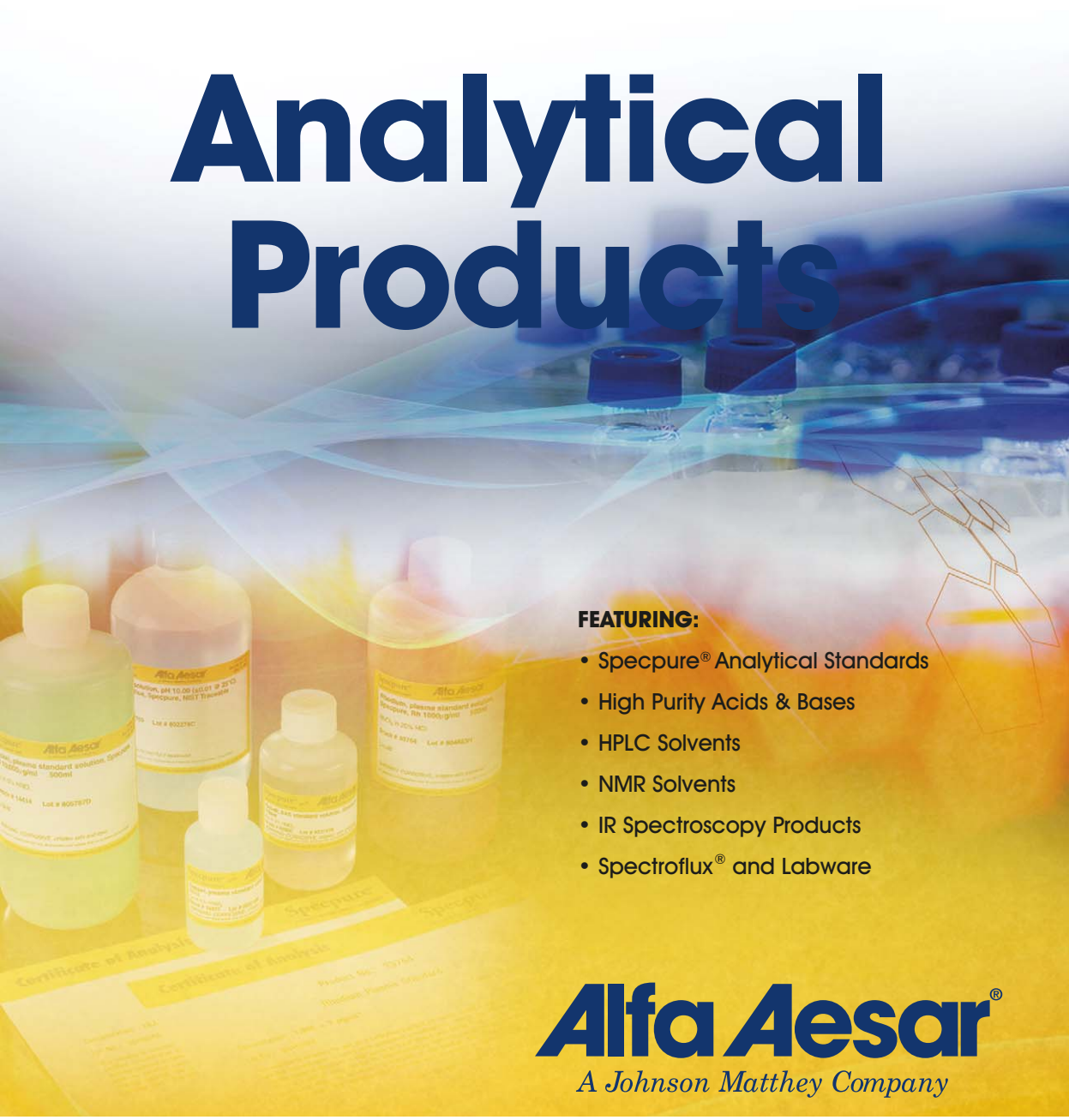
Analytical Products



FEATURING:

- Specpure® Analytical Standards
- High Purity Acids & Bases
- HPLC Solvents
- NMR Solvents
- IR Spectroscopy Products
- Spectroflux® and Labware

Alfa Aesar®
A Johnson Matthey Company

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Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
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Владикавказ (8672)28-90-48
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Вологда (8172)26-41-59
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Иваново (4932)77-34-06
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Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
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Киров (8332)68-02-04
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Красноярск (391)204-63-61
Курск (4712)77-13-04
Курган (3522)50-90-47
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Ноябрьск (3496)41-32-12
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Саранск (8342)22-96-24
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35
Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Улан-Удэ (3012)59-97-51
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Чебоксары (8352)28-53-07
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
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Specpure®

Specpure is the brand name for Alfa Aesar's comprehensive offering of spectrochemical analytical standard solutions. Specpure standards are unsurpassed in accuracy, purity and quality. Each product is guaranteed for one year from ship date and is shipped with a detailed certificate of analysis and an individual expiration sticker.

We manufacture Specpure solution using the highest purity raw materials and ASTM Type I deionized water. Alfa Aesar's Atomic Absorption standards solutions are accurate to +/-1.0% and the Plasma solutions to +/-0.3%. Quality is assured by our adherence to strict QC standards, including:

- Balances routinely calibrated using NIST-traceable reference weights
- Class A volumetric labware is regularly calibrated
- All containers are inertness-tested, washed, preleached and triple rinsed in high purity water
- Solutions are verified both instrumentally against NIST-SRMs and by classical wet assay

Alfa Aesar's single-element aqueous standards (both AA and plasma grades) are assayed using the High Performance ICP method (HP-ICP-AES) developed by NIST. This assures that these standards have the highest accuracy and the lowest uncertainty of any commercially available standards. Both the assayed concentration and the uncertainty are directly traceable to NIST-SRMs.

Alfa Aesar's high purity starting materials, years of manufacturing experience and ISO Certified quality systems ensure a dependable analytical product.

Products for the Analytical Chemist

Beyond aqueous standard solutions, Alfa Aesar offers a variety of other products used in analytical applications.

- Analytical Graphite Products
- Test Strips and pH Determination Materials
- Infrared Spectroscopy Products
- Mass Spectrometry Standards
- NMR and Specialty Solvents
- Indicators
- Acids and Bases
- Labware (Base metal, PTFE, carbon, ceramic)

Alfa Aesar is proud to offer top of the line products for analysis of insoluble inorganic sample materials.

Spectroflux®
Alkali borate fusion fluxes
Spectroflux alkali metal borate fusion fluxes are available for sample preparation of insoluble inorganic materials.

Precious Metal Labware
Johnson Matthey platinum labware provides tolerance to extreme heat and corrosive forces. The zirconia grain stabilized (ZGS) material is specially formulated to resist grain growth and deformation.

How to Order/General Information

Custom Synthesis
We offer flexible custom manufacturing services to produce quality products with the assurance of full confidentiality. Our labs routinely output chemicals and materials to meet research, pilot-scale and full-scale production requirements.

Customer Service
Our dedicated scientific and commercial teams offer the full service package, from concept to production, packaging and delivery. For the sampling stage, our catalog distribution center offers products, pre-packed in various sizes and ready for immediate shipment. On top of that, many thousands of products are stocked in semi-bulk or bulk quantities to meet the increasing demand for quick turn around of pilot- and production -scale units.

