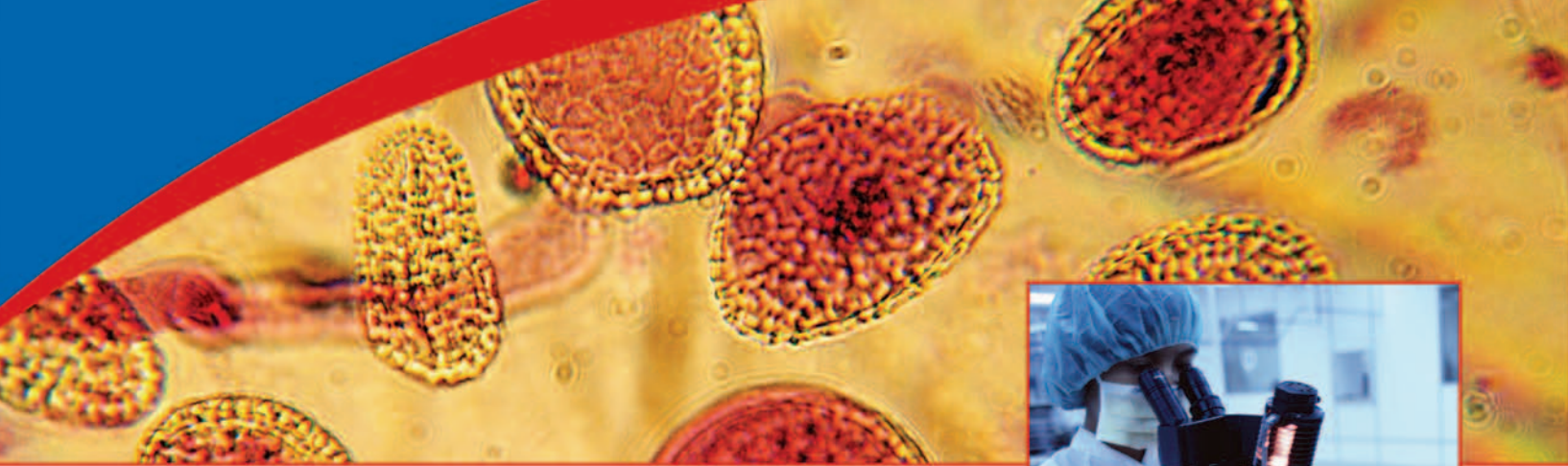


EPR SAMPLE TUBES, DEWARs, AND ACCESSORIES



Committed to Product Excellence...and Continuous Support





EPR (ESR) Spectroscopy

Electron-Paramagnetic-Resonance (EPR) or Electron-Spin-Resonance (ESR) spectroscopy measures the absorption of microwave radiation by an unpaired electron (typically transition-metal-ions, organic radicals, and defects in materials) when it is placed in a strong magnetic field. It is a unique technique for characterizing unpaired electrons. Free electrons play a role in many chemical processes, including oxidation, polymerization, and catalysis. EPR as a spectroscopic technique can be applied in chemistry, medical science, microbiology, material science, physics, mineralogy as well as other scientific disciplines.

EPR Applications

- Structure of paramagnetic centers
- Detection and identification of free radicals
- Organic radicals in proteins
- Spin labeling of micromolecules
- Radiation dosimetry
- Studying oxidation and reduction processes
- Defects in crystals

Species that contain unpaired electrons are:

- Free radicals
- Odd-electron molecules
- Transition-metal-ion complexes
- Lanthanide and trans-uranide ions
- Triplet-state molecules and biradicals
- Organic ion-radicals

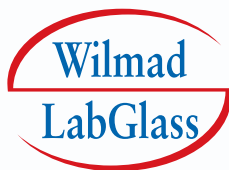
EPR is very sensitive to the molecular environment surrounding unpaired electrons. EPR spectra allows for the positive identification of individual compounds and is capable of providing molecular structure not obtainable by any other analytical tool. These capabilities are a result of the unpaired electron's spin magnetic moment. EPR is also used in the study of detection and identification of radicals in the biomedical field. Another popular application of EPR is "spin labeling" where macromolecules are tagged so as to determine the environment in which the spin label is located. EPR methods measure the interaction of the electron with the nuclei for determining the



structure of transition-metal-ion containing proteins. Radiation dosimetry is another important EPR application used in clinical radiology, radiation accident dosimetry, and industrial radiation processing.

Wilmad-LabGlass offers EPR products compatible with instruments manufactured by Bruker, Varian, JEOL, Resonance Instruments/MicroNow, and Radiopan. These products may also be compatible with other EPR spectrometers.

Cavity resonators are the most commonly used microwave resonators employed in EPR. The collet system used with the cavity determines if a given sample tube fits your cavity.



Instrument photo on cover courtesy of Bruker BioSpin



Wilmad-LabGlass Quartz EPR Sample Tubes

Unique Properties of Quartz for EPR

- Quartz is pure silicon dioxide (SiO₂)
- Quartz has a high dielectric constant
- Quartz has a low level of paramagnetic impurities

Vitreous-Quartz is used in EPR because it has a high dielectric constant and low level of paramagnetic impurities. Two types of Quartz are used for EPR sample tubes: Clear Fused-Quartz (CFQ), a naturally occurring material, and Suprasil®, the trade name of Heraeus-Amersil synthetic Quartz. Materials with high dielectric constant alter the microwave

field and concentrate the field on the sample. The low level of paramagnetic impurity, i.e. iron, prevents interferences with the sample's EPR lines.

Synthetic Quartz transmits electromagnetic radiation through the UV spectrum. Over long periods, CFQ irradiated with UV will discolor. Synthetic Quartz EPR tubes should be used when applying ionizing radiation to generate radical species and for a sample with very low signal. In most every other case, except UV irradiation and samples with low sensitivity, Clear Fused-Quartz will provide the same results as Suprasil®.

Wilmad-LabGlass offers two series of EPR sample tubes: precision, with the designation "PQ" and non-precision or routine, with "SQ" in the product numbers.

Because of the strict tolerances of the precision tubes' OD and ID they should be used for:

- Reproducible positioning of the sample in the resonator
- When you must have the same quantity of sample in the resonator from one sample to the other.

In most other cases non-precision tubes can be used.

