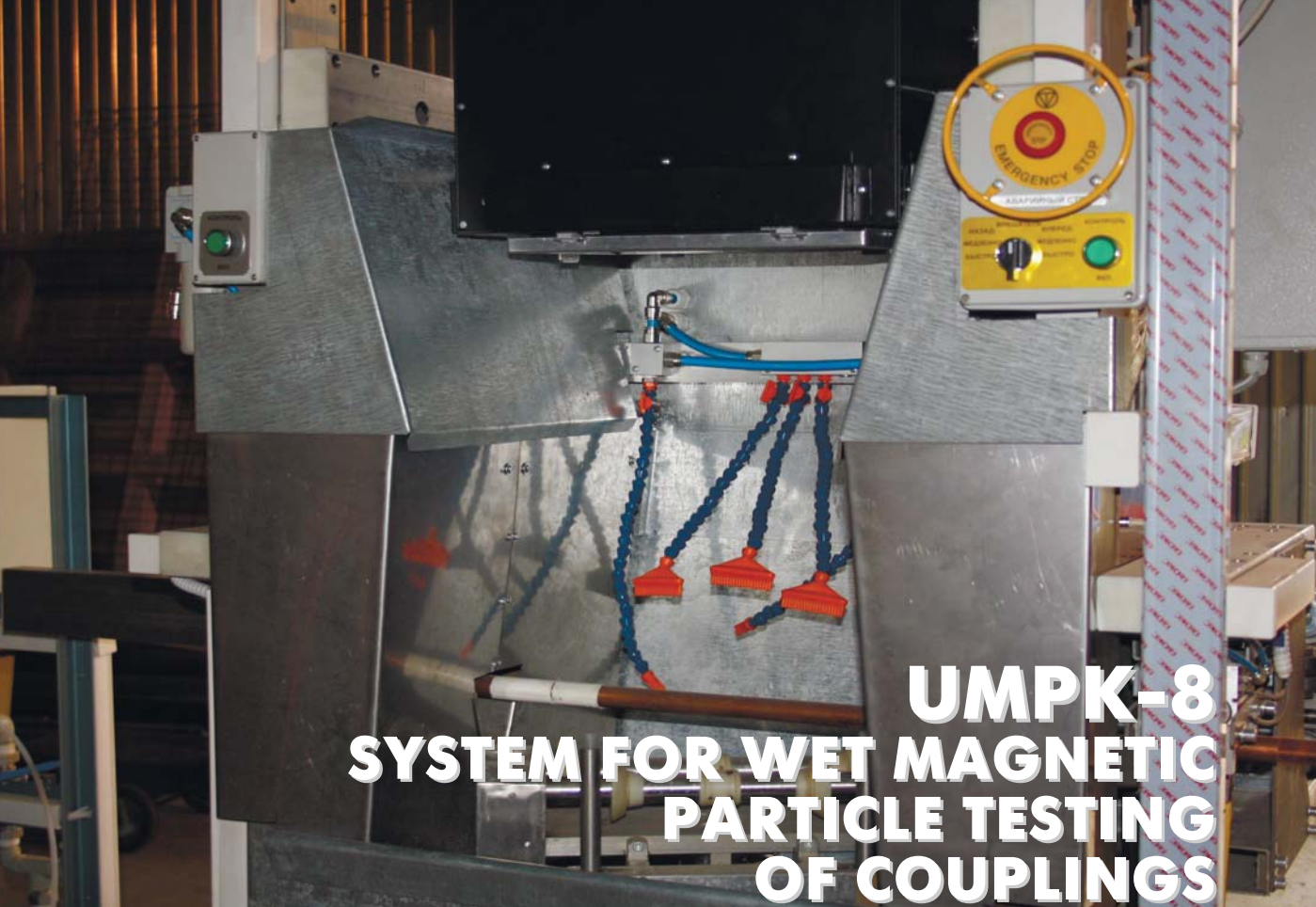


## MAIN SPECIFICATIONS

- The System resetting time for another dimension type \_\_\_\_\_ not more than 30 min.
- Time of wheel testing \_\_\_\_\_ not more than 1.2 min.
- Testing productivity \_\_\_\_\_ 50 wheels per hour.
- Number of operators \_\_\_\_\_ 4 operators.
- Intensity of light emitted by UV-lamps at a distance of 380 mm \_\_\_\_\_ not more than  $4000 \text{ mc W/cm}^2$ .
- Testing station illumination \_\_\_\_\_ not more than 10 lx.
- Strength of magnetic fields excited by magnetizers \_\_\_\_\_ not more than 30 A/cm.
- 100% registration of testing results.
- Record, storage of testing results and online display of information of the testing process in a form of a summary table on the Office PC.
- Output of testing results on electronic carrier and in a hard copy.
- Provided remote work with archives of saved data.
- Possibility of video-monitoring system integration for remote testing process control.

