AVIO ICP-OES CONSUMABLES AND SUPPLIES

Consumables and Supplies Reference Guide

PerkinElmer®
For the Better

INTRODUCTION AND OVERVIEW

Consumables for the Avio® 200/500 and the Avio® 220/550/560 Max series are designed with your instrument in mind. Each part is fit to perform and manufactured with the highest quality materials available. Whether you're looking for sample introduction components or standards, we have the consumables you need to keep your Avio systems up and running.

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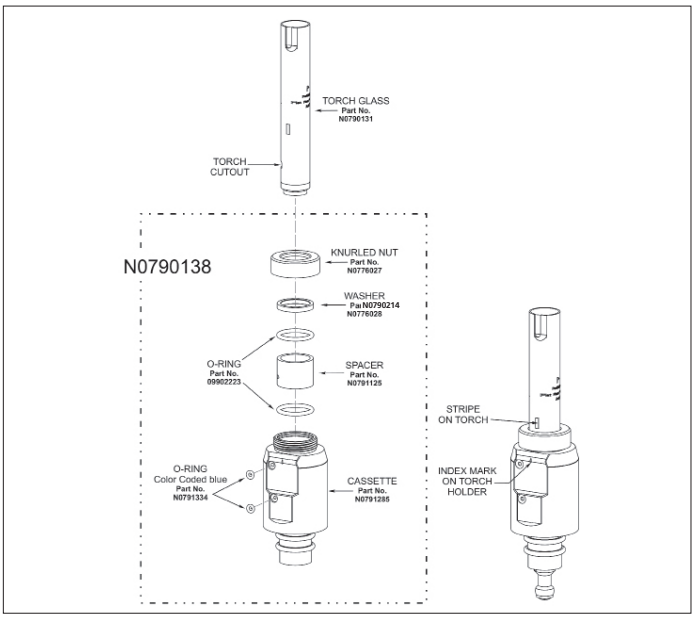
Demountable Torches

Demountable design using one-piece quartz tubing for plasma and auxiliary gas flow. Available in a range of styles from 1 and 3 slots, depending on your application needs. 1-slot torches are the standard torch for aqueous solutions. 3-slot torches are typically used for organic analysis.

Quartz Torches

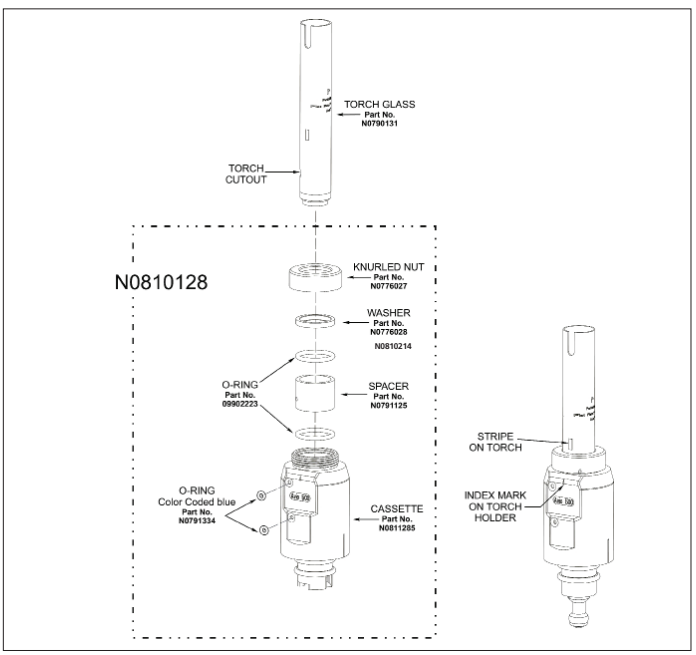
Description	# of Slots	Part No.
Standard	1	N0790131
Hybrid XLT Organics (not ceramic)	3	N0790249
With PVDF O-Ring-free holder	1	N0811908



Avio 200 and 220 Max Torch Body Assembly (N0790138)

Torch O-Rings and Removal Tool

# of Slots	Qty.	Part No.
O-Ring Kit for Adjustable Torch		N0790437
Includes:		
O-Ring – 0.799 ID 0.103 WD	2	09902223
O-Ring – 0.101 ID 0.070 WD	2	N0791334
O-Ring Kit for Scott Injector		N0790440
Includes:		
O-Ring - 8.74 ID 1.78 WD	2	09200518
O-Ring - 0.239 ID 0.70 WD	2	09902207
O-Ring - 0.344 ID 0.070 WD	2	N0791333
O-Ring Kit for Cyclonic Injector		N0790441
Includes:		
O-Ring - 0.239 ID 0.70 WD	2	09902207
O-Ring - 0.301 ID 0.70 WD	2	09926070
O-Ring - 0.344 ID 0.070 WD	2	N0791333
O-Ring Removal Tool		09920410

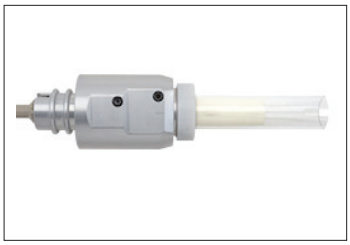


Avio 500 and 550/560 Max Torch Body Assembly (N0810128)

Torch Body Assemblies

Description	Part No.
Torch Body Assembly for Avio 200 and 220 Max	N0790138
Torch Body Assembly for Avio 500 and 550/560 Max	N0810128

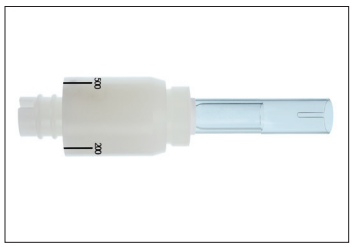
Demountable Torches, Continued



D-Torch™ and Spares

The D-Torch is designed to reduce running costs associated with torch wear when analyzing challenging sample such as organic solvents, fusions and samples containing high total dissolved solids (TDS) or hydrofluoric acid (HF).

Description	Part No.
Avio 200 and 220 Max D-Torch Complete Assembly with Quartz Outer Tube	N0790442
Avio 500 and 550 Max D-Torch Complete Assembly with Quartz Outer Tube	N0810861
Avio 200 and 220 Max D-Torch Ceramic Outer Tube (optional)	N0791303
Avio 500 and 550 Max D-Torch Ceramic Outer Tube (optional)	N0811912
Avio 200 and 220 Max D-Torch Body	N0791300
Avio 500 and 550 Max D-Torch Body	N0811904
Avio 200 and 220 Max / Avio 500 D-Torch Outer Tube	N0791301
Retaining Ring for Outer Tube	N0777055
O-Ring Kit	N0777715
Torch Adapter with Auxiliary Port	N0774070



ESI ZipTorches

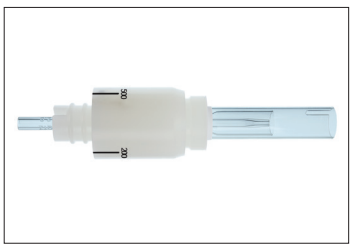
The ESI ZipTorch is a new torch design for Avio ICP-OES. ZipTorches can be used interchangeably between the two systems.

Features

- One-piece base
- Dual gas connections
- No internal o-rings
- Quick-press and socket-free spray chamber connection

Benefits

- Easy cleaning
- Highly reproduceable installation position
- No user contact with torch tubes
- One torch for all Avio ICP-OES instruments
- Torch or injector can be exchanged in seconds
- Eliminate ground glass ball joint connectors and clamps

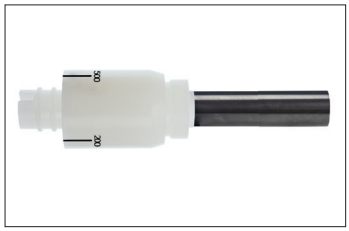


One-piece ZipTorches

The one-piece ZipTorch has an integrated quartz injector for simplicity, easy maintenance and quick torch alignment.

Description	Injector Size	Part No.
Quartz one-piece ZipTorch with injector and PVDF o-ring free holder	1 mm	N0811902
	1.5 mm	N0811903
	2 mm	N0811906
	2.5 mm	N0811907
Organics Quartz one-piece ZipTorch with injector and PVDF o-ring free holder	1 mm	N0791864
	1.5 mm	N0791865
	2 mm	N0791866

Demountable Torches, Continued

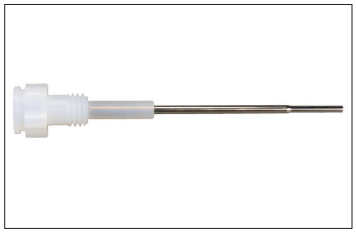


Demountable ZipTorches

The demountable ZipTorch utilizes a removable and replaceable injector. Recommended for use with HF applications (using sapphire or Pt injectors) or when the user prefers to remove the injector for cleaning without dismounting the torch.

The Nitride ZipTorch is a direct replacement for the standard Avio ICP-OES torches. It provides substantial enhancements in chemical resistance over standard quartz torches.

Description	Part No.
Demountable Quartz ZipTorch with PVDF O-Ring-Free Holder	N0811908
Demountable Organic ZipTorch with PVDF O-Ring-Free Holder	N0811935
Demountable Silicon Nitride ZipTorch with PVDF O-Ring-Free Holder	N0811913



Injectors for Demountable ZipTorches

ZipTorch injectors are designed for use with the quartz, organics and silicon nitride demountable torches. Quartz is used for wide range of non-HF aqueous applications and organic solvents. Sapphire is utilized for environmental, geochemistry, and HF applications. Platinum is used with volatile organic solvents and HF-containing semiconductor-grade chemicals.

Description	Injector Size	Part No.
Quartz Demountable Injectors	1 mm	N0791859
	1.5 mm	N0791860
	2 mm	N0791861
	2.5 mm	N0791862
Sapphire Demountable Injectors	1.5 mm	N0791850
	2 mm	N0791851
Platinum Demountable Injectors	2 mm	N0791849

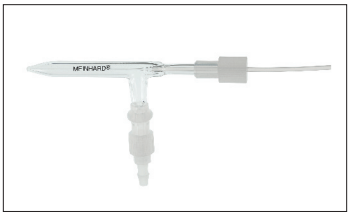
Torch Modules for Avio 200 and 220 Max

Description	Part No.
Quick Change Torch Module - Scott Spray Chamber/Cross-Flow Nebulizer *Includes: GemTip Cross-Flow Nebulizer (N0780546), 1-Slot Quartz Torch (N0790131), 2.0 mm Alumina Injector (N0791183), Scott Spray Chamber (N0791499).*	N0790606
Quick Change Torch Module - Cyclonic Spray Chamber/Concentric Nebulizer *Includes: Type K1 Standard Nebulizer (N0777707), 1-Slot Quartz Torch (N0790131), 2.0 mm Alumina Injector (N0791183), Baffled Cyclonic Spray Chamber (N0791352).*	N0790607

Torch Modules for Avio 500 and 550/560 Max

Description	Part No.
Quick Change Torch Module - Scott Spray Chamber/Cross-Flow Nebulizer *Includes: GemTip Cross-Flow Nebulizer (N0780546), 1-Slot Quartz Torch (N0790131), 2.0 mm Alumina Injector (N0791183), Scott Spray Chamber (N0791499).*	N0810606
Quick Change Torch Module - Cyclonic Spray Chamber/Concentric Nebulizer *Includes: Type K1 Standard Nebulizer (N0777707), 1-Slot Quartz Torch (N0790131), 2.0 mm Alumina Injector (N0791183), Baffled Cyclonic Spray Chamber (N0791352).*	N0810607

Nebulizers



MEINHARD® Nebulizers

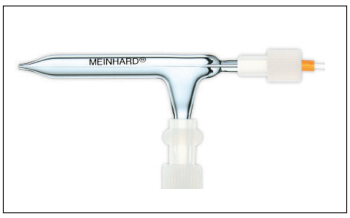
Provide excellent sensitivity and precision for aqueous solutions and samples with few dissolved solids (less than 1%). MEINHARD® Nebulizers are self-aspirating and must not be used with solutions containing hydrofluoric acid. All require an end cap for use with Ryton® Scott spray chambers.

