FLOOR-MODEL ULTRACENTRIFUGE

OPTIMA X SERIES

BRILLIANCE
at every turn.

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современная лаборатория

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BECKMAN
COULTER
Life Sciences

History

Beckman centrifuges have a history of over 70 years since first developing the Model E, the world's first analytical ultracentrifuge in 1947. We are grateful for the support of our valued customers over these many years.

Developed originally in 1949, as an analytical ultracentrifuge to separate samples, the high-performance Model L is typically used as a preparative centrifuge. Until around 1950, Beckman centrifuges were known affectionately as "Spincos" and constantly delivered leading edge technology, such as powerful acceleration and precision temperature control functionality as the top brand of centrifuges and ultracentrifuges. In 1963, we developed the Type 50 Ti, the world's first titanium rotor. We also developed the TL-100, the world's first table-top ultracentrifuge, in 1984, taking the world by storm. With a quick response to environmental measures, we employed the world's first electric cooling system in 1989.

Theodor (The) Svedberg
(August 1884 to February 1971)
Recipient of the Nobel Prize in Chemistry

1953 DNA double-helix structure determined

1947

Analytical Ultracentrifuge Model E
The world's first analytical ultracentrifuge

1949

Preparative ultracentrifuge Model L
The world's first floor-type preparative ultracentrifuge

1963

Type 50 Ti Rotor
The world's first titanium rotor

1979

L8 Series Ultracentrifuge
Microprocessor and the world's first vacuum-encased induction drive technology

1984

The world's first top-loading swing rotor

1989

The world's first near-vertical rotor

1989

Optima L Series
The world's first floor-model ultracentrifuge employing a non-chlorofluorocarbon (CFC) thermoelectric heating and cooling system

Optima X Series

A new generation of floor-model ultracentrifuges employing advanced thinking that are gentle on people and the environment

Optima X Series

Premier Models Optima XPN-100 / 90 / 80

Basic Models Optima XE-100 / 90

Maximum Speed: 100,000 / 90,000 / 80,000 rpm
Maximum g Force: 802,000 / 694,000 / 548,300 x g

The masterwork of Beckman centrifuges, the leading brand of centrifuges and ultracentrifuges, is the Optima X series. We have seamlessly designed everything from the tubes and rotors to the centrifuge's main unit, incorporating the know-how that has been gained over many years into a reliable and safe design that is easy-to-use.

Optima XPN is equipped with eXpert, an intelligent software program to assist beginners, and provides powerful support for density gradient centrifugation, etc. The centrifuge also has enhanced data management which provides the capabilities to support customers' GMP processes.

We support a wide-range of research and development, not only in the field of the life sciences for proteins, exosomes, genes, intracellular organelles, and viruses but also in the field of engineering for nanoparticles. We meet a variety of needs, from basic research to quality control and production line applications.

Arnold O. Beckman
(April 1900 to May 2004)

Preparative Ultracentrifuge Model L

1. Safety and Security
2. Easy-to-use
3. Management
4. Environment
5. Accuracy
6. High Performance
7. Abundance
8. History

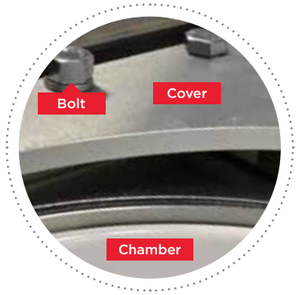
Safety and Security

Support for various international specifications

- CE and CSA mark requirements
- Manufacturing at ISO 13485-certified factory
- International Standard IEC/EN 61010-2-020 compliant
- International Standard IEC/EN 61326-1 compliant

Safe and Secure operation validated by Maximum Credible Accident (MCA) Testing*1

Ultra-thick steel is used in the lid of the ultracentrifuge. Additionally, the lid of the centrifuge is covered rigidly with an steel plate constructed from one seamless sheet of steel and a thick bolt. As a result, even if an accident occurred during centrifugation at, for example, 100,000 rpm, none of the parts, including the rotor, would be thrown out of the chamber. Moreover, by employing a 940 mm x 681 mm wide foot print and daring to increase its weight to 485 kg, we have kept the potential for large movement of the centrifuge that may result in collision with surrounding objects to a minimum.



We Developed the World's First Top-Loading Style to Prevent Mishooking of the Swing Rotor

Mishooking of the swing rotor may result in a major accident. We then developed the world's first top-loading style in which mishooking cannot occur, in principle, to prevent this mishooking. Moreover, the SW 32 Ti and SW 32.1 employ a mechanism in which the lid of the bucket is closed by turning it only 90° to prevent imbalances caused by closing the lid incorrectly.

SW 32 Ti*2	32,000 rpm, 175,000 x g, 6 tubes x 38.5 mL
SW 32.1 Ti*2	32,000 rpm, 187,000 x g, 6 tubes x 17 mL

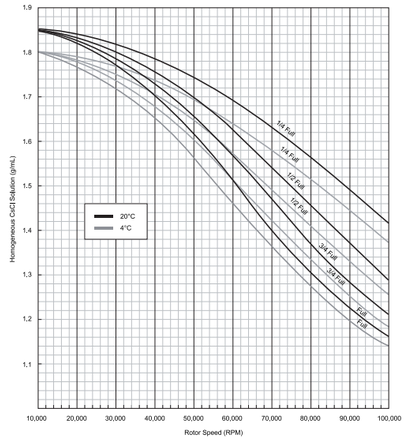
*1: Safety testing Certified by CSA (Canadian Standards Association) which is a Nationally Recognized Test laboratory (NRTL).