Clear Fused-Quartz Precision EPR Tubes

Product Number	OD mm	ID mm	Wall mm	Concentricity microns	Camber microns	Length mm
704-PQ-100M	1.99 ± 0.013	1.02 ± 0.013	0.48	76	76	100
704-PQ-6.25	1.99 ± 0.013	1.02 ± 0.013	0.48	76	76	159
705-PQ-6.25	2.97 ± 0.013	1.99 ± 0.013	0.48	76	76	159
706-PQ-9.50	3.80 ± 0.013	2.79 ± 0.013	0.51	102	102	241
714-PQ-100M <i>new!</i>	4.00 ± 0.013	3.20 ± 0.013	0.40	51	51	100
714-PQ-7 <i>new!</i>	4.00 ± 0.013	3.20 ± 0.013	0.40	51	51	178
714-PQ-8	4.00 ± 0.013	3.20 ± 0.013	0.40	51	51	203
715-PQ-250M	4.00 ± 0.013	3.20 ± 0.013	0.40	51	76	250
700-PQ-7	4.97 ± 0.013	2.16 ± 0.013	1.40	102	102	178
701-PQ-7	4.97 ± 0.013	3.43 ± 0.013	0.76	102	102	178
702-PQ-7	4.97 ± 0.013	4.20 ± 0.013	0.38	102	102	178
703-PQ-100M <i>new!</i>	4.97 ± 0.013	4.20 ± 0.013	0.38	51	51	100
703-PQ-7	4.97 ± 0.013	4.20 ± 0.013	0.38	51	51	178
703-PQ-200M <i>new!</i>	4.97 ± 0.013	4.20 ± 0.013	0.38	51	51	200
528-PQ-7 <i>new!</i>	4.97 ± 0.013	4.20 ± 0.013	0.38	25	13	178
528-PQ-200M <i>new!</i>	4.97 ± 0.013	4.20 ± 0.013	0.38	25	13	200
535-PQ-7 <i>new!</i>	4.97 ± 0.013	4.20 ± 0.013	0.38	13	6	178
535-PQ-200M <i>new!</i>	4.97 ± 0.013	4.20 ± 0.013	0.38	13	6	200
713-3PQ-7 <i>new!</i>	10.00 ± 0.013	9.07 ± 0.013	0.46	76	38	178
713-3PQ-200M	10.00 ± 0.013	9.07 ± 0.013	0.46	76	38	200
713-5PQ-7 <i>new!</i>	10.00 ± 0.013	9.07 ± 0.013	0.46	51	25	178
713-5PQ-200M	10.00 ± 0.013	9.07 ± 0.013	0.46	51	25	200
713-7PQ-7 <i>new!</i>	10.00 ± 0.013	9.07 ± 0.013	0.46	38	13	178
713-7PQ-200M <i>new!</i>	10.00 ± 0.013	9.07 ± 0.013	0.46	38	13	200



Ordering Tip

Order non-precision EPR Tubes when you are not doing quantitative measurements.

Clear Fused-Quartz Non-Precision EPR Tubes

Product Number	OD mm	ID mm	Wall mm	Length mm
712-SQ-100M <i>new!</i>	2	1	0.5	100
712-SQ-250M	2	1	0.5	250
707-SQ-100M <i>new!</i>	4	3	0.5	100
707-SQ-250M	4	3	0.5	250
710-SQ-100M <i>new!</i>	5	4	0.5	100
710-SQ-250M	5	4	0.5	250

Technical Tip

Many background signals found in Quartz result from “matrix” effect that may not be associated with impurities. Ionizing radiation generates many of these signals (E’signals) which result from electrons in the SiO₂ “matrix” of the glass. They develop at elevated temperature or when exposed to ionizing radiation. The E’signal can be removed by heating the tube to 550-600°C.

Suprasil® Precision EPR Tubes

Product Number	OD mm	ID mm	Wall mm	Concentricity microns	Camber microns	Length mm
725-PQ-159M	2.96 ± 0.013	1.99 ± 0.013	0.48	76	76	159
726-PQ-9.50	3.80 ± 0.013	2.79 ± 0.013	0.51	76	102	241
734-PQ-7 <i>new!</i>	4.00 ± 0.013	3.20 ± 0.013	0.40	51	51	178
734-PQ-8	4.00 ± 0.013	3.20 ± 0.013	0.40	51	51	203
735-PQ-100M <i>new!</i>	4.00 ± 0.013	3.20 ± 0.013	0.40	51	76	100
735-PQ-250M	4.00 ± 0.013	3.20 ± 0.013	0.40	51	76	250
721-PQ-7	4.97 ± 0.013	3.43 ± 0.013	0.76	102	102	178
722-PQ-7	4.97 ± 0.013	4.20 ± 0.013	0.38	102	102	178
723-PQ-100M <i>new!</i>	4.97 ± 0.013	4.20 ± 0.013	0.38	51	51	100
723-PQ-7	4.97 ± 0.013	4.20 ± 0.013	0.38	51	51	178
723-PQ-200M <i>new!</i>	4.97 ± 0.013	4.20 ± 0.013	0.38	51	51	200
728-PQ-7 <i>new!</i>	4.97 ± 0.013	4.20 ± 0.013	0.38	25	13	178
728-PQ-200M <i>new!</i>	4.97 ± 0.013	4.20 ± 0.013	0.38	25	13	200
729-PQ-7 <i>new!</i>	4.97 ± 0.013	4.20 ± 0.013	0.38	13	6	178
729-PQ-200M <i>new!</i>	4.97 ± 0.013	4.20 ± 0.013	0.38	13	6	200
733-3PQ-7	10.00 ± 0.013	9.07 ± 0.013	0.46	76	38	178
733-3PQ-200M <i>new!</i>	10.00 ± 0.013	9.07 ± 0.013	0.46	76	38	200
733-5PQ-7	10.00 ± 0.013	9.07 ± 0.013	0.46	51	25	178
733-5PQ-200M <i>new!</i>	10.00 ± 0.013	9.07 ± 0.013	0.46	51	25	200
733-7PQ-7 <i>new!</i>	10.00 ± 0.013	9.07 ± 0.013	0.46	38	13	178
733-7PQ-200M <i>new!</i>	10.00 ± 0.013	9.07 ± 0.013	0.46	38	13	200

Suprasil® Non-Precision EPR Tubes

Product Number	OD mm	ID mm	WALL mm	Length mm
724-SQ-100M <i>new!</i>	2	1	0.5	100
724-SQ-159M	2	1	0.5	159
727-SQ-100M <i>new!</i>	4	2.4	0.8	100
727-SQ-250M	4	2.4	0.8	250
730-SQ-100M <i>new!</i>	5	3.4	0.8	100
730-SQ-250M	5	3.4	0.8	250

NOTE: OD tolerances for non-precision EPR sample tubes are ±0.4 mm; wall thickness tolerances are ±0.2 mm.

