



Nalgene and Nunc Centrifuge Ware

Select the right vessel and
spin with confidence

Spin with confidence at virtually any scale

The process of selecting a centrifuge and rotor can feel like the easy part when faced with choosing the tube or bottle that is the right fit for both the rotor and application.

There are several factors to consider when selecting the correct vessel for each application:

- Chemical compatibility
- Volume
- Temperature
- Relative centrifugal force (RCF) required
- Protocols to be used for loading and sample recovery
- Cleaning and autoclaving steps

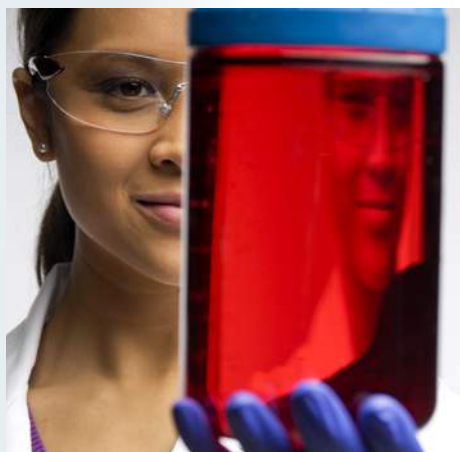
Understanding your requirements before selecting a tube or bottle ensures you make the right choice.

Whether your application includes the need for separations, large volume pelleting, protein purification or DNA isolation, the comprehensive selection of Thermo Scientific™ Nalgene™ and Thermo Scientific™ Nunc™ centrifuge ware offers a solution for virtually scales and is available in sizes from 10 mL to 2 L. Such a broad offering means a tube or bottle for many spins – from clinical and bioproduction, to processing bacteria, yeast, tissue, and viruses.

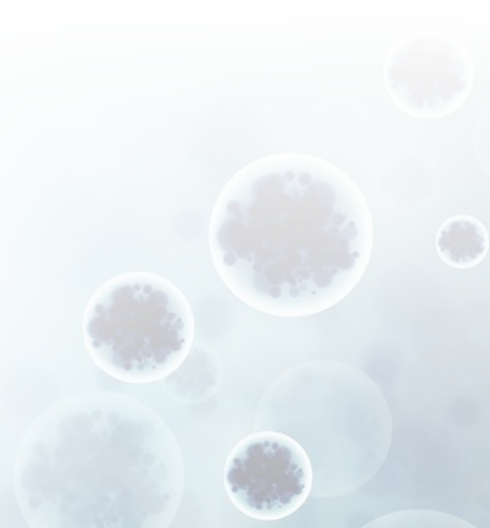
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Simplify performance at every turn with a reliable and safe approach to centrifugation



Nalgene Conical-Bottom Centrifuge Tubes

polypropylene copolymer

Thermo Scientific™ Nalgene™ PPCO conical-bottom centrifuge tubes with molded-in graduations have excellent chemical resistance.

Designed for low-speed centrifugation in refrigerated and non-refrigerated centrifuges

details

- Translucent PPCO is compatible with a wide range of lab reagents
- Conical bottoms concentrate pellet in a small area for easy isolation and retrieval
- Molded-in graduations last the life of the tube
- Last longer than polycarbonate tubes under conditions of repeated autoclaving
- Autoclavable

Ordering Information: Supplied without closure; friction fit closures available.



Note: Centrifuge tubes must be filled at least 80% for proper performance.



Nalgene Conical Bottom Centrifuge Tubes

Cat. No.	Capacity, mL	O.D. x H, mm	Max Force, xg	No. per Pack/Case	Closure sold separately
3103-0015	15	16.8 x 118.6	6,000	10/100	DS3111-0017
3103-0050	50	28.7 x 133.1	6,000	10/100	DS3111-0029

Nalgene Conical-Bottom Centrifuge Tubes

polycarbonate

Thermo Scientific™ Nalgene™ PC open-top conical-bottom tubes have outstanding mechanical strength and clarity, making them excellent for whole-cell separations.

Versatile polycarbonate tubes can be used in both refrigerated and nonrefrigerated centrifuges.

details

- Conical bottoms concentrate pellet in a small area for easy isolation and retrieval
- Excellent clarity for viewing tube contents
- Molded-in graduations last the life of the tube
- Autoclavable

Ordering Information: Supplied without closure; friction fit closures available.

Alert: Autoclaving repeatedly shortens the life of polycarbonate tubes.



Note: Centrifuge tubes must be filled at least 80% for proper performance.



Nalgene Conical Bottom Centrifuge Tubes

Cat. No.	Capacity, mL	O.D. x H, mm	Max Force, xg	No. per Pack/Case	Closure sold separately
3105-0015	15	17.0 x 120.1	6,000	10/100	DS3111-0017
3105-0050	50	28.7 x 134.1	6,000	10/100	DS3111-0029

Nalgene High-Speed Round-Bottom Centrifuge Tubes

polypropylene copolymer

Thermo Scientific™ Nalgene™ high-speed round-bottom centrifuge tubes feature uniform wall thickness and diameter, providing improved rotor fit and performance.

Designed for use in high speed rotors in refrigerated or nonrefrigerated centrifuges.

details

- Sterility assurance level (SAL) of 10^{-6}
- Molding technique produces uniform wall thickness for increased strength
- Uniform diameter (no taper) for better rotor fit and force tolerance
- 50 mL (Cat. No. 3110-9500) and 100 mL sizes lipped for easier retrieval from rotor cavities
- Excellent chemical resistance
- Economical choice – may also be used as test tubes
- Longer-lasting than polycarbonate tubes under conditions of repeated autoclaving
- Autoclavable

Ordering Information: Supplied without closure; friction-fit closures available separately (Cat. No. DS3111-series).

Alert: Use with friction fit closures (Cat. No. DS3111-series) for high speed centrifugation.



Note: Centrifuge tubes must be filled at least 80% for proper performance.



Nalgene Oak Ridge High-Speed Centrifuge Tubes

Cat. No.	Capacity, mL	O.D. x H, mm	Max Force, xg	No. per Pack/Case	Closure sold separately
3110-0120	12	15.8 x 102.1	50,000	10/100	DS3111-0016
3110-0150	15	15.8 x 112.8	50,000	10/100	DS3111-0016
3110-0160	16	17.8 x 98.6	50,000	10/100	DS3111-0018
3110-0380	38	25.2 x 88.1	50,000	10/100	DS3111-0025
3110-0500	50	28.5 x 102.4	50,000	10/100	DS3111-0030
3110-9500	50	28.5 x 102	50,000	10/100	DS3111-0029
3110-1000	100	31.5 x 163.1	50,000	10/100	DS3111-0032

Nalgene High-Speed Round-Bottom Centrifuge Tubes

polycarbonate

Thermo Scientific™ Nalgene™ high-speed round-bottom centrifuge tubes demonstrate outstanding mechanical strength and clarity.

Designed for high-speed centrifugation in refrigerated and nonrefrigerated centrifuges.

details

- Designed with round bottoms and uniform diameter (no taper) for better fit and force tolerance to fit high-speed rotors
- Molding technique produces uniform wall thickness for increased strength
- Lip (on Cat. Nos. 3117-1000 and 3117-9500) allows easier retrieval from rotor cavities
- Economical choice – may also be used as test tubes
- Excellent transparency for viewing contents
- These high-speed polycarbonate tubes withstand temperatures from -135° to +135°C (-211° to +275°F)
- Autoclavable

Ordering Information: Supplied without closure; friction-fit closures available separately (Cat. No. DS3111-series).

Alert: Use with friction-fit closures (Cat. No. DS3111-series) for high-speed centrifugation.



Note: Centrifuge tubes must be filled at least 80% for proper performance.



Nalgene Oak Ridge High-Speed Centrifuge Tubes

Cat. No.	Capacity, mL	O.D. x H, mm	Max Force, xg	No. per Pack/Case	Closure sold separately
3117-0120	12	15.9 x 103.1	50,000	10/100	DS3111-0016
3117-0150	15	16.0 x 114.0	50,000	10/100	DS3111-0016
3117-0160	16	17.9 x 99.8	50,000	10/100	DS3111-0018
3117-0380	38	25.3 x 88.6	50,000	10/100	DS3111-0025
3117-0500	50	28.8 x 103.1	50,000	10/100	DS3111-0030
3117-9500	50	28.5 x 106.2	50,000	10/100	DS3111-0029
3117-1000	100	31.5 x 164.3	50,000	10/100	DS3111-0032

Nalgene Oak Ridge High-Speed Centrifuge Tubes

FEP, ETFE screw closure

Thermo Scientific™ Nalgene™ FEP Oak Ridge high-speed centrifuge tubes are excellent for high-speed centrifugation of aggressive chemicals.

Excellent for phenol–chloroform extractions in refrigerated machines.

details

- Withstand temperatures from -100°C to 150°C (-148°F to 302°F) for versatility from the freezer to the autoclave and more
- Use to 50,000 xg in refrigerated centrifuges (tubes must be filled 100% to prevent collapse)
- Leakproof[†] ETFE closures prevent material loss under ordinary use for most spins up to 10,000 xg
- Sealing closure assemblies (sold separately) available for 30 mL and 50 mL size to assure leakproof service especially at high speeds >10,000 xg or when spinning hazardous materials
- Autoclavable

Ordering Information: Optional sealing closure assemblies available – Cat. No. DS3131-0020 (for 30 mL tube) and DS3131-0024 (for 50 mL tube).



Note: Must be filled to 100% of total capacity for centrifugation.

Nalgene Oak Ridge High-Speed Centrifuge Tubes with Screw Closure

Cat. No.	Capacity, mL	O.D. x H, mm	Max Force, xg	Closure Size, mm	No. per Pack/Case
3114-0010	10	16.0 x 79.0	50,000	13	2/10
3114-0030	30	25.7 x 93.0	50,000	20	2/10
3114-0050*	42	28.8 x 106.7	50,000	24	2/10

*Designed to fit standard 50 mL rotors.

[†] Our guarantee for a leakproof seal is subject to our standard product warranty, as set forth in the Thermo Fisher Scientific Terms and Conditions of Sale. Our products are leakproof at ambient temperature and pressure when used with their corresponding closures. However, to ensure safe usage, customers are advised to test our containers and closures under conditions of their planned applications. Please contact technicalsupport@thermofisher.com if you need additional information about our products.

