

SPECIFICATION FOR WATER SAMPLING COLLECTION SYSTEM

- General
- Technical Requirements Water Sampling Collection System

Revised on 06-03-2019

TABLE OF CONTENTS

1.0	GENERAL	6a1 – 2
1.1	Scope of work	6a1 – 2
1.2	Environmental Conditions	6a1 – 2
1.3	Installation Testing and Commissioning	6a1 – 2
1.3.1	Installation	6a1 – 2
1.3.2	Information to be provided at The Commissioning	6a1 – 2
1.3.3	Testing and Commissioning of Equipment	6a1 – 3
1.3.4	Applicable Standards	6a1 – 3
1.3.5	Certification on Commissioning.....	6a1 – 3
1.3.6	Warranty	6a1 – 3
1.3.7	Defect Liability	6a1 – 4
1.4	Calibration of Instrument & Meters	6a1 – 4
1.5	Motors and LT Equipment	6a1 – 4
1.5.1	Motors	6a1 – 4
1.5.2	Insulation	6a1 – 4
1.5.3	Protection of Enclosure	6a1 – 4
1.5.4	Controls - Indicators and Alarms	6a1 – 4
1.5.5	Sampling Pumps	6a1 – 5
1.5.6	Earthing Terminals	6a1 – 5
1.5.7	Power Supply	6a1 – 5
1.5.8	Power Cables	6a1 – 6
1.5.9	Cable Installation	6a1 – 6
1.5.10	Earth Conductors	6a1 – 6
1.5.11	Items to be Earthed	6a1 – 6

SPECIFICATIONS FOR SUPPLY AND INSTALLATION SAMPLING PUMPS AND ACCESSORIES

1. GENERAL

1.1 SCOPE OF WORK

Total quality assurance system for manufacturing process of Sampling Pumps and all other accessories to be supplied and installed under the scope of this bid shall comply with ISO 9001: 2015 or “equivalent”

The contractor shall be responsible for installation of the units supplied by him in accordance with the specifications and drawings approved by the Board.

The supplying and fixing of all items such as brackets, supports, clamps, clips, plugs, bolts, screws etc. shall be carried out by the contractor. Details shall be submitted for approval by the Engineer before fixing.

The painting of all equipment, brackets, supports, etc; shall be done by the contractor. The contractor shall also carry out all Civil, Electrical and Mechanical works, adjustments and tests and provide his own tools and testing equipment for this purpose.

When completed all equipment shall be suitable in every respect for the service intended. The contractor shall supply all the material and do all work which may be reasonably implied as being incidental to this work.

1.2 ENVIRONMENTAL CONDITIONS

The equipment to be provided under this contract shall be suitable for installation and operation at site conditions and environmental conditions given in the Data Sheet.

1.3 INSTALLATION TESTING AND COMMISSIONING

1.3.1 INSTALLATION

The contractor shall provide the all equipment with necessary accessories and factory-trained personnel to supervise installation and initial operation of all components. The Sampling Pumps and other accessories shall be connected and installed at the locations shown in the list of drawings in section 8 and in accordance with the manufacturer’s recommendations. Contractor shall certify that the equipment is installed in a manner to ensure proper operations.

1.3.2 INFORMATION TO BE PROVIDED AT THE COMMISSIONING

The contractor shall provide following in three copies at least **14 days** before handing over of the equipment.

1. Operation and Maintenance manuals of Pumps and Motors.
2. Control wiring diagrams for Electrical Panels. (Including Automatic Controls).
3. Spare Parts Manuals and all other literature pertaining to the items supplied.

1.3.3 TESTING AND COMMISSIONING OF EQUIPMENT

After the completion installation of Sampling Pumps and other accessories shall be field tested to ensure compliance with the performance requirements as specified.

When all installation work is satisfactorily completed the Contractor shall inform the Engineer in writing that the Sampling Pumps and other accessories are ready for handing over and then Engineer shall fix a date for taking over.

After the satisfactory completion of all tests, the Contractor shall operate the equipments and accessories for 7 days, and during this period, instruct, train any person nominated by the Engineer regarding the operation and maintenance of the equipment.

