



LOWENCO



Datasheet

Large-Scale Storage Unit (LSSU)

Dec 2025



Description

Large-Scale Storage Unit (LSSU)

Our Large-Scale Storage Unit (LSSU) is engineered to deliver ultra-low-temperature storage capacity with robust performance, high energy efficiency and full operational flexibility.

With a chamber volume of 19.82 m³ (700 ft³) and a storage capacity of 4,800 L, the LSSU provides room for large-scale storage while maintaining strict temperature stability across the entire unit.

Designed for demanding pharma and biotech environments, the system operates reliably within a –20°C to –80°C temperature range, ensuring product uniformity of ±1.0°C

Temperature control is fully adjustable in 0.1°C increments via the HMI, enabling precise configuration for each application.

The redundancy system features N+1 redundancy, ensuring each electrical and mechanical component can operate independently to safeguard uptime.

The refrigeration system supports multiple refrigerant options, including HT – R744 (GWP 3) and LT – R508B (GWP 13400).

The interior can be configured with racks, pallets and trolleys and temperature setpoints can be easily adapted to meet evolving operational requirements.



HIGHLIGHTS:

Chamber volumen

19.82 m³ or 700 ft

Storage capacity

4,800 L per unit

Temperature range

–20°C to –80°C

Uniformity

±1.0°C on products

Certifications

Large-Scale Storage Unit (LSSU)



Designed for the future of pharma:

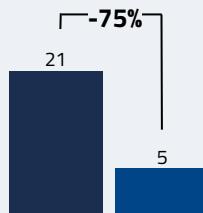
- TIGHT TEMPERATURE STABILITY
- HIGH-VOLUME STORAGE CAPACITY
- REPAIRABLE WITHOUT SHUTDOWN
- MECHANICAL AND AUTOMATED REDUNDANCY
- SEAMLESS DIGITAL INTEGRATION
- INDEPENDENT SET POINTS PER UNIT

Key Features

The LOWENCO LSSU has a small footprint, low energy and cost - combined with top reliability and service.

Smallest Footprint

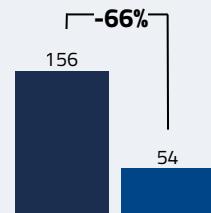
M₂ /tonne1



The LSSU can replace up to 35 upright freezers - reducing the physical footprint with 75%.

Low Power Consumption

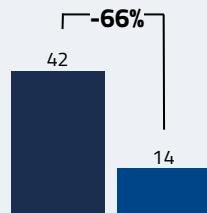
Wh/kg1/day



It requires up to 66% less power than incumbent solutions.

Strong Sustainability Profile

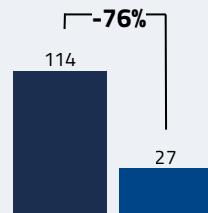
CO₂ emissions: kg CO₂ /kg1/year



Small footprint and low energy consumption means 66% lower CO₂ emissions. In addition, the LSSU has a 25-year lifecycle and fully recyclable components.

Low Total Cost of Ownership

EUR/year/kg1 product stored



In sum total, the LSSU has up to 76% lower total cost of ownership.



Who benefits

from a large-scale solution?

Our large-scale solution is designed for pharmaceutical companies and CDMOs handling high volumes of temperature-sensitive products where uptime, compliance and efficiency are critical.

When to move beyond a freezer farm:

- When storage volumes exceed 3,000 L and are spread across multiple upright freezers.
- You require consistent $\pm 1.0^{\circ}\text{C}$ product uniformity across large batch volumes.
- You want easier access, reduced handling and streamlined workflows for high-throughput environments.
- N+1 mechanical and electrical redundancy is required to protect high-value materials.
- You need to reduce footprint and energy consumption, while supporting scalable, long-term storage at -20°C to -80°C .



Return on investment:

Facilities often achieve measurable savings and improved performance when replacing as few as 30 upright freezers with a large-scale solution; reducing footprint, cutting energy use and CO₂ emissions, lowering total cost of ownership while improving reliability.

Go from this



Replacing
42
upright
freezers

To this



Curious what large-scale cold storage could do for your facility



Request a complimentary ROI assessment and discover how much space, energy and cost you could save by replacing a freezer farm with a complete large-scale solution.

[Request Your ROI Assessment](#)

GENERAL

Chamber volume	19,82 m ³ (700 ft ³)
Storage capacity (mass)	4.800 L
Total footprint including loading area	32,8 M ₂

DIMENSIONS & WEIGHT

Interior dimensions	5,850 mm (W) x 1,600 mm (D) x 2,200 mm (H)
Exterior dimensions	6,300 mm (W) x 2,000 mm(D) x 5,800 mm (H)
Unit weight	Approx, 4,0 tons
Unit weight freezer shell w. compressor units	Approx, 5,7 tons
Unit weight fully loaded freezer	Approx, 11,3 tons

PERFORMANCE

Temperature range	-20°C to -80°C
Uniformity	±1.0°C on products
Temperature control	Adjustable 0,1°C increments via HMI
Ambient operating temperature	10°C - 25°C
Energy consumption at -80°C	5,8 Kwh (Drycooler)

REFRIGERATION SYSTEM

Redundancy	N+1 Each fully electrical and mechanical redundant
Condenser / Heat rejection cycle	Chilled water - Tower water - Drycooler
System type	Cascade system - single unit system
Refrigerants (More options on request)	HT - R744 - GWP 3 LT - R508B - GWP 13400

CONTROLS & INTERFACES

Human machine interface (HMI)	IPC 677E with Siemens Unified 20 SCADA application
PLC	Siemens ET200SP 1510 1PN
External communications ethernet protocols	Modbus TCP/IP Siemens S7 online OPC UA
Hardwired external connections FMS/BMS	Urgent alarm Non urgent alarm 2 pcs. Thermowell
Alarms up to 150 pr. LSSU	Status High/low temp Door open Power failure System failure

MODULARITY

Interior	Project configurable with racks / pallets / trolleys
Temperature	Easy converting to another temperature setpoint

OPERATIONAL

Optional services	Service Level Agreements Mapping on request Technical / Operational training of personnel Extended Warranty
Life cycle of freezer shell	25 years in US, EU and Asia