Ordering Tip

Wilmaad-LabGlass sample tubes with PQ in the product number are precision tubes. Tubes with SQ in the product number are non-precision.

Special EPR Sample Tubes

Graded seals/constricted EPR tubes are available for air-sensitive samples. For a complete listing of our Special EPR sample tubes, visit www.Wilmad-LabGlass.com.

J Young valve tubes are very popular for air-sensitive samples, samples that generate moderate pressures and catalytic studies. J Young valves can be attached to any precision EPR and NMR tube. The J Young adapter is produced from Pyrex® and because of the difference in the coefficient of expansion, in order to seal the Pyrex adapter to the Quartz tube, a graded seal is used.

NOTE: Extreme caution should be exercised when using glass EPR tubes at elevated or reduced pressures. Due to the nature of glass, the performance of these tubes under pressure or vacuum cannot be guaranteed.

J Young EPR Sample Tubes

Product Number	OD mm
702-JY	5
703-JY	5
528-PQ-JY <i>new!</i>	5
535-PQ-JY <i>new!</i>	5
713-3JY	10
713-5JY	10
713-7JY <i>new!</i>	10

*Prices are for 7" (178 mm) tubes

Ordering Tip

J Young EPR tubes are available in 7, 8, or 9-inch (178, 203, 229 mm) lengths. When ordering J Young EPR tubes, specify the desired length by adding a -7, -8, or -9 to the catalog number.

J Young adapters and pistons are also available for 5 and 10 mm OD EPR tubes. We can custom manufacture the EPR tube to a specific size and length. Please call the Customer Service Department at 800.220.5171 or 856.697.3000 for details.

Product Number	Description
GVA-5	5 mm Pyrex Adapter
GVA-10	10 mm Pyrex Adapter
VNMR/5-PISTON	5 mm PTFE Piston
VNMR/10-PISTON	10 mm PTFE Piston

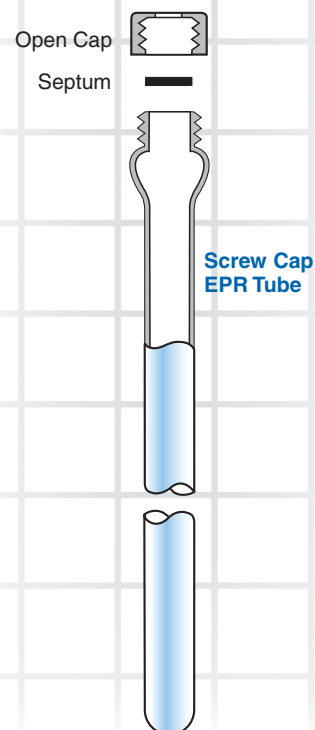
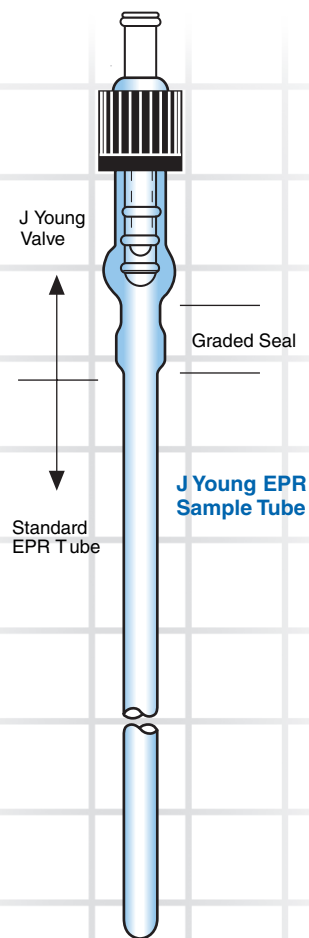
Screw-Cap EPR Tubes

- Quartz
- Suprasil®

These tubes are commonly used when injecting a sample, as well as for air-sensitive samples with coaxial inserts and vortex plugs. You can also easily and economically store your sample in the screw-cap tube with a solid tube cap for later analysis. The screw-cap tubes are supplied with PTFE/Silicon Septum (Teflon® sheet bonded chemically to silicon rubber), inert to most organic compounds but not recommended for corrosive materials. We also offer PTFE/Pharmaceutical Rubber Septum (Teflon sheet bonded chemically to pharmaceutical rubber), inert to most solvents and corrosive materials but not recommended for multiple punctures. For a complete listing of our Quartz and Suprasil® Screw-Cap EPR sample tubes, visit www.Wilmad-LabGlass.com.

Capillary Tubes

Wilmad-LabGlass capillary tubes are used in EPR applications when the amount of sample is limited. They are available in Quartz and Suprasil®, 0.4 to 2.4 mm OD and 100 mm in length. The capillary tubes are open on both ends and are easily sealed. For a complete listing of capillary tubes, see www.Wilmad-LabGlass.com.



Standard TE₁₀₂ Cavity Aqueous Cells

When the sample contains water, the strong electric dipole of the water molecule interacts with the microwave field and a large amount of microwave energy is adsorbed by the sample. Flat cells confine the sample to a 0.3 mm space that is optimized for TE₁₀₂ resonators.

Product Number*	Plate Material	Flat Section Width/Length mm	Upper Tube ID/OD mm	Lower Tube ID/OD mm
WG-812	QUARTZ	10.5/60	5/7	1.5-2.0/7-9
WG-812-S	QUARTZ	10.5/60	5/7	1.5-2.0/7-9
WG-812-Q	SUPRASIL®	10.5/60	5/7	1.5-2.0/7-9
WG-812-S-Q	SUPRASIL®	10.5/60	5/7	1.5-2.0/7-9
WG-814	QUARTZ	10.5/60	0.5-1/5-7	0.5-1/5-7
WG-814-S	QUARTZ	10.5/60	0.5-1/5-7	0.5-1/5-7
WG-814-Q	SUPRASIL®	10.5/60	0.5-1/5-7	0.5-1/5-7
WG-814-S-Q	SUPRASIL®	10.5/60	0.5-1/5-7	0.5-1/5-7

*For a listing of our standard TM₁₁₀ and "S" aqueous cells visit www.Wilmad-LabGlass.com. The "S" cells are manufactured to make it easier to couple your sample to the microwave field of TM cavity resonator.