Provided implementation of magnetic particle testing in accordance with the following Regulatory Documentation:

- ISO 6933;
- DIN EN ISO - 9934 - 1,2,3;
- AAR M 107;
- AAR M 208.



# UMPK-8! SYSTEM FOR WET MAGNETIC PARTICLE TESTING OF COUPLINGS

## PURPOSE

The system is intended for testing the couplings for longitudinally and transversely oriented defects on outer and inner surfaces, in accordance with requirements of the following standards:

API Spec 5CT/ISO 11960,	GOST R 53366 (ISO 11960),
TU U 27.2-35537363-209,	TU U 27.2-05757883-197,
GOST 632,	TU U 27.2-8-94,
GOST 633,	TU 1308-206-0147016,
in compliance with ASTM E709,	DIN EN ISO 10893-5,
GOST 21105.	

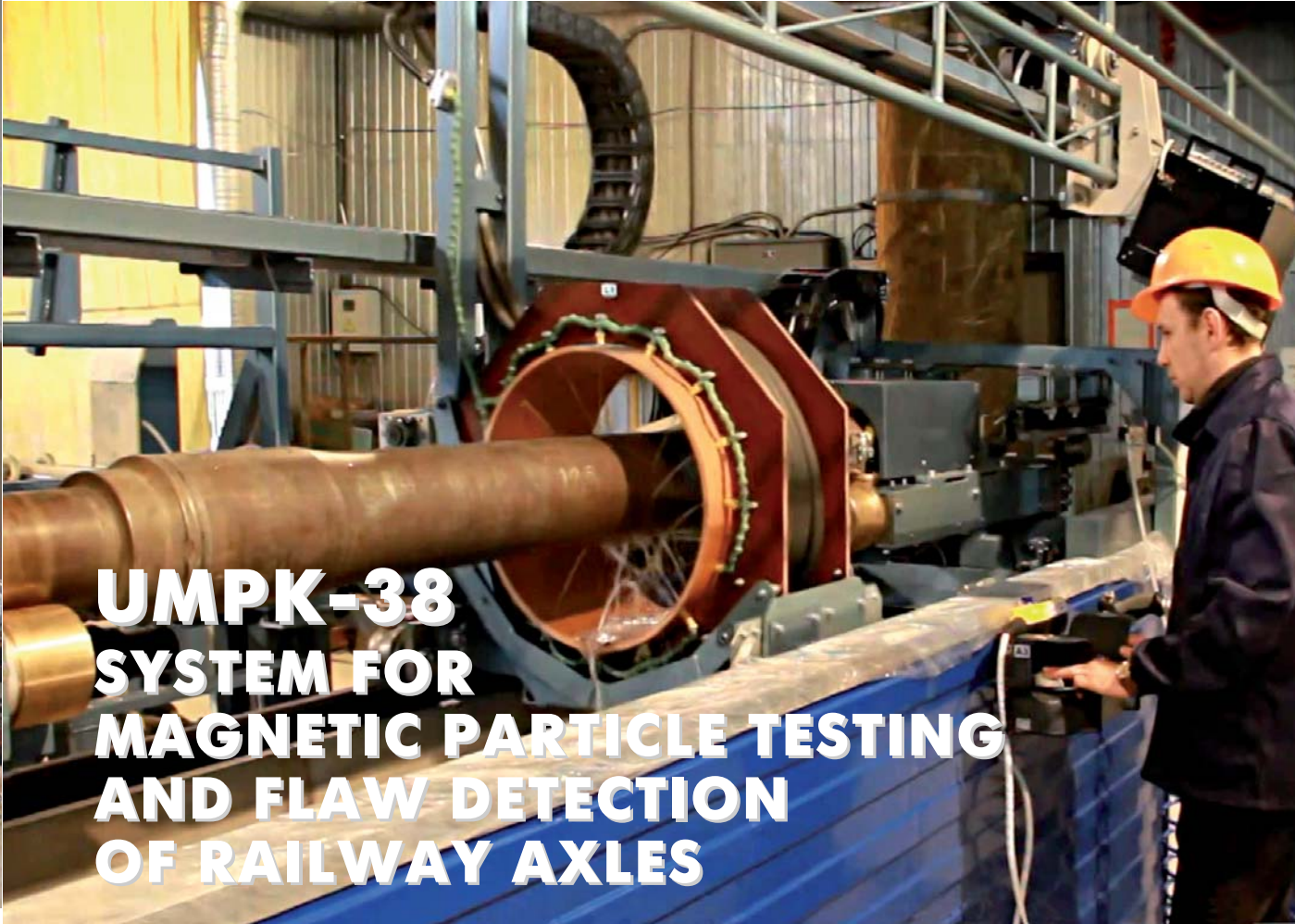
Couplings with the following dimensions are subject to testing:

