**Mechanical work, Submersible Pump, ( Sewerage Type) Discharge= 45m3/hr. Head=8m**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Description** | **UNDP Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Make: | Andritz Hydro, Grundfos, wilo , or equivalent |  |  |
|  | Type: | Submersible |  |  |
|  | Rated speed: | (1400-1500) rpm |  |  |
|  | Enclosure class: | (IEC 34-5) IP 68 |  |  |
|  | Insulation class: F | F |  |  |
|  | Pump liquid: | Sewerage water |  |  |
|  | Rated flow : | 45m3/h |  |  |
|  | Rated head : | 8 m |  |  |
|  | Material: | Cast iron EN 5.1301 EN-GJL-250 |  |  |
|  | Shaft | Stainless steel |  |  |
|  | Impeller | Stainless steel |  |  |
|  | Impeller Type: | Super Vortex. |  |  |
|  | Bearing | shall be grease type lubrications |  |  |
|  | Rated voltage: | 380V-416V |  |  |
|  | No of phase: | 3PH |  |  |
|  | Frequency: | 50Hz |  |  |
|  | Power | (2-5) KW. |  |  |
|  | Efficiency: | (70-85) % |  |  |
|  | Protection: | Bearing heating sensor.  Moisture sensor  Water in Oil sensor. |  |  |
|  | Installation: | Auto coupling, guide pipes and brackets should install. |  |  |
|  | Chain or steel rope: | Stainless steel chain should connect with each submersible pump to be used for lifting purpose. |  |  |
| 2 | Control Panel: |  |  |  |
|  | Starting Type: | DOL / (Star – Delta) starting method. |  |  |
|  | Hour Counter | Hour counter for each pump. |  |  |
|  | Control panel | The panel should control three submersible pumps. Should supplied from same pump manufacturer. |  |  |
|  | Indicators | Ampere meter, volte meter, starting, On green light and button, Off Red light and Button. |  |  |
|  | Level measurement | The Dedicated Controls system starts/stops the wastewater pumps by means of  • float switches,  • analog pressure sensor or  • ultrasonic sensor. |  |  |
|  | External communication | Dedicated Controls system can communicate with external units such as  • PC  • mobile phone  • SCADA/BMS systems. |  |  |
|  | Controls supports | CIM 200 Modbus RTU Cable, RS-485  CIM 250 Modbus/SMS messaging GSM/GPRS  CIM 270 GRM\* GSM/GPRS |  |  |
|  | Basic Features | Pump start/stop  • alternating operation of two pumps  • overflow detection  • overflow measurement  • alarms and warnings  • advanced alarm schedules  • start and stop delays  • free language selection. |  |  |
| 3 | Submit Manufacturer certification and test reports by BV: | To be submitted |  |  |
| 4 | Submit Detail drawing brochure catalogue: | To be submitted |  |  |

**Mechanical work, Manual Gate valves*.***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | **Gate Valve** | | |  |
| 2 | Manufacturer/Make: | Erhard, VAG, Prat or equivalent |  |  |
| 3 | Specification | Flanged, DN (100) mm dia. |  |  |
| 4 | Drilling according | Drilling according to ISO 2531 PN10 |  |  |
| 5 | Body and bonnet | GGG-40 |  |  |
| 6 | Disk | GGG-40 |  |  |
| 7 | Shaft | X20 Cr13 (AISI-420) |  |  |
| 8 | Sealing | EPDM / NBR |  |  |
| 9 | Standards | Flanges - DIN2510 (PN10) |  |  |
| 10 | Coating | Epoxy Blue Ral 5015, 250 microns as average |  |  |
| 11 | Operation | Hand wheel operated |  |  |
| 12 | Submit Manufacturer certification and test reports | To be submitted |  |  |
| 13 | Submit Detail drawing brochure catalogue. | To be submitted. |  |  |

**Mechanical work, Manual Gate valves.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | **Gate Valve** | | |  |
| 2 | Manufacturer/Make: | Erhard, VAG or equivalent |  |  |
| 3 | Specification | Flanged, DN (150) mm dia. |  |  |
| 4 | Drilling according | Drilling according to ISO 2531 PN10 |  |  |
| 5 | Body and bonnet | GGG-40 |  |  |
| 6 | Disk | GGG-40 |  |  |
| 7 | Shaft | X20 Cr13 (AISI-420) |  |  |
| 8 | Sealing | EPDM / NBR |  |  |
| 9 | Standards | Flanges - DIN2510 (PN10) |  |  |
| 10 | Coating | Epoxy Blue Ral 5015, 250 microns as average |  |  |
| 11 | Operation | Hand wheel operated |  |  |
| 12 | Submit Manufacturer certification and test reports | To be submitted |  |  |
| 13 | Submit Detail drawing brochure catalogue. | To be submitted. |  |  |

***Manual and electrical actuated butterfly, valves & Dismantling joints***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Valve | | |  |
|  | Manufacturer/Make: | Duyar, VAG or equivalent |  |  |
|  | Specification | Flanged, DN (50 - 300) mm dia. |  |  |
|  | Type | Flanged |  |  |
|  | Body | GGG40 |  |  |
|  | Disk | AISI 304 Stainless Steel |  |  |
|  | Mill | AISI 316 Stainless Steel |  |  |
|  | Sealing | EPDM / NBR |  |  |
|  | Standards | Flanges - DIN2510 (PN10) |  |  |
| **2** | **Actuator & Worm Gear:** | | |  |
|  | Manufacturer/Make: | Auma , Centork, Bernard or equivalent |  |  |
|  | Type | Electrical |  |  |
|  | Electrical actuation features | 110 Single Phase, 230/460 Three Phase  • Modulating Service  • Throttling Service  • Remote push button control and indication  • Torque Switches, Limit Switches  • De-clutch able handwheels  • Available from a wide variety of manufacturers |  |  |
|  | Operation | Electrical – Actuated & Hand wheel operated |  |  |
| 2 | Documents | | |  |
|  | Certification of origin | To be submitted |  |  |
|  | Submit Manufacturer certification and test reports | To be submitted |  |  |
|  | Submit Detail drawing brochure catalogue. | To be submitted. |  |  |