Type A nebulizers are for high sensitivity.

Type C and K are for high solids. Type K are for low argon flow.

Type	Ar Flow Rate	Uptake Rate	Material	Part No.
A3	1 L/min	3 mL/min	Glass	00472020
C1	1 L/min	1 mL/min	Glass	00472022
K3	0.7 L/min	3 mL/min	Glass	N0681574
K1	0.7 L/min	1 mL/min	Glass	N0777707
K1 LDV*	0.7 L/min	1 mL/min	Glass	N0811287

Includes: N0777414, N8121036, N0777460
**Standard nebulizer included with Avio instrument.*



MEINHARD® Plus Nebulizers

Type A+ nebulizers are for lowdead volume and high sensitivity

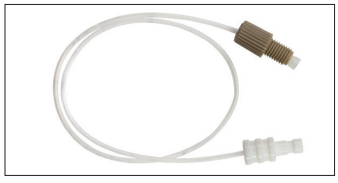
- Self aspiration rate 0.5 mL/min with argon flow 1 L/min at 50 PSI (3.4 bar/345 kPa)
- Peristaltic pumped rate 0.1 mL/min to 3.0 mL/min
- Quartz reduces blank levels compared to glass nebulizers

Type	Ar Flow Rate	Uptake Rate	Material	Part No.
TR+	1 L/min	0.5 mL/min	Glass	N8122462
TQP+	1 L/min	0.5 mL/min	Quartz	N8122461

Includes: N8121039, GL54, N8121036, N0777460

MEINHARD® Nebulizer Spares

Description	Part No.
Liquid-End Connector Kit, 10" length by 0.020" ID x 0.062" OD	N0811288
Nebulizer Clip for MEINHARD® Nebulizers	N0777460
F5-50 Standard Nebulizer Solution Fitting, 0.5 mm PTFE. 0.5 mm x 70 cm Capillary	N0777414
Nebulizer Clip for MEINHARD Nebulizers, Qty. 1	N0777460
FG PFA Gas Quick Connect	N8121036
F0 Encapsulated Micro Tubing, 0.25 mm ID (Green Marker) 70 cm Long Micro Capillary	N8121038
F1 Detachable Capillary, 0.80 mm ID (Blue Marker) 70 cm Long Capillary	N8121037
F2 Standard Integrated Capillary, 0.5 mm ID (Orange Marker) 70 cm Long Capillary	N8121039
MEINHARD Nebulizer Gas Line	N0791843
PFA Adapter for Glass Nebulizers	N8145365
Quick Disconnect Tubing without Swagelock	N0770610
Nebulizer Spacer (Avio)	N0791438



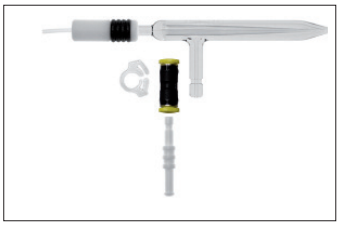
Direct Connection (DC) Nebulizer Spares

Description	Part No.
DC Nebulizer Gas Fitting with Ratchet Nebulizer Connector for Avio	N0811308

Nebulizers, Continued

End Cap for Concentric Glass, GemCone and Similar Nebulizers

Description	Part No.
Scott Spray Chamber End Cap	N0680504

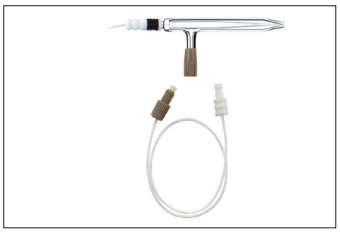


MicroMist U-Series Nebulizers

Ar Flow Rate	Uptake Rate	Part No.
0.7 L/min	0.05 mL/min	N0775349
0.7 L/min	0.1 mL/min	N0775348
0.7 L/min	0.2 mL/min	N0775347
0.7 L/min	0.6 mL/min	N0775346

SeaSpray U-Series Nebulizers

Ar Flow Rate	Uptake Rate	Part No.
0.7 L/min	2 mL/min	N0775345

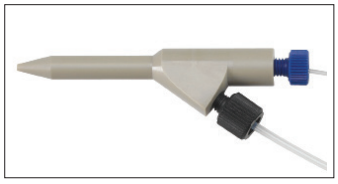


MicroMist Direct Connection (DC) Nebulizers

Ar Flow Rate	Uptake Rate	Part No.
0.7 L/min	0.05 mL/min	N0811303
0.7 L/min	0.1 mL/min	N0811302
0.7 L/min	0.2 mL/min	N0811301
0.7 L/min	0.6 mL/min	N0811300

SeaSpray Direct Connection (DC) Nebulizers

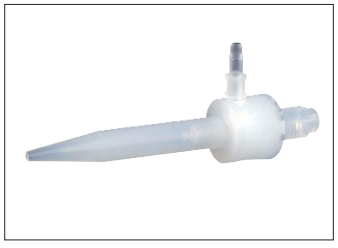
Ar Flow Rate	Uptake Rate	Part No.
0.7 L/min	0.4 mL/min	N0811307
0.7 L/min	1.0 mL/min	N0811306
0.7 L/min	2.0 mL/min	N0811305



PEEK and PTFE Mira Mist® Nebulizers

The MiraMist® fits regular spray chambers as a direct replacement for glass concentric nebulizers. Its features include standard pressure (45 psi), low sample flow and enhanced parallel path design.

Description	Uptake Rate	Part No.
PEEK Mira Mist®	0.2 to 2.5 mL/min	N0775330
PTFE Mira Mist	0.02 to 2.5 mL/min	N0777031
Ari Mist	0.05 to 1.0 mL/min	N0777032
T2100	0.5 to 3.0 mL/min	N0777033



MicroFlow Nebulizers

MicroFlow nebulizers are constructed entirely from chemically resistant fluoropolymers, ideal for strong acids, alkalis, organics, high salt solutions and high solid concentrations. They are resistant to clogging, are reliably self-aspirated or pumped and produce a fine aerosol for high transport efficiency and high sensitivity.

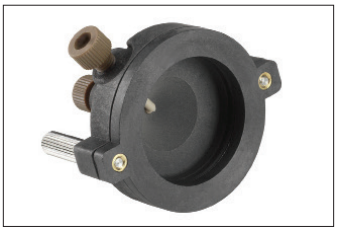
Description	Part No.
PolyPro ST Nebulizer	N0777219
PFA-ST Nebulizer	N0777049
PFA-ST3 MicroFlow Nebulizer	N0777676

Nebulizers, Continued

GemCone™ Nebulizers

Low-Flow GemCones™ permit lower nebulizer gas flow rates, useful for spectral lines with high excitation energies and for providing a more robust plasma. GemCone™ Nebulizers require an end cap for use with Ryton Scott Spray Chambers.

Description	Part No.
GemCone™ Low-Flow Nebulizer	N0770358
GemCone™ High Dissolved Solids	N0690670
GemCone™ Sample Capillary Adapter	N0371505
Scott Spray Chamber End Cap for GemCone™ Nebulizers	N0680504
Quick Disconnect Tubing	N0770336



GemTip™ Cross-Flow II Nebulizers

Excellent general purpose nebulizer for the analysis of strong mineral acids (including HF) and samples with less than 5% dissolved solids.

Description	Part No.
GemTip™ Cross-Flow II Nebulizer	N0780546
GemTip™ Cross-Flow II Tip Kits	N0780676
GemTip™ Cross-Flow Nebulizer O-Ring Kit *Includes: 09902001 qty. 2, 09902033 qty. 2, 09902151 qty. 3, 09921003 qty. 1, 3 cm of Teflon® sample tubing.*	N9300067

pergo Argon Humidifiers

The *pergo* improves performance of all concentric nebulizers for the routine analysis of brines, fusion digests and other high-TDS samples. A high-pressure membrane positioned inside a temperature-controlled water reservoir perfuses water vapor into the ICP nebulizer gas stream. By increasing humidity in the argon nebulizer gas, the *pergo* prevents salt deposits at the nebulizer tip, improving short and long-term signal stability. *pergo* 2 dual Argon humidifier is for analyses dealing with high concentrations of dissolved solids on instruments using auxiliary gas. Includes gas line connector kit.

Description	Part No.
pergo argon high solids accessory without Nebulizer	N8145315
pergo argon high solids accessory with MEINHARD® TR+ Nebulizer	N8145316
pergo 2 without Nebulizer	N8140743
pergo argon high solids accessory with PFA-ST HF-resistant Nebulizer	N8150427

Spray Chambers

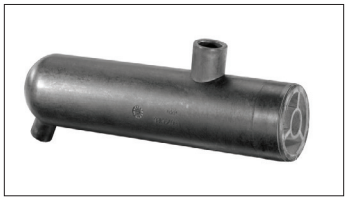
Baffled Cyclonic Spray Chambers

Description	Part No.
Baffled Cyclonic Spray Chamber (Standard)	N0791352
Baffled Cyclonic Spray Chamber 4 mm for Oils with Oxygen Port	N0770389
Avio 200 and 220 Max Quartz O-Ring Free Spray Chamber	N0791841
Avio 200 and 220 Max Quartz 8 mm PFA Adapter O-Ring Free Spray Chamber	N0791842
Avio 500 and 550/560 Max Quartz 12/5 Socket O-Ring Free Spray Chamber	N0811900
Nebulizer Spacer	N0791438
Extra Metal Clip	09200593

Spray Chambers, Continued

HF Resistant Spray Chamber

Description	Part No.
HF Resistant Cyclonic Spray Chamber TFE PTFE O-Ring free, 50 mL with grounding strap included	N0790373



Scott Spray Chamber

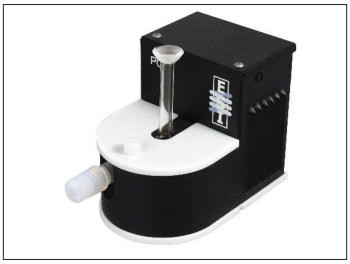
The Scott Spray Chamber is corrosion-resistant and is inert to most mineral acids including HF, aqua regia and all organic solvents normally used in ICP analyses.

Description	Part No.
Scott Spray Chamber	N0790384
Scott Spray Chamber Clamp Adapter	N0790296

PFA Spray Chambers

All-purpose spray chambers which offers resistance to hydrofluoric acid.

Description	Part No.
PFA 47 mm M-200 Avio	N0791847
PFA 47 mm M-200 with Gas Port	N0791848



Temperature Controlled Spray Chambers

PC^3 Peltier Cooled sample introduction system (Temperature Range + 2 °C to -5 °C) with PFA-ST Nebulizer. The PC^{3x} operates at -10 °C to + 80 °C.