- nominal outer diameter \_\_\_\_\_ 66.5 to 146 mm;
- nominal inner diameter \_\_\_\_\_ 41.9 mm;
- length \_\_\_\_\_ 100 to 300 mm.

## MAIN SPECIFICATIONS:

- The system ensures circular (transversal) and longitudinal magnetizing of couplings, using the applied field method.
- Circular magnetizing current \_\_\_\_\_ AC, 50 Hz, smoothly adjustable \_\_\_\_\_ from 0 up to 5000 A.
- Longitudinal magnetizing current \_\_\_\_\_ AC, 50 Hz, with smoothly adjustable magnetic flow \_\_\_\_ from 0 to 10000 ampereturns.
- Inspection table at the testing & magnetizing station is rotated with 90° step.
- UV-light intensity on a tested surface \_\_\_\_\_ no less than 1000 mcW/cm<sup>2</sup>.
- Testing station illumination \_\_\_\_\_ up to 20 lx.





# UMPK-38 SYSTEM FOR MAGNETIC PARTICLE TESTING AND FLAW DETECTION OF RAILWAY AXLES

## PURPOSE

The system is intended for magnetic particle testing of railway axles during their production (at axle finishing site), using the MT fluorescent method in accordance with GOST 21105. This stationary-type system can be either built into the process line of axle production site, or operated independently as a separate MT station.

The system ensures detection of surface defects such as cracks, laminations, overlaps, etc. of longitudinal or transverse orientation which can appear during products manufacturing ("B" reference sensitivity level as per GOST 21105), in accordance with DSTU GOST 31334-2009, GOST 31334-2007, EN 13261, RD 32.144-2000.

## MAIN SPECIFICATIONS

- Combined circular and polar magnetizing of test objects by continuous field method;
- Automatic demagnetizing of test objects by reducing the alternating field amplitude from its maximum value to near zero;
- System's capacity while testing the maximum assortment of flawless axles, including the mechanical equipment for automatic loading/unloading \_\_\_\_\_ no less than 15 axles/hour;
- Installed electric power \_\_\_\_\_ no more than 50 kVA.



# OS-3 SYSTEM OF ULTRASONIC AND EDDY CURRENT IN-LINE TESTING OF RAILWAY AXLES

## THE MAIN ADVANTAGE OF THIS SYSTEM IS THE APPLICATION OF TWO TESTING TECHNIQUES:

- Ultrasonic (UT) - intended for testing the metal structure of a railway axle and internal defects detection.
- Eddy current (ET) - intended for testing the radial surfaces and fillet (radius) transitions of the rail axle for the presence of surface defects (cracks, fine cracks) with the opening from 10  $\mu\text{m}$  and minimal depth 0.5 mm.

## PURPOSE

Os-3 system performs 100% ultrasonic testing according to RD 32.144-2000 and eddy current testing of railway axles with the further analyses of testing results and making a decision on axle rejection. The testing process is completely automated, including the axle loading and unloading from the testing site.

## MAIN SPECIFICATIONS

- Testing time, no more than \_\_\_\_\_ 6 min.
- In-line display of testing results.
- Saving the complete testing results in electronic format with the possibility of further review, analysis and creation of statistical reports.