**Mechanical work, Electrical Actuated -worm Gear, Cam centric plug Valve for sludge pipe.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | **Plug Valve** | | |  |
|  | Manufacturer/Make: | Val Matic, Erhard, VAG or equivalent |  |  |
|  | Type | Cam centric plug Valve for sludge pipe |  |  |
|  | Specification | Flanged, DN (150-200) mm dia. |  |  |
|  | Drilling according | Drilling according to ISO 2531 PN10 |  |  |
|  | Body and bonnet | GGG-40 |  |  |
|  | Disk | GGG-40 |  |  |
|  | Shaft | X20 Cr13 (AISI-420) |  |  |
|  | Sealing | EPDM / NBR |  |  |
|  | Standards | Flanges - DIN2510 (PN10) |  |  |
|  | Coating | Epoxy Blue Ral 5015, 250 microns as average |  |  |
| 2 | **Actuator & Worm Gear:** |  |  |  |
|  | Manufacturer | Auma, Centork, Bernard or equivalent |  |  |
|  | Electrical actuation features | 110 Single Phase, 230/460 Three Phase  • Modulating Service  • Throttling Service  • Remote push button control and indication  • Torque Switches, Limit Switches  • De-clutch able handwheels  • Available from a wide variety of manufacturers |  |  |
|  | Type | Electrical |  |  |
|  | Operation | Electrical – Actuated & Hand wheel operated |  |  |
| 3 | Documents |  |  |  |
|  | Certification of origin | To be submitted |  |  |
|  | Submit Manufacturer certification and test reports | To be submitted |  |  |
|  | Submit Detail drawing brochure catalogue. | To be submitted. |  |  |

**Mechanical work, Non-Return Valve (Seat tilting Disc) Specification**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Description** | | **Required specifications** | **Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
|  | Manufacturer | | Erhard, VAG, Pratt or equivalent |  |  |
| **1** | | **Material** | | |  |
|  | Body | | Ductile iron / Cast Iron |  |  |
|  | Disc /Valve ring. | | Ductile iron EN-GJS-400-15 (GGG-40) / Zinc- free bronze / stainless steel 1.4404 / elastomer KTW/W270 |  |  |
|  | Valve sealing | | EPDM or equivalent |  |  |
|  | Check valve Shaft | | Stainless steel. |  |  |
|  | Valve size | | DN 200 mm |  |  |
|  | Pressure rating | | PN 10 |  |  |
| **2** | **Corrosion protection** | | | |  |
|  | Body | | Internally and externally epoxy coated according GSK guides or equivalent |  |  |
|  | Disc | | epoxy coated according GSK guides or equivalent |  |  |
| **3** | **Test and approvals** | | | |  |
|  | Final inspection test | | According to EN12266 or equivalent |  |  |
|  | Elastomers approval | | According to W270 or equivalent |  |  |
|  | Flanges ends on both sides | | According to EN1092-1 or equivalent |  |  |
| **4** | **Certificates and documents** | | | |  |
|  | Certificates | | ISO, DVGW, DAKKS or equivalent |  |  |
|  | Submit Manufacturer certification and test reports | | To be submitted |  |  |
|  | Submit Detail drawing brochure catalogue. | | To be submitted |  |  |

|  |  |  |  |  |
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| **Mechanical works (Level Transmitter for water reservoirs)** | | | |  |
| ***#*** | ***Description*** | ***UNDP Requested specifications*** | ***Bidders Offered specification*** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Type | Ultrasonic Water level Transducer |  |  |
| 2 | Brand name | (Endress Hauser , Youkogawa , APG or equivalent) |  |  |
| 3 | Reservoir deep | 5 m |  |  |
| 4 | Evaluation : | Level |  |  |
| 6 | Operation | Level + Pump control, alternating  Illuminated display + keypad, panel mounting front IP 65 |  |  |
| 7 | Power supply | 90-253 VAC |  |  |
| 8 | Output: | 1 X 0/4-20mA Hart |  |  |
| 9 | Range | 0.3 – 6 m |  |  |
| 10 | Temperature : | 5-40 C |  |  |
| 11 | Fluid | Water |  |  |
| 12 | Detail drawing brochure catalogue | To be submitted. |  |  |

**BOQ Mechanical work – Motorized cleaning mechanical stainless steel screen bar.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Type: | Motorized Mechanical Cleaning Screen bar |  |  |
| 2 | Make: | Armes , Mass or Equivalent |  |  |
| 3 | Channel Width: | 400mm |  |  |
| 4 | Chanel Depth | 2150mm |  |  |
| 5 | Angle | 750 |  |  |
| 6 | Screen spacing. | 20mm |  |  |
| 7 | Bar thickness | 10mm |  |  |
| 8 | Frame material | AISI 304 |  |  |
| 9 | Bar Material | AISI 304 |  |  |
| 10 | Drive | Motor + Reducer |  |  |
| 11 | Power | 0.55 Kw. |  |  |
| 12 | Accessories | Control panel. |  |  |
| 13 | Submit Detail drawing brochure catalogue: | To be submitted. |  |  |