Small-Volume TE₁₀₂ Cavity Variable-Temperature (VT) Aqueous Cells

Product Number*	Plate Material	Flat Section Width/Length mm	Upper Tube ID/OD mm	Sample Volume μ L
WG-808	QUARTZ	4.75/47	3/4	100
WG-808-S	QUARTZ	4.75/47	3/4	100
WG-808-Q	SUPRASIL®	4.75/47	3/4	100
WG-808-S-Q	SUPRASIL®	4.75/47	3/4	100

The WG-808 VT Aqueous Cell works with most common VT Dewar Inserts, including WG-821 and WG-848. Due to the small volume of the cell, it can be used only with a sample that gives a strong signal.

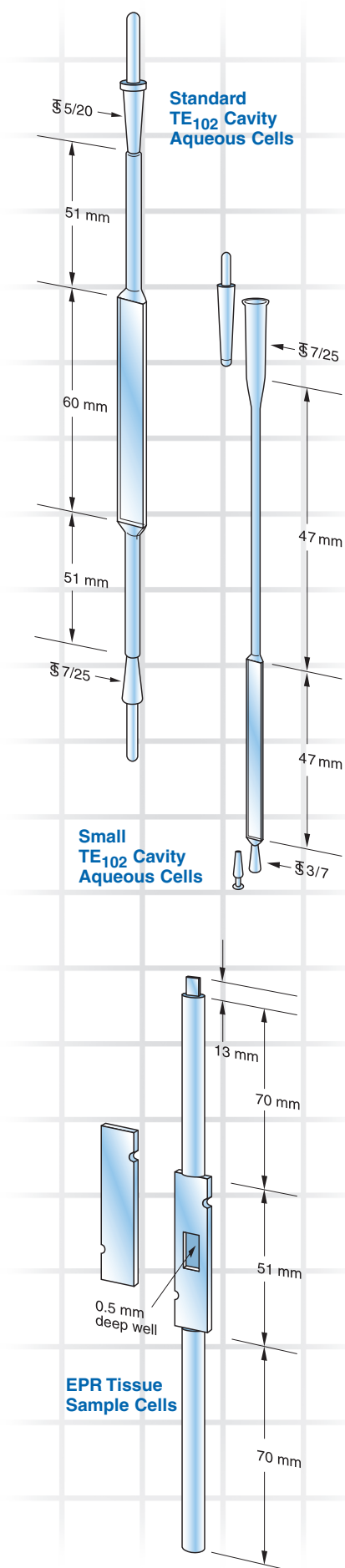
We also offer Large-Volume TM₁₁₀ VT Aqueous Cells, series WG-813-TMS, used only with WG-821-TMR Dewar Insert.

*The listed cells can be used for all TE₁₀₂ except JEOL Spectrometers. Call for Aqueous Cells for JEOL Spectrometers.

EPR Tissue Sample Cells

EPR Tissue Sample Cells are used for viscous samples such as polymers and wet tissue. All cells, except WG-807-Q, include a 0.5 mm deep well for thick samples. The sample is placed between the plates. The EPR Tissue Sample Cells come with two support rods. Each cell includes two coverslides and two "Bronzite" clips.

Product Number	Plate Material	Rod Length Upper/Lower mm	Cavity Dimensions mm	Baseplate Width/Length mm	Coverplate mm
WG-806	QUARTZ	70/70	5/10	8/51	42/8
WG-806-Q	SUPRASIL®	70/70	5/10	8/51	42/8
WG-806-A	QUARTZ	70/70	7/23	10/51	42/10
WG-806-A-Q	SUPRASIL®	70/70	7/23	10/51	42/10
WG-806-B	QUARTZ	90/63	7/23	16/65	42/10
WG-806-B-Q	SUPRASIL®	90/63	7/23	16/65	42/10
WG-807	QUARTZ	70/70	NONE	8/51	42/8
WG-807-Q	SUPRASIL®	70/70	NONE	8/51	42/8



Replacement Parts for Tissue and Aqueous Cells

Coverplates for Tissue Cells

Wilmad-LabGlass offers replacement coverplates in Quartz and Suprasil® for EPR Tissue Sample Cells. All coverplates are 1.6 mm thick and have notches for the support clips (Product No. WG-806-CL) that hold the coverplate in place.

Product Number	Material	Dimensions Length/Width mm
WG-806-CP	QUARTZ	42/8
WG-806-CP-Q	SUPRASIL®	42/8
WG-806-A-CP	QUARTZ	42/10
WG-806-A-CP-Q	SUPRASIL®	42/10
WG-806-B-CP	QUARTZ	56/16
WG-806-B-CP-Q	SUPRASIL®	56/16

We also offer coverplates made from TPX plastic. TPX plastic is highly permeable to O₂, N₂, and CO₂ and should not be used with organic solvents.

Product Number	Dimensions Length/Width mm	For Tissue Cell
WG-806-TPX	42/8	WG-806 (-Q) WG-807 (-Q)
WG-806-A-TPX	42/10	WG-806-A (-Q)
WG-806-B-TPX	56/16	WG-806-B (-Q)

TPX Chemical Resistance at Room Temperature

Effect on TPX Coverplates					
0-Negligible	1-Limited	2-Considerable	3-Extensive		
Acetic Acid	1	Diethyl Ether	2	Methylene Chloride	0
Acetone	1	Ethanol	0	Pyridine	1
Benzene	2	Hexane	2	NaOH (50%)	0
Chloroform	2	HCl (30%)	0	THF	2
Chromic Acid	0	H ₂ O ₂ (70%)	0	Trichlorethylene	2
DMF	0	Methanol	0	Water	0

Stoppers for Aqueous Cells*

Product Number	Material	Taper Joints
WG-813-STP-A	Hollow/Pyrex®	7/25
WG-808-STP-A	Hollow/Quartz	7/25
WG-813-TMS-STP-A	Hollow/Quartz	5/20
WG-808-STP-B	Solid/Quartz	3/7
WG-813-STP-B	PTFE	5/20
WG-813-TMS-STP-B**	Silicone	

*For Aqueous Cells WG-812, WG-813, and WG-808.

**The silicone stopper is not manufactured with standard taper joints. It takes the form of the cell.

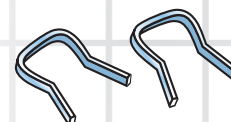
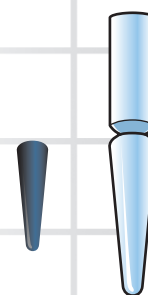
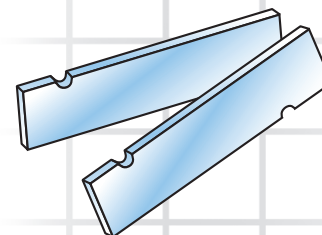
Bronzite Coverplate Clip

To secure the coverplate to the tissue cell.

