

## ***ANNEX II + III: TECHNICAL SPECIFICATIONS + TECHNICAL OFFER***

**Contract title: Supply of Equipment Necessary for Improving of Conformity Assessment (CA) Services in the Republic of Serbia**

**1 /20**

### **LOT 5: EQUIPMENT FOR DETERMINATION OF PHYSICAL AND MECHANICAL PROPERTIES OF METALLIC MATERIALS/PRODUCTS AND OTHER PRODUCTS**

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**Columns 1-2 should be completed by the Contracting Authority**

**Columns 3-4 should be completed by the tenderer**

**Column 5 is reserved for the evaluation committee**

Annex III - the Contractor's technical offer

The tenderers are requested to complete the template on the next pages:

- Column 2 is completed by the Contracting Authority shows the required specifications (not to be modified by the tenderer);
- Column 3 is to be filled in by the tenderer and must detail what is offered (for example the words “compliant” or “yes” are not sufficient);
- Column 4 allows the tenderer to make comments on its proposed supply and to make eventual references to the documentation.

The eventual documentation supplied should clearly indicate (highlight, mark) the models offered and the options included, if any, so that the evaluators can see the exact configuration. Offers that do not permit to identify precisely the models and the specifications may be rejected by the evaluation committee.

The offer must be clear enough to allow the evaluators to make an easy comparison between the requested specifications and the offered specifications.

**Unless otherwise specified, the requirements in these Technical Specifications are presented as a minimum standard which the offered goods must meet.**

Unless otherwise stated, the following requirements shall also apply:

#### **A - Documentation**

Upon delivery of the goods a technical documentation for equipment (such as instruction manual for the use, maintenance, calibration, etc.), in English shall be provided, unless otherwise stipulated by Serbian technical regulations. If available, an additional manual in the Serbian language would be welcomed.

#### **B – Compliance to safety rules and regulations**

When submitting a tender, the tenderer must state expressly that all of the proposed equipment meet the safety requirements of the applicable rules and regulations in force in the Republic of Serbia. Upon delivery, the tendered equipment shall include proof of compliance.

**C - Certificate of calibration**

The Contractor shall deliver the equipment with the certificates of calibration for the equipment contributing to the uncertainty of the final test result for which they are intended to be used. The certificates of calibration should be issued by an accredited calibration laboratory, unless otherwise specified.

**D – Installation**

The Contractor shall install the equipment in the premises of the user and demonstrate after the installation of the equipment that it is capable of performing the functions required of it.

**E - Training**

When applicable, the Contractor shall provide on-the-job training to ensure the correct operation and maintenance of the equipment, at the time of installation, with additional training, to be provided by the Contractor within the following 6-month period. Tenderer shall submit training programme. The length of the training shall be adequate to the technical characteristics and maintenance requirements of the equipment supplied and shall allow the final user to properly handle the instrument(s). The training material must be provided on minimum 1 (one) electronic media and in minimum 1 (one) hard copy per trainee. The training should be in Serbian language (or interpretation must be provided by the supplier). The performance of the equipment against the required technical specifications shall be verified as part of the training.

**F – Warranty**

The Contractor shall provide a warranty for the equipment supplied in line with the Special Conditions. This warranty shall remain valid for one year after provisional acceptance.

**G - Commercial Warranty**

Commercial warranty must remain valid for two years (after the end of one year standard warranty) in accordance with the conditions laid down in Article 32 of the Special and General Conditions. Tenderer must provide a detailed description of the organisation of the proposed service.

