

**ANNEX II + III:**

**TECHNICAL SPECIFICATIONS + TECHNICAL OFFER**

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**Technical Specifications**

**for the**

**Supply of measuring instruments for the inspection of equipment to control better pesticides application**

**Publication reference: EuropeAid/134089/C/SUP/RS**

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## 1. General Requirements

- 1.1. The Contractor will be required to provide at the latest with delivery, original documents or certificates (e.g. CE mark) including the test protocols, that prove conformity of all delivered equipment to the requirements to the standards where specified in Annex III. Preferably these documents are to be included with the tender offer.
- 1.2. The Contractor must be aware that no provisional acceptance can be given without the presence of the complete set of documents as described under 1.1. and in addition to other requirements conditioning provisional acceptance.
- 1.3. Tenderers are required to demonstrate that the offered specifications are responsive to the Tender Dossier requirements identifying the model, manufacturer and country of origin of each individual item in their Technical Offer. Tenderers are to provide necessary documentation (catalogues, guides, brochures, manuals, booklets etc) with detailed technical specifications of all items being offered thus enabling the Contracting Authority to verify the information provided in the offer.
- 1.4. The technical specifications described in column 2 of the Annex II + III: the Technical Specifications + Technical Offer are minimum requirements. Tenderers may offer better specifications, with improved, additional or new features, but must not provide offers that do not strictly comply with the minimum requirements.
- 1.5. All equipment must have a durable self-adhesive EU visibility logo.

The contractor shall produce a draft of the layout and submit it for approval by the Contracting Authority prior to production / delivery. The Contracting Authority shall advise the successful bidder on the exact dimension, layout, colour regime and wording/symbols of these self-adhesive stickers upon contract signature. The contractor will provide to the Project Manager documentary proof signed by the Beneficiary that the EU visibility stickers have been submitted as foreseen above as part of their application for the Provisional Acceptance. The design of the EU visibility sticker must be approved by the Project manager in advance.

All supplies must comply with the generic Visibility policies in force within the scope of external aid contracts financed from the EU general budget; tenderers will thus be aware that certain visibility rules apply and that the guidelines and manuals concerned may be found in the EUROPEAID website, at: [http://ec.europa.eu/europeaid/work/visibility/index\\_en.htm](http://ec.europa.eu/europeaid/work/visibility/index_en.htm).

## **2. Completeness of the supply**

- 2.1 Supply delivery, including installation, integration and final customization must include all needed parts, accessories, operating and maintenance manuals, trainings and consumables required for the supplies to be presented for provisional acceptance fully installed, operational and ready for use.
- 2.2 It shall be the sole responsibility of the Tender to ensure that all pre-requisites for the completeness of the supply delivery are met before its commencement.

## **3. Supply Delivery**

- 3.1 There will be no partial provisional acceptance. Provisional acceptance may be requested only when all supplies of all the equipment have been delivered to site, have been installed, are fully compliant with all tender specifications and general requirements, have passed all required tests, are fully functional and after operator training has been completed.

## **4. Conformity to regulations and standards**

- 4.1 Providers and their products must be compliant to relevant regulations and standards, including ISO, IEC, domestic or CE marking, as marked in each specific item.
- 4.2 Tender must provide a certificate of conformity (at latest with delivery see also 1.1), issued by a regulatory agency of recognised competence, for each item or category of items as applicable.
- 4.3 Tender must provide additional or specific certificates, when required in specifications for particular item(s).

## LIST OF ACRONYMS (CHECK FOR COMPLETENESS)

- CE: *conformité européenne*, French for "European conformity".
- ISO: *International organisation for standardization*
- IEC: *International Electrotechnical Commission*
- EN 10204: *DIN EN 10204 : 2004 - Metallic Products - Types of Inspection Documents*
- EN 13790: *DIN EN 13790 Agricultural machinery - Sprayers; Inspection of sprayers in use*

## ANNEX II + III - THE TECHNICAL SPECIFICATIONS + THE TECHNICAL OFFER

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

- Column 1 and 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)<sup>1</sup>,
- Column 4 allows the tenderer to make comments on its proposed supply and to make eventual references to the documentation,
- Column 5 is reserved for the Evaluation Committee.

