



# NEPTUNE<sup>®</sup>

*Tools for Life Sciences*





## COMMITMENT TO QUALITY

Neptune PipetteTips are manufactured under stringent controls in Neptune's ISO 9001 certified facility. Neptune's advanced manufacturing process continually monitors the quality of products and individual batch testing ensures Neptune products are certified RNase, DNase, and Endotoxin free.

Test	Product	Assay Description
Function	Tips	Our custom built robotic equipment precisely measures insertion force, checks each tip for vacuum pressure loss, and constantly monitors the function of Neptune tips so that you can be assured of reliable performance.
	Tubes	Samples from each lot of Neptune tubes are extensively centrifuged and boil tested to ensure they meet the highest standards.
	Plates	Neptune PCR and megatiter plate dimensions are checked against SBS specifications and vacuum tested on customized fixtures to ensure that each plate is flat and leak-free.
Sterility	Process	Neptune pre-sterile products have undergone electron beam irradiation and bioburden testing by an independent laboratory.
Molecular Purity	Nucleic acids	Neptune products are PCR tested and certified to be free of contaminating human nucleic acids.
	Nucleases	Neptune plastics are tested and certified to be free of nucleases, with a test sensitivity level of less than $3.4 \times 10^{-11}$ Kunitz units of RNase and $1.7 \times 10^{-11}$ Kunitz units of DNase.
	Endotoxins/Pyrogens	LAL coagulation testing demonstrates these products are free of endotoxins, test sensitivity is 0.06 EU/mL.
Traceability	Process	Each product contains a 6 digit lot number located on the rack, pack and case of each finished good. With Neptune's advanced manufacturing process all raw materials are able to be traced for maximum quality assurance.





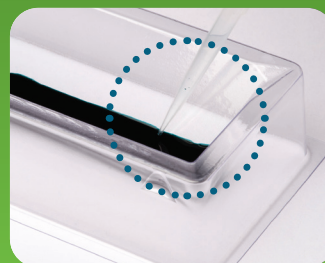
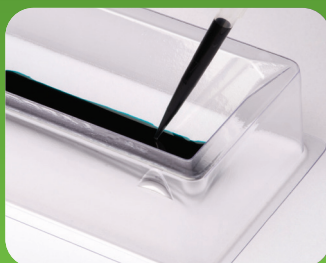
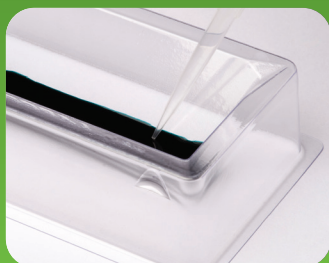
# Pipette Tips

<b>Commitment to Quality</b>	<b>2</b>
<b>Packaging Options</b>	<b>4</b>
<b>ESP Reload System</b>	<b>5</b>
<b>Filter Tips</b>	<b>6-7</b>
<b>Filter Tip Compatibility Chart</b>	<b>8-9</b>
<b>Non Filter Tips</b>	<b>10-13</b>
<b>Non Filter Tip Compatibility Chart</b>	<b>14-15</b>
<b>Empty Racks</b>	<b>16</b>
<b>Best Laboratory Practices &amp; Index</b>	<b>18-27</b>



# S<sup>3</sup> SAMPLE SAVING SURFACE

## NEPTUNE

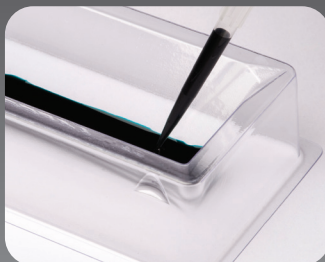
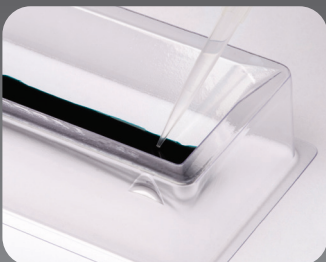


Before Pipetting

Fluid Drawn

Sample Dispensed

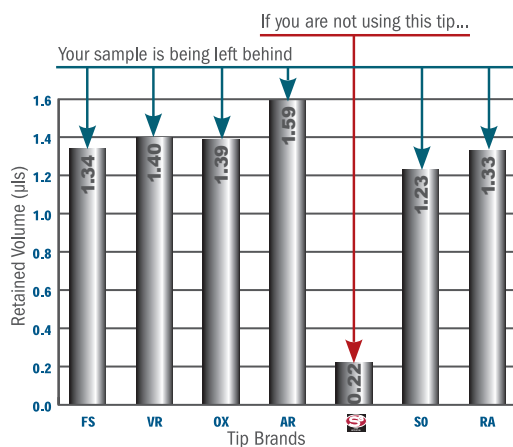
## STANDARD POLYMER TIPS



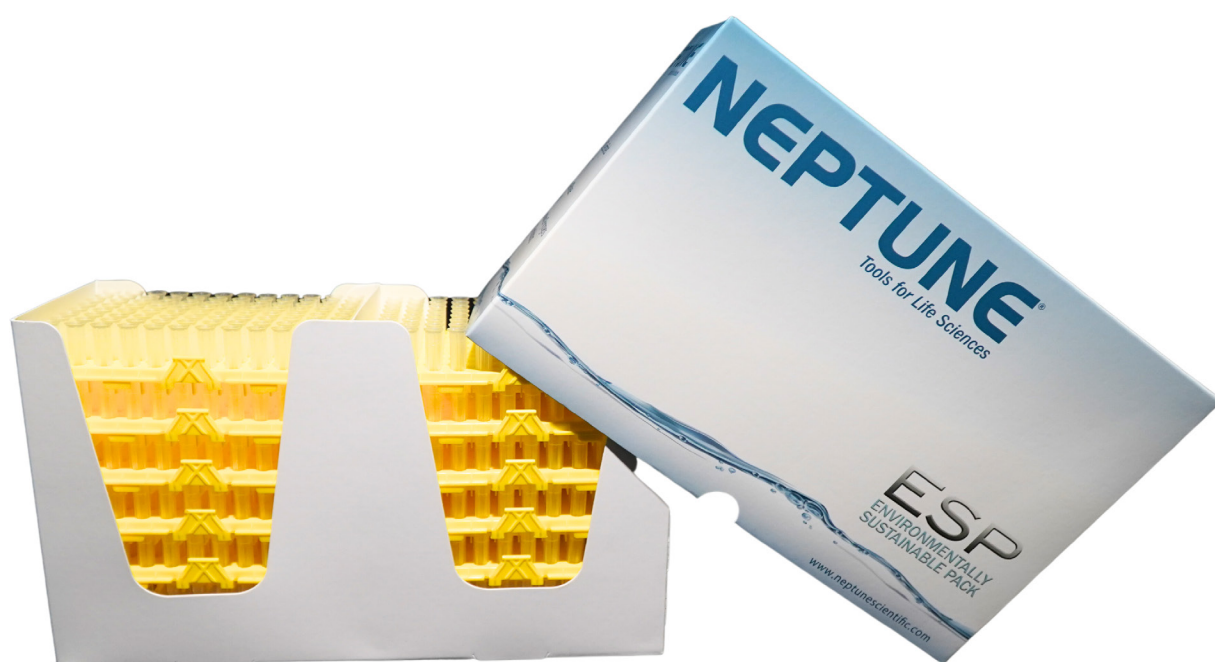
Neptune's exclusive S<sup>3</sup> polymer was designed to increase pipetting accuracy by virtually eliminating sample retention. S<sup>3</sup> low retention pipette tips deliver volumes within 0.1% of the indicated volume, versus 0.7% for standard polymer tips. This provides more accurate results.

Pipette tips produced from standard polymers will variably retain biological solutions, preventing accurate and repeatable results. Diamond polishing of the mold reduces the number of imperfections, producing a smoother surface. Silicone treatment of tips further reduces retention, but can leach out and interfere with reactions or degrade at autoclaving temperatures.

Neptune was the first to address this challenge with the development of a novel polymer technology that produces a Sample Saving Surface on plastics. Neptune's S<sup>3</sup> polymer system results in a surface that virtually eliminates sample hold-up, providing the most accurate and consistent sample delivery possible in the industry.







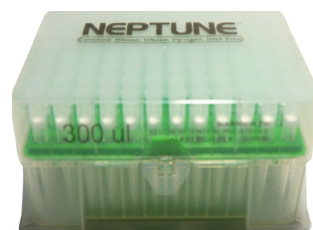
**ESP**  
ENVIRONMENTALLY  
SUSTAINABLE PACK

## FEATURES:

- Reload up to 10 trays in 90 seconds
- Requires 57% less storage space than full racks
- Reuse existing racks/trays
- Generates 90% less packaging waste
- Available in unfiltered and filtered pipette tip formats

The Neptune ESP (Environmentally Sustainable Pack) System was designed to meet industry demands to minimize plastic waste by 90% and provide an environmentally friendly solution. ESP tips provide a low cost alternative compared with racked product, while saving time not having to load bulk tips.