**LOT 5: EQUIPMENT FOR DETERMINATION OF PHYSICAL AND MECHANICAL PROPERTIES OF METALLIC MATERIALS/PRODUCTS  
AND OTHER PRODUCTS**

1. Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
1	<b>UNIVERSAL TESTING MACHINE FOR TENSILE, COMPRESSION, FLEXURE AND COMPONENT TESTING OF METALLIC MATERIALS, AND TESTING OF PLASTIC MATERIALS</b>  QUANTITY: 1			
	<b>Manufacturers name:</b>			
	<b>Product model:</b>			
	The equipment is able to perform tests according to the following standards: EN ISO 6892-1:2009 Metallic materials - Tensile testing - Part 1: Method of test at room temperature EN ISO 6892-2:2011 Metallic materials - Tensile testing - Part 2: Method of test at elevated temperature EN ISO 7438:2005 Metallic materials - Bend test EN ISO 5173:2010 + A1:2011 Destructive tests on welds in metallic materials - Bend tests - EN ISO 8491:2004 Metallic materials - Tube (in full section) - Bend test EN ISO 8493:2004 Metallic materials - Tube - Drift-expanding test EN ISO 8495:2013 Metallic materials - Tube - Ring-expanding test.			

	<p>EN 12814-1:1999 + AC:2003 Testing of welded joints of thermoplastics semi-finished products - Part 1: Bend test.</p> <p>EN 12814:2000-2 Testing of welded joints of thermoplastics semi-finished products - Part 2: Tensile test.</p> <p>The units of this combined test equipment shall be compatible. Data acquisition from extensometers, furnace and testing machine all to be integrated into same PC and software.</p> <p><b>UNIVERSAL TESTING MACHINE</b></p> <p>Test system for tensile, compression, flexure and component testing</p> <p>Digital measurement and control electronics</p> <p>Modular system structure for a wide range of applications</p> <p>Nominal force 250 kN, Load cell 250 kN, class 0,5 starting from 5 kN</p> <p>Capable of test speed 450 mm/min</p> <p>Data processing system with computer and printer, software for material testing to be included.</p> <p><b>EXTENSOMETER</b></p> <p>Universal Macro extensometer, accuracy class 0.5, resolution 0.15 µm</p> <p>Set of sensor arms, drive unit actuating closing and opening sensor arms and to set gauge length.</p>			
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	<p>For use in tensile, compression, flexure and cyclic tests to determine standard materials characteristic values</p> <p>Measurement up to specimen break enabled by rotatable knife-edges with appropriate safety devices</p> <p>Signal to be interfaced to the data processing system</p> <p><b>FURNACE</b></p> <p>Furnace to work with the testing machine for determination of elastic behaviour, tensile strength and yield strength of materials at elevated temperature in air</p> <p>Minimal temperature: 200 °C Maximum temperature: 900 °C</p> <p>Heating rate: 20 K/min <math>\pm</math> 2 K/min</p> <p>Inside diameter: approximately 100 mm, Heated length: approximately 300 mm, Diameter of top and bottom ports: approximately 50 mm</p> <p>Temperature stability (with clamped specimen): <math>\pm</math> 5 K</p> <p>Thermocouples compatible with the furnace</p> <p>Control unit for high temperature furnace Temperature tolerance at the specimen at a length of 100 mm <math>\pm</math>2 K, Temperature constancy at the specimen: <math>\pm</math>2 K</p> <p>Holding arm to hold the furnace on the testing machine</p>			
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	<p><b>HIGH TEMPERATURE EXTENSOMETER</b>  High-temperature extensometer, for use in the furnace</p> <p>Determination of the elongation of the specimen, for use in air at high temperature</p> <p>The axial determination of the elongation to be caused by direct setting of the extensometer on the specimen</p> <p>accuracy class 1</p> <p>Temperature range to 900 °C</p> <p>Gauge length to a minimum of 40 mm</p> <p><b>ACCESSORIES</b>  Wedge screw Grips and steel Jaw inserts for round and flat specimens (ambient temperature application)</p> <p>High-temperature specimen grips for tensile tests on round specimen according to DIN 50125 - Temperature range up to 900 °C</p> <p>Power supply: 220-230 V, 50 Hz.</p> <p>The following additional requirements apply:</p>				
	A - Documentation				
	B – Compliance to safety rules and regulations				
	C - Certificate of calibration				
	D - Installation				
	E – Training:	Number of persons to be trained:			
		2			

