PCR Plastic Consumables

Reaction Tubes, Plates, Sealers, and Accessories

BIO-RAD

PCR Plastic Consumables

One just right for you ...

Bio-Rad thin-wall PCR tubes, PCR plates, sealers, and accessories are precisely manufactured for optimal fit and cycling performance in Bio-Rad thermal cyclers and real-time systems. These high-quality consumables are suitable for a wide variety of applications. Bio-Rad tubes, tube caps, and PCR plates are molded, inspected, and packaged in a Class 100,000 or 10,000 cleanroom environment to prevent possible nucleic acid or nuclease contamination, then process sampled and tested to be negative for DNase, RNase, and human DNA.

When you open each box of Bio-Rad reaction vessels, you can be confident that the contents are in pristine condition. Contact your local sales representatives for sample packs.

The reaction vessels and sealing systems featured in this catalog have been designed to provide the best possible fit and performance with Bio-Rad and other brands of thermal cyclers and real-time PCR systems.

Thin-Wall PCR Tubes

Thin-wall polypropylene PCR tubes fit precisely in Bio-Rad sample blocks, ensuring accurate heat transfer to the sample. Extremely tight-sealing caps allow cycling of samples as small as 5 µl in cyclers with a heated lid.

PCR Tube, Tube Strip, and Cap Selection Guide

Feature	0.5 ml Tubes	0.2 ml Tubes	High-Profile 0.2 ml Tube Strips	Low-Profile 0.2 ml Tube Strips	Domed Cap Strips	Optical Flat Cap Strips
Thermal cycling volume	10–200 µl	5–125 µl	5–125 µl	5–125 µl	≥5 µl	≥5 µl
Maximum volume	600 µl	300 µl	250 µl	200 µl		
Availability of white tubes				•		
Well profile	High	High	High	Low		

Individual PCR Tubes, 0.2 ml and 0.5 ml

These full-height (high-profile) PCR tubes have double-locking caps that won't pop open during cycling. PCR volume ranges are 5–125 µl for 0.2 ml tubes and 10–200 µl for 0.5 ml tubes. Tubes with flat, frosted caps for easy labeling are available in both 0.2 ml and 0.5 ml sizes (not suitable for real-time PCR).

To help prevent accidental contamination by multiple users, the 0.5 ml individual tubes with attached caps are available in resealable plastic bags of 100 tubes. Use of a capping tool is recommended for proper seating of caps on tubes.

Ordering Information

Catalog #	Description
Individual PCR Tubes With Attached Caps (0.2 ml)	
TFI-0201	**PCR Tubes With Flat Caps (0.2 ml)**, natural, 1,000
TWI-0201	**PCR Tubes With Domed Caps (0.2 ml)**, natural, 1,000
Individual PCR Tubes Without Caps (0.2 ml)	
TBI-0201	**PCR Tubes Without Caps (0.2 ml)**, natural, 1,000
Individual PCR Tubes With Attached Caps (0.5 ml)	
TBI-0501	**PCR Tubes With Flat Caps (0.5 ml)**, natural, 1,000 (2 bags of 500)
TBI-0502	**PCR Tubes With Flat Caps (0.5 ml)**, natural, 800 (8 bags of 100)

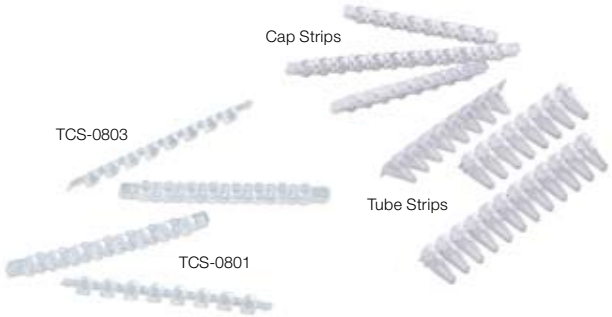
PCR Tube and Cap Strips

Both tubes and caps are available in strips of 8 or 12, for use in 48-well and 96-well sample blocks.

- Tight sealing and convenient handling for multiple samples
- Choice of domed or flat optical cap strips

Full-Height (High-Profile) 0.2 ml PCR Tube Strips
Recommended reaction volumes are 5–125 µl. Tube strips and domed cap strips are also available packaged together in convenient bags sufficient for 96 samples. The resealable bags protect unused tubes and caps from accidental contamination.

Low-Profile 0.2 ml PCR Tube Strips
These tubes reduce the potential for condensate formation and allow greater light capture in fluorescence assays, such as those used in real-time PCR. Low-profile tubes are ideal for use in fast and low-volume PCR reactions. Overall height, including flat optical caps and 96-place rack, is 18.3 mm. Tube height is 15.5 mm. Low-profile tubes are available in opaque white for optical applications.



Cap Strips for 0.2 ml PCR Tubes and PCR Plates
These cap strips provide extremely tight sealing of all Bio-Rad 0.2 ml PCR tubes and plates during thermal cycling and cold storage. Flat cap strips feature ultraclear upper surfaces, ideal for fluorescence applications. Average light transmittance is 1.7-fold higher than with standard-clarity domed cap strips. Flat caps are available in strips of 8, and domed caps are available in strips of 8 or 12. Use of a capping tool is recommended for proper seating of caps on tubes or plates.

Ordering Information

Catalog #	Description
Full-Height Tube Strips Without Caps (0.2 ml)	
TBS-0201	**8-Tube Strips Without Caps (0.2 ml)**, 120
TBS-1201	**12-Tube Strips Without Caps (0.2 ml)**, natural, 100 strips (1,200 PCR tubes)
Low-Profile 8-Tube Strips Without Caps (0.2 ml)	
TLS-0801	**Low-Profile 8-Tube Strips Without Caps (0.2 ml)**, natural, 120 (960 PCR tubes)
TLS-0851	**Low-Profile 8-Tube Strips Without Caps (0.2 ml)**, white, 120 (960 PCR tubes)
Domed Cap Strips	
TCS-0801	**Domed 8-Cap Strips**, for 0.2 ml PCR tubes and plates, natural, 120
TCS-1201	**Domed 12-Cap Strips**, for 0.2 ml PCR tubes and plates, natural, 200
Optical Flat Cap Strips	
TCS-0803	**Optical Flat 8-Cap Strips**, for 0.2 ml PCR tubes and plates, ultraclear, 120
Full-Height Tube Strips With Domed Cap Strips (0.2 ml)	
TBC-0802	**8-Tube Strips and Domed Cap Strips (0.2 ml)**, natural, 20 bags of 12 x 8-tube strips and 12 x 8-cap strips (1,920 PCR tubes and 1,920 caps)
TBC-1202	**12-Tube Strips and Domed Cap Strips (0.2 ml)**, natural, 20 bags of 8 x 12-tube strips and 8 x 12-cap strips (1,920 PCR tubes and 1,920 caps)

Capping Tools and Racks

96-Place PCR Tube Rack and Cover

These stackable storage units for tubes and PCR plates provide a stable platform for preparing or centrifuging reactions.