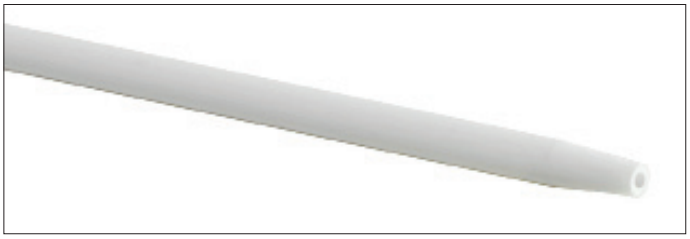
Description	Part No.
PC^3 Peltier Cooled Cyclonic Spray Chamber for Avio 200 and 220 Max	N0790953
PC^{3x} Peltier Cooled Cyclonic Spray Chamber for Avio 200 and 220 Max	N0790959
PC^{3x} Peltier Cooled Cyclonic Spray Chamber for Avio 500 and 550 Max	N0810860

IsoMist Spray Chambers

The IsoMist XR programmable temperature controlled cyclonic spray chamber now features an improved thermodynamic design providing an extended temperature range and faster cool-down, so your ICP is ready to go sooner. IsoMist XR has a peltier unit with a range of -25 °C to + 80 °C.

Description	Part No.
IsoMist XR Glass	N0810856
IsoMist XR PFA	N0810857
IsoMist XR Quartz	N0810858

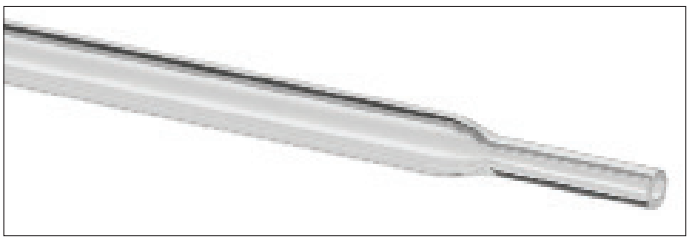
Injectors and Injector Support Adapters



Alumina Injectors

Alumina injectors are corrosion-resistant to all mineral acids including HF and aqua regia. They are also used with less volatile organic solvents, e.g., xylene.

Dimensions	Part No.
0.80 mm i.d.	N0791180
1.2 mm i.d.	N0791181
1.2 mm i.d. (1.2 mm entire length of tube)	N0791182
2.0 mm i.d. (standard with Avio instrument)	N0791183



Quartz Injectors

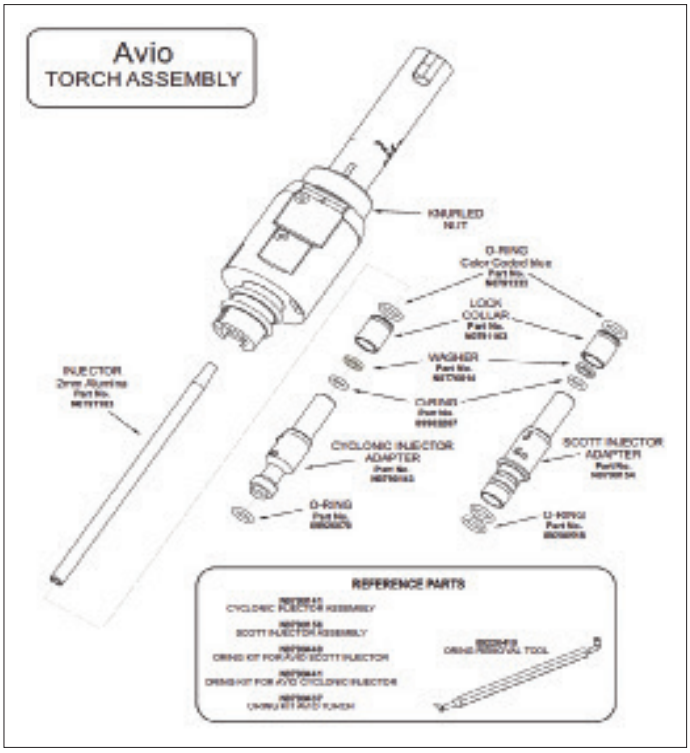
Quartz injectors are designed for organic solvents and non-HF matrices.

Dimensions	Part No.
0.80 mm i.d.	N0791185
1.2 mm i.d	N0791186
1.2 mm i.d. (1.2 mm entire length of tube)	N0791187
1.6 mm i.d.	N0791188
2.0 mm i.d.	N0791189
3.0 mm i.d.	N0791190

Sapphire Injectors

Sapphire injectors are ideal for silicon applications.

Dimensions	Part No.
2.0 mm i.d.	N0791184



Injector Support Adapter Kits and O-Rings

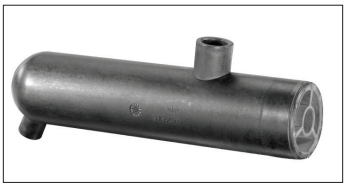
Dimensions	Part No.
Injector Adapter Kit-Cyclonic (includes o-rings)	N0790141
Injector Adapter Kit-Scott (includes o-rings)	N0790156
Injector Adapter O-Ring Kit Cyclonic *(Includes: 09902207 qty. 2, 09926070 qty. 2, N0791333 qty. 2)*	N0790441
Injector Adapter O-Ring Kit Scott *(Includes: 09902207 qty. 2, 09200518 qty. 2, N0791333 qty. 2)*	N0790440
O-Ring Kit for Avio Torch	N0790437
O-Ring Removal Tool	09220410

Sample Introduction Kits

Cyclonic/Concentric Kit

	Part No.
Cyclonic/Concentric Kit*	N0790608
Includes:	
1 Slot Quartz Torch	N0790131
2.0 mm i.d. Alumina Injector	N0791183
Baffled Cyclonic Spray Chamber	N0791352
MEINHARD® Type K1 Nebulizer	N0777707
Injector Adapter	N0790141

**Includes one of each.*



Scott/Cross-Flow II Kit

	Part No.
Scott/Cross-Flow II Kit*	N0790609
Includes:	
1 Slot Quartz Torch	N0790131
2.0 mm i.d. Alumina Injector	N0791183
Scott Spray Chamber*	N0790384
GemTip™ Cross-Flow II Nebulizer	N0780546
Injector Adapter	N0790156
Scott Spray Chamber Clamp Adapter	N0790296

**Includes one of each.*

Organics Kit

	Qty.	Part No.
Organics Kit		N0790610
Includes:		
3 Slot Quartz Torch	2	N0790249
1.2 mm i.d. Alumina Injector (1.2 mm entire length of tube)	2	N0791182
Baffled Cyclonic Spray Chamber	1	N0791352
GemCone™ Low-Flow Nebulizer	1	N0770358
Cyclonic Spray Chamber Adapter	1	N0790141
Nebulizer Spacer	1	N0791438

Purge Components

Axial Window

Purge Components

Description/ICP Model	View	Part No.
Purge Window Avio 200/500 and Avio 220/550/560 Max	Axial	09992731
Purge Window Avio 200 and 220 Max	Radial	N0690672
Purge Window Avio 500 and 550/560 Max	Radial	N0810346
Optical Kit (includes Windows O-Rings) Avio 200 and 220 Max	Axial/Radial	N0790439
Axial Flat Mirror Kit Avio 200 and 220 Max	Axial	N0790196
Optical Kit (includes Windows and O-Rings) Avio 500 and 550/560 Max	Axial/Radial	N0810439
Flat Mirror Kit Avio 500 and 550/560 Max	Axial	N0810194

Autosampler Tubes

Autosampler Graduated Tubes with Red Caps

Capacity	Size	Type	Qty.	Part No.
15 mL*	17 mm x 120 mm	Conical Bottom	500	B0193233
50 mL*	28 mm x 115 mm	Conical/Freestanding	500	B0193234

Autosampler Round Bottom Tubes

Capacity	Size	Type	Qty.	Part No.
8 mL	13 mm x 100 mm	Round Bottom	1,200 bulk	N0777156
15 mL	17 mm x 100 mm	Round Bottom	1,200 bulk	N0777167
	Plugs for N0777167	(blue) Plugs Only	1,200 bulk	N0777599
15 mL*	17 mm x 100 mm	Round Bottom	2,000 bulk	N0777099

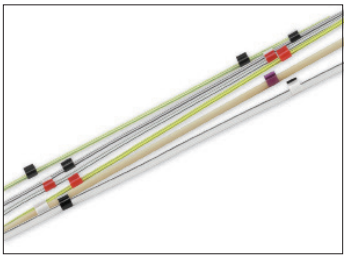
**Graduated tubes*

Spares

Spares

Description	Part No.
Instrument Air Filter (intake) – Requires 2 (Avio 200 and 220 Max) Requires 4 (Avio 500 and 550/560 Max)	09995098
Air Filter Assembly for Instrument Air Supply (see image on left)	N0775325
Replacement Air Filter Element for N0775325	N9306067
Polyscience WhisperCool Chiller Replacement Air Filter	N0777095
Chiller Coolant Mix 30 Plus-Five 1/2 Gallons	N0776200

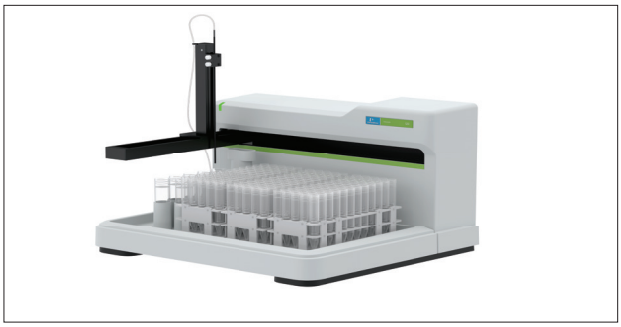
Pump Tubing



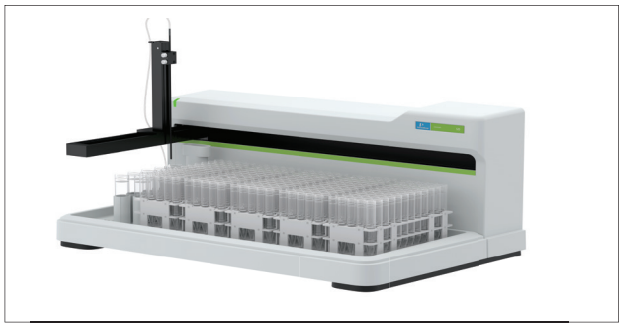
i.d. (mm)	Stop Colors	Standard PVC (Pkg 12)	Flared PVC (Pkg 12)	Solvent Flex (Pkg 12)	Viton® (Pkg 12)	Santoprene® (Pkg 12)	Silicone (Pkg 6)
0.19	orange / red	N0695476	N0773111				
0.25	orange / blue	N0773117	N0773112				
0.38	orange / green	N0777110	N0777042	N0777874			
0.44	green / yellow		N0773113				
0.51	orange / yellow		N0777476		N0777446		
0.64	orange / white		N0777711				
0.76	black / black	09908587	N0777043	00473550	N0773118		00473552
1.02	white / white				N0777442		N0777441
1.14	red / red	09908585		09923037	N0773115	N0773119	N0691595
1.30	gray / gray				N0777445	N0777444	N0777443
1.42	yellow / yellow	N0777521					
1.52	yellow / blue	09923536					
1.65	blue / blue				N0777447		
1.85	green / green	N0777518				N0773116	
2.06	purple / purple	N0777561					
2.79	purple / white			02508080			09923448
3.18	black / white	N8122012					

S23/S25 Autosampler and Supplies

The S20 series is a platform of high-performance, robust, chemically resistant and agile autosamplers, designed specifically to improve sample throughput and save on analysis time.



