TORONTECH

LARGE CAPACITY HIGH SPEED CENTRIFUGE (4 X 750 ML)

Large Capacity High Speed Centrifuge (4 x 750 mL) – ToronCent™ HS LC

ToronCent™ HS LC large capacity high speed centrifuge handles up to 3 liters of sample per cycle and reaches 21,000 rpm with its high speed angle rotors. Laboratories running blood component preparation, cell harvesting, and bulk protein recovery get volume and speed on one benchtop platform. The swing rotor accepts four 750 mL rectangular buckets and loads 36 conical 50 mL tubes in a single run. Acceleration to full speed takes 15 seconds, keeping total cycle times short.

Fourteen rotor options cover tubes and bottles of 0.2 mL through 750 mL, plus deep-well plates and standard microplates. Angle rotors deliver a maximum relative centrifugal force of 30,642 x g for pelleting work, while the swing rotors trade speed for the 4 x 750 mL bucket capacity. Rotor identification is automatic, so the control system applies the correct speed ceiling to whichever rotor is installed. Aerosol-tight buckets are available for biocontainment.

A 7-inch color touchscreen drives parameter entry, and 100 named program groups store recurring protocols for repeatable runs. The AC variable frequency motor holds speed within ±10 rpm and needs no brush replacement over its service life. An air flow guiding design moves heat out of the chamber to keep temperature sensitive samples cooler during extended runs. The ToronCent™ HS LC occupies a 510 mm wide footprint and weighs 76 kg.

APPLICATIONS

Large Capacity High Speed Centrifuge (4 x 750 mL) – ToronCent™ HS LC Applications

The ToronCent™ HS LC serves laboratories that need both high g-force separation and bulk sample throughput without operating two separate instruments.

- **Clinical Laboratories and Blood Banking**: separates plasma, serum, and buffy coat, processing up to 152 vacuum blood collection tubes per cycle with the rectangular bucket adapters
- **Cell Culture and Bioprocessing**: harvests mammalian and bacterial cells from culture media in 250 mL and 500 mL bottles, then pellets washed cells in smaller conical tubes
- **Molecular Biology and Genomics**: pellets nucleic acid precipitates, spin columns, and PCR plates using the microtube and microplate rotor options
- **Pharmaceutical Quality Control**: clarifies formulations, separates suspensions, and prepares samples for chromatographic and spectroscopic analysis
- **Protein Purification and Biochemistry**: recovers ammonium sulfate precipitates, clarifies lysates, and concentrates protein fractions at up to 30,642 x g
- **Food and Beverage Analysis**: separates fat, solids, and aqueous phases in dairy, juice, and beverage samples for compositional testing
- **Environmental and Water Testing**: concentrates suspended solids, sediment, and microbial biomass from large volume field samples
- **Veterinary Diagnostics**: prepares animal blood, urine, and tissue samples across species with varying draw volumes
- **Academic and Contract Research**: supports shared core facilities where one instrument must cover microliter through liter scale separations

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TorontCent™ HS LC
Large Capacity High Speed Centrifuge
(4 x 750 mL)

FEATURES

Large Capacity High Speed Centrifuge (4 x 750 mL) – ToronCent™ HS LC Key Features

The ToronCent™ HS LC combines a brushless drive, a wide rotor library, and a programmable touchscreen interface built around repeatable protocols.