*2: +/- 0.8C over entire temperature range.

By Maintaining Strict Temperature Control Inside the Chamber at ± 0.5°C, Cesium Chloride Crystallization Accidents are Prevented

As a precaution when using cesium chloride as the density gradient medium, crystallization during centrifugation must be prevented. For this reason, the maximum speed must be derived using a curve plotted with the cesium chloride and maximum speed of the rotor. This curve varies with temperature. In other words, the maximum speed at which crystallization due to temperature does not occur varies. For this reason, the temperature inside the chamber must be controlled precisely.

The rotor temperature inside the chamber is accurately monitored with two independent temperature sensor systems (thermopile and thermistor). In the event that one of the systems fails during centrifugation, monitoring continues with the other system, and the centrifugation can be ended safely.



Safety Ensured with Three Overspeed Prevention Functions

Dynamic Rotor Inertia Check (DRIC)
Recognizes the rotor by calculating the rotational energy of the rotor during centrifugation. It checks that the speed settings are correct and adjusts to an appropriate speed.

Optical Sensor Overspeed Disk
Checks the tolerated maximum speed of the rotor by optically reading the overspeed disk and controls the speed.

Magnetic Sensor Rotation Monitoring Function
It also has a magnetic sensor rotation monitoring function that monitors the spindle rotation using a magnetic sensor.

Long-term Peace-of-Mind Warranty

Drive unit: 10-year warranty

Rotor: 5-year warranty

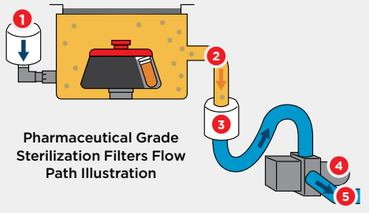
Main unit: 1-year warranty plus extended warranty of up to 2 years

Support for Unexpected Electrical Outages with a Line Voltage Handling System

In the event of an unexpected electrical outage or a state of low-electrical power (85 VAC or less), the rotor continues to turn at momentum without braking or stopping suddenly. As a result, you can decide whether to stop it or to continue running it when the power returns. Moreover, it comes equipped with a 180 to 264 VAC automatic voltage switching system.

Two Pharmaceutical Grade Sterilization Filters (Manufactured by Pall Corporation)

With pharmaceutical-grade sterilizing filters, containment can be maximized. Also, by placing the filters in two places, the airflow inlet and outlet, you have peace of mind even in the event of reverse flow.



Pharmaceutical Grade Sterilization Filters Flow Path Illustration

1. Pharmaceutical Grade Sterilization Filter
2. Chamber
3. Pharmaceutical Grade Sterilization Filter
4. Vacuum Pump
5. Airflow

Easy-to-use

Hardware

Wide Work Space

Securing a wider space for rotor installation enables safer, more secure sample loading.

Main Unit Design for Detaching Rotor

The ergonomic, inward curving front panel makes the rotor easy to detach, reducing physical strain when loading the heavy rotor.

Vacuum Pump Requiring Minimal Maintenance

The time and effort spent on maintenance are decreased because moisture in the oil inside the pump is constantly being removed by a vacuum pump equipped with a moisture-removing system.

Software

Easy-to-Use, Movable, 15-inch Large LCD Touch Screen

15-inch Large LCD touch screen is easy to use. The touch screen monitor can be moved up to 45° vertically and horizontally, improving visibility and ease of use.

Troubleshooting Help Functionality

Equipped with help function, problems can be resolved on the panel even without a manual.

Support for Multiple Languages for Foreign Students

With support for 9 languages (Japanese, English, Chinese, Korean, Italian, French, Spanish, German, and Russian), foreign students can also feel comfortable using it.

Standardly Equipped with Rotor Catalog and Tube Catalog

Because it comes standardly equipped with a rotor catalog and tube catalog, a list of tubes for each rotor is displayed. The maximum speed that can be set for the selected tube is determined automatically. As a result, tube damage due to setting the rotor speed incorrectly is reduced.

Easily Understand the Running Status with the Color Bar at the Top of the Screen

A status display function that lets you know the main unit's status at a glance is employed using the color of the header on the main screen: ready screen (blue), running and stopping (green), warning message (yellow), and error message (red).

Toggle Between RPM and RCF (Centrifugal Force) with One Touch

By selecting a rotor, you can toggle between RPM and RCF with one touch, to set either easily

Rotor Catalog

Labware Catalog

Status Color Bars

Management

Optima XPN has enhanced data management which provides the capabilities to support customers' GMP processes.

Automatically Records a Complete History Including a Run History That Can Be Output

Run records, the number of times that a rotor is used, the self-diagnostic history and programs are recorded automatically per user and can be output to recording media (USB flash and drive, etc.) or printers connected to the LAN via USB or Ethernet. Management with a log book is no longer necessary, making the work more efficient.

- Rotor usage history according to serial number*1
- All changes to system settings are recorded as a system log
- Run history, diagnostic history, run status real-time plotting
- User defined programs/steps, user guide export
- Export as XML and CSV files
- Viewable in spreadsheets, such as Microsoft Excel
- Comments can be entered manually for each centrifugation
- Centrifuge history can be filtered based on user or date

Three Levels of Security Configurable for 50 Users

Useful for laboratories used by several users

- Configurable for three levels of access: Administrator, Super User, and Operator
- User IDs and PINs configurable for up to 50 users
- Password protection and electronic signatures maintain chain of custody

Complete Network Management

Data management is remarkably easy with a PC connection and access to a LAN environment using Ethernet. Monitoring the centrifugation status from a different room from the one in which the main unit is installed results in prevention of biohazards as well as saving on time and labor.

