



United Nations Industrial Development Organization

Technical Specifications for the provision of technical equipment, supply and delivery of cooling system as well as the provision of technical services for SO Kombinat "Progress" company in Kyiv, Ukraine

“Improving energy efficiency and promoting renewable energy in the agro-food and other small and medium enterprises (SMEs) in Ukraine”

UNIDO Project Number: GFUKR11004

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I. General Background Information

UNIDO is implementing a 5 years project titled “*Improving energy efficiency and promoting renewable energy in the agro-food and other small and medium enterprises (SMEs) in Ukraine*” funded by GEF and leveraged by private sector. The main objective of the project is to develop a market environment for introducing EE and enhanced use of RE technologies in the agro-food and other energy intensive manufacturing SMEs in Ukraine as a basis for promoting their competitiveness while ensuring an integrated approach for lower carbon intensity and improvement in their productivity and local environment.

One of the main activities of the project is significant reduction of the ammonia quantity in existing ammonia cooling system in State Organization Kombinat "Progress" of the State Reserve Agency of Ukraine. The company is localized in Kyiv and it is the largest cold storage plant in the Kyiv, Ukraine. The company will be referred as SO Kombinat "Progress".

As a result of the Project, SO Kombinat "Progress" will benefit from considerable savings in energy costs and environmental risks and indirect GHG emission will be reduced.

II. Aim of this Technical Specifications

The supply, delivery, installation and maintenance of technical equipment as well as the provision of technical services (training) of refrigeration system to State Organization Kombinat "Progress" of the State Reserve Agency of Ukraine in Kyiv, Ukraine.

III. Transportation

Transportation of all equipment is to be DAP (Incoterms 2010) project site, Ukraine including unloading. The address details will be provided after awarding of the contract.

IV. General Time Schedule

All works under this Technical Specifications have to be completed 4 calendar months after signature of contract.

V. Installation and Maintenance

The proposals have to include installation and maintenance services as well as training. However, the installation and maintenance services as well as training will be part of a direct and separate contract between the selected Contractor and SO Kombinat “Progress”. If this condition is not acceptable, the bidder must clearly state so in their proposal.

VI. Technical Services to be provided: Training

Hands-on training of 4 operators selected by the SO Kombinat "Progress" with the focus on detailed explanation and demonstration of procedures for operation, maintenance and installation of the refrigeration system have to be included in the proposal. The training will have duration of 4 days and will be held in Ukrainian language. If necessary, translation to Ukrainian should be provided.

Training services will be part of a separate contract between the Contractor and SO Kombinat “Progress”.

VII. Documentation Requirements

The documentation listed below should be supplied as follows; 1 pcs DVD, 1 pcs hard copy print:

- Operating Manual - Compressor & Oil Separator (Russian)
- Installation & Maintenance Manual (Russian)
- Grasso or Equivalent Maintenance Monitor Manual (English)

- Manufacturing Report Book - Package (English)
- Manufacturing Report Book - Oil Separator (English)
- 100% Non-Destructive Testing - Package (English)
- 100% Non-Destructive Testing - Oil Separator (English)
- Declaration of Conformity (English)
- Operating Manual - GSC-TP (Russian)
- Safety Manual - NH3 (Russian)

VIII. Compatibility Requirements

The equipment should be compatible with these directives and applied standards listed below:

1) Compressor units:

Pressure Equipment Directive 2014/68/EU (PED), applied standard: AD2000 Merkblatt, Machinery Directive 2006/42/EC MD, applied standards: NEN-EN-ISO 12100-1/2, NEN-EN 12693, NEN-EN 378-1/2/3/4, NEN-EN-ISO 13857, NEN-EN-IEC 60204-1, AD2000 Merkblatt

2) Evaporative condenser:

PED 97/23/EC coil design, Eurovent certified performance, ISO9001 production compliance and compliance -but not limited- with the following:

- European Machine Directive
- European Pressure Equipment Directive 2014/68/EU (PED)
- Atex Directive
- Eco Design
- Thermal performance acceptance testing of mechanical draught series wet cooling towers
- Method of measurement and evaluation of thermal performances of wet cooling towers.