Nalgene Oak Ridge Centrifuge Tubes

polysulfone, polypropylene screw closure

Thermo Scientific™ Nalgene™ Oak Ridge PSF centrifuge tubes feature enhanced resistance to acids and bases and excellent clarity for viewing separation interfaces and pellets.

Designed for high-speed centrifugation in refrigerated and nonrefrigerated centrifuges.

details

- With round bottoms to fit high speed rotors
- Transparent, with straw-colored cast, allows easy content viewing
- Leakproof[†] PP screw closures prevent material loss under ordinary use for most spins up to 10,000 xg
- For leakproof assurance at speeds >10,000 xg, use with sealing closure assembly (sold separately)
- Autoclavable

Ordering Information: Optional sealing closure assemblies available – Cat. No. DS3131-0020 (for 30 mL tube) and DS3131-0024 (for 50 mL tube).



Note: Tubes must be filled at least 80% for proper performance.

Nalgene Oak Ridge Centrifuge Tubes with Sealing Closure

Cat. No.	Capacity, mL	O.D. x H, mm	Max Force, xg	Closure Size, mm	No. per Pack/Case
3115-0030	30	25.8 x 94.0	50,000	20	10/100
3115-0050*	43	29.0 x 107.2	50,000	24	10/100

*Designed to fit standard 50 mL rotors.

Nalgene Oak Ridge High-Speed Centrifuge Tubes

polycarbonate; polypropylene screw closure

Thermo Scientific™ Nalgene™ Oak Ridge high-speed centrifuge tubes are strong and have excellent mechanical strength.

Transparent tubes are clear and allow easy viewing of contents. Designed for high-speed centrifugation in refrigerated and non-refrigerated centrifuges.

details

- Excellent mechanical strength and visual clarity
- Can be autoclaved repeatedly, but autoclaving will reduce product life
- Leakproof† PP screw closures prevent material loss under ordinary use for most spins up to 10,000 xg
- For leakproof performance >10,000 xg, use a sealing closure assembly (sold separately)
- Autoclavable

Ordering Information: Optional sealing closure assemblies available – Cat. No. DS3131-0020 (for 30 mL tube) and DS3131-0024 (for 50 mL tube).



Note: Centrifuge tubes must be filled at least 80% for proper performance.

Nalgene Oak Ridge High Speed Centrifuge Tubes with Screw Closures

Cat. No.	Capacity, mL	O.D. x H, mm	Max Force, xg	Closure Size, mm	No. per Pack/Case
3118-0010	10	16.1 x 81.5	50,000	13	10/100
3118-0028	28	25.8 x 94.0	50,000	20	10/100
3118-0030	30	25.8 x 94.0	50,000	20	10/100
3118-0050*	43	28.8 x 106.4	50,000	24	10/100
3118-0085**	81	38.2 x 105.2	50,000	33	10/100

*Designed to fit standard 50 mL rotors. ** Designed to fit standard 85 mL rotors.

Nalgene Oak Ridge High-Speed Centrifuge Tubes

polypropylene copolymer, polypropylene screw closure

Thermo Scientific™ Nalgene™ Oak Ridge high-speed centrifuge tubes are strong and have excellent mechanical strength. Translucent tubes are contact-clear and allow easy viewing of contents.

details

- Greater chemical resistance than polycarbonate
- Can be autoclaved repeatedly – lasts longer than polycarbonate tubes under conditions of repeated autoclaving
- Leakproof[†] PP screw closures prevent material loss under ordinary use for most spins up to 10,000 xg
- For leakproof performance >10,000 xg, use a sealing closure assembly (sold separately)
- Autoclavable

Ordering Information: Optional sealing closure assemblies available – Cat. No. DS3131-0020 (for 28 and 30 mL tubes) and DS3131-0024 (for 50 mL tube).



Note: Centrifuge tubes must be filled at least 80% for proper performance.

Nalgene Oak Ridge High Speed Centrifuge Tubes with Screw Closures

Cat. No.	Capacity, mL	O.D. x H, mm	Max Force, xg	Closure Size, mm	No. per Pack/Case
3119-0010	10	16.1 x 80.5	50,000	13	10/100
3119-0028	28	25.8 x 94.0	50,000	20	10/100
3119-0030	30	25.8 x 93.5	50,000	20	10/100
3119-0050*	42	28.8 x 105.9	100,605	24	10/100

*Designed to fit standard 50 mL rotors.

Nalgene Oak Ridge High-Speed Centrifuge Tubes

polysulfone, polypropylene sealing closure with silicone gasket

Thermo Scientific™ Nalgene™ PSF high-speed Oak Ridge centrifuge tubes feature enhanced resistance to acids and bases.

Designed for high-speed centrifugation in refrigerated and non-refrigerated centrifuges.

details

- With round bottoms to fit high speed rotors
- Transparent, with straw-colored cast, allows easy content viewing
- Leakproof[†] PP sealing closures prevent material loss under ordinary use for most spins up to 10,000 xg
- Autoclavable

Ordering Information: Additional sealing closure assembly available separately (Cat. No. DS3131-0024).



Note: Conical centrifuge tubes must be filled at least 80% for proper performance.

Nalgene Oak Ridge Centrifuge Tubes with Sealing Closure

Cat. No.	Capacity, mL	O.D. x H, mm	Max Force, xg	Closure Size, mm	No. per Pack/Case
3137-0050*	43	28.8 x 114.8	50,000	24	10/50

*Designed to fit standard 50 mL rotors.

Nalgene Oak Ridge High-Speed Centrifuge Tubes

polycarbonate; polypropylene sealing closure; silicone gasket

Thermo Scientific™ Nalgene™ Polycarbonate high-speed Oak Ridge centrifuge tubes are strong and have excellent mechanical strength. Transparent tubes provide clarity for easy viewing of contents.

Designed for high-speed centrifugation in refrigerated and non-refrigerated centrifuges

details

- With round bottoms to fit high speed rotors
- Transparent, allowing easy content viewing
- Leakproof[†] PP sealing closures prevent material loss under ordinary use for most spins up to 10,000 xg
- Autoclavable

Ordering Information: Additional sealing closure assemblies available separately (Cat. No. DS3131-0020 for 30 mL tube and DS3131-0024 for 50 mL tube).



Note: Conical centrifuge tubes must be filled at least 80% for proper performance.

Nalgene Oak Ridge High Speed Centrifuge Tubes

Cat. No.	Capacity, mL	O.D. x H, mm	Max Force, xg	Closure Size, mm	No. per Pack/Case
3138-0010	10	16.1 x 83.8	50,000	13	10/50
3138-0016	16	17.8 x 106.7	50,000	15	10/50
3138-0030	30	25.8 x 102.6	50,000	20	10/50
3138-0050*	42	28.8 x 114.6	50,000	24	10/50

*Designed to fit standard 50 mL rotors.

Nalgene Oak Ridge High-Speed Centrifuge Tubes

polypropylene copolymer, polypropylene sealing closure, silicone gasket

Thermo Scientific™ Nalgene™ Oak Ridge high-speed centrifuge tubes are strong and have excellent mechanical strength.

Translucent tubes are contact-clear and allow easy viewing of contents. Designed for high-speed centrifugation in refrigerated and non-refrigerated centrifuges.

details

- Greater chemical resistance than polycarbonate
- Can be autoclaved repeatedly – last longer than polycarbonate tubes under conditions of repeated autoclaving
- Leakproof[†] PP sealing closures prevent material loss under ordinary use for most spins up to 10,000 xg or spinning hazardous materials
- Autoclavable

Ordering Information: Additional sealing closures assemblies available for selected sizes. Use Cat. No. DS3131-0020 (for 30 mL tube) and DS3131-0024 (for 50 mL Tube).



Note: Centrifuge tubes must be filled at least 80% for proper performance.

Nalgene Oak Ridge High-Speed Centrifuge Tubes with Sealing Closure

Cat. No.	Capacity, mL	O.D. x H, mm	Max Force, xg	Closure Size, mm	No. per Pack/Case
3139-0010	10	16.1 x 82.8	50,000	13	10/50
3139-0016	16	18.1 x 106.4	50,000	15	10/50
3139-0030	30	25.8 x 102.1	50,000	20	10/50
3139-0050*	42	28.8 x 113.5	100,605	24	10/50

*Designed to fit standard 50 mL rotors.

Nalgene Conical Oak Ridge Centrifuge Tubes

polypropylene copolymer, polypropylene screw closure

Thermo Scientific™ Nalgene™ Oak Ridge centrifuge tube can spin in a refrigerated or non-refrigerated centrifuge, conical tube adapter required.

details

- With conical bottoms for superior separation and pelleting
- Feature silk-screened graduations from 5 to 35 mL in 1 mL increments
- Polypropylene copolymer tubes are translucent and offer better chemical resistance than polycarbonate; repeatedly autoclavable
- Can withstand forces to 50,000 xg in refrigerated or non-refrigerated centrifuges – requires adapter, Cat. No. DS3147-0050, sold separately
- Leakproof† PP linerless closures prevent material loss under ordinary use for most spins up to 10,000 xg
- Autoclavable

Ordering Information: To assure leakproof service, especially at speeds greater than 10,000 xg or when spinning hazardous materials, use Nalgene sealing closure Cat. No. DS3132-0024 or sealing closure assembly Cat. No. DS3131-0024.

Requires: White polycarbonate tube adapter (see Cat. No. DS3147-0050).



Nalgene Oak Ridge High-Speed Centrifuge Tubes with Sealing Closure

Cat. No.	Capacity, mL	O.D. x H, mm	Max Force, xg	Closure Size, mm	No. per Pack/Case
3148-0050	35	28.3 x 103.9	50,000	24	10/100

Nunc Conical Centrifuge Tubes

polypropylene, high density polyethylene closure

Thermo Scientific™ Nunc™ 15 mL and 50 mL conical centrifuge tubes are premium, high-quality conical tubes and offer maximum cleanliness with a recyclable, plastic rack. They provide increased traceability with the largest writing area on the market.