- Remote monitoring and control are possible from a PC or a mobile device (Installation of a dedicated application MobileFuge*2 is required.)
- By connecting to the user's LAN environment, run history and other data can be exported to any drive on the network
- Data can be printed to a printer on the network
- When an error occurs on a running machine, an alert can be sent to a registered e-mail address

Real-Time Run Status Plotting Function

Plots graphs and provides a visualization of the running temperature and speed in real-time. Centrifugation can be recorded in detail. All the plotted graphs are recorded on the main unit, so it is possible to recall data from the run history.

* 1 Rotor registration and history management are not possible on the Optima X series for previously purchased rotors.

* 2 MobileFuge is supported on iOS and Android operating systems.

Environment

Quietest in Class with Minimal Power Consumption

Quietest in Class (Less Than 51 dBA) Design Using Quiet-drive Technology

By developing a drive that reduces the resonances of the drive during centrifugation, noise pollution is reduced, and a running noise that is quietest in its class of 51 dBA or less is achieved.

Employing a Regenerative Braking System to Reduce Electrical Consumption

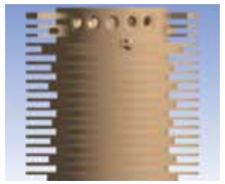
By converting inertial energy during deceleration to electrical energy instead of heat, energy is regenerated and the power consumption during centrifugation is reduced. Also power consumption of 60 W or less when idling is achieved (up to a 56% cut compared to the past).

Absolutely No CFC or Other Refrigerants Used

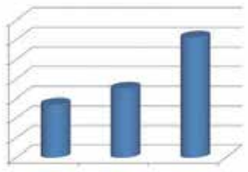
An electrical cooling system is employed to achieve a refrigerant gas-free system that is environmentally friendly.

Reduced Noise of Drive and Cooling Fins

Previous Drive and Cooling Fins



New Drive and Cooling Fins
Changing the shape of the fin enabled the reduction of resonance at any speed



With the regenerative braking system, we successfully cut the power consumption when idling compared to previous products, such as the Optima L-100K (23%) and the Optima L-100XP (56%).

Unique Design

High-Precision and Long Life Achieved by Using a Vacuum-Encased Drive Unit

The drive unit and chamber are in the same vacuum system for a design with longevity without a vacuum seal. Also, high-precision control is made possible because the drive unit and chamber are in the same space. As a result, naturally a high degree of reproducibility is possible, but the soft acceleration that is critical for density gradient centrifugation is also possible.

Vacuum-Encased Drive Unit

High Performance

Centrifugation Software “eXpert”

With eXpert software, simulation and calculation of centrifuge conditions when using density gradient centrifugation for a variety of samples, including plasmid DNA, RNA, proteins, and viruses, is possible with the ESP (Efficient Sedimentation Program).

- Sucrose density gradient centrifugation simulation display
- Creation of density gradient centrifugation conditions
- Substitute Rotor Run
- Calculation of sedimentation coefficient based on centrifugation results or molecular weight
- Calculation of pelleting time based on sedimentation coefficient

Other Useful Features

- Delayed start function that enables you to specify a run start time and end time
- Equipped with a chemical resistances table for tubes
- Step program import function

Wide Variety of Tubes and Rotors

Rotors

Fixed-Angle Rotors

Rotors	Maximum Speed* (rpm)	Maximum g Force* (x g)	*K* Factor	Tube Size (ϕ x length: mm)	Capacity (tube count x mL)
Type 100 Ti	100,000	802,000	15	13×64	8×6
Type 90 Ti	90,000	694,000	25	16×76	8×13.5
Type 70 Ti	70,000	504,000	44	25×89	8×39
Type 70.1 Ti	70,000	450,000	36	16×76	12×13.5
Type 50.2 Ti	50,000	302,000	69	25×89	12×39
Type 50.4 Ti	50,000	312,000	33	13×64	44×6.5
Type 45 Ti	45,000	235,000	133	38×102	6×94
Type 42.2 Ti	42,000	223,000	9	7×20	72×0.23
Type 25	25,000	92,500	62	8×51	100×1
Type 19	19,000	53,900	951	60×120	6×250

Swing Rotors

Rotors	Maximum Speed (rpm)	Max g Force (xg)	*K* Factor	Tube Size (ϕ x length:mm)	Capacity (tube count x mL)
SW 60 Ti	60,000	485,000	45	11×60	6×4
SW 55 Ti	55,000	368,000	48	13×51	6×5
SW 41 Ti	41,000	288,000	124	14×89	6×13.2
SW 40 Ti	40,000	285,000	137	14×95	6×14
SW 32 Ti	32,000	175,000	204	25×89	6×38.5
SW 32.1 Ti	32,000	187,000	228	16×102	6×17
SW 28	28,000	141,000	246	25×89	6×38.5
SW 28.1	28,000	150,000	276	16×102	6×17

Vertical Rotors

Rotors	Maximum Speed* (rpm)	Maximum g Force* (x g)	*K* Factor	Tube Size (ϕ x length: mm)	Capacity (tube count x mL)
VTi 90	90,000	645,000	6	13×51	8×5.1
VTi 65.1	65,000	402,000	13	16×76	8×13.5
VTi 65.2	65,000	416,000	10	13×51	16×5.1
VTi 50	50,000	242,000	36	25×89	8×39