S23 Autosampler (N0830015)



S25 Autosampler (N0830025)

50 mL Autosampler Tubes (B0193234)

S23 and S25 Autosampler Kits

Aqueous Consumables Kit Included with Autosampler (Ships with S23 and S25 Autosamplers)

Description	Qty.	Part No.
Carbon Fiber Probe 0.5 mm I.D. x 108 in. – PTFE	1	N0777547
Probe Fitting Kit (1x Barb, 2x Ferrule 1x ¼ 28 Fitting)	1	N0830022
S20 Series Dual Rinse Station	1	N0831032
S20 Tygon Rinse and Waste Tubing Kit	1	N0831033
Peri-pump Tubing Pharmx Kit 1X 3.2mm 2X 2mm ID	1	N0831030
Narrow Neck Bottle without Cover, 2 L	2	B0104344
50 mL Autosampler Tubes 28 mm x 115 mm (Freestanding) with Red Flat Caps	10 (tubes)	B0193234
15 mL Autosampler Tubes 17 mm x 100 mm (Round Bottom)	60 (tubes)	N0777167
Sample Rack, 60 Position, 15 mL Autosampler Tubes	1	N0830026

Ultra Clean Consumables Kit (Sold Separately) Kit Part No. N0830017

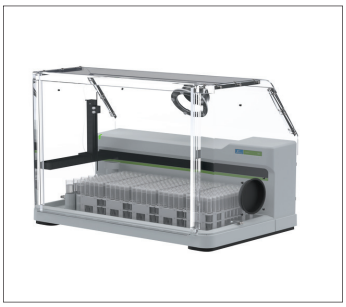
Description	Qty.	Part No.
Polypropylene Bottle Rinse 2 Container, 4 Liter	1	N0777259
Polypropylene Bottle Rinse 1 Container, 4 Liter	1	N0777258
Dual Rinse Station	1	N0831032
Peripump Tygon Tubing 2 x 2 mm x 1 x 3.2 mm	1	N0831039
Tygon Tubing FEP Lined 120"	1	N0831041
Rinse Line, 1.0 mm ID	2	N2024101
Self-aspirating Probe 80 cm Capillary 0.30 mm ID	1	N8152513

Filtered Stainless Steel Probe (N0771529)

Organics Consumables Kit (Sold Separately) Kit Part No. N0830013

Description	Qty.	Part No.
Narrow Neck Bottle without Cover, 2 L	2	B0104344
Filtered Stainless Steel Probe	1	N0771529
60-Position Metal Sample Rack	1	N0811959
Probe Fitting Kit (1x Barb, 2x Ferrule 1x ¼ 28 Fitting)	1	N0830022
Dual Rinse Station	1	N0831032
Tygon Rinse and Waste Tubing Kit for Fuels and Lubricants (Yellow)	1	N0831036
Peri-pump Tubing Viton Kit 1x 3.2mm 2x 2 mm ID	1	N0831040

S23/S25 Autosampler and Supplies continued



S25 Enclosure N0830021

Additional Accessories (Sold Separately)

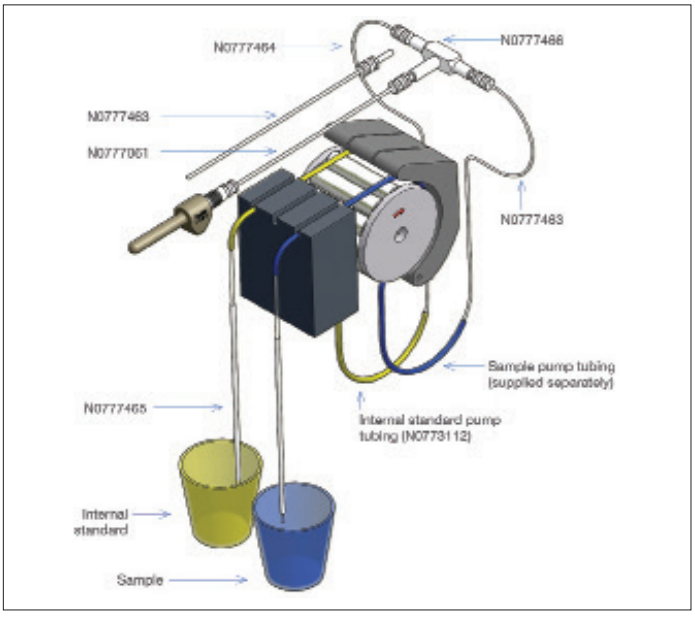
Description	Part No.
S23 Enclosure	N0830011
S25 Enclosure	N0830021
HEPA Filter Kit For S23/S25 Enclosures	N0810920
HEPA Filter Only	N0811977
S23 Removeable Tray	N0831037
S25 Removeable Tray	N0831038
Filtered Stainless Steel Probe with Screen Tip	N0771529
Plastic Sample Rack 21 Locations 25 – 30 mm Tubes	N0830028
Plastic Sample Rack 60 Locations 13 – 16 mm Tubes	N0830026
Metal Sample Rack 60 Locations 13 – 16 mm Tubes	N0811959
Plastic Sample Rack 90 Locations 10 – 13 mm Tubes	N0830027
Double Rinse Station for S20 Autosamplers	N0831032

Additional Consumables (Sold Separately)

Description	Part No.
15 mL Autosampler Tubes with Red Flat Caps, Qty. 500	B0193233
50 mL Freestanding Autosampler Tubes with Red Caps, Qty. 500	B0193234
15 mL Round Bottom Autosampler Tubes; Qty. 1200	N0777167
Plugs for 15 mL N0777167 Tubes, (Blue) Plugs Only; Qty. 1200	N0777599
Narrow Neck Bottle 2000 mL without Cover	B0104344
Probe Fitting Kit (1x Barb, 2x Ferrule 1x ¼ 28 Fitting)	N0830022
Peripump Tubing Pharma Kit	N0831030
Peripump Tubing Viton Kit (Black)	N0831039
Series Tygon Rinse and Waste Tubing Kit (Clear)	N0831033
Tygon Rinse and Waste Tubing Kit for Fuels and Lubricants (Yellow)	N0831036
Carbon Fiber Probe 0.5 mm I.D. x 108 in. – PTFE	N0777547
Carbon Fiber Probe 0.8 mm I.D. x 108 in. – PTFE	N0811953
Carbon Fiber Probe 1.0 mm I.D. x 108 in. – PTFE	N0811956
Tygon FEP Lined 120"	N0831041
Ultra Clean Tubing Kit	N0830016

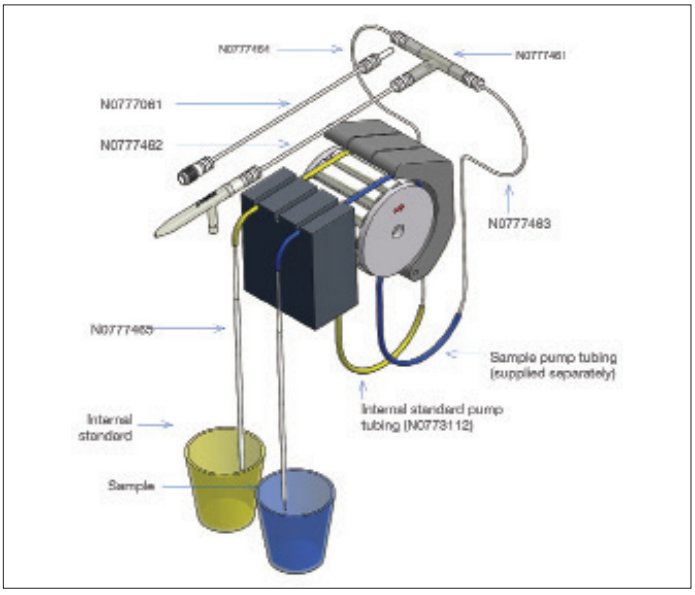
Internal Standard Kits

In-line Standard Additions kits, one which includes a glass mixing chamber/combiner for solutions which do not contain HF and another which includes an inert mixing chamber/combiner. Both kits are completely modular so that damaged or worn components can easily be replaced. The heart of the kit is the mixing chamber/combiner. It is designed for zero dead volume on the input ends which accommodate the sample and addition lines. The output end is designed with a small mixing chamber so that the sample and added reagent are intimately mixed prior to introduction to the nebulizer. All connections to the mixing chamber/combiner use EzyFit connectors. A sampling probe for the reagent addition bottle is included so that it remains well anchored in the bottle. Inline addition of internal standards and ionization buffers provides an efficient means of accurately and precisely dosing all of your samples without extra effort or the risk of error or contamination. Internal standardization is often used to compensate for physical and mass-space interferences in ICP spectrometry. In many cases, it also enhances short-term and long-term reproducibility.



HF-Resistant Internal Standard Kit

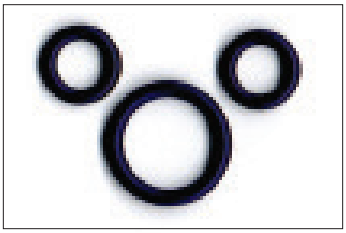
Description	Part No.
HF-Resistant Internal Standard Kit	N0774067
Includes:	
HF Mixing T-piece	N0777466
Internal Standard Sample Probe 0.25 mm ID	N0777465
EzyFit Sample Tube 0.5 mm ID	N0777463
UniFit-EzyFit Sample Tube	N0777061
EzyFit Internal Standard Tube 0.25 mm ID	N0777464
Vitex® Gripper Paper - Qty. 6	N0777848
Orange-Blue Flared End PVC Tubing 0.25 mm ID – Qty. 12	N0773112



Non HF-Resistant Internal Standard Kit

Description	Part No.
Non HF-Resistant Internal Standard Kit	N0774068
Includes:	
EzyFit Glass Mixing T-piece	N0777461
Internal Standard Sample Probe 0.25 mm ID	N0777465
EzyFit Sample Tube - Twin	N0777462
EzyFit Sample Tube 0.5 mm ID	N0777463
EzyFit Internal Standard Tube 0.25 mm ID	N0777464
Vitex® Gripper Paper - Qty. 6	N0777848
Orange-Blue Flared End PVC Tubing 0.25 mm ID – Qty. 12	N0773112
UniFit-EzyFit Sample Tube	N0777061