Neptune's revolutionary transfer system allows you to reload your empty racks/trays with new tips in a single movement. The patented transfer card is designed to prevent contamination by minimizing the amount of handling when reloading empty racks/trays. The ESP system is available in both unfiltered and filtered pipette tip reloads. We offer ESP reloads in both pre-sterile and non-sterile formats. Look for the **E** symbol on the pipette chart (under packaging) on pages 10-17. When buying the ESP system for the first time, be sure to purchase an empty tray (page 20).








# FILTER TIPS

Neptune Filter Tips are pre-sterile and tested to be free of:

- Human DNA
- DNase & RNase
- Endotoxins

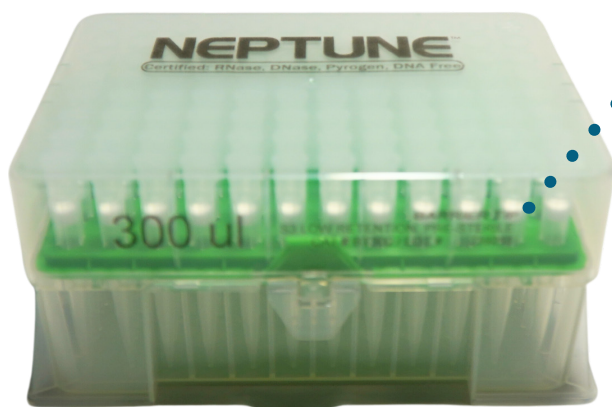


	Neptune PN	Tip Type	Packaging	Quantity
<b>BT10 Series – 10 µL Filter Tip</b> 	63300746	<b>S<sup>3</sup></b>	<b>PS</b> <b>R</b>	10 racks of 96/pack 5 packs/case
	63300747	<b>NP</b>	<b>PS</b> <b>R</b>	10 racks of 96/pack 5 packs/case
<b>BT10XL Series – 10 µL Extended Length Filter Tip</b> 	63300754	<b>S<sup>3</sup></b>	<b>PS</b> <b>R</b>	10 racks of 96/pack 5 packs/case
	63300753	<b>NP</b>	<b>PS</b> <b>R</b>	10 racks of 96/pack 5 packs/case
<b>BT10E Series – 10 µL Eppendorf Style Filter Tip</b> 	63300751	<b>S<sup>3</sup></b>	<b>PS</b> <b>R</b>	10 racks of 96/pack 5 packs/case
<b>BT10F Series – 10 µL Finn Style Filter Tip</b> 	63300752	<b>S<sup>3</sup></b>	<b>PS</b> <b>R</b>	10 racks of 96/pack 5 packs/case
<b>BT20 Series – 20 µL Filter Tip</b> 	63300757	<b>S<sup>3</sup></b>	<b>PS</b>	10 racks of 96/pack
			<b>R</b>	5 packs/case

**FEATURES** **S<sup>3</sup>** Sample Saving Surface **PS** Pre-Sterile **NP** Natural Polypropylene

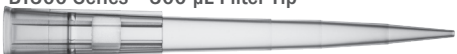
**PACKAGING OPTIONS** **R** Racked **E** ESP Reload System **B** Bulk  
Empty rack needed (pg 16)





## Product Identification

- Increases lot traceability and makes the racks recyclable
- Printed catalog number simplifies the reordering process

	Neptune PN	Tip Type	Packaging	Quantity
<b>BT100 Series - 100 µL Filter Tip</b> 	63300748	<b>S<sup>3</sup></b>	<b>PS R</b>	10 racks of 96/pack
				5 packs/case
<b>BT200 Series - 200 µL Filter Tip</b> 	63300759	<b>S<sup>3</sup></b>	<b>PS R</b>	10 racks of 96/pack
				5 packs/case
<b>BTXLT Series - 180 µL Extended Length Filter Tip</b> 	63300764	<b>NP</b>	<b>PS R</b>	8 racks of 96/pack
				4 packs/case
<b>BT200XLT Series - 200 µL Extended Length Filter Tip</b> 	63300762	<b>NP</b>	<b>PS R</b>	8 racks of 96/pack
				4 packs/case
<b>BT300 Series - 300 µL Filter Tip</b> 	63300763	<b>S<sup>3</sup></b>	<b>PS R</b>	10 racks of 96/pack
				5 packs/case
<b>BT1000 Series - 1000 µL Filter Tip</b> 	63300749	<b>S<sup>3</sup></b>	<b>PS R</b>	8 racks of 96/pack
				4 packs/case
	63300750	<b>NP</b>	<b>PS R</b>	8 racks of 96/pack
				4 packs/case
<b>BT1250 Series - 1000-1250 µL Extended Length Filter Tip</b> 	63300755	<b>S<sup>3</sup></b>	<b>PS R</b>	8 racks of 96/pack
				4 packs/case
	63300756	<b>NP</b>	<b>PS R</b>	8 racks of 96/pack
				4 packs/case

**FEATURES** **S<sup>3</sup>** Sample Saving Surface

**PS** Pre-Sterile

**NP** Natural Polypropylene













**PACKAGING OPTIONS** **R** Racked

**E** ESP Reload System  
Empty rack needed (pg 16)

**B** Bulk

# FILTER TIP COMPATIBILITY CHART

Neptune pipette tips are compatible with a broad range of industry leading pipettes. The table below represents compatibility among some of the more recognized brands on the market. Compatibility is determined based on fit and function. Tip fit is determined by the ability to mount and eject Neptune tips onto the pipette. Function is determined by the ability to calibrate the pipette within the manufacturer's specifications using Neptune tips. For more information on tip compatibility, visit [www.neptunescientific.com](http://www.neptunescientific.com).

Pipettor Brand/Model	Brand Transferpette® S	Capp® Bravo	Capp® 12-Channel	Eppendorf Reference®	Eppendorf Research®	Eppendorf Research® Plus	Eppendorf Xplorer Plus
BT10 Series – 10 µL Filter Tip 	0.5 - 10 µL	0.5 - 10 µL	0.5 - 10 µL	0.1 - 2.5 µL 0.5 - 10 µL 2 - 20 µL	0.1 - 2.5 µL 0.5 - 10 µL	0.1 - 2.5 µL 0.5 - 10 µL 2 - 20 µL	0.5 - 10 µL
BT10XL Series – 10 µL Extended Length Tip 	0.5 - 10 µL	0.5 - 10 µL	0.5 - 10 µL	0.1 - 2.5 µL 0.5 - 10 µL 2 - 20 µL	0.1 - 2.5 µL 0.5 - 10 µL	0.1 - 2.5 µL 0.5 - 10 µL 2 - 20 µL	0.5 - 10 µL
BT10E Series – 10 µL Eppendorf Style Filter Tip 				0.1 - 2.5 µL 0.5 - 10 µL 2 - 20 µL			
BT10F Series – 10 µL Finn Style Filter Tip 							
BT20 Series – 20 µL Filter Tip 	2 - 20 µL 10 - 100 µL 20 - 200 µL	5 - 50 µL 1 - 100 µL	5 - 50 µL 30 - 300 µL				
BT100 Series – 100 µL Filter Tip 	2 - 20 µL 10 - 100 µL 20 - 200 µL	5 - 50 µL 1 - 100 µL	5 - 50 µL 30 - 300 µL				
BT200 Series – 200 µL Filter Tip 	2 - 20 µL 10 - 100 µL 20 - 200 µL	5 - 50 µL 1 - 100 µL	5 - 50 µL 30 - 300 µL	2 - 20 µL 10 - 100 µL 50 - 200 µL	2 - 20 µL 10 - 100 µL	10 - 100 µL	
BTXLT - 180 µL Filter Tip 							
BT200XLT Series - 200 µL Extended Length Filter Tip 							
BT300 Series – 300 µL Filter Tip 	2 - 20 µL 10 - 100 µL 20 - 200 µL	5 - 50 µL 10 - 100 µL	5 - 50 µL 30 - 300 µL	50 - 200 µL	20 - 200 µL 10 - 100 µL 30 - 300 µL /12		15 - 300 µL
BT1000 Series – 1000 µL Filter Tip 				100 - 1000 µL	100 - 1000 µL	100 - 1000 µL	50 - 1000 µL
BT1250 Series – 1000-1250 µL Extended Length Filter Tip 				100 - 1000 µL		100 - 1000 µL	50 - 1000 µL