Easy Cap™ Tool

The Easy Cap tool provides the pressure necessary to achieve a tight seal, one tube at a time, when capping individual or strip tubes. The narrow end securely fastens domed caps to 0.2 ml tubes or 96-well PCR plates. The wide end firmly holds thin-wall 0.5 ml tubes to prevent accidental crushing when opening or closing. The side slot allows easy opening of tight-fitting caps without generating aerosols.

Strip Cap Tool

This tool quickly and easily seats 8- and 12-cap strips on PCR plates or tubes. A grooved channel on one side is designed to seal domed caps, while the flat edge on the opposite side seats flat caps. For best results, seal tube strips while they are in the thermal cycler block or in a 96-place rack.

Ordering Information

Catalog #	Description
TRC-0501	**96-Place Racks**, with covers, for PCR tubes and unskirted and semi-skirted microplates, assorted colors, 5
ECT-1000	**Easy Cap Tool**, ensures tight seal for 0.2 ml PCR tubes or 96-well microplates
ECT-2000	**Strip Cap Tool**, for seating 8- and 12-cap strips on PCR plates or tubes

48-Well PCR Plates

Multiplate™ 48-Well PCR Plates

The versatile, unskirted design and 48-well format make these Multiplate unskirted PCR plates ideal for laboratories using 48-well blocks on Bio-Rad instruments. The plates are suitable for reaction volumes of 5–125 µl. Two plate styles are available:

- **Full-height (high-profile, 20.70 mm) wells, natural color** — designed to fit in most thermal cyclers
- **Low-profile (15.50 mm) wells, natural color or white** — optimized for fast PCR and low-volume reactions

Multiplate Full-Height 48-Well PCR Plate

Multiplate Low-Profile 48-Well PCR Plate

Compatible Instruments

C1000™, S1000™, DNA Engine® family, MJ Mini™, MiniOpticon™ (low-profile white plates recommended)

Ordering Information

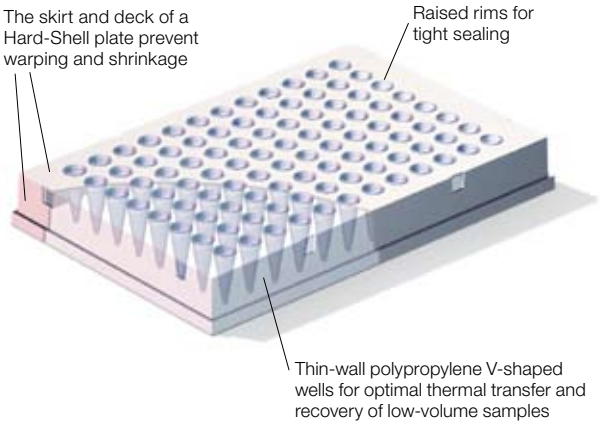
Catalog #	Description
MLP-4801	**Multiplate 48-Well Unskirted PCR Plates**, natural, 50
MLL-4801	**Multiplate Low-Profile 48-Well Unskirted PCR Plates**, natural, 50
MLL-4851	**Multiplate Low-Profile 48-Well Unskirted PCR Plates**, white, 50

96-Well PCR Plates

Bio-Rad offers 96-well PCR plates in several formats that are ideal for use with any PCR instrument. Unskirted, semi-skirted, and skirted plates are available for various PCR and real-time PCR needs.

Hard-Shell® 96-Well PCR Plates

Hard-Shell PCR plates are specifically designed to withstand the stresses of heat sealing, thermal cycling, and robotic handling. The patented two-component design features a skirt and deck molded from a rigid, thermostable polymer. In a separate step, the thin-wall wells are molded of virgin polypropylene selected for low DNA binding. This design prevents problems due to the warping, shrinkage, and sticking that may occur when single-component polypropylene PCR plates are exposed to the high temperatures of thermal cycling or heat sealing. Thus, performance is improved in many applications. In addition, these plates can withstand –80°C storage and high centrifugation forces, convenient for alcohol precipitations.



Hard-Shell 96-Well Skirted PCR Plates, Low-Profile

Features of the skirted plates include:

- Reaction volumes of 5–125 µl (200 µl maximum)
- Low-profile (16.05 mm) wells optimized for low-volume reactions and fast PCR
- Superior stability and flatness, allowing precise positioning for automation
- Full skirt for robotic handling and labeling surface
- Footprint and well spacing that match ANSI/SBS standard dimensions

Hard-Shell 96-Well Skirted PCR Plate

Compatible Instruments

C1000, S1000, DNA Engine family, PTC-100®, CFX96™, Chromo4™, Opticon™, Eppendorf Mastercycler series, Idaho Technology LightScanner

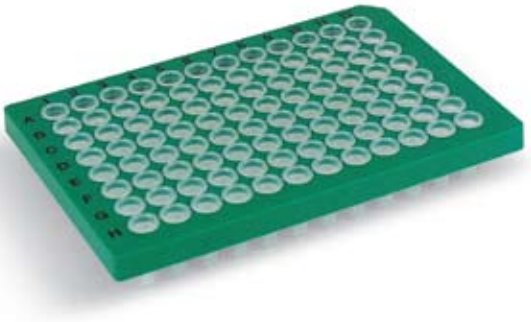
Ordering Information

Description	Clear Wells	White Wells	Black Wells
Hard-Shell Thin-Wall 96-Well Skirted PCR Plates			
White Shell, 50	HSP-9601	HSP-9655	—
Red Shell, 50	HSP-9611	—	—
Yellow Shell, 50	HSP-9621	—	—
Blue Shell, 50	HSP-9631	HSP-9635	—
Green Shell, 50	HSP-9641	HSP-9645	—
Black Shell, 50	HSP-9661	HSP-9665	HSP-9666
White Shell, bar-coded, 50	HSP-9901	HSP-9955	—
White Shell, bulk pack of 400 plates	HSP-9601B	—	—

Hard-Shell 96-Well Semi-Skirted PCR Plates, Full-Height (High-Profile)

This Hard-Shell PCR plate fits most thermal cyclers. Features of semi-skirted plates include:

- Reaction volumes of 5–125 µl (350 µl maximum)
- Full-height (20.75 mm) wells that fit most thermal cyclers, real-time PCR detection systems, and DNA sequencers
- Warp-free half-height skirt for improved robotic handling and labeling surface



Hard-Shell 96-Well Semi-Skirted PCR Plate

Compatible Instruments

C1000, S1000, DNA Engine family, PTC-100, iCycler®, iQ™5, iCycler iQ®, MyiQ™, MyiQ™2, Chromo4, Applied Biosystems 0.2 ml tube cyclers, standard real-time systems, and DNA sequencers (3130, 7300, 7500, 9700, Veriti, etc.), Eppendorf Mastercycler series, Stratagene (Agilent) Mx series, Idaho Technology LightScanner

Ordering Information

Description	Clear Wells	White Wells	Black Wells
Hard-Shell Full-Height 96-Well Semi-Skirted PCR Plates, 25			
Clear Shell	HSS-9601	—	—
Green Shell	HSS-9641	—	—
Black Shell	—	HSS-9665	—
Clear Shell, bar-coded	HSS-9901	—	—

Multiplate™ 96-Well PCR Plates

Multiplate 96-Well Unskirted PCR Plates, Full-Height (High-Profile)

The single-component polypropylene construction of Multiplate PCR plates confers very low protein binding and excellent retention of sample. When less than a full plate is needed, these plates are easily cut with scissors to the required size. The plates are designed for compatibility with a wide variety of sealing methods for oil-free cycling, and are suitable for PCR volumes of 5–125 µl.