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.

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Tenderers are required to demonstrate that the offered specifications are responsive to the Tender Dossier requirements identifying model, manufacturer and country of origin of each individual item in their Technical Offer.

Technical specifications described in column 2, Annex II + III: "the Technical Specifications + the Technical offer" are minimum requirements. Tenderers may offer better specifications and newer models/versions, with improved, additional or new features, but must not provide offers that do not strictly comply with the minimum requirements or are incompatible with intended purpose of use.

The information provided by the tenderer in column 3 of Annex II+III should be such that reference to accompanying documentation/technical literature for evaluation purposes is kept to a minimum and is only required for verification purposes.

The accompanying documentation to be provided for all items being offered must contain detailed technical specifications of technical characteristics, functionality, regulatory compliance, and conformity to standards as requested in specifications in Annex III.

The information provided in the accompanying literature must match the Tenderer's written specifications. In case there are minor differences between for example the supplied manufacturers' technical literature and the Tenderer's written specification, the reasons must be detailed in the Tenderer's specifications.

Manufacturers' technical literature should be marked appropriately i.e. item model number and manufacturers' technical specification "line/s" where they correspond to the requested technical specifications. As cross-reference Column 4 "Notes, remarks, ref to documentation" should be used.

The Tenderer should preferably attach printed labels to the literature to identify correspondence with the item No offered, rather than handwritten identification.

Tenderer must provide technical documentation in English language.

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

### Summary of Items tendered

3 chapters one LOT	Items	No of Units	Location of Delivery	Delivery Period (Days)
1. MEASURING INSTRUMENTS FOR NOVI SAD	1.1 Reference manometer calibration set	1	Faculty of Agriculture Novi Sad, Department of Agricultural Engineering, Trg Dositeja Obradovića 8	120
	1.2 Flow-meter calibration set	1		
	1.3 Electronic patternator calibration set	1		
	1.4 Software	1		
2. MEASURING INSTRUMENTS FOR ZEMUN (BELGRADE)	2.1 Electronic horizontal patternator	1	Faculty of Agriculture - Zemun (Belgrade), Institut for Agricultural Engineering, Nemanjina 6	120
	2.2 Vertical patternator	1		
	2.3 Flow rate device --mechanical (20 nozzles)	1		
	2.4 Reference manometer calibration set	1		
	2.5 Flow-meter calibration set	1		
	2.6 Electronic patternator calibration set	1		
	2.7 Software	1		
3. MEASURING INSTRUMENTS FOR AGRICULTURAL EXTENSION SERVICES AND AGRICULTURAL SCHOOLS	3.1 Pump tester	31	Locations of Delivery are situated in the Table for Delivery Addresses, Places of Acceptance and Beneficiary Contact Persons in column Address for delivery and acceptance for El Lot 5	120
	3.2 Testbox	31		
	3.3 Single nozzle tester	31		
	3.4 Flow rate device -- mechanical	31		
	3.5 Electronic horizontal patternator	31		
	3.6. Software	31		

Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
1	<b>MEASURING INSTRUMENTS FOR NOVISAD</b>			
1.1	Reference manometer calibration set Measuring range: 0-35 bar Accuracy: $\pm 0.1\%$ FS Electronic sensor working on a battery Handheld, portable, easy to transport Including pressure creator and connection pieces for 1/2", 3/8" and 1/4" With recent calibration certificate An instruction book in English and Serbian language shall be included with information on how to operate, adjust and calibrate the measuring device. Training			
1.2	<b>Flow-meter calibration set</b> Flow meter with accuracy in the range from 15-500 l/min of 0.5% Pump with capacity of 300 to 500 l/min Possibility to regulate the flow-rate of the pump Tank of min. 150 liter It shall be possible to connect the flow meter of the Mobile measuring centre to the reference flow meter with quick couplings and connectors to hoses (1", 1/2", 3/4") An instruction book in English and Serbian language shall be included with information on how to operate, adjust and calibrate the measuring device. Training			
1.3	<b>Electronic patternator calibration set</b> With this set it must be possible to simulate a determined flow over the test bench It must be possible to check the accuracy of the test bench with a maximal accuracy of 1% An instruction book in English and Serbian language shall be included with information on how to operate, adjust and calibrate the measuring device. Training			
1.4	<b>Software</b>			

Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	Integrate the results of the inspections and issued certificates by the Mobile inspection centres			
	Give a brief overview of the performed inspections			
	Manage the results and certificates of the qualified test-operators			
	Please note: Producer of the Software must be the same as producer of the device			
2	<b>MEASURING INSTRUMENTS FOR ZEMUN (BELGRADE)</b>			
2.1	<b>Electronic horizontal patternator.</b>			
	The device shall comply with EN13790			
	The measured data shall be transferred from the measuring wagon to a computer either by means of a data carrier which can be connected to the PC or by means of wireless communication.			
	The measuring wagon can be controlled either by a control panel on the measuring wagon or by wireless communication from the computer			
	Software shall be included, with this software the measuring results can be displayed and transformed to data useable for evaluation the cross distribution pattern.			
	The electronic patternator can operate autonomous for a period of min. 8 hours without connection to power supply. An extra battery and a battery charger shall be included in the package.			
	In the kit, a measuring track of min. 36 meter, consist of parts with rails of min. 3.5 m length' each shall supplied.			
	The electronic patternator shall be able to measure and store the data of sprayers with a maximum working width of 65 meter.			
	A provision to collect the sprayed water shall be included in the package. It shall be possible to collect the water while testing sprayers of a working width of minimum 10 meters to maximum 36 meters (include some extra 2 meter to collect spray from the last nozzle).			
	½ day installation and training shall be included.			
	The device shall be delivered with an actual calibrating certificate.			



Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	An instruction book in English and Serbian language shall be included with information on how to operate, adjust and calibrate the patternator Training			
2.2	<b>Vertical patternator</b> Vertical patternator is designed to measure the vertical liquid distribution of orchard and air-blast sprayers. The patternator is constructed with specially manufactured discs that allow the air to pass through next to the discs. The discs shall filter the sprayed liquid and guide it to measuring glasses The collected liquid between the discs is guided per min. 25 cm of height to a measuring glass. The measuring glasses should be minimally 100 ml, graduated per 1ml. Patternator is mobile, with min 2 tracks whose length should minimally at 3.20 m. It should be easy dismountable and not weigh more than 200 kg Height of the patternator should be minimally 4.0 m. An instruction book in English and Serbian language shall be included with information on how to operate, adjust and calibrate the patternator Training			
2.3	<b>Flow rate device - mechanical</b> With the device it shall be possible to test 10 to 20 nozzles at the same time. The measuring glasses have a content of 1000 to 2000 mL, 10 to 20 mL graduation, 1% precision. It shall be possible to empty the measuring glasses completely in an easy manner. The measuring device shall be equipped with universal adaptors that fit on all types of nozzle holders and caps A collection container shall be included to recuperate all sprayed liquid. In the container a pump is installed for pump back the water to the sprayer An instruction book in English and Serbian language shall be included with information on how to operate, adjust and calibrate the measuring device. Training			
2.4	<b>Reference manometer calibration set</b> Training			

Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	Measuring range: 0-35 bar Accuracy: $\pm 0,1\%$ FS Electronic sensor working on a battery Handheld, portable, easy to transport Including pressure creator and connection pieces for 1/2", 3/8" and 1/4" An instruction book in English and Serbian language shall be included with information on how to operate, adjust and calibrate the measuring device. Training			
2.5	<b>Flow-meter calibration set</b> Flow meter with accuracy in the range from 15-500 l/min of 0,5% Pump with capacity of 300 to 500 l/min Possibility to regulate the flow-rate of the pump Tank of min. 150 liter It shall be possible to connect the flow meter of the Mobile measuring centre to the reference flow meter with quick couplings and connectors to hoses (1", 1/2", 3/4") An instruction book in English and Serbian language shall be included with information on how to operate, adjust and calibrate the measuring device. Training			
2.6	<b>Electronic patternator calibration set</b> With this set it must be possible to simulate a determined flow over the test bench It must be possible to check the accuracy of the test bench with a maximal accuracy of 1% An instruction book in English and Serbian language shall be included with information on how to operate, adjust and calibrate the measuring device. Training			
2.7	<b>Software</b> Integrate the results of the inspections and issued certificates by the Mobile inspection centres Give a brief overview of the performed inspections Manage the results and certificates of the qualified test-operators			

Item Number	2. Specifications Required	3 Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	Please note: Producer of the Software must be the same as producer of device			
	<b>MEASURING INSTRUMENTS FOR AGRICULTURAL EXTENSION SERVICES AND AGRICULTURAL SCHOOLS</b>			
3.1	<b>Pump tester</b> Equipped with an inductive flow sensor and electronic pressure sensor. Both sensors need to be connected to a monitor, that displays continuously pressure and flow rate (eventually with memory). The flow meter and pressure sensor shall Comply with the EU standard EN13790 Measuring range of flow sensor between 20 and 500 l/min, precision of 0.5%, maximum constant working pressure 20 bar Pressure sensor, pressure 20 to 30 bar, class 0.5 (0.5% precision over the full range) Over-pressure valve 20 bar to protect the sensors. Transparent part to check for air tightness of the hydraulic system Strong, stable construction, resistant to shocks and vibrations Welded stainless steel pipes (where possible) and stainless steel pressure regulation valve (30 to 40 bar). Integrated in a firm and robust aluminium box, foreseen with support wheels for easy transport. Connections to liquid hoses of 1, 1 1/4" and 1 1/2" The pump tester works on a 12V battery and has autonomy of at least 1 working day after full recharging of the battery. The device shall be supplied with 1 battery and a battery charger. An instruction book in English and Serbian language shall be included with information on how to operate, adjust and calibrate the measuring device. Training			
3.2	<b>Testbox</b> Basic test box for calibration and analysing sprayer performance A stopwatch A brush to clean nozzles. A passive flow meter, fitting on all types of nozzle holders/caps and designated to avoid leaks.			

Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<p>A digital pressure sensor to define the pressure in the air chamber/pump accumulator.</p> <p>A manometer tester equipped with two reference manometer with a diameter of 160 mm, class 0.6, scale division 0,1 bar. One manometer shall have an end value of 16 bar (for testing field-crop sprayers), the second manometer shall have an end-value of 40 bar (for testing air-assisted sprayers). The reference manometers shall have a recent calibration certificate according to EN 10204</p> <p>A measuring glass of 2 L with graduation every 20 mL (can be replace by measuring glass of 1 L, graduated every 10 mL).</p> <p>4 units to measure the pressure at the nozzles/nozle holders, fitting on all types of nozzle caps and holders, equipped with a damped manometer with a diameter of min. 100 mm, class 1,0 end scale 10 bar. To avoid weight stress on nozzle bodies, a construction should be supplied that allows to put the weight on the spray boom.</p> <p>A robust box shall be included to pack and transport this items.</p> <p>An instruction book in English and Serbian language shall be included with information on how to operate, adjust and calibrate the measuring device.</p> <p>Training</p>			
3.3	Single nozzle tester			
	<p>The device shall be able to test the flow rate of nozzles with a flow rate from 0.4 l/min up to 4 l/min. with an accuracy on +/- 1%</p> <p>The nozzle tester shall be supplied with a special adapter for measuring the flow rate of air-injection and pneumatic spraying nozzles.</p> <p>The data of minimum 10 sets of 100 nozzles need to be stored in the memory of the monitor and shall be able to be transmitted to a PC.</p> <p>A measuring report of the nozzles or of a complete inspection can be accomplished on a PC with the complementary software.</p> <p>The monitor should be light weight (handheld and function on small batteries, preferable rechargeable type AA).</p>			