At the taking over, all equipment shall be tested for a period of 7 days to determine that the equipments are in satisfactory of all conditions.

If the Engineer is not satisfied with the performance of equipment or their installation he may refuse to take over until necessary improvements are effected. Any time necessary for this additional works will be considered as contractor's delay.

1.3.4 APPLICABLE STANDARDS

All installation work shall be carried out in accordance with international standards as stated in particular specification.

1.3.5 CERTIFICATION ON COMMISSIONING

Contractor shall supply test certificates demonstrating compliance with the performance specified herein.

1.3.6 WARRANTY

The contractor shall provide manufacturer's warranty to the employer that the Goods and Services Supplied under the contract will comply strictly with the Contract and shall be first class in every case and shall be free from defects. The supplier further warrants to the Purchaser that all materials, equipment and supplies furnished by the supplier for the purpose of the goods will be new, merchantable of the most suitable grade, and fit for their intended purposes. The supplier shall warrant that the services to be carried out under this contract will conform to generally accepted professional standards and engineering principals.

This warranty shall remain valid for the period mentioned in the Data Sheet. After the final acceptance, any part of the equipment which fails or does not give satisfactory performance during this period of warranty, shall be replaced within the number of days as mentioned in the **Data Sheet** from the date the Contractor has been notified to do so.

All expenses involved in this connection shall be borne by the contractor who should take this into consideration when bidding.

1.3.7 DEFECT LIABILITY

Maintenance of all the equipments and accessories supplied and installed under this contract to be carried out by the contractor for the period mentioned in the **Data Sheet**. Contractor shall submit the preventive maintenance schedule with the offer. Any spares used supplied under this contract and used for repair purposes during the defect liability period shall be replaced at no additional cost.

1.4 CALIBRATION OF INSTRUMENTS & METERS

All instruments & meters shall be calibrated in the Metric Units as follows:

- (i) Pressure in metric water column.
- (ii) Flow in lit/sec.
- (iii) Quantities cubic meters.
- (iv) Water level in meters.
- (v) Current in Amperes.
- (vi) Voltage in Volts.

1.5 MOTORS AND LT EQUIPMENT

1.5.1 MOTORS

Motor capacities less than 0.75 kW shall be **Continuous single phase**, Squirrel Cage, Induction type designed for **230V, 50 Hz**. Design of the motors shall be such that they can operate within $\pm 6\%$ of the nominal voltage continuously without damage.

Motor capacities above 0.75 kW shall be **Continuous three phase**, Squirrel Cage, Induction type designed for **400V, 50 Hz**. Design of the motors shall be such that they can operate within $\pm 6\%$ of the nominal voltage continuously without damage.

Synchronous speed shall be 3000 rpm or 1500 rpm. Each Motor shall be provided with a lifting eyebolt and shall have a service factor of 3.

1.5.2 INSULATION

Motors shall be of **class F** insulation of standard of the National Electrical Manufacturing Association but the operating temperature rise shall be restricted to that of **class B**

1.5.3 PROTECTION OF ENCLOSURE

Motor enclosures shall be protected to **IP68** for submersible pump motor and dry installed motor enclosures shall be protected to **IP55**.

Motors installed in areas exposed to dust (ex. dust o alum/Poly aluminium chloride /lime) shall be protected to **IP64**. Power & control panels in dust free in house areas shall be protected to **IP55** and especially for panels installed at dusty environment (Lime/Alum/Poly aluminium chloride dusts) shall have protection of **IP64**.

1.5.4 CONTROLS - INDICATORS AND ALARMS

1. Push Buttons for Start/Stop/Reset
2. Indicator lamps to indicate following,
 - Motor Running
 - Motor Stopped (Manual)
 - Motor Tripped (Overload/Thermal Tripped)

1.5.5 SAMPLING PUMPS

The supplier shall provide and install following electrical switchgear necessary for DOL (<3kW or above star-delta) starters wired for manual start and stop and automatic stop function of the pumps when the water level in the suction side is low.

