

Technical Specifications

(Note: - Parties must mention make & model no. of the equipment offered by them, with detailed specification (on separate sheet). Otherwise their tender will not be accepted.)

1. Auto-titrator

Auto-titrator titrations in for performing all types aqueous and non-aqueous of potentiometric phases.

A. Features of the system:

- 1) Auto-titrator system having capability to carry out all types of potentiometric titrations e.g. complexometric, acid- base, redox, argentometric, precipitation, iodometric, nonaqueous etc. as well as pH, mV, temperature & concentration measurements.
- 2) Simultaneous Titration Facility one after another to perform any two titration application simultaneously without disturbing the setup.
- 3) Automatic recognition of the basic instrument and all the peripheral devices connected to it by the software like automatic burette recognition, automatic sensor recognition, and automatic dosing drive recognition features with intelligent chips.
- 4) Facility to connect minimum four titrating burettes for different types of titrations.
- 5) Equipped with one volumetric Karl Fischer Titration unit
- 6) Facility to have customized calculation.
- 7) Facility to connect minimum two (02) auxiliary burettes for the addition of auxiliary solution or buffer solution needed for titrations and back titrations.
- 8) Facility to upgrade the system to connect minimum 7 titrating burettes in the future.
- 9) System should have the remote port to connect to the sample changer/autosampler whenever required.
- 10) Real time curve display
- 11) Power: 220-230V/50Hz
- 12) Operation: From Touch pad and/or PC
- 13) Interfaces: Dual RS-232/ USB ports for attachment of balances, autosampler, printer, PC, barcode reader etc.

B. Dosing Drives:

- 1) Plug and play type dosing drives, automatically recognized by titrator on connection and can be used immediately for analysis without further configuration.
- 2) Electronics parts of the drive should not be damaged due to reagent spill or leak from burette.

- 3) Flexibility to interchange titrants without contamination
- 4) Simple to connect and automatic recognition of dosing drives

- 5) Quantity required: 02 Nos.

C. Burette/Dosing Units:

- 1) Type: Intelligent burette with latest burette technology and chip which can automatically detect the burette volume, reagent type and titer validity etc. irrespective of the drives on which the burettes with the titrants are present.
- 2) Possibility to mount the Burette with the Basic Instrument unit
- 3) Facility to see and remove air bubble, if any, from the dosing cylinder
- 4) Rinsing and preparation of the dosing unit can be carried out automatically
- 5) Single click command for emptying and filling of burette
- 6) Resolution: Minimum 1/10,000 of burette volume or better
- 7) Burette volume: Burettes volume of 1, 5, 10, and 20 ml should be available.
- 8) Dosing Accuracy: + /- 0.03% of burette volume
- 9) Filling time: 20 sec

10) Quantity required:

a) Minimum 4 Nos. of 20 ml volume (for Acid/base, Non Aqueous, and Argentometric etc.)

b) 01 No. of 10 ml volume for Volumetric Karl Fischer titration

D. Parameters:

The system with adequate sensors/electrodes should be capable of measuring following parameters in the given ranges as per DIN/ASTM standards.

a) Voltage:

Range: -1000mV to +1000mV or better

Resolution: 0.1 mV or better

b) pH:

Range: 0-14

Resolution: 0.001 or better

pH Calibration: minimum 3 point calibration with automatic buffer recognition and automatic temperature compensation

c) Alkalinity (carbonate, bicarbonate & total Alkalinity):

Range: Single ppm to % level

Resolution: Up to 3 decimals

d) Salinity or Chloride content:

Range: 0.5 ppm to % level

e) Hardness (Ca, Mg & Total Hardness):

Range: 10 ppm onwards

f) Non- aqueous titrations for TAN/TBN etc.

g) Bromine Index/Bromine Number

E. Sensors/Electrodes:

All sensors/electrodes shall be intelligent and plug & play type, which are automatically identified by the titrator when connected thus eliminates the possibility of use of wrong electrode.