Nunc conical tubes are constructed of polypropylene and available in a bulk pack or in racked configuration.



details

- Recyclable plastic rack reduces waste in the lab
- New plastic rack minimizes risk of contamination and particles compared to Styrofoam and is easy to clean
- Tubes are sterile to 10^{-6} SAL
- Large writing area provides more space for sample traceability
- RCF rating enables greater range of applications from low speed to high speed centrifugation
- USP Class VI, non-pyrogenic, non-cytotoxic and RNase/DNase-free to ensure the highest performance
- Leakproof[†] to protect samples

Specifications

Material (Tube) Polypropylene

Material (Cap) HDPE

Color (Cap) Blue

Shape Conical

Sterile Yes

Writing Area Yes

Nunc Conical Sterile Polypropylene Centrifuge Tubes

Cat. No.	Capacity, mL	OD x H, mm	Max Force xg	Packaging	No. per Pack/Case
339650	15	15.8 x 120.4	10,500	Bulk	50/500
339651	15	15.8 x 120.4	10,500	Racked	25/500
339652	50	27.9 x 116.0	17,000	Bulk	25/500
339653	50	27.9 x 116.0	17,000	Racked	25/300

Nunc EZFlip Centrifuge Tubes

polypropylene

Thermo Scientific™ Nunc™ 15 mL and 50 mL EZ Flip conical centrifuge tubes come in a proprietary hinged-cap tube system with an ergonomic design for one-handed opening and closing.

Integrated leakproof cap prevents cross-contamination and lost closures.

details

- Conical bottom, sterile
- Clarified polypropylene combines chemical resistance and high-speed tolerances
- Leakproof and airtight to prevent cross contamination
- White writing area and flat caps for sample identification
- Printed volume markings and graduations
- Standard conical tube dimensions

Ordering Information: Tubes are sterile and supplied in a bulk pack (sleeve) or a rack.



Nunc EZFlip Centrifuge Tubes

Cat. No.	Capacity, mL	O.D. x H, mm	Max Force, xg	Packaging	No. per Pack/Case
362694	15	16.3 x 113.5	8,500	Bulk	50/500
362695	15	16.3 x 113.5	8,500	Racked	50/500
362696	50	27.9 x 108.2	9,500	Bulk	25/500
362697	50	27.9 x 108.2	9,500	Racked	25/500

Nunc 200 mL Centrifuge Tubes

polypropylene

Thermo Scientific™ Nunc™ 200 mL centrifuge tubes hold 200 mL total volume for larger batches.

Thermo Scientific Nunc labware products are made from high purity resins, and molded using our state-of-the-art processes. Plastic labware is a safer alternative to glass without sacrificing accuracy.

details

- Tightness tested
- Fits most centrifuges

Compliance: Meet USP Class VI



Note: RCF tested with adaptor 377585.

Nunc 200 mL Centrifuge Tube

Cat. No.	Capacity, ml	OD x H, mm	Max Force, xg	No. Per Pack/Case
376813	200	59.9 x 137.2	7,000	4/48

Nunc Conical Tube Rack

Thermo Scientific™ Nunc™ conical tube rack fits most centrifuges and is tightness-tested.

details

- Hold six 200 mL tubes or 20 - 50 mL tubes
- Epoxy/steel or expanded polystyrene foam

Compliance: Meet USP Class VI



Nunc 200 mL Conical Tube Rack

Cat. No.	Description	Holds	No. per Pack/Case
374179	Expanded polystyrene	6 tubes	1/1

Nunc Wide-Mouth Conical Centrifuge Tubes

polypropylene

Thermo Scientific™ Nunc™ 250 mL conical tube offers added capacity for your larger samples with a one-of-a-kind wide mouth design, providing open, easy access for pipetting, decanting and removal of the pellet following centrifugation.

details

- Wide mouth design; 250mL capacity
- RNase/DNase free
- USP Class VI
- Sterile 10⁻⁶ SAL
- Non-pyrogenic, non-cytotoxic
- Clarified polypropylene for good view of separations and final pellet
- Leakproof†
- For research use only
- Max RCF 10,000 when fully supported by conical rotor cavity or conical adaptor, achieved in reliability tests based on sedimentation of 1.2 specific gravity fluid at 18°C
- Easy-to-open sterile packaging



Nunc 250mL Wide-Mouth Conical Centrifuge Tube

Cat. No.	Capacity, mL	OD x H, mm	Max Force, xg	No. per Pack/Case
376814	250	9.7 x 144.2	10,000	4/40

Nalgene 1 L Super Speed Centrifuge Bottles with Sealing Closure

Thermo Scientific™ Nalgene™ 1 L super speed centrifuge bottles with Sealing Closure are designed to boost productivity and pellet recovery in high-speed, large-volume gross separation applications.

Molded of transparent PC and PPCO, these bottles are autoclavable and have excellent mechanical strength properties.

details

- Process a full liter in each bottle at speeds up to 15,810 xg
- Smooth inner walls reduces sheering in mammalian culture separations
- Ideal for bacterial, yeast tissue isolations and viral harvesting
- Choose PC for excellent clarity and mechanical strength
- Choose PPCO copolymer for excellent chemical resistance
- Recommended operating temperature range 4° to 22°C; storage to -70°C
- USP Class VI compliant, non-cytotoxic, autoclavable

Includes: 3-piece sealing cap assembly, PP plug, closure and silicone gasket for added leakproof[†] assurance



Nalgene 1 L Super Speed Centrifuge Bottles with Sealing Closure

Cat. No.	Material	Capacity, mL	OD x H, mm	Max Force, xg	No. per Pack/Case
3140-1006	Polycarbonate	1000	97.5 x 195.3	15,810	6/6
3141-1006	Polypropylene copolymer	1000	97.5 x 195.3	15,810	6/6

Nalgene 2 L Bio Bottles with Sealing Closure

polypropylene copolymer, polypropylene closure with silicone gasket

Thermo Scientific™ Nalgene™ 2 L Bio Bottle offers a solution for the separation of large-volume harvests in a single run.

Ideal for bacterial, yeast and tissue isolations. Two-piece plug and sealing cap design promotes aseptic handling.

details

- Process up to 12 L in a single run at speeds up to 7,333 xg
- Graduated, wide-mouth design simplifies decanting, re-suspensions and pellet removal
- Conical shape and smooth inner surface assures compact pellet formation
- For centrifugation operating temperatures from 4°C to 22°C and storage to 0°C
- Compliance: Meets USP VI, non-cytotoxic, non-hemolytic



Note: 2 L Bio Bottles must be filled to at least 80% of the total capacity for optimal performance

Includes: White PP sealing screw closure with silicone gasket for leakproof[†] assurance.

Ordering Information: The use of support bridge (Cat. No. 75007686) is required. This bridge can be ordered from your laboratory equipment representative or laboratory equipment customer service

Nalgene 2 L Bio Bottles with Sealing Closure

Cat. No.	Capacity	L x W x H, mm	Max Force, xg	Sterile	No. per Pack/Case
3120-2006	2 L Bio Bottle	175.5 x 111.5 x 209.3	7,333	No	6/6
3120-2024	2 L Bio Bottle	175.5 x 111.5 x 209.3	7,333	Yes	1/24

Nalgene Centrifuge Bottles

polypropylene copolymer, polypropylene closures

Thermo Scientific™ Nalgene™ centrifuge bottles are ideal for large-volume cell harvesting, pelleting and protein purification.

Molded of rigid and robust polypropylene copolymer, these translucent bottles are autoclavable and have excellent chemical resistance properties.

details

- For low- to moderate-speed centrifugation of biological and chemical samples
- Closure included

Ordering Information: To assure leakproof[†] service, especially at higher speeds and fill volumes, use Nalgene sealing closure Cat. No. DS3131-0038 for 250 mL and Cat. No. DS3132-0063 for 1000 mL bottles

Alert: When spinning 250 mL bottle in the Thermo Scientific™ Sorvall™ GSA rotor, use of the Nalgene centrifuge bottle adapter (DS3125-0250) is required



Note: For proper performance, bottles must be filled to at least 80% of total capacity, except for 3120-9500 which must not be filled more than 75% of total capacity

Nalgene PPCO Centrifuge Bottles with PP Closure

Cat. No.	Capacity, mL	OD x H, mm	Max Force, xg	No. per Pack/Case
3120-0250	250	61.8 x 125.2	13,200*	4/36
3120-0500	500	73.8 x 158.9	4,800	4/24
3120-9500	500	69.5 x 158.9	13,700	4/24
3120-1000	1000	98.0 x 174.2	7,100	4/16
3120-1010**	1000	98.0 x 168.4	7,100	4/16

* Up to 27,500 xg with sealing cap assembly

** For use with IEC rotors

Nalgene Centrifuge Bottles with Sealing Closure

polypropylene copolymer, polypropylene closure

Thermo Scientific™ Nalgene™ centrifuge bottles are ideal for large-volume cell harvesting, pelleting and protein purification.

Molded of rigid and robust PPCO, these translucent bottles are autoclavable and have excellent chemical resistance properties.

details

- For low- to moderate-speed centrifugation of biological and chemical samples
- Bottle includes PP sealing cap assembly with silicone gasket for added leakproof[†] assurance at maximum speeds or when spinning hazardous materials