Multiplate Full-Height 96-Well PCR Plate

Compatible Instruments

C1000, S1000, DNA Engine family, PTC-100, MyCycler™, iCycler, iQ5, iCycler iQ, MyiQ, MyiQ2, Chromo4, Applied Biosystems 0.2 ml tube cyclers, standard real-time systems, and DNA sequencers, Eppendorf Mastercycler series, Stratagene (Agilent) Mx series

Ordering Information

Catalog #	Description
Multiplate 96-Well Unskirted PCR Plates	
MLP-9601	**Multiplate 96-Well Unskirted PCR Plates**, natural, 25 plates
MLP-9651	**Multiplate 96-Well Unskirted PCR Plates**, white, 25 plates
MLP-9611	**Multiplate 96-Well Unskirted PCR Plates**, pink, 25 plates
MLP-9631	**Multiplate 96-Well Unskirted PCR Plates**, blue, 25 plates

Multiplate 96-Well Unskirted PCR Plates, Low-Profile

Multiplate low-profile PCR plates combine the unskirted feature of the original Multiplate plate and the 5 mm lower overall height. The lower height (15.50 mm) reduces the potential for condensate formation and offers advantages for fast PCR, low-volume reactions, and light capture in fluorescence assays, such as those used in real-time PCR. A rigid top surface provides firm handling, while still allowing the plate to be cut for use in other formats.

Multiplate Low-Profile 96-Well PCR Plate

Compatible Instruments

C1000, S1000, DNA Engine family, PTC-100, CFX96, Chromo4, Opticon, Applied Biosystems 0.1 ml tube cyclers and fast real-time systems, Eppendorf Mastercycler series, Idaho Technology LightScanner

Ordering Information

Catalog #	Description
Multiplate Low-Profile 96-Well Unskirted PCR Plates	
MLL-9601	**Multiplate Low-Profile 96-Well Unskirted PCR Plates**, natural, 25 plates
MLL-9651	**Multiplate Low-Profile 96-Well Unskirted PCR Plates**, white, 25 plates

iQ™ 96-Well Semi-Skirted Real-Time PCR Plates, Full-Height

These semi-skirted, full-height PCR plates are optimized for iQ5, iCycler iQ, MyiQ2, and MyiQ real-time PCR detection systems. The semi-skirted design adds stiffness and a labeling surface. Plates are perforated every three columns for easy setup of triplicate reactions.

Compatible Instruments

C1000, S1000, DNA Engine family, PTC-100, MyCycler, iCycler, MyiQ, iCycler iQ, iQ5, MyiQ2, Chromo4, Applied Biosystems 0.2 ml tube cyclers and standard real-time systems, Eppendorf Mastercycler series, Stratagene (Agilent) Mx series

Ordering Information

Catalog #	Description
iQ 96-Well PCR Plates	
223-9441	**iQ 96-Well PCR Plates**, 25

Microseal® 96-Well PCR Plates

Microseal 96-Well Semi-Skirted PCR Plates, Full-Height (High-Profile)

These PCR plates are designed for Applied Biosystems 0.2 ml tube cyclers, real-time PCR systems, and DNA sequencers. The semi-skirted design adds stiffness and a surface for labeling. They are not recommended for use in Bio-Rad cyclers because the raised ridges around the plate prevent proper sealing in these instruments.

Compatible Instruments

Applied Biosystems 0.2 ml tube cyclers, standard real-time systems, and DNA sequencers

Microseal Full-Height 96-Well Semi-Skirted PCR Plate

Microseal 96-Well Skirted PCR Plates, Low-Profile

These PCR plates feature single-component construction and a skirted design that is suitable for high-throughput plate handling. The robot-friendly design features low-binding polypropylene construction, locator holes, and flat vertical sidewalls for secure handling and easy bar coding. Raised rims around wells provide an excellent surface for tight sealing with a variety of sealing methods, and allow easy release of the sealer from the plate. Bar-coded plates are also available.

Microseal Low-Profile 96-Well Skirted PCR Plate

Compatible Instruments

C1000, S1000, DNA Engine family, PTC-100, CFX96, Chromo4, Opticon, Eppendorf Mastercycler series

Ordering Information

Catalog #	Description
Microseal 96-Well Semi-Skirted PCR Plates, Full-Height	
MSS-9601	**Microseal 96-Well Semi-Skirted PCR Plates**, natural, 25
Microseal 96-Well Skirted PCR Plates, Low-Profile	
MSP-9601	**Microseal 96-Well Skirted PCR Plates**, natural, 50
MSP-9605	**Microseal 96-Well Skirted PCR Plates**, bar-coded, natural, 50

Concord™ 96-Well Skirted Polycarbonate PCR Plates, Low-Profile

Concord 96-well PCR plates have a thin-wall polycarbonate construction that allows excellent heat transfer. A minimum sample volume of 20 µl is recommended for oil-free cycling with these plates.

Ordering Information

Catalog #	Description
CON-9601*	**Concord 96-Well Polycarbonate PCR Plates**, low-profile, skirted, natural, 25
CVR-9601	**Dust Covers**, for Concord polycarbonate PCR wells, nonsealing, 25

* Not recommended for use with ^{35}S.