## CONSIDERING THE CUSTOMER'S REQUIREMENTS THE SYSTEM CAN IMPLEMENT THE FOLLOWING FEATURES AS:

- Carrying out a complex 100% eddy current testing of axle surface.
- Changing the testing scheme by using additional probes and sounding schemes.
- Improving the couplant supply system.
- Introducing the customer's requirements into the System software.



# OS-4 SYSTEM OF ULTRASONIC IMMERSION TESTING OF RAILWAY AXLES

## PURPOSE

The "Os-4" System is intended for immersion ultrasonic testing of axles of railway wheelsets for the presence of internal discontinuities and changes in attenuation of UT vibrations in the axle material.

The System can be applied for ultrasonic testing of cylindrical parts of various profiles.

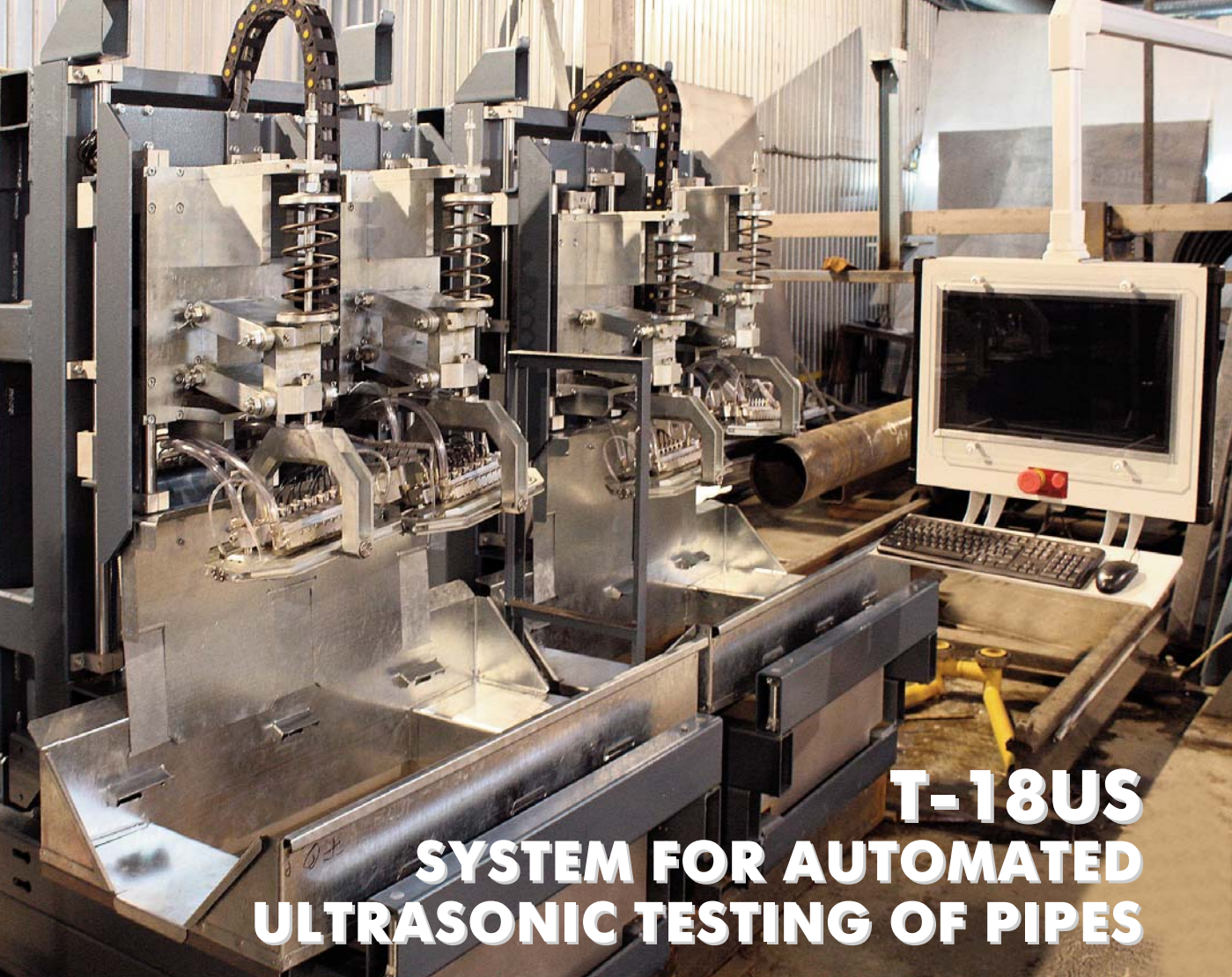
The System provides a 100% ultrasonic testing with the further analysis of testing results and making decision on axle rejection along with the output of full testing protocol to electronic carrier and in a hard copy. All UT results are stored on a hard drive in a form of B-scan via all channels on each tested axle with the possibility to archive them on electronic carrier.