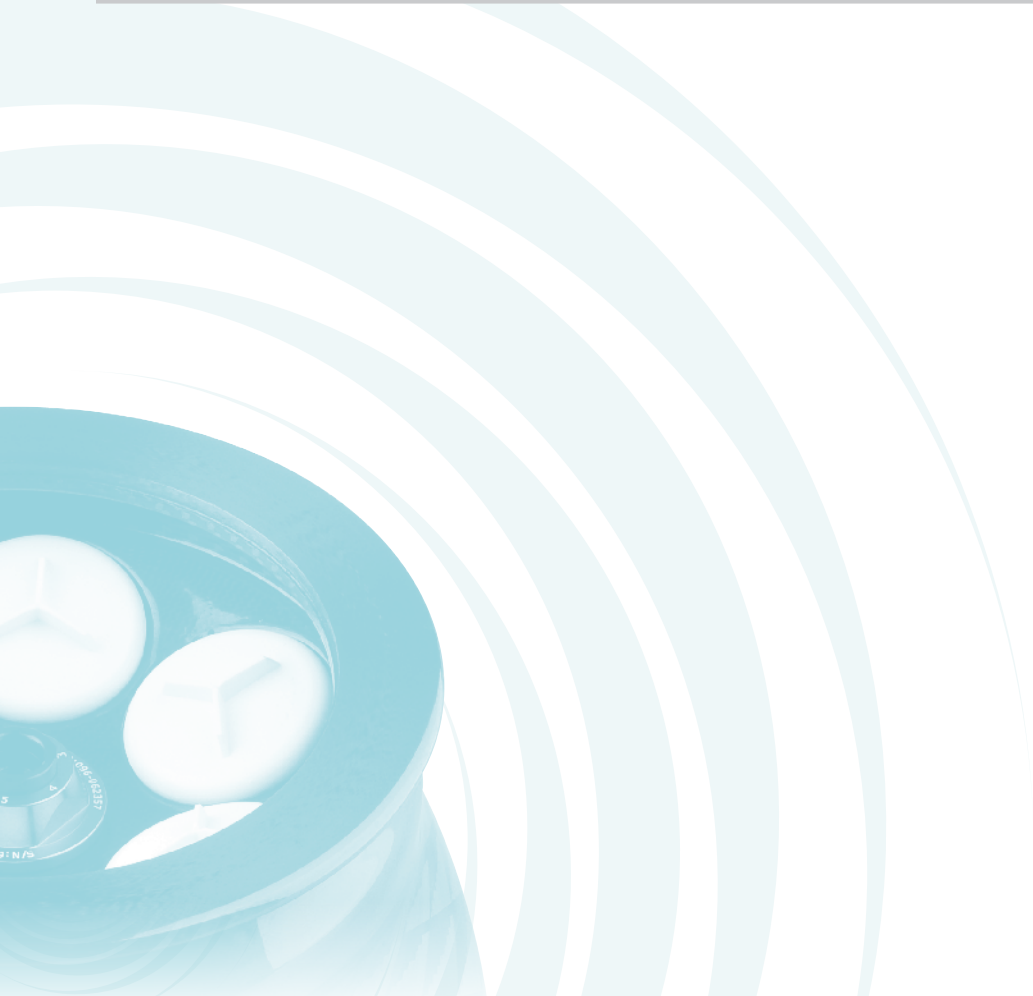
Requires: When spinning 250 mL bottle in a Sorvall GSA rotor, use of the Nalgene centrifuge bottle adapter (DS3125-0250) is required.



Note: For proper performance bottles must be filled to 80% of total capacity

Nalgene Centrifuge Bottles with Sealing Closure

Cat. No.	Capacity, mL	OD x H, mm	Max Force, xg	No. per Pack/Case
3141-0250	250	61.1 x 132.8	27,500	4/36
3141-0500	450	69.5 x 159.3	13,700	4/24



Nalgene Centrifuge Bottles

polycarbonate with polypropylene closures

Thermo Scientific™ Nalgene™ centrifuge bottles are ideal for large-volume cell harvesting, pelleting and protein purification.

Molded of transparent polycarbonate, these translucent bottles are autoclavable and have excellent mechanical strength properties.

details

- For low-speed centrifugation of biological and chemical samples
- Translucent polycarbonate for easy visualization of samples

Ordering Information: For added leakproof[†] assurance at maximum speeds or when spinning hazardous materials, use with PP sealing closure assemblies; available for 250 mL (Cat. No. DS3131-0038) and 1000 mL (Cat. No. DS3132-0063) sizes.

Alert: When spinning 250 mL bottle in Sorvall GSA rotor, use of the Nalgene centrifuge bottle adapter (Cat. No. DS3125-0250) is required.



Note: For proper performance, bottles must be filled to at least 80% of total capacity

Nalgene Centrifuge Bottles with Screw Closures

Cat. No.	Capacity, mL	OD x H, mm	Max Force, xg	No. per Pack/Case
3122-0250	250	61.8 x 125.2	27,500	4/36
3122-0500	500	69.5 x 158.9	13,700	4/24
3122-1000	1000	98.2 x 177.0	7,100	4/16
3122-1010	1000	98.2 x 169.7	7,100	4/16

Nalgene Centrifuge Bottles with Sealing Closure

polypropylene copolymer, polypropylene closure

Thermo Scientific™ Nalgene™ centrifuge bottles are ideal for large-volume cell harvesting, pelleting and protein purification.

Molded of transparent PC, these translucent bottles are autoclavable and have excellent mechanical strength properties.

details

- For low- to moderate-speed centrifugation of biological and chemical samples
- Molded clear PC for easy visualization of samples
- PP sealing cap closure with silicone gasket, for added leakproof^f assurance at maximum speeds or when spinning hazardous materials

Alert: When spinning 250 mL bottle in a Sorvall™ GSA rotor, use of the Nalgene centrifuge bottle adapter (DS3125-0250) is required.



Note: For proper performance bottles must be filled to 80% of total capacity

Nalgene Centrifuge Bottles with Sealing Closures

Cat. No.	Capacity, mL	OD x H, mm	Max Force, xg	No. per Pack/Case
3140-0250	250	61.8 x 134.4	27,500	4/36
3140-0500	450	69.5 x 159.5	13,700	4/24

Nalgene FEP Centrifuge Bottles

Fluorinated ethylene-propylene, ethylene-tetrafluoroethylene

Thermo Scientific™ Nalgene™ FEP centrifuge bottles are ideal for low-speed, lipid and phenol extractions, digestions and precipitations.

Molded of autoclavable, translucent FEP, these bottles resist most acids, bases and organic solvents.

details

- Use in temperatures from -100°C to +150°C
- FEP provides excellent chemical resistance, ideal for large-volume extraction, digestion and precipitation procedures requiring the use of aggressive chemicals

Ordering Information: For added leakproof[†] assurance at maximum speeds or when spinning hazardous materials use with PP sealing closures assemblies (DS3131-0038)

Alert: When spinning 250 mL bottle in a Sorvall GSA rotor, use of the Nalgene centrifuge bottle adapter (Cat. No. DS3125-0250) is required.



Note: For proper performance, must be filled to 100% of total capacity

Nalgene Centrifuge Bottles with Screw Closures

Cat. No.	Capacity, mL	OD x H, mm	Max Force, xg	No. per Pack/Case
3127-0250	250	59.9 x 126.5	4,000	1/6

Nalgene Centrifuge Bottles

high-density polyethylene, polypropylene closures

Thermo Scientific™ Nalgene™ centrifuge bottles are ideal for large-volume cell harvesting, pelleting and protein purification requiring refrigerated temperatures.

Molded of rigid and robust HDPE, these translucent bottles have excellent chemical resistance properties and are rated for temperatures as low as -100°C.

details

- For low-speed centrifugation of biological and chemical samples
- Excellent for use in refrigerated centrifuges
- Rated for use in temperatures as low as -100°C

Alert: When spinning 250 mL bottle in a Sorvall GSA rotor, use of the Nalgene centrifuge bottle adapter (Cat. No. DS3125-0250) is required



Note: For proper performance bottles, must be filled to at least 80% of total capacity

Nalgene Centrifuge Bottles with Screw Closures

Cat. No.	Capacity, mL	OD x H, mm	Max Force, xg	No. per Pack/Case
3121-0250	250	61.2 x 131.6	8,000	6/36

Nalgene Conical-Bottom Centrifuge Bottles

Thermo Scientific™ Nalgene™ conical-bottom centrifuge bottles are designed for pelleting applications such as cell culture harvesting and protein biochemistry, including ammonium sulfate precipitations.

Available as polycarbonate (PC) and polypropylene copolymer (PPCO) bottles.

details

- Transparent PC offers excellent mechanical strength and clarity for viewing tube contents
- Rigid and robust PPCO bottles have excellent chemical resistance properties
- Molded-in graduations last the life of the tube
- For low- to moderate-speed centrifugation of biological and chemical samples
- Leakproof[†] polypropylene sealing closures prevent material loss under ordinary use for most spins up to 27,500 xg
- Autoclavable

Ordering Information: Must be used with Nalgene adapter for conical-bottom centrifuge bottles (Cat. No. DS3126-0175).



Note: For proper performance, bottles must be filled to at least 80% of total capacity

Nalgene Conical-Bottom Centrifuge Bottles with Sealing Closures

Cat. No.	Material	Capacity, mL	OD x H, mm	Max Force, xg	No. per Pack/Case
3143-0175	PPCO	175	61.8 x 139.4	27,500	4/36
3144-0175	PC	175	61.8 x 140.5	27,500	4/36

Nalgene Conical-Bottom Centrifuge Bottles

polystyrene, high-density polyethylene closure

Thermo Scientific™ Nalgene™ sterile conical-bottom centrifuge bottles are an economical and disposable solution for low-speed, large-volume cell harvesting, pelleting and protein purification.

Molded of PS, these translucent bottles are individually wrapped and ready to use.

Well suited for sterile cell culture applications. Designed for use in low-speed refrigerated or non-refrigerated centrifuges.

details

- Molded of transparent PS for easy visualization of samples
- Well suited for sterile cell culture applications
- Designed for use in low-speed refrigerated or non-refrigerated centrifuges up to 5,800 xg
- Gamma-radiation sterilized, individually wrapped and ready to use
- Molded-in graduations to assist with volume measurements

Alert: Must be used with Nalgene adapter for conical-bottom centrifuge bottles (DS3126-0175).



Note: For proper performance, bottles must be filled to at least 80% of total capacity

Nalgene Conical-Bottom Centrifuge Bottles with Screw Closures

Cat. No.	Capacity, mL	OD x H, mm	Max Force, xg	No. per Pack/Case
3145-0175	175	61.5 x 135.6	5,800	2/48

Nalgene Spherical-Bottom Centrifuge Bottles

polycarbonate, polypropylene closure

Thermo Scientific™ Nalgene™ spherical-bottom centrifuge bottles are ideal for large-volume cell harvesting, pelleting and protein purification.

Molded of transparent PC, these translucent bottles are autoclavable and have excellent mechanical strength properties.

details

- For low- to moderate-speed centrifugation of biological and chemical samples
- Molded of transparent PC for easy visualization of samples
- Spherical-bottom design facilitates pellet formation and retrieval

Ordering information: For use in standard rotors, the use of the Nalgene spherical-bottom adaptor Cat. No. DS3124-0010 is recommended.

Note: For proper performance, bottles must be filled to 80% of the total capacity



Nalgene Spherical-Bottom Centrifuge Bottles

Cat. No.	Capacity, mL	OD x H, mm	Max Force, xg	No. per Pack/Case
3123-0250	250	61.8 x 140.0	27,500	4/36

Nalgene Friction-Fit Closures for Plastic Centrifuge Tubes

polypropylene

Thermo Scientific™ Nalgene™ friction-fit closures are designed to fit Nalgene open-top round bottom and conical centrifuge tubes and feature a pull tab for easy removal from the centrifuge.

