

LARGE CAPACITY LOW SPEED REFRIGERATED CENTRIFUGE (4 X 750 ML)



Large Capacity Low Speed Refrigerated Centrifuge (4 x 750 mL) - ToronCent™ LSR LC

ToronCent™ LSR LC is a large capacity low speed refrigerated centrifuge built for clinical laboratories, blood processing facilities, and cell culture suites. The unit reaches 5,500 rpm and 4,904 x g while holding the chamber between -20°C and 40°C within $\pm 0.5^\circ\text{C}$. Four buckets carry 750 mL each, giving 3 liters of throughput per cycle. The rotor system accepts everything from 1.5 mL microtubes to 500 mL bottles and 96-well microplates.

Sample integrity depends on how well a run holds temperature. The refrigerated model pairs a variable-frequency compressor with PID control and a dual-channel refrigeration circuit. An airflow guiding design routes cold air through the chamber to offset the heat that rotor windage generates at speed. Operators can pre-cool the chamber to a rotor-specific setpoint on a schedule, so the machine is ready when samples arrive. Sleep mode maintains refrigeration between runs at a default 15 minute interval.

Control runs through a 7-inch touchscreen that responds through gloves, with RCF and rpm switchable at a single touch. Each of the 100 storable programs splits into five steps with independent speed and duration, which suits multi-stage protocols such as platelet separation. The instrument logs run records and diagnostics automatically, giving quality teams a traceable history of every batch. A non-refrigerated variant shares the same rotor system and controls for labs that do not need cooling.

APPLICATIONS

Large Capacity Low Speed Refrigerated Centrifuge (4 x 750 mL) - ToronCent™ LSR LC Applications

The ToronCent™ LSR LC covers the sample volumes and temperature ranges that clinical, research, and production laboratories work with daily. Swing-out and fixed-angle rotors let one platform serve tube-level and bottle-level workloads.

- **Blood Banking and Component Preparation:** 750 mL swing-out buckets accommodate blood bags and large collection volumes for separating plasma, platelets, and packed cells under temperature control
- **Clinical Diagnostics:** batch processing of vacuum blood collection tubes, up to 152 tubes of 5 mL or 7 mL per run, for serum and plasma recovery ahead of analysis
- **Cell Culture and Harvesting:** gentle swing-out pelleting of cells from media in conical tubes and 500 mL bottles, with chamber cooling to protect viability
- **Molecular Biology:** recovery of nucleic acid and protein precipitates across microtube through bottle formats using the fixed-angle rotor at 4,904 x g
- **Pharmaceutical and Biotech Quality Control:** clarification of process intermediates and in-process samples under documented temperature conditions
- **Microbiology and Virology:** concentration of cell suspensions and culture supernatants inside aerosol-tight buckets that contain biohazardous material
- **Urinalysis and Cytology:** low-speed sedimentation of urine and body fluid samples for microscopic examination and cytospin preparation
- **Food, Beverage, and Environmental Testing:** separation of solids from liquid samples in large-volume bottles before instrumental analysis
- **Microplate-Based Assays:** spin-down of deep-well and standard 96-well plates for ELISA, cell-based assays, and sample preparation workflows



FEATURES

Large Capacity Low Speed Refrigerated Centrifuge (4 x 750 mL) - ToronCent™ LSR LC Key Features

The ToronCent™ LSR LC combines touchscreen programming, automatic rotor recognition, and refrigeration hardware built for repeated long runs. Feature set below reflects the refrigerated configuration; cooling-specific items do not apply to the non-refrigerated variant.

- **7-Inch Full Touchscreen:** glove-compatible operation with every run parameter visible on one screen, faster to set than a push-button panel
- **One-Touch RCF and Speed Switching:** toggles between rpm and x g without leaving the run screen, so protocols written in either unit transfer directly
- **Five-Step Programmable Runs:** each program holds up to five stages with independent speed and time, covering multi-phase separations from a single start
- **100-Program Memory:** stores validated methods so repeat protocols run identically across shifts and operators
- **Dual Time Ranges and Three Timing Modes:** 1 second to 99 minutes 59 seconds or 1 minute to 99 hours 59 minutes, with start timing, speed timing, and continuous timing
- **11 Acceleration and 12 Deceleration Profiles:** matched ramp rates protect delicate gradients and layer boundaries, with user-set free parking (unbraked coast) time
- **PID Temperature Control with VF Compressor:** variable-frequency compressor and a dual-channel refrigeration circuit (both patented) hold $\pm 0.5^{\circ}\text{C}$ anywhere from -20°C to 40°C
- **Scheduled Pre-Cooling:** rotor-specific pre-cooling parameters can be set in advance so the chamber sits at setpoint before samples reach the bench
- **Energy-Saving Sleep Mode:** a user-set sleep interval (15 minutes by default) maintains cooling readiness while cutting compressor duty and extending service life
- **Automatic Rotor Identification:** the drive recognizes the installed rotor and holds speed inside its rated limit, removing over-speed risk from operator error