## FUNCTIONAL CAPABILITIES

- Carrying out the full ultrasonic testing of axle structural parts in radial direction with the further analysis of testing results and making the decision on axle rejection.
- Presentation of axle testing results in a matrix: depth of occurrence, coordinates and conditional defects sizes.
- Recording, storing the received testing results.
- Output of testing results (testing report) in a hard copy and to electronic carrier with the possibility to archive them on a hard drive.
- Light and Sound flaw ALARM.

The System provides implementation of all compulsory and additional methods of acceptance ultrasonic testing of the tested axle, in accordance with:

- **EN13261.** Railway applications. Wheelsets and two-axle bogies. Axles. Product requirements
- **ISO 5948.** Railway rolling stock. Ultrasonic acceptance testing.
- **M101 - Association of American Railroads.** Heat-treated carbon steel axles. Specifications.
- **RD32.144-2000.** Non-destructive acceptance testing. Solid-rolled wheels, rims and wheelset axles of rolling stock. Specifications.
- **BN 918275 -** Wheelset shafts for rolling stock traction units and wagons.



# T-18US SYSTEM FOR AUTOMATED ULTRASONIC TESTING OF PIPES

## PURPOSE

The system is intended for automated ultrasonic testing of pipes (with outer diameter 168-426 mm, wall thickness 4 - 50 mm) during their rotary traveling in relation to scanners.

The system allows carrying out of ultrasonic immersion testing in accordance with such international standards as API Spec 5CT, API Spec 5L, EN 10210, EN 10246, DIN1629, DIN1630, GOST 17410, ASTM E 213, ISO 10893-1, ISO 10893-2, ISO 10893-8, ISO 10893-10, ISO 10893-12.

## FUNCTIONAL CAPABILITIES AND SPECIFICATIONS

- Untested areas at the pipe ends do not exceed \_\_\_\_\_200 mm;
- 100% recording and saving of test results to the database;
- Paint marking of defective sections.
- 4 mechano-acoustic immersion units;
- Number of ultrasonic transducers:
  - 20 - for pipe body inspection for the presence of laminations and wall thickness deviations;
  - 16 - for pipe body inspection for the presence of longitudinally oriented defects;
  - 16 - for pipe body inspection for the presence of transversely oriented defects;
- Nominal frequency of ultrasonic transducers \_\_\_\_\_2.25-5 MHz;
- Number of ultrasonic channels for data acquisition and processing \_\_6.



# T-18, T-18VT SYSTEM OF AUTOMATED NON-DESTRUCTIVE TESTING OF PIPE'S BODY

## PURPOSE

The System is intended for non-destructive testing of pipes (with the outer diameter from 140 to 377 mm, wall's thickness - from 4 to 30 mm) during drive linear motion along the flaw detection roller bed.

The System provides detection of defects in accordance with the requirements of the following standards: API Spec 5L, API Spec 5CT, EN 102246-3, EN 10246-7, acceptance class U2, EN 10246-14, acceptance class U2, DIN 1629, DIN 1630, DIN 17175, ISO.

## FUNCTIONAL CAPABILITIES AND SPECIFICATIONS

- Performance of complex ultrasonic and eddy current testing of pipe's body.
- Length of not inspected pipe's ends does not exceed 300 mm.
- Max. scanning step is not less than 30 pipes per hour.
- Marking the fact of testing performance and a separate marking of coordinates of defected areas.
- Sound and light Alarm (automatic defects Alarm).
- 100% registration of testing results.

## UT SPECIFICATIONS

- Four immersion tanks.
- Number of ultrasonic channels.
  - > 20 - for the pipe's body testing for delaminations and for carrying out of thickness gauging.
  - > 10 - for the pipe's body testing for longitudinal oriented defects.
  - > 10 - for the testing of pipe's body for transverse oriented defects.
- Nominal UT frequencies: 2,5 and 7 MHz.