Product Number
WG-806-CL

Ordering Tip

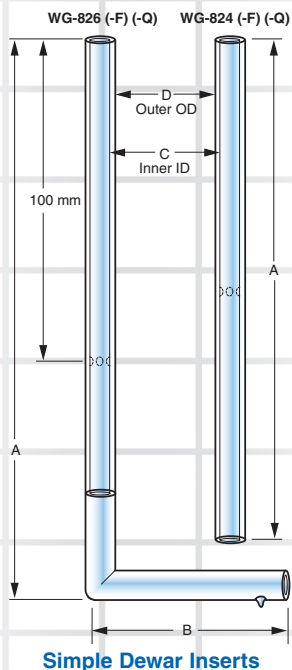
Wilmad-LabGlass uses Q in the catalog number to designate products produced from Suprasil® in the critical portion of the cell. All other cells are produced from Clear Fused-Quartz.



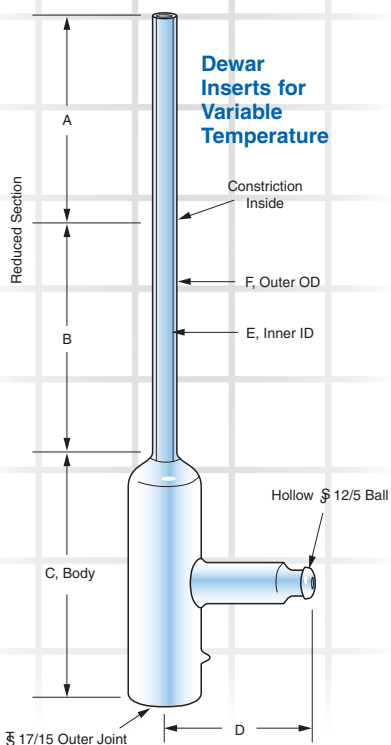
Dewar Inserts

Applications

- Temperature control – connect a source of temperature controlled gas (nitrogen) to the sidearm of the Dewar Insert.
- For experiments that do not require temperature control. Increase the sensitivity of the cavity of the EPR spectrometer by placing the sample inside of the Dewar Insert. The Quartz helps focus the microwave energy on the sample. Use a Simple Dewar Insert for room temperature applications.



Simple Dewar Inserts



Dewar Inserts for Variable Temperature

Options

- Dewar Inserts are available for Bruker, Varian, JEOL, Resonance Instruments/ MicroNow, and Radiopan Cavity Resonators
- Silvered or unsilvered Dewar Insert (silvered is a standard feature)
- With or without support dimples (dimples are a standard feature)

We also manufacture special Dewar Inserts to custom specifications. If you do not see what you need in this brochure, please contact the Customer Service Department at 800.220.5171 or 856.697.3000 or send us a drawing with the dimensions, including tolerances.

Simple Dewar Inserts

Wilmad-LabGlass offers straight (WG-824) and bent (WG-826) Simple Dewar Inserts.

Applications

- Protect the cavity if you have a spill
- Increase the sensitivity of the cavity
- Fill the other half of a dual cavity
- Flow a gas over the sample for room-temperature studies

Product Number	Upper Material	Silvered/ Dimpled	Dimensions mm			
			A	B	C	D
WG-824	QUARTZ	No/No	200	-	5	11
WG-824-Q	SUPRASIL®	No/No	200	-	5	11
WG-824-F	QUARTZ	No/No	200	-	6	10.5
WG-824-F-Q	SUPRASIL®	No/No	200	-	6	10.5
WG-826	QUARTZ	Yes/Yes	180	60	5	11
WG-826-Q	SUPRASIL®	Yes/Yes	180	60	5	11
WG-826-F	QUARTZ	Yes/Yes	180	60	5	11
WG-826-F-Q	SUPRASIL®	Yes/Yes	180	60	5	11

Dewar Inserts for Variable-Temperature (VT)

- To connect to variable-temperature apparatus
- Temperature range from -178°C to +300°C
- Room-temperature experiments to boost the sensitivity
- Short VT air pathway, which reduces thermal lag and gradients

NOTE: The lower section of the Dewar Insert is made of Quartz and the reduced section can be Quartz or Suprasil®.

Product Number	Upper Material	Dimensions mm					
		A	B	C	D	E	F
WG-821	QUARTZ	84	63	72	48	5 min	11.4 max
WG-821-Q	SUPRASIL®	84	63	72	48	5 min	11.4 max
WG-821-F	QUARTZ	147		72	48	6 min	10.5 max
WG-821-F-Q	SUPRASIL®	147		72	48	6 min	10.5 max

NOTE: WG-821 and WG-821-Q are silvered and dimpled. WG-821-F and WG-821-F-Q are not.

We also offer Long Dewar Inserts, WG-822 series and WG-821-FL, where section A and B are 242 mm. Visit our web site www.Wilmad-LabGlass.com or call the Customer Service Department at 800.220.5171 or 856.697.3000 for more information.

Performance Characteristics

- Most Dewar Inserts can be used between -178°C and +300°C
- For temperatures over 300°C, the special high-temperature Dewar Insert should be used
- For temperature below -178°C, the use of the Helium Cryostat is recommended

Ordering Tip

4 mm sample tube can be used with all Dewar Inserts. 5 mm sample tube can only be used with Dewar Inserts with "F" in the product number.

Dewar Inserts for JEOL Spectrometer

Wilmad-LabGlass offers series WG-848 Dewar Inserts for JEOL Spectrometers. The upper reduced section of the original JEOL Dewar Insert is made of Suprasil®; however our more economical version is available made from Quartz. There are two sidearm versions:

- The sidearm for connection with JEOL's VT system ends with a hollow #7 ball joint
- The sidearm for connection to other VT systems end with 12/5 ball joint

Please visit our web site www.Wilmad-LabGlass.com or call the Customer Service Department at 800.220.5171 or 856.697.3000 for JEOL Dewar Inserts selection and pricing.

WG-894 Dewar Insert for Q-Band or Low Gap Resonators

This is the largest Wilmad-LabGlass Dewar Insert. It is designed to allow insertion of the resonator inside the Dewar Insert. The insert, made from Pyrex® or equivalent, is silvered to the base of the upper section for thermal stability at temperatures above 100°C.

It can be used for any spectrometer that has a gap of 40 mm or larger.