Quality Control
We employ advanced quality control for both in-process and final product testing phases. The high standard of our modern quality control and assurance facilities is matched by the expertise of our experienced staff.

Ordering
There is no minimum order. We welcome all orders, regardless of size. Lower value orders may be subject to a nominal handling fee.

Pricing
Most current pricing may be found at our website ( ). In cases where the selling price has changed significantly, we will contact you prior to filling your order. Our payment terms are net 30 days of invoice.

Technical Service
At your request, we will furnish technical assistance and information with respect to our products. Our Technical Service Representatives are trained in specific product lines to answer your questions regarding applications, specifications, product properties and handling.

Material Safety Data Sheets
A Material Safety Data Sheet (MSDS) for each product is available on our website and also automatically accompanies your order. If one is not immediately available, a copy will be sent via mail as soon as possible. If an MSDS is needed prior to shipment of a product please contact us or visit .

Certificates of Analysis
Lot specific Certificates of Analysis for select regions are available online at . Please contact us by phone, fax or email to request Certificates of Analysis as needed.

Return Shipments
Some materials are not returnable. Returned shipments cannot be accepted unless prior arrangements have been made. Requests for return authorization must be made within 30 days of your receiving the materials. Restocking fees may be charged on authorized returns.

Shipping
Whenever possible, we will ship products by the method specified on your order.

Terms of Sale
Please refer to your local sales office for full details of Terms and Conditions.

New Customers
We welcome new customers and setting up an account with Alfa Aesar is easy. Just contact us and a customer service representative will assist you.

Abbreviations and Codes

The following abbreviations are used throughout our listing of products.

AAS	Atomic absorption spectrometry
AES	Atomic emission spectrometry
ACS	Chemicals meeting the specifications outlined by the American Chemical Society
APS	Average particle size
anhy	Anhydrous
Å	Angstrom
≈	Approximately
approx.	Approximately
Atm	Atmospheres
b.p.	Boiling point in °C at 760mm pressure, unless otherwise specified
(c)	Contained weight of active material
°C	Celsius
cc	Cubic centimeter
cm	Centimeter
cont.	Contained
cP	Centipoise
cS	Centistoke
d.	Density
dec.	Decomposes
dia.	Diameter
ea.	Each
eV	Electron volt
°F	Fahrenheit
f.p.	Flash point
FSSS	Fisher sub-sieve sizer
F.W.	Formula weight
g	Gram
g/l	Grams per liter (gas density)
GLC	Suitable for use in gas liquid chromotography
GC	Gas chromotography
HPLC	High-performance liquid chromotography
ICP	Inductively Coupled Plasma
ID	Inner diameter
in	Inch
incl	Includes
IR	Infrared
J/mol·K	Joule(s) per mole Kelvin
kg	Kilogram
L or l	Liter
lb	Pound
m	Meter
M	Molarity of solution
mg	Milligram
µ	Micro
µg	Microgram
meq	Milliequivalent
Merck	The Merck Index
µm	Micrometer (micron)
max	Maximum
micron	Micrometer
mm	Millimeter
m.p.	Melting point
mol	Mole
mmol	Millimole
M.W.	Molecular weight
Mw	Weighted averaged molecular weight
Mn	Number averaged molecular weight
Mw/Mn	Monodispersity value

N	Normality of solution
n_D^{20}	Refractive index for the sodium D line at 20 °C (or temperature indicated)
nm	Nanometer
NEW!	New product
NMR	Nuclear magnetic resonance
OD	Outer diameter
optical gr.	Suitable for optical applications
pc(s)	Piece(s)
pH	Value taken to represent the acidity or alkalinity of an aqueous solution
POR	Price on request
ppb	Parts per billion
ppm	Parts per million
prec.	Precipitated
Primary Standard	Analytical reagent of exceptional purity, for standardizing volumetric solutions and preparing reference standards
PTFE	Poly(tetrafluoroethylene)
Purified	A grade of higher quality than technical, often used where there are no official standards
P.T.	Passes test
P.V.	Pore volume
Reagent	Reagent grade
REM	Rare earth metal
(REO)	Rare earth oxide base - content of specific rare earth element in comparison to total rare earths present
S.A.	Surface area
Sp.Gr.	Specific gravity
Sp.Rot.	Specific rotation
subl.	Sublimes
Tc	Critical temperature
TLC	Thin-layer chromotography
TSCA	Toxic Substance Control Act
UN	Hazardous material transportation identification number
λ	Wavelength in nanometers
wt	Weight
w/w	Weight/weight
w/v	Weight/volume
XRD	X-ray diffraction
△	Air sensitive
◪	Moisture sensitive
■	Hygroscopic
▲	Light sensitive
>	Greater than
≥	Greater than or equal to
<	Less than
≤	Less than or equal to
[ ]	Numbers in brackets after the chemical description indicate the Chemical Abstract Service Registry Number
- mesh #	90% particles pass through screen having a given mesh size
+ mesh #	90% particles are retained by a screen having a given mesh size
†	Denotes substance is listed in Toxic Substance Control Act (TSCA) inventory

Mesh Size Conversion Table

A “+” before the mesh size indicates the particles are retained on and are larger than the sieve. A “–” before the mesh size indicates the particles pass through and are smaller than the sieve.

For example, –325 mesh indicates the particles pass through and are smaller than the openings of a 325 mesh (44 micron) sieve. Typically 90% or more of the particles will fall within the specified mesh.

MESH SIZE	APPROXIMATE MICRON SIZE	APPROXIMATE MILLIMETERS	INCHES
4	4760	4.76	0.185
6	3360	3.36	0.131
8	2380	2.38	0.093
12	1680	1.68	0.065
16	1190	1.19	0.046
20	840	0.84	0.0328
30	590	0.59	0.0232
40	420	0.42	0.0164
50	297	0.29	0.0116
60	250	0.25	0.0097
70	210	0.21	0.0082
80	177	0.17	0.0069
100	149	0.14	0.0058
140	105	0.10	0.0041
200	74	0.07	0.0029
230	62	0.06	0.0024
270	53	0.05	0.0021
325	44	0.04	0.0017
400	37	0.03	0.0015
625	20	0.02	0.0008
1250	10	0.01	0.0004
2500	5	0.005	0.0002

Alfa Aesar®

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PERIODIC TABLE OF THE ELEMENTS