384-Well PCR Plates

Hard-Shell® 384-Well Skirted PCR Plates

Hard-Shell PCR plates are designed to withstand the stresses of thermal cycling and robotic handling. The patented two-component design provides superior stability and flatness, allowing precise positioning for automation. Features include:

- Reaction volumes of 1–30 µl (50 µl maximum)
- Extremely uniform wells that reduce well-to-well variability in optical assays, such as those used in real-time PCR
- Compatibility with most 384-well thermal cyclers, real-time PCR detection systems, and DNA sequencers
- White-well option for increased fluorescent signal strength
- Color-coded skirts with clear or white wells
- Warp-free skirt and deck for improved robotic handling
- Footprint and well spacing that match ANSI/SBS standard dimensions
- Low-cost, user-readable bar code option for convenient database tracking

Compatible Instruments

C1000, S1000, DNA Engine family, CFX384™, Applied Biosystems cyclers, real-time systems, and DNA sequencers, Eppendorf Mastercycler series, Idaho Technology LightScanner

Ordering Information

Description	Clear Wells	White Wells	Black Wells
Hard-Shell Thin-Wall 384-Well Skirted PCR Plates			
Clear Shell, 50	HSP-3801	HSP-3805	—
White Shell, 50	HSP-3851	—	—
Red Shell, 50	HSP-3811	—	—
Yellow Shell, 50	HSP-3821	—	—
Blue Shell, 50	HSP-3831	—	—
Green Shell, 50	HSP-3841	—	—
Black Shell, 50	—	HSP-3865	HSP-3866
Clear Shell, bar-coded, 50	HSP-3901	HSP-3905	—
Clear Shell, bulk pack of 500 plates	HSP-3801B	—	—

Microseal® 384-Well Skirted PCR Plates

Microseal 384-well skirted PCR plates feature single-component construction and a skirted design that is suitable for high-throughput plate handling. The plates are available in clear, opaque white, and black for luminescence- and fluorescence-based assays. Bar-coded plates are also available.

Compatible Instruments

C1000, S1000, DNA Engine family, iCycler, CFX384, Applied Biosystems cyclers, real-time systems, and DNA sequencers, Eppendorf Mastercycler series, Idaho Technology LightScanner

Ordering Information

Description	50 Plates	Bar-Coded, 50 Plates
Microseal 384-Well Skirted PCR Plates		
Natural	MSP-3842	MSP-3846
White	MSP-3852	—
Black	MSP-3862	—

PCR Plate Accessories

Microseal® 384 Plate Positioner

To achieve consistent results in automated processes such as dispensing and retrieving small volumes (<5 µl) in a PCR plate, precise positioning and uniform well depth are required. Placing a Microseal 384-well PCR plate onto the Microseal 384 plate positioner secures the PCR plate and flattens it if needed. The positioner footprint (127.90 x 85.85 mm) is designed to fit securely into the plate nest of commonly used automated liquid handlers.

Heat Sealer Support Plate

This thin aluminum support plate ensures optimal sealing of Hard-Shell 384-well PCR plates when using automated heat sealers, so less fine-tuning of heat seal conditions is needed.

Microseal 384 Plate Positioner

Ordering Information

Catalog #	Description
ADR-3841	**Microseal 384 Plate Positioner**, for automated liquid handling
ADR-3001	**Heat Sealer Support Plate**, for supporting Hard-Shell 384-well plates in automated heat sealers

Instrument Compatibility of PCR Plastic Consumables

	0.2 ml Tubes						48- and 96-
	Individual Full-Height	Strips Full-Height	Strips Low-Profile	Hard-Shell Semi-Skirted Full-Height	Hard-Shell Skirted Low-Profile	Multiplate Unskirted Full-Height	Multiplate Unskirted Low-Profile
							
Catalog #	pages 4, 5	pages 6, 7	pages 6, 7	pages 10, 12	pages 10, 11	page 13	page 14
Thermal Cycler							
Bio-Rad C1000 and S1000	•	•	•	•	•	•	•
Bio-Rad DNA Engine line, PTC-100	•	•	•	•	•	•	•
Bio-Rad MyCycler	•	•				•	
Bio-Rad iCycler	•	•		•		•	
Bio-Rad MJ Mini	•	•	•			•	•
Applied Biosystems 0.2 ml tube cyclers (2720, 9700, Veriti)	•	•		•		•	
Applied Biosystems 0.1 ml tube cyclers (9800 fast, Veriti fast)			•				•
Applied Biosystems 384-well cyclers (9700, Veriti)							
Eppendorf Mastercycler series	•	•	•	•	•	•	•

-Well Plates				384-Well Plates		Sealers and Caps		
iQ Semi-Skirted Full-Height	Concord Skirted Low-Profile	Microseal Semi-Skirted Full-Height	Microseal Skirted Low-Profile	Hard-Shell 384	Microseal 384	Microseal 'B' Seals	Optical Cap Strips	Domed Cap Strips
								
page 15	page 17	page 16	page 16	pages 18 , 19	page 20	pages 28 – 30	pages 6 , 7	pages 6 , 7
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Instrument Compatibility of PCR Plastic Consumables (cont.)

	0.2 ml Tubes						48- and 96-
	Individual Full-Height	Strips Full-Height	Strips Low-Profile	Hard-Shell Semi-Skirted Full-Height	Hard-Shell Skirted Low-Profile	Multiplate Unskirted Full-Height	Multiplate Unskirted Low-Profile
							
Catalog #	pages 4, 5	pages 6, 7	pages 6, 7	pages 10, 12	pages 10, 11	page 13	page 14
Real-Time PCR System							
Bio-Rad CFX96 or CFX384*			•		•		•
Bio-Rad MyiQ2, iQ5, iCycler iQ, MyiQ		•		•		•	
Bio-Rad Chromo4		•	•	•	•	•	•
Bio-Rad Opticon, Opticon 2			•		•		•
Bio-Rad MiniOpticon*			•				•
Applied Biosystems standard systems (7300, 7500, 7900HT)		•		•		• (except 7900HT)	
Applied Biosystems fast systems (7500 fast, StepOne, StepOnePlus)			•				•
Eppendorf Mastercycler ep *realplex*		•	•	•	•	•	•
Stratagene (Agilent) Mx series		•		•		•	
Corbett (QIAGEN) Rotor-Gene	•						
Other Instruments							
Applied Biosystems DNA sequencers (3100, 3700, 3730)				•		•	
Idaho Technology LightScanner				•	•	•	•

* CFX384 and MiniOpticon real-time PCR detection systems are factory calibrated for white tubes and white-well plates. White plastics are recommended due to their superic

-Well Plates				384-Well Plates		Sealers and Caps	
iQ Semi-Skirted Full-Height	Concord Skirted Low-Profile	Microseal Semi-Skirted Full-Height	Microseal Skirted Low-Profile	Hard-Shell 384	Microseal 384	Microseal 'B' Seals	Optical Cap Strips
							
page 15	page 17	page 16	page 16	pages 18 , 19	page 20	pages 28–30	pages 6 , 7
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r signal-to-noise ratio. Using clear tubes or clear-well plates on these instruments will require user calibration.