Item Number	2. Specifications Required	3. Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
3.4	The system is light and be kept easily in a hand.			
	The nozzle tester is delivered in a handy and strong case.			
	The unit should be usable for all types of nozzles used on field crop and orchard sprayers. Parts for measuring orchard nozzles should be added.			
	The device is supplied with a calibration report.			
	An instruction book in English and Serbian language shall be included with information on how to operate, adjust and calibrate the measuring device.			
	Training			
	<b>Flow rate device – mechanical</b>			
	With the device it shall be possible to test 10 to 20 nozzles at the same time.			
	The measuring glasses shall have a content of 1000 to 2000 mL, 10 to 20 mL graduation, 1% precision.			
	It shall be possible to empty the measuring glasses completely in an easy manner.			
3.5	The measuring device shall be equipped with adaptors are universal and fit on all types of nozzle holders and caps.			
	A collection container shall be included to recuperate all sprayed liquid.			
	An instruction book in English and Serbian language shall be included with information on how to operate, adjust and calibrate the measuring device.			
	Training			
	<b>Electronic horizontal patternator</b>			
	The device shall comply with EN13790			
	The measured data shall be transferred from the measuring wagon to a computer either by means of a data carrier that can be connected to the PC or by means of wireless communication.			
	The measuring wagon can be controlled either by a control panel on the measuring wagon or by wireless communication from the computer			
	Software shall be included; with this software the measuring results can be displayed and transformed to data useable for evaluation the cross distribution pattern.			

Item Number	2. Specifications Required	3 Specifications Offered	4. Notes, remarks, ref to documentation	5. Evaluation Committee's notes
	<p>The electronic patternator can operate autonomous for a period of 8 hours without connection to power supply. An extra battery and a battery charger shall be included in the package.</p> <p>In the kit, a measuring track of min. 36 meter, consist of parts with rails of min. 3.5 m length' each shall supplied.</p> <p>The electronic patternator shall be able to measure and store the data of sprayers with a maximum working width of 65 meter.</p> <p>A provision to collect the sprayed water shall be included in the package. It shall be possible to collect the water while testing sprayers of a working width of minimum 10 meters to maximum 36 meters (include some extra 2 meter to collect spray from the last nozzle).</p> <p>1 day installation and training shall be foreseen in groups of max 6 stations</p> <p>An instruction book in English and Serbian language shall be included with information on how to operate, adjust and calibrate</p> <p>Training</p>			
3.6	Software			
	Integrate the measuring values from the different measuring devices			
	Create uniform testreports of performed tests on base of a by the Minister defined layout and content			
	Please note: Producer of the Software must be the same as producer of device			

## Delivery Addresses, Places of Acceptance and Beneficiary Contact Persons

### Beneficiary Contact Person

Snežana Savčić-Petrić  
Ministarstvo poljoprivrede, šumarstva i vodoprivrede  
Uprava za zaštitu bilja  
Odeljenje za sredstva za zaštitu i ishranu bilja  
Omladinskih brigada 1  
11070 Novi Beograd  
Tel/fax: + 381 11 2600 081  
e-mail: snezana.savcicpetric@minpolj.gov.rs

The addresses for final delivery are the following: The delivery has to be coordinated strictly with the Beneficiary Contact Person, who is the overall responsible for the project and will be in charge for the distribution.

Contact Person	Beneficiary Institution	Position	Contact Phone
Aleksandar Sedlar	Faculty of Agriculture Novi Sad, Department of Agricultural Engineering, Trg Dositeja Obradovića Street 8	Ass. professor	+381 21 485 3363 +381 63 507 571

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