- a) One suitable 3 phase MCCB with adequate breaking capacity to serve as the feeder for the starters
- b) Contactor wired for DOL (<3kW) starting / Contactor wired for Star Delta (>3kW) starting
- c) One three phase adjustable thermal over load
- d) Indicator lamps to indicate the following
 - * Pump Running - Red
 - * Pump Stop - Green
 - * Pump Tripped - Amber
 - * Solution level low - Blue
- e) Control relays, transducers, cables etc. necessary for realizing above shall be provided.

1.5.6 EARTHING TERMINALS

Earthing bar mounted in the lower part of the enclosure shall be marked as Main Earth Terminal and shall be completed with screw connections, for earthing conductors. Earthing terminal shall be connected to the site earthing system.

1.5.7 POWER SUPPLY

The main power shall be taken as directed by the engineer, and Panel board at chemical house shall be supplied with suitably sized MCCB for each motor and other electrical accessories. The panel for chlorinators and chemical equipment and all other connections shall be provided and fixed by the contractor.

All electrical equipment & wiring shall conform to the standards set by the I.E. E., U.K. and to Sri Lanka regulations and be acceptable to the Ceylon Electricity Board.

Equipment shall be rated to operate on 230V single-phase 50 Hz supply – 3 wire including “earth wire” or

Equipment shall be rated to operate on 400V three-phase 50 Hz supply – 4 wire including “earth wire”

1.5.8 POWER CABLES

All power cables shall be PVC insulated, with copper conductors. Cable sizes shall be determined in accordance with latest IEC wiring regulations and Engineer's approval shall be sought in this regard.

All underground cables shall be PVC/SWA/2/4 core with copper conductors.

All power and control cables shall be supplied and installed/laid by the contractor to suit the existing site conditions and as instructed by the Engineer.

1.5.9 CABLE INSTALLATION

Method of installation for cables shall be selected in accordance with IEC wiring regulations to suit the specific application. However, the following requirements are to be met.

- (a) Cables which are to be run on walls, ceilings or other building structures shall be secured on cable trays, ladders or enclosed in conduits or trunking.
- (b) Where building structure incorporates covered trench system cable shall be laid on horizontal trays against the side(s) of the trench.
- (c) Every cable shall be permanently identified at each end by cable markers with semi rigid black PVC carrier strip, which shall be fixed axially by means of 2 PVC straps.
- (d) All power cables to be run external to the buildings shall be in type 250 PVC pipes so that the cable can be pulled out for inspection and easy replacement. Manhole openings shall be provided every **30m** or after a bend and top side of the cable path shall be covered by suitable concrete slabs.

1.5.10 EARTH CONDUCTORS

Earth conductors shall be sized in accordance with IEC regulations. PVC cable insulation shall be green. Cable armoring and screens shall not be used as sole earth protective conductor, and earthing shall be arranged in accordance with BS 7430:2011+A1:2015.

1.5.11 ITEMS TO BE EARTHED

The following equipment shall be connected to the main earth terminal by means of earthing conductor with cross sectional area as per requirement of IEE wiring regulations;

- a) All motor cases
- b) Any other metal object, which may become under faulty conditions.
- c) Panel boards
- d) Lightning protection system earth
- e) All surge protection devices of equipments
- f) Any other items

2.0	TECHNICAL REQUIREMENTS FOR WATER SAMPLING COLLECTION SYSTEM	6an – 8
2.1	General Requirements	6an – 8
2.2	Service Water Arrangement	6an – 8

2 TECHNICAL REQUIREMENTS FOR WATER SAMPLING COLLECTION SYSTEM

2.1 GENERAL REQUIREMENTS

It is required to pump water from sampling points specified in the data sheet to the wash basin located in the laboratory for the purpose collecting of water samples.

Sampling taps shall be installed at the wash basin in the laboratory.

Sampling water pumps shall be designed to suit the following conditions

- Water flow rate from sampling taps shall not be less than 0.2 liters per sec.
- Flow velocity through sample piping shall not exceed the 2 meters /sec.
- The operating switches of sample taps shall be located close to the wash basin in the laboratory.

Contractor shall supply, install, commission and hand over the total sampling collecting system, to the satisfaction of the engineer.

2.2 SERVICE WATER ARRANGEMENT

Any arrangement necessary to provide service water within treatment plant site shall be done according to the site arrangement and as instructed by the Engineer.