1 IA												13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	18 VIIIA
1.00794 1 **H** Hydrogen	2 IIA																4.002602 2 **He** Helium
6.941 3 **Li** Lithium	9.012182 4 **Be** Beryllium											10.811 5 **B** Boron	12.011 6 **C** Carbon	14.00674 7 **N** Nitrogen	15.9994 8 **O** Oxygen	18.9984032 9 **F** Fluorine	20.1797 10 **Ne** Neon
22.989768 11 **Na** Sodium	24.3050 12 **Mg** Magnesium	3 IIIB	4 IVB	5 VB	6 VIB	7 VIIB	8 VIII	9 VIII	10 VIII	11 IB	12 IIB	26.981539 13 **Al** Aluminum	28.0855 14 **Si** Silicon	30.973762 15 **P** Phosphorus	32.066 16 **S** Sulfur	35.4527 17 **Cl** Chlorine	39.948 18 **Ar** Argon
39.0983 19 **K** Potassium	40.078 20 **Ca** Calcium	44.955910 21 **Sc** Scandium	47.88 22 **Ti** Titanium	50.9415 23 **V** Vanadium	51.9961 24 **Cr** Chromium	54.93805 25 **Mn** Manganese	55.847 26 **Fe** Iron	58.93320 27 **Co** Cobalt	58.6934 28 **Ni** Nickel	63.546 29 **Cu** Copper	65.38 30 **Zn** Zinc	69.723 31 **Ga** Gallium	72.61 32 **Ge** Germanium	74.92159 33 **As** Arsenic	78.96 34 **Se** Selenium	79.904 35 **Br** Bromine	83.80 36 **Kr** Krypton
85.4678 37 **Rb** Rubidium	87.62 38 **Sr** Strontium	88.90585 39 **Y** Yttrium	91.224 40 **Zr** Zirconium	92.9064 41 **Nb** Niobium	95.94 42 **Mo** Molybdenum	98 43 **Tc** Technetium	101.07 44 **Ru** Ruthenium	102.9055 45 **Rh** Rhodium	106.42 46 **Pd** Palladium	107.868 47 **Ag** Silver	112.411 48 **Cd** Cadmium	114.818 49 **In** Indium	118.710 50 **Sn** Tin	121.75 51 **Sb** Antimony	127.60 52 **Te** Tellurium	126.9045 53 **I** Iodine	131.29 54 **Xe** Xenon
132.9054 55 **Cs** Cesium	137.327 56 **Ba** Barium	57-71 **La-Lu**	178.49 72 **Hf** Hafnium	180.9479 73 **Ta** Tantalum	183.85 74 **W** Tungsten	186.207 75 **Re** Rhenium	190.23 76 **Os** Osmium	192.22 77 **Ir** Iridium	195.08 78 **Pt** Platinum	196.96654 79 **Au** Gold	200.59 80 **Hg** Mercury	204.3833 81 **Tl** Thallium	207.2 82 **Pb** Lead	208.98037 83 **Bi** Bismuth	208.9824 84 **Po** Polonium	209.9871 85 **At** Astatine	222.0176 86 **Rn** Radon
223.0197 87 **Fr** Francium	226.0254 88 **Ra** Radium	89-103 **Ac-Lr**	261.1087 104 **Rf** Rutherfordium	262.1138 105 **Db** Dubnium	263.1182 106 **Sg** Seaborgium	262.1229 107 **Bh** Bohrium	265 108 **Hs** Hassium	266 109 **Mt** Meitnerium	269 110 **Ds** Darmstadtium	272 111 **Uuu** Unununium	277 112 **Uub** Ununbium						

ATOMIC WEIGHT
24.3050 12 — ATOMIC NUMBER
Mg — SYMBOL
Magnesium — ELEMENT

138.9055 57 **La** Lanthanum	140.115 58 **Ce** Cerium	140.90765 59 **Pr** Praseodymium	144.24 60 **Nd** Neodymium	146.9151 61 **Pm** Promethium	150.36 62 **Sm** Samarium	151.965 63 **Eu** Europium	157.25 64 **Gd** Gadolinium	158.92534 65 **Tb** Terbium	162.50 66 **Dy** Dysprosium	164.93032 67 **Ho** Holmium	167.26 68 **Er** Erbium	168.9342 69 **Tm** Thulium	173.04 70 **Yb** Ytterbium	174.967 71 **Lu** Lutetium
227.0278 89 **Ac** Actinium	232.0381 90 **Th** Thorium	231.0359 91 **Pa** Protactinium	238.03 92 **U** Uranium	237.0482 93 **Np** Neptunium	244.0642 94 **Pu** Plutonium	243.0614 95 **Am** Americium	247.0703 96 **Cm** Curium	247.0703 97 **Bk** Berkelium	251.0796 98 **Cf** Californium	252.0829 99 **Es** Einsteinium	257.0951 100 **Fm** Fermium	258.0986 101 **Md** Mendelevium	259.1009 102 **No** Nobelium	262.11 103 **Lr** Lawrencium

Section 1 Standard Selection Guide

Standard Selection Guide

Alfa Aesar Standard Selection Guide

Element, matrix	AAS Standard 1000 ppm	Plasma Standard 10 ppm	Plasma Standard 1000 ppm	Plasma Standard 10,000 ppm
Aluminum, HCl	33557	-	13856	14405
Aluminum, HNO_3	-	-	38727	38721
Antimony, HCl	33558	-	13818	14387
Antimony, H_2O/tartaric acid/tr. HNO_3	-	-	41682	41683
Arsenic, HNO_3	33559	45246	13836	14369
Barium, HNO_3	88052	45247	13876	14423
Beryllium, HNO_3	88053	45248	13848	14406
Bismuth, HNO_3	88054	45249	13822	14388
Boron, NH_4OH	-	-	13859	14370
Boron, H_2O	88055	-	39147	-
Cadmium, HNO_3	88056	45250	13813	14424
Calcium, HNO_3	88057	-	13852	14407
Carbon, H_2O	-	-	13844	14389
Cerium, HNO_3	-	-	13815	14371
Cesium, HNO_3	-	-	13825	14425
Chromium, HNO_3	88059	-	13864	14408
Chromium, HCl	-	45251	38728	38722
Cobalt, HNO_3	88060	45242	13828	14390
Copper, HNO_3	-	45253	13867	14372
Dysprosium, HNO_3	-	-	13838	14426
Erbium, HNO_3	-	-	13877	14409
Europium, HNO_3	-	-	35753	35761
Gadolinium, HNO_3	-	-	13829	14373
Gallium, HNO_3/tr. HCl	-	-	13869	14427
Germanium, HNO_3/tr. HF	-	45254	13841	14410
Germanium, H_2O/tr F^-	-	-	42242	-
Gold, HCl	88068	-	13881	14392
Hafnium, HCl	-	-	13843	14374
Holmium, HNO_3	-	45255	35756	35762
Indium, HNO_3	-	45256	13846	14411
Iridium, HCl	-	-	35751	35752
Iron, HNO_3	88073	-	13830	14375
Lanthanum, HNO_3	-	-	13870	14429
Lead, HNO_3	88075	45257	13853	14412
Lithium, HNO_3	88076	-	13821	14394
Lutetium, HNO_3	-	-	35765	35757
Magnesium, HNO_3	88077	-	13861	14430
Manganese, HNO_3	88078	45258	13826	14413
Mercury, HNO_3	88079	45259	13865	14395
Molybdenum, HNO_3/ tr. HF	35764	45260	35758	35766
Molybdenum, NH_4OH	-	-	38719	38726