May not be liquid-tight during high-speed centrifugation.

details

- Designed to be compatible with Nalgene open-top round bottom and conical centrifuge tubes
- Cat. No. DS3111-0030 fits non-lipped 50 mL centrifuge tubes only
- Autoclavable



Nalgene Friction-Fit Closures for Open Top Centrifuge Tubes

Cat. No.	Closure Size, mm	No. per Case
DS3111-0016	16	20
DS3111-0017	17	20
DS3111-0018	18	20
DS3111-0025	25	20
DS3111-0029	29	20
DS3111-0030	30	20
DS3111-0032	32	20



Nalgene Sealing Cap Assemblies

polypropylene screw closure, ETFE plug, Viton™ fluoroelastomer o-ring

Thermo Scientific™ Nalgene™ sealing cap assembly permits tube use at their highest rated speed level (10,000 xg or greater) without leakage, even when full.

details

- Top fits securely for use at maximum speeds without leakage
- Autoclavable/Biohazard/Leakproof†



Nalgene Sealing Cap Assemblies

Cat. No.	Closure Size, mm	No. per Case
DS3131-0020	20	2
DS3131-0024	24	2

Nalgene Centrifuge Tube Sealing Closures

polypropylene screw closure, silicone gasket

Thermo Scientific™ Nalgene™ sealing cap assemblies ensure leakproof service of Nalgene centrifuge bottles at their recommended maximum rated speeds.

details

- Recommended when spinning hazardous materials compatible with centrifuge tube material.
- White polypropylene with red silicone gaskets for leakproof high speed spin performance
- Autoclavable/Leakproof†



Note: Before autoclaving, set closure on top of the container without engaging the threads.

Nalgene Sealing Caps for Oak Ridge Tubes

Cat. No.	Closure Size, mm	No. per Case
DS3132-0020	20	2
DS3132-0024	24	6
DS3132-0058	58	2
DS3132-0063	63	2

Nalgene Oak Ridge Conical Centrifuge Tube Adapters

white polycarbonate

Thermo Scientific™ Nalgene™ Oak Ridge conical tube adapter must be used with Nalgene 35 mL conical Oak Ridge tubes (Cat. No. 3148).

details

- Easily removed from rotors after use
- Autoclavable



Nalgene Conical-Bottom Centrifuge Tubes

Cat. No.	Description	No. per Case
DS3147-0050	Conical-Bottom Centrifuge Tube Adaptor	6

Nalgene Spherical-Bottom Centrifuge Bottle Adapters

polycarbonate

Thermo Scientific™ Nalgene™ spherical-bottom centrifuge bottle adapter is specifically designed to mate with Cat. No. 3123-0250 for use in standard centrifuge rotors

details

- Molded of rigid and robust white polycarbonate for assured durability.
- Total height of Nalgene spherical-bottom centrifuge bottle with closure and adapter is 137.5 mm



Nalgene Spherical-Bottom Centrifuge Bottle Adaptors

Cat. No.	Description	No. per Pack/Case
DS3124-0010	Spherical-Bottom Centrifuge Bottle Adaptor	4/4

Nalgene Conical-Bottom Centrifuge Bottle Adapters

polycarbonate

Thermo Scientific™ Nalgene™ conical-bottom bottle adapter is designed for use with Cat. Nos. 3143, 3144, and 3145.

details

- Molded of rigid, robust white PC for assured durability
- Centrifugation of Nalgene Conical Bottom Centrifuge Bottles (Cat. Nos. 3143, 3144, 3145) requires this adapter



Nalgene Conical-Bottom Centrifuge Bottle Adaptors

Cat. No.	Description	No. per Pack/Case
DS3126-0175	Conical Bottom Centrifuge Bottle Adapter	4/4

Nunc Centrifuge Bottle Adapters and Cushions

Thermo Scientific™ Nunc™ centrifuge bottle adapters and cushions are tightness-tested, fit most centrifuges, and meet USP Class VI.

Nunc products are high-quality plastics for use in biotechnology, pharmaceutical and research laboratories, as well as in the production of vaccines and diagnostic kits.

details

- Centrifuge Bottle Adapters/Cushions are required when spinning selected centrifuge bottles



Nunc 200 mL Centrifuge Bottle Adapters and Cushions

Cat. No.	Description	No. per Pack/Case
377585	Cushion Adapter, Nylon, For 200 mL tubes	2/2

Nalgene Centrifuge Bottle Adapters

low density polyethylene

Thermo Scientific™ Nalgene™ centrifuge bottle adapter provides support to all Nalgene 250 mL bottles for proper fit in Sorvall GSA rotors.

details

- Molded of white, low-density polyethylene
- For use with Nalgene centrifuge bottles: Cat. Nos. 3120-0250, 3121-0250, 3127-0250, 3140-0250 and 3141-0250



Nalgene Centrifuge Bottle Adapter

Cat. No.	Description	No. per Pack/Case
DS3125-0250	Centrifuge Bottle Adapter for 250 mL bottles	6/6

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Chemical compatibility

It is important to evaluate the compatibility of the sample being spun, paying particular attention to the chemical composition. Each container material offers different levels of performance during centrifugation when exposed to different chemicals. The key performance differences between the various vessel materials are as follows:

Polycarbonate:

a harder material with glass-like transparency that can typically withstand higher RCF and enables easy visualization of the contents. Consider another material if working with common laboratory chemicals, such as alcohol and acetone due to incompatibility.

Polypropylene:

compatible with alcohol and acetone - softer and therefore not generally rated to withstand higher RCF

FEP:

excellent when using aggressive solvents, but has speed limitations based on temperature and rotor configuration. However, FEP generally must be filled to capacity for centrifuge applications to remain leak-proof and intact.

Polyethylene:

very impact resistant making it ideal for rougher handling, but a lower melting point for this resin makes it incompatible with some applications.

See the chemical compatibility chart on Pages 41-47.

Volume

Working volume can be dictated by the protocol being used and can be limited by the rotors that may already be available. The general rule for safe centrifugation is that the tube or bottle should be filled at least 80%. Where noted, other volumes may be required—for example some tubes must be filled completely to prevent failure, while others must be limited to only 75-80% to prevent leakage. Using a bottle less than half-filled to capacity can lead to high levels of material stress and can result in bottle failure. Users should familiarize themselves with the recommended fill levels, and plan their centrifugation accordingly. If the sample volume is smaller than the available rotor capacity, reducing adapters are available for most rotors from the manufacturer. Adapters allow a smaller-volume tube to be run at the appropriate fill volume, thus preventing accidents.

Temperature

Although modern centrifuges and rotors can operate at temperatures as high as 45°C, do not assume that every bottle or tube can safely withstand the same temperatures. Temperature stability can differ from resin to resin. PPCO, PC, and PS vessels, as well as some closures and O-ring materials, can only withstand certain chemicals under specific temperatures when exposed to centripetal force. For example, PS can become brittle near freezing and FEP must be utilized in a refrigerated (~4°C) centrifuge to prevent deformation in use.

See the Autoclaving section for more information on autoclavability of our resins.

Relative Centrifugal Force (RCF)

Closely related to volume and chemical compatibility is the g-force at which the bottles and tubes will be centrifuged. All bottles tested for centrifugation have a maximum speed rating. Vessels run at speeds higher than the recommended rating can result in sample loss, or worse, potential damage to the centrifuge and rotor.

Most protocols specify a speed either in revolutions per minute (RPM) or RCF, measured in “xg.” It is extremely important to understand the difference between the two: RPM changes with the specified rotor and is dependent upon its radius, while RCF is a constant and represents the actual gravitational force being applied independent of the rotor.

Rotors and centrifuges may have different ratings that than those supported by the centrifugation vessel itself. It is important to follow the ratings of the tube or bottles being used.

Users should not exceed the RCF stated by the manufacturer of the vessel. For Thermo Fisher Rotors calculations between RCF and RPM are available at <http://info.thermofisher.com/content/rcfgenerator>

Protocols

In order to select the most appropriate high quality centrifugation vessels, a protocol plan for sample loading and unloading should be made. Knowing the steps in the process not only simplifies the number of products to select from, but also ensures success by choosing the vessel that best fits your process. Important questions to ask include:

Will the user be layering sample with a pipette or pouring in large volumes from a beaker?

There are several types of bottle openings, from wide-mouth (~70 mm) for large volumes to very small openings (~3 mm). Technique for sample recovery is also important (see Table 1).

Will the user recover the samples by pouring off, scraping out, suctioning off, pipetting off, or drawing off the sample with a syringe?

The techniques for sample recovery are varied, but many tubes and bottles are designed to accommodate specific techniques. Wide-mouth bottles are excellent for scraping out pellets after the supernatant is poured off or suctioned out. Pipetting is commonly used for smaller volumes (50 mL or less, making standard screw-cap or open-topped tubes, such as thick-walled tubes, ideal. Sample removal via a syringe is typically applied when performing gradient work; therefore, collection of the band of interest is very important and may require a thin-walled tube that can be punctured.

Where listed, our centrifuge ware resins meet requirements of CFR21 section of Food Additives Amendment of the Federal Food and Drug act. End users must validate the vessel in their specific process for any compliance purposes.

Table 1 - Example Sample recovery

Application	Recovery Technique	Recommended Tube or Bottle
Pelleting	Pouring/Scraping	Wide-mouthed bottles
	Suctioning	Standard screw cap (Oak Ridge Style)
Gradient work	Pipetting	Standard screw cap or open-topped, thick-walled tubes
	Piercing	Thin-walled, sealed

Preventative maintenance

After all of the necessities have been identified, a buying decision has been made, and the product is in the laboratory being used, how can the life of the product be maximized? One common cause of damage to adapters, rotors, and centrifuges is vessel failure. Often the root cause of the failure can be overuse or misuse. To prevent this from occurring, there are several best practices that can be implemented:

- Always inspect the bottles before use and remove from service anything that looks suspect (i.e., discoloration, crazing, spots that do not come off, scratches, etc.).
- If the vessel has O-rings in the lid, always check them for cracks or compression, which could result in leakage or sample loss and, in extreme cases, cause centrifuge damage.
- If the vessel has a lid, always read and follow the instructions for assembly. Ensure that all of the parts required to seal and use it properly are present.