Product Number
WG-894

Dewar Flasks (Cold Finger Dewars)

Dewar Flasks are a convenient alternative to VT systems for studies at -195°C (b.p. of liquid N₂).

Wilmad-LabGlass offers Dewar Flasks manufactured from either Quartz or Suprasil®. All Dewar Flasks are silvered around the reservoir. The most popular Dewar Flasks offered are listed below. If you need a special design, please contact our Customer Service Department.

Wilmad-LabGlass offers Dewar Flasks with small 50 mL and large 150 mL reservoirs.

Small 50 mL Dewar Flasks*

Use when the hold time of the experiment is between 15-25 minutes.

Product Number	Finger Material	Dimensions mm				
		A	B	C	D	E
WG-816	QUARTZ	4.9 min	11.4 max	22	86	162
WG-816-Q	SUPRASIL®	4.9 min	11.4 max	22	86	162
WG-816-B	QUARTZ	5.4	10.5	22	86	162
WG-816-B-Q	SUPRASIL®	5.4	10.5	22	86	162
WG-819	QUARTZ	4.9 min	11.4 max	22	105	178
WG-819-Q	SUPRASIL®	4.9 min	11.4 max	22	105	178
WG-819-B	QUARTZ	5.4	10.5	22	105	178
WG-819-B-Q	SUPRASIL®	5.4	10.5	22	105	178

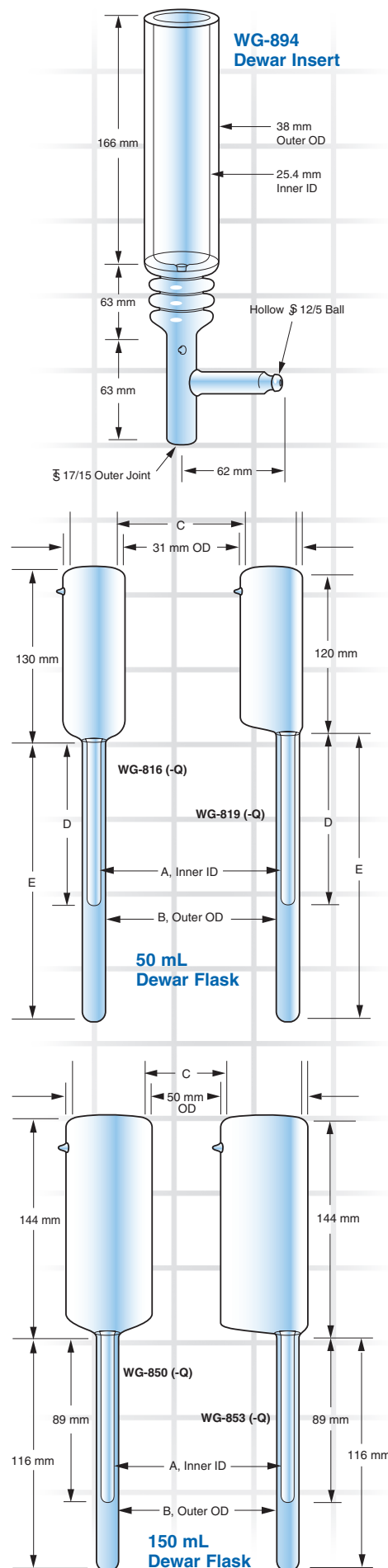
*Small Dewar Flasks hold up to 4 mm O.D. sample tubes

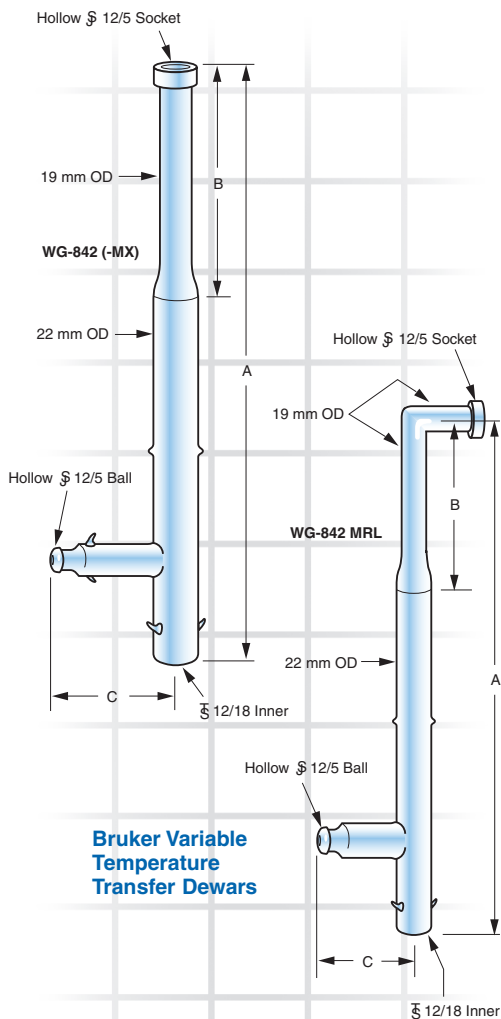
Large 150 mL Dewar Flasks

Use when the hold time of the experiment is greater than 30 minutes.

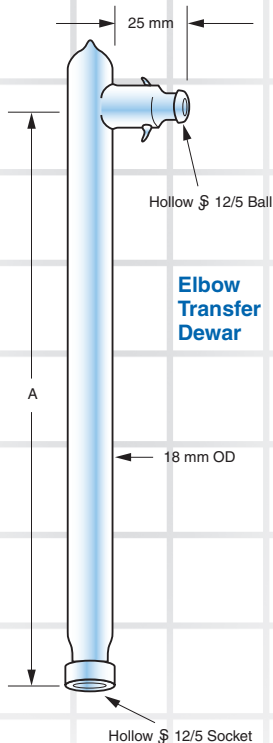
Product Number	Finger Material	Dimensions mm		
		A	B	C
WG-850	QUARTZ	4.9 min	11.4 max	22
WG-850-Q	SUPRASIL®	4.9 min	11.4 max	22
WG-850-B	QUARTZ	5.4	10.5	22
WG-850-B-Q	SUPRASIL®	5.4	10.5	22
WG-853	QUARTZ	4.9 min	11.4 max	22
WG-853-Q	SUPRASIL®	4.9 min	11.4 max	22
WG-853-B	QUARTZ	5.4	10.5	22
WG-853-B-Q	SUPRASIL®	5.4	10.5	22

The series WG-819 and WG-853 are Offset Dewar Flasks, which are used when the control is too close to the reservoir of the flask.