Comparison of PCR Plates*

Feature	Multiplate 48- or 96-Well Unskirted** Full-Height	Multiplate 48- or 96-Well Unskirted** Low-Profile	Hard-Shell 96-Well Semi-Skirted	Hard-Shell Skirted 96-Well	Hard-Shell Skirted 384-Well	iQ 96-Well Semi-Skirted	Microseal 96-Well Semi-Skirted	Microseal 96-Well Skirted	Microseal 384-Well Skirted	Concord Polycarbonate 96-Well
Thermal cycling volume	5–125 µl	5–125 µl	5–125 µl	5–125 µl	1–30 µl	5–125 µl	5–125 µl	5–125 µl	5–25 µl	20–150 µl
Maximum well volume	330 µl	200 µl	330 µl	250 µl	50 µl	330 µl	330 µl	220 µl	40 µl	210 µl
Automation/ bar coding			•	•	•			•	•	
Rigid, warp-free skirt and deck			•	•	•					
Availability of white or black wells	•	•	•	•	•				•	
Color-coded skirts with clear wells			•	•	•					
Well profile	High	Low	High	Low		High	High	Low		Low

* See sealer selection chart, page 27.

** Multiplate unskirted plates can be cut to the size needed when running small numbers of reactions.

Sealers

Effective sealing is essential for PCR and qPCR reactions. Besides cap strips (pages 6, 7), Bio-Rad offers many sealing options to best fit your needs.

Sealer Selection Guide

	Microseal				96-Well	Microseal		Auto-Sealing	Chill-out™
Feature or Use	**'A' Film**	**'B' Seal**	**Sealing Kit**	**'F' Foil**	**Sealing Mats**	**'P' Pads***	**'P+' Pads***	**Lids**	**Liquid Wax**
	pages 28–30				pages 29, 30	pages 31, 32		pages 31, 32	page 33
Thermal cycling volume 96-well 384-well	≥10 µl ≥5 µl	≥10 µl ≥5 µl	≥5 µl	≥25 µl ≥5 µl		≥15 µl ≥10 µl	≥5 µl ≥4 µl	≥3 µl ≥1 µl	≥2 µl ≥2 µl
Recommended for real-time systems		•	•						•
Automated sealing						•	•	•	•
Reusable					•	•	•	•	
Cold storage		•	•	•				•	•
Pierceable seal				•					•
Adhesive-based seal		•	•	•					
Sealing 96-well plates	•	•	•	•	•	•	•	•	•
Sealing 384-well plates	•	•		•		•	•	•	•
Sealing Concord plates	•			•					•
Suggested for cyclers without heated lids									•

* Reaction volume data based on use with a motorized, high-pressure lid.

PCR Plate Sealers

Microseal® 'A' Film
Microseal 'A' film quickly and effectively seals the full range of Bio-Rad PCR plates and tubes. The pliant inner layer is designed to seal tightly during cycling, yet release smoothly to minimize the risk of aerosol formation and cross-contamination of samples. This film is easily cut for use with fewer than 96 wells; a peel-away release liner protects the sealing surface from contamination (not suitable for qPCR). An optional sealing roller provides a quick way to firmly seat Microseal 'A' film on an entire array of wells.

Microseal 'A' Film

Sealing Roller

Microseal® 'B' Adhesive Seals, Optically Clear
Microseal 'B' seals provide an adhesive-based sealing option for thermal cycling using thin-wall PCR plates. The strong adhesive layer ensures secure sample storage (as low as –20°C and up to 120°C) or transport before or after cycling, as well as tight sealing during thermal cycling when supplemental pressure is applied by a heated lid. This clear polyester film allows easy inspection of sample wells and effective light transmission for optical assays. The sealing surface is protected from contamination by a peel-away release liner. Perforated end-tabs allow removal of overhanging film for automation and other applications.

Microseal 'B' Adhesive Seals

Microseal 'B' adhesive seal accessories include:

- **Optical compression pad (96-well)** — enhances the seal integrity of Microseal 'B' clear seals when used in real-time PCR detection systems
- **Optical film sealing kit** — contains 100 Microseal 'B' clear seals and an optical compression pad

Microseal® 'F' Foil
These aluminized foil seals act as a barrier against evaporation from –80°C to 150°C. They are thin enough to pierce with a pipet tip for recovery of samples from individual wells, and they are suitable for use with automated systems, such as the ABI 3730 DNA analyzer. In addition to cold storage applications, they can be used for thermal cycling for sample volumes of 25 µl (96-well) or 5 µl (384-well).

96-Well PCR Plate Sealing Mats
These reusable mats are convenient for sealing 96-well PCR plates; they are not suitable for qPCR.

Pressure Pad
This foam pad with magnet distributes lid pressure uniformly on sealing film on plates used in thermal cyclers.

Optical Compression Pad

Microseal 'F' Foil

96-Well PCR Plate Sealing Mat

Optical Sealing Tape

An adhesive-based sealing option for optical assays demanding a low-fluorescent background. Recommended for the Idaho Technology LightScanner system.

Ordering Information

Catalog #	Description
MSA-5001	**Microseal 'A' Film**, package of 50 seals
MSR-0001	**Sealing Roller**, for film seals
MSB-1001	**Microseal 'B' Adhesive Seals**, optically clear, 100
ADR-3296	**Optical Compression Pad**, for improved film sealing of 96-well plates in DNA Engine Opticon 2 and Chromo4 systems
MSO-1001	**Optical Film Sealing Kit**, for 96-well plates, includes optical compression pad, 100 Microseal 'B' clear adhesive seals
MSF-1001	**Microseal 'F' Foil**, package of 100 seals
223-9442	**96-Well PCR Plate Sealing Mats**, 5
ADR-5001	**Pressure Pad**, uniformly distributes lid pressure for sealing film
223-9444	**Optical Sealing Tape**, package of 100 sheets

Sealing Pads for Automation

Microseal® 'P' and 'P+' Sealing Pads

These reusable sealing pads are designed to adhere to a motorized heated lid. They are ideal for applications such as cycle sequencing, in which several successive runs may be sealed with the same pad. Use 'P' pads with Power Bonnet™ lids, and 'P+' pads with Moto Alpha™ units. Microseal 'P+' pads provide improved sealing of low-volume reactions — as low as 5 µl in 96-well plates and 1 µl in 384-well plates. Each pad may be used for approximately 25 runs. Microseal 'P' and 'P+' pads are intended for use exclusively with the higher sealing pressures provided by a motorized lid.

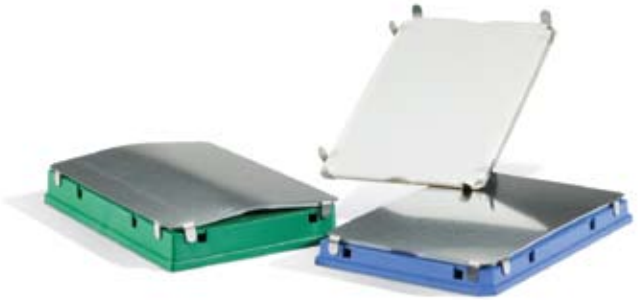
Auto-Sealing Lids for PCR Plates

These lids are reusable automation-friendly sealers that prevent evaporation and contamination during reaction assembly and seal tightly for thermal cycling when the cycler lid is closed. They can be reused up to 50 times. The lids are constructed of metal with an attached compressible pad, and they can be applied by robotic gripper devices.