- If the vessels are shared, know who is using them and that they are being used, cleaned and stored properly.
- Replace centrifuge ware as required, and remember: centrifuge bottles and tubes are consumables and must be replaced regularly to prevent sample loss and equipment damage. Using any vessel until it fails is unsafe.
- The specific life of a vessel depends greatly on the specific application, chemicals, and cleaning applied to the vessel. Contact technical support or your sales contact if you have questions about use ranges for your specific application.

It is strongly recommended to pre-test under actual experimental conditions to determine any potential negative outcome.

Cleaning and autoclaving

Sometimes, the manner in which vessels are treated between centrifugation runs is more relevant to the selection of centrifuge ware than the actual centrifugation itself. It is important that the user clearly identify what is needed between runs with respect to cleaning and autoclaving in their protocols:








Cleaning

1. Soak centrifuge ware in a mild, non-alkaline detergent (such as Nalgene L900) to loosen debris.
2. Hand wash and rinse thoroughly, with a final rinse in distilled water.
3. Do not use abrasive cleansers or brushes.

Autoclaving

1. PP, PPCO, FEP and ETFE can be autoclaved repeatedly for 15-minute cycles at 121°C/15 psig (1.02 bar).
2. PC and PSF can also be autoclaved repeatedly, but a loss in mechanical strength will result. Inspect these materials periodically for signs of crazing (minute visual cracks), and discard product if cracks are visible to the unaided eye.
3. Leave closures (cap and plug) unassembled from units to prevent collapse of tubes or bottles when cooling.
4. Do not autoclave LDPE, HDPE or PS.

Resin Quick Reference Chart

Resin	FEP	PPCO	PC	HDPE	PP	PS	PSF
Autoclavable	Yes	Yes	Yes	N	Yes	N	Yes
Microwaveable	Marginal ¹	Marginal	Yes	No	Yes	N	Yes
Dry heat (oven)	Yes	No	Yes	No	No	No	Yes
Radiation	No	No	Yes	Yes	No	Yes	Yes
Freeze	Yes	Yes	Yes	Yes	No	No	Yes
Flexability	Excellent	Moderate	Rigid	Rigid	Rigid	Rigid	Rigid
Clarity	Translucent	Translucent	Clear	Translucent	Translucent	Clear	Clear
Recycling	 OTHER	 PP	 OTHER	 HDPE	 PP	 PS	 OTHER
Non-cytotoxic	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Food and beverage use	Yes	Yes	Yes	Yes ²	Yes	Yes	Yes

1=The resin will absorb and retain significant amounts of heat resulting in an unexpectedly hot surface

2=Acceptable for: Non acid, aqueous products; may contain salt sugar or both (ph about 5.0); dairy products and modifications; oil-in-water emulsions, high or low fat; moist bakery products with surface containing no free fat or oil; dry solids with the surfaces containing no free fats or oil

Centrifuge Ware Chemical Resistance Table

Chemical, Concentration	Resin							O-rings		Closures			
	FEP	PPCO	PC	PE	PP	PSF	PS	SILI	Viton®	PP	ETFE	PE	PPE
1-(4-Chlorophenyl)ethanone, pure	S	S	M	S	M	M	U	U	U	M	S	S	–
1,3-Butadiene, pure	S	U	U	U	U	U	U	U	S	U	S	U	U
1,4-Dioxane, pure	S	M	U	M	M	U	U	U	U	M	M	M	U
1:3 Mixture Of Nitric And Hydrochloric Acids, pure	S	U	U	U	U	U	U	U	M	U	S2	U	U
1-Pentanol, pure	S	S	M	M	M	M	S2	U	S	M	S	M	M
1-Phenylethanone, pure	S	M	U	M	M	U	U	U	U	M	S	M	U
1-Undecanol, pure	S	S2	M	S	M	M	M	–	S	M	S2	S	–
2,2,4-Trimethylpentane, pure	S	U	U	U	U	M	U	U	–	U	S2	U	–
2,2'-Oxybispropane, pure	S	U	U	U	U	U	U	U	U	U	S2	U	–
2,4,6-Trinitrophenol, pure	S	M	U	U	M	U	U	U	S	M	M	U	S2
2-Hydroxy-1,2,3-Propanetricarboxylic Acid Tributyl Ester, pure	S	M	U	M	M	U	U	U	U	M	S2	M	U
2-Hydroxybenzaldehyde, pure	S	S2	M	S	M	M	U	U	M	M	U	S	–
2-Isopropoxypropane, pure	S	U	U	U	U	U	U	U	U	U	S2	U	–
2-Methoxyethanol, pure	S	S	U	S	M	U	U	U	U	M	S2	S	–
2-Methoxyethyl Oleate, pure	S	S2	U	S	M	U	U	U	–	M	S	S	–
2-Propanol, pure	S	S	U	S	S	M	S2	S2	S	S	S	S	S2
2-Propanone, pure	S	M	U	U	M	U	U	U	U	M	M	U	U
2-Propenenitrile, pure	S	U	U	S	U	U	U	U	U	U	S2	S	U
3-Phenyl-2-propenal, pure	S	U	M	U	U	M	U	U	U	U	S2	U	–
4'-Chloroacetophenone, pure	S	S	M	S	M	M	U	U	U	M	S	S	–
Acetaldehyde, pure	S	M	U	U	M	U	U	U	U	M	M	U	U
Acetic Acid Benzyl Ester, pure	S	S2	U	M	S	U	U	U	S	S	S2	M	–
Acetic Acid Phenylmethyl Ester, pure	S	S2	U	M	S	U	U	U	S	S	S2	M	–
Acetic Anhydride, pure	S	M	U	U	M	U	U	U	U	M	S	U	U
Acetone, pure	S	M	U	U	M	U	U	U	U	M	S2	U	U
Acetonitrile, pure	S	U	U	S	M	U	U	U	U	M	S2	S	U
Acetophenone, pure	S	M	U	M	M	U	U	U	U	M	S	M	U
Acrylonitrile, pure	S	U	U	S	U	U	U	U	U	U	S2	S	U
Adipic Acid, pure	S	S	S	S	S	S	S	–	S2	S	S	S	–
Alanine, pure	S	S	S	S	S	S	S	S2	S	S	S	S	S
Allyl Alcohol, pure	S	S	M	U	S	M	U	–	S	S	S2	U	–
Aluminum Chloride, pure	S	S	S2	S	S	S	S	U	S	S	S	S	S
Aluminum Hydrate, pure	S	S	U	S	S	M	M	S2	S	S	S	S	S
Aluminum Hydroxide, pure	S	S	U	S	S	M	M	S2	S	S	S	S	S

Key:

S = Satisfactory, **S1** = Satisfactory, may cause discoloration, **S2** = Satisfactory below 26°C only

M = Marginal; may be satisfactory for use in a centrifuge depending on length of exposure and speed.

Testing under operation conditions is suggested before actual run, **U** = Unsatisfactory; not recommended

Centrifuge Ware Chemical Resistance Table (cont'd)

Chemical, Concentration	Resin							O-rings		Closures			
	FEP	PPCO	PC	PE	PP	PSF	PS	SILI	Viton®	PP	ETFE	PE	PPE
Aluminum Salts, pure	S	S	M	S	S	M	S2	U	M	S	S	S	S2
Aluminum Trihydrate, pure	S	S	U	S	S	M	M	S2	S	S	S	S	S
Amino Acids, pure	S	S	S	S	S	S	S	S2	S	S	S2	S	S
Ammonia, pure	S	S	U	S	S	M	S2	U	U	S	S	S	M
Ammonium Chloride, pure	S	S	S2	S	S	S	S	S2	S2	S	S	S	S2
Ammonium Glycolate, pure	S	S2	M	S	S	M	S	–	S2	S	S	S	–
Ammonium Oxalate, pure	S	S2	S	S	S	S	S	–	–	S	S	S	–
Ammonium Salts, pure	S	S	M	S	S	M	M	S2	M	S	S	S	S2
Amyl Alcohol, pure	S	S	M	M	M	M	S2	U	S	M	S	M	M
Amyl Chloride, pure	S	U	U	U	U	U	U	U	M	U	S	U	U
Aniline, pure	S	U	U	U	M	U	U	U	U	M	M	U	U
Aqua Regia, pure	S	U	U	U	U	U	U	U	M	U	S2	U	U
Arsenic Acid, pure	S	M	S	S	S	S	S	S2	S	S	S	S	M
Benzaldehyde, pure	S	M	U	U	M	U	U	U	U	M	M	U	U
Benzenamine, pure	S	U	U	U	M	U	U	U	U	M	M	U	U
Benzene, pure	S	U	U	U	U	U	U	U	S	U	S2	U	U
Benzol, pure	S	U	U	U	U	U	U	U	S	U	S2	U	U
Benzyl Acetate, pure	S	S2	U	M	S	U	U	U	S	S	S2	M	–
Benzyl Alcohol, pure	S	U	U	U	M	U	U	U	S	M	S	U	–
Boric Acid, pure	S	S	S	S	S	S	S	S2	S	S	S	S	S
Bromine, pure	S	U	U	U	U	U	U	U	U	U	S2	U	U
Bromoform, pure	S	U	U	U	U	U	U	U	S	U	M	U	–
Butadiene, pure	S	U	U	U	U	U	U	U	S	U	S	U	U
Butyl Acetate, pure	S	M	U	U	U	U	U	U	U	U	S2	U	U
Butyl Chloride, pure	S	U	U	U	U	U	U	U	–	U	S	U	U
Butyl Citrate, pure	S	M	U	M	M	U	U	U	U	M	S2	M	U
Butyric Acid, pure	S	U	U	U	U	M	U	U	M	U	S	U	–
Calcium Chloride, pure	S	S	S	S	S1	S	S	S2	S	S1	S	S	S
Calcium Hypochlorite, Saturated	S	S	U	S	S	M	S2	U	S	S	S	S	M
Carbazole, pure	S	S	U	S	S	U	S	–	–	S	S	S	–
Carbon Disulfide, pure	S	U	U	U	M	U	U	U	S	M	M	U	U
Carbon Tetrachloride, pure	S	U	U	U	U	U	U	U	S	U	S	U	U
Cedarwood Oil, pure	S	U	M	U	U	M	U	U	S	U	S2	U	–
Cellosolve® Acetate, pure	S	S2	U	S	M	U	U	U	U	M	S2	S	–
Chlorobenzene, pure	S	U	U	U	U	U	U	U	S	U	M	U	U
Chloroform, pure	S	U	U	U	U	U	U	U	S	U	M	U	U