## ET SPECIFICATIONS

- Scanner with surface ECPs consists of:
  - 18 surface ECPs;
  - ECP are set into protective wearproof cases;
  - each ECP has independent mechanical suspension providing stable gap between the ECP and pipe's body.
- Encircling ECP unit:
  - consists of magnetizing device and of encircling ECP with centering hubs;
  - is set with probes allowing to carry out pipes testing with clearly specified range of diameters;
  - equipped with mechanical positioning assembly for ECP centering relative to the testing pipe.



# SNK "YUG" SYSTEM FOR AUTOMATED ULTRASONIC IN-LINE TESTING OF WHEELS AND TYRES

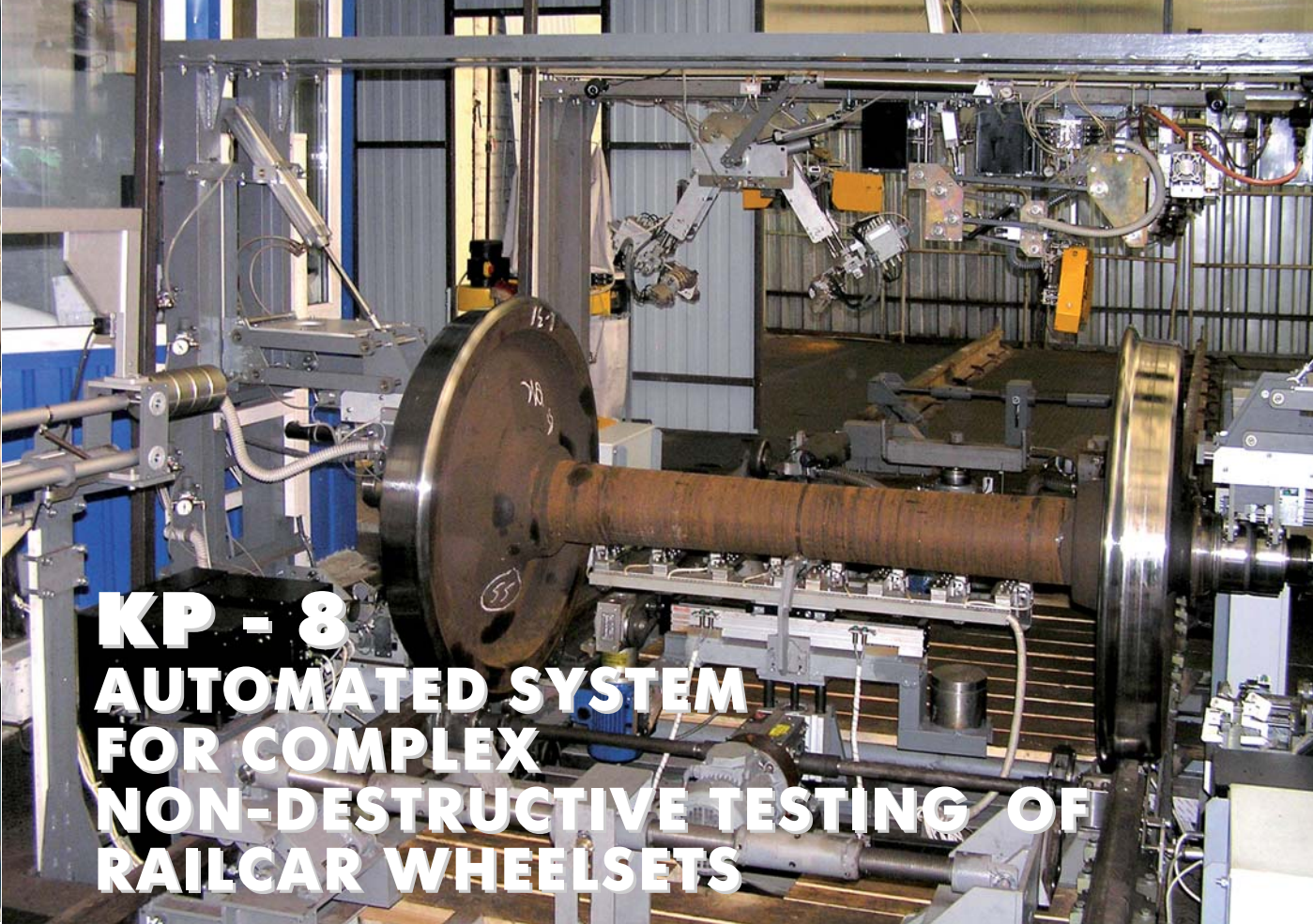
## PURPOSE

The system provides for inspection of wheel rims in axial and radial directions, along with additional testing with 45° probes (according to the requirements listed in Appendix H to EN 13262), as well as wheel disks and hubs – in two opposite directions by UT technique, visualizing the inspection process and verifying its results for conformity to the standard.

The system also assesses the wheels' compliance with GOST 10791, EN 13262 and AAR M 107/208 code.

## MAIN SPECIFICATIONS

- Wheel diameter \_\_\_\_\_ 700-1350 mm;
- Rim width \_\_\_\_\_ 80-160 mm;
- Rim thickness \_\_\_\_\_ 35-150 mm;
- Maximum wheel weight \_\_\_\_\_ 1500 kg;
- Probe frequency \_\_\_\_\_ 2 to 5 MHz;
- Number of ultrasonic channels \_\_\_\_\_ 14;
- Maximum pulse repetition frequency \_\_\_\_\_ 2000 Hz;
- System capacity,  
including the wheel loading/unloading \_\_\_\_\_ 10 - 25 wheels/hour;
- Involute scan step \_\_\_\_\_ adjustable from 1 to 8 mm;
- Defect depth measurement accuracy \_\_\_\_\_ no more than  $\pm 3$  mm;
- Accuracy of defects mutual disposition  
estimate along the scan path \_\_\_\_\_ no more than  $\pm 15$  mm;
- Minimum detectable reflector \_\_\_\_\_ 1 mm.



# KP - 8 AUTOMATED SYSTEM FOR COMPLEX NON-DESTRUCTIVE TESTING OF RAILCAR WHEELSETS

## PURPOSE


The System is intended for automated non-destructive testing of wheelsets of railway freight cars by ultrasonic and eddy current techniques and provides 100% testing and detection of internal and surface defects.