Alfa Aesar Standard Selection Guide

Element, matrix	AAS Standard 1000 ppm	Plasma Standard 10 ppm	Plasma Standard 1000 ppm	Plasma Standard 10,000 ppm
Neodymium, HNO_3	-	-	13882	14431
Nickel, HNO_3	88082	45261	13839	14414
Niobium, HF	-	-	13831	14396
Niobium, H_2O/tr. F^-	-	-	42244	42245
Osmium, HCl	-	-	13871	-
Palladium, HCl	88085	-	13833	14432
Palladium, HNO_3	44631	-	-	-
Palladium, H_2O	45270	45271	-	-
Phosphorus, HNO_3	-	-	-	-
Platinum, HCl	88086	-	13827	14397
Potassium, HNO_3	88087	-	13866	14379
Praeseodymium, HNO_3	-	-	13812	14433
Rhenium, HNO_3	-	-	13817	14416
Rhodium, HCl	-	45320	35754	35763
Rubidium, HNO_3	-	-	13872	14380
Ruthenium, HCl	-	-	35767	35773
Samarium, HNO_3	-	-	13854	14417
Scandium, HNO_3	-	45262	35769	35755
Selenium, HNO_3	88094	45263	13845	14381
Silicon, HNO_3/tr. HF	88095	-	13814	14435
Silicon, H_2O/tr. F^-	-	-	38717	38723
Silver, HNO_3	88096	45264	13849	14418
Sodium, HNO_3	88097	-	13832	14400
Strontium, HNO_3	88098	-	13874	14382
Sulfur, H_2O	-	-	13842	14436
Tantalum, HF	-	-	13840	14419
Tantalum, H_2O/tr. F^-	-	-	42246	42247
Tellurium, HCl	-	-	13879	14401
Tellurium, HNO_3	-	45265	44632	-
Terbium, HNO_3	88110	45266	13860	14383
Thallium, HNO_3	88111	-	13851	14437
Thulium, HNO_3	89889	-	13824	14402
Tin, HCl	88112	-	13863	14384
Titanium, HNO_3/tr. HF	35771	45267	35768	35759
Titanium, H_2O/tr. F^-	-	-	38720	38725
Tungsten, HNO_3/tr. HF	-	-	35770	35772
Tungsten, H_2O	-	-	42248	42249
Vanadium, HNO_3	88116	-	13850	14385
Ytterbium, HNO_3	-	-	13819	14439
Yttrium, HNO_3	-	45268	13855	14422
Zinc, HNO_3	88118	45269	13835	14404
Zirconium, HCl	-	-	13875	14386

Section 2 Atomic Absorption Products

Atomic Absorption Standards

Specpure® Atomic Absorption Standards

These solutions are intended for use with either flame or furnace atomic absorption spectroscopy (AA/GFAA). Atomic Absorption is the most frequently used instrumental technique for elemental analysis. Alfa Aesar offers 70 single-element aqueous solutions at 1000µg/ml in both 100ml and 500ml sizes. Key features of Specpure® Atomic Absorption Standards include:

- A NIST-traceable Certificate of Analysis is included with each standard solution.
- Expiration date stickers are included with each standard solution.
- Guaranteed for one year from date of shipment.
- Certified accuracy based upon high performance ICP (HP-ICP-AES) assay method developed by NIST.

Stock #	Description	Standard Selling Sizes
33557	**Aluminum, AAS standard solution, Specpure®, Al 1000µg/ml** Al in 5% HCl, Liquid, UN1789, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
33558	**Antimony, AAS standard solution, Specpure®, Sb 1000µg/ml** Sb in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**100ml** **500ml** **bulk**
33559	**Arsenic, AAS standard solution, Specpure®, As 1000µg/ml** As in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88052	**Barium, AAS standard solution, Specpure®, Ba 1000µg/ml** $Ba(NO_3)_2$ in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88053	**Beryllium, AAS standard solution, Specpure®, Be 1000µg/ml** Be in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88054	**Bismuth, AAS standard solution, Specpure®, Bi 1000µg/ml** Bi in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88055	**Boron, AAS solution standard, Specpure®, B 1000µg/ml** H_3BO_3 in H_2O, Liquid, †	**100ml** **500ml** **bulk**
88056	**Cadmium, AAS standard solution, Specpure®, Cd 1000µg/ml** Cd in 5% HNO_3, Liquid, UN3264, †  R:34, S:3-20-23-26-36/37/39-45-60	**100ml** **500ml** **bulk**
88057	**Calcium, AAS standard solution, Specpure®, Ca 1000µg/ml** $CaCO_3$ in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88059	**Chromium, AAS standard solution, Specpure®, Cr 1000µg/ml** Cr in 5% HCl, Liquid, UN1789, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88060	**Cobalt, AAS standard solution, Specpure®, Co 1000µg/ml** Co in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88061	**Copper, AAS standard solution, Specpure®, Cu 1000µg/ml** Cu in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88068	**Gold, AAS standard solution, Specpure®, Au 1000µg/ml** Au in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**100ml** **500ml** **bulk**
88073	**Iron, AAS standard solution, Specpure®, Fe 1000µg/ml** Fe in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**

Stock #	Description	Standard Selling Sizes
88075	**Lead, AAS standard solution, Specpure®, Pb 1000µg/ml** Pb in 5% HNO_3, Liquid, UN3264, †  R:34, S:23b-26-36/37/39-45	**100ml** **500ml** **bulk**
88076	**Lithium, AAS standard solution, Specpure®, Li 1000µg/ml** Li_2CO_3 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88077	**Magnesium, AAS standard solution, Specpure®, Mg 1000µg/ml** Mg in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88078	**Manganese, AAS standard solution, Specpure®, Mn 1000µg/ml** Mn in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88079	**Mercury, AAS standard solution, Specpure®, Hg 1000µg/ml** Hg in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
35764	**Molybdenum, AAS standard solution, Specpure®, Mo 1000µg/ml** Mo in 5% HNO_3/tr. HF, Liquid, UN3264, †   R:20/21/22-34, S:7/9-23-26-36/37-45	**100ml** **500ml** **bulk**
88082	**Nickel, AAS standard solution, Specpure®, Ni 1000µg/ml** Ni in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88085	**Palladium, AAS standard solution, Specpure®, Pd 1000µg/ml** Pd in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**100ml** **500ml** **bulk**
88086	**Platinum, AAS standard solution, Specpure®, Pt 1000µg/ml** Pt in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**100ml** **500ml** **bulk**
88087	**Potassium, AAS standard solution, Specpure®, K 1000µg/ml** KNO_3 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88094	**Selenium, AAS standard solution, Specpure®, Se 1000µg/ml** Se in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88095	**Silicon, AAS standard solution, Specpure®, Si 1000µg/ml** Si in 5% HNO_3/tr. HF, Liquid, UN3264, †   R:20/21/22-34, S:7/9-23-26-36/37-45	**100ml** **500ml** **bulk**
88096	**Silver, AAS standard solution, Specpure®, Ag 1000µg/ml** Ag in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88097	**Sodium, AAS standard solution, Specpure®, Na 1000µg/ml** Na_2CO_3 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88098	**Strontium, AAS standard solution, Specpure®, Sr 1000µg/ml** $Sr(NO_3)_2$ in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88111	**Thallium, AAS standard solution, Specpure®, Tl 1000µg/ml** Tl in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
89889	**Thulium, AAS standard solution, Specpure®, Tm 1000µg/ml** Tm_2O_3 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**

Atomic Absorption Standards

Stock #	Description	Standard Selling Sizes
88112	**Tin, AAS standard solution, Specpure®, Sn 1000µg/ml** Sn in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**100ml** **500ml** **bulk**
35771	**Titanium, AAS standard solution, Specpure®, Ti 1000µg/ml** Ti in 5% HNO_3/tr. HF, Liquid, UN3264, †  R:20/21/22-34, S:7/9-23-26-36/37-45	**100ml** **500ml** **bulk**
88116	**Vanadium, AAS standard solution, Specpure®, V 1000µg/ml** V_2O_5 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
88118	**Zinc, AAS standard solution, Specpure®, Zn 1000µg/ml** Zn in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**

Specpure® Matrix Modifiers, Releasing Agents and Ionization Buffers

Alfa Aesar is pleased to offer Specpure® matrix modifiers, ionization buffers and releasing agents. Each solution is accompanied by a NIST-traceable Certificate of Analysis which reports trace impurity levels of 70 elements. Expiration date stickers are also included with every solution.