Avio 200 and 220 Max Spares Kits



Avio 200 and 220 Max Cyclonic Configuration Spares Kit

Kit Part No. N0790805

Description	Qty.	Part No.
Black/Black 0.76 mm ID PVC Solva, Pkg. 12	1	00473550
Tygon Tubing 0.3 M/Per Feet	1	02506516
Viton O-Ring 0.799 ID x 0.103 WD	2	09902223
PVC Red/Red Tubing 1/14 mm ID, Pkg.12	1	09908585
PVC Blk/Blk Tubing 0.76 mm ID, Pkg. 12	1	09908587
Hose Clamp 1/4 Inch Stainless Steel	1	09920041
PTFE Tubing .031 X .016 Per 1 FT/0.3 M	4	09985708
Solva Tubing Yellow 2.79 mm ID	0.33	09985735
Spectrometer Air Filter	2	09995098
Nebulizer Clip Tyton Snapper	1	N0777460
Quartz Torch 1-Slot	1	N0790131
Cyclonic/Concentric Adj. Injector O-Ring Kit	1	N0790436
Optical Kit Avio 200 w/Windows/O-Rings	1	N0790439
Nebulizer Liquid Fit 0.020" ID x 0.062" OD	1	N0791018
Alumina Injector 2.0 mm	1	N0791183
O-Ring 0.101 ID x 0.070 WD Teflon Coated	2	N0791334
FG+ Gas Quick Connect for MEINHARD Nebulizer	1	N8121036
700 µL/min Self-aspirating Capillary for ST Nebulizer	1	N8145137
Torch Igniter Contact 0.4 mm	1	N0791507

Avio 200 and 220 Max Scott Configuration Spares Kit

Kit Part No. N0790806

Description	Qty.	Part No.
Black/Black 0.76 mm ID PVC Solva, Pkg. 12	1	00473550
Viton O-Ring 0.799 ID x 0.103 WD	2	09902223
Polyethylene Tubing for Neb,10 FT	1	09908265
PVC Red/Red Tubing 1/14 mm ID, Pkg. 12	1	09908585
PVC Blk/Blk Tubing 0.76 mm ID, Pkg. 12	1	09908587
Barb Fitting - Coupler 3/32 TBG 3/32 TBG	1	09920186
Barb Fitting - Male 10-32 UNF 3/32 TBG	1	09920267
O-Ring- 0.126 ID 0.040 WD	2	09921045
PTFE Tubing .031 X .016 Per 1 FT/0.3 M	4	09985708
Solva Tubing Yellow 2.79 mm ID	0.33	09985735
Spectrometer Air Filter	2	09995098
Ferrule Kit-ZOD Xflow Nebulizer	1	N0680612
Drain Adaptor	1	N0695414
Drain Coupling	1	N0695415
GemTip Tip Kit for Cross-Flow II Nebulizer	1	N0780676
Quartz Torch 1-Slot	1	N0790131
Adj. Inj. Scott/Cross-Flow II O-Ring Kit	1	N0790438
Optical Kit w/Windows/O-Rings	1	N0790439
Alumina Injector 2.0 mm	1	N0791183
O-Ring 0.101 ID x 0.070 WD Teflon Coated	2	N0791334
Torch Igniter Contact 0.4 mm	1	N0791507

Avio 500 and 550/560 Max Spares Kits

Avio 500 and 550/560 Max Cyclonic Configuration Spares Kit

Kit Part No. N0810850

Description	Qty.	Part No.
Black/Black 0.76 mm ID PVC Solva, Pkg. 12	1	00473550
Viton O-Ring 0.799 ID x 0.103 WD	2	09902223
Cyclonic/Concentric Adj. Injector O-Ring Kit	1	N0790436
PVC Red/Red Tubing 1/14 mm ID, Pkg. 12	1	09908585
PVC Blk/Blk Tubing 0.76 mm ID, Pkg. 12	1	09908587
Nebulizer Clip Tyton Snapper	1	N0777460
FG+ Gas Quick Connect for MEINHARD Nebulizer	1	N8121036
Tygon Tubing 0.3 M/Per Feet	1	02506516
Hose Clamp 5.8-7.0 MM SST	1	09920041
Solva Tubing 2.79 mm ID	0.33	09985735
Spectrometer Air Filter	4	09995098
Nebulizer Liquid Fit 0.020" ID x 0.062" OD	1	N0791018
700 µL/min Self-asp Capillary for ST Nebulizer		N8145137
PTFE Tubing .031 X .016 Per 1 FT/0.3 M	4	09985708
Alumina Injector 2.0 mm	1	N0791183
Quartz Torch 1-Slot	1	N0790131
Optical Spares Kt	1	N0810439
O-Ring 0.101 ID x 0.070 WD Teflon Coated	2	N0791334
Replacement Kit - Avio Axial Flat	1	N0810194
Torch Igniter Contact 0.4 mm	1	N0791507

Avio 500 and 550/560 Max Scott Configuration PM Kit

Kit Part No. N0810851

Description	Qty.	Part No.
Black/Black 0.76 mm ID PVC Solva, Pkg. 12	1	00473550
Viton O-Ring 0.799 ID x 0.103 WD	2	09902223
Polyethylene Tubing for AA Neb,10 FT	1	09908265
PVC Red/Red Tubing 1/14 mm ID, Pkg. 12	1	09908585
PVC Blk/Blk Tubing 0.76 mm ID, Pkg. 12	1	09908587
Barb Fitting - Coupler 3/32 TBG 3/32 TBG	1	09920186
Barb Fitting - Male 10-32 UNF 3/32 TBG	1	09920267
O-Ring 0.126 ID 0.040 WD	2	09921045
PTFE Tubing .031 X .016 Per 1 FT/0.3 M	4	09985708
Solva Tubing Yellow 2.79 mm ID	0.33	09985735
Spectrometer Air Filter	4	09995098
Ferrule Kit-ZOD Xflow Nebulizer	1	N0680612
Drain Adaptor	1	N0695414
Drain Coupling	1	N0695415
GemTip Tip Kit for Cross-Flow II Nebulizer	1	N0780676
Quartz Torch 1-Slot	1	N0790131
Optical Spares Kt	1	N0810439
Adj. Inj. Scott/Cross-Flow II O-Ring Kit	1	N0790438
Alumina Injector 2.0 mm	1	N0791183
O-Ring 0.101 ID x 0.070 WD Teflon Coated	2	N0791334
Replacement Kit - Avio Axial Flat	1	N0810194
Torch Igniter Contact 0.4 mm	1	N0791507

PerkinElmer Pure Standards

Single-Element Standards – 1,000 µg/mL

Whatever your application, you can depend on PerkinElmer Pure Standards to yield reliable, accurate results. PerkinElmer offers a wide selection of atomic spectroscopy calibration standards. Each solution is supplied with a comprehensive Certificate of Analysis that documents the quality and reliability.
Please visit our website for a complete listing of Atomic Spectroscopy Standards.

Element	Symbol	Matrix	Pure Grade 125 mL Part No.	Pure Grade 500 mL Part No.
Aluminum	Al	2% HNO_3	N9300184	N9300100
Antimony	Sb	2% HNO_3		N9300101
Antimony	Sb	H_2O/0.6% Tart. Acid/Tr. HNO_3	N9300207	
Arsenic	As	2% HNO_3	N9300180	N9300102
Barium	Ba	2% HNO_3	N9300181	N9300103
Beryllium	Be	2% HNO_3	N9300172	N9300104
Bismuth	Bi	10% HNO_3	N9303761	N9300105
Boron	B	H_2O	N9303760	N9300106
Cadmium	Cd	2% HNO_3	N9300176	N9300107
Calcium	Ca	2% HNO_3	N9303763	N9300108
Carbon	C	H_2O	N9303762	N9300109
Cerium	Ce	2% HNO_3	N9303765	N9300110
Cesium	Cs	2% HNO_3	N9303767	N9300111
Chromium	Cr	2% HNO_3	N9300173	N9300112
Cobalt	Co	2% HNO_3	N9303766	N9300113
Copper	Cu	2% HNO_3	N9300183	N9300114
Dysprosium	Dy	2% HNO_3	N9303768	N9300115
Erbium	Er	2% HNO_3	N9303769	N9300116
Europium	Eu	2% HNO_3	N9303770	N9300117
Gadolinium	Gd	2% HNO_3	N9303773	N9300118
Gallium	Ga	2% HNO_3	N9303772	N9300119
Germanium	Ge	H_2O/0.16% F-	N9303774	N9300120
Gold	Au	10% HCl	N9303759	N9300121
Hafnium	Hf	2% HCl	N9303775	N9300122
Holmium	Ho	2% HNO_3	N9303776	N9300123
Indium	In	2% HNO_3	N9303777	N9300124
Iridium	Ir	10% HCl	N9303778	N9300125
Iron	Fe	2% HNO_3	N9303771	N9300126
Lanthanum	La	2% HNO_3	N9303780	N9300127
Lead	Pb	2% HNO_3	N9300175	N9300128
Lithium	Li	2% HNO_3	N9303781	N9300129
Lutetium	Lu	2% HNO_3	N9303782	N9300130
Magnesium	Mg	2% HNO_3	N9300179	N9300131
Manganese	Mn	2% HNO_3	N9303783	N9300132
Mercury	Hg	10% HNO_3	N9300174	N9300133
Molybdenum	Mo	H_2O	N9303784	N9300134
Neodymium	Nd	2% HNO_3	N9303787	N9300135
Nickel	Ni	2% HNO_3	N9300177	N9300136
Niobium	Nb	H_2O/0.4% HF	N9303786	N9300137
Palladium	Pd	10% HCl	N9303789	N9300138

PerkinElmer Pure Standards, continued

Element	Symbol	Matrix	Pure Grade 125 mL Part No.	Pure Grade 500 mL Part No.
Phosphorus	P	H_2O	N9303788	N9300139
Platinum	Pt	10% HCl	N9303791	N9300140
Potassium	K	2% HNO_3	N9303779	N9300141
Praseodymium	Pr	2% HNO_3	N9303790	N9300142
Rhenium	Re	H_2O	N9303793	N9300143
Rhodium	Rh	10% HCl	N9303794	N9300144
Rubidium	Rb	2% HNO_3	N9303792	N9300145
Ruthenium	Ru	10% HCl	N9303795	N9300146
Samarium	Sm	2% HNO_3	N9303800	N9300147
Scandium	Sc	2% HNO_3	N9303798	N9300148
Selenium	Se	2% HNO_3	N9300182	N9300149
Silicon	Si	H_2O/0.4% F-	N9303799	N9300150
Silver	Ag	2% HNO_3	N9300171	N9300151
Sodium	Na	2% HNO_3	N9303785	N9300152
Strontium	Sr	2% HNO_3	N9303802	N9300153
Sulfur	S	H_2O	N9303796	N9300154
Tantalum	Ta	H_2O/0.8% HF	N9303803	N9300155
Tellurium	Te	10% HNO_3	N9304385	N9304384
Terbium	Tb	2% HNO_3	N9303804	N9300157
Tin	Sn	20% HCl	N9303801	N9300161
Thallium	Tl	2% HNO_3	N9300170	N9300158
Thulium	Tm	2% HNO_3	N9303807	N9300160
Titanium	Ti	H_2O/0.24% F-	N9303806	N9300162
Tungsten	W	H_2O	N9303809	N9300163
Vanadium	V	2% HNO_3	N9303808	N9300165
Ytterbium	Yb	2% HNO_3	N9303811	N9300166
Yttrium	Y	2% HNO_3	N9303810	N9300167
Zinc	Zn	2% HNO_3	N9300178	N9300168
Zirconium	Zr	2% HNO_3	N9303812	N9300169