## MAIN SPECIFICATIONS

- Number of ultrasonic and EMA channels for:
  - solid-rolled wheel testing ..... 24;
  - wheelset axle testing ..... 13.
- Number of eddy current channels for:
  - testing the side surfaces of a wheel rim ..... 16;
  - rolling surface testing ..... 6;
  - testing the pre-rim area of a wheel disk ..... 8;
  - axle webs and wheel seat testing ..... 14;
  - axle middle part testing ..... 8;
  - flange testing ..... 9;
  - testing the bearing inner races of axlebox unit ..... 10.
- Rated frequency value:
  - ultrasonic waves, MHz ..... 0.25; 0.4; 2.5 and 5.
- Values of probe angles ..... from 0 to 90°.

## THE SYSTEM PERFORMS THE FOLLOWING SERVICE FUNCTIONS

- Recording and storing the testing results.
- Output of testing results (testing report) on electronic carrier and in a hard copy.
- The System assures the testing efficiency of not less than 10 wheelsets per hour as soon as they are continuously loaded to the testing site and are flaw-free.
- Automated complex of non-destructive testing of elements of railcar wheelsets, such as RU1-957 and RU1Sh-957.
- Rolling circle diameter:
  - no more than 964 mm new wheels;
  - not less than 850 mm for maximally worn-out wheels.



# PSH-11 SYSTEM OF AUTOMATED ULTRASONIC TESTING OF LONGITUDINAL WELDED PIPES

- The system is incorporated in the customer's manufacturing line.
- The inspection process is completely automated.
- Number of ultrasonic channels:
  - 4 for the testing joints for longitudinal oriented defects;
  - 1(2) for carrying out of thickness gauging in heat affect zone of pipe.
- Nominal UT frequencies: 4,0 and 10,0 MHz.

## PURPOSE

The System is intended for carrying out automated ultrasonic testing of welded joints and heat affected zone of tubes with diameter from 60 to 168 mm and wall thickness from 3 to 10 mm for the presence of internal defects such as longitudinally oriented cracks in the area of 20 mm from the weld line along with the measurement of a weld line profile.