Specpure® Matrix Modifiers

Matrix modifiers are designed for use with graphite furnace atomic absorption (GFAA). A matrix modifier is added to a sample to prevent undesired elemental losses during pyrolysis, by converting the element to a less volatile form.

Stock #	Description	Standard Selling Sizes
42663	**Ammonium dihydrogen phosphate, Matrix Modifier Solution, Specpure®** 10% $NH_4H_2PO_4$ in 2% HNO_3, Liquid, UN3264, †	**100ml** **bulk**
	R:34, S:23-26-36/37/39-45	
39044	**Magnesium nitrate, Matrix Modifier Solution, Specpure®** 1% $Mg(NO_3)_2$ in 2% HNO_3, Liquid, UN3264, †	**100ml** **bulk**
	R:34, S:23-26-36/37/39-45	
39043	**Nickel nitrate, Matrix Modifier Solution, Specpure®** 1% $Ni(NO_3)_2$ in 2% HNO_3, Liquid, UN3264, †	**100ml** **bulk**
	R:34, S:23-26-36/37/39-45	
44765	**Palladium nitrate, Matrix Modifier Solution, Specpure®** 0.1% Pd in 10% HNO_3, Liquid, UN2031, †	**100ml** **bulk**
	R:34, S:23-26-36/37/39-45	
44241	**Palladium nitrate, Matrix Modifier Solution, Specpure®** 1% Pd in 10% HNO_3, Liquid, UN2031, †	**100ml** **bulk**
	R:34, S:23-26-36/37/39-45	

Specpure® Pre-mixed GFAA Matrix Modifiers

These pre-mixed matrix modifiers are designed for use with graphite furnace atomic absorption (GFAA).

Stock #	Description	Standard Selling Sizes
45292 NEW!	**Ammonium dihydrogen phosphate & Magnesium nitrate, Matrix Modifier Solution, Specpure®** 0.001% $NH_4H_2PO_4$ & 0.06% $Mg(NO_3)_2$ in 2% HNO_3, Liquid, UN3264	**250ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
45290 NEW!	**Palladium nitrate & Magnesium nitrate, Matrix Modifier Solution, Specpure®** 0.075% Pd & 0.05% $Mg(NO_3)_2$ in 2% HNO_3, Liquid, UN3264	**250ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
45291 NEW!	**Palladium nitrate & Magnesium nitrate, Matrix Modifier Solution, Specpure®** 0.1% Pd & 0.06% $Mg(NO_3)_2$ in 2% HNO_3, Liquid, UN3264	**250ml** **bulk**
	R:34, S:23b-26-36/37/39-45	

Specpure® Releasing Agents

Releasing agents function to minimize chemical interferences by preferentially combining with the interfering anion. This action promotes the release of the analyte atoms.

Stock #	Description	Standard Selling Sizes
39036	**Lanthanum chloride, Releasing Agent Solution, Specpure®** 1% La (as La_2O_3) in 2% HCl, Liquid, UN3264, †	**500ml** **bulk**
	R:34, S:20-26-36/37/39-45-60	

Ionization Buffers

Stock #	Description	Standard Selling Sizes
39035	**Lanthanum nitrate, Releasing Agent Solution, Specpure®** 1% La (as La_2O_3) in 2% HNO_3, Liquid, UN3264, †	**100ml** **500ml** **bulk**
	R:34, S:20-26-36/37/39-45-60	

Specpure® Ionization Buffers

Atoms of elements with very low ionization potentials can be ionized at flame temperatures, thereby reducing the population of free atoms. By providing an excess of electrons, ionization buffers act to suppress this mechanism, yielding a greater population of free atoms for measurement.

Stock #	Description	Standard Selling Sizes
45294 NEW!	**Cesium nitrate, Ionization Buffer Solution, Specpure®** 1% Cs (as Cs_2CO_3) in 5% HNO_3, Liquid	**100ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
45293 NEW!	**Lithium nitrate, Ionization Buffer Solution, Specpure®** 1% Li (as Li_2CO_3) in 5% HNO_3, Liquid	**100ml** **bulk**
	R:34, S:23b-26-36/37/39-45	

Section 3 Inorganic Standards for Water Analysis

Inorganic Standards

Stock #	Description	Standard Selling Sizes
43804	**Cyanide, standard solution, Specpure®, CN^- 1000µg/ml** KCN in 0.1% NaOH, Liquid, †  R:20/21/22, S:9-36/37	**100ml** **500ml** **bulk**
42234	**Hexavalent Chromium, standard solution, Specpure®, Cr^{+6} 1000µg/ml** $(NH_4)_2Cr_2O_7$ in H_2O, Liquid, †  R:45-46-20-42/43-52/53, S:53-45-60-61	**100ml** **500ml** **bulk**
42561	**Hydrazine, standard solution, Specpure®, N_2H_4 100µg/ml** N_2H_4 in 1% CH_3CO_2H, Liquid, Note: Guaranteed stable for six months from ship date. Keep refrigerated, †	**500ml** **bulk**
42225	**Silica, standard solution, Specpure®, SiO_2 1000µg/ml** Na_2SiO_3 in H_2O, Liquid, †	**100ml** **500ml** **bulk**
42562	**Total Organic Carbon (TOC), standard solution, Specpure®, 1000µg/ml** $KHC_8H_4O_4$ in H_2O, Liquid, †	**100ml** **500ml** **bulk**

Section 4 Plasma Standards

Specpure® Plasma Standards

These solution standards are intended for use with ICP, DCP, or ICP-MS. These techniques are capable of determining the concentrations of many elements quickly, either simultaneously or sequentially. Key features of Specpure® Plasma Standards include:

- A NIST-traceable Certificate of Analysis which includes trace metal analysis of 70 elements is included with each standard solution.
- Expiration date stickers are included with each standard solution.
- Guaranteed for one year from date of shipment.
- Certified accuracy based upon high performance ICP (HP-ICP-AES) assay method developed by NIST.