Near-vertical Rotors

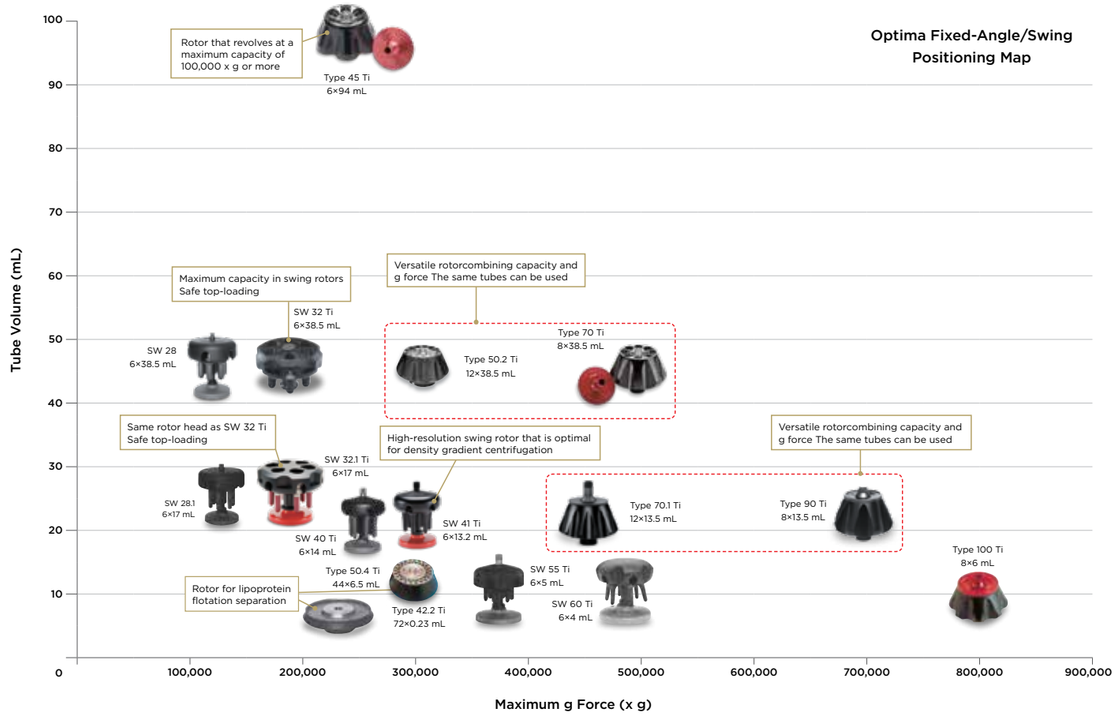
Rotors	Maximum Speed* (rpm)	Maximum g Force* (x g)	*K* Factor	Tube Size (ϕ x length: mm)	Capacity (tube count x mL)
NVT 100	100,000	750,000	8	13×51	8×5.1
NVT 90	90,000	645,000	10	13×51	8×5.1
NVT 65	65,000	402,000	21	16×76	8×13.5
NVT 65.2	65,000	416,000	15	13×51	16×5.1

Zonal Rotors

Rotors	Maximum Speed (rpm)	Maximum g Force (x g)	Maximum Flow Rate (mL)	Maximum Rotor Capacity (mL)	Rotor Radius (cm)
Ti-15	32,000	102,000	50-200	1,675	7.5

Continuous Flow Rotors

Rotors	Maximum Speed (rpm)	Maximum g Force (xg)	Maximum Flow Rate (L/hr)	Maximum Rotor Capacity (mL)	*K* Factor
CF-32 Ti	32,000	102,000	9	430	42



Twist-Lock Bucket & Top-Loading

Swing Rotor SW 32
Ti/SW 32.1 Ti

1 Push in

2 Turn 90° for easy locking

3

4 Simply insert from the top

- Employs a mechanism in which the lid of the bucket is closed by turning it only 90° to prevent imbalances caused by closing the lid incorrectly.
- We developed the world's first top-loading style in which mishooking cannot occur, in principle, to prevent this mishooking.
- The risk of sample diffusion is reduced because only the bucket can be inserted and removed even with the rotor head loaded in the centrifuge (main unit).
- The rotor head is the same for the SW 32 Ti and SW 32.1 Ti, so it can support both 38.5 mL and 17 mL by changing the bucket.
- We have a complete line of tubes for your use; select from 11 types for the SW 32 Ti and 8 types for the SW 32.1 Ti to suit your purpose.

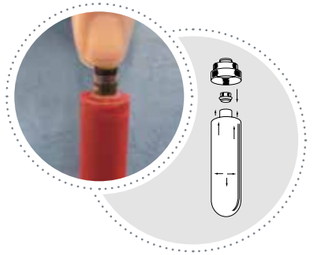
SW 32 Ti	32,000 rpm, 175,000 x g, 6 tubes x 38.5 mL
SW 32.1 Ti	32,000 rpm, 187,000 x g, 6 tubes x 17 mL

Access the twist lock movie here

Complete Solution

Tubes

OptiSeal Tubes



- Simply push in the plug (stopper) gently with your finger to seal completely. Special tools are not required.