Finnpipette™ F1	Finnpipette™ F2	Finnpipette™ Digital	Gilson® PIPETMAN® L	Hamilton® SoftGrip	Nichiryo Nichipet EX II	Sartorius/Biohit Proline®	Sartorius/Biohit Proline® Plus	Sartorius/Biohit mLINE®	Sartorius/Biohit Proline® Plus 8- and 12-Channel	VWR® Ultra High Performance
1 - 10 µL		0.5 - 10 µL /8	P2 P10	0.2 - 2 µL 1 - 10 µL	0.5 - 10 µL	0.5 - 10 µL		M3 M10	0.5 - 10 µL	0.1 - 2 µL 0.5 - 10 µL
1 - 10 µL		0.5 - 10 µL /8	P2 P10"	0.2 - 2 µL 1 - 10 µL	0.5 - 10 µL	0.5 - 10 µL		M3 M10	0.5 - 10 µL	0.1 - 2 µL 0.5 - 10 µL
		0.5 - 10 µL /8	P2 P10			0.5 - 10 µL		M10		
			P20 P100 P200				10 - 100 µL 20 - 200 µL	M100 M200		
			P20 P100 P200				10 - 100 µL 20 - 200 µL	M20 M100 M200	10 - 100 µL 30 - 300 µL	
			P20 P100 P200				10 - 100 µL 20 - 200 µL	M20 M100 M200	10 - 100 µL 30 - 300 µL	
2 - 20 µL 5 - 50 µL /12 20 - 200 µL	5 - 50 µL 10 - 100 µL	20 - 200 µL 5 - 50 µL /8	P20 P100 P200				10 - 100 µL 20 - 200 µL	M20 M100 M200	10 - 100 µL 30 - 300 µL	
			P100 P200							
			P100 P200							
10 - 100 µL	10 - 100 µL	50 - 300 µL /8	P200				10 - 100 µL 20 - 200 µL 30 - 300 µL	M100 M200 M300 /12	10 - 100 µL 30 - 300 µL	
100 - 1000 µL	100 - 1000 µL		P1000	100 - 1000 µL	100 - 1000 µL	200 - 1000 µL		M1000		100 - 1000 µL
100 - 1000 µL	100 - 1000 µL		P1000	100 - 1000 µL	100 - 1000 µL	200 - 1000 µL		M1000		100 - 1000 µL

# NON FILTER TIPS



## FEATURES:

- Eco-friendly racks designed for minimum plastic consumption
- Easy-insertion, easy-ejection
- S<sup>3</sup> technology assures the highest recovery of your precious sample



	Neptune PN	Tip Type	Packaging	Quantity
<b>2040 Series – 10 µL Micro Tip</b>  	63302157	S <sup>3</sup>	B	1000 tips/bag 20 bags/case
	63300504	NP	B	1000 tips/bag 20 bags/case
	63302158	S <sup>3</sup>	R	10 racks of 96/pack 5 packs/case
	63300508	S <sup>3</sup>	PS R	10 racks of 96/pack 5 packs/case
	63300506	NP	R	10 racks of 96/pack 5 packs/case
	63300507	NP	PS R	10 racks of 96/pack 5 packs/case
	63302159	S <sup>3</sup>	E	20 cards of 96/pack 4 packs/case
	63300511	NP	E	20 cards of 96/pack 4 packs/case
<b>2340 Series – 10 µL Extended Length Tip</b>  	63302171	NP	B	1000 tips/bag 20 bags/case
	63302174	NP	R	10 racks of 96/pack 5 packs/case
	63300555	NP	PS R	10 racks of 96/pack 5 packs/case
	63300553	S <sup>3</sup>	B	1000 tips/bag 20 bags/case
	63300557	S <sup>3</sup>	R	10 racks of 96/pack 5 packs/case
	63300558	S <sup>3</sup>	PS R	10 racks of 96/pack 5 packs/case
	63302176	S <sup>3</sup>	E	10 cards of 96/pack 10 packs/case
	63300560	NP	E	10 cards of 96/pack 10 packs/case

**FEATURES** S<sup>3</sup> Sample Saving Surface PS Pre-Sterile NP Natural Polypropylene

**PACKAGING OPTIONS** R Racked E ESP Reload System Empty rack needed (pg 16) B Bulk





	Neptune PN	Tip Type	Packaging	Quantity
<b>2140 Series – 10 µL Eppendorf Style Tip</b>  	63302167	<b>S<sup>3</sup></b>	<b>B</b>	1000 tips/bag 20 bags/case
	63300544	<b>S<sup>3</sup></b>	<b>PS R</b>	10 racks of 96/pack 5 packs/case
<b>2100 Series – 200 µL Universal Tip</b>  	63300526	<b>NP</b>	<b>B</b>	1000 tips/bag 10 bags/case
	633002163	<b>S<sup>3</sup></b>	<b>B</b>	1000 tips/bag 10 bags/case
	63300532	<b>NP</b>	<b>R</b>	10 racks of 96/pack 5 packs/case
	63300533	<b>NP</b>	<b>PS R</b>	10 racks of 96/pack 5 packs/case
	63302165	<b>S<sup>3</sup></b>	<b>R</b>	10 racks of 96/pack 5 packs/case
	63300534	<b>S<sup>3</sup></b>	<b>PS R</b>	10 racks of 96/pack 5 packs/case
	63300530	<b>NP</b>	<b>RS</b>	5 inserts of 192/pack 5 packs/case
	63302164	<b>S<sup>3</sup></b>	<b>RS</b>	5 inserts of 192/pack 5 packs/case
	63300538	<b>NP</b>	<b>E</b>	10 cards of 96/pack 10 packs/case
	63302166	<b>S<sup>3</sup></b>	<b>E</b>	10 cards of 96/pack 10 packs/case

**FEATURES** **S<sup>3</sup>** Sample Saving Surface

**PS** Pre-Sterile

**NP** Natural Polypropylene

**PACKAGING OPTIONS** **R** Racked



**RS** Rack & Stack

**E** ESP Reload System  
Empty rack needed (pg 16)

**B** Bulk



Non Filter Tips

# NON FILTER TIPS

	Neptune PN	Tip Type	Packaging	Quantity
2150 Series – 200 µL Extended Length Tip 	63300545	NP	R	8 racks of 96/pack, 4 packs/case
	63300546	NP	PS R	8 racks of 96/pack, 4 packs/case
2090 Series – 300 µL Universal Tip 	63300516	NP	B	1000 tips/bag 10 bags/case
	63302160	S <sup>3</sup>	B	1000 tips/bag 10 bags/case
	63302161	NP	R	10 racks of 96/pack 5 packs/case
	63300519	NP	PS R	10 racks of 96/pack 5 packs/case
	63302161	S <sup>3</sup>	R	10 racks of 96/pack 5 packs/case
	63300520	S <sup>3</sup>	PS R	10 racks of 96/pack 5 packs/case
	63300523	NP	E	10 cards of 96/pack 10 packs/case
	63302162	S <sup>3</sup>	E	10 cards of 96/pack 10 packs/case

**FEATURES** S<sup>3</sup> Sample Saving Surface PS Pre-Sterile NP Natural Polypropylene  
**PACKAGING OPTIONS** R Racked E ESP Reload System B Bulk  
 Empty rack needed (pg 16)



	Neptune PN	Tip Type	Packaging	Quantity
<b>2160 Series – 1000 µL Universal Tip</b>  	63302168	NP	B	1000 tips/bag 4 bags/case
	63302169	NP	R	8 racks of 96 tips/pack, 4 packs/case
	63300549	NP	PS R	8 racks of 96 tips/pack, 4 packs/case
	63302170	NP	E	10 cards of 96 tips/pack 5 packs/case
<b>2370 Series – 1000-1250 µL Extended Length Tip</b>  	63302177	S <sup>3</sup>	B	1000 tips/bag 4 bags/case
	63300563	NP	B	1000 tips/bag 4 bags/case
	63300565	NP	R	8 racks of 96/pack 4 packs/case
	63300566	NP	PS R	8 racks of 96/pack 4 packs/case
	63302178	S <sup>3</sup>	R	8 racks of 96/pack 4 packs/case
	63300567	S <sup>3</sup>	PS R	8 racks of 96/pack 4 packs/case
	63300570	NP	E	10 cards of 96/pack 5 packs/case
	63302179	S <sup>3</sup>	E	10 cards of 96/pack 5 packs/case

