Interreg Co-funded by the European Union | SustainaMetal

IPA Bulgaria – Türkiye

ANNEX II + III: TECHNICAL SPECIFICATIONS + TECHNICAL OFFER

Contract title: Supply of "Supply of melting induction furnace unit - 1 unit" **p 1 / 13**

Publication reference: BGTR0300119-PP2-SUP-01

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.

IMPORTANT:

The tenderer shall hold valid regulatory and quality certificates appropriate to the manufacturing and/or trading and/or servicing of industrial induction melting furnaces, or equivalent equipment:

- A valid EU Declaration of Conformity and **CE marking** for the offered equipment, proving compliance with Machinery Directive 2006/42/EC, Low Voltage Directive 2014/35/EU, and EMC Directive 2014/30/EU, or equivalent national transpositions;
- (Optional) A valid ISO 9001 Quality Management System certificate for the manufacturer;
- (Optional) ISO 14001 (Environmental Management) and/or ISO 45001 (Occupational Health and Safety) certificates;

Delivery address: ***Devlet Mahallesi Atatürk Caddesi No:310 Vize / Kırklareli / Türkiye***

1. Item number	2. Specifications required	3. Specifications offered	4. Notes, remarks, ref to documentation	5. Evaluation committee's notes
1	**Supply of melting induction furnace – 1 unit:** Power and control unit for 600 kW melting Specifications required: - Loading capacity: 1000 kg per pot. - Material to be melted: steel, iron, ductile iron, and cast iron. - Melting temperature: min Steel 1600°C, Iron min 1400°C. - Melting time: arround Steel 60 ±5 min, Iron 55 ±5 min. - Power consumption: arround Steel 570 ±5 kW/ton, Iron 530 ±5 kW/ton.			

1. Item number	2. Specifications required	3. Specifications offered	4. Notes, remarks, ref to documentation	5. Evaluation committee's notes
1.1	**POWER UNIT** a) Inverter Type: Series inverter It should be possible to provide maximum power to the pot from the start to the end of melting. The capacitor groups should be water-cooled. The main control card DSPIC should control the system with a digital processor card. The rectifier section should be statically controlled. b) Main Control Card (PLC) -PLC (Programmable Logic Control); responsible for continuously controlling and commanding the system. -The MAIN CARD should receive information from electronic control cards, protection, and control circuits. -The LCD screen should provide the operator with information about the current status of the system. -The control of the unit should be very easy to control. -The operator should receive understandable messages about the system.			

1. Item number	2. Specifications required	3. Specifications offered	4. Notes, remarks, ref to documentation	5. Evaluation committee's notes
	-In case of any malfunction, the system should automatically stop. -The occurred malfunctions should be stored in the MAIN CARD memory for retrospective fault tracking. -Future technological advancements should be applicable to the system. -The MAIN CARD should have digital inputs and outputs as well as analog inputs and outputs. c)The following warnings should be able to come to the PLC: • Phase error • Unit water temperature high • Furnace water temperature high • Unit water flow • Furnace water pressure • Furnace water flow • Furnace selection switch • Thyristor overheat • Inverter fault • Reactor fault • Door open • Full power • Inverter on • Cold Metal Loading Warning • Inverter Max. Limit Warning • Sintering Indicator • Inverter Voltage status • Thyristor Voltage Warning • Control Panel • LCD Display • Unit overheating			

1. Item number	2. Specifications required	3. Specifications offered	4. Notes, remarks, ref to documentation	5. Evaluation committee's notes
	d) The Main Card Control Main Program should control the operation of a second program on the main card outside of the PLC program, which monitors the operation of the resonance circuit. e)The Rectifier Section should consist of thermal magnetic circuit breakers, fast fuses, D/C reactors for overcurrent, and triac groups that convert A/C current to D/C current. f)The main control card and rectifier card should contain digital and analog inputs that allow communication with the operation or unit's protection units. For example, values such as furnace power, furnace voltage, grid current, thyristor T.O.T time, furnace operating frequency, furnace current, etc., should be entirely loadable from a computer with a program. It should be possible to see all information or system-related faults such as low unit water pressure, overheating, pump failure or non-operation, cooling fan failure or non-operation, door open, fuse blown, low switch, etc., on the LCD screen			

1. Item number	2. Specifications required	3. Specifications offered	4. Notes, remarks, ref to documentation	5. Evaluation committee's notes
	g)The Inverter Section should consist of high-current fast triacs, diode groups, and water-cooled high-current and frequency triacs. h)There should be a Rectifier Card controlled by a PIC microcontroller that manages the soft start operation of the system, fires the rectifier triacs, detects short circuit currents, and protects the system. i)There should be a Main Control Card responsible for controlling the entire system. It should have a high-performance digital microprocessor (DCPIC). The settings or program of the main card should be entirely loadable from a PC computer. j) There should be an Earthing Card that stops the system by understanding the leakage of molten metal in the furnace coil or the leakage of any electrical point of the system to the ground.			