Specpure® Single-Element Plasma Standards

Stock #	Description	Standard Selling Sizes
13856	**Aluminum, plasma standard solution, Specpure®, Al 1000µg/ml** Al in 5% HCl, Liquid, UN1789, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14405	**Aluminum, plasma standard solution, Specpure®, Al 10,000µg/ml** Al in 5% HCl, Liquid, UN1789, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
38727	**Aluminum, plasma standard solution, Specpure®, Al 1000µg/ml** $Al(NO_3)_3$ in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
38721	**Aluminum, plasma standard solution, Specpure®, Al 10,000µg/ml** $Al(NO_3)_3$ in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13818	**Antimony, plasma standard solution, Specpure®, Sb 1000µg/ml** Sb in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14387	**Antimony, plasma standard solution, Specpure®, Sb 10,000µg/ml** Sb in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
41682	**Antimony, plasma standard solution, Specpure®, Sb 1000µg/ml** Sb in H_2O/tartaric acid/tr. HNO_3, Liquid, †	**50ml** **100ml** **500ml** **bulk**
41683	**Antimony, plasma standard solution, Specpure®, Sb 10,000µg/ml** Sb in H_2O/tartaric acid/tr. HNO_3, Liquid, †	**50ml** **100ml** **500ml** **bulk**
45246 NEW!	**Arsenic, plasma standard solution, Specpure®, As 10µg/ml** As in 2% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **bulk**
13836	**Arsenic, plasma standard solution, Specpure®, As 1000µg/ml** As in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14369	**Arsenic, plasma standard solution, Specpure®, As 10,000µg/ml** As in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
45247 NEW!	**Barium, plasma standard solution, Specpure®, Ba 10µg/ml** $Ba(NO_3)_2$ in 2% HNO_3, Liquid, UN3264  R:34, S:23b-26-36/37/39-45	**100ml** **bulk**

Stock #	Description	Standard Selling Sizes
13876	**Barium, plasma standard solution, Specpure®, Ba 1000µg/ml** $Ba(NO_3)_2$ in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14423	**Barium, plasma standard solution, Specpure®, Ba 10,000µg/ml** $Ba(NO_3)_2$ in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
45248 NEW!	**Beryllium, plasma standard solution, Specpure®, Be 10µg/ml** $Be_4O(C_2H_3O_2)_6$ in 2% HNO_3, Liquid, UN3264	**100ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
13848	**Beryllium, plasma standard solution, Specpure®, Be 1000µg/ml** $Be_4O(C_2H_3O_2)_6$ in 5% HNO_3, Liquid, UN3264	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14406	**Beryllium, plasma standard solution, Specpure®, Be 10,000µg/ml** $Be_4O(C_2H_3O_2)_6$ in 5% HNO_3, Liquid, UN3264	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
45249 NEW!	**Bismuth, plasma standard solution, Specpure®, Bi 10µg/ml** Bi in 2% HNO_3, Liquid, UN3264, †	**100ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
13822	**Bismuth, plasma standard solution, Specpure®, Bi 1000µg/ml** Bi in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14388	**Bismuth, plasma standard solution, Specpure®, Bi 10,000µg/ml** Bi in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
13859	**Boron, plasma standard solution, Specpure®, B 1000µg/ml** H_3BO_3 in 1% NH_4OH, Liquid, †	**50ml** **100ml** **500ml** **bulk**
14370	**Boron, plasma standard solution, Specpure®, B 10,000µg/ml** H_3BO_3 in 1% NH_4OH, Liquid, †	**50ml** **100ml** **500ml** **bulk**
39147	**Boron, plasma standard solution, Specpure®, B 1000µg/ml** H_3BO_3 in H_2O, Liquid, †	**50ml** **100ml** **500ml** **bulk**
45250 NEW!	**Cadmium, plasma standard solution, Specpure®, Cd 10µg/ml** Cd in 2% HNO_3, Liquid, UN3264	**100ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
13813	**Cadmium, plasma standard solution, Specpure®, Cd 1000µg/ml** Cd in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14424	**Cadmium, plasma standard solution, Specpure®, Cd 10,000µg/ml** Cd in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
13852	**Calcium, plasma standard solution, Specpure®, Ca 1000µg/ml** $CaCO_3$ in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14407	**Calcium, plasma standard solution, Specpure®, Ca 10,000µg/ml** $CaCO_3$ in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
13844	**Carbon, plasma standard solution, Specpure®, C 1000µg/ml** CH_3CO_2H in H_2O, Liquid, †	**50ml** **100ml** **500ml** **bulk**

Single-Element Standards

Stock #	Description	Standard Selling Sizes
14389	**Carbon, plasma standard solution, Specpure®, C 10,000µg/ml** CH_3CO_2H in H_2O, Liquid, †	**50ml** **100ml** **500ml** **bulk**
13815	**Cerium, plasma standard solution, Specpure®, Ce 1000µg/ml** Ce in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14371	**Cerium, plasma standard solution, Specpure®, Ce 10,000µg/ml** Ce in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13825	**Cesium, plasma standard solution, Specpure®, Cs 1000µg/ml** Cs_2CO_3 in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14425	**Cesium, plasma standard solution, Specpure®, Cs 10,000µg/ml** Cs_2CO_3 in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13864	**Chromium, plasma standard solution, Specpure®, Cr 1000µg/ml** Cr in 5% HCl, Liquid, UN1789, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14408	**Chromium, plasma standard solution, Specpure®, Cr 10,000µg/ml** Cr in 5% HCl, Liquid, UN1789, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
45251 NEW!	**Chromium, plasma standard solution, Specpure®, Cr 10µg/ml** $Cr(NO_3)_3$ in 2% HNO_3, Liquid, UN3264, † R:34, S:23b-26-36/37/39-45	**100ml** **bulk**
38728	**Chromium, plasma standard solution, Specpure®, Cr 1000µg/ml** $Cr(NO_3)_3$ in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
38722	**Chromium, plasma standard solution, Specpure®, Cr 10,000 µg/ml** $Cr(NO_3)_3$ in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
	Chromium standard solution, hexavalent, see Inorganic standards	**bulk**
45252 NEW!	**Cobalt, plasma standard solution, Specpure®, Co 10µg/ml** Co in 2% HNO_3, Liquid, UN3264 R:34, S:23b-26-36/37/39-45	**100ml** **bulk**
13828	**Cobalt, plasma standard solution, Specpure®, Co 1000µg/ml** Co in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14390	**Cobalt, plasma standard solution, Specpure®, Co 10,000µg/ml** Co in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
45253 NEW!	**Copper, plasma standard solution, Specpure®, Cu 10µg/ml** Cu in 2% HNO_3, Liquid, UN3264 R:34, S:23b-26-36/37/39-45	**100ml** **bulk**
13867	**Copper, plasma standard solution, Specpure®, Cu 1000µg/ml** Cu in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14372	**Copper, plasma standard solution, Specpure®, Cu 10,000µg/ml** Cu in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13838	**Dysprosium, plasma standard solution, Specpure®, Dy 1000µg/ml** Dy_2O_3 in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**

Stock #	Description	Standard Selling Sizes
14426	**Dysprosium, plasma standard solution, Specpure®, Dy 10,000µg/ml** Dy_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
13877	**Erbium, plasma standard solution, Specpure®, Er 1000µg/ml** Er_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14409	**Erbium, plasma standard solution, Specpure®, Er 10,000µg/ml** Er_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
35753	**Europium, plasma standard solution, Specpure®, Eu 1000µg/ml** Eu_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
35761	**Europium, plasma standard solution, Specpure®, Eu 10,000µg/ml** Eu_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
13829	**Gadolinium, plasma standard solution, Specpure®, Gd 1000µg/ml** Gd_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14373	**Gadolinium, plasma standard solution, Specpure®, Gd 10,000µg/ml** Gd_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
13869	**Gallium, plasma standard solution, Specpure®, Ga 1000µg/ml** Ga in 5% HNO_3/tr. HCl, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14427	**Gallium, plasma standard solution, Specpure®, Ga 10,000µg/ml** Ga in 5% HNO_3/tr. HCl, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
45254 *NEW!*	**Germanium, plasma standard solution, Specpure®, Ge 10µg/ml** Ge in 2% HNO_3/tr. HF, Liquid, UN3264	**100ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
13841	**Germanium, plasma standard solution, Specpure®, Ge 1000µg/ml** Ge in 5% HNO_3/tr. HF, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:20/21/22-34, S:7/9-23-26-36/37-45	
14410	**Germanium, plasma standard solution, Specpure®, Ge 10,000µg/ml** Ge in 5% HNO_3/tr. HF, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:20/21/22-34, S:7/9-23-26-36/37-45	
42242	**Germanium, plasma standard solution, Specpure®, Ge 1000µg/ml** $(NH_4)_2GeF_6$ in H_2O/trace F^-, Liquid, †	**50ml** **100ml** **500ml** **bulk**
	R:20/21/22-36/37/38, S:7/9-26-36/37-45	
13881	**Gold, plasma standard solution, Specpure®, Au 1000µg/ml** Au in 20% HCl, Liquid, UN1789, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
14392	**Gold, plasma standard solution, Specpure®, Au 10,000µg/ml** Au in 20% HCl, Liquid, UN1789, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
13843	**Hafnium, plasma standard solution, Specpure®, Hf 1000µg/ml** $HfCl_2O$ in 5% HCl, Liquid, UN1789, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14374	**Hafnium, plasma standard solution, Specpure®, Hf 10,000µg/ml** $HfCl_2O$ in 5% HCl, Liquid, UN1789, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	