QuickSeal Tubes

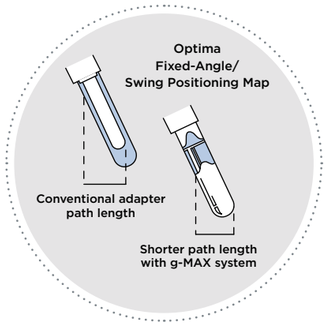
- A heat-sealing type of biocontainment tube.

Stainless Tubes
(38.5 / 94 mL)

- Sometimes chemical polymerization resin tubes are not appropriate for centrifugation using organic solvents.
- Best for tetrahydrofuran, esters, and aldehydes.

g-MAX System

- With the g-MAX system, several capacity tubes can be centrifuged at maximum g force in one rotor, drastically shortening the separation time. Small-volume samples can also be centrifuged at maximum g force.



Type 90 Ti

Tube Volume	*K* Factor	Peak Relative Separation Time
13.5 mL	25	1
6.3 mL	14	0.56
4.2 mL	11	0.44

SW 41 Ti

Tube Volume	*K* Factor	Peak Relative Separation Time
13.2 mL	124	1
5.9 mL	55	0.44
3.5 mL	27	0.21

Konical Tubes

- Conical tubes that are best for collecting small-volume pellets.
- For use with a swing rotor; place in adapter at the bottom of the bucket.

Accessories

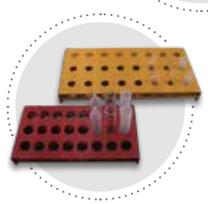
Rack for Use with OptiSeal Tubes

- For dedicated use with OptiSeal tubes, with plugs that can be removed to facilitate sample collection as well.

Tube Slicer
(For use with thickwall tubes)

- Supports open-top thickwall tubes for use in ultracentrifuges with diameters of 7 to 13 mm.

Rack for Use with Tubes



- Supports 7 types of tubes with diameters of 8 to 38 mm.

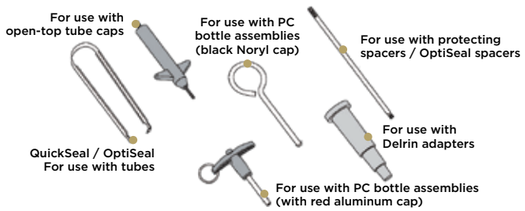
Tube Slicer
(For use with thinwall tubes)

- Supports thinwall tubes for use in ultracentrifuges with diameters of 8 to 25 mm.

Cordless Tube Topper Sealing Kit

- Heat-seal the tip of the QuickSeal tube to seal completely.

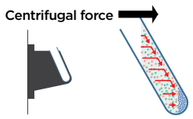
Tube Removal Tool



Rotor Selection Guide

Select a rotor type based on use → Select tubes to suit your purpose → Select rotor based on g force and processing capacity → Adapter Spacer

Fixed-Angle Rotors

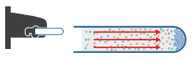


Movement of particles with a fixed-angle rotor

- Processing capacity is large
- Easy to handle
- The pellet leaves traces on the surface of the wall; therefore, the risk of contamination is high

* The numbers represent the recommended order.	Type 100 Ti 8 tubes x 6.0 mL	Type 90 Ti 8 tubes x 13.5 mL	Type 70.1 Ti 12 tubes x 13.5 mL	Type 70 Ti 8 tubes x 39 mL	Type 50.2 Ti 12 tubes x 39 mL	Type 45 Ti 6 tubes x 94 mL	Type 19 6 tubes x 250 mL	Type 50.4 Ti 44 tubes x 6.5 mL	Type 42.2 Ti 72 tubes x 0.23 mL	Type 25 100 tubes x 1 mL	Adapter Spacer
Pellet / Supernatant Collection											
1 Bottle Assembly Easy ultracentrifugation processing is possible with screw-style cap Use from approx. half of the quantity is possible	–	65,000 rpm 362,000 x g 8 tubes x 10.4 mL	65,000 rpm 388,000 x g 12 tubes x 10.4 mL	60,000 rpm 371,000 x g 8 tubes x 26.3 mL	50,000 rpm 302,000 x g 12 tubes x 26.3 mL	45,000 rpm 235,000 x g 6 tubes x 70 mL	19,000 rpm 53,900 x g 6 tubes x 250 mL	–	–	–	–
2 OptiSeal Tubes Can be sealed easily with a plug	–	90,000 rpm 694,000 x g 8 tubes x 8.9 mL	70,000 rpm 450,000 x g 12 tubes x 8.9 mL	70,000 rpm 504,000 x g 8 tubes x 32.4 mL	50,000 rpm 302,000 x g 12 tubes x 32.4 mL	–	–	50,000 rpm 312,000 x g 44 tubes x 4.7 mL	–	–	Spacer is required
3 QuickSeal Tubes Heat-sealing for a complete seal Optimal for infectious samples, such as viruses	100,000 rpm 802,000 x g 8 tubes x 2-6 mL	90,000 rpm 694,000 x g 8 tubes x 4.2-13.5 mL	70,000 rpm 450,000 x g 12 tubes x 4.2-13.5 mL	70,000 rpm 504,000 x g 8 tubes x 15-39 mL	50,000 rpm 302,000 x g 12 tubes x 15-39 mL	45,000 rpm 235,000 x g 6 tubes x 94 mL	–	50,000 rpm 312,000 x g 44 tubes x 2 / 6 mL	–	–	Spacer is required
4 Thickwall Tubes Ultracentrifugation processing is possible from half the quantity * Contains only cases in which centrifugation without caps is possible	–	30,000 / 50,000 rpm 77,000 / 197,000 x g 8 tubes x 4 / 8 mL	30,000 / 50,000 rpm 82,700 / 212,000 x g 12 tubes x 4 / 8 mL	20,000-45,000 rpm 41,200-208,000 x g 8 tubes x 4-16.5 mL	20,000-45,000 rpm 48,000-244,000 x g 12 tubes x 4-16.5 mL	15,000 / 39,000 rpm 26,200-156,000 x g 6 tubes x 4-47 mL	–	30,000-50,000 rpm 112,400-312,000 x g 44 tubes x 1 / 4 mL	42,000 rpm 223,000 x g 72 tubes x 0.23 mL	25,000 rpm 92,500 x g 100 tubes x 1 mL	Adaptor may be required
Intermediate Band: Density gradient centrifugation, etc.											
1 OptiSeal Tubes Can be sealed easily with a plug	–	90,000 rpm 694,000 x g 8 tubes x 8.9 mL	70,000 rpm 450,000 x g 12 tubes x 8.9 mL	70,000 rpm 504,000 x g 8 tubes x 32.4 mL	50,000 rpm 302,000 x g 12 tubes x 32.4 mL	–	–	50,000 rpm 312,000 x g 44 tubes x 4.7 mL	–	–	Spacer is required
2 QuickSeal Tubes Heat-sealing for a complete seal Optimal for infectious samples, such as viruses	100,000 rpm 802,000 x g 8 tubes x 2-6 mL	90,000 rpm 694,000 x g 8 tubes x 4.2-13.5 mL	70,000 rpm 450,000 x g 12 tubes x 4.2-13.5 mL	70,000 rpm 504,000 x g 8 tubes x 15-39 mL	50,000 rpm 302,000 x g 12 tubes x 15-39 mL	45,000 rpm 235,000 x g 6 tubes x 94 mL	–	50,000 rpm 312,000 x g 44 tubes x 2 / 6 mL	–	–	Spacer is required
Floating Fraction: Lipoproteins, etc.											
1 Thickwall Tubes Ultracentrifugation processing is possible from half the quantity	–	–	–	–	–	–	–	30,000-50,000 rpm 112,400-312,000 x g 44 tubes x 1 / 4 mL	42,000 rpm 223,000 x g 72 tubes x 0.23 mL	25,000 rpm 92,500 x g 100 tubes x 1 mL	Type 50.4 Ti Adapter / cap may be required