Non Filter Tips











**FEATURES** S<sup>3</sup> Sample Saving Surface PS Pre-Sterile NP Natural Polypropylene

**PACKAGING OPTIONS** R Racked E ESP Reload System Empty rack needed (pg 16) B Bulk



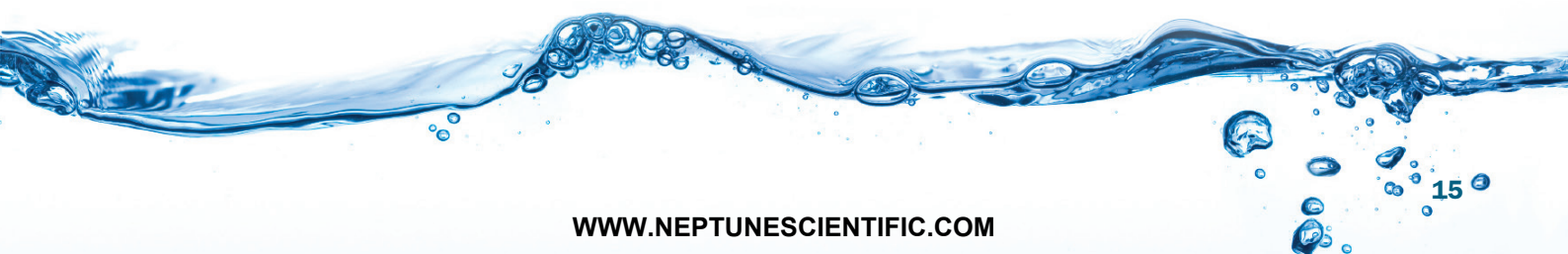
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Pipettor Brand/Model	Brand Transferte <sup>®</sup> S	Capp <sup>®</sup> Bravo	Capp <sup>®</sup> 12-Channel	Eppendorf Reference <sup>®</sup>	Eppendorf Research <sup>®</sup>	Eppendorf Research <sup>®</sup> Plus	Eppendorf Xplorer Plus
2040 Series – 10 µL Micro Tip 				0.1 - 2.5 µL 0.5 - 10 µL 2 - 20 µL	0.5 - 10 µL		
2340 Series – 10 µL Extended Length Tip 				0.1 - 2.5 µL 0.5 - 10 µL 2 - 20 µL	0.5 - 10 µL	0.5 - 10 µL	
2140 Series – 10 µL Eppendorf Style Tip 				0.1 - 2.5 µL 0.5 - 10 µL 2 - 20 µL			
2100 Series – 200 µL Universal Tip 	2 - 20 µL 10 - 100 µL 20 - 200 µL	5 - 50 µL 1 - 100 µL	5 - 50 µL 30 - 300 µL	2 - 20 µL 10 - 100 µL 50 - 200 µL	2 - 20 µL 10 - 100 µL	10 - 100 µL	
2016 Series – 200 µL Extended Length Gel Tip* 							
2150 Series – 200 µL Extended Length Tip* 							
2090 Series – 300 µL Universal Tip 	20 - 200 µL	5 - 50 µL 1 - 100 µL	5 - 50 µL 30 - 300 µL	50 - 200 µL	30 - 300 µL /12		15 - 300 µL
2110 Series – 1000 µL Traditional Shaped Tip* 				100 - 1000 µL	100 - 1000 µL	100 - 1000 µL	50 - 1000 µL
2160 Series – 1000 µL Universal Tip* 				100 - 1000 µL	100 - 1000 µL	100 - 1000 µL	50 - 1000 µL
2370 Series – 1000-1250 µL Extended Length Tip 	100 - 1000 µL			100 - 1000 µL	100 - 1000 µL	100 - 1000 µL	50 - 1000 µL 50 - 1200 µL/8

\*Pipette tip series marked with asterisk are not compatible with multichannel pipettors.

Finnpipette™ F1	Finnpipette™ F2	Finnpipette™ Digital	Gilson® PIPETMAN® L	Hamilton® SoftGrip	Nichiryo Nichipet EX II	Sartorius/Biohit Proline®	Sartorius/Biohit Proline® Plus	Sartorius/Biohit mLINE®	Sartorius/Biohit Proline® Plus 8- and 12-Channel	VWR® Ultra High Performance
		0.5 - 10 µL	P2 P10	0.2 - 2 µL 1 - 10 µL	0.5 - 10 µL	0.5 - 10 µL		M3 M10		0.1 - 2 µL 0.5 - 10 µL
		0.5 - 10 µL	P2 P10	0.2 - 2 µL 1 - 10 µL	0.5 - 10 µL			M3 M10		0.1 - 2 µL 0.5 - 10 µL
		20 - 200 µL						M10 /12		
2 - 20 µL 5 - 50 µL /12 20 - 200 µL	5 - 50 µL 10 - 100 µL	20 - 200 µL 5 - 50 µL /8	P20 P100 P200				10 - 100 µL 20 - 200 µL	M20 M100 M200	10 - 100 µL 30 - 300 µL	
			P100 P200							
			P100 P200							
10 - 100 µL	10 - 100 µL	50 - 300 µL /8	P200				10 - 100 µL 20 - 200 µL 30 - 300 µL	M100 M200 M300 /12	10 - 100 µL 30 - 300 µL	
100 - 1000 µL	100 - 1000 µL		P1000	100 - 1000 µL	100 - 1000 µL	200 - 1000 µL		M1000		100 - 1000 µL
100 - 1000 µL	100 - 1000 µL		P1000	100 - 1000 µL	100 - 1000 µL	200 - 1000 µL		M1000		100 - 1000 µL
100 - 1000 µL	100 - 1000 µL		P1000	100 - 1000 µL	100 - 1000 µL	200 - 1000 µL		M1000		100 - 1000 µL



# EMPTY RACKS



Manufactured and developed to use the least amount of plastic. These spare trays are designed to fit Neptune's 10  $\mu$ L, 10XL, 20  $\mu$ L, 200  $\mu$ L, 300  $\mu$ L, 1000  $\mu$ L and 1000XL pipette tips.

## FEATURES:

- *Recyclable racks*
- *Maximum space saving design*
- *Less waste – reduce plastic waste by up to 90% over conventional racks in combination with our patented ESP reload system*

Neptune PN	Packaging	Quantity	Compatible Tips
2042-ER	Empty Rack with Snapcard for bulk users	10 racks/pack 5 packs/case	2040 Series 2340 Series
2342-ER	Empty Rack with Snapcard for bulk users	10 racks/pack 5 packs/case	2140 Series 2340 Series
2347-ER	Empty Rack without Snapcard for ESP reload	10 racks/pack 5 packs/case	2340 Series
2372-ER	Empty Rack with Snapcard for bulk users	8 racks/pack 4 packs/case	2370 Series
2377-ER	Empty Rack without Snapcard for ESP reload	8 racks/pack 4 racks/case	2370 Series







# BEST LABORATORY PRACTICES

## Autoclaving: Staying within the Parameters

When Autoclaving Neptune products, please stay within the parameters specified below:

### Heat Exposure Recommendations for Autoclaving

Setting Temperature Time

121°C 10-15 minutes

Pressure at 15 PSI (approximately 1 atm.)

### CAUTION: Over-Autoclaving Distortion

Pipette tips and tubes are precision manufactured to tolerances of less than 0.005 inches. Over-autoclaving produces unseen distortions caused by excess heat and/or exposure time. Tubes that “pop” during boiling and loose fitting bent tips are often the result. To limit distortion, all tubes should be open during autoclaving and tips should be racked in trays. Do not exceed the time and temperature recommendations shown in the table. Excessive heating can also produce color changes in tubes or tray hot-stamped logos. **Do not “overcook” your plastic products.**

## RCF Ratings for Centrifuge Tubes

Two important specifications for centrifuges are Revolutions Per Minute (RPM) and Relative Centrifugal Force (RCF). Of the two specifications, Relative Centrifugal Force (RCF), or G force, is a standard unit of measure across all centrifuges and can be calculated using the formula below. Setting the RCF too high can cause a centrifuge tube to crack, and shatter. It is imperative that the end user confirms their RCF setting before beginning centrifugation.

### RCF Value Equation

$$\text{RCF} = 0.00001118 \times \text{radius} \times \text{RPM}^2$$

RCF: Relative centrifugal force

Radius: rotor radius in centimeters

RPM: maximum RPM

## Cryogenic Storage for Neptune Cryovials and Cryotubes

### Liquid vs. Vapor Phase Storage

All cryogenic containers are designed for vapor phase storage. We advise against routine liquid phase storage because of the explosive potential of liquid N<sub>2</sub> when exposed to room temperatures.



## Pipette Tips

For more than 25+ years, Neptune has provided great value and proven quality. Our extensive line of universal fit pipette tips and barrier tips address the liquid handling needs of some of the busiest academic, clinical and research laboratories around the world. To ensure that Neptune pipette tips perform as well in your hands as they do in ours, we've outlined some best practices for using tips in the lab.

### Compatibility

The single greatest contributing factor to liquid handling performance is fit. Pipette tips work with pipettors as a unified "system", and the better the fit, the greater the overall accuracy and precision. Verify the compatibility of Neptune tips with your pipettor by referring to the Neptune Product Catalog or online at [www.neptunescientific.com](http://www.neptunescientific.com). If you do not find your specific pipettor in the compatibility chart, request a sample for confirmation of fit.

Mounting tips onto a pipettor should be done with firm downward pressure. You should not have to repeatedly pound the pipettor onto the tips. This can not only cause damage to your pipettor, but also increase your risk for repetitive stress disorder (RSD).

A good seal will ensure complete draw and dispense of your sample. However, you should also verify that the pipettor you are using has been calibrated. Verify that your pipettor is both accurate and precise. For pipettors that are used daily, it is recommended to have them calibrated every three months.



Precise, but not Accurate



Accurate, but not Precise



Precise and Accurate

## Product Handling

When stored properly, Neptune pipette tips have a long shelf life and maintain high quality performance. Store tips at room temperature and practice a first in, first out (FIFO) program for managing inventory. When not in use, keep the lids closed on tip racks to prevent contamination from airborne particulates. Avoid touching pipette tips with your fingers, even when gloved.

Depending on the sample solution that you are working with, there are options to consider in tips and pipetting technique. For example, Neptune tips with S3 technology are ideal for viscous and/or precious samples where delivery of every drop counts. In the next section are general guidelines for pipetting with air displacement pipettes. Note that most all pipettor manufacturers will recommend a pre-rinsing of the pipette tip to improve accuracy, but this is seldom done in practice and is only noticed as an improvement in positive displacement pipettes.