Single-Element Standards

Stock #	Description	Standard Selling Sizes
45255 NEW!	**Holmium, plasma standard solution, Specpure®, Ho 10µg/ml** Ho_2O_3 in 2% HNO_3, Liquid, UN3264 R:34, S:23b-26-36/37/39-45	**100ml** **bulk**
35756	**Holmium, plasma standard solution, Specpure®, Ho 1000µg/ml** Ho_2O_3 in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
35762	**Holmium, plasma standard solution, Specpure®, Ho 10,000µg/ml** Ho_2O_3 in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
45256 NEW!	**Indium, plasma standard solution, Specpure®, In 10µg/ml** In in 2% HNO_3, Liquid, UN3264, † R:34, S:23b-26-36/37/39-45	**100ml** **bulk**
13846	**Indium, plasma standard solution, Specpure®, In 1000µg/ml** In in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14411	**Indium, plasma standard solution, Specpure®, In 10,000µg/ml** In in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
35751	**Iridium, plasma standard solution, Specpure®, Ir 1000µg/ml** $IrCl_3$ in 20% HCl, Liquid, UN1789, † R:34, S:23b-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
35752	**Iridium, plasma standard solution, Specpure®, Ir 10,000µg/ml** $IrCl_3$ in 20% HCl, Liquid, UN1789, † R:34, S:23b-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13830	**Iron, plasma standard solution, Specpure®, Fe 1000µg/ml** Fe_2O_3 in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14375	**Iron, plasma standard solution, Specpure®, Fe 10,000µg/ml** Fe_2O_3 in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13870	**Lanthanum, plasma standard solution, Specpure®, La 1000µg/ml** La_2O_3 in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14429	**Lanthanum, plasma standard solution, Specpure®, La 10,000µg/ml** La_2O_3 in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
45257 NEW!	**Lead, plasma standard solution, Specpure®, Pb 10µg/ml** Pb in 2% HNO_3, Liquid, UN3264 R:34, S:23b-26-36/37/39-45	**100ml** **bulk**
13853	**Lead, plasma standard solution, Specpure®, Pb 1000µg/ml** Pb in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14412	**Lead, plasma standard solution, Specpure®, Pb 10,000µg/ml** Pb in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13821	**Lithium, plasma standard solution, Specpure®, Li 1000µg/ml** Li_2CO_3 in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14394	**Lithium, plasma standard solution, Specpure®, Li 10,000µg/ml** Li_2CO_3 in 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**

Stock #	Description	Standard Selling Sizes
35765	**Lutetium, plasma standard solution, Specpure®, Lu 1000µg/ml** Lu_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
35757	**Lutetium, plasma standard solution, Specpure®, Lu 10,000µg/ml** Lu_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
13861	**Magnesium, plasma standard solution, Specpure®, Mg 1000µg/ml** Mg in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14430	**Magnesium, plasma standard solution, Specpure®, Mg 10,000µg/ml** Mg In 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
45258 NEW!	**Manganese, plasma standard solution, Specpure®, Mn 10µg/ml** Mn in 2% HNO_3, Liquid, UN3264	**100ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
13826	**Manganese, plasma standard solution, Specpure®, Mn 1000µg/ml** Mn in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14413	**Manganese, plasma standard solution, Specpure®, Mn 10,000µg/ml** Mn in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
45259 NEW!	**Mercury, plasma standard solution, Specpure®, Hg 10µg/ml** Hg in 5% HNO_3, Liquid, UN3264, †	**100ml** **bulk**
	R:34, S:23-26-36/37/39-45	
13865	**Mercury, plasma standard solution, Specpure®, Hg 1000µg/ml** Hg in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14395	**Mercury, plasma standard solution, Specpure®, Hg 10,000µg/ml** Hg in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
45260 NEW!	**Molybdenum, plasma standard solution, Specpure®, Mo 10µg/ml** Mo in 2% HNO_3/tr. HF, Liquid, UN3264	**100ml** **bulk**
	R:20/21/22-34, S:7/9-23b-26-36/37-45	
35758	**Molybdenum, plasma standard solution, Specpure®, Mo 1000µg/ml** Mo in 5% HNO_3/tr. HF, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:20/21/22-34, S:7/9-23-26-36/37-45	
35766	**Molybdenum, plasma standard solution, Specpure®, Mo 10,000µg/ml** Mo in 5% HNO_3/tr. HF, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:20/21/22-34, S:7/9-23-26-36/37-45	
38719	**Molybdenum, plasma standard solution, Specpure®, Mo 1000µg/ml** $(NH_4)_2MoO_4$ in 1% NH_4OH, Liquid, †	**50ml** **100ml** **500ml** **bulk**
38726	**Molybdenum, plasma standard solution, Specpure®, Mo 10,000µg/ml** $(NH_4)_2MoO_4$ in 1% NH_4OH, Liquid, †	**50ml** **100ml** **500ml** **bulk**
13882	**Neodymium, plasma standard solution, Specpure®, Nd 1000µg/ml** Nd_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14431	**Neodymium, plasma standard solution, Specpure®, Nd 10,000µg/ml** Nd_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	