		Duration: minimum 3 (three) working days			
	F - Warranty				
	G - Commercial Warranty				
2	<b>ROLLER BEARINGS RADIAL CLEARANCES MEASURING DEVICE</b>				
	QUANTITY: 1				
	<b>Manufacturers name:</b>				
	<b>Product model:</b>				
	<p>The equipment is able to perform tests according to the following standards:</p> <p>ISO 1132-1:2000 Rolling bearings - Tolerances - Part 1: Terms and definitions.</p> <p>ISO 1132-2:2001 Rolling bearings - Tolerances - Part 2: Measuring and gauging principles and methods.</p> <p>Bearings outer diameters working range (in consistence with the bearings types listed below): 90 mm - 190 mm.</p> <p>Measurement unit: 1 µm,</p> <p>Radial load: ~150 N</p> <p>Compatible digital gage.</p> <p>Precision: at least ±3 µm.</p> <p>Set of mounting and loading tools for following 63xx roller bearings types: 6309, 6310, 6311, 6312, 6313, 6314, 6315, 6316, 6317 and 6318.</p>				

	Set of mounting and loading tools for following 62xx roller bearings types: 6211, 6212, 6213, 6214, 6215, 6216, 6217, 6218, 6219, 6220 and 6221				
	Power supply: 220-230 V, 50 Hz.				
	In case the proposed equipment requires pneumatic power supply, a compatible electrically driven compressor unit shall be included to meet any pneumatic system requirements of the equipment.				
	The following additional requirements apply:				
	A - Documentation				
	B – Compliance to safety rules and regulations				
	C - Certificate of calibration				
	D - Installation				
	E – Training:		Number of persons to be trained: 2		
		Duration: minimum 1/2 (half) working day			
	F - Warranty				
	G - Commercial Warranty				
3	<b>ROLLER BEARINGS VIBRATIONS TESTER - SMALLER</b>				
	QUANTITY: 1				
	<b>Manufacturers name:</b>				
	<b>Product model:</b>				
	The equipment is able to perform tests according to the following standards: ISO 15242-1:2004 Rolling bearings - Measuring				



	<p>methods for vibration - Part 1: Fundamentals. ISO 15242-2:2004 + Cor 1:2010 Rolling bearings - Measuring methods for vibration - Part 2: Radial ball bearings with cylindrical bore and outside surface. ISO 15242-3: 2004 + Cor 1:2010 Rolling bearings - Measuring methods for vibration - Part 3: Radial spherical and tapered roller bearings with cylindrical bore and outside surface.</p> <p>Intended use: Testing equipment for precise vibrations measurements of deep groove ball bearings according to the above standards.</p> <p>Bearings outer diameters working range in consistence with the bearings types listed below: 30 mm - 100 mm</p> <p>Measurement unit: 1 <math>\mu\text{m/s}^2</math> (or 1 dB)</p> <p>Vibrations measurements on three standard frequency bands: 50-300 Hz, 301-1800 Hz, 1801- 10000 Hz</p> <p>Axial test load: adjustable, from 30 N - up to 200 N</p> <p>Spindle speed: ~1800 rpm</p> <p>Measuring electronics to pickup the radial vibration of a bearing into an electrical signal. Signal to be amplified and digitalized. Data acquisition by computer system.</p> <p>Software to analyse data and facilitate in storing, comparing, reporting of the data.</p> <p>Set of calibration tools included. The calibration</p>			
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	<p>tools comprises digital load cell, alignment tools, spring balance, tachometer, sensor calibration tool, ball for spindle check and calibration exciter.</p> <p>Set of mounting (mandrels, holders, spindles) and loading (pushers) tools for the following 63xx roller bearings types: 6300, 6301, 6302, 6303, 6304, 6305, 6306, 6307, 6308, and 6309.</p> <p>Set of mounting (mandrels, holders, spindles) and loading (pushers) tools for the following 62xx roller bearings types: 6200, 6201, 6202, 6203, 6204, 6205, 6206, 6207, 6208, 6209, 6210, and 6211.</p> <p>Power supply: 3-phase 380-400 V, 50 Hz.</p> <p>In case the proposed equipment requires pneumatic power supply, a compatible electrically driven compressor unit shall be included to meet pneumatic system requirements of the equipment.</p> <p>The following additional requirements apply:</p>				
	A - Documentation				
	B – Compliance to safety rules and regulations				
	C - Certificate of calibration				
	D - Installation				
	E – Training:	Number of persons to be trained: 2			
		Duration: minimum 1 (one) working day			
	F - Warranty				
	G - Commercial Warranty				

