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| **ANNEXURE A-1: Proposed Laboratory Equipment Supply for a Typical WWTP**  *(The bidders shall propose equivalent or similar laboratory equipment suitable for the type of WWTP that he offers in the bid)* | | | | | | |
| **Item** | **Equipment and**  **Instrument** | **Qty** | **Unit** | **Specification** | | |
| 1 | Analytical Balance | 1 | pc | Type: | Auto calibrating type | |
| Readability | 0.1mg or better  Max. 210g or more | |
| Power source | 220-240V | |
| Reference | RADWAG/ AS 220 R2 or equivalent. | |
| 2 | Auto-dry desiccators | 1 | pc | Type: | Cabinet type auto dry desiccators equipped with auto dry unit with hygrometer | |
| Materials: | Plastic | |
| Dimension  (approx.): | L 260 × W 320 × H470 | |
| Inner humidity: | to be controlled automatically approx. 30 to 40 % | |
| Power Source | 220-240V | |
| Reference | Sanplatec, Japan Auto C-3B or Equivalent or similar | |
| 3 | Centrifuge | 1 | pc | Type | general-purpose use | |
| Speed Range | 0 to 6,000 rpm or more | |
| Display | digital display | |
| Power Source | 220-240 V | |
| Others | with rotor (fixed-angle) and related accessories (tubes etc.) | |
| Reference | HETTICH Rotofix32A1206 or equivalent | |
| 4 | UV/VIS spectrophotometer | 1 | pc | Wavelength range | 190 to 1100 nm or equivalent | |
| Bandwidth: | 2nm or equivalent | |
| Wavelength accuracy: | ±1.0 nm in Wavelength range 200 to 900nm or equivalent | |
| Calibration type: | automatic wavelength calibration | |
| Display: | LED display | |
| Power source: | 220-240V | |
| Others: | all accessories | |
| Reference | HACH DR 6000 or equivalent | |
| 5 | Filtration assembly | 1 | pc |  | With a coarse fritted glass support base, a graduated glass funnel with 300 ml capacity, clamp, silicone stopper, filtering flask etc | |
| 6 | Water purification system | 1 | pc | Pure water quality: | 1-5 ppb  TOC<0.2ppb/l | |
| Max. flow rate: | 1.0 l/min or more | |
| Others: | with standard spare-parts, accessories, and consumables for 1 year. | |
| Power Source | 220-240V | |
| Reference | Thermo Scientific Smart 2 pure/UV | |
| 7 | Ultrasonic cleaner | 1 | pc | Capacity: | 6 litres or more | |
| Power source: | 220-240 V | |
| Others: | equipped with timer and standard accessories | |
| Reference | Rocker/ Soner 206 H or equivalent or similar | |
| 8 | Muffle furnace | 1 | pc | Operating temperature range: | 100 to 1100 degrees C or equivalent | |
| Capacity: | 5 litres or more | |
| Accessories: | exhaust unit, gloves, steel tong and high-form crucibles (15 ml × 1 pkg, 100 ml × 1pkg) | |
| Power source: | 220-240V | |
| Reference: | Hobersal /HD 230 PAD or Equivalent or Similar. | |
| 9 | COD Reactor | 1 | pc | Programmable temperature range: | 37 to 165 degree C | |
| Programmable timer range: | 0-480 minutes | |
| Display | Digital | |
| Power Source | 220-240V | |
| VNumber of vial wells | dual block (21 vials for dia. 16-mm vial and 4 vials for dia. 20-mm vial) | |
| Others | all accessories (such as adapters etc.) | |
| Reference | HACH DRB200 Reactor or equivalent or similar | |
| 10 | Oven | 2 | pc | Capacity | not less than 180 litres | |
| Temperature range | 40 to 260 degree C  Temperature | |
| Display | LED | |
| Temperature control accuracy: | ±0.5% of set point, which is103-105 deg C for wastewater sample testing | |
| Power source: | 220-240V | |
| Reference | Pol-Eko / SL 180 or Equivalent or Similar | |
| 11 | Incubator (Coliform) | 1 | pc | Capacity | 80 litres or more | |
| Temperature range | 5 to 75  degree C | |