Swing Rotor



Movement of particles with a swing rotor

- When distinct bands in the density gradient are desirable
- Risk of contamination is low
- Suitable for small-volume samples because the pellet is positioned in the center of the tube

	SW 60 Ti 6 tubes × 4 mL	SW 55 Ti 6 tubes × 5 mL	SW 41 Ti 6 tubes × 13.2 mL	SW 40 Ti 6 tubes × 14 mL	Top-loading SW 32.1 Ti 6 tubes × 17 mL	Top-loading SW 32 Ti 6 tubes × 38.5 mL	SW 28.1 6 tubes × 17 mL	SW 28 6 tubes × 38.5 mL	Adapter Spacer
Pellet / Supernatant Collection									
1 UC Tube (Thinwall) Transparent, facilitating visual confirmation of the pellets	60,000 rpm 485,000 x g 6 tubes x 4 mL	48,000 / 55,000 rpm 269,000 / 368,000 x g 6 tubes x 0.8 / 5 mL	41,000 rpm 288,000 x g 6 tubes x 13.2 mL	40,000 rpm 285,000 x g 6 tubes x 14 mL	32,000 rpm 187,000 x g 6 tubes x 17 mL	32,000 rpm 175,000 x g 6 tubes x 38.5 mL	28,000 rpm 150,000 x g 6 tubes x 17 mL	28,000 rpm 141,000 x g 6 tubes x 38.5 mL	SW 55 Ti An adapter may be required
2 PP Tube (Thinwall) Round bottom / conical bottom Select either round bottom and conical bottom Conical bottoms are recommended for a small-volume pellet collection	60,000 rpm 480,000 / 485,000 x g 6 tubes x 1.5 / 4 mL	55,000 rpm 368,000 x g 6 tubes x 3 / 5 mL	41,000 rpm 284,000 / 288,000 x g 6 tubes x 10 / 13.2 mL	40,000 rpm 280,000 / 285,000 x g 6 tubes x 10/14 mL	32,000 rpm 187,000 x g 6 tubes x 14.5 / 17 mL	32,000 rpm 175,000 x g 6 tubes x 31.5 / 38.5 mL	28,000 rpm 148,000 / 150,000 x g 6 tubes x 14.5 / 17 mL	28,000 rpm 141,000 x g 6 tubes x 31.5 / 38.5 mL	For conical bottoms, an adapter is required
3 Thickwall Tubes Enables ultracentrifugation processing from half the quantity, optimal for series of experiments with inconsistent sample volumes	60,000 rpm 485,000 x g 6 tubes x 3 mL	55,000 rpm 368,000 x g 6 tubes x 3.5 mL	–	–	–	32,000 rpm 175,000 x g 6 tubes x 30 mL	–	28,000 rpm 141,000 x g 6 tubes x 30 mL	–
4 OptiSeal Tubes Can be sealed easily with a plug	–	55,000 rpm 368,000 x g 6 tubes x 3.3 mL	–	–	–	32,000 rpm 175,000 x g 6 tubes x 32.4 mL	–	28,000 rpm 141,000 x g 6 tubes x 32.4 mL	Spacer is required
5 QuickSeal Tubes Round bottom / conical bottom Heat-sealing for a complete seal Optimal for infectious samples, such as viruses	60,000 rpm 480,000 / 485,000 x g 6 tubes x 1.3-3 mL	55,000 rpm 368,000 x g 6 tubes x 2 mL	41,000 rpm 284,000 / 288,000 x g 6 tubes x 3.5-8 mL	40,000 rpm 280,000 / 285,000 x g 6 tubes x 3.5-8 mL	32,000 rpm 187,000 x g 6 tubes x 4.2-17 mL	32,000 rpm 175,000 x g 6 tubes x8.4-33 mL	28,000 rpm 150,000 x g 6 tubes x 4.2-17 mL	28,000 rpm 141,000 x g 6 tubes x 8.4-33 mL	Spacer is required For conical bottoms, an adapter is required
Intermediate Band: Density gradient centrifugation, etc.									
1 PP Tube (Thinwall) Facilitates insertion of the needle when collecting bands	60,000 rpm 485,000 x g 6 tubes x 4 mL	55,000 rpm 368,000 x g 6 tubes x 5 mL	41,000 rpm 288,000 x g 6 tubes x 13.2 mL	40,000 rpm 285,000 x g 6 tubes x 14 mL	32,000 rpm 187,000 x g 6 tubes x 17 mL	32,000 rpm 175,000 x g 6 tubes x 38.5 mL	28,000 rpm 150,000 x g 6 tubes x 17 mL	28,000 rpm 141,000 x g 6 tubes x 38.5 mL	–