IX. Guarantee and other Requirements

The guarantee period for all equipment and workmanship is minimum 12 months from the startup of the complete system. The warranty for Compressor Unit is minimum 24 months from the startup of the complete system.

The guarantee shall cover cost of replacement or repair of any defective equipment and freight. If any repair is of specialist nature the contractor shall provide a technician to carry out the work at his own expense.

Bidders can visit SO Kombinat "Progress" during preparation of the plan of activities on their own cost.

Disposal arrangements and pre-installation set up of the plant will be under responsibility of SO Kombinat "Progress".

X. Language Requirements

All communication as well as reporting shall be in English language.

XI. Deliverables

- Workplan Report: detailing the finalized plan of activities, including the blueprints and final layouts. The report shall also include safety and quality control plans. No manufacturing of equipment shall be initiated until UNIDO provides the go-ahead.
- Pre-Shipment Report: a preparatory report detailing the activities and services carried

out during the reporting period, and pre-shipment report to be carried out before transportation of the equipment to the project site. UNIDO may be present for the pre-shipment inspection.

- Monthly progress reports, to provide status of progress of work during the reporting period including photographic evidence of the delivery;
- Final Completion report including:
 - 1- Final as built complete set of technical drawings and plans. These include all system installation as well as safety plans, part numbers etc.
 - 2- All technical documentation, manuals, operating and maintenance instructions as well as quick repair/fix instructions and replacement of parts
 - 3- Certificate of completion of training duly signed by the trainees and the contractor
 - 4- Certificate of acceptance of the equipment duly installed signed by the contractor, the project beneficiary and UNIDO
 - 5- List of spare parts

XII. Evaluation Criteria

- Compliance with the requirements under this Terms of Reference
- Minimum 5 years of experience in supply of complete industrial refrigeration systems
- At least 2 similar projects successfully completed (with reference details) in the last 3 years
- Previous experience in Ukraine or the region is an advantage
- Certification from recognized institutions related to production of industrial systems

XIII. Scope of Supply

Sl. No.	Component	Description of Components	Quantity / Systems*	Unit Price USD	Total Price USD	Compliance* (YES/NO)	Remarks
1.	Compressor unit	<p>Compressor: Reciprocating, Two Stage, without external cooling circuit Cooling Capacity: 200 kW (or more) Refrigerant: R717 Temperature of evaporation: $T_o = -33...-35\text{ }^{\circ}\text{C}$ Temperature of condensation: $T_c = +32...+35\text{ }^{\circ}\text{C}$ Ambient temperature: $+35\text{ }^{\circ}\text{C}$ Superheat (Total): 5 K Intercooling: closed flash, temperature difference 10 K</p> <p>Compressor components: oil discharge filter element, set of special tools, hand operated oil filling pump</p> <ul style="list-style-type: none"> - Minimum/Maximum allowed speed:500/1200 RPM - Mating flanges on suction and discharge connections - Pre lubrication stop valve, mounted on the direct driven oil pump, internal overflow valves - Clockwise direction of rotation when facing the shaft end of the compressor - Compressor should be filled with nitrogen - Compressor should be mounted on base frame <p>External Safety Valve (HP): double safety valve, 25 bar Capacity Control mounted on the compressor: 220-240V / 50-60Hz</p> <ul style="list-style-type: none"> - Part Load steps allowed for current operating conditions: 100 - 83 - 67 - 50 - 33 (minimum allowed part load step 33%), - RF induction filters <p>Crankcase Heater mounted on the compressor: 500 W (or more), 220-240V / 50-60Hz Base Frame for concrete block Stop Valves: suction, discharge and intermediate valves with additional hand wheels, suction and discharge stop valves should be mounted Check Valves: should be mounted in vertical line position and upwards flow direction;</p> <ul style="list-style-type: none"> - HP Discharge DN40 (Delta P = 0.04 bar (0.09K), flow min = 25% of flow max) - LP Discharge DN65 (Delta P = 0.04 bar (0.09K), flow min = 25% of flow max) <p>Purge Valves: suction and discharge lines low stage, suction and discharge lines high stage Intermediate suction gas filter with stop valve suction HD and compressor flange should be welded together and mounted on compressor Direct Drive: with coupling elements, coupling halves are mounted, coupling guard, black spots Oil Separator HP: should be mounted on base frame, including oil return float valve and mating flanges Electric Motor: 400/3/50 voltage/Hz, IP55 enclosure, IE2</p>	2				