***BOQ Mechanical - Air-Blower 550m3/hr***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
|  | Type: | Rotary |  |  |
|  | Make: | Atlas Copco, mapro, Root , Hibon or Equivalent |  |  |
|  | Flow rate: | Q= 550 m3/hr. |  |  |
|  | Pressure | Min. 500 ml bar |  |  |
|  | Speed max: | (1500-3000) rpm |  |  |
|  | Voltage: | 220-240 V |  |  |
|  | Power | (15-20)KW |  |  |
|  | Frequency: | 50 Hz |  |  |
|  | Theory: | Centrifugal Pump |  |  |
|  | Shaft seal: | mechanical sealing |  |  |
|  | Temperature: | 0°C - max 80 °C |  |  |
|  | Accessories | Suction filter, silencer, discharge line silencer , check valve, water trap, drain valve , necessary valves, source of belt and guard, relief valve, case and sound cabinet. |  |  |
|  | Shaft Material: | Stainless Steel |  |  |
|  | Gland & Impeller | Bronze |  |  |
|  | Submit Detail drawing brochure catalogue: | To be submitted. |  |  |

***BOQ Mechanical - Air-Blower 308 m3/hr***

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| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Type: | Rotary |  |  |
| 2 | Make: | Atlas Copco, mapro, Root, Hibon or Equivalent |  |  |
| 3 | Flow rate: | Q= (308-310) m3/hr. |  |  |
| 4 | Pressure | ( 250-300) ml bar |  |  |
| 5 | Speed max: | (1300-3000) rpm |  |  |
| 6 | Voltage: | 220-240 / 380 V |  |  |
| 7 | Power | (5.5-7) Kw |  |  |
| 8 | Frequency: | 50 Hz |  |  |
| 9 | Theory: | Centrifugal Pump |  |  |
| 11 | Shaft seal: | mechanical sealing |  |  |
| 12 | Temperature: | 0°C - max 80 °C |  |  |
| 13 | Accessories | Suction filter, silencer, discharge line silencer, check valve, water trap, drain valve, necessary valves, source of belt and guard, relief valve, case and sound cabinet. |  |  |
| 14 | Shaft Material: | Stainless Steel |  |  |
| 15 | Gland & Impeller | Bronze |  |  |
| 16 | Submit Detail drawing brochure catalogue: | To be submitted. |  |  |

***BOQ Mechanical – Bridge mechanical Scraper***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
|  | Type: | Peripheral driven bridge scraper |  |  |
|  | Make: | Wes tech / Armes or Equivalent |  |  |
|  | Tank Dia. | 9.5 m |  |  |
|  | Tank depth | 4m |  |  |
|  | Motor |  |  |  |
|  | Power | (1.1-2) Kw |  |  |
|  | Speed | (1000-1500) rpm |  |  |
|  | Voltage: | 220-240 / 380 V |  |  |
|  | Frequency: | 50 Hz |  |  |
|  | Gear Box | 4 round /hr |  |  |
|  | Torque overload protection to protect the scraper and gearbox. | Torque meter to be installed with two stage, Alarm then shutdown the system |  |  |
|  | Scraper material | AISI 304 |  |  |
|  | Bridge | Carbon steel epoxy coated |  |  |
|  | Hand rail and grating walk way | Galvanized steel / epoxy coated minimum three layer. |  |  |
|  | No of wheels | (2-4) |  |  |
|  | Walking path | Carbon steel epoxy coated / Hot dip galvanized. |  |  |
|  | Submit Detail drawing brochure catalogue: | To be submitted. |  |  |

***BOQ Mechanical – Disc Membrane diffusors***

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| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
|  | Type: | 9" Disc Membrane Diffusors |  |  |
|  | Make: | Aquaflex, Armes or Equivalent |  |  |
|  | Membrane | EPDM- Silicone- PTFE ( Teflon coated) |  |  |
|  | Diameter ( inside /outside) | 230/270 mm |  |  |
|  | Surface area | 0.039 m2 |  |  |
|  | Flow | (7-8) m3/hr. |  |  |
|  | connection | 3/4-inch external thread |  |  |
|  | Submit Detail drawing brochure catalogue: | To be submitted. |  |  |

***BOQ Mechanical – Online dissolved oxygen meter field type.***

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| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
|  | Type: | Online oxygen meter field type. |  |  |
|  | Make: | Hach, cam lab or Equivalent |  |  |
|  | Measuring rang | (0-20) mg/L, automatic range switching, 0-400C |  |  |
|  | Resolution | 0.1mg/L, 0.10C |  |  |
|  | Control Interface | Two sets of normally open relay contact, divided into high and low alarm signal, photoelectric isolation output |  |  |
|  | Signal isolation output: | photoelectric coupler isolated protection 4-20mA signal output |  |  |
|  | Relay: | arbitrary setting of hysteresis, relay load 3A 220VAC |  |  |
|  | Working conditions: | ambient temperature of 0-60℃, relative humidity ≤ 90% |  |  |
|  | Output load | <300Ω (4-20mA) |  |  |
|  | Working voltage: | 220VAC±10%, |  |  |
|  | Warranty | One year |  |  |
|  | Screen | Large screen dot matrix LCD display, English menu operation. |  |  |
|  | Features | * Multi parameter simultaneous display: oxygen value, temperature, output current, alarm point and so on. Visually readable and with range overrun hints. * The alarm status is displayed on the screen, and the output of the switch ON signal can be simultaneously connected. * Communication function RS-485 communication interface (MODBUS Protocol Part compatible), 4-20 mA current output corresponding to the DO value can be arbitrarily set * To be connected with main control panel for send signals to operate blowers of the aeration tanks. |  |  |
|  | Submit Detail drawing brochure catalogue: | To be submitted. |  |  |