4	<b>ROLLER BEARINGS VIBRATIONS TESTER – LARGER</b>  QUANTITY: 1			
	<b>Manufacturers name:</b>			
	<b>Product model:</b>			
	<p>The equipment is able to perform tests according to the following standards:          ISO 15242-1:2004 Rolling bearings - Measuring methods for vibration - Part 1: Fundamentals.          ISO 15242-2:2004 + Cor 1:2010 Rolling bearings - Measuring methods for vibration - Part 2: Radial ball bearings with cylindrical bore and outside surface.          ISO 15242-3: 2004 + Cor 1:2010 Rolling bearings - Measuring methods for vibration - Part 3: Radial spherical and tapered roller bearings with cylindrical bore and outside surface.</p> <p>Intended use: Testing equipment for precise vibrations measurements of deep groove ball bearings according to the above standards.</p> <p>Bearings outer diameters working range in consistence with the bearings types listed below:          100 mm - 190 mm</p> <p>Measurement unit: 1 <math>\mu\text{m/s}^2</math> (or 1 dB)</p> <p>Vibrations measurements on three standard frequency bands: 50-300 Hz, 301-1800 Hz, 1801-10000 Hz</p> <p>Axial test load: adjustable, from 100 N - up to 800N</p>			

	<p>Spindle speed: ~700 rpm</p> <p>Measuring electronics to pickup the radial vibration of a bearing into an electrical signal. Signal to be amplified and digitalized. Data acquisition by computer system.</p> <p>Software to analyse data and facilitate in storing, comparing, reporting of the data.</p> <p>Supplementary calibration tools taking into account the set of calibration tools to be delivered with item 3 above. Additional tools to calibrate the larger vibration tester to be included.</p> <p>Set of mounting (mandrels, holders, spindles) and loading (pushers) tools for the following 63xx roller bearings types: 6310, 6311, 6312, 6313, 6314, 6315, 6316, 6317, and 6318.</p> <p>Set of mounting (mandrels, holders, spindles) and loading (pushers) tools for the following 62xx roller bearings types: 6212, 6213, 6214, 6215, 6216, 6217, 6218, 6219, 6220, and 6221.</p> <p>Power supply: 3-phase 380-400 V, 50 Hz.</p> <p>In case the proposed equipment requires pneumatic power supply, a compatible electrically driven compressor unit shall be included to meet any pneumatic system requirements of the equipment.</p> <p>The following additional requirements apply:</p>			
	A - Documentation			

	B – Compliance to safety rules and regulations			
	C - Certificate of calibration			
	D - Installation			
	E – Training:	Number of persons to be trained: 2		
		Duration: minimum 1 (one) working day		
	F - Warranty			
	G - Commercial Warranty			
5	<b>ROLLER BEARINGS AXIAL CLEARANCE MEASURING DEVICE</b>			
	QUANTITY: 1			
	<b>Manufacturers name:</b>			
	<b>Product model:</b>			
	<p>The equipment is able to perform tests according to the following standards:  ISO 1132-1:2000 Rolling bearings - Tolerances - Part 1: Terms and definitions.  ISO 1132-2:2001 Rolling bearings - Tolerances - Part 2: Measuring and gauging principles and methods.</p> <p>Bearings outer diameters working range (in consistence with the bearings types listed below):  30 mm - 100 mm.</p> <p>Measurement unit: 1 µm.</p> <p>Spindle speed: ~90 rpm (according to relevant standard).</p> <p>Compatible digital gage.</p>			