Microseal 'P+' Sealing Pad

Three varieties of auto-sealing lids are available:

- **Flat lid** — allows low-volume cycling (down to 1 µl) in 384-well plates using a Moto Alpha unit
- **Arched lid** — self-releasing; can also be removed by robotic devices
- **Arched lid with wide tabs** — especially well suited for gripping with robotic grippers



Auto-Sealing Lids

Ordering Information

Catalog #	Description
Microseal 'P' and 'P+' Pads	
MSP-1001	**Microseal 'P' Pads**, reusable, for Power Bonnet lids, 10
MSP-1002	**Microseal 'P+' Pads**, reusable, for Moto Alpha unit lids, 10
MSP-1003	**Microseal 'P' Replacement Pads**, for MSL-2032, reusable, 10
Auto-Sealing Lids for PCR Plates	
MSL-2012	**Flat Auto-Sealing PCR Plate Lids**, reusable, 4
MSL-2022	**Arched Auto-Sealing PCR Plate Lids**, reusable, 4
MSL-2032	**Arched Auto-Sealing PCR Plate Lids With Wide Tabs**, reusable, 4

Chill-out™ Liquid Wax

Chill-out liquid wax provides an excellent vapor barrier that may be used instead of mineral oil in thermal cyclers without heated lids. After cycling, the tubes are chilled below 10°C to harden the wax. The solid layer protects samples from spills or aerosol formation, but is easy to penetrate with a pipet tip for sample retrieval. Chill-out liquid wax is available in a clear formulation for use in fluorescence assays, such as those used in real-time PCR, and a bright red formulation, easily visible when recovering reaction products (not recommended for sealing Microseal 384-well PCR plates).

Specifications

Reaction Volume	Chill-out Wax Volume	Reaction Volume	Chill-out Wax Volume
2–20 µl	10 µl	60–80 µl	25 µl
20–40 µl	15 µl	>80 µl	30 µl
40–60 µl	20 µl		

Ordering Information

Catalog #	Description
CHO-1401	**Chill-out Liquid Wax**, red, 100 ml
CHO-1404	**Chill-out Liquid Wax**, red, 1 L
CHO-1411	**Chill-out Liquid Wax**, clear, optical grade, 100 ml
CHO-1414	**Chill-out Liquid Wax**, clear, optical grade, 1 L

Frame-Seal™ Incubation Chambers

Frame-Seal incubation chambers are easy-to-use, strongly adhesive hybridization chambers with flexible plastic coverslips. They provide vapor-tight sealing for FISH, polonies, in situ PCR, and PRINS and allow samples to be recovered easily. The seal withstands temperatures up to 97°C. Frame-Seal chambers should be used with plain (unprinted) glass slides. Slides with highly hydrophobic ink patterns (such as Teflon) are not recommended for use with Frame-Seal chambers.

- UV-treatable for inactivation of contaminating DNA
- Compatible with Bio-Rad and other horizontal-format thermal cyclers that accommodate slides

Ordering Information

Catalog #	Description
SLF-0201	**Frame-Seal Incubation Chambers**, 9 x 9 mm, 25 µl capacity, coverslips included, 100
SLF-0601	**Frame-Seal Incubation Chambers**, 15 x 15 mm, 65 µl capacity
SLF-1201	**Frame-Seal Incubation Chambers**, 17 x 28 mm, 125 µl capacity
SLF-3001	**Frame-Seal Incubation Chambers**, 19 x 60 mm, 300 µl capacity

Liquid Handling Solutions

For liquid-handling applications, Bio-Rad offers pipet tips, reagent reservoirs, and test tubes.

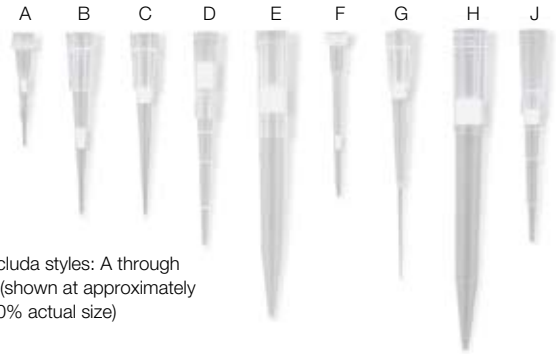
Pipet Tips

Bio-Rad's pipet tips are made from virgin polypropylene and have been accurately molded for an airtight fit. The finest molds and manufacturing methods are used, so the tips are guaranteed to have a smooth interior surface, which is essential for precision pipetting.

- Tips and racks are autoclavable at 120°C at 15 lb of pressure for 15 minutes; tips presterilized by E-beam irradiation are also available
- All materials used in both natural and colored pipet tips have been formulated without heavy metals
- Xcluda™ pipet tips have been independently tested and certified to be free of DNase, RNase, and pyrogens
- Pipet tip racks are manufactured from polypropylene, with a plastic content code of 5, and are free of labels for convenient recycling

Xcluda™ Aerosol Barrier Pipet Tips

Xcluda aerosol barrier pipet tips guard against aerosol contamination of samples, a feature of particular importance in PCR experiments. The barrier will not seal on contact with liquid if unintentional overpipetting occurs, which protects samples from accidental loss. Offered in nine different styles, the tips fit a variety of pipets. They are available presterilized in fully enclosed racks and are independently tested and certified to be free of DNase, RNase, and pyrogens.



Xcluda styles: A through J (shown at approximately 60% actual size)

Ordering Information

Catalog #	Description	Catalog #	Description
211-2001	**Xcluda Style A**, 0.5–10 µl, 960	211-2026	**Xcluda Style F**, 0.5–10 µl, 1,000
211-2006	**Xcluda Style B**, 2–20 µl, 960	211-2031	**Xcluda Style G**, 10–100 µl, 1,000
211-2011	**Xcluda Style C**, 10–100 µl, 960	211-2036	**Xcluda Style H**, 100–1,000 µl, 1,000
211-2016	**Xcluda Style D**, 20–200 µl, 960	211-2041	**Xcluda Style J**, 10–100 µl, 960
211-2021	**Xcluda Style E**, 100–1,000 µl, 960		

Pipet Tips for Gel Loading

Seque/Pro™ Capillary Pipet Tips

Seque/Pro capillary pipet tips have an average OD of <0.3 mm, making them ideal for loading sequencing gels or IEF tube gels. Seque/Pro tips perform best when used with Eppendorf ultra micro pipets (0.5–10 µl), and can also be used with Rainin Pipetman 10 and 20 µl pipets.