		<p>classification, variable speed option, 6 poles, isolated bearing</p> <p>System Controller, GSC-TP (touch panel): GSC should be consisted of the control unit with operator keypad and display unit, indicator lights for "Running", "Warning" and "Alarm", emergency stop button, output relays, housing etc.</p> <ul style="list-style-type: none"> - Voltage/Hz 220-240V / 50-60Hz, compatible with EN378-2 (Europe) - Compact microprocessor control with standard software - The safety of the unit should be guaranteed by the continuous monitoring and displaying of all important operating data - All sensors and actuators should be fully wired to the compressor controller, excl. crankcase heater - GSC communication I/O & software for frequency inverter should be included to the offer <p>5 pcs Temperature Sensors: to be mounted on:</p> <ul style="list-style-type: none"> - LP suction line - LP discharge line - HP suction line - HP discharge line - crankcase <p>5 pcs Pressure Sensors: 4-20mA, to be mounted on :</p> <ul style="list-style-type: none"> - LP suction line (0-10 bar), - LP discharge line (0-30 bar), - HP discharge line (0-30 bar), - oil (0-30 bar) - crankcase (0-10 bar) <p>Pressure Gauge Panel: standard scales, including mounted gauges:</p> <ul style="list-style-type: none"> - 1x suction pressure, - 1x discharge pressure, - 1x intermediate pressure - 2x oil pressure <p>Safety Switch Panel: pressure safety switch panel mounted on the compressor</p> <p>Packing: Wooden beam packing</p> <p>Warranty on compressor unit: 24 months after commissioning</p> <p>Refrigerating capacity and shaft power: compatible with EN12900 and EN13771 or equivalent</p>					
2.	Evaporative condenser	<p>Condensing capacity: suitable for capacity of compressor unit 1, capacity: 300 kW (or more)</p> <p>Refrigerant: R717</p> <p>Temperature of condensation: $T_c = + 32 \text{ }^\circ\text{C}$</p> <p>Entering wet bulb temperature: $+22 \text{ }^\circ\text{C}$</p> <p>Entering dry bulb temperature: $+35 \text{ }^\circ\text{C}$</p> <p>Operative mode: wet</p> <p>Case: hot-dip galvanized steel with corrosion protection</p> <p>Overall height limit: not more 2100 mm</p> <p>Condensing coil: hot-dip galvanized steel with internal corrosion protection</p> <p>Maximum operating pressure: 23 bar according to PED, pneumatically tested at 34 bar</p> <p>Total pressure drop: not more than 1 kPa</p> <p>Fans: centrifugal fan with V-belt drive and heavy duty fan shaft bearings</p> <p>Fan motor:</p>	1				

		Voltage: 400V Frequency: 50 Hz Protection class: IP55 Efficiency level fan motor: IE3 Acoustical data: less than 63 dB (A) at 15 m distance Water distribution system: centrifugal spray pump included, efficiency level pump motor IE3					
3.	Transportation	DAP project site, Ukraine –Incoterms 2010 including unloading					
4.	Installation of all the proposed equipment	Installation services will be part of a separate contract between the Contractor and SO Kombinat “Progress”.					
5.	Commissioning and Start up	Commissioning and Start up services will be part of a separate contract between the Contractor and SO Kombinat “Progress”.					
5.	Maintenance	maintenance services will be part of a separate contract between the Contractor and SO Kombinat “Progress”.					
6.	Training	Please see Training section above. Training services will be part of a separate contract between the Contractor and SO Kombinat “Progress”.					
7.	Insurance 110% of value of equipment						
	TOTAL (USD)						