- **Aerosol-Tight Buckets:** sealed round and rectangular buckets contain aerosols during biohazardous work, and buckets with their adapters are autoclavable
- **AC Frequency Conversion Motor:** the brushless drive needs no brush replacement, generates no brush dust, and holds speed accuracy within 10 rpm
- **Airflow Guiding Chamber Design:** directed cold airflow keeps chamber temperature low for heat-sensitive samples across the full run
- **Automatic Run and Diagnostic Logging:** every cycle is recorded, giving QC teams a retrievable history of instrument operation and batch separation
- **Short Spin Function:** momentary spin collects sample at the tube base without programming a full run
- **0.5 mL to 750 mL Adapter Range:** microtubes, conical tubes, vacuum blood tubes, RIA tubes, bottles, and microplates run on one platform
- **Benchtop Footprint at High Capacity:** 4 x 750 mL capacity that usually calls for a floor model refrigerated centrifuge fits on a bench at 398 mm height

THEORY & METHOD

Theory and Method

Centrifugal separation works on density difference. Spinning a sample generates a radial acceleration field that pushes denser particles outward faster than the surrounding fluid, so components stratify by density. Relative centrifugal force describes the strength of that field as a multiple of gravity, calculated as $RCF = 1.118 \times 10^{-5} \times r \times N^2$, where r is the rotating radius in centimeters and N is speed in rpm. Radius counts as much as speed, which is how a 5,500 rpm rotor of this diameter reaches 4,904 x g.

Sedimentation rate follows Stokes' law: particle velocity rises with the square of particle radius and with the density gap between particle and medium, and falls as the medium becomes more viscous. Packed red cells settle in minutes at a few hundred x g, while small particles need higher fields and longer runs. Low speed centrifuges target the first group, trading

top-end speed for the rotor radius and bucket volume that let a lab process liters instead of milliliters.

Rotor geometry decides the shape of the pellet and the length of the sedimentation path. Swing-out buckets pivot to horizontal under load, so particles travel the full tube length and settle as a flat pellet with clean layer boundaries. Fixed-angle rotors hold tubes at a set angle, shortening the path and raising throughput at higher RCF. Refrigeration counters the heat that air friction against the spinning rotor puts into the chamber, holding labile samples near setpoint through long runs.

TECHNICAL SPECIFICATIONS

Large Capacity Low Speed Refrigerated Centrifuge (4 x 750 mL) -
ToronCent™ LSR LC Technical Specifications

Parameter	Refrigerated Model	Non-Refrigerated Variant
Max Speed	5,500 rpm	5,500 rpm
Max RCF	4,904 x g	4,904 x g
Max Capacity	4 x 750 mL	4 x 750 mL
Speed Accuracy	±10 rpm	±10 rpm
Time Setting Range	1 s to 99 min 59 s; 1 min to 99 h 59 min	1 s to 99 min 59 s; 1 min to 99 h 59 min
Timing Modes	Start timing, speed timing, continuous timing	Start timing, speed timing, continuous timing
Temperature Setting Range	-20°C to 40°C	Not applicable
Temperature Accuracy	±0.5°C	Not applicable
Pre-Cooling Function	Yes	Not applicable

Parameter	Refrigerated Model	Non-Refrigerated Variant
Compressor Unit	High-performance compressor, R134a environment-friendly refrigerant	Not applicable
Display	7-inch full touchscreen	7-inch full touchscreen
Program Memory	100 user-defined programs, up to 5 steps each	100 user-defined programs, up to 5 steps each
Acceleration / Deceleration	11 acceleration stages / 12 deceleration stages	11 acceleration stages / 12 deceleration stages
Drive	AC frequency conversion (brushless) motor	AC frequency conversion (brushless) motor
Short Spinning	Yes	Yes
Rotor Identification	Yes	Yes
Noise	≤65 dB(A)	≤65 dB(A)
Voltage	AC 220 V ±22 V, 50/60 Hz (110V is also available)	AC 220 V ±22 V, 50/60 Hz (110V is also available)
Power Consumption	1.6 kW	900 W
Dimensions (W x D x H)	713 × 681 × 398 mm	510 × 635 × 398 mm
Packing Dimensions	860 × 810 × 620 mm	660 × 770 × 450 mm
Net Weight	95 kg	76 kg

Rotor Options

Rotor	Type	Max Speed	Max RCF	Max Capacity
Rotor 1	Fixed-angle rotor	5,500 rpm	4,904 x g	40 x 15 mL
Rotor 2	Swing-out rotor	4,000 rpm	3,345 x g	4 x 500 mL (buckets ordered separately)
Rotor 3	Swing-out rotor	4,000 rpm	3,500 x g	4 x 750 mL (buckets ordered separately)

Rotor	Type	Max Speed	Max RCF	Max Capacity
Rotor 4	Swing-out rotor with automatic de-capping	4,000 rpm	3,370 x g	120 tubes (13 x 75 mm / 13 x 100 mm)

Custom rotor configurations are available on request.