	Accuracy: $\pm 3 \mu\text{m}$ .			
	Set of mounting and loading tools for following 63xx roller bearings types: 6300, 6301, 6302, 6303, 6304, 6305, 6306, 6307, 6308 and 6309			
	Set of mounting and loading tools for following 62xx roller bearings types: 6200, 6201, 6202, 6203, 6204, 6205, 6206, 6207, 6208, 6209, 6210 and 6211			
	Power supply: 220-230 V / 50 Hz.			
	In case the proposed equipment requires pneumatic power supply, a compatible electrically driven compressor unit shall be included to meet any pneumatic system requirements of the equipment.			
	The following additional requirements apply:			
	A - Documentation			
	B – Compliance to safety rules and regulations			
	C - Certificate of calibration			
	D - Installation			
6	E – Training:	Number of persons to be trained:		
		2		
		Duration: minimum 1/2 (half) working day		
	F - Warranty			
	G - Commercial Warranty			
6	<b>LASER SCANNER</b>			
	QUANTITY: 1			
	<b>Manufacturers name:</b>			
	<b>Product model:</b>			

	<p>Intended use: Conformity assessment in the field of energy efficiency of building constructions, as well as for control of pipelines and identification of pipeline failure in thermoelectric power plants, in accordance with CABs' developed method. .</p> <p>Instrument type: Pulsed laser scanner, laser class 1.</p> <p>Data acquisition rate: High speed (<math>\leq 1</math> million points per second) laser scanner (laser class 1).</p> <p>Accuracy: Three dimensional position accuracy <math>\pm 3</math> mm at 50 m, linearity error <math>\leq 1</math> mm</p> <p>Operating distance range 100 m, and field-of-view (<math>360^\circ</math>)</p> <p>Operating temperature range: <math>-10^\circ\text{C}</math> to <math>+45^\circ\text{C}</math>.</p> <p>Integrated electronic bubble and laser plummet.</p> <p>Camera auto-adjusting, integrated 5 megapixels resolution digital camera with zoom and video stream.</p> <p>Surveyor's tripod and tribrach to suit the instrument.</p> <p>Carrying case.</p> <p>Data storage: Integrated solid-state drive (SSD), external PC, external USB device or equivalent. Data transfer: Ethernet, WLAN, USB or equivalent.</p>			
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	PC-Software: Software to load scanned data and perform registration and geo-referencing to a common coordinate system.				
	Power supply: rechargeable batteries, battery charger and AC adapter. Power supply for AC adapter: 220-230 V - 50 Hz.				
	The following additional requirements apply:				
	A - Documentation				
	B – Compliance to safety rules and regulations				
	C - Certificate of calibration				
	E – Training:	Number of persons to be trained: 2			
		Duration: minimum 2 (two) working days			
7	F - Warranty				
	G - Commercial Warranty				
	<b>UNIVERSAL DATA ACQUISITION SYSTEM AND DATA ACQUISITION SOFTWARE</b>				
	One item composed of two parts:				
	<b>Manufacturers name:</b>				
	<b>Product model:</b>				
	<b>PART 1: UNIVERSAL DATA ACQUISITION SYSTEM</b>				
	QUANTITY: 1				
	Intended use: Proof load testing of bridges in-situ				