### Forward Pipetting Techniques

- Press the operating button to the first stop
- Dip the tip into the solution and then slowly release the operating button
- Dispense the solution by pressing the operating button down to the first stop. Then continue pressing down to the second stop, known as the "blow-out". Avoid tilting the pipettor sideways in your hand
- Release the operating button and eject tip

### Reverse Pipetting Techniques

The reverse technique is used for pipetting solutions that are highly viscous (i.e., whole blood or serum) or have a tendency to foam. An alternative is to use Neptune pipette tips with S3 technology.

- Press the operating button all the way down to the second stop
- Dip the tip into the solution and slowly release the operating button. This will fill the tip with a volume that is larger than the set volume
- Wait 1-2 seconds and withdraw the tip from the solution
- Dispense the solution by pressing the operation button gently and steadily to the first stop. This volume is equal to the set volume. Hold the button in this position. Some liquid will remain in the tip and should not be dispensed
- Release the operating button to the ready position and eject tip

### Avoiding Contamination

Never directly touch or handle pipette tips, even when wearing gloves — tips should only make contact with a pipettor and solution. Change tips after pipetting of each sample and keep the pipettor vertical to prevent sample from running into the pipette shaft. Release the dispensing button slowly to prevent aerosol generation. Always use barrier filter tips when working with PCR, bacteria, viruses, or other sensitive substrates that can easily cross-contaminate via aerosols.

If autoclaving is required by your lab protocol, or if you are using bulk tips that are hand-racked in your lab, please adhere to the following guidelines:

- Make sure that tips are loaded into the tip rack. Autoclaving tips when they are not racked risks warping the tips. A tip which is no longer straight can result in upwards of 10% error in accuracy
- Use a piece of autoclave indicator tape to secure the lid of the tip rack
- Set autoclave for 121 °C, 15 PSI (1 atm) for 15 minutes
- Unlike glassware, do not use a "dry cycle" as this may distort and warp the tips
- Remove tips when autoclave has cooled and store as described in the Product Handling section above

## Microcentrifuge Tubes

Microcentrifuge tubes (MCTs) are the workhorse of today's lab. Neptune's complete line of 0.6, 1.6, and 2.0 mL tubes were designed to meet the challenges of a wide array of lab procedures - from assays, to centrifugation, to sample storage.

### Chemical Resistance

Neptune microcentrifuge tubes are made from medical grade polypropylene resin. This enables us to provide tubes without contaminating extractables, while maintaining high chemical resistance to a broad range of reagents and solvents. Before initiating use of these products for a new assay, please refer to the chemical resistance chart in the Neptune Product Catalog, or by going to [www.neptunescientific.com](http://www.neptunescientific.com).

### Use in Centrifugation

MCTs from Neptune can withstand centrifugation up to 20,000 RCF. Before you use tubes for centrifugation, it is important to understand the difference between Revolutions Per Minute (RPM) and Relative Centrifugal Force (RCF). Of the two specifications, RCF, or G force, is a standard unit of measurement across all centrifuges and can be calculated using the formula provided here. Setting the RCF too high can cause a centrifuge tube to crack and shatter. Make sure that you are using the appropriate RCF speed, and not RPM.

#### Calculating RCF

$$RCF = 0.0001118 \times \text{radius of centrifuge rotor (cm)} \times \text{RPM}^2$$



# BEST LABORATORY PRACTICES *CONTINUED*

## Sample Storage in Freezer

Neptune MCT's can withstand freezing down to -80 °C and are often used for shorter term storage of samples. Water density expands by approximately 8 1/3% upon freezing, so be sure to have allowance for expansion when placing your samples in the tubes.

## Avoiding Contamination

Always wear personal protective equipment (PPE) when handling laboratory consumables. When removing MCTs from the product bag, never reach into the bag with your hands. Instead, pour the tubes out from the bag. This avoids contamination and the ziplock seal of the bag preserves the remaining tubes for future use.

If autoclaving is required by your lab protocol, please adhere to the following guidelines:

- Pour MCTs into a sterile beaker
- Cover the beaker with aluminum foil and use a piece of autoclave indicator tape to secure the foil to the beaker
- Set autoclave for 121 °C, 15 PSI (1 atm) for 15 minutes
- Unlike glassware, do not use a "dry cycle" as this may distort the plastic of the tubes
- Keep tube sealed in beaker until use

## PCR Tubes

Neptune offers a collection of high quality 0.2 to 0.6mL thin walled tubes specifically manufactured for PCR applications. The rigorous quality standards of this product line ensure peak performance in even the most sensitive of PCR assays.

## Compatibility

The uniform thin-wall dimensions of Neptune PCR tubes make them compatible with thermocycler blocks on the market that accept industry standard tubes. Good block-tube contact is important for efficient thermocycling reactions, so it is always recommended to verify fit and contact of the tubes with your particular system. Also, be sure to check the heated lid of your system. Many thermocyclers come with heated lids with adjustable heights, so make sure that yours is set to optimize the seal and avoid the effects of condensation within the tube cap. Over adjustment may crush the tube.

## Product Handling

Neptune PCR tubes are made of virgin polypropylene and have a long shelf life when properly stored. Maintaining room temperature storage, away from prolonged sun exposure, will help prevent the tubes from becoming brittle and yellow over time. Maintain a First In, First Out (FIFO) process for tube inventory.

When assembling your PCR, do so in a separated area. Always use aerosol barrier pipette tips and be sure to use a new tip every time you touch your stock solution and reagents to avoid cross-contamination.

## Avoiding Contamination

Always wear PPE when handling products to set up a PCR reaction. When removing PCR tubes from the product bag, never reach into the bag with your hands. Instead, pour the tubes out from the bag. This avoids contamination and the ziplock seal of the bag preserves the remaining tubes for future use. Autoclaving thin-walled

PCR tubes is not recommended as it may impact the integrity of the seal. If sterility is a concern, purchase pre-sterile Neptune PCR tubes. If autoclaving is required by your lab protocol, please adhere to the following guidelines:

- Pour PCR tubes into a sterile beaker
- Cover the beaker with aluminum foil and use a piece of autoclave indicator tape to secure the foil to the beaker
- Set autoclave for 121 °C, 15 PSI (1 atm) for 15 minutes
- Unlike glassware, do not use a "dry cycle" as this may distort the plastic of the tubes
- Keep tube sealed in beaker until use

## PCR Plates

Neptune offers an expansive line of 96-well PCR plates. Whether using the full profile, low profile, fully skirted, or semi-skirted plates, the rigorous quality standards of this product line ensure peak performance in even the most sensitive of PCR assays.

## Compatibility

PCR plates from Neptune are molded from medical grade, high performance polypropylene and feature uniform thin-walls for superior heat transfer. The many options of plate styles (full profile, low profile, fully skirted and semi-skirted) means broader compatibility with the leading thermocyclers on the market. Good block-well contact is important for efficient thermocycling reactions, so be sure to refer to the PCR plate compatibility chart in the Neptune Product Catalog or on [www.neptunescientific.com](http://www.neptunescientific.com) when considering your plate. Also, be sure to check the heated lid of your system. Many thermocyclers come with heated lids with adjustable heights, so make sure that yours is set to optimize the seal and avoid the effects of condensation within the plate.

## Product Handling

Neptune PCR plates are made of virgin polypropylene and have a long shelf life when properly stored. Maintaining room temperature storage, away from prolonged sun exposure, will help prevent the tubes from becoming brittle and yellow over time. Maintain a First In, First Out (FIFO) process for plate inventory.

When assembling your PCR, do so in a separate "Pre-PCR" area and always wear PPE when handling products. Always use aerosol barrier pipette tips and be sure to use a new tip every time you touch your stock solution and reagents to avoid cross-contamination. Use the appropriate plate sealing tape for your application to reduce evaporation during cycling.

## Avoiding Contamination

Neptune PCR plates are manufactured and tested to ensure the highest level of purity. Because they are certified as RNase, DNase, DNA, and endotoxin-free, it is not necessary to autoclave the plates before use. In fact, there have been several published reports where autoclaves have introduced contamination to products, particularly in busy labs that share the same autoclave. Additionally, autoclaving PCR plates may result in product warpage, which may impact fit and compatibility in your thermocycler. After cycling, always perform a quick spin of the plate to pull down condensation and prevent cross contamination when removing the sealing tape.



# CHEMICAL AND PHYSICAL PROPERTIES OF PLASTICS

The information in this chart has been supplied to Biotix by various reputable raw material manufacturers, and is to be used only as a guide in selecting products for appropriate chemical compatibility. These values are based on laboratory tests with raw materials. Plastic components produced from these raw materials are frequently subject to influences that cannot be recognized in standard tests (temperature, pressure, material stress, etc.). In critical cases, it is essential that a test is carried out first to your unique protocol. Biotix does not warrant (neither express nor implied) that the information in this chart is accurate or complete or that any material is suitable for any purpose. No legal claims can be derived from this information, nor do we accept any liability for it.