| Temperature accuracy at 40 degrees C | ±0.1 degrees C | |
| Display: | LED or LCD | |
| Power source: | 220-240V | |
| Reference | Pol-Eko / SL 180 or Equivalent or Similar | |
| 12 | Microscope | 1 | pc | Type | Digital camera compound | |
| microscope Magnification: |  | |
| Power source: | 220-240 V | |
| Others | with full accessories (such as software, USB 2.0 PCI card etc.) | |
| Reference | Carl Zeiss /Primostar 415500-0057-000 or Equivalent or Similar | |
| 13 | Clean bench | 1 | pc | Cleanliness: | | ISO Class 2 |
| Reference | | Biobase/BSC1300IIA2-X or Equivalent or Similar |
| 14 | Incubator (BOD) | 1 | pc | Capacity | | 180L or more |
| Temperature range: | | 10 to 40  degree C |
| Temperature accuracy: | | ±1.0  degree C |
| Power source: | | 220-240V |
| Others | | WTW TS 606/2i BOD Thermostat Cabinet or equivalent |
| Reference | | VELP/ FOC 215I or Equivalent or similar |
| 15 | Sterilizer (autoclave) | 1 | pc | Type: | | electric steam type |
| Chamber capacity: | | electric steam type |
| Power source: | | 220-240 V |
| Reference | | Gemmy - SA-252 For Equivalent or Similar |
| 16 | Refrigerator | 3 | pc | Capacity: | | 300 litres or more |
| Cold room Temperature | | 0 to +10 degrees C |
| Freezer room Temperature | | less than minus 10 degrees C |
| Power Source | | 220-240 V |
| Reference | | Samsung Digital Inverter 350L Refrigerator RT37M5532SL or Equivalent or Similar |
| 17 | Fume hood (draft chamber ) | 1 | pc | Type | | standard type, with the exhaust fan and ducts |
| Exhaust air: | | not less than 10m3/min |
| Table Top | | ceramic made or other materials with anti-acidity, anti- alkalinity and heat-proof function |
| Front door: | | upper and lower movable balance door |
| Front glass: | | reinforced and heat-resistant safety glass |
| Power source: | | 220-240V |
| Dimension:  (Approx) | | L 1800 × W 800 × H 2000 or more |
| Reference: | | Biobase/FH 1800 (P) or Equivalent or Similar |
| 18 | Portable pH/meter | 2 | pcs | Type: | | portable pH meter with LCD (liquid crystal display) and automatic temperature compensation |
| Measuring range | | 0 to 14 pH units, 0 to ±2,000 mV |
| Temperature range: | | -10 to 110 degrees C |
| Sensitivity | | 0.0l pH, 0.1 mV |
| Accuracy | | ±0.0l pH, ±0.l mV |
| Calibration method | | 3 points automatic calibration |
| Accessories: | | carrying case, electrode 3m cable electrode storage solution and pH colour buffer solution kit. |
| Reference | | HACH sensION+ pH1 or Equivalent or Similar. |
| 19 | Portable colorimeter | 1 | pc | Spectral bandwidth: | | 10nm nominal |
| Wavelength accuracy | | ±1nm |
| Wavelength calibration: | | automatic fixed wavelength |
| Display of Colorimeter | | digital (LCD） |
| Power source: | | AA Alkaline Battery × 4 |
| Accessory: | | reagent sets, apparatus, adaptor, illustrated instrument and procedures manual, |
| Additional accessories: | | round glass cells (25 ml, 6 cells) |
| Reference | | HACH DR/890 Colorimeter or Equivalent or Similar. |
| 20 | Portable DO meter | 2 | pc | Type | | portable DO meter |
| DO range: | | 0 to 20.0 mg/l |
| Temperature range: | | 0 to 50 degrees C |
| Length of cable: | | 3m |
| Accessories: | | carrying case HACH SensION6 or equivalent |
| Reference | | HACH sensION + DO6 or Equivalent or Similar |
| 21 | Portable DO/ORP | 1 | pc | Type | | Dual input multiparameter meter HATCH HQ 40D or equivalent |
| Probes | | Luminescent Dissolved Oxygen (LD0) and ORP (Oxygen Reduction Potential), rugged, gel filled, stainless steel with polymer shroud and 5 m cable.  HACH IntelliCAL or equal. |