Prot/Elec™ Pipet Tips

Prot/Elec tips fit easily within a gap of 0.75 mm between vertical slab gel plates while maintaining a large bore for fast sample flow. The 200 µl capacity tips are molded to fit Rainin Pipetman 20, 100, and 200 pipets and Eppendorf 20 and 100 µl pipets. Prot/Elec tips are also available with an aerosol barrier to guard against airborne contaminants and cross-contamination of samples (see Xcluda style G).

Ordering Information

Catalog #	Description
223-9911	**Seque/Pro Capillary Pipet Tips**, in enclosed autoclavable rack, 0.5–10 µl, 200
223-9912	**Seque/Pro Capillary Pipet Tips**, sterilized in enclosed rack, 0.5–10 µl, 200
223-9915	**Prot/Elec Pipet Tips**, bulk pack, plastic bag in dust-free box, 1–200 µl, 1,000
223-9917	**Prot/Elec Pipet Tips**, racked, 12 x 17 format, 204 per rack with a cover on each rack, 1–200 µl, 1,020
223-9916	**Prot/Elec Pipet Tips**, racked, 8 x 12 format, 96 per rack with a cover on each rack, 1–200 µl, 960

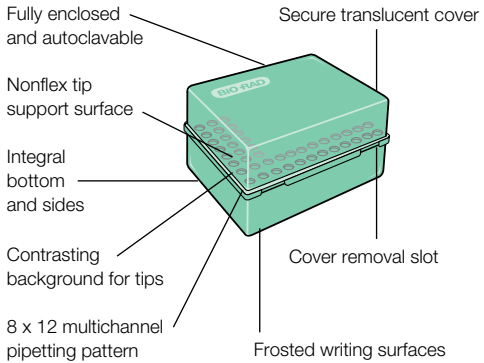
Tip Selection Guide

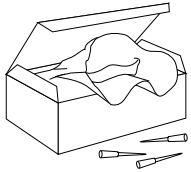
Pipet Type	Tip Type
Costar (8-Pette, 12-Pette)	
20–200 µl	28
25–200 µl	28
Eppendorf	
0.5–10 µl	Seque/Pro, Xcluda F, 31
2–20 µl	Prot/Elec, Xcluda B, 14, 35, 37–39
10–100 µl	Prot/Elec, Xcluda C and G, 35, 37–39
50–250 µl	39, 40, 41
100–1,000 µl	Xcluda H, 41
Excalibur	
1–200 µl	Prot/Elec, 35, 37–39
200–1,000 µl	40, 41
Thermo Labsystems Finnpipette	
5–40 µl	Prot/Elec, Xcluda B, C, G, 35, 37–39
40–200 µl	Prot/Elec, Xcluda C and G, 35, 37–39
200–1,000 µl	Xcluda E
Oxford Benchmate	
0.5–10 µl	Seque/Pro, Xcluda A, 14
10–50 µl	Xcluda J, 35, 37–39
40–200 µl	Prot/Elec, Xcluda C, D, G, 35, 37–39
200–1,000 µl	Xcluda E

Pipet Type	Tip Type
Rainin Pipetman and EDP Series	
0.1–10 µl	Seque/Pro, Xcluda F, 31
2–20 µl	Prot/Elec, Seque/Pro, Xcluda B, 31, 35, 37–39
10–100 µl	Prot/Elec, Xcluda C and G, 35, 37–39
20–200 µl	Prot/Elec, Xcluda D, 35, 37–39
100–1,000 µl	Xcluda E, 40, 41
Socorex	
0.5–10 µl	Seque/Pro
1–200 µl	Prot/Elec, 35, 37–39
200–1,000 µl	40, 41
Titertek Flow	
5–200 µl	26
5–300 µl	Xcluda D
Volac	
1–20 µl	Prot/Elec, 31, 35, 37–39
1–200 µl	Prot/Elec, 35, 37–39
200–1,000 µl	40, 41

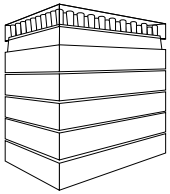
Standard Pipet Tips

MTP
8 x 12 format, enclosed, nonflex racks are suitable for repeated reloading and autoclaving. Racked tips are also available presterilized.

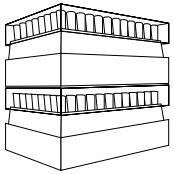




BR
Bulk tips, plastic bag in a dust-free box.



RBR
Racked tips, one cover on a stack of nested racks.



TBR
Ideal for autoclaving, each rack has its own lid and covered bottom for full enclosure.

Tip Packaging Options

	Standard Tip Type Number									
Packaging Option	**14**	**26**	**28**	**31**	**35**	**37**	**38**	**39**	**40**	**41**
BR	•		•	•	•	•	•	•	•	•
RBR					•					
TBR	•				•				•	•
MTP		•			•	•	•			
MTP-S (sterilized)			•		•	•	•			

Ordering Information

Catalog #	Description
MTP 8 x 12 Format, Enclosed Racks	
223-9301	**MTP-26 Tips**, natural, 5–200 µl, 960
223-9303	**MTP-35 Tips**, yellow, 1–200 µl, 960
223-9304	**MTP-37 Tips**, natural, 1–200 µl, 960
223-9313	**MTP-38 Tips**, yellow, graduated, beveled, 1–200 µl, 960
MTP-S 8 x 12 Format, Enclosed Racks, Presterilized*	
223-9307	**MTP-28-S Tips**, natural, 25–200 µl, 960
223-9308	**MTP-35-S Tips**, yellow, 1–200 µl, 960
223-9309	**MTP-37-S Tips**, natural, 1–200 µl, 960
223-9318	**MTP-38-S Tips**, yellow, graduated, beveled, 1–200 µl, 960

continues

Ordering Information

Catalog #	Description
BR Bulk Tips	
223-9014	**BR-14 Tips**, natural, 0.1–10 µl, 1,000
223-9028	**BR-28 Tips**, natural, 25–200 µl, 1,000
223-9031	**BR-31 Tips**, natural, 0.5–10 µl, 1,000
223-9035	**BR-35 Tips**, yellow, 1–200 µl, 1,000
223-9037	**BR-37 Tips**, natural, 1–200 µl, 1,000
223-9038	**BR-38 Tips**, yellow, graduated, beveled, 1–200 µl, 1,000
223-9039	**BR-39 Tips**, natural, graduated, beveled, 1–200 µl, 1,000
223-9040	**BR-40 Tips**, blue, 100–1,000 µl, 500
223-9041	**BR-41 Tips**, natural, 100–1,000 µl, 500
RBR Racked Tips, One Cover on Nested Racks	
223-9135	**RBR-35 Tips**, yellow, 1–200 µl, 1,000
TBR Racked Tips, Cover on Each Rack	
223-9354	**TBR-14 Tips**, natural, 0.1–10 µl, 1,000
223-9347	**TBR-35 Tips**, yellow, 1–200 µl, 1,000
223-9350	**TBR-40 Tips**, blue, 100–1,000 µl, 1,000
223-9351	**TBR-41 Tips**, natural, 100–1,000 µl, 1,000

* Presterilized racks and tips are not suitable for autoclaving. Order nonsterile racks for reloading tips and autoclaving.