## General Physical Properties

Classes of substances; 20°C	HDPE	LDPE	PC	PP
Acids, weak or dilute	E	E	E	E
Acids, strong or concentrated	E	E	G	E
Alcohols, aliphatic	E	E	G	E
Aldehydes	G	G	F	G
Bases	E	E	N	E
Esters	G	G	N	G
Hydrocarbons, aliphatic	F	G	F	G
Hydrocarbons, aromatic	F	G	N	F
Hydrocarbons, halogenated	N	F	N	F
Keytones	G	G	N	G
Oxidizing agents, strong	F	F	N	F

## Plastics Acronym Chart

Low Density Polyethylene	LDPE
High Density Polyethylene	HDPE
Polycarbonate	PC
Polypropylene	PP

## Explanation of Footnotes

- 1 - Satisfactory to 72°F (22°C)
- 2 - Satisfactory to 120°F (48°C)
- 3 - Satisfactory to 90°F (32°C)
- 4 - Satisfactory to 120°F (93°C)

- A = No effect  
 B = Minor Effect  
 C = Moderate Effect  
 D = Severe Effect; Not Recommended  
 E = No damage after 30 days of constant exposure  
 G = Little or no damage after 30 days of constant exposure  
 F = Some effect after seven days of constant exposure; may see cracking, crazing, loss of strength  
 N = Not recommended for continuous use  
 - = Not Available

## Chemical Resistance Chart

Reagent	HDPE	LDPE	PC	PP
Acetaldehyde	C	C	C1	A1
Acetamide	A	A	D	A1
Acetate Solvent	A	A	-	B1
Acetic Acid	A	A2	B1	B1
Acetic Acid 20%	A	A	A1	A1
Acetic Acid 80%	A	D	B1	A
Acetic Acid, GlacialD	D	B1	A1	D
Acetic Anhydride	C	D	D	B1
Acetone, 50% water	-	-	-	A
Acetone	D	B1	D	A
Acetonitrile	A	A	D	A1
Acetophenone	C	D	D	C
Acetyl Chloride (dry)	-	D	D	D
Acetylene	-	D	D	A1
Acrylonitrile	A	A	D	A1
Adipic Acid	A	A	-	B2
Alanine	A	A	A	A
Alcohols				
- Amyl	A	B2	B1	B1
- Benzyl	B	D	-	A
- Butyl	-	A	A2	A
- Diacetone	A	B1	-	B2
- Ethyl	A	B	B2	A
- Isobutyl	A	A2	-	A1
- Isopropyl	a	A2	A2	A2

Reagent	HDPE	LDPE	PC	PP
- Methyl	A	A1	B1	A2
- Propyl	-	A2	-	A
Allyl Chloride	A	-	-	A
Aluminum Acetate (saturated)	-	-	-	A
Aluminum Chloride	A	B2	A1	A
Aluminum Chloride 20%	A	B2	A1	A
Aluminum Fluoride	A	A2	-	A
Aluminum Hydroxide	A	A2	B1	A
Aluminum Nitrate	-	A2	A1	A2
Aluminum Potassium Sulfate 10%	A	A2	A1	A
Aluminum Potassium Sulfate 100%	A	A2	A2	A
Aluminum Sulfate	A	A2	A	A
Alums	-	A	-	A
Amines	B	C1	-	B2
Ammonia 10%	A	C1	D	A2
Ammonia Nitrate	-	A	-	A
Ammonia anhydrous	A	B2	D	A
Ammonia liquid	A	C1	D	A2
Ammonia Acetate	A	A	-	A
Ammonia Bifluoride	-	A2	-	A
Ammonium Carbonate	B	B2	-	A
Ammonium Chloride	A	A2	A2	A
Ammonium Fluoride 25%	A	-	-	A2
Ammonium Hydroxide	A	A1	D	A
Ammonium Glycolate	A	A	B	A

# CHEMICAL AND PHYSICAL PROPERTIES OF PLASTICS *CONTINUED*

Reagent	HDPE	LDPE	PC	PP
Ammonium Nitrate	A	A1	-	A
Ammonium Oxalate	a	-	A1	A
Ammonium Persulfate	A	A2	-	A
Ammonium Phosphate, Dibasic	-	A2	A2	A
Ammonium Phosphate, Monobasic	-	A	-	A
Ammonium Phosphate, Tribasic	-	C	-	A
Ammonium Sulfate	A	A1	A2	A
Ammonium Sulfite	B	B2	-	A
Amyl Acetate	-	C1	D	B1
Amyl Alcohol	A	B2	B1	B1
Amyl Chloride	B	D	-	D
Aniline	B	C	D	A1
Aniline Hydrochloride	-	D	D	D
Antifreeze	-	-	-	D
Antimony Trichloride	B	B2	A2	A
Aqua Regia (80% HCL, 20% HNO3)	D	B1	D	B1
Arochlor 1248	-	C1	-	D
Aromatic Hydrocarbons	-	C	-	D
Arsenic Acid	B	B2	A1	A
Arsenic Salts	-	B	-	-
Barium Carbonate	-	B2	A2	A
Barium Chloride	B	A1	A	A
Barium Cyanide	-	B	-	D
Barium Hydroxide	-	B2	D	B
Barium Nitrate	-	B2	D	A
Barium Sulfate	B	B2	D	B1
Barium Sulfide	A	B2	-	B
Benzaldehyde	B	A1	D	D
Benzenamine	B	A	D	A
Benzene	D	D	D	D
Benzene Sulfonic Acid	A	A1	D	D
Benzoic Acid	A	A1	B1	B1
Benzol	-	C1	D	B
Benzyl Chloride	-	-	-	C1
Bleach	-	-	-	D
Bleaching liquors	-	A1	-	A1
Borax (Sodium Borate)	A	A2	-	B
Boric Acid	A	A2	-	A
Bromine	D	D	C1	D
Bromofone	D	D	D	D
Butadiene	D	D	D	C
Butane	-	C1	D	A1
Butanol (Butyl Alcohol)	-	B2	B1	A1
Butyl Amine	-	C1	D	B1
Butyl Ether	-	-	-	D
Butyl Phthalate	A	C1	D	B2

Reagent	HDPE	LDPE	PC	PP
Butyl Acetate	B	C1	D	B1
Butyric Acid	D	D	D	B1
Calcium Bisulfide	-	B1	-	A
Calcium Bisulfite	A	A1	D	A
Calcium Carbonate	-	B	C2	A
Calcium Chloride (30% in water)	A	B2	-	A2
Calcium Chloride (saturated)	A	-	-	A
Calcium Hydroxide 10%	A	-	-	A
Calcium Hydroxide (saturated)	A	-	-	A
Calcium Hydroxide	A	A2	D	A2
Calcium Hypochlorite 30%	A	-	-	A
Calcium Hypochlorite (saturated)	A	-	-	A
Calcium Nitrate	B	A1	A2	A2
Calcium Oxide	-	B1	-	A
Calcium Sulfate	-	B1	A2	A
Calcium Sulfide	-	-	-	A
Carbolic Acid (Phenol)	-	D	D	B
Carbon Bisulfide	-	-	-	D
Carbon Dioxide (dry)	-	A1	-	A2
Carbon Dioxide (wet)	-	A1	-	A2
Carbon Disulfide	D	D	D	D
Carbon Monoxide	-	A2	-	A
Carbon Tetrachloride	C	D	D	D
Carbon Tetrachloride (dry)	C	D	-	D
Carbon Tetrachloride (wet)	C	-	-	D
Carbonic Acid	B	B2	A1	A
Cellulose Acetate	-	-	-	A
Chloral Hydrate	D	-	-	D
Chlorine Water	C	B1	-	D
Chlorine Anhydrous Liquid	C	D	C	D
Chlorine (dry)	B	D	-	D
Chloroacetic Acid	A	D	D	C1
Chlorobenzene (Mono)	D	C1	D	C1
Chlorobromomethane	-	A	-	A
Chloroform	D	C1	D	C1
Chlorosulfonic Acid	D	D	C1	D
Chromic Acid 5%	A	A	B	D
Chromic Acid 10%	A	A	B	D
Chromic Acid 30%	A	A	C	D
Chromic Acid 50%	A	A	D	D
Citric Acid	A	D	A1	A
Citric Oils	B	-	-	A
Copper Chloride	-	-	-	A
Copper Cyanide	-	B2	D	A
Copper Nitrate	-	B2	D	A
Copper Sulfate 5%	A	A2	A1	A