| Range | | ORP ± 1200 mV |
| LDO: luminescent DO probe (no membrane) | | 0 – 20 mg/litre |
| Accessories: | | ORP/Redox standard solution, • USB and A/C power adapter kit., • meter stand • rugged field case for two rugged probes |
| Warranty: | | 6 months for probe sensor 2 years for meter |
| Reference | | HACH HQ40D (8507400) or Equivalent or Similar |
| 22 | PortableTurbidity, TSS, Sludge Level meter | 1 | pc | RangeTurbidity | | 0.001 to 4000NTU (Nephelometric Turbidity Units) |
| Suspended Solids: | | 0.001 to 400 g/L (1 to 400,000 mg/L) |
| Accuracy Turbidity | | less than 3% or ±0.02 NTU, |
| Suspended Solids: | | less than 4% or ±0.001 g/L whichever is greater |
| Resolution Turbidity: | | 0*.001 at 0 to 0.999 NTU; 0.01 at 1 to 9.99 NTU; 0.1 at 10 to 99.9 NTU*; 1 at greater than 100 NTU |
| Suspended Solids: | | 0.001 at 0 to 0.999 g/L; 0.01 at 1 to 9.99 g/L;0.1 at 10 to 99.9 g/L; 1 at greater than 100 g/L |
| Units of MeasureTurbidity | | NTU, FNU, EBC |
| Suspended Solids: | | ppm, mg/L, g/L, % |
| Operating Modes | | Single, interval, or continuous measurement |
| Power Requirements | | 6 rechargeable NiMH batteries (recommended 1.2 V/min. 1800 mAH) or 6 "AA" standard batteries |
| Plug-in Charger: | | 115/230 Vac, 50/60 Hz Sensor Cable Length: 10 m (32.8 ft.) |
| Current Input: | | Approx. 60 mA |
| Wetted Materials Probe: | | : stainless steel |
| Sensor Window | | sapphire  Internal Data Memory for up to 290 measured values |
| Carrying Case: | | 320 x 450 x 110 mm |
| Warranty: | | 2 years |
| Reference | | Hatch LXV322 or equivalent or Similar. |
| 23 | Equipment for BOD analysis | 2 | pc | Type | | BOD self-check measurement (pressure sensor method) |
| BOD range: | | 1 to 4000 mg/l |
| Pressure range: | | 500 to 1350 hPa |
| Accuracy | | ± 1% of value ±1 hPa |
| Complete package: | | 12 measuring places, 12 inductive stirring system, and other accessories (including 12 amber sample bottles, 12 stirrer bars and stirrer bar remover, CO2 absorbent, nitrification inhibitor, 164 and 432 ml overflow measuring flasks, and blocks of chart paper etc.) |
| Additional accessories: | | 22.7, 43.5, 97, 250, 365 ml overflow measuring flasks |
| Reference | | HACH / BODTrak II or Equivalent or Similar. |
| 24 | Thermometer | 2 | pc | Type | | mercury-type, with carrying case |
| Temperature range | | 0-50 degrees C |
| Accuracy: | | ±1 degrees C |
| Reference | | Tecpel/DTM-315 or equivalent or Similar |
| 25 | Transmittance grade meter | 1 | pc | height: | | not less than 300 mm |
| Materials: | | plastic or glass with discharge tube |
| Reference | | SIBATA , Standard, 080530-052 or Equivalent or Similar |
| 26 | Glass desiccators | 2 | pc | Bowl capacity: | | 7.5 litres or more |
| Plate diameter: | | not less than 230 mm |
| Reference | | Isolab/039.01.250 Or Equivalent por Similar |
| 27 | Vacuum pump | 1 | pc | Max. vacuum: | | 5×10-2 torr |
| Free-air capacity:  (approx.) | | 95 litres/min |
| Power Source | | 220-240V |
| Reference | | Rocker/Rocker 400 or Equivalent or Similar |
| 29 | Stirring hot plate (withMagnetic stirring Bars) | 2 | unit | Plate size: (approx.) | | 120 × 120 |
| Top plate material: | | ceramic |
| Temperature range: | | 5 to 500 degrees C |
| Speed range: | | 60-1,000 rpm |
| Power source: | | 220-240 V |
| Reference | | Velp/AREC or Equivalent or Similar |
| 30 | Sampling instrument | 1 | pc | Type | | 1 set, including 1 dipper  1 Water Sampler |
| Capacity | | 500 ml |
| Handle length: | | 1.8m or longer |
| Reference | | Hydro-Bios (436 131) or Equivalent or Similar. |