***Mechanical work- Gas Vacuum Chlorinator System (6 Kg/hr.)***

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| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Type: | Gas Vacuum Chlorinator |  |  |
| 2 | Make | Severn Trent, Grundfose or equivalent. |  |  |
| 3 | Capacity | 6 Kg/hr. |  |  |
| 4 | Drive mode: | Electric |  |  |
| 5 | Voltage: | 220-240 V |  |  |
| 6 | Frequency | 50 Hz |  |  |
| 7 | Operating components : | Flow control valve, Feed rate indicator are mounted on fiber glass panel. Panel also has indication of water pressure gauge and chlorine vacuum gauge. |  |  |
| 8 | Injectors: | A water operating injector is mounted in the panel with provision for water inlet and chlorine solution outlet. |  |  |
| 9 | Gas trap | Gas trap |  |  |
| 10 | Electrical Heater | Built in Electrical heater |  |  |
| 11 | Chlorinator Parts: |  |  |  |
| 12 | Chlorine gas flow meter in Kg/hr.  Water Pressure gage:  Chlorine Vacuum gage:  Injector with check-valve:  Chlorine gas flow control valve  Floor mounted panel | (no.1)  (no.1)  (no.1)  (no.1)  (no.1)  (no.1) |  |  |
| 13 | Vacuum chlorine gas dosing systems | Wall mounted type. |  |  |
| 14 | Vacuum regulator |  |  |  |
| 15 | Dosing regulator |  |  |  |
| 16 | Chlorine gas Header for cylinder connection | 1 " dia. Stainless steel pipe  2 Valve with 1 " dia. Material. Bronze  Two no of cylinders installed together. |  |  |
|  | **Connections:** |  |  |  |
| 17 | Pressure side chlorine: | Union nut 1", G 3/4,  G 5/8, yoke USA,  flexible copper line  6/8 mm (1/2")  Vacuum safety line:  PE hose 10/14 mm,  or PVC pipe DN 15  (external diameter20 mm) |  |  |
| 18 | Submit Detail drawing brochure catalogue: | To be submitted |  |  |
| 19 | Submit Manufacturer certification: | To be submitted |  |  |

***Mechanical work , Chlorinator Boosting Pump***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Type: | Multi stages Pump |  |  |
| 2 | Flow rate: | Q= ( 3 -5)m3/hr |  |  |
| 3 | Head: | H= 40 m |  |  |
| 4 | Speed max: | 2900 rpm |  |  |
| 5 | Voltage: | 220-240V |  |  |
| 6 | Frequency: | 50 Hz |  |  |
| 7 | Power | 1.5 Kw / As per manufacturer |  |  |
| 8 | Theory: | Centrifugal Pump |  |  |
| 9 | Shaft seal: | mechanical sealing |  |  |
| 10 | Temperature: | - 15°C - max 80 °C |  |  |
| 11 | Max Pressure: | 6 Bar |  |  |
| 12 | Max Efficiency: | 80% |  |  |
| 13 | Shaft Material | Stainless Steel |  |  |
| 13 | Gland & Impeller | Bronze |  |  |
| 14 | Submit Detail drawing brochure catalogue: | To be submitted. |  |  |

**Mechanical Work sludge Progressive cavity Pumps;**

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| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| **Motor** | | | |  |
|  | Manufacturer | Seepex, Netzsch, Siemens or equivalent. |  |  |
|  | Type | Gear Motor |  |  |
|  | Ratio(I) | 4.61 |  |  |
|  | Speed of Drive | (300-320) rpm |  |  |
|  | Rated voltage | (400-620) V DOL/ (Star- Delta) |  |  |
|  | No. of phases | 3 (Three) |  |  |
|  | Frequency | 50 Hz |  |  |
|  | Rated speed | (1480-1500) RPM |  |  |
|  | Rated power | (20-22) Kw |  |  |
|  | Cos phi power factor | 0.70 - 0.80 |  |  |
|  | Insulation class | F |  |  |
|  | Enclosure | IP 55 |  |  |
|  | Max ambient temp. | (5-60 )°C |  |  |
| **Pump** | | | |  |
|  | Manufacturer | Sepeex, Netzsch , Siemens or equivalent. |  |  |
|  | Pump type: | Progressive cavity pump |  |  |
|  | Casing material | EN-JL 1040 (gci-25) |  |  |
|  | Suction connection | DN 150 PN 16 DIN EN 1092 (DIN2501) |  |  |
|  | Pressure connection | DN 150 PN 16 DIN EN 1092 (DIN2501 |  |  |
|  | Pump liquid | Sewerage Sludge |  |  |
|  | Rated flow | 45m3/hr |  |  |
|  | Maximum working pressure | 7bar |  |  |
|  | Max. temperature of dosed chemical | (20-45) °C |  |  |
|  | Shaft diameter | 80 mm. |  |  |
|  | **Protections:** |  |  |  |
|  | Dry running protection device (TSE) | basic design  - sensor sleeve fitted to the stator of the  pump with integrated temperature sensor  and evaluation unit (IP67)  - fixed switch off temperature 60°C  - connection with M12 sensor plug  Voltage 24 V DC  Temperature coefficient Pt100  Material sensor sleeve 1.4404 / AISI 316L  Material connection head 1.4404 / AISI 316L |  |  |
|  | Over pressure protection | Design Overpressure protection  Casing stainless steel casing 304  Membrane ceramic membrane AL203  Sealing ring Viton  Measuring range 0-20 bar  Connection G½"  Output signal 4-20 mA  Supply voltage 24 V DC |  |  |
|  | Certification of origin | To be submitted. |  |  |
|  | Submit Manufacturer certification and test reports | To be submitted. |  |  |
|  | Submit Detail drawing brochure catalogue. | To be submitted. |  |  |

