LIQUID NITROGEN (LN2) STORAGE TANK SPECIFICATION SHEET

1. Scope & Application

This document outlines the core structural and performance specifications required for procuring a high-capacity, dry-vapor liquid nitrogen storage tank system of a **Mid-Capacity (Class 2 / Standard Height)** performance requirements. It ensures optimal biological sample preservation without direct LN2 contact, minimal evaporation loss, and long-term vacuum stability.

QTY: 1 storage tank

QTY: 1 isothermal freezer

2. Core Technical Specifications

2.1 Thermal Performance

- **Operating Phase:** Isothermal dry-vapor design utilizing a jacketed liquid nitrogen reservoir incorporated directly into the wall of the freezer unit. The storage chamber must remain completely free of bulk liquid nitrogen to eliminate direct sample submersion, cross-contamination, and safety risks associated with handling liquid nitrogen.
- **Thermal Uniformity:** Must maintain industry-standard temperature consistency throughout the storage area, achieving an average operating temperature of -193°C or lower in the dry-vapor phase with a minimal internal temperature gradient.
- **Insulation Type:** Multi-layer high-performance vacuum insulation jacket separating the LN2 outer jacket wall and external environment.

2.2 Structural & Material Integrity

- **Constructed Material:** Heavy-duty, cryogenic-grade stainless steel construction.
- **Form Factor & Mobility:** Compact round space-saving design mounted on heavy-duty casters for ease of mobility.
- **Lid & Gasket System:** Features a counter-balanced, lockable lid with an advanced woven lid gasket design to ensure a tight thermal seal and increased interior visibility during sample retrieval.
- **Piping & Tubing:** Features integrated annular fill and sensor tube routing.
- **Access & Neck Geometry:** Wide neck opening (minimum 31.0 in. /787 mm) providing unrestricted sample access and maximum internal visibility while maintaining low thermal loss.

2.3 Storage & Configuration

- **System Flexibility:** Accommodates all standard industry rack systems (square or rotary/carousel configurations).
- **Footprint Efficiency:** Must match the internal usable space of standard liquid nitrogen freezers to ensure zero loss of usable storage volume.

- **Class 2 Storage Racking Capacity:** Must support up to 17 standard racks holding 13 boxes per rack (total minimum capacity of 221 boxes / 22,100 vials per unit).

2.4 Safety & Monitoring

- **Automated Controller & Monitoring System:** Comes equipped with an integrated microprocessing auto-fill and monitoring system featuring:
  - Dual-temperature display monitoring.
  - Automated LN2 level sensing and auto-fill triggering.
  - Programmable high/low liquid level and temperature alarm thresholds.
- **Operator Safety:** Complete isolation of LN2 in the jacketed perimeter wall to eliminate splashing, cold-burn risks, or sample immersion hazards during operation.
- **Pressure Management:** Dual relief valves with explicit Maximum Allowable Working Pressure (MAWP) ratings to safely manage LN2 jacket pressure.
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3. Salient Performance Characteristics: Mid-Capacity Dry-Vapor Cryogenic Freezer (Class 2 Baseline)

(The following specifications establish the minimum technical and operational thresholds for this unit class)

3.1 Volumetric & Sample Capacities

- **Minimum 2 mL Vial Storage Capacity:** ≥ 22,100 vials (221 boxes total across 17 racks)
- **Minimum 50 mL Cryobag Capacity:** ≥ 1,120 bags
- **Maximum LN2 Reservoir Capacity:** ≤ 75 Liters

3.2 Dimensional Constraints & Footprint

- **Maximum Exterior Dimensions (W X D X H):**
  - **Width:** ≤ 37.0 in. (939 mm)
  - **Depth:** ≤ 48.0 in. (1,219 mm)
  - **Height:** ≤ 47.5 in. (1,206 mm)
- **Minimum Usable Interior Dimensions:**
  - **Usable Diameter:** ≥ 31.0 in. (787 mm)
  - **Usable Height:** ≥ 29.0 in. (787 mm)
  - **Neck Opening Diameter:** ≥ 31.0 in. (787 mm)

3.3 Freezer Racks

- The quoted liquid nitrogen storage system must include freezer racks designed to maximize the specific unit's internal storage capacity.

4. Delivery

- The liquid nitrogen storage system shall include professional white-glove delivery, complete mechanical and vacuum-insulated piping hookup, sensor calibration, system pressure testing, and full operational startup with on-site user training by certified technicians.
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