2 UC Tube (Thinwall) Transparent, facilitating visual confirmation of bands	60,000 rpm 485,000 x g 6 tubes x 4 mL	48,000 / 55,000 rpm 269,000 / 368,000 x g 6 tubes x 0.8 / 5 mL	41,000 rpm 288,000 x g 6 tubes x 13.2 mL	40,000 rpm 285,000 x g 6 tubes x 14 mL	32,000 rpm 187,000 x g 6 tubes x 17 mL	32,000 rpm 175,000 x g 6 tubes x 38.5 mL	28,000 rpm 150,000 x g 6 tubes x 17 mL	28,000 rpm 141,000 x g 6 tubes x 38.5 mL	SW 55 Ti An adapter may be required
3 OptiSeal Tubes Can be sealed easily with a plug	–	55,000 rpm 368,000 x g 6 tubes x 3.3 mL	–	–	–	32,000 rpm 175,000 x g 6 tubes x 32.4 mL	–	28,000 rpm 141,000 x g 6 tubes x 32.4 mL	Spacer is required
4 QuickSeal Tubes Heat-sealing for a complete seal Optimal for infectious samples, such as viruses	60,000 rpm 485,000 x g 6 tubes x 1.5 / 2 mL	55,000 rpm 368,000 x g 6 tubes x 2 mL	41,000 rpm 288,000 x g 6 tubes x 3.5 / 5.9 mL	40,000 rpm 285,000 x g 6 tubes x 3.5 / 5.9 mL	32,000 rpm 187,000 x g 6 tubes x 4.2-17 mL	32,000 rpm 175,000 x g 6 tubes x 15-33 mL	28,000 rpm 150,000 x g 6 tubes x 4.2-17 mL	28,000 rpm 141,000 x g 6 tubes x 15-33 mL	Spacer is required

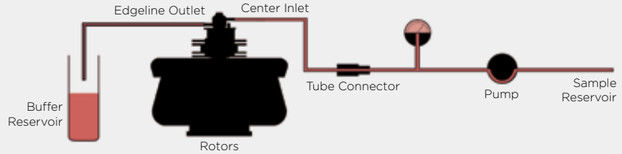
Special Rotors

Continuous Flow Rotor CF-32 Ti

By injecting (loading) samples continuously into the rotor while it rotates at a high speed, the constituents contained in the sample can be collected as pellets on the rotor wall. It can also be used to remove impurities from a sample.

The CF-32 Ti, a continuous flow rotor for use in an ultracentrifuge, is used to separate large-volume samples of 2 L or more in a single centrifugation and to collect pellets efficiently. The amount of sample that can be processed during a single centrifugation operation will be determined by the amount of pellets that are produced as a result of the centrifugation. The speed of sample influx is dependent on the sedimentation coefficient S of the sample particles. It will be possible to increase the flow rate for particles with a large S value (showing a high speed of centrifugal sedimentation), and the maximum rate will be 9 L/h. By using a pump to continuously send the sample into the rotor that is rotating at high speed, pellets will be formed along the inner wall of the rotor, and the supernatant can be recovered from the rotor outlet. After all of the sample has entered the rotor, the rotation will be stopped in order to remove the rotor and recover the pellets.

CF-32 Ti
Maximum Speed: 32,000 rpm
Maximum g Force: 102,000 x g
Rotor Capacity: 430 mL



Core Flow Path Illustration for Continuous Flow

Zonal Rotor Ti-15

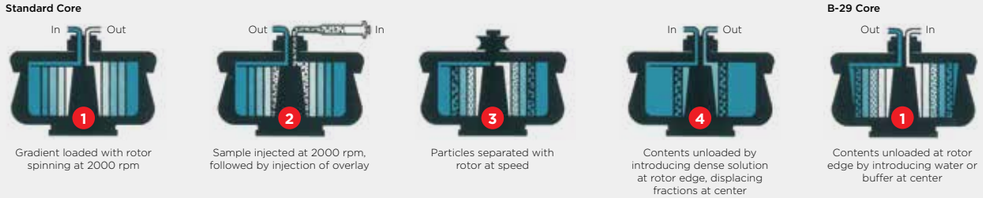
A solution's gradient density is formed (sucrose, etc.) while rotating, a sample from the center of the rotor is injected and density gradient centrifugation is performed. Inject post-separation high-density solution from the rotor wall side, and collect the fraction of the target substance from the center.