Reagent	HDPE	LDPE	PC	PP
Copper Sulfate >55	A	A2	A1	A
Cresols	D	C1	D	D
Cresylic Acid	-	B1	D	A1
Cupric Acid	-	B1	A1	A2
Cyclohexane	D	B1	B	D
Cyclohexanon	B	D	D	D
Detergents	A	D	A1	A
Dextrin	A	-	-	A
Dextrose	A	-	-	A
Diacetone Alcohol	A	A	D	A1
Dichlorobenzane	-	-	D	C1
Dichloroethane	C	C1	D	D
Diesel Fuel	D	C1	A2	A1
Diethyl Ether	D	-	D	A1
Diethylamine	D	D	D	A1
Diethylene Glycol	A	B2	B1	A2
Dimethyl Aniline	B	-	D	D
Dimethyl Formamide	A	A	D	A
Diphenyl	-	-	-	D
Diphenyl Oxide	-	-	-	D
Disodium Phosphate	A	-	-	A
Epson Salts (Magnesium Sulfate)	-	A2	A1	A
Ethane	-	-	-	D
Ethanol	A	B	B2	A
Ethanolamine	-	-	-	D
Ether	D	D	-	D
Ethyl Acetate	A	A	D	A1
Ethyl Benzoate	B	C2	D	B1
Ethyl Chloride	C	C1	D	D
Ethyl Ether	D	D	-	D
Ethylene Bromide	-	D	D	D
Ethylene Chloride	C	D	D	C1
Ethylene Chlorohydrin	-	D	D	D
Ethylene Dichloride	D	D	D	D
Ethylene Glycol	A	A2	B1	A
Ethylene Oxide	B	A	C1	D
Fatty Acids	A	D	B1	A
Ferric Chloride	D	A1	A2	A
Ferric Nitrate	-	A2	A1	A
Ferric Sulfate	-	A2	A1	A
Ferrous Chloride	A	A2	D	A
Ferrous Sulfate	-	A2	A1	A
Fluboric Acid	A	A2	-	A
Flourine	D	D	C	D
Fluosilicic Acid	B	A2	A1	A
Formaldehyde 40%	A	D	A1	A
Formaldehyde 100%	A	B	A2	C

Reagent	HDPE	LDPE	PC	PP
Formic Acid	A	D	A1	A1
Freon 11	A	C	-	A
Freon 12	-	A1	-	A2
Freon 22	-	-	-	B
Freon 113	-	-	B1	D
Freon TF	B	-	-	D
Fuel Oils	C	B	B1	A
Furan Resin	-	D	-	D
Furfural	A	D	D	D
Gallic Acid	A	A	-	A
Gasoline (high-aromatic)	B	A	A	A
Gasoline , leaded, ref.	B	-	A2	B
Gasoline, unleaded	B	-	A2	C1
Gelatin	A	A2	-	A
Glucose	A	A2	A1	A
Glycerin	A	A1	A2	A
Glycolic Acid	-	A2	-	A
Heptane	B	B1	B	C2
Hexane	C	D	D	B1
Hydraulic Oil (Petro)	A	C	-	D
Hydraulic Oil (Synthetic)	A	A	-	D
Hydrazine	D	-	D	C
Hydrobromic Acid 20%	D	B2	-	A2
Hydrobromic Acid 100%	D	B1	-	C1
Hydrochloric Acid 20%	A	A2	B1	B2
Hydrochloric Acid 37%	A	B2	D	C
Hydrochloric Acid 100%	D	-	D	B1
Hydrochloric Acid, Dry Gas	D	A2	-	B
Hydrocyanic Acid	A	A2	-	A
Hydrocyanic Acid (Gas 10%)	A	-	B1	A
Hydrofluoric Acid 20%	A	A2	D	A2
Hydrofluoric Acid 50%	A	A1	D	A2
Hydrofluoric Acid 75%	B	C1	D	C1
Hydrofluoric Acid 100%	D	-	D	C1
Hydrofluosilicic Acid 20%	B	B2	-	A
Hydrofluosilicic Acid 100%	C	B1	-	A
Hydrogen Gas	A	A2	A2	A
Hydrogen Peroxide 10%	A	A	A2	A
Hydrogen Peroxide 30%	A	C2	A2	B1
Hydrogen Peroxide 50%	A	C2	A2	B1
Hydrogen Peroxide 100%	A	C2	A	B1
Hydrogen Sulfide (aqua)	A	A	A	A1
Hydrogen Sulfide (dry)	A	A	-	A1
Hydroquinone	-	A	-	A
Iodine	B	A1	-	C
Isooctane	B	B	B1	A2
Isopropyl Acetate	B	B1	D	B1

# CHEMICAL AND PHYSICAL PROPERTIES OF PLASTICS *CONTINUED*

Reagent	HDPE	LDPE	PC	PP
Isopropyl Ether	D	B	D	B
Isotane	-	-	-	D
Kerosene	B	C1	D	B
Ketones	D	C1	D	C
Laquer Thinners	D	A	B	D
Laquers	D	A	D	D
Lactic Acid	A	A1	B	B
Latex	-	-	-	A2
Lead Acetate	A	A2	-	A1
Lead Nitrate	A	A2	-	A2
Lead Sulfamate	-	A1	A1	A2
Linoleic Acid	-	A	-	B1
Lithium Chloride	D	A2	B1	A2
Lye: KOH Potassium Hydroxide	B	A	D	A
Lye: NaOH Sodium Hydroxide	B	D	D	A
Lye: Ca(OH) <sub>2</sub> Calcium Hydroxide	B	A2	D	A2
Magnesium Bisulfate	-	-	A1	A2
Magnesium Carbonate	-	B	A1	A
Magnesium Chloride	A	A1	A2	A2
Magnesium Hydroxide	B	A2	A1	A
Magnesium Nitrate	B	A2	A1	A
Magnesium Sulfate (Epson Salts)	A	A2	A1	A
Maleic Acid	A	B2	-	A
Maleic Anhydride	A	D	-	D
Malic Acid	-	B2	-	A1
Melamine	-	-	-	A
Mercuric Chloride (dilute)	A	A	A	B
Mercuric Cyanide	-	A	-	B
Mercurous Nitrate	-	A	A2	A
Mercury	A	A	D	B
Methane	-	-	-	A
Methanol (Methyl Alcohol)	A	A1	B1	A2
Methyl Acetate	C	B1	D	D
Methyl Acrylate	-	-	-	D
Methyl Alcohol 10%	A	A1	B1	A2
Methyl Bromide	-	C1	-	C
Methyl Butyl Ketone	-	-	D	D
Methyl Cellulose	-	-	D	B
Methyl Chloride	-	C1	D	D
Methyl Dichloride	-	-	-	D
Methyl Ethyl Ketone	D	D	D	B2
Methyl Isobutyl Ketone	D	C	D	A
Methyl Methacrylate	-	-	-	D
Methylamine	-	A1	-	A2
Methylene Chloride	D	D	D	B1
Mineral Spirits	D	B	C	B

Reagent	HDPE	LDPE	PC	PP
Monoethanolamine	-	C	-	B
Morpholine	-	-	D	B2
Naphtha	-	A1	B	B
Naphthalene	B	C	-	B
Natural Gas	-	A	-	A
Nickel Chloride	B	A	A2	A
Nickel Nitrate	B	A	D	A2
Nickel Sulfate	B	A	A	A
Nitrating Acid (<1%)	-	-	-	C
Nitrating Acid (<15% H <sub>2</sub> SO <sub>4</sub> )	-	-	-	C
Nitrating Acid (>15% H <sub>2</sub> SO <sub>4</sub> )	-	-	-	C
Nitrating Acid (<15% HNO <sub>3</sub> )	-	-	-	C
Nitric Acid (5-10%)	A	B	A	A
Nitric Acid (20%)	B	C	B1	A2
Nitric Acid (50%)	D	B1	B	B
Nitric Acid (Concentrated)	D	C1	C1	D
Nitrobenzene	D	C1	D	B1
Nitromethane	D	A	D	B2
Nitrous Acid	-	-	-	A
Nitrous Oxide	-	C	-	D
Oleic Acid	C	C2	-	B1
Oleum 25%	-	D	-	D
Oleum 100%	-	D	-	D
Oxalic Acid (cold)	A	A2	-	A2
Ozone	A	C1	A1	B
Palmitic Acid	-	-	-	B1
Parafin	B	B	A1	A1
Pentane	-	D	A	D
Perchloric Acid	D	B	-	C
Perchloroethylene Acid	D	D	D	D
Petrolatum	-	B	-	D
Petroleum	D	C1	-	B1
Phenol (10%)	D	B	B1	B1
Phenol (Carbolic Acid)	D	D	D	B
Phosphoric Acid (<40%)	A	A	A	A2
Phosphoric Acid (>40%)	A	B1	A	A2
Phosphoric Acid (crude)	B	B1	A	B2
Phosphoric Acid (molten)	D	-	-	D
Phosphoric Acid Anhydride	A	-	D	A
Phosphorus	-	B	-	A
Photographic Developer	-	A	A2	A
Photographic Solutions	A	A	A1	A2
Phthalic Acid	B	B2	-	A
Phthalic Anhydride	-	-	A1	D
Picric Acid	D	A	D	B1
Potash (Potassium Carbonate)	B	A1	-	A