The built in memory chip allows the storage of important sensor data e.g. article and serial numbers, calibration data, calibration history, working life and calibration validity period etc.

Sensors/electrodes with required cables should be provided along with the titrator for the following titrations:

i) EDTA Complexometric.

ii) Acid Base & pH.

iii) Non Aqueous Titrations.

iv) Iodometric.

v) Bromine Index / Bromine Number.

vi) Redox.

vii) Argentometric / Precipitation Titrations.

viii) Volumetric Karl Fischer titration unit consisting of electrodes and other required accessories

F. Stirrer:

Plug and Play type magnetic / Propeller stirrer. Stirring speed and direction should be controlled from the main instrument within the method.

G. Titration Stand: 02 Nos.

titration stands with stirrers, connecting cables and other essential accessories.

H. Titration Beakers: Minimum 100 nos. of polypropylene titration beakers of 100 ml capacity each should be provided.

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I. Methods: Minimum 50 Pre-programmed methods should be available and stored.
J. Result Storage: Possible to export the results to PC/LIMS through the USB stick.
K. Auto Sample Changer:
1. Sample changer with facility to handle minimum 30 samples in titration beakers of 100ml maximum capacity each.
2. Possibility to prepare the sample before the Titration using auxiliary dosing devices. Possibility to handle a minimum of 2 auxiliary reagents to be quoted.
3. Facility to go sequentially one sample after the other or the sample processor should be able to execute the titration with any sequence as decided by the user.
4. Results should be preferably available in one format containing all the parameters as mentioned.
5. Facility for automatic rinsing and cleaning of the setup should be provided. Re-generation facility should be built into the system.
6. The supplier has to provide details of the Auto Sample Changer with details & drawings. In case of 3rd party product, address of OEM/authorized dealer to be provided.
L. PC and Printer
i) Branded PC from HP, Lenovo, Dell, Sony, Toshiba or of equivalent make with min. 320 GB HDD, 8GB RAM, DVD R/W, 17 inch TFT Monitor, Key Board, Mouse etc. , 64 bit Windows 10 or higher Operating System
ii) HP laserjet or equivalent printer compatible with the supplied PC.
iii) Antivirus with minimum one year validity.
M. Software Package
i) Latest Window Based Software (Preferably windows 10) for operation of the entire system and data acquisition.
ii) Compatible with the operating system of the PC to be supplied and allows a fully automated workflow including LIMS connection.
iii) It should be possible to connect minimum 30 nos. of Titrator / Other Lab Instruments.
iv) The software should support client server environment. It should be possible to export the data to LIMS and automatic data backup.
v) Should be able to control the titrator and all devices connected to it.
vi) Automatic recognition of devices and monitoring of titer validity, calibration intervals of Sensors etc.
vii) Possibility of multitasking like method creation during preparation of dosing devices etc.
viii) Provision to save the SOP of the titration as Application note along with the method itself.
ix) Other types of evaluations like Fix End point evaluation, Minimum/maximum evaluation, Gran evaluation to evaluate non S- shaped curves.
x) Possibility to include any number of commands like Measuring, adding of solutions, titration in a single method.
xi) Live display with different axis and possible to view measured value, calculated value, 1st derivative (ERC) etc.
xii) Hold and/or Suspend function to halt the ongoing titration and dosing activities.
xiii) Result trend analysis, History about the each determination should be available.
xiv) Export and import of data in different formats like CSV (to excel), XML (to LIMS), etc.
xv) Custom reports with the customer's desired logo.
xvi) Possibility to connect a Balance to automatically transfer the weight data.

N. Calibration Standards: The party shall provide adequate quantities of buffers for pH calibration, calibration standards certified by NABL or equivalent Laboratories, reference samples for performance evaluation for the parameters for which electrodes/sensors provided, at least for one year operation.

O. Power Back-up System:

Inverter or UPS for power back-up support which can withstand atleast 30 minutes or so.