Bruker Variable Temperature Transfer Dewars



Elbow Transfer Dewar

Bruker Variable-Temperature (VT) Transfer Dewar

The Bruker ER 4121 VT system includes a long Transfer Dewar and heater that goes inside the Dewar. Wilmad-LabGlass, with the help of Bruker scientists, developed two Transfer Dewars that can be used with all Bruker EPR spectrometers:

- The longer WG-842-MX can be used with Bruker spectrometers with magnets (pole caps) >18 cm diameter
- The WG-842-MRL can be used with Bruker spectrometers with smaller magnets

Product Number	ID mm	Dimensions mm		
		A	B	C
WG-842	8	425	75	75
WG-842-MX	8	725	75	110
WG-842-MRL	7	768	118	110

NOTE: Lower chamber ID dimensions above standard taper joint are provided to calculate the ability to insert a heater probe. If you require a Transfer Dewar with a different ID dimension, please contact us with your specifications.

Wilmad-LabGlass also offers Bridge Transfer Dewar WG-843 for Bruker VT Systems. This Dewar is designed to make adjusting the flow path of the VT carrier gas easier. It is positioned between the long transfer and the Nitrogen Evaporator Dewar.

To order the Bridge Transfer Dewar please visit our web site www.Wilmad-LabGlass.com or call the Customer Service Department at 800.220.5171 or 856.697.3000.

Replacement Parts for Varian E-257 System

Replacement Heater/Sensor and Immersion Transfer Dewar

The Heater/Sensor is designed to fit into the Varian Dewar Insert (WG-821, see page 8). A version with a Type-T Thermocouple and an Immersion Transfer Dewar for connection to the liquid nitrogen bottle are also available.

Product Number	Description
WG-12571	Heater/Sensor with Platinum Element
WG-120131	Heater/Sensor with Type-T Thermocouple
WG-760	Immersion Transfer Dewar

Elbow Transfer Dewar

Product Number	A mm
WG-840	308
WG-840-L	346
WG-840-XL	416

Ordering Tip

If you need a Dewar Insert with a special diameter or length, silvered or dimpled, call the Customer Service Department at 800.220.5171 or 856.697.3000.

EPR of Electrolytically Generated Radicals

Most EPR studies of organic free radicals in solution have been generated by chemical oxidation or reduction. Controlled oxidation-reduction reactions can be carried out in the EPR cavity. Wilmad-LabGlass offers complete Electrolytic Cell Assemblies with a Quartz or Suprasil® Flat Cell. Components of an assembly are also available separately. Electrolytic cell assemblies are available for the TE₁₀₂ and TE₀₁₁ cavities of all spectrometers.

Complete Electrolytic Cell Assembly

Product Number	Description
WG-810	Bruker, Resonance Instruments/MicroNow
WG-810-Q	Varian, Radiopan
WG-810-J	JEOL
WG-810-J-Q	JEOL

Components for Electrolytic Cell Assembly

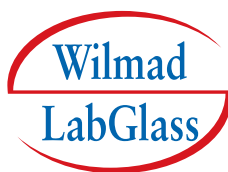
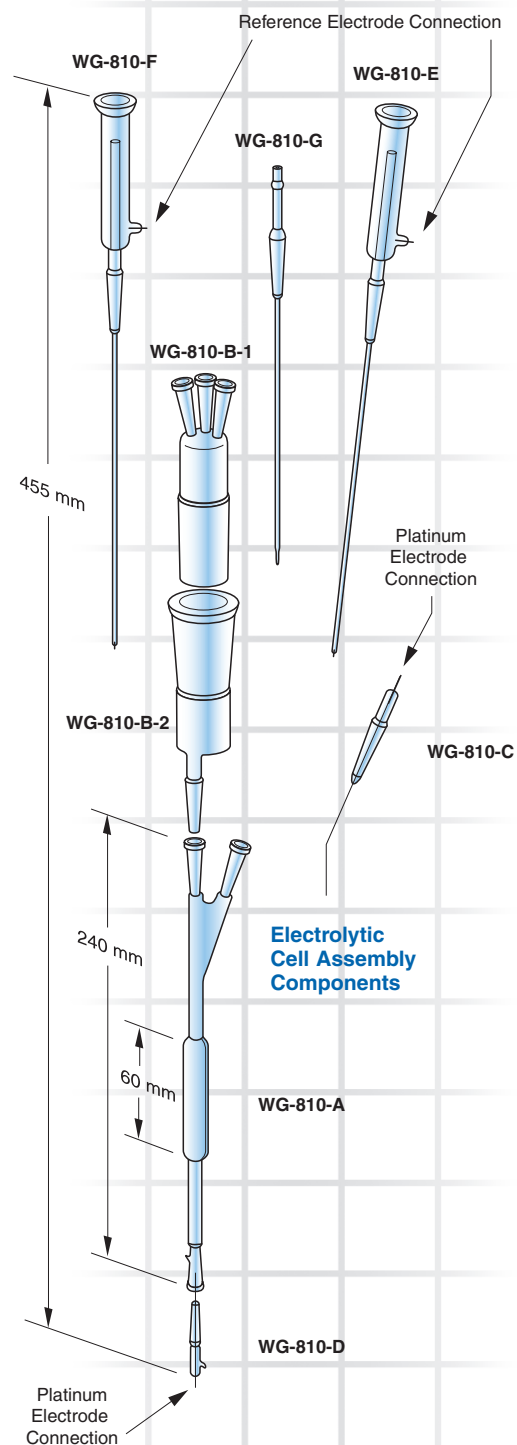
Product Number	Description
WG-810-A	Quartz Flat Section
WG-810-A-Q	Suprasil® Flat Section
WG-810-C	Upper Platinum Electrode, 8"
WG-810-D	Lower Platinum Electrode, 2"
WG-810-E	Short Calomel Electrode, 8-3/4"
WG-810-F	Long Calomel Electrode, 13"
WG-810-G	Gas Bubbler

Electrolytes for Electrolytic Cells

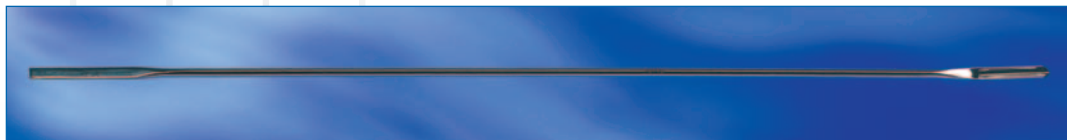
Product Number	Description
18513	Reference Solution—3M KCl saturated with AgCl
18508	Electrode Cleaner, for removing protein coating
18528	Diaphragm Cleaner: Thiol based
18895	Reactivating Solution: Hydrofluoric Acid based
18823	Electrode Storage Solution—3M KCl

Ordering Tip

Wilmad-LabGlass offers a special pH electrode that fits into sample tubes as small as 5 mm O.D. (see page 14).