**Piping and fittings system**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Piping and fittings system | All materials used for piping and fittings have CE, ISO certificates or equivalent. All the pipes and fittings are PN10 UPVC inside the system. Besides, the steel pipes shall be stainless steel or hotdip galvanized. |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Mechanical Work, Portable Generator** | | |  |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
|  | Manufacture Name | Autosan, hyundai , or Equivalent |  |  |
| 1 | Type | Portable |  |  |
| 2 | Rated Power | 4-5 KVA |  |  |
| 3 | Rated speed | 3000 rpm |  |  |
| 4 | Rated current | 18-23Ampere |  |  |
| 5 | Rated Voltage | 220V, 50 Hz. |  |  |
| 6 | Maximum ambient temperature | 50 c. |  |  |
| 7 | Fuel | Diesel / Benzine. |  |  |
| 8 | Outlet socket | 2 No. |  |  |
| 9 | Compliance & Certification | To be submitted |  |  |
| 10 | Operation manual | To be submitted |  |  |

**Mechanical Work, DC Electrical welding machine, 1-phase (10-200A)**

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| --- | --- | --- | --- | --- | --- |
|  | | **Description** | **Requested specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | | Manufacturer | MAGMAWELD, Miller, ESAB, or equivalent |  |  |
| 2 | | Line Voltage (3 Phase) | 230 V / 50 Hz |  |  |
| 3 | | Input Power | (5-9) kVA (14%) |  |  |
| 4 | | Input Current | 42.1 A (14%) |  |  |
| 5 | | Recommended Line Fuse | 32 A Delayed |  |  |
| 6 | | Welding Current Range | 10-200 ADC |  |  |
| 7 | | Rated Welding Current | 200 ADC (14%) |  |  |
| 8 | | Max. Open Circuit Voltage | 65 VDC |  |  |
| 9 | | Electrode Range | 1.6 – 4.00 mm |  |  |
| 10 | | Protection Class | IP 23S |  |  |
| **Standard Accessories (included)** | | | | |  |
| 11 | Earth Clamp and Cable | | 16 mm² - 3 m |  |  |
| 12 | Electrode Holder with Cable | | 16 mm² - 3 m |  |  |
|  | | | | |  |
| 13 | Submit Detail drawing brochure catalogue. | | To be submitted |  |  |
| 14 | Submit Manufacturer certification and test reports | | To be submitted |  |  |
| 15 | Submit Detail drawing brochure catalogue. | | To be submitted |  |  |

**Mechanical work , Portable submersible pump ( 30m3/hr @12m)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Description** | **Requested specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
|  | Motor |  |  |  |
| 1 | Make | ABB, Schneider, Siemens or equivalent |  |  |
| 2 | Rated voltage | 380V – 400V |  |  |
| 3 | No of phase | 3PH Y/D |  |  |
| 4 | Frequency | 50 Hz |  |  |
| 5 | Type | Submersible |  |  |
| 6 | Rated speed | 1000-1500 RPM |  |  |
| 7 | Rated power | According to the Manufacturer standard |  |  |
| 8 | Cos phi power factor | 0.80 - 0.85 |  |  |
| 9 | Start method | Star - Delta |  |  |
| 10 | Enclosure class (IEC 34-5) | IP 68 |  |  |
| 11 | Insulation class (IEC 85) | F |  |  |
| 12 | Motor Protect | Control panel |  |  |
| 13 | Thermal Protection | External |  |  |
| 14 | Built-in temperature transmitter | Yes |  |  |
| 15 | Max ambient temp. | 60°C |  |  |
| 16 | Starter type | Star - Delta |  |  |
|  | ***Pump section*** |  |  |  |
| 17 | Manufacturer/Make: | Speroni, Grundfos, Wilo, flyght Sweden. |  |  |
| 18 | Type: | Submersible Pump Sewerage |  |  |
| 19 | Pump liquid | Sewage water |  |  |
| 20 | Rated flow | 30 m3/h |  |  |
| 21 | Rated head | 10 M |  |  |
| 22 | Shaft Materials | Stainless steel AISI 304 |  |  |
| 23 | Impeller Material | Cast Iron |  |  |
| 24 | Efficiency | 75-85% |  |  |
| 25 | Pressure rating | PN10 |  |  |
| 26 | Max & min. Liquid temp. range | 0-40C |  |  |
| 27 | Pump type | Submersible pump Sewerage Type |  |  |
| 28 | Flexible Hose | 30 m flexible reinforced |  |  |
| 29 | Flange | Hose connected with flange compatible with pump flange. |  |  |
| 30 | Certification of origin | Certification of origin |  |  |
| 31 | Submit Manufacturer certification and test reports | Submit Manufacturer certification and test reports. |  |  |
| 32 | Submit Detail drawing brochure catalogue. | Submit Detail drawing brochure catalogue. |  |  |

**Mechanical works, portable Submersible pump used for drain water.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***#*** | ***Description*** | ***Requested specifications*** | ***Bidders Offered specification*** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
|  | **Motor** |  |  |  |
| 1 | Make | ABB, Schneider, Siemens or equivalent |  |  |
| 2 | Rated voltage | 230 V. |  |  |
| 3 | No of phase | 1PH |  |  |
| 4 | Frequency | 50 Hz |  |  |
| 5 | Type | Submersible |  |  |
| 6 | Rated speed | 2,900 RPM |  |  |
| 7 | Rated power | According to the Manufacturer standard |  |  |
| 8 | Cos phi power factor | 0.80 - 0.85 |  |  |
| 9 | Start method | Star - Delta |  |  |
| 10 | Enclosure class (IEC 34-5) | IP 68 |  |  |
| 11 | Insulation class (IEC 85) | B |  |  |
| 12 | Motor Protect | Control panel |  |  |
| 13 | Thermal Protection | External |  |  |
| 14 | Built-in temperature transmitter | Yes |  |  |
| 15 | Max ambient temp. | 40°C |  |  |
| 16 | Pump type | Submersible pump used for drain water |  |  |
| 17 | Flexible Hose | 30 m flexible reinforced |  |  |
| 18 | Connection NPT | Hose to connectable with pump discharge. |  |  |
| 19 | Certification of origin | Certification of origin |  |  |
| 20 | Submit Manufacturer certification and test reports | Submit Manufacturer certification and test reports. |  |  |
| 21 | Submit Detail drawing brochure catalogue. | Submit Detail drawing brochure catalogue. |  |  |

