



**Request for quotation**

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**Call Opened: 27/07/2020**

**Call Closed: 10/08/2020**

**Title:**

Procurement of bioreactor/fermenter

**Description:**

At the University of Jordan (Amman/Jordan), we are interested in purchasing an industrial bioreactor intended to be used as an anaerobic digester for food wastes.

The technical specifications are presented below. Nevertheless, if your system embraces different specifications that might still be suitable and serve the same purpose, please suggest them as alternative specifications (i.e., offer).

**Contract type:**

Procurement

**Submission Method:**

Via express mail (DHL, TNT, FedEx, Aramex, etc.) to the following address:

Tendering department  
The University of Jordan (JU)  
Amman 11942 Jordan  
Attention: Prof. Khaled Al Fawares

**Award method:**

Best price-quality ratio

**Conditions:**

- The legal framework followed for the procurement process is Jordan's Governmental Procurement System No. 28 for the year 2019.
- Due to our tight time frame the delivery time must not exceed 12 weeks after signing the contract.

## CEOMED

- Your offer must include onsite services that include installation and test run the bioreactor at site.
- Down payments can be made only against a prepayment bank guarantee amounting to 100% of the down payment.
- A performance guarantee needs to be issued for 10% of the contract value.
- A one year warranty guarantee needs to be issued.
- A 0.85% of the contract value needs to be included in your offer to cover governmental fees.

### Technical Specifications

Anaerobic bioreactor that comprises a stainless steel vessel supported with agitation system, specific sensors and measuring instruments, in addition to a control system (including software).

<b>Applications</b>	
Microbial bioreactor operated for anaerobic digestion of ground food waste	
<b>Mode of operation</b>	
Continuous	
<b>Vessel specifications</b>	
Working capacity	1000 L
Material	Stainless steel 316
insulation	Air tight cylindrical tank
Installation method	Supporting legs, skid mounted
Vessel design pressure	2.0 bar
Jacket design pressure	2.5 bar
Vessel temperature	50 C
Jacket temperature	100 C
Shape	Dish end top and bottom, with head being welded to the shell
connections	<ul style="list-style-type: none"> <li>– One lower side entry ports for each of the following probes: pH, Temperature and dissolved oxygen.</li> <li>– One lower side manual diaphragm valve for sampling</li> <li>– Four ports for acid, base and two spare chemical dosing</li> <li>– One top port for gas (exhaust) line</li> <li>– One top man hole with round viewing glass</li> <li>– One side feed port with a pneumatic diaphragm valve for inlet</li> <li>– One bottom connection flange for agitation system</li> <li>– One bottom connection port with flange for lower differential pressure level transmitter.</li> </ul>

## CEOMED

	<ul style="list-style-type: none"> <li>– One bottom connection port for bottom outlet/drainage</li> <li>– One medium connection with a pneumatic diaphragm valve for medium outlet/drainage.</li> </ul>
Jacket	Containing two nozzles for circulating water inlet and outlet.
<b>Drive specifications</b>	
Adequate mixing is required for ground food waste having a density of 500-1200 kg/m <sup>3</sup> and a viscosity of 6250 to 36000 mPa.s	
Motor	AC motor with gear box
Speed range	0- 350 rpm
power	At least 1.5 KW
<b>Mixing impeller</b>	
Number of impellers	Two impeller on the shaft spaced approximately two impeller diameter apart
Impeller diameter/tank diameter	0.2-0.4
Effective height/ impeller diameter	2-4
<b>Gas (exhaust) control</b>	
Automatic control valve and pressure sensor for automatic controlling of vessel pressure	
Pressure gauge	One pressure gauge with a range of 0- 0.2 MPa
sampling	Instrument bypass line with a solenoid valve to connect with CO <sub>2</sub> and CH <sub>4</sub> sensors
<b>Thermal control specification</b>	
An electric heating system with water tank and a circulation pump. Piping and all required valves are to be connected to hot water and/or cooling water supply	
<b>Dosing control specification</b>	
pumps	Peristaltic pumps assigned to function for acid and base control
<b>Sterilization</b>	
None	
<b>Pipes and valves</b>	
Pipes material	Stainless steel 316 with surface polish
Valves types	Diaphragm valves For temperature control loop, a solenoid valves are to be used
<b>Control system</b>	
A control system for process parameters including pH, dissolved oxygen (DO), oxidation reduction potential (ORP), temperature, rotational speed and pressure.	
pH	Range 1- 14 Resolution 0.01 PID control for injecting acid and base via regulating peristaltic pumps.

Temperature	Range 0- 150 C Resolution 0.1 C Control: PID control with circulating water via solenoid valves.
pressure	Pressure gauge control Range 0- 0.2 MPa
DO	Accuracy: +/- 1% to +6 ppb Material: stainless steel 316L Response time: 90 sec Detection range: 6ppb to saturation
ORP	Range: +/- 2000 mV Temperature range 0-100 C Pressure range: 0-100 psig
Rotational speed	Range 0- 350 rpm Resolution ±1% Control: PID control
<b>Biogas measurements</b>	
Biogas flow meter	Range : 5 L/h- 10 L/h Volumetric flowrate accuracy: ±2% of reading Temperature 0-50 C
CO <sub>2</sub> monitor and measurements	Range: 0-100 % Resolution ±1% Measurement time <20 s
CH <sub>4</sub> monitor and measurement	Range: 0-100 % Resolution ±1% Measurement time <20 s