Multi-Element Standards

Matrix	Contents	Vol.	Part No.
Multi-Element Solution 1			
2% HNO_3	10 µg/mL: Be, Bi, Ce, Co, In, Mg, Ni, Pb, U	125 mL	N9300231
Multi-Element Solution 2			
5% HNO_3	10 µg/mL: Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sc, Sm, Tb, Th, Tm, Y, Yb	125 mL	N9300232
Multi-Element Solution 3			
5% HNO_3	10 µg/mL: Ag, Al, As, Ba, Be, Bi, Ca, Cd, Co, Cr, Cs, Cu, Fe, Ga, Hg*, In, K, Li, Mg, Mn, Na, Ni, Pb, Rb, Se, Sr, Tl, U, V, Zn **Supplied in separate bottle.*	125 mL	N9300233
Multi-Element Solution 3 without Mercury		125 mL	N9301720

PerkinElmer Pure Standards, continued

Multi-Element Standards, continued

Matrix	Contents		Vol.	Part No.
Multi-Element Solution 4				
5% HCl/1% HNO_3	10 µg/mL: Au, Hf, Ir, Pd, Pt, Rh, Ru, Sb, Sn, Te		125 mL	N9300234
Multi-Element Solution 5				
H_2O/tr HF	10 µg/mL: B, Ge, Mo, Nb, P, Re, S, Si, Ta, Ti, W, Zr		125 mL	N9300235
PerkinElmer Pure I				
5% HNO_3	400 µg/mL: Tl 150 µg/mL: Ga 50 µg/mL: Ag, Ni 20 µg/mL: Cd, Co, Cu, Zn 5 µg/mL: Ba, Mn	200 µg/mL: Bi, In, Pb 100 µg/mL: Al 25 µg/mL: Cr 15 µg/mL: B, Fe 1 µg/mL: Be, Sr	125 mL	N9303940
PerkinElmer Pure IV				
10% HNO_3	1000 µg/mL: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, 125 mL K, Li, Mg, Mn, Na, Ni, Pb, Sr, Tl, Zn		125 mL	N9303941
PerkinElmer Pure VIII				
5% HNO_3	100 µg/mL: Al, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, K, 125 mL Li, Mg, Mn, Na, Ni, Pb, Se, Sr, Te, Tl, Zn		125 mL	N9303942
PerkinElmer Pure IX				
5% HNO_3	100 µg/mL: As, Be, Pb, Cd, Cr, Ni, Se, Tl		125 mL	N9303943
Mercury				
5% HNO_3	100 µg/mL: Mercury in 5% HNO_3		125 mL	N9300223
PerkinElmer Pure X				
2% HNO_3	35,000 µg/mL: Ca 8,000 µg/mL: Na 100 µg/mL: B, Fe, Mo, Sr 30 µg/mL: Mn 20 µg/mL: Be, Cd, Cr, Cu	15,000 µg/mL: Mg 3,000 µg/mL: K 50 µg/mL: As, Ba, Ni, V, Zn 25 µg/mL: Co, Pb 10 µg/mL: Bi, Se, Tl	125 mL	N9303944
Mercury				
5% HNO_3	8 µg/mL: Mercury in 5% HNO_3		125 mL	N9303954
PerkinElmer Pure XI				
5% HNO_3	2500 µg/mL: Zn 800 µg/mL: Cu 10 µg/mL: Cd	900 µg/mL: Cr, Pb 200 µg/mL: Ni	125 mL	N9303945
Mercury				
5% HNO_3	5 µg/mL: Mercury in 5% HNO_3		125 mL	N9303949
PerkinElmer Pure XIII				
5% HNO_3	500 µg/mL: Al 100 µg/mL: As, Be, Co, Cr, Cu, Fe, Mn, Ni, Pb, Zn	250 µg/mL: V 25 µg/mL: Cd, Se	125 mL	N9303946
PerkinElmer Pure XVII				
15% HCL/trace HF	100 µg/mL: Hf, Ir, Sb, Sn, Ta, Ti, Zr		125 mL	N9303948

Interference Check Standards

Matrix	Contents		Vol.	Part No.
Interferents A				
5% HNO_3	5,000 µg/mL: Al, Ca, Mg	2,000 µg/mL: Fe	500 mL	N9300226
Alternate Interferents A				
5% HNO_3	1,000 µg/mL: Cr, Cu, Mn, Ni, Ti, V		500 mL	N9300228

PerkinElmer Pure Standards, continued

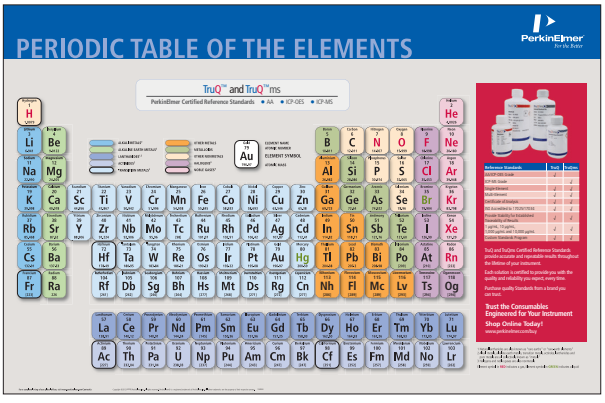
Interference Check Standards, continued

Matrix	Contents		Vol.	Part No.
Analytes B				
5% HNO_3/trTartaric Acid/tr HF			125 mL	N9300227
	100 µg/mL: Cd, Ni, Zn 50 µg/mL: Ba, Be, Co, Cr, Cu, Mn, V 10 µg/mL: As, Tl	60 µg/mL: Sb 20 µg/mL: Ag		
Alternate Analytes B				
5% HNO_3/tr Tartaric Acid/tr HF			125 mL	N9300229
	100 µg/mL: Al, As, B, Mo, Na, Sb, Se, Tl	10 µg/mL: Ca, Fe, Mg, Si		

Universal Data Acquisition Standards Kit

Matrix	Contents	Vol.	Part No.
Solution Kit (Includes items listed below – 1 bottle of each)			N9306225
5% HNO_3	10 µg/mL: Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sm, Sc, Tb, Th, Tm, Y, Yb	125 mL	N9300232
5% HNO_3	10 µg/mL: Al, Ag, As, Ba, Be, Bi, Ca, Cd, Co, Cr, Cs, Cu, Fe, Ga, In, K, Li, Mg, Mn, Na, Ni, Pb, Rb, Se, Sr, Ti, V, U, Zn	125 mL	N9300233
10% HCl/1% HNO_3	10 µg/mL: Au, Hf, Ir, Pd, Pt, Rh Ru, Te, Sb, Sn	125 mL	N9300234
5% HNO_3	10 µg/mL: Hg	125 mL	N9300253
H_2O/tr HF	10 µg/mL: B, Ge, Mo, Nb, P, Re, S, Si, Ta, Ti, W, Zr	125 mL	N9300235

Custom Reference Standards for Inorganic Analysis



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Single-Element, Metallo-Organic Standards

Element	Symbol	Matrix	Size	Part No.
Aluminum 1000 µg/g	Al	Hydrocarbon Oil	50 g	N9308200
Aluminum 5000 µg/g	Al	Hydrocarbon Oil	50g	N9308729
Antimony 1000 µg/g	Sb	Hydrocarbon Oil	50 g	N9308201
Arsenic 1000 µg/g	As	Hydrocarbon Oil	50 g	N9308202
Barium 1000 µg/g	Ba	Hydrocarbon Oil	50 g	N9308203
Beryllium 1000 µg/g	Be	Hydrocarbon Oil	50 g	N9308204
Bismuth 1000 µg/g	Bi	Hydrocarbon Oil	50 g	N9308205
Boron 1000 µg/g	B	Hydrocarbon Oil	50 g	N9308206
Cadmium 1000 µg/g	Cd	Hydrocarbon Oil	50 g	N9308207
Calcium 1000 µg/g	Ca	Hydrocarbon Oil	50 g	N9308208
Calcium 5000 µg/g	Ca	Hydrocarbon Oil	50 g	N9308322
Chromium 1000 µg/g	Cr	Hydrocarbon Oil	50 g	N9308209
Cobalt 1000 µg/g	Co	Hydrocarbon Oil	50 g	N9308210
Copper 1000 µg/g	Cu	Hydrocarbon Oil	50 g	N9308211
Iron 1000 µg/g	Fe	Hydrocarbon Oil	50 g	N9308212
Lanthanum 1000 µg/g	La	Hydrocarbon Oil	50 g	N9308213
Lead 1000 µg/g	Pb	Hydrocarbon Oil	50 g	N9308214
Lithium 1000 µg/g	Li	Hydrocarbon Oil	50 g	N9308215
Magnesium 1000 µg/g	Mg	Hydrocarbon Oil	50 g	N9308216
Manganese 1000 µg/g	Mn	Hydrocarbon Oil	50 g	N9308217
Mercury 1000 µg/g	Hg	Hydrocarbon Oil	50 g	N9308218
Molybdenum 1000 µg/g	Mo	Hydrocarbon Oil	50 g	N9308219

Element	Symbol	Matrix	Size	Part No.
Nickel 1000 µg/g	Ni	Hydrocarbon Oil	50 g	N9308220
Phosphorus 1000 µg/g	P	Hydrocarbon Oil	50 g	N9308221
Potassium 1000 µg/g	K	Hydrocarbon Oil	50 g	N9308222
Scandium 1000 µg/g	Sc	Hydrocarbon Oil	10 g	N9308255
Scandium 1000 µg/g	Sc	Hydrocarbon Oil	50 g	N9308223
Selenium 1000 µg/g	Se	Hydrocarbon Oil	50 g	N9308224
Silicon 1000 µg/g	Si	Hydrocarbon Oil	50 g	N9308225
Silver 1000 µg/g	Ag	Hydrocarbon Oil	50 g	N9308226
Sodium 1000 µg/g	Na	Hydrocarbon Oil	50 g	N9308227
Strontium 1000 µg/g	Sr	Hydrocarbon Oil	50 g	N9308228
Sulfur 10 µg/g	S	Hydrocarbon Oil	50 g	N9308229
Sulfur 100 µg/g	S	Hydrocarbon Oil	50 g	N9308230
Sulfur 1000 µg/g	S	Hydrocarbon Oil	50 g	N9308231
Thallium 1000 µg/g	Tl	Hydrocarbon Oil	50 g	N9308232
Tin 1000 µg/g	Sn	Hydrocarbon Oil	50 g	N9308233
Titanium 1000 µg/g	Ti	Hydrocarbon Oil	50 g	N9308234
Vanadium 1000 µg/g	V	Hydrocarbon Oil	50 g	N9308235
Yttrium 1000 µg/g	Y	Hydrocarbon Oil	50 g	N9308236
Yttrium 5000 µg/g	Y	Hydrocarbon Oil	50 g	N9308323
Zinc 1000 µg/g	Zn	Hydrocarbon Oil	50 g	N9308237
Zirconium 1000 µg/g	Zr	Hydrocarbon Oil	50 g	N9308238

Metallo-Organic Standards, continued

V-21 Wear Metal Standards

Includes: Ag, Al, B, Ba, Ca, Cd, Cr, Cu, Fe, Mg, Mn, Mo, Na, Ni, P, Pb, Si, Sn, Ti, V, Zn