**Mechanical Work , 5 ton manual hoist crane**

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| --- | --- | --- | --- | --- |
| **#** | **Description** | **UNDP Requested specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| Manufacturer | | | |  |
| 1 | Manufacturer | KITO, GH cranes, Street, DONGQI, PODEM cranes or equivalent |  |  |
| **Crane** | | | |  |
| 2 | Capacity | 5 tons |  |  |
|  | Lifting height | (6-10) meters |  |  |
|  | Operation | Manual Four direction ( up-Down ) |  |  |
|  | Certification of origin | Certification of origin |  |  |
|  | Submit Manufacturer certification and test reports | Submit Manufacturer certification and test reports. |  |  |
|  | Submit Detail drawing brochure catalogue. | Submit Detail drawing brochure catalogue. |  |  |

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| ***BOQ Mechanical Item , 50L Seamless Steel Chlorine cylinders:*** | | | |  | |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** | |
| 1 | Manufacturer Name | Bursan or Equivalent |  | |  | |
| 2 | Type | Vertical |  | |  | |
| 3 | Chlorine capacity | (50-65) Liter |  | |  | |
| 4 | Empty weight | 650 Kg |  | |  | |
| 5 | Test pressure | 345 bar. |  | |  | |
| 7 | Design temperature | -20C - +75 c deg. |  | |  | |
| 8 | Number of valves | 1 |  | |  | |
| 9 | Cylindrical length | (1,460-1,500) mm |  | |  | |
| 10 | Out side dia. | (229-240) mm |  | |  | |
| 11 | Valve protection Dome | 1 Protective cap. |  | |  | |
| 12 | Coating | Epoxy paint Yellow above Iron red acrylic anti- rust paint. |  | |  | |
| 13 | Certification of origin | To be submitted |  | |  | |
| 14 | Submit Manufacturer certification and test reports | To be submitted |  | |  | |
| 15 | Submit Detail drawing brochure catalogue. | To be submitted |  | |  | |

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| --- | --- | --- | --- | --- |
| ***Mechanical Work 24,000 Btu/hr. Split Unit:*** | | |  | |
| **Description** | **Required Specifications** | **Bidders Offered specification** | | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** | |
| Manufacturer Name | Gree, LG, Tosot or Equivalent |  | |  | |
| Type | Wall Mounted Split Unit |  | |  | |
| **CHARACHTERISTICS** |  |  | |  | |
| Auxiliary supply voltage (V) | 230 V/50HZ |  | |  | |
| Tonnage Range (T) | 2 |  | |  | |
| Compressor | DC Inverter / T3 |  | |  | |
| Refrigerant Gas | R410 A |  | |  | |
| Cooling Capacity (BTUH) | 24,000 |  | |  | |
| Filter Type | Mico dust protection filters washable |  | |  | |
| Operation Range temperature © | (17 -30) |  | |  | |
| Remote Control | Wireless /LCD type |  | |  | |
| Noise Level (dB) | 30 - 35 -40 |  | |  | |
| Max ambient temp. | T3 (52°C) |  | |  | |
| Base | Steel base weather installed on the ground or wall mounted. |  | |  | |
| Installation method: | If installed on the roof the 65mm dia. Required Pvc sleeves are included. |  | |  | |
| Indoor drain pipe | Should installed. |  | |  | |
| Certification of origin | To be submitted |  | |  | |
| Submit Manufacturer certification and test reports | To be submitted |  | |  | |
| Submit Detail drawing brochure catalogue. | To be submitted |  | |  | |

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| ***Mechanical Work 18,000 Btu/hr. Split Unit:*** | | |  | |
| **Description** | **Required Specifications** | **Bidders Offered specification** | | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** | |
| Manufacturer Name | Gree, LG, Tosot or Equivalent |  | |  | |
| Type | Wall Mounted Split Unit |  | |  | |
| **CHARACHTERISTICS** |  |  | |  | |
| Auxiliary supply voltage (V) | 230 V/50HZ |  | |  | |
| Tonnage Range (T) | 2 |  | |  | |
| Compressor | DC Inverter / T3 |  | |  | |
| Refrigerant Gas | R410 A |  | |  | |
| Cooling Capacity (BTUH) | 18,000 |  | |  | |
| Filter Type | Micro dust protection filters washable |  | |  | |
| Operation Range temperature © | (17 -30) |  | |  | |
| Remote Control | Wireless /LCD type |  | |  | |
| Noise Level (dB) | 30 - 35 -40 |  | |  | |
| Max ambient temp. | T3 (52°C) |  | |  | |
| Base | Steel base weather installed on the ground or wall mounted. |  | |  | |
| Installation method: | If installed on the roof the 65mm dia. Required Pvc sleeves are included. |  | |  | |
| Indoor drain pipe | Should installed. |  | |  | |
| Certification of origin | To be submitted |  | |  | |
| Submit Manufacturer certification and test reports | To be submitted |  | |  | |
| Submit Detail drawing brochure catalogue. | To be submitted |  | |  | |