Key:

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Centrifuge Ware Chemical Resistance Table (cont'd)

Chemical, Concentration	Resin							O-rings		Closures			
	FEP	PPCO	PC	PE	PP	PSF	PS	SILI	Viton®	PP	ETFE	PE	PPE
Cinnamaldehyde, pure	S	U	M	U	U	M	U	U	U	U	S	2	–
Cinnamic Aldehyde, pure	S	U	M	U	U	M	U	U	U	U	S2	U	–
Cinnamon Oil, pure	S	M	M	U	U	M	U	U	U	U	S2	U	–
Copper Sulfate, pure	S	S	S	S	S	S	S	S2	M	S	S	S	S
Cresol, pure	S	M	U	U	U	U	U	U	U	U	S2	U	U
Cyanoethylene, pure	S	U	U	S	U	U	U	U	U	U	S2	S	U
Cyclohexane, pure	S	M	M	M	M	M	U	U	S2	M	S2	M	U
Cyclohexanone, pure	S	U	U	M	M	U	U	U	U	M	S	M	U
Cyclopentane, pure	S	U	U	U	U	U	U	U	S	U	S	U	U
Decahydronaphthalene, pure	S	U	U	M	U	U	U	U	S	U	S	M	U
Decalin, pure	S	U	U	M	U	U	U	U	S	U	S	M	U
Diacetone Alcohol, pure	S	M	U	S	M	U	M	U	U	M	S2	S	–
Diacetone, pure	S	M	U	U	S2	U	U	U	U	S2	S2	U	U
Dibutyl Phthalate, pure	S	M	M	U	M	M	U	U	M	M	M	U	U
Diethyl Benzene, pure	S	U	U	U	U	U	U	U	S	U	S2	U	–
Diethyl Ether, pure	S	U	U	U	U	U	U	U	U	U	S2	U	U
Diethyl Ketone, pure	S	M	U	U	M	U	U	U	U	M	M	U	U
Diethyl Malonate, pure	S	S	U	S	S	U	U	U	U	S	S	S	–
Diethylamine, pure	S	M	U	U	M	M	M	U	U	M	U	U	–
Diethylene Dioxide, pure	S	M	U	M	M	U	U	U	U	M	M	M	U
Diethylene Glycol Monoethyl Ether, pure	S	S	U	S	S	M	U	U	M	S	S	S	–
Diethylene Glycol, pure	S	S	M	S	S	M	S2	U	S	S	S	S	–
Diisopropyl Ether, pure	S	U	U	U	U	U	U	U	U	U	S2	U	–
Dimethyl Acetamide, pure	S	S	U	M	S	U	U	U	U	S	S2	M	–
Dimethyl Formamide, pure	S	S	U	S	S	U	U	U	U	S	M	S	U
Dimethyl Ketone, pure	S	M	U	U	M	U	U	U	U	M	M	U	U
Dimethylsulfoxide, pure	S	S	U	S	S	U	U	U	U	S	S2	S	S
Dioxane, pure	S	M	U	M	M	U	U	U	U	M	M	M	U
DIPE, pure	S	U	U	U	U	U	U	U	U	U	S2	U	–
Dipropylene Glycol, pure	S	S	M	S	S	M	S	U	S	S	S	S	S2
DMSO, pure	S	S	U	S	S	U	M	U	U	S	S2	S	S
Ether, pure	S	U	U	U	U	U	U	U	U	U	S2	U	U
Ethyl Acetate, pure	S	M	U	M	M	U	U	U	U	M	S2	M	U
Ethyl Alcohol, pure	S	S	U	M	S	S2	M	U	S	S	S	M	S
Ethyl Benzene, pure	S	U	U	U	U	U	U	U	S	U	M	U	U

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Centrifuge Ware Chemical Resistance Table (cont'd)

Chemical, Concentration	Resin							O-rings		Closures			
	FEP	PPCO	PC	PE	PP	PSF	PS	SILI	Viton®	PP	ETFE	PE	PPE
Ethyl Benzoate, pure	S	M	U	U	M	U	U	U	U	M	S2	U	U
Ethyl Butyrate, pure	S	M	U	M	M	U	U	U	U	M	S2	M	–
Ethyl Chloride, pure	S	U	U	U	U	U	U	U	S	U	S	U	U
Ethyl Cyanoacetate, pure	S	S	U	S	S	U	M	U	–	S	S	S	–
Ethyl Lactate, pure	S	S	U	S	S	U	U	U	U	S	S	S	–
Ethylene Chloride, pure	S	U	U	U	U	U	U	U	M	U	U	U	U
Ethylene Glycol Monomethyl Ether, pure	S	S	U	S	M	U	U	U	U	M	S2	S	–
Ethylene Glycol, pure	S	S	U	S	S	M	S	S2	S	S	S	S	S2
Ethylene Oxide, pure	S	U	U	U	M	U	U	U	U	M	S2	U	S2
EtO, pure	S	S	U	S	S	U	U	U	U	S	S	S	S2
Fatty Acids, Saturated, pure	S	S2	M	S	S	M	S2	U	S	S	S	S	S2
Fatty Acids, Unsaturated, pure	S	S2	M	S	S	M	M	U	S	S	S	S	S2
Fluorides, pure	S	S	S	S	S	S	M	U	M	S	S	S	S2
Formic Acid, pure	S	S2	U	M	S	M	U	U	M	S	S	M	S
Freon TF, pure	S	S2	M	S	M	M	U	U	M	M	S2	S	–
Fuel Oil No. 1, pure	S	M	S2	U	M	S2	U	U	S	M	S	U	U
Gasoline, pure	S	U	U	M	U	U	U	U	S	U	S	M	U
Glutaraldehyde Disinfectant, pure	S	S	M	S	S	M	M	U	M	S	S2	S	S
Glutaraldehyde, pure	S	S	M	S	S	M	M	U	U	S	S2	S	S
Glycerine, pure	S	S	S	S	S	S	S	S2	S	S	S	S	S
Glycerol, pure	S	S	S	S	S	S	S	S2	S	S	S	S	S
Hexane, pure	S	M	U	U	M	U	U	U	S	M	S2	U	U
Hydrated Alumina, pure	S	S	U	S	S	M	M	S2	S	S	S	S	S
Hydrazine, pure	S	U	U	U	U	U	U	U	S	U	U	U	–
Iodine Crystals, pure	S1	U	S1	U	S1	S1	S1	U	S	S1	S2	U	U
Isobutanol, pure	S	S	S2	S	S	S2	S2	S2	S	S	S	S	S
iso-Butyl Alcohol, pure	S	S	S2	S	S	S2	S2	S2	S	S	S	S	S
Isopropanol, pure	S	S	U	S	S	M	S2	S2	S	S	S	S	S2
Isopropyl Acetate, pure	S	M	U	M	M	U	U	U	U	M	S2	M	–
Isopropyl Alcohol, pure	S	S	U	S	S	M	S2	S2	S	S	S	S	S2
Isopropyl Benzene, pure	S	U	U	U	U	U	U	U	S	U	S2	U	–
Isopropyl Ether, pure	S	U	U	U	U	U	U	U	U	U	S2	U	–
Jet Fuel, pure	S	U	M	U	U	M	M	U	S	U	S2	U	M
Kerosene, pure	S	M	S2	U	M	S2	U	U	S	M	S	U	U
Lacquer Thinner, pure	S	U	U	U	U	U	U	U	U	U	S	U	U

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Testing under operation conditions is suggested before actual run, **U** = Unsatisfactory; not recommended

Centrifuge Ware Chemical Resistance Table (cont'd)

Chemical, Concentration	Resin							O-rings		Closures			
	FEP	PPCO	PC	PE	PP	PSF	PS	SILI	Viton®	PP	ETFE	PE	PPE
L-alpha-amino Propionic Acid, pure	S	S	S	S	S	S	S	S2	S	S	S	S	S
Lead Acetate, pure	S	S	S	S	S	S	S	U	M	S	S	S	S
L-Tartaric Acid, pure	S	S2	S2	M	S	S	S	S2	S	S	S	M	S2
Magnesium Chloride, pure	S	S	S	S	S	S	S	S2	S	S	S	S	S
MEK, pure	S	S2	U	U	M	U	U	U	U	M	M	U	U
Mercuric Chloride, pure	S	S	S	S	S	S	S2	M	S	S	S	S	S
Methoxyethyl Oleate, pure	S	S2	U	S	M	U	U	U	–	M	S	S	–
Methyl Acetate, pure	S	M	U	U	M	U	U	U	U	M	S2	U	U
Methyl Alcohol, pure	S	S	M	M	S1	S2	U	S2	M	S1	S	M	S
Methyl Ethyl Ketone, pure	S	S2	U	U	M	U	U	U	U	M	M	U	U
Methyl Isobutyl Ketone, pure	S	M	U	U	S2	U	U	U	U	S2	S2	U	U
Methyl Propyl Ketone, pure	S	M	U	U	M	U	U	U	U	M	S2	U	U
Methylene Chloride, pure	S	U	U	U	U	U	U	U	S	U	U	U	U
Methyloxirane, pure	S	U	U	U	M	U	U	U	U	M	S	U	S2
Methyl-t-Butyl Ether, pure	S	U	U	U	U	U	U	U	U	M	S2	U	–
MIBK, pure	S	M	U	U	S2	U	U	U	U	S2	S2	U	U
Mineral Spirits, pure	S	U	U	U	U	U	M	U	S	U	S2	U	–
n-Butanol, pure	S	S	M	S	S	M	S2	U	S	S	S	S	M
n-Butyl Acetate, pure	S	M	U	M	U	U	U	U	U	U	S2	M	U
n-Butyl Alcohol, pure	S	S	M	S	S	M	S2	U	S	S	S	S	M
n-Decane, pure	S	U	U	M	M	M	U	U	S	M	S	M	–
n-Heptane, pure	S	U	U	U	U	M	U	U	S	U	S	U	U
Nitrobenzene, pure	S	U	U	U	M	U	U	U	U	M	S2	U	U
Nitromethane, pure	S	U	U	U	U	U	U	U	U	U	M	U	U
n-Octane, pure	S	S2	M	U	U	M	U	U	S	U	S	U	U
Oil, Cedarwood, pure	S	U	U	U	U	U	U	U	S	U	S2	U	–
Oil, Cinnamon, pure	S	M	M	U	U	M	U	U	U	U	S2	U	–
Oil, Mineral, pure	S	S2	S2	U	U	S2	M	S2	S	U	S	U	S2
Oil, Orange, pure	S	M	U	U	M	M	U	U	S	M	S	U	–
Oil, Pine, pure	S	M	U	U	M	U	U	U	S	M	S2	U	–
Orange Oil, pure	S	M	U	U	M	M	U	U	S	M	S	U	–
Orthoarsenic Acid, pure	S	M	S	S	S	S	S	S2	S	S	S	S	S2
Ozone, pure	S	S2	U	M	U	S	U	S2	S2	U	S	M	U
p-Chloroacetophenone, pure	S	S	M	S	M	M	U	U	U	M	S	S	–
p-Dichlorobenzene, pure	S	U	U	U	U	U	U	U	U	U	U	U	U