Reagent Reservoirs

Disposable reagent reservoirs are ideal for dispensing reagent with multichannel pipets. Their sloping design makes it easy to pick up liquid to the last drop. The 50 ml capacity is graduated to 25 ml in 5 ml increments. These presterilized reagent reservoirs are not autoclavable.

Reagent Reservoir

Ordering Information

Catalog #	Description
224-4872	**Sterilized Reagent Reservoirs**, graduated, polystyrene, 5 per package, box of 200

Titertube® Micro Test Tubes

Titertube 1 ml micro test tubes allow efficient preparation and storage of large numbers of samples in an 8 x 12 format.

Tubes and racks are made of polypropylene; they are autoclavable to 120°C and freezable to –80°C. The polyethylene plugs, which seal tightly for storage, are not designed for repeated use and cannot be autoclaved. The tubes are offered in sterile and unsterilized strips of eight, which may be cut apart to separate the tubes. Titertube micro test tubes have:

- A 1 ml capacity, 8.8 x 45 mm
- Spacing that matches 96-well plates
- Enclosed racks that stack to store 5,800 samples/ft^3
- Racks with a grid for identification of contents

Ordering Information

Catalog #	Description
223-9390	**Titertube Micro Test Tubes**, unsterilized, 10 racks of 96 tubes
223-9395	**Titertube Micro Test Tubes**, presterilized,* 10 racks of 96 tubes
223-9391	**Titertube Micro Test Tubes**, unsterilized, bulk, 1,000
223-9393	**Titertube Plugs**, unsterilized, 960 in 120 strips of 8
223-9392	**Titertube Plugs**, presterilized,* 960 in 120 strips of 8
223-9394	**Titertube Rack**, empty, holds 96 Titertube micro test tubes, 10

* Presterilized racks and polyethylene plugs are not suitable for autoclaving; order unsterilized racks to reload tubes and autoclave.

EZ Micro™ and Standard Micro Test Tubes

EZ Micro graduated polypropylene test tubes have a frosted marking area and a flat top that is pierceable by a 19 gauge or thicker needle. Standard polypropylene micro test tubes are recommended for solvent extraction and heating, when a very tight cap seal is required. Because of their tighter cap fit, standard tubes may be more difficult to manipulate in applications that require repeated opening and closing of the tubes. Separate polyethylene caps for the 1.5 ml capless tubes have a knurled top for easy handling.

The micro test tubes are:

- Suitable for general-purpose benchtop centrifuge use; sturdy uniform walls easily withstand up to 13,000 x g
- Autoclavable to 120°C; freezable to –80°C
- Available in 2 ml, 1.5 ml, and 500 µl sizes

500 µl
EZ Micro

1.5 ml
EZ Micro

2 ml
EZ Micro

1.5 ml
Standard

1.5 ml
Capless

Ordering Information

Catalog #	Description
223-9503	**EZ Micro Test Tubes**, 500 µl, natural, 1,000
223-9480	**EZ Micro Test Tubes**, 1.5 ml, natural, 500
223-9430	**EZ Micro Test Tubes**, 2 ml,* natural, 500
223-9501	**Micro Test Tubes**, standard, 1.5 ml, natural, 500
223-9500	**Micro Test Tubes**, capless, 1.5 ml, polypropylene, natural, graduated, 500
223-9490	**Separate Caps**, for capless micro test tubes, white, 1,000

* To fit centrifuges, 2 ml tubes have thinner walls than standard tubes and are intended for short runs at less than 13,000 x g. Heavy samples, high g forces, long runs, or centrifuges that radiate excess heat may damage these tubes.

Screwcap Micro Test Tubes

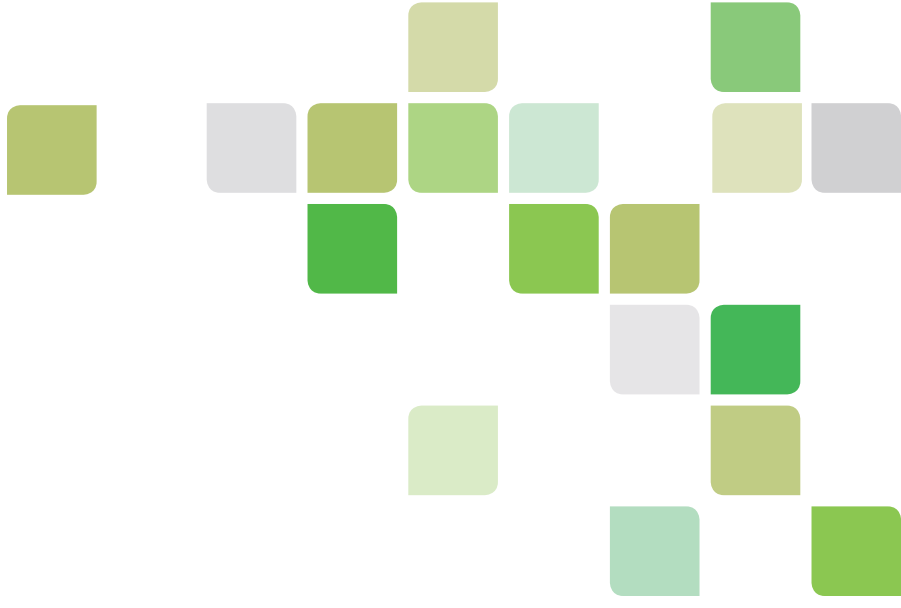
Screwcap micro test tubes and caps are made of polypropylene. O-rings are made of a blend of polyethylene and polypropylene. Features include:

- O-ring operating range from –55 to 150°C
- Uniform walls for uniform heat transfer
- Conical bottoms for pellet collection
- Knurled caps for easy handling

0.5 ml Conical | 0.5 ml Skirted | 1.5 ml Conical | 2.0 ml Skirted | Screwcap

Ordering Information

Catalog #	Description
224-0165	**0.5 ml Conical Tubes**, with installed O-ring screwcaps, sterilized, 500
224-0185	**0.5 ml Skirted Tubes**, with installed O-ring screwcaps, sterilized, 500
224-0100	**1.5 ml Conical Tubes**, with separate O-ring screwcaps, unsterilized, 500
224-0110	**1.5 ml Conical Tubes**, with installed O-ring screwcaps, sterilized, 500
224-0130	**2.0 ml Skirted Tubes**, with separate O-ring screwcaps, unsterilized, 500
224-0140	**2.0 ml Skirted Tubes**, with installed O-ring screwcaps, sterilized, 500



BIO-RAD

Bio-Rad Laboratories, Inc.

Life Science Group

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