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| **Mechanical works, (Electric Cold Drinking Water Cooler )** | | | | |
| ***#*** | ***Description*** | ***UNDP Requested specifications*** | ***Bidders Offered specification*** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ)** |
| 1 | Type | Free standing Cold Drinking Water Dispenser |  |  |
| 2 | Min Capacity | 60 liter |  |  |
| 3 | Min Cooling water capacity | 60 liters per hour up to 5 Degrees: |  |  |
| 4 | Material of Tank | Stainless steel / Plastic |  |  |
|  | Material of the panel, top lid, Front Top, Front bottom & sides / rear | **Stainless steel / plastic** |  |  |
| 5 | Dip Tray | **Stainless steel / Plastic** |  |  |
| **6** | Min Number of Tap, Brass cr. Plated. | 2 |  |  |
| **8** | Compressor |  |  |  |
|  | Water inlet hose pipe & float valve. | Provided |  |  |
|  | Over flow pipe | Provided. |  |  |
| 9 | Refrigerant | 134a /404a |  |  |
| 10 | Power | (1-1.5) Hp. |  |  |
| 11 | Voltage | 220V-240v /50Hz |  |  |
| 12 | Submit Detail drawing brochure catalogue | To be submitted |  |  |

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| --- | --- | --- | --- | --- |
| **Mechanical works, Horizontal Centrifugal Pump electrically controlled for filling up the Reservoirs on the roof.** | | | |  |
| ***#*** | ***Description*** | ***UNDP Requested specifications*** | ***Bidders Offered specification*** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ)** |
|  | ***Motor*** |  |  |  |
| 1 | Make | Wilo , Pedrollo , Grundfos, or Equivalent. |  |  |
| 2 | Rated voltage | 220V –240V |  |  |
| 3 | No of phase | 1 PH with capacitor. |  |  |
| 4 | Frequency | 50 Hz |  |  |
| 5 | Rated speed | 2900 RPM |  |  |
| 6 | Rated power | 1.1 Kwatt |  |  |
| 7 | Cos phi power factor | 0.80 - 0.90 |  |  |
| 8 | Start method | Normal Start |  |  |
| 9 | Enclosure class | (IEC 34-1)( protect water jet, mud and dust) IP 55 |  |  |
| 10 | Insulation class | F |  |  |
| 11 | Motor Protect | Full motor protection |  |  |
| 12 | Thermal Protection | Full motor protection |  |  |
| 13 | Built-in temperature transmitter | yes |  |  |
| 14 | Max ambient temp. | 60°C |  |  |
|  | **Pump section** |  |  |  |
| 15 | Manufacturer/Make: | Wilo , Pedrollo , Grundfos, or Equivalent. |  |  |
| 16 | Type: | Centrifugal horizontal Pump electrically controlled, Automatic On / off |  |  |
| 17 | Pump liquid | Clean water |  |  |
| 18 | Rated flow | 3 m3/hr. |  |  |
| 19 | Rated head | 30 M |  |  |
| 20 | Pump Body | Cast Iron with threaded ports ISO 228/1 |  |  |
| 21 | Shaft Materials | Stainless Steel 1.4404 |  |  |
| 22 | Impeller Material | Brass, radial Peripheral Vanes. |  |  |
| 23 | Mechanical seal | Ceramic – graphite - NBR |  |  |
| 24 | Efficiency | 75-80% |  |  |
| 25 | Pressure rating | PN10 |  |  |
| 26 | Max & min. Liquid temp. range | 0-40°C |  |  |
| 27 | Pump type | Centrifugal pumps. |  |  |
| 28 | Operation | Fully Automatic. On /Off, Non-Dry running protection. |  |  |

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|  | **Mechanical work / lab Equipment: UV / Visible spectrophotometer** | | |  |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Manufacture Name | Hach, cam lab, Dalco, or Equivalent |  |  |
| 2 | Type | UV / Visible spectrophotometer  programmed testing methods, including high-speed wavelength scanning across the UV and Visible Spectrum. |  |  |
| 3 | Operation mode | Transmittance (%), absorbance and concentration (wavelength, time) |  |  |
| 4 | Source Lamp | Tungsten (visible range), deuterium (UV range) |  |  |
| 5 | Wave length | 190 - 1100 nm |  |  |
| 6 | Wave length accuracy | ± 1 nm |  |  |
| 7 | Wave length resolution | 0.1 nm |  |  |
| 8 | Wave length selection | Automatic, based on method selection |  |  |
| 9 | Scanning speed | (900-1000) nm/min (in 1 nm steps) |  |  |
| 10 | Display | TFT 7 inch WVGA color touch |  |  |
| 11 | Data logger | 5000 data points (result, date, time, sample-ID, user-ID) |  |  |
| 12 | Programmed Methods | >250 |  |  |
| 13 | Use Methods | (200-210) |  |  |
| 14 | Sample cell compatibility | Rectangular: 10, 20, 30, 50 mm, 1 inch; round: 13 mm, 16 mm, 1 inch  Optional 100 mm rectangular cell with additional adapter |  |  |
| 15 | Enclosure Rating | IP20 with closed lid. |  |  |
| 16 | Interfaces | USB type A (2), USB type B, Ethernet, RFID module |  |  |
| 17 | Warranty | One year. |  |  |
| 18 | Submit Manufacturer certification and User manual: |  |  |  |

**Laboratory Equipment.**

**Mechanical work / lab Equipment: Dry Thermostat COD Reactor:**

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| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Type: | Dry Thermostat COD Reactor |  |  |
| 2 | Make: | Hach, Phipps bird or equivalent |  |  |
| 3 | Temperature range | (37-165) c0 |  |  |
| 4 | Pre-Programmed | 100,105,150, & 165 C0 |  |  |
| 5 | Heating range | (20-150) in 10 min. |  |  |
| 6 | Temperature stability | ±1 °C in conformity with EN, ISO, EPA methods |  |  |
| 7 | Display | Large, easily readable display and one-key operation for standard digestions |  |  |
| 8 | Tubes: | COD reactor with one block to fit 15 x 16mm tubes |  |  |
| 9 | Warranty | One year |  |  |
| 10 | Submit Manufacturer certification and User manual: | To be submitted. |  |  |