Accessories



EPR Spatula

Product Number	Description
806	Stainless Steel Micro Spatula



EPR Pipettes

Product Number	Description
803	10-3/4" Overall length, Short Tip for 5 mm or larger OD 7" length tubes
803A	13-1/2" Overall length, Long Tip for 5 mm or larger OD 7", 8", and 9" length tubes
803B-3	Pipettes, 10-1/2" Overall length, Long Tip for 3 mm 7", 8", and 9" length tubes
804	Latex Bulb, for all pipettes



EPR Filters and Funnels

Product Number	Description
807	Regular Tip Filter
808	Luer Tip Filter
809	Rubber Bulb
815	EPR Powder Funnel



Hamilton Gas-Tight Syringes

Product Number	Syringe Volume (μL)	Graduations Every (μL)
81220	500	10
81320	1000	20
81420	2500	50
81520	5000	100

NOTE: Can be used with SS or PTFE needles. PTFE needles are 12" in length with ODs from 0.79 to 2.11 mm and allow sample retrieval from the smallest sample tube. Call Customer Service at 800.220.5171 or 856.697.3000.



Stainless Steel Needle

Product Number	Description	Pack
90022	22 Gauge Needle, 2" Length (0.41 mm ID x 0.71 mm OD)	6

Sample Tube Caps

Product Number	Tube OD mm	Cap Color
521-G	4	Blue
521	5	Red, Yellow, Blue, Green Black, Purple, Orange, White
521-C	10	Red

NOTE: Not to be used with chloroform. Use Teflon® tube caps.

Teflon Tube Caps

Product Number	Tube OD mm
WG-1264-3	3
WG-1264-4	4
WG-1264-5	5
WG-1264-10	10

Screw-Cap Closures for Special EPR Tubes

Product Number	Tube OD mm
Solid Caps	
TR-SC-01	4-5
Open Caps	
TR-OC-01	3 and 5

Septa for Open Caps

Product Number	Description
TR-LR-01	PTFE/Pharm. Rubber for 3 & 5 mm Tubes
TR-LS-01	PTFE/Silicone Rubber for 3 & 5 Tubes

Screw Cap Closures and Septa are available for special 10 mm OD EPR tubes. Call Customer Service at 800.220.5171 or 856.697.3000 for price and availability.

EPR Tube Racks

Product Number	Description	Tube Size mm
820-A	Polypropylene	4-5
820-B	Polypropylene	10
WG-1301	Coated Steel	≤12
WG-2442	Stainless Steel	4-5

Wilmad-LabGlass also offers Sample Support Collets for JEOL ES-UCX2 Resonator Cavity, which holds the sample tube in place. For a complete product listing, visit www.Wilmad-LabGlass.com.

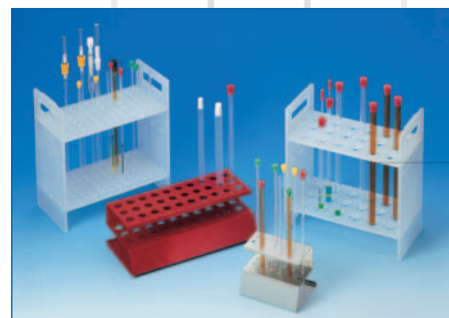
Pressure-Sensitive Labels

Product Number	Tube OD mm	Labels/Package
WGL-5	5	480
WGL-10	10	400



Technical Tip

PTFE/pharmaceutical grade rubber septa are inert to most solvents and many corrosive materials. They are not recommended for multiple punctures. PTFE/silicone septa are inert to most organic solvents and compounds; however, they are not recommended for use with strong corrosive materials.





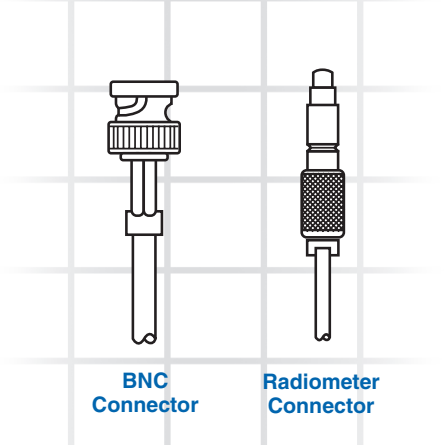
Tip-Off Manifold

Applications:

- Air-sensitive samples
- Sample sealing
- Vacuum transfers
- Freeze-pump-thaws

Provides excellent chemical resistance because only PTFE, Viton®, and Pyrex® materials contact the sample.

Product Number	Tube OD mm
552-3	3
552-5	5
552-10	10



pH Electrodes

pH Range: 1-14

Sodium Error: 0.1 at pH 12

Temperature Range: 0-70°C

Resistance at 20°C: 100-1000 Ω

Resolution: ±0.02 pH Units

Reproducibility: 99% within 1 min

Wilmad-LabGlass has a wide selection of electrolytes and electrode cleaners. For a complete listing, visit our web site www.Wilmad-LabGlass.com or call the Customer Service Department at 800.220.5171 or 856.697.3000.

Product Number	Description
6030-02-BNC	pH electrode with BNC Connector
6030-02-6	pH electrode with Radiometer Connector



EPR/NMR Tube Washers

For easy cleaning of your tubes!

Single-Tube Washer Without Ground Joint

Product Number	Tube OD mm	Length mm
WG-1207-5	5	178
WG-1207-5-8	5	203
WG-1207-10	10	178

Use with thin-walled tubes only.

Single-Tube Washer With 24/40 Ground Joint

Product Number	Tube OD mm	Length mm
WG-1207-J5	5	178
WG-1207-J5-8	5	203
WG-1207-J10	10	178

Use with thin-walled tubes only.

Multi-Tube Washer

Product Number	Tube OD mm	Length mm
WG-2506	5	178

Use with thin-walled tube only. Custom multi-tube washers are available for different length tubes.



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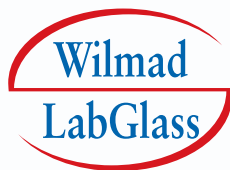
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