- **21,000 rpm Maximum Speed and 30,642 x g**: pellets fine precipitates and subcellular fractions that lower speed benchtop units cannot bring down
- **4 x 750 mL Swing Rotor Capacity**: processes 3 liters per cycle, covering 36 conical 50 mL tubes or 152 vacuum blood collection tubes in one load
- **14 Interchangeable Rotors**: covers 0.2 mL microtubes through 750 mL buckets, deep-well plates, and standard microplates on one drive
- **Automatic Rotor Identification**: recognizes the installed rotor and applies its speed ceiling, removing the risk of over-speeding a low rated rotor
- **15-Second Acceleration to Full Speed**: shortens total cycle time and reduces the time samples spend at intermediate speeds
- **7-Inch Color Touchscreen (800 x 480)**: shows setpoints and live running values side by side, so operators track a run without switching screens
- **100 Named Program Groups**: stores and labels recurring protocols by method or user, giving consistent parameters across shifts and operators
- **11 Acceleration and 12 Deceleration Ramps**: matches the ramp profile to the separation, with soft braking that leaves gradients and loose pellets undisturbed
- **AC Variable Frequency Motor**: eliminates carbon brush wear and brush dust, holding speed within ±10 rpm with no scheduled drive maintenance
- **Air Flow Guiding Chamber**: routes airflow to draw frictional heat away from the bowl and hold temperature sensitive samples cooler through long runs

- **Autoclavable Rotors, Baskets, and Adapters**: withstand steam sterilization at high temperature and pressure for routine decontamination
- **Aerosol-Tight Bucket Option**: seals the sample carrier for work with infectious or hazardous material
- **Automatic Run and Diagnostic Logging**: records every cycle and fault event so operators can trace instrument behavior and batch separation history
- **Short Spin Function**: delivers quick pulse spins for tube collection and rapid microtube work without programming a full cycle
- **Quiet Operation at ≤65 dB(A)**: keeps sound at a level suitable for open bench and shared laboratory placement

THEORY & METHOD

Theory and Method

Centrifugal separation replaces gravity with a much larger radial acceleration field. Spinning a sample around a fixed axis pushes every particle outward, and denser particles migrate faster than the surrounding fluid. The field strength is expressed as relative centrifugal force, calculated as $RCF = 1.118 \times 10^{-5} \times r \times N^2$, where r is the rotor radius in millimeters and N is speed in rpm. Speed enters squared, which explains why this centrifuge reaches 30,642 x g at 21,000 rpm.

Sedimentation rate follows Stokes' law: particles settle in proportion to the square of their diameter and to the density difference between particle and medium. Whole cells and similar large, dense material separate in minutes at a few thousand x g. Fine precipitates and subcellular debris need the tens of thousands of x g the angle rotors supply. Rotor geometry decides which regime a run occupies. Angle rotors hold tubes at a fixed pitch, giving a short sedimentation path and a wall-packed pellet.

Swing rotors pivot the buckets horizontal during acceleration, so particles travel the full tube length and form a flat, clean pellet. That geometry suits density gradient work and blood component layering, but it limits speed, so the 4 x 750 mL swing rotor tops out at 4,000 rpm. Eleven acceleration and twelve deceleration profiles let operators ramp gently at the end of a run to avoid remixing a settled pellet. Rotational drag heats the chamber, and the air flow guiding path carries that heat

away.

TECHNICAL SPECIFICATIONS

Large Capacity High Speed Centrifuge (4 x 750 mL) – ToronCent™ HS LC Technical Specifications

Parameter	Specification
Maximum Speed	21,000 rpm
Maximum RCF	30,642 x g
Maximum Capacity	4 x 750 mL
Speed Accuracy	±10 rpm
Time Setting Range	1 s to 99 min 59 s / 1 min to 99 h 59 min
Timing Modes	Start timing, speed timing, continuous timing
Rotor Identification	Yes
Short Spin Function	Yes
Display	7-inch color touchscreen, 800 x 480 resolution
Program Memory	100 user-defined program groups
Acceleration Rates	11
Deceleration Rates	12

Parameter	Specification
Drive Motor	AC variable frequency, brushless
Noise Level	≤65 dB(A)
Voltage	AC 220 V ±22 V, 50/60 Hz (110V is also available)
Power Consumption	900 W
Dimensions (W x D x H)	510 x 635 x 398 mm
Packing Dimensions (W x D x H)	660 x 770 x 450 mm
Net Weight	76 kg