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| **Mechanical work / lab Equipment: Dry Vacuum / Pressure Pump.** | | |  |
| **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| Manufacture Name | Hach, cam lab, Dalco, or Equivalent |  |  |
| Type | Dry laboratory vacuum/pressure pumps for physical and aqueous vapour applications |  |  |
| Flowrate | (18-20) Liter/ Min. |  |  |
| Vacuum | (133-140) mbar |  |  |
| Pressure | (7.9-10) |  |  |
| Features | Water jet or aspirator replacement  for general duties - Oil-free Wob-L piston pump technology - Lightweight  compact and portable with a high performance to size ratio - 8mm hose  nozzles. |  |  |
| Warranty | One year. |  |  |
| Submit Manufacturer certification and User manual: |  |  |  |

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| --- | --- | --- |
| **Mechanical work / lab Equipment: Chilling Heating Incubator 27.5L, 4°C - 70°C.** | | |
| **Description** | **Required Specifications** | **Bidders Offered specification** |
| Manufacture Name | Hach, cam lab, Dalco, or Equivalent |  |
| Type | Chilling Heating Incubator 27.5L, 4°C - 70°C. |  |
| Working base | Peltier-based - no compressors, no CFC's and energy efficient |  |
| Temperature range: | (4-70 C0)  Max cooling to 16 C0 below room temperature. |  |
| Readability  Accuracy | Of 01 0C  ± 0.2°C |  |
| Control | PID Controller |  |
| Chamber uniformity | ± 0.5°C |  |
| Operation with | Timer with alarm and Auto-off functions |  |
| Protection | Electronic calibration and power failure protection |  |
| Interface | RS232 |  |
| Features | benchtop solid state convection chilling/heating incubators are reliable, accurate and  easy to use. The incubators are Peltier-based for heating and chilling. They have no compressors or CFC's. ideal application :   * Protein crystal growth * BOD analysis |  |
| Warranty | One year. |  |
| Submit Manufacturer certification and User manual: | To be submitted |  |

**Mechanical work / lab Equipment: Flexible Laboratory bench multi Meter for efficient water quality parameters testing**

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| --- | --- | --- | --- | --- |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Type: | Single input channel for flexible measurement of pH, Conductivity, Total Dissolved Solid (TDS), Optical Dissolved Oxygen (DO),  Biochemical Oxygen Demand (BOD), Oxide Reduction Potential (ORP/Redox), Temperature, Ion Selective Electrode (ISE) direct  concentration reading for Ammonia, Ammonium, Fluoride, Chloride, Sodium - connect any Intellical |  |  |
| 2 | Make: | Hach, Cam lab or equivalent |  |  |
| 3 | Automatic Buffer Recognition: | Yes |  |  |
| 4 | Barometric Pressure Measurement | Automatic compensation of DO when using an LDO or LBOD probe |  |  |
| 5 | Calibration | Demal (1D/ 0.1D/ 0.01D);  Molar (0.1M/ 0.01M/0.001M); NaCl (0.05%; 25μS/cm; 1000μS/cm; 18mS/cm);  Standard sea water; |  |  |
| 6 | Calibration Intervals/Alerts/Reminder: | Off, selectable from 2 hours to 7 days |  |  |
| 7 | Communication | Integrated USB type A (for USB 2.0 flash memory device, printer, keyboard) and Integrated USB  type B (for PC) |  |  |
| 8 | Tubes: | COD reactor with one block to fit 15 x 16mm tubes |  |  |
| 9 | Compliance Certifications: | CE.WEEE |  |  |
| 10 | Conductivity measurement: | yes |  |  |
| 11 | Conductivity Measurement Range: | 0.01 μS/cm - 200.0 mS/cm |  |  |
| 12 | Conductivity measurement: Temperature  correction | None; Linear; NaCl Non-Linear Natural Water. |  |  |
| 13 | Data Export | Download via USB connection to PC or flash memory device. Automatically transfer entire data  log or as readings are taken |  |  |
| 14 | Data Memory | 500 records/FIFO |  |  |
| 15 | Data storage | Automatic, GLP ISO compliant reading data stored with calibration |  |  |
| 16 | Display | Detailed mode/Large mode |  |  |
| 17 | Display Type: | 440 x 160 pixel LCD with backlight illumination |  |  |
| 18 | DO Measurement Range: | 0.1 - 20.0 mg/L (ppm) 1 - 200% saturation |  |  |
| 19 | DO Resolution: | 0.1 |  |  |
| 20 | DO sensor calibration: | 100% (water-saturated air (100%) calibration  • 100% with 0 (water-saturated air (100%) calibration with 0 point  • mg/L (calibration with a specified dissolved oxygen concentration (mg/L) solution)  • mg/L with 0 (calibration with a specified dissolved oxygen concentration (mg/L) solution with 0  point)  • Factory (calibration with the default LDO calibration) |  |  |
| 21 | Language | English |  |  |
| 22 | pH Buffer Sets: | Color-coded: 4.01, 7.00, 10.01 pH;  IUPAC: 1.679, 4.005, 7.000, 10.012, 12.45 pH  DIN: 1.09, 4.65, 9.23 pH  User-defined custom buffer sets |  |  |
| 23 | pH Electrode calibration: | 1 - 3 Calibration points  Calibration summary data logged and displayed |  |  |
| 24 | pH Measurement Range: | 0 - 14 pH |  |  |
| 25 | TDS Measurement Range: | 0.00 mg/L - 50.0 g/L as NaCl |  |  |
| 26 | TDS Resolution: | 0.01 mg/L - 0.1 g/L upon measuring range. |  |  |
| 27 | Warranty | One year |  |  |
| 28 | Submit Manufacturer certification and User manual: | To be submitted. |  |  |

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