Density gradient centrifugation of large-volume (approx. 50 mL) samples can be performed. In general, the resolution is better than with a swing rotor, and in most cases, separation using almost the same density gradient conditions as with the swing rotor is possible. A Standard Core and B-29 Core can be used. The Standard Core is a core for collecting from light fractions. On the other hand, the B-29 Core can collect from both light and heavy liquids. However, effective centrifugal path has been shortened because the rotor wall is tilted, and the maximum g force is also reduced. The B-29 Core is used mainly in the preparative isolation of floating fractions (flotation separations, put sample in from side and collect at center).

Ti-15
Maximum Speed: 32,000 rpm
Maximum g Force: 102,000 x g
Maximum Capacity: 1,675 mL

Basic Specifications

	Standard Core	B-29 Core
Maximum Speed (rpm)	32,000	2,000
Maximum g Force (x g)	102,000	96,500
***K* Factor**	481	468
Nominal Capacity (mL)	1,675	1,350



Step Operation Software

In continuous flow separation and zonal centrifugation, operation of the main unit is burdensome because a peristaltic pump injects / ejects the sample. With the Optima X series, each step from the sample injection (load) to the ejection (unload) is displayed on the screen, allowing anyone to easily perform the operation.

Floor-model Ultracentrifuge Optima X Series Specifications

Main Unit Specifications	Premier Model Optima XPN Series			Basic Model Optima XE Series	
	XPN-100	**XPN-90**	**XPN-80**	**XE-100**	**XE-90**
Product Number (Standard System)	A94469	A94468	A95765	A94516	A94471
Product Number (Biosafe System)	B10048	B10047	B10046	B10045	B10044
Maximum Speed (rpm)	100,000	90,000	80,000	100,000	90,000
Maximum g Force (x g)	802,000	694,000	548,300	802,000	694,000
Overspeed prevention function	Dynamic rotor inertia check (DRIC), optical sensor overspeed disk, magnetic rotation monitoring functionality				
Display	15-inch full-color LCD touch screen				
Chamber / drive unit cooling system	Electrical heating and cooling system (completely CFC-free) / air cooling				
Drive unit warranty	10-year warranty				
Rotor compatibility	Compatible with existing Beckman Coulter floor rotors				
Rotation control precision	± 2 rpm (with revolutions at 1,000 rpm or higher)				
Preset temperature range	0 to 40°C at 1°C intervals				
Temperature control precision / temperature indicator	± 0.5°C (within the set temperature range) / in 0.1°C increments				
Rotor acceleration / deceleration	10 types / 11 types				
Operating System Software	Embedded Windows operating system-based				
Interface	USB ports (3), Ethernet port (1)			USB ports (3)	
Calorific Power	3,400 Btu/hr (1.0 kW)				
Idle-Time Electrical Consumption	60 W or less				
Operating Noise	<51 dBA				
Installation Environment (temperature / humidity)	10 to 35°C / 80% or less				
Power Supply	200-240 V, 30 A, 50/60 Hz				
Dimensions and Weight	940 (W) × 681 (D) × 1,257 (H) mm, 485 kg				

Conformance with Safety Standards: International Standard IEC 61010-2-020-compliant, EMC Directive EN 61326 Standards, CSA and CE mark requirements, and manufactured in an ISO 13485-certified factory

Software Specifications	Premier Models Optima XPN Series	Basic Models Optima XE Series
Rotor catalog	O	O
Tube catalog	O	O
Help function	O	O
RPM, RCF, ω^2t indicator	O	O
Self-diagnostics history export function	10,000 messages	10,000 messages
Run history management	More than 5,200 events	×
Delayed start	O	×
Chemical resistances table	O	×
Rotor logging by serial number	O	×
Remote control and monitoring function	O	×
User ID and password setting	50 people	×
3-level access authentication setting	O	×
Manages electronic signatures and run logs	O	×
Export run history (main unit / rotor)	O	×
User Defined Programs/Steps	1,000 programs of up to 30 steps each	×
Operational Status Real-time Plotting Feature (speed/temperature)	O	×
eXpert Simulation Software	O	×

Optima XPN-100 / 90 / 80

Optima XE-100 / 90

Reliable Support Program

At Beckman Coulter, we provide various programs to help you use our equipment safely.

1 Quality Program

We provide both IQ (Installation Qualification) and OQ (Operational Qualification) programs.

2 Maintenance Service Program

We provide the following types of maintenance services.

1. Comprehensive Plan
2. Protective Service Plan
3. Simple Plan
4. Basic Plan
5. Extended Warranty

3 FRIP Program (Field Rotor Inspection Program)

This is a rotor inspection program held as needed by trained field service technicians. A field service technician inspects your older rotor and reports on whether or not it can be used safely.

4 Rotor Seminar (Course on the Safe Handling of the Centrifuge Rotor)

Held by request, this workshop covers the correct method for using rotors and tubes as well as routine maintenance.

ООО «Диаэм»

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