Rotor 2 (4 x 500 mL) Buckets and Adapters

Bucket	Adapter Capacity
Round bucket / Aerosol-tight round bucket	4 x 1 x 250 mL
Round bucket / Aerosol-tight round bucket	4 x 2 x 100 mL
Round bucket / Aerosol-tight round bucket	4 x 4 x 50 mL (conical or round)
Round bucket / Aerosol-tight round bucket	4 x 7 x 20 mL
Round bucket / Aerosol-tight round bucket	4 x 9 x 15 mL (conical or round)
Round bucket / Aerosol-tight round bucket	4 x 11 x 15 mL conical (cap ≤21.5 mm)
Round bucket / Aerosol-tight round bucket	4 x 14 x 10 mL
Round bucket / Aerosol-tight round bucket	4 x 19 x 5/7 mL vacuum blood collection tube
Round bucket / Aerosol-tight round bucket	4 x 36 x 1.5 mL
Rectangular bucket / Rectangular bucket with sealing cover	4 x 1 x 250 mL
Rectangular bucket / Rectangular bucket with sealing cover	4 x 3 x 100 mL
Rectangular bucket / Rectangular bucket with sealing cover	4 x 6 x 50 mL (conical or round)
Rectangular bucket / Rectangular bucket with sealing cover	4 x 12 x 15 mL (conical or round)
Rectangular bucket / Rectangular bucket with sealing cover	4 x 20 x 10 mL

Bucket	Adapter Capacity
Rectangular bucket / Rectangular bucket with sealing cover	4 x 31 x 5/7 mL vacuum blood collection tube
Rectangular bucket / Rectangular bucket with sealing cover	4 x 56 x 1.5 mL

Rotor 3 (4 x 750 mL) Buckets and Adapters

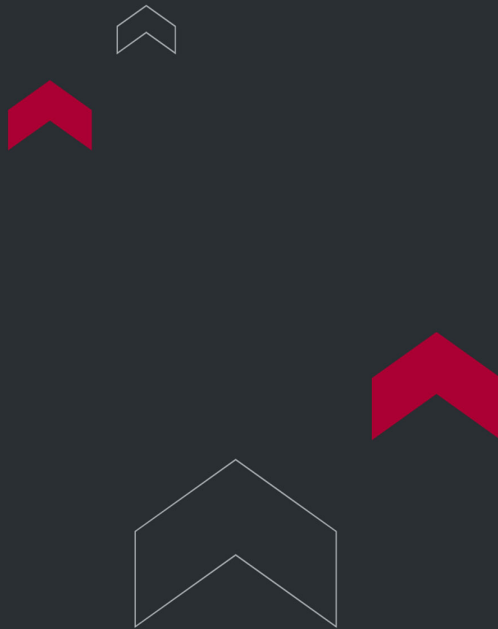
Bucket	Adapter Capacity
Round bucket / Aerosol-tight round bucket	4 x 1 x 500 mL (conical or flat)
Round bucket / Aerosol-tight round bucket	4 x 1 x 250 mL (conical or flat)
Round bucket / Aerosol-tight round bucket	4 x 4 x 100 mL
Round bucket / Aerosol-tight round bucket	4 x 5 x 50 mL (self-standing tube)
Round bucket / Aerosol-tight round bucket	4 x 7 x 50 mL (conical or round)
Round bucket / Aerosol-tight round bucket	4 x 10 x 20 mL
Round bucket / Aerosol-tight round bucket	4 x 15 x 15 mL (conical)
Round bucket / Aerosol-tight round bucket	4 x 19 x 10 mL (self-standing tube)
Round bucket / Aerosol-tight round bucket	4 x 21 x 10 mL
Round bucket / Aerosol-tight round bucket	4 x 27 x 5/7 mL vacuum blood collection tube
Round bucket / Aerosol-tight round bucket	4 x 37 x 5 mL (RIA tube)
Round bucket / Aerosol-tight round bucket	4 x 56 x 1.5 mL
Rectangular bucket	4 x 9 x 50 mL (conical or round)
Rectangular bucket	4 x 19 x 15 mL (conical or round)

Bucket	Adapter Capacity
Rectangular bucket	4 x 30 x 10 mL
Rectangular bucket	4 x 38 x 5/7 mL vacuum blood collection tube
Microplate bucket	4 x 2 x 96 deep-well plates (total plate height ≤67 mm)
Microplate bucket	4 x 4 x 96 microplates (total plate height ≤67 mm)

Rotor 4 (Automatic De-Capping) Accessories

Item	Description
Brackets	Tube brackets for the automatic de-capping swing-out rotor
Adapter	13 x 75 mm / 13 x 100 mm tube adapter, 120 tube positions total

Additional bucket and adapter configurations can be customized on request.



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