US Department of Agriculture (USDA)

Attachment 1 - Specifications

Project

Titrator Excellence 7 Auto Volume System

General Information

1.0 Scope

The USDA-ARS Grape, Prunus and Citrus Breeding and Genetics Laboratories perform routine and advanced chemical analyses to support phenotyping, quality testing, nutrient profiling, and research experiments requiring precise titration. Parameters such as acidity, alkalinity, pH, buffering capacity, and ion concentrations are essential for characterizing grapevine, prunus and citrus tissues, juices, wines, soil extracts, and nutrient solutions. Current manual titration methods are time-consuming and susceptible to variability, impacting data reproducibility and throughput.
The Titrator Excellence T7 offers (Brand name or Equal) fully automated, high-precision titration with seamless integration into laboratory workflows, improving efficiency, accuracy, and regulatory traceability.

Contractor Requirements

3.0 Technical Requirements / Tasks

Minimum Specifications

- **Titrator Excellence 7 (Brand Name or Equal)**

  Potentiometric sensor inputs:
  Measurement range ± 2000 mV
  Resolution / Error limit 0.1 mV / 0.2 m

  Polarized Sensor input:
  Measurement range Ipol / Upol 0 … 2000 mV / 0 … 200 µA
  Resolution Ipol / Upol 0.1 mV / 0.1 µA
  Error limit Ipol / Upol 2.0 mV / 0.2 µA
  Current source range Ipol / Upol 0–24 µA AC / 0–2000 mV AC
  Current source resolution Ipol / Upol 0.1µA / 0.1mV

  Temperature sensor input PT1000:
  Measuring range –20...130 °C Resolution / Error limit 0.1 °C / 0.2 °C

  Burette drive:
  Burette resolution (for 10 mL burette) 0.5 µL (1/20000 of the burette volume)
  Error limit 0.2% of the burette volume
  Resolver resolution 0.0625% of burette volume
  Filling time and discharge time 20 s at 100% filling rate

  Titrator Dimensions:
  Width 210 mm
  Depth 246 mm
  Height 250 mm
  Weight 4.3Kg

  Terminal:
  Screen WVGA 7” color TFT
  Resolution 800 x 480 pixel

- **Base InMotion Max**

Power Supply:
Input voltage 100–240V AC
Input frequency 47–63 Hz

Power Consumption:
Idle 8 VA
Maximum 70 VA

Max Base Dimensions:
Width 420 mm
Depth 588 mm
Height (incl. Tower) 563 mm

Weight:
Base 8.0 kg
Pro/Max Tower 4.2 kg
Max Rack 2.3 kg

Sample Size and Capacity
25 mL tubes: 303 samples
80 mL vessels: 113 samples
100 mL beakers: 55 samples
180 mL beakers: 43 samples
250 mL beakers: 24 samples

Automation & Cleaning Features
Includes PowerShower™ automated rinsing
Cleaning sequences for sensors (park/conditioning)

Modularity & Integration
Compatible with all InMotion modular options (additional pumps, rack types, water-bath temperature control)
Connects to Mettler Toledo Excellence titrators, refractometers, density meters, UV/VIS, and pH meters

Visual Status Indicators
LED tower light provides real-time system status (running, ready, or attention required)

Workflow Control
Intuitive method programming: customizing preparation, conditioning, maintenance, and cleaning, with parallel task capability

- **Rack Kit InMotion Max**

Rack diameter and material: 570mm, using polymer-coated aluminum
Rack Hole Diameter 80 mL 36.6 mm

- **Burette**

DV1020m**l**

Error limit 0.2%
Minimum Steps: 1µL

- **pH Sensor InLab Cool (2)**
  Measuring range: pH 1 – 11
  Type of junction: Immovable glass sleeve
  Sensor Type Combined electrode
  Temperature range: -30 C – 80C
  Shaft Material: Glass
  Shaft length: 120mm
  Origin of Precision: cool down, self-cleaning junction, flexible connectivity

- **Tapered Cone**
  Sleeve adaptor

- **Dosing Unit dDrive**
  Dimensions: Height 191mm, Width 81mm, Depth 167mm
  Resolution (drive): 120,000
  Dispensing volume: 10 µL – 500 mL

- **Liquid Handler DispenSix**
  Dimension: Height 90mm, Width 40mm, Depth 60mm
  Dosing Capability: Up to 4 liquids.
  Material: Borosilicate Glass
  Application Type: Liquid Handling
  Burette Volume: 50 mL
  Dosing Rate: 0.12 mL/min – 120mL/min

- **Manual Titration Kit**

- **Aliquoting Beaker (100 mL)**
  80mL Aliquoting for Liquid Handler and Rondo60/A

- **Pump SP280 Peristaltic**

- **Tube Suction/ Waste M8 3m**

- **Dispensing Tube InMotion M6 200 cm**

- **Suction Tube M6 200cm (3)**

- **Blind Plug Set M6**

- **Software LabX Titration Express**
  Starter Pack for Titration
  Application Type: Titration software
  Connectivity and Software: LabX Software

- **Dispensing Tube Adapter (3)**

- **Beaker PP (80mL), 30 pcs (4)**
  Titration Beaker PP 80 mL

- **All-in-One Kit 2 6x250 mL**
  Technical pH buffers 250 mL bottles: pH 4.01, pH 7.00, pH 10.00
  3 mol/L KCI Electrolyte: 250 mL
  Pepsin Cleaning Solution: 250 mL
  InLab Storage Solution: 250 mL
  Parameter: pH
  Purpose: Calibration/Verification; Electrolyte; Maintenance.

- Additional required features are training operation for Titrator Excellence 7 and Based InMotion Max (2 visits each) please extended care for Titrator Excellence 7 and Base InMotion Max.

4.0 Government Furnished
N/A

5.0 Deliverables / Schedule

Key Deliverables

Item	Quantity	Place of Delivery	Delivery
Titrator Excellence 7 Auto Volume System	1 Each	USDA ARS 9611 S Riverbend Ave Parlier, CA 93645	July 31, 2026

6.0 Travel
N/A

7.0 Contractor's Key Personnel
N/A

8.0 Security Requirements
N/A

9.0 Data Rights
N/A

10.0 Section 508 – Electronic and Information Technology Standards
N/A