Reagent	HDPE	LDPE	PC	PP
Potassium Bicarbonate	B	A	-	A
Potassium Bromide	B	A	A1	A
Potassium Chlorate	B	A1	A1	A
Potassium Chloride	A	A1	A	A
Potassium Chromate	-	A	-	A
Potassium Cyanide Solutions	-	A	-	A
Potassium Dichromate	B	A	A1	A
Potassium Ferricyanide	-	A2	-	A2
Potassium Ferrocyanide	-	A1	-	A
Potassium Hydroxide (Caustic Potato)	A	A	D	A
Potassium Iodite	B	B1	-	A2
Potassium Nitrate	B	A	A1	A
Potassium Permanganate	A	A	A2	A1
Potassium Sulfate	B	A2	A1	A
Potassium Sulfide	-	A2	-	A
Propane (liquefied)	D	C1	C1	A
Propylene Glycol	A	B2	B1	A2
Pyridine	D	B1	D	A2
Pyrogalllic Acid	-	-	-	A
Salicylic Acid	-	B2	A1	A1
Silicone	-	-	A2	A
Silver Nitrate	A	A	A2	A1
Soap Solutions	B	D	A1	A
Soda Ash (see Sodium Carbonate)	A	B	A	A
Sodium Acetate	A	A	A1	A
Sodium Aluminate	-	-	-	-
Sodium Benzoate	B	A2	A2	A2
Sodium Bicarbonate	A	A2	A2	A
Sodium Bisulfate	B	A2	A1	A
Sodium Borate (Borax)	B	A2	A1	A2
Sodium Carbonate	A	B2	A2	A
Sodium Chlorate	-	B2	A1	A
Sodium Chloride	A	A2	A2	A
Sodium Cyanide	B	A2	-	A
Sodium Ferrocyanide	-	A	-	A
Sodium Fluoride	-	A2	-	A
Sodium Hydroxide (20%)	C	B	A2	A
Sodium Hydroxide (50%)	C	B	D	A
Sodium Hydroxide (80%)	C	-	D	A
Sodium Hypochlorite (100%)	C	B2	-	B
Sodium Hypochlorite (<20%)	A	A	C	A
Sodium Metaphosphate	B	A1	-	A1
Sodium Metasilicate	-	-	-	A
Sodium Nitrate	B	A2	-	A
Sodium Perborate	-	A1	-	A
Sodium Peroxyde	B	A	A2	B

Reagent	HDPE	LDPE	PC	PP
Sodium Polyphosphate	B	A	-	A
Sodium Silicate	A	A2	-	A
Sodium Sulfate	-	A2	A2	A
Sodium Sulfide	B	A2	D	A
Sodium Sulfite	B	B1	-	A2
Sodium Thiosulfate	-	A1	D	A2
Stannic Chloride	-	A2	A1	A
Stannous Chloride	-	B2	-	A
Stearic Acid	A	B1	A1	A2
Stoddard Solvent	-	C2	A2	C
Sulfate (Liquors)	A	A2	-	A
Sulfur Chloride	-	C1	-	C1
Sulfur Dioxide	D	B1	-	A1
Sulfur Dioxide (dry)	A	A1	A1	A1
Sulfur Hexafluoride	-	B	-	-
Sulfur Trioxide	-	-	-	C
Sulfur Trioxide (dry)	-	C1	-	D
Sulfuric Acid (<10%)	A	A1	A1	A2
Sulfuric Acid (10 - 75%)	A	A1	B1	A1
Sulfuric Acid (75 - 100%)	B	C	D	C1
Sulfuric Acid (cold concentrated)	B	D	-	A2
Sulfuric Acid (hot concentrated)	B	D	D	D
Sulfurous Acid	B	B2	-	A
Tannic Acid	A	B2	C	A
Tartaric Acid	A	A1	-	A
Tetrachloroethane	-	-	-	C
Tetrachloroethylene	C	B	D	D
Tetrahydrofuran	C	C1	D	C2
Tin Salts	-	-	-	A
Toluene	D	C1	D	C1
Trichloroacetic Acid	C	A	D	A
Trichlorethane	D	-	D	C
Trichloroethylene	D	D	-	C1
Tricresylphosphate	-	B1	-	A1
Triethylamine	-	-	-	D
Trisodium Phosphate	A	A	-	A
Turpentine	B	D	D	D
Urea	A	A	D	A
Urine	A	A2	-	A
Vinegar	A	A	A2	A
Vinyl Acetate	D	A	-	B1
Water, Deionized	A	-	-	A2
Water, Distilled	A	A2	A2	A
Water, Salt	A	A2	A2	A
Xylene	D	B	D	B
Zinc Chloride	A	A1	A2	A
Zinc Sulfate	A	A2	A2	A



# INDEX

Neptune PN	Page	Neptune PN	Page	Neptune PN	Page	Neptune PN	Page	Neptune PN	Page
BT10	10	2047.T	20	2142.S	15	2377.S	17	3427.8AS.X	26
BT10E	10	2090	16	2152.96.N	16	2377.T	20	3427.8S.X	26
BT10F	10	2090.N	16	2152.96.NS	16	2405.X	33	3428.8.X	25
BT10.N	10	2092	16	2160	17	2405.S.X	33	3428.8A.X	25
BT10XL	10	2092.N	16	2162.96	17	2600.X	27	3438.X	30
BT10XLS3	10	2092.NS	16	2162.96.S	17	2600.8.X	27	3459.8.X	26
BT100	11	2092.S	16	2162.T	20	2601.8.X	27	3470.X	24
BT1000.96	11	2092.T	20	2167.96	17	2601.8S.X	27	3471.X	24
BT1000.96.N	11	2097	16	2167.96.S	17	2601.X	27	3472.X	24
BT1250	11	2097.N	16	2340	14	2601.S.X	27	3728.8AS.X	25
BT1250.N	11	2097.NS	16	2340S3	14	2602.8.X	27	3728.8S.X	25
BT20	10	2097.S	16	2342	14	2602.8S.X	27	3730.X	30
BT20-ESP	10	2097.T	20	2342.S	14	3102.X	24	3731.X	30
BT200	11	2100	15	2342S3	14	3103.X	24	3732.X	30
BT200-ESP	11	2100.N	15	2342S3.S	14	3104.X	24	3735.X	23
BT200XLT	11	2100.Y	15	2342.T	20	3120.A.X	24	3735.A.X	23
BT300	11	2100.YN	15	2347	14	3121.A.X	24	3735.AS.X	23
BTXLT	11	2101	15	2347.N	14	3423.X	25	3735.S.X	23
2016	16	2101.N	15	2347.NS	14	3423.A.X	25	3742.X	30
2016.S	16	2102	15	2347.S	14	3423.AS.X	25	3745.X	23
2040	14	2102.N	15	2347.T	20	3423.S.X	25	3745.A.X	23
2040.N	14	2102.NS	15	2370	17	3425.X	25	3745.AS.X	23
2042	14	2102.S	15	2370.N	17	3425.A.X	25	3745.S.X	23
2042.N	14	2102.T	20	2372	17	3425.AS.X	25	3765.X	23
2042.NS	14	2107	15	2372.N	17	3425.S.X	25	3765.A.X	23
2042.S	14	2107.N	15	2372.NS	17	3426.8.X	26	3765.S.X	23
2042.T	20	2107.S	15	2372.S	17	3426.8A.X	26	4445.X	23
2047	14	2107.T	20	2372.T	20	3426.8AS.X	26	4445.A.X	23
2047.N	14	2110.B	16	2377	17	3426.8S.X	26	4445.AS.X	23
2047.NS	14	2140	15	2377.N	17	3427.8.X	26	4445.S.X	23
2047.S	14	2142	15	2377.NS	17	3427.8A.X	26		

<b>B</b>	
Best Laboratory Practices	34-36
<b>C</b>	
Chemical and Physical Properties of Plastics	37-41
Cryotubes	24
Cryovials	24
<b>E</b>	
ESP™ Reload System	8-9
<b>F</b>	
Filter Tip Compatibility Chart	12-13
<b>M</b>	
Megatiter Plate, 96-Well	33
Microcentrifuge Tubes, 0.6 mL	23
Microcentrifuge Tubes, 1.6 mL	23
Microcentrifuge Tubes, 2.0 mL	23
Minitube System	27

<b>P</b>	
PCR Plate Thermocycler Compatibility	31-32
PCR Plates, 96-Well, Non-Skirted Full Profile	30
PCR Plates, 96-Well, Non-Skirted Low Profile	30
PCR Plates, 96-Well, Semi-Skirted	30
PCR Plates, 96-Well, Skirted	30
PCR Tubes, 8-Strip, 0.2 mL	25-26
PCR Tubes, Thin Wall, 0.2 mL	25-26
Pipette Tips, 10 µL	10, 14
Pipette Tips, 200-300 µL	11, 15-16
Pipette Tips, 1000 µL	11, 16-17, 20
Pipette Tips, 1000XL	11, 17, 20
Pipette Tips, 5000 µL	17
Pipette Tips, Barrier Tips	10-11
Pipette Tips, Blue	16
Pipette Tip Compatibility Chart	18-19
Pipette Tips, ESP Reload	8-11, 14-17
Pipette Tips, Extended Length	10-11, 14, 16, 17
Pipette Tips, Filtered	10-11
Pipette Tips, Gel Loading	16
Pipette Tips, Rack and Stack	15
Pipette Tips, Yellow	15

<b>S</b>	
S <sup>3</sup> Sample Saving Surface	7
Spare Trays	20
<b>T</b>	
Tray Compatibility Chart	20





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