Carrying out automated ultrasonic testing according to the Regulatory Documentation:

- API 5 CT. Specification for casing and tubing. Eighth edition.
- API 5 Spec 5 L. Specification for Line Pipe. Forty - forth edition.

## COMPLIANCE WITH THE REGULATORY DOCUMENTATION API SPEC 5L, API SPEC 5CT

The System assures detection of defects that are equivalent to the reflectivity of artificial defects - grooves with the depth of 5% from the wall thickness, but no less than 0.3 mm, width of 1 mm and length of 50 mm in a base metal, parallel to the weld at both sides of a weld edge at outer and inner surface of a tube wall.



The Personnel Certification Body in the field of non-destructive testing of technical objects of railway transport was founded in 2005 on the base of Ukrainian Scientific Research Institute for Non-Destructive Testing.

Certification of NDT personnel according to the requirements of ISO 9712:2012 and ISO/IEC 17024:2012 standard is carried out on the basis of Accreditation Certificate No. 60012 dated January 14, 2014 issued by National Accreditation Agency of Ukraine.

## PERSONNEL CERTIFICATION BODY in the field of non-destructive testing UkrSRINDT

PCB "UkrSRINDT" assists to ensure an independent and impartial assessment of the personnel competence to build the trust and recognition with our customers and meet their needs in improvement of personnel qualification in accordance with the requirements of ISO 9712:2012 and ISO/IEC 17024:2012 standards.

Certification of specialists on NDT for I, II and III qualification levels are carried out in accordance with the requirements of ISO 9712: 2012 on the following NDT methods:

- EDDY CURRENT (ET);
- MAGNETIC PARTICLE (MT);
- PENETRANT (PT);
- ULTRASONIC (UT);
- VISUAL (VT);
- RADIOGRAPHIC (RT);
- ACOUSTIC EMISSION (AT).

### SECTORS BY THE PRODUCTION TECHNOLOGY:

1. Castings (c)
2. Forged pieces (f);
3. Welded items (w);
4. Pipes (t);
5. Rolled metal (wp);
- 5CM.Composite materials.

### INDUSTRIAL SECTORS:

6. Metalware manufacture (different combinations c, f, w, t, wp);
7. Field inspection (different combinations c, f, w, t, wp);
8. Railway transport and products for it (combinations f, wp or other sectors by the production technology).

We are open for our Clients and ready to present the possibility to get acquainted with our activity, with our requirements and Quality Control System.





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**MRA Schedule 2**  
Note: Registrations shown past the published expiry date may be in progress of renewal. Contact the Secretary of the ICNDT Certification Committee for further information.

NDT PCB	Accreditation of Conformity with Standards	Date of registration	Expiry of registration
Australian Institute for Non-destructive Testing (AINTDT)	AS/NZS 2984 Accreditation System of Australia and New Zealand	1 May 2014	30 April 2017
Inspection Services of (France)	FNAS - French Accreditation Service	28 February 2014	26 May 2017
United Overseas Technology	Public Centre for Accreditation	27 February 2014	27 February 2017
Certification Body UDT-CERT (France)			



# PCB "UkrSRINDT" received worldwide recognition

European Federation for non-destructive testing EFNDT recognized Personnel Certification Body in the field of non-destructive testing PCB "UkrSRINDT" as European Independent Personnel Certification Body and approved it until January 13, 2017.

PCB "UkrSRINDT" is registered under the ICNDT Multilateral Recognition Agreement (MRA) on mutual recognition of certificates of NDT specialists, issued in accordance with the standards ISO/IEC 17024:2012 and ISO 9712:2012. Certificates issued by PCB "UkrSRINDT" are recognized by the signatories to the ICNDT MRA.

PCB 'UkrSRINDT' assists to ensure an independent and impartial estimation of personnel competence to build trust and recognition with our customers and meet their needs in approval of personnel qualification in the field of voluntary certification in accordance with the requirements of standards ISO 9712:2012 and EN 4179:2009

Everyone who wants to get qualification level, recognized in European countries is invited for cooperation.

**OUR MOTTO:**  
**QUALIFICATIVE PERSONNEL**  
**IS A PLEDGE OF QUALITY!**

Information on PCB "UkrSRINDT" and provided services can be reached from the web-site

[www.ospndt.com](http://www.ospndt.com)



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