Description	Matrix	Size	Part No.
V-21 Wear Metals Standard 10 µg/g	Hydrocarbon Oil	100 g	N9308300
V-21 Wear Metals Standard 10 µg/g	Hydrocarbon Oil	200 g	N9308301
V-21 Wear Metals Standard 10 µg/g	Hydrocarbon Oil	400 g	N9308324
V-21 Wear Metals Standard 30 µg/g	Hydrocarbon Oil	100 g	N9308302
V-21 Wear Metals Standard 30 µg/g	Hydrocarbon Oil	200 g	N9308303
V-21 Wear Metals Standard 30 µg/g	Hydrocarbon Oil	400 g	N9308325
V-21 Wear Metals Standard 50 µg/g	Hydrocarbon Oil	100 g	N9308304
V-21 Wear Metals Standard 50 µg/g	Hydrocarbon Oil	200 g	N9308305
V-21 Wear Metals Standard 50 µg/g	Hydrocarbon Oil	400 g	N9308326
V-21 Wear Metals Standard 100 µg/g	Hydrocarbon Oil	100 g	N9308306
V-21 Wear Metals Standard 100 µg/g	Hydrocarbon Oil	200 g	N9308307
V-21 Wear Metals Standard 100 µg/g	Hydrocarbon Oil	400 g	N9308327
V-21 Wear Metals Standard 300 µg/g	Hydrocarbon Oil	100 g	N9308308
V-21 Wear Metals Standard 300 µg/g	Hydrocarbon Oil	200 g	N9308309
V-21 Wear Metals Standard 300 µg/g	Hydrocarbon Oil	400 g	N9308328
V-21 Wear Metals Standard 500 µg/g	Hydrocarbon Oil	100 g	N9308310
V-21 Wear Metals Standard 500 µg/g	Hydrocarbon Oil	200 g	N9308311
V-21 Wear Metals Standard 500 µg/g	Hydrocarbon Oil	400 g	N9308329
V-21 Wear Metals Standard 900 µg/g	Hydrocarbon Oil	100 g	N9308312
V-21 Wear Metals Standard 900 µg/g	Hydrocarbon Oil	200 g	N9308313
V-21 Wear Metals Standard 900 µg/g	Hydrocarbon Oil	400 g	N9308330

V-21+K Wear Metal Standards

Includes: Ag, Al, B, Ba, Ca, Cd, Cr, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, P, Pb, Si, Sn, Ti, V, Zn

Description	Matrix	Size	Part No.
V-21+K Wear Metals Standard 10 µg/g	Hydrocarbon Oil	100 g	N9308355
V-21+K Wear Metals Standard 10 µg/g	Hydrocarbon Oil	200 g	N9308356
V-21+K Wear Metals Standard 30 µg/g	Hydrocarbon Oil	100 g	N9308357
V-21+K Wear Metals Standard 30 µg/g	Hydrocarbon Oil	200 g	N9308358
V-21+K Wear Metals Standard 30 µg/g	Hydrocarbon Oil	400 g	N9308371
V-21+K Wear Metals Standard 50 µg/g	Hydrocarbon Oil	100 g	N9308359
V-21+K Wear Metals Standard 50 µg/g	Hydrocarbon Oil	200 g	N9308360
V-21+K Wear Metals Standard 50 µg/g	Hydrocarbon Oil	400 g	N9308372
V-21+K Wear Metals Standard 100 µg/g	Hydrocarbon Oil	100 g	N9308361
V-21+K Wear Metals Standard 100 µg/g	Hydrocarbon Oil	200 g	N9308362
V-21+K Wear Metals Standard 100 µg/g	Hydrocarbon Oil	400 g	N9308373
V-21+K Wear Metals Standard 300 µg/g	Hydrocarbon Oil	100 g	N9308363
V-21+K Wear Metals Standard 300 µg/g	Hydrocarbon Oil	200 g	N9308364
V-21+K Wear Metals Standard 500 µg/g	Hydrocarbon Oil	100 g	N9308365
V-21+K Wear Metals Standard 500 µg/g	Hydrocarbon Oil	200 g	N9308366
V-21+K Wear Metals Standard 500 µg/g	Hydrocarbon Oil	400 g	N9308374
V-21+K Wear Metals Standard 900 µg/g	Hydrocarbon Oil	100 g	N9308367
V-21+K Wear Metals Standard 900 µg/g	Hydrocarbon Oil	200 g	N9308368

V-23 Wear Metal Standards

Includes: Ag, Al, B, Ba, Ca, Cd, Cr, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Si, Sn, Ti, V, Zn

Description	Matrix	Size	Part No.
V-23 Wear Metals Standard 10 µg/g	Hydrocarbon Oil	100 g	N9308239
V-23 Wear Metals Standard 10 µg/g	Hydrocarbon Oil	200 g	N0776109
V-23 Wear Metals Standard 10 µg/g	Hydrocarbon Oil	400 g	N9308315
V-23 Wear Metals Standard 30 µg/g	Hydrocarbon Oil	100 g	N9308241
V-23 Wear Metals Standard 30 µg/g	Hydrocarbon Oil	200 g	N9308242
V-23 Wear Metals Standard 30 µg/g	Hydrocarbon Oil	400 g	N9308316
V-23 Wear Metals Standard 50 µg/g	Hydrocarbon Oil	100 g	N9308243
V-23 Wear Metals Standard 50 µg/g	Hydrocarbon Oil	200 g	N0776104
V-23 Wear Metals Standard 50 µg/g	Hydrocarbon Oil	400 g	N9308317
V-23 Wear Metals Standard 100 µg/g	Hydrocarbon Oil	100 g	N9308245
V-23 Wear Metals Standard 100 µg/g	Hydrocarbon Oil	200 g	N0776105
V-23 Wear Metals Standard 100 µg/g	Hydrocarbon Oil	400 g	N9308318
V-23 Wear Metals Standard 300 µg/g	Hydrocarbon Oil	100 g	N9308247
V-23 Wear Metals Standard 300 µg/g	Hydrocarbon Oil	200 g	N9308248
V-23 Wear Metals Standard 300 µg/g	Hydrocarbon Oil	400 g	N9308319
V-23 Wear Metals Standard 500 µg/g	Hydrocarbon Oil	100 g	N9308249
V-23 Wear Metals Standard 500 µg/g	Hydrocarbon Oil	200 g	N0776106
V-23 Wear Metals Standard 500 µg/g	Hydrocarbon Oil	400 g	N9308320
V-23 Wear Metals Standard 900 µg/g	Hydrocarbon Oil	100 g	N9308251
V-23 Wear Metals Standard 900 µg/g	Hydrocarbon Oil	200 g	N9308252
V-23 Wear Metals Standard 900 µg/g	Hydrocarbon Oil	400 g	N9308321

V-26 Wear Metal Standards

Includes: Ag, Al, B, Ba, Bi, Ca, Cd, Cr, Cu, Fe, In, Li, K, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Si, Sn, Ti, V, Zn

Description	Matrix	Size	Part No.
V-26 Wear Metals Standard 10 µg/g	Hydrocarbon Oil	100 g	N0776130
V-26 Wear Metals Standard 10 µg/g	Hydrocarbon Oil	200 g	N0776131
V-26 Wear Metals Standard 10 µg/g	Hydrocarbon Oi	400 g	N9308743
V-26 Wear Metals Standard 30 µg/g	Hydrocarbon Oil	100 g	N0776132
V-26 Wear Metals Standard 30 µg/g	Hydrocarbon Oil	200 g	N0776133
V-26 Wear Metals Standard 30 µg/g	Hydrocarbon Oil	100 g	N0776138
V-26 Wear Metals Standard 30 µg/g	Hydrocarbon Oil	400 g	N9308745
V-26 Wear Metals Standard 50 µg/g	Hydrocarbon Oil	100 g	N0776134
V-26 Wear Metals Standard 50 µg/g	Hydrocarbon Oil	200 g	N0776135
V-26 Wear Metals Standard 50 µg/g	Hydrocarbon Oil	400 g	N9308747
V-26 Wear Metals Standard 100 µg/g	Hydrocarbon Oil	100 g	N0776136
V-26 Wear Metals Standard 100 µg/g	Hydrocarbon Oi	200 g	N0776137
V-26 Wear Metals Standard 100 µg/g	Hydrocarbon Oil	400 g	N9308742
V-26 Wear Metals Standard 300 µg/g	Hydrocarbon Oil	200 g	N0776139
V-26 Wear Metals Standard 300 µg/g	Hydrocarbon Oil	400 g	N9308744
V-26 Wear Metals Standard 500 µg/g	Hydrocarbon Oil	100 g	N0776140
V-26 Wear Metals Standard 500 µg/g	Hydrocarbon Oil	200 g	N0776141
V-26 Wear Metals Standard 500 µg/g	Hydrocarbon Oil	400 g	N9308746
V-26 Wear Metals Standard 900 µg/g	Hydrocarbon Oil	100 g	N0776142
V-26 Wear Metals Standard 900 µg/g	Hydrocarbon Oil	200 g	N0776143
V-26 Wear Metals Standard 900 µg/g	Hydrocarbon Oil	400 g	N9308748

Metallo-Organic Standards, continued

Internal Standards

Description	Matrix	Size	Part No.
Cobalt (Co) Internal Standard, 6%	Mineral Spirits	200 g	N0776107
Cobalt (Co) Internal Standard, 6%	Mineral Spirits	400 g	N9308334
Cobalt (Co) Internal Standard, 5000 µg/g	Hydrocarbon Oil	50 g	N9308258
Cobalt Sulfur-Free Metallo-Organic Concentrate: Co @ approx 3%	Hydrocarbon Oil	400 g	N9304168

Metal Additive Standards

Description	Matrix	Size	Part No.
Metal Additive Standard 3: Ca @ 5000 µg/g; P, Zn @ 1600 µg/g	Hydrocarbon Oil	100 g	N9308369
Metal Additive Standard 3: Ca @ 5000 µg/g; P, Zn @ 1600 µg/g	Hydrocarbon Oil	200 g	N9308370
Metal Additive Standard 3: Ca @ 5000 µg/g; P, Zn @ 1600 µg/g	Hydrocarbon Oil	400 g	N9308552
Metal Additive Standard 4: Ca @ 5000 µg/g; Mg, P, Zn @ 1600 µg/g	Hydrocarbon Oil	100 g	N9308259
Metal Additive Standard 4: Ca @ 5000 µg/g; Mg, P, Zn @ 1600 µg/g	Hydrocarbon Oil	200 g	N0776108
Metal Additive Standard 4: Ca @ 5000 µg/g; Mg, P, Zn @ 1600 µg/g	Hydrocarbon Oil	400 g	N9308333

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Matrix Oils and Solvents

Description	Matrix	Size	Part No.
Hydrocarbon Oil	75 cSt oil	500 mL	N0776103
Hydrocarbon Oil	75 cSt oil	1 Gal.	N9308262
Mineral Oil (low sulfur)	20 cSt Mineral Oil	500 mL	N9308263
Mineral Oil (low sulfur)	20 cSt Mineral Oil	1/2 Gal.	N9308264
V-Solv™ ICP Solvent	Hydrocarbon Oil	1 Gal.	N9308265
V-Solv™ ICP Solvent	Hydrocarbon Oil	5 Gal.	N9308378
V-Solv™ + Cobalt ICP Solvent V-Solv™	V-Solv	1 Gal.	N9308198
V-Solv™ + Cobalt ICP Solvent V-Solv™	V-Solv	5 Gal.	N9308199
Citrajet® Liquid Acid Cleaner		1 Gal.	N0777063
Citrajet® Liquid Acid Cleaner		5 Gal.	N0777064