	<p>and structures in-situ, load testing of prefabricated concrete products, for structures, steel and concrete roof elements, masonry anchors, rock and ground anchors, measurement of cable tension force. Data acquisition system will be used for supporting available instrumentation.</p> <p>The equipment shall meet the minimum following requirements:</p> <ul style="list-style-type: none"> <li>- 48 individually configurable inputs (electrically isolated)</li> <li>- 24 bit A/D converter per channel for synchronous parallel measurements</li> <li>- Supply voltage for active transducers (DC): 5 V to 24 V</li> <li>- Data rate 19200Hz</li> <li>- Supply voltage for active transducers (DC): 5V to 24V</li> <li>- Carrier frequency (sine) <math>4800 \pm 1.5</math> Hz</li> <li>- Accuracy class 0.05 – 0.1</li> <li>- The equipment shall be able to measure on each individual input, the signal provided by the following transducers: Strain gage full and half bridge, inductive full and half bridge, piezo resistive full bridge, potentiometric transducers, three voltage ranges, current; resistance (e. G. PTC, NTC, KTY); resistance thermometer (PT100, PT1000); <u>these transducers are not to be procured by the contractor.</u></li> <li>- Power supply: 220-230 V - 50 Hz.</li> </ul> <p><b>PART 2: DATA ACQUISITION SOFTWARE (Compatible with part 1)</b></p> <p>QUANTITY: 1</p>			
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	<p>Related standards: DKD-R 6-1:2003, ISO 376:2011.</p> <p>Intended use: Data acquisition software for calibration of pressure gauges.</p> <p>The equipment shall also meet the minimum following requirements:</p> <ul style="list-style-type: none"> <li>- Fully compatible with part 1 of this item</li> <li>- Sample rate data acquisition: 0.5, 1, 2, 5, 10, 20, 50, 75, 100, 200, 300, 600, 1200, 2400, 4800, 9600, 19200 Hz</li> <li>- Visualisation: full-screen and multiple layers, strip chart, digital display/table, analog meter, function key</li> <li>- Automation of measurement sequences (VBA scripts)</li> <li>- Easy system and channel configuration (sensor data base, CAN dbc, TEDS Editor, data rate)</li> <li>- Automatic reporting or export of measuring data and displays (Microsoft Word, Excel)</li> <li>- Adding virtual channels computed online (algebra, FFT, strain gage rosette analysis)</li> <li>- Powerful data analysis</li> <li>- Wide range of storage and export formats (catman BIN, Excel, ASCII, DIAdem, MAT, RPC III, MDF, etc.).</li> </ul> <p>Operating system Windows 7 <sup>TM</sup> (32x and 64x) or above.</p> <p>The following additional requirements apply:</p>			
	A - Documentation			
	B – Compliance to safety rules and regulations			
	C - Certificate of calibration			

	D - Installation				
	E – Training:	Number of persons to be trained:			
		1			
		Duration: minimum 1 (one) working day			
	F - Warranty				
	G - Commercial Warranty				
8	<b>WHOLE SHOE FLEXING MACHINE</b>				
	QUANTITY: 1				
	<b>Manufacturers name:</b>				
	<b>Product model:</b>				
	<p>The equipment is able to perform tests according to the following standard and regulation: EN ISO 20344:2011, PPE Directive 89/686/EEC</p> <p>Intended use: Equipment for the determination of the resistance to water penetration of the whole shoe during to repeated flexing according to section 5.15.2 of the above mentioned standard.</p> <p>The equipment shall also meet the following requirements:</p> <ul style="list-style-type: none"> <li>- Suitable for all types of footwear</li> <li>- Flexing rate: <math>140 \pm 1</math> cycles per minute</li> <li>- Flexing angle adjustable up to 50° in the natural flexing line of the shoe, in order to simulate flexing during wear</li> </ul> <p>Power supply: 220-230 V - 50 Hz.</p> <p>The following additional requirements apply:</p>				
	A - Documentation				

	B – Compliance to safety rules and regulations				
	D - Installation				
	E – Training:	Number of persons to be trained:			
		1			
		Duration: minimum 1 (one) working day			
	F - Warranty				
G - Commercial Warranty					