1. Item number	2. Specifications required	3. Specifications offered	4. Notes, remarks, ref to documentation	5. Evaluation committee's notes
	k)The Control Panel should allow power control of the system. All data related to the operation of the system should be readable digitally via analog or an LCD screen on the control panel. l)The Main Card Control Main Program should control the operation of a resonance circuit program on the main card outside of the PLC program			

1. Item number	2. Specifications required	3. Specifications offered	4. Notes, remarks, ref to documentation	5. Evaluation committee's notes
1.2	**STEEL-BODIED INDUCTION MELTING FURNACE** The pot should be entirely contained within a steel frame. There should be high gauss value magnetic shunts around the coil to prevent heating of the steel structure and to collect the magnetic field. These shunts should also press firmly against the coil to prevent its movement in both directions. Heat-resistant concrete should be present above and below the coil. Additionally, there should be cooling windings at the top and bottom of the coil to extend the life of the lining. The coil should be water-cooled and made of round-section high-conductivity copper. Heat-resistant wedges should be present to prevent rotation of the coil. The coil should be painted with heat-resistant epoxy paint and the copper winding intervals should be supported with epoxy material.			

1. Item number	2. Specifications required	3. Specifications offered	4. Notes, remarks, ref to documentation	5. Evaluation committee's notes
1.3	**COOLING UNIT** In this system, the furnaces and power units should be completely enclosed, and there should be no scaling in the furnace and power circuits. The system should consist of the following parts: • Cooling pumps • Closed circuit tower • Cooling System Electrical Panel			

1. Item number	2. Specifications required	3. Specifications offered	4. Notes, remarks, ref to documentation	5. Evaluation committee's notes
1.4	**HYDRAULIC UNIT** -Hydraulic Control Console: This panel should have buttons related to the furnace lifting system, grounding system antenna control buttons, and optionally, a kW meter and power adjustment potentiometer. -Remote Control Console: Most functions such as furnace power, antenna test circuit, and system warnings should be controllable through this console. -Hydraulic Power Unit: It consists of a hydraulic power unit that moves the furnace for loading metal. Additionally, there should be one motor pump available for lifting the furnace in case of power outages.			

1. Item number	2. Specifications required	3. Specifications offered	4. Notes, remarks, ref to documentation	5. Evaluation committee's notes
1.5	**HOSES AND BARS** -Water-Cooled Energy Hoses: These are water-cooled energy hoses that transfer energy to the furnace. -Furnace Water Connection Hose: These are water connection hoses that transfer cooling water from the cooling water system to the furnaces and return it to the cooling system after exiting the coil. -Water-Cooled Copper Bars Between Furnace and Power Unit: These bars facilitate energy transfer between the unit and the pot. To reduce energy loss, current should be carried by thick-section water-cooled copper bars and hoses containing copper.			
1.6	**ISOLATION TRANSFORMER** To ensure the safety of personnel working in the furnace, the voltage from the grid should be applied to the unit through an isolation transformer. This prevents personnel working in the furnace from electric shocks or harm due to electricity. It provides the required transformation ratio to the desired operating voltage.			

1. Item number	2. Specifications required	3. Specifications offered	4. Notes, remarks, ref to documentation	5. Evaluation committee's notes
2.	**Melting Assistant Software must be available.** Its basic features include: -Automatic Sintering Mode: Since the lining material will require sintering after forging, the automatic sintering mode should perform all necessary steps automatically. -kWh Consumption Display: It should display the total power consumption from the start-up and the consumption in the last melting. -Observation Screen: It should display power-related data such as frequency, capacitor voltage, inverter current, DC voltage, line current, and DC current.			
3	**Commissioning and Engineering Service of the System** The manufacturer is responsible for checking the drawings provided, inspecting the installed piping, and carrying out the commissioning of the furnace. Once the installation works are completed properly, the manufacturer's team will commission the furnace for the first time.			

1. Item number	2. Specifications required	3. Specifications offered	4. Notes, remarks, ref to documentation	5. Evaluation committee's notes
4	**Required Drawings and Manuals** All technical drawings required for the system and manuals specifying the system's operation will be provided by the manufacturer.			

1. Item number	2. Specifications required	3. Specifications offered	4. Notes, remarks, ref to documentation	5. Evaluation committee's notes
5	**Responsibilities of the Manufacturer** The manufacturer's responsibilities include: -Delivering the system on time (This period cannot exceed 15 days from the informing CA unless there are force majeure circumstances). -Delivering the system in working condition and obtaining three successful castings. - The manufacturer shall provide a **minimum 10-year guarantee for the availability of spare parts** for the supplied system and shall ensure the provision of **maintenance and repair service within 24 hours** upon notification of malfunction. -Ensuring appropriate packaging during shipment. -Supplying drawings for hydraulic, water, electrical, and mechanical installations. -Visiting the customer after shipment to provide information on all installations. -Supervising the initial lining process. -Providing operators with information on system usage. **After sell services and Training:** The contractor is responsible to provide at least 1 day training to at least three operators of the machine.			