Angle Rotor Options

Max Capacity	Max Speed	Max RCF	Adapters Available
12 x 1.5 / 2.2 mL	21,000 rpm	30,642 x g	0.2 mL, 0.5 mL
12 x 15 mL (conical)	13,000 rpm	18,894 x g	5 mL (conical)
12 x 10 mL	14,000 rpm	20,140 x g	1.5 mL, 5 mL
6 x 30 mL	14,000 rpm	20,140 x g	5 mL, 10 mL
6 x 50 mL	13,000 rpm	17,947 x g	1.5, 5, 10, 15, 20, 25, 30 mL
6 x 50 mL (conical)	12,000 rpm	15,292 x g	15 mL (conical); 50 mL round bottom adapter included
12 x 5 mL	15,000 rpm	15,840 x g	0.5 mL, 1.5 mL
30 x 1.5 / 2.2 mL	13,000 rpm	19,090 x g	0.2 mL, 0.5 mL
48 x 1.5 / 2.2 mL	13,000 rpm	18,525 x g	0.2 mL, 0.5 mL

Max Capacity	Max Speed	Max RCF	Adapters Available
6 x 100 mL	10,000 rpm	11,960 x g	5, 10, 25 mL; 15 mL and 50 mL (conical/round)
24 x 1.5 / 2.2 mL	16,000 rpm	24,498 x g	0.2 mL, 0.5 mL
8 x 50 mL (conical)	11,000 rpm	14,100 x g	1.5, 5, 10, 15, 20, 25, 30 mL; 50 mL round bottom adapter included
8 x 50 mL	12,000 rpm	15,615 x g	1.5, 5, 10, 15, 20, 25, 30 mL

Swing Rotor Options

Parameter	4 x 500 mL Swing Rotor	4 x 750 mL Swing Rotor
Maximum Speed	4,000 rpm	4,000 rpm
Maximum RCF	3,345 x g	3,500 x g
Maximum Capacity	4 x 500 mL	4 x 750 mL
Buckets	Round, aerosol-tight round, rectangular, rectangular with sealing cover	Round, aerosol-tight round, rectangular, microplate
Bucket Supply	Ordered separately	Ordered separately

Bucket and Adapter Configurations, 4 x 500 mL Swing Rotor

Bucket Type	Adapter Configurations
Round bucket and aerosol-tight round bucket	4 x 1 x 250 mL; 4 x 2 x 100 mL; 4 x 4 x 50 mL (conical/round); 4 x 7 x 20 mL; 4 x 9 x 15 mL (conical/round); 4 x 11 x 15 mL conical (cap ≤21.5 mm); 4 x 14 x 10 mL; 4 x 19 x 5/7 mL vacuum blood collection tube; 4 x 36 x 1.5 mL
Rectangular bucket and rectangular bucket with sealing cover	4 x 1 x 250 mL; 4 x 3 x 100 mL; 4 x 6 x 50 mL (conical/round); 4 x 12 x 15 mL (conical/round); 4 x 20 x 10 mL; 4 x 31 x 5/7 mL vacuum blood collection tube; 4 x 56 x 1.5 mL
Custom configurations	Available on request

Bucket and Adapter Configurations, 4 x 750 mL Swing Rotor

Bucket Type	Adapter Configurations
Round bucket and aerosol-tight round bucket	4 x 1 x 500 mL (conical/flat); 4 x 1 x 250 mL (conical/flat); 4 x 4 x 100 mL; 4 x 5 x 50 mL (self-standing tube); 4 x 7 x 50 mL (conical/round); 4 x 10 x 20 mL; 4 x 15 x 15 mL (conical); 4 x 19 x 10 mL (self-standing tube); 4 x 21 x 10 mL; 4 x 27 x 5/7 mL vacuum blood collection tube; 4 x 37 x 5 mL (RIA tube); 4 x 56 x 1.5 mL
Rectangular bucket	4 x 9 x 50 mL (conical/round); 4 x 19 x 15 mL (conical/round); 4 x 30 x 10 mL; 4 x 38 x 5/7 mL vacuum blood collection tube
Microplate bucket	4 x 2 x 96 deep-well plate; 4 x 4 x 96 microplate; total plate height ≤67 mm

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