Fuel Standards

Description	Matrix	Size	Part No.
Blank for Diesel Fuel Dilution Standard	75 cSt hydrocarbon oil	100 mL	N9308266
2% (v/v) Devolatilized Diesel Fuel in Hydrocarbon Oil	75 cSt hydrocarbon oil	100 mL	N9308151
4% (v/v) Devolatilized Diesel Fuel in Hydrocarbon Oil	75 cSt hydrocarbon oil	100 mL	N9308152
5% (v/v) Devolatilized Diesel Fuel in Hydrocarbon Oil	75 cSt hydrocarbon oil	100 mL	N9308153
10% (v/v) Devolatilized Diesel Fuel in Hydrocarbon Oil	75 cSt hydrocarbon oil	100 mL	N9308154
Blank for Gas Fuel Dilution Standard	75 cSt hydrocarbon oil	100 mL	N9308270
2% (v/v) Devolatilized Gasoline in Hydrocarbon Oil	75 cSt hydrocarbon oil	100 mL	N9308156
5% (v/v) Devolatilized Gasoline in Hydrocarbon Oil	75 cSt hydrocarbon oil	100 mL	N9308157
10% (v/v) Devolatilized Gasoline in Hydrocarbon Oil	75 cSt hydrocarbon oil	100 mL	N9308158

Metallo-Organic Standards, continued

Acid Number Standards

Description	Matrix	Size	Part No.
Acid Number (AN) Reference Material, 0.1 mg KOH/g	Hydrocarbon Oil	100 g	N9308160
Acid Number (AN) Reference Material, 0.1 mg KOH/g	Hydrocarbon Oil	400 g	N9308161
Acid Number (AN) Reference Material, 1 mg KOH/g	Hydrocarbon Oil	100 g	N9308162
Acid Number (AN) Reference Material, 1 mg KOH/g	Hydrocarbon Oil	400 g	N9308163
Acid Number (AN) Reference Material, 1.5 mg KOH/g	Hydrocarbon Oil	100 g	N9308164
Acid Number (AN) Reference Material, 1.5 mg KOH/g	Hydrocarbon Oil	400 g	N9308165
Acid Number (AN) Reference Material, 0.5 mg KOH/g	Hydrocarbon Oil	100 g	N9308166
Acid Number (AN) Reference Material, 0.5 mg KOH/g	Hydrocarbon Oil	400 g	N9308167
Acid Number (AN) Reference Material, 3 mg KOH/g	Hydrocarbon Oil	50 g	N9308168
Acid Number (AN) Reference Material, 3 mg KOH/g	Hydrocarbon Oil	400 g	N9308169
Acid Number (AN) Reference Material, 2 mg KOH/g	Hydrocarbon Oil	50 g	N9308170

Base Number Standards

Description	Matrix	Size	Part No.
Base Number (BN) Reference Material, 10 mg KOH/g	Hydrocarbon Oil	50 g	N9308555
Base Number (BN) Reference Material, 10 mg KOH/g	Hydrocarbon Oil	400 g	N9308173
Base Number (BN) Reference Material, 15 mg KOH/g	Hydrocarbon Oil	50 g	N9308174
Base Number (BN) Reference Material, 30 mg KOH/g	Hydrocarbon Oil	50 g	N9308176
Base Number (BN) Reference Material, 30 mg KOH/g	Hydrocarbon Oil	400 g	N9308177
Base Number (BN) Reference Material, 40 mg KOH/g	Hydrocarbon Oil	50 g	N9308178
Base Number (BN) Reference Material, 6 mg KOH/g	Hydrocarbon Oil	50 g	N9308554
Base Number (BN) Reference Material, 6 mg KOH/g	Hydrocarbon Oil	400 g	N9308181
Base Number (BN) Reference Material, 70 mg KOH/g	Hydrocarbon Oil	50 g	N9308182

Karl Fischer Standards

Nominal Water Concentration (%)	Matrix	Size	Part No.
Karl Fischer Water in Oil, Blank	10W30 Motor oil	50 g	N9308298
Karl Fischer Water in Oil, 0.1%	10W30 Motor oil	400 g	N9308279
Karl Fischer Water in Oil, 0.5%	10W30 Motor oil	50 g	N9308280
Karl Fischer Water in Oil, 1.0%	10W30 Motor oil	50 g	N9308281

Soot Content Standards

Nominal Water Concentration (%)	Matrix	Size	Part No.
Nominal Soot Content Range: Blank	15W40 Diesel oil	50 mL	N9308282
Nominal Soot Content Range: 0.5-2%	15W40 Diesel oil	50 mL	N9308283
Nominal Soot Content Range: 2-4%	15W40 Diesel oil	50 mL	N9308284
Nominal Soot Content Range: 4-6%	15W40 Diesel oil	50 mL	N9308285

Biodiesel Standards

Description	Matrix	Size	Part No.
Biodiesel Blank	B100 biodiesel	100 mL	N9308286
Biodiesel Blank	B100 biodiesel	500 mL	N9308287
Sulfur @ 20 µg/g in Biodiesel	B100 biodiesel	100 mL	N9308288
Metals in Biodiesel – Ca, K, Mg, Na, P @ 20 µg/g	B100 biodiesel	100 g	N9308289
Metals in Biodiesel - Ca, K, Mg, Na, P @ 5µg/g	B100 Biodiesel	100 g	N9308726

Metallo-Organic Standards, continued

Coolant Standards

Description	Size	Part No.
Custom HI 1A: Al @ 10 µg/mL; Mg @ 20 µg/mL; Ca @ 32 µg/mL; Cu, Fe, Pb, Zn @ 50 µg/mL; B @ 1000 µg/mL; P @ 2000 µg/mL; K @ 5000 µg/mL; Na @ 10,000 µg/mL 3% HNO_3 (v/v)	500 mL	N9308341
Custom QC 1A: Al, Cu @ 5 µg/mL; Mg @ 10 µg/mL; Zn @ 20 µg/mL; Fe, Pb @ 25 µg/mL; Ca @ 50 µg/mL; B @ 250 µg/mL; P @ 1000 µg/mL; K @ 2500 µg/mL; Na @ 5000 µg/mL 3% HNO_3 (v/v)	500 mL	N9308342
Custom LO 1A: Al, Cu @ 2 µg/mL; Mg, Zn @ 4 µg/mL; Fe @ 5 µg/mL; Ca, Pb @ 10 µg/mL; B @ 50 µg/mL; P @ 400 µg/mL; K, Na @ 1000 µg/mL 3% HNO_3 (v/v)	500 mL	N9308343
Custom QC 1B: Sn @ 10 µg/mL; Si @ 30 µg/mL; Mo @ 50 µg/mL 3% HNO_3 (v/v)/tr HF 500 mL	500 mL	N9308344
Custom LO 1B: Sn @ 5 µg/mL; Si @ 10 µg/mL; Mo @ 20 µg/mL 3% HNO_3 (v/v)/tr HF	500 mL	N9308345
Custom HI 1B: Sn @ 20 µg/mL; Mo, Si @ 100 µg/mL 3% HNO_3 (v/v)/tr HF	500 mL	N9308346

Viscosity Reference Standards

Description	Matrix	Size	Part No.
Viscosity Standard Reference Kit	Hydrocarbons	5 x 500 mL	N5316000
Nominal Viscosity: 4.5 cSt at 40 °C, and 1.6 cSt at 100 °C	Hydrocarbons	500 mL	N9307740
Nominal Viscosity: 10 cSt at 40 °C, and 2.7 cSt at 100 °C	Hydrocarbons	500 mL	N5316001
Nominal Viscosity: 30 cSt at 40 °C, and 5.3 cSt at 100 °C	Hydrocarbons	500 mL	N5316002
Nominal Viscosity: 30 cSt at 40 °C, and 5.3 cSt at 100 °C	Hydrocarbons	1 Gal.	N5316025
Nominal Viscosity: 100 cSt at 40 °C, and 16.8 cSt at 100 °C	Hydrocarbons	500 mL	N5316003
Nominal Viscosity: 100 cSt at 40 °C, and 16.8 cSt at 100 °C	Hydrocarbons	1 Gal.	N5316024
Nominal Viscosity: 360 cSt at 40 °C, and 42 cSt at 100 °C	Hydrocarbons	500 mL	N5316004
Nominal Viscosity: 930 cSt at 40 °C, and 82 cSt at 100 °C	Hydrocarbons	500 mL	N5316005

Sulfur Standards

Description	Matrix	Size	Part No.
Polysulfide Oil Blank	13 cSt Mineral Oil	500 mL	N9308390
Sulfur @ 500 µg/g, from Polysulfide Oil	13 cSt Mineral Oil	500 mL	N9308391
Sulfur @ 1000 µg/g, from Polysulfide Oil	13 cSt Mineral Oil	500 mL	N9308392
Sulfur @ 5000 µg/g, from Polysulfide Oil	13 cSt Mineral Oil	500 mL	N9308393
Sulfur @ 1 wt%, from Polysulfide Oil	13 cSt Mineral Oil	500 mL	N9308394
Sulfur @ 5 wt%, from Polysulfide Oil	13 cSt Mineral Oil	500 mL	N9308395
Sulfur @ 0 µg/g (Blank)	#2 Diesel Fuel	500 mL	N9308714
Sulfur @ 5 µg/g, from Polysulfide Oil	#2 Diesel Fuel	500 mL	N9308715
Sulfur @ 10 µg/g, from Polysulfide Oil	#2 Diesel Fuel	500 mL	N9308716
Sulfur @ 15 µg/g, from Polysulfide Oil	#2 Diesel Fuel	500 mL	N9308717
Sulfur @ 20 µg/g, from Polysulfide Oil	#2 Diesel Fuel	500 mL	N9308718
Sulfur @ 25 µg/g, from Polysulfide Oil	#2 Diesel Fuel	500 mL	N9308719
Sulfur @ 50 µg/g, from Polysulfide Oil	#2 Diesel Fuel	500 mL	N9308720
Sulfur @ 100 µg/g, from Polysulfide Oil	#2 Diesel Fuel	500 mL	N9308721
Sulfur @ 500 µg/g, from Polysulfide Oil	#2 Diesel Fuel	500 mL	N9308722
Sulfur @ 1000 µg/g, from Polysulfide Oil	#2 Diesel Fuel	500 mL	N9308723
Sulfur @ 1500 µg/g, from Polysulfide Oil	#2 Diesel Fuel	500 mL	N9308724

Metallo-Organic Standards, continued

Crackle Test Reference Standards

Description	Matrix	Size	Part No.
0 wt% H_2O	10W30 Motor Oil	100 mL	N9308337
0.1 wt% H_2O	10W30 Motor Oil	100 mL	N9308338
0.5 wt% H_2O	10W30 Motor Oil	100 mL	N9308339

Proficiency Testing Standards

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Proficiency Testing Program

Description	Size	Part No.
PTP Standard for Elemental Analysis of Oils	25 g	N9308314

Note: Analyze a sample for up to 23 common elements and report the concentrations in µg/g (ppm). Enter all elements or only those that are of interest to you. Results are color-coded pass/fail indications in green (pass), yellow (borderline), and red (fail).

Description	Size	Part No.
Sample for Particle Count Analysis	125 mL	N9308725

Note: Particle Count PTP test standard includes eight channels (4, 6, 8, 14, 21, 38, 50 and 70 µm). One bottle for ISO 11171 only.

Description	Size	Part No.
Viscosity PTP Test Standard	50 mL	N9308540

Note: Report viscosity values in cSt at 40 °C, 100 °C, or both.

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