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Centrifuge Ware Chemical Resistance Table (cont'd)

Chemical, Concentration	Resin							O-rings		Closures			
	FEP	PPCO	PC	PE	PP	PSF	PS	SILI	Viton®	PP	ETFE	PE	PPE
Pentyl acetate, pure	S	M	U	S	M	U	U	U	U	M	S	S	U
Perchloric Acid, pure	U	M	U	U	M	U	U	U	S	M	M	U	M
Perchloroethylene, pure	S	U	U	U	U	U	U	U	S	U	S2	U	–
Petroleum, pure	S	M	M	U	U	S2	U	U	S	U	S	U	S2
Phenyl Methyl Ketone, pure	S	M	U	M	M	U	U	U	U	M	S	M	U
Phenylacrolein, pure	S	U	M	U	U	M	U	U	U	U	S2	U	–
Picric Acid, pure	S	M	U	U	M	U	U	U	S	M	M	U	S2
Pine Oil, pure	S	M	U	U	M	U	U	U	S	M	S2	U	–
Potassium Chloride, pure	S	S	S	S	S	S	S	S2	S	S	S	S	S
Potassium Permanganate, pure	S	S1	S1	S	S1	S1	S2	S2	S2	S1	S	S	S
Propane, pure	S	S	S	S	S	S	U	S2	S	S	S	S	M
Propionic Acid, pure	S	S2	U	M	M	M	M	–	–	M	M	M	–
Propylene Glycol, pure	S	S	M	S	S	M	S	S2	S	S	S	S	S2
Pyridine, pure	S	U	U	U	U	U	U	U	U	U	U	U	U
Salicylaldehyde, pure	S	S2	M	S	M	M	U	U	M	M	U	S	–
sec-Butanol, pure	S	S	S2	S	S	S2	S2	S2	S	S	S	S	S
sec-Butyl Alcohol, pure	S	S	S2	S	S	S2	S2	S2	S	S	S	S	S
Silicone Oil, pure	S	S	S	S	S	S	S2	U	S	S	S	S	S2
Silver Acetate, pure	S	S	S2	S	S	S	S	U	S	S	S	S	S
Silver Nitrate, pure	S	S1	S	S	S1	S	S	S2	S	S1	S	S	S1
Skydrol LD4 Aviation Hydraulic Fluid, pure	S	M	U	M	M	U	U	U	S	M	S	M	–
Soda Ash, pure	S	S	M	M	S1	S	S2	S2	S	S1	S	M	S
Sodium Acetate, pure	S	S	S2	S	S	S	S	U	U	S	S	S	S
Sodium Carbonate, pure	S	S	M	M	S1	S	S2	S2	S	S1	S	M	S
Sodium Dichromate, pure	S	S	S	S	S	S	M	S2	S	S	S	S	–
Stearic Acid, pure	S	S	M	M	S2	S2	S2	U	S	S2	S	M	S2
Sulfur Dioxide, pure	S	S	M	S	S	M	U	U	S2	S	S	S	U
Sulfur Salts, pure	S	U	U	M	M	M	U	U	M	M	S2	M	M
Tartaric Acid, pure	S	S2	S2	M	S	S	S	S2	S	S	S	M	S2
TCA, pure	S	S	U	S2	S	U	U	U	U	S	M	S2	S
tert-Butanol, pure	S	S	M	S	S	M	S2	U	S	S	S	S	S
tert-Butyl Alcohol, pure	S	S	M	S	S	M	S2	U	S	S	S	S	S
Tetrahydrofuran, pure	S	M	U	U	U	U	U	U	U	U	U	U	U
THF, pure	S	M	U	U	U	U	U	U	U	U	U	U	U
Thionyl Chloride, pure	S	U	U	U	U	U	U	–	M	U	S2	U	–

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Centrifuge Ware Chemical Resistance Table (cont'd)

Chemical, Concentration	Resin							O-rings		Closures			
	FEP	PPCO	PC	PE	PP	PSF	PS	SILI	Viton®	PP	ETFE	PE	PPE
Tincture of Iodine, pure	S1	U	S1	S2	S1	S1	M	U	S	S1	S	S2	S1
Toluene, pure	S	U	U	U	U	U	U	U	U	U	S2	U	U
Tribromomethane, pure	S	U	U	U	U	U	U	U	S	U	M	U	–
Tributyl Citrate, pure	S	M	U	M	M	U	U	U	U	M	S2	M	U
Trichloroacetic Acid, pure	S	S	U	S2	S	U	U	U	U	S	M	S2	S2
Trichloroethane, pure	S	U	U	U	U	U	U	U	S	U	S	U	U
Trichloroethylene, pure	S	U	U	U	U	U	U	U	S	U	U	U	U
Triethylene Glycol, pure	S	–	S2	S	S	S2	S2	–	S	S	S	S	–
Tripropylene Glycol, pure	S	S	S2	S	S	S	S	S2	S	S	S	S	S2
Tris Buffer Solution, pH 11, pure	S	S	U	S	S	S	S2	S2	S	S	S	S	S2
Tris Buffer Solution, pH 7.0, pure	S	S	M	S	S	S	S2	S2	S	S	S	S	S
Trisodium Phosphate, pure	S	S	M	S	S	M	S	S2	S	S	S	S	S2
Tung Oil, pure	S	–	–	S	S2	–	U	S2	S	S2	S	S	–
Tung Oil, pure	S	–	–	S	S2	–	U	S2	S	S2	S	S	–
Undecyl Alcohol, pure	S	S2	M	S	M	M	M	–	S	M	S2	S	–
Urea, pure	S	S	U	S	S	S	S	M	S	S	S	S	S
Vinyl Cyanide, pure	S	U	U	S	U	U	U	U	U	U	S2	S	U
White Spirits, pure	S	U	U	U	U	U	M	U	S	U	S2	U	–
Xylene, pure	S	U	U	U	U	U	U	U	S	U	S	U	U
Zinc Stearate, pure	S	S	S	S	S	S	S	–	S	S	S	S	S

Key:

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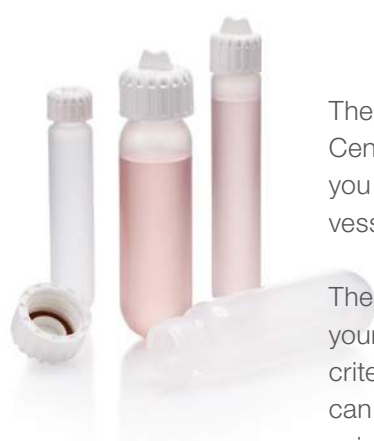
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Disclaimer: This Centrifuge Ware Chemical Resistance Table is a general guide and pertains to Thermo Scientific™ Nalgene™ and Nunc™ centrifuge ware. As so many factors can affect the chemical resistance of a given product, you should test under your own conditions. Compatibility recommendations are given at room or ambient temperature conditions. The listing is intended as a guide for selecting the appropriate Nalgene and Nunc centrifuge ware with the most common chemicals used in life science research. This information is based on technical publications, laboratory experiments, data from material suppliers and field tests. Thermo Fisher recommends that compatibility be established by the customer in their specific application and storage temperature because the actual performance may differ as a result of variations in temperature, concentration, exposure time, and other factors. Product information contained within this Centrifuge Ware Chemical Resistance Table is provided to the best of our knowledge and belief, but without obligation or liability. This Chemical Compatibility Table is not a product warranty statement. Any information or advice provided by Thermo Fisher Scientific in this Centrifuge Ware Chemical Resistance Table is for reference purposes only.

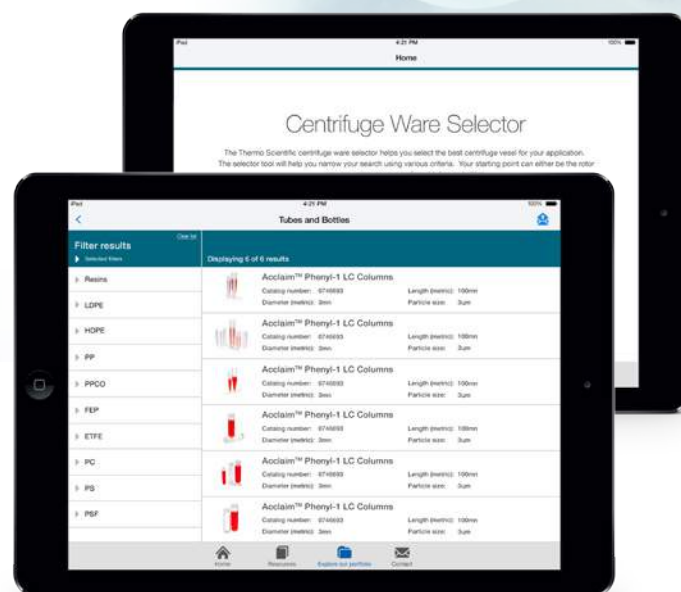
Centrifuge Ware Selector Tool

Selection of the right centrifuge vessel is easier than ever



The Thermo Scientific Centrifuge Ware Selector helps you select the best centrifuge vessel for your application.

The selector tool helps narrow your search using various criteria. Your starting point can either be the rotor you are using, or your preferred tubes or bottles.



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