Single-Element Standards

Stock #	Description	Standard Selling Sizes
45261 NEW!	**Nickel, plasma standard solution, Specpure®, Ni 10µg/ml** Ni in 2% HNO_3, Liquid, UN3264  R:34, S:23b-26-36/37/39-45	**100ml** **bulk**
13839	**Nickel, plasma standard solution, Specpure®, Ni 1000µg/ml** Ni in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14414	**Nickel, plasma standard solution, Specpure®, Ni 10,000µg/ml** Ni in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13831	**Niobium, plasma standard solution, Specpure®, Nb 1000µg/ml** $NbCl_5$ in 2% HF, Liquid, UN1790, †  R:23/24/25-34, S:7/9-26-36/37-45	**50ml** **100ml** **500ml** **bulk**
14396	**Niobium, plasma standard solution, Specpure®, Nb 10,000µg/ml** $NbCl_5$ in 2% HF, Liquid, UN1790, †  R:23/24/25-34, S:7/9-26-36/37-45	**50ml** **100ml** **500ml** **bulk**
42244	**Niobium, plasma standard solution, Specpure®, Nb 1000µg/ml** NH_4NbF_6 in H_2O/tr. F^-, Liquid, †  R:20/21/22-36/37/38, S:7/9-26-36/37-45	**50ml** **100ml** **500ml** **bulk**
42245	**Niobium, plasma standard solution, Specpure®, Nb 10,000µg/ml** NH_4NbF_6 in H_2O/tr. F^-, Liquid, †  R:20/21/22-36/37/38, S:7/9-26-36/37-45	**50ml** **100ml** **500ml** **bulk**
13871	**Osmium, plasma standard solution, Specpure®, Os 1000µg/ml** $(NH_4)_2OsCl_6$ in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13833	**Palladium, plasma standard solution, Specpure®, Pd 1000µg/ml** Pd in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14432	**Palladium, plasma standard solution, Specpure®, Pd 10,000µg/ml** Pd in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
44631	**Palladium, plasma standard solution, Specpure®, Pd 1000µg/ml** Pd in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
45270 NEW!	**Phosphorus, plasma standard solution, Specpure®, P 1000µg/ml** H_3PO_4, H_2O, Liquid, UN3264  R:34, S:23b-26-36/37/39-45	**100ml** **500ml** **bulk**
45271 NEW!	**Phosphorus, plasma standard solution, Specpure®, P 10,000µg/ml** H_3PO_4, H_2O, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
13827	**Platinum, plasma standard solution, Specpure®, 1000µg/ml** Pt in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14397	**Platinum, plasma standard solution, Specpure®, Pt 10,000µg/ml** Pt in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13866	**Potassium, plasma standard solution, Specpure®, K 1000µg/ml** KNO_3 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14379	**Potassium, plasma standard solution, Specpure®, K 10,000µg/ml** KNO_3 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**

Stock #	Description	Standard Selling Sizes
13812	**Praseodymium, plasma standard solution, Specpure®, Pr 1000µg/ml** Pr_6O_{11} in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14433	**Praseodymium, plasma standard solution, Specpure®, Pr 10,000µg/ml** Pr_6O_{11} in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
13817	**Rhenium, plasma standard solution, Specpure®, Re 1000µg/ml** Re in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14416	**Rhenium, plasma standard solution, Specpure®, Re 10,000µg/ml** Re in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
45320 NEW!	**Rhodium, plasma standard solution, Specpure®, Rh 10µg/ml** $RhCl_3$ in 2% HCl, Liquid, UN1789, †	**100ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
35754	**Rhodium, plasma standard solution, Specpure®, Rh 1000µg/ml** $RhCl_3$ in 20% HCl, Liquid, UN1789, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
35763	**Rhodium, plasma standard solution, Specpure®, Rh 10,000µg/ml** $RhCl_3$ in 20% HCl, Liquid, UN1789, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
13872	**Rubidium, plasma standard solution, Specpure®, Rb 1000µg/ml** Rb_2CO_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:3-20-26-36/37/39-45-60	
14380	**Rubidium, plasma standard solution, Specpure®, Rb 10,000µg/ml** Rb_2CO_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:3-20-26-36/37/39-45-60	
35767	**Ruthenium, plasma standard solution, Specpure®, Ru 1000µg/ml** $RuCl_3$ in 20% HCl, Liquid, UN1789, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
35773	**Ruthenium, plasma standard solution, Specpure®, Ru 10,000µg/ml** $RuCl_3$ in 20% HCl, Liquid, UN1789, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
13854	**Samarium, plasma standard solution, Specpure®, Sm 1000µg/ml** Sm_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14417	**Samarium, plasma standard solution, Specpure®, Sm 10,000µg/ml** Sm_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
35769	**Scandium, plasma standard solution, Specpure®, Sc 1000µg/ml** Sc_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
35755	**Scandium, plasma standard solution, Specpure®, Sc 10,000µg/ml** Sc_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
45263 NEW!	**Selenium, plasma standard solution, Specpure®, Se 10µg/ml** Se in 2% HNO_3, Liquid, UN3264	**100ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
13845	**Selenium, plasma standard solution, Specpure®, Se 1000µg/ml** Se in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	

Single-Element Standards

Stock #	Description	Standard Selling Sizes
14381	**Selenium, plasma standard solution, Specpure®, Se 10,000µg/ml** Se in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13814	**Silicon, plasma standard solution, Specpure®, Si 1000µg/ml** Si in 5% HNO_3/tr. HF, Liquid, UN3264, †   R:20/21/22-34, S:7/9-23-26-36/37-45	**50ml** **100ml** **500ml** **bulk**
14435	**Silicon, plasma standard solution, Specpure®, Si 10,000µg/ml** Si in 5% HNO_3/tr. HF, Liquid, UN3264, †   R:20/21/22-34, S:7/9-23-26-36/37-45	**50ml** **100ml** **500ml** **bulk**
38717	**Silicon, plasma standard solution, Specpure®, Si 1000µg/ml** $(NH_4)_2SiF_6$ in H_2O/tr. F^-, Liquid, †	**50ml** **100ml** **500ml** **bulk**
38723	**Silicon, plasma standard solution, Specpure®, Si 10,000µg/ml** $(NH_4)_2SiF_6$ in H_2O/tr. F^-, Liquid, †	**50ml** **100ml** **500ml** **bulk**
45264 NEW!	**Silver, plasma standard solution, Specpure®, Ag 10µg/ml** Ag in 2% HNO_3, Liquid, UN3264  R:34, S:23b-26-36/37/39-45	**100ml** **bulk**
13849	**Silver, plasma standard solution, Specpure®, Ag 1000µg/ml** Ag in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14418	**Silver, plasma standard solution, Specpure®, Ag 10,000µg/ml** Ag in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13832	**Sodium, plasma standard solution, Specpure®, Na 1000µg/ml** Na_2CO_3 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14400	**Sodium, plasma standard solution, Specpure®, Na 10,000µg/ml** Na_2CO_3 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13874	**Strontium, plasma standard solution, Specpure®, Sr 1000µg/ml** $Sr(NO_3)_2$ in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14382	**Strontium, plasma standard solution, Specpure®, Sr 10,000µg/ml** $Sr(NO_3)_2$ in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13842	**Sulfur, plasma standard solution, Specpure®, S 1000µg/ml** $(NH_4)_2SO_4$ in H_2O, Liquid, †	**50ml** **100ml** **500ml** **bulk**
14436	**Sulfur, plasma standard solution, Specpure®, S 10,000µg/ml** $(NH_4)_2SO_4$ in H_2O, Liquid, †	**50ml** **100ml** **500ml** **bulk**
13840	**Tantalum, plasma standard solution, Specpure®, Ta 1000µg/ml** $TaCl_5$ in 2% HF, Liquid, UN1790, †  R:23/24/25-34, S:7/9-26-36/37-45	**50ml** **100ml** **500ml** **bulk**
14419	**Tantalum, plasma standard solution, Specpure®, Ta 10,000µg/ml** $TaCl_5$ in 2% HF, Liquid, UN1790, †  R:23/24/25-34, S:7/9-26-36/37-45	**50ml** **100ml** **500ml** **bulk**
45265 NEW!	**Tellurium, plasma standard solution, Specpure®, Te 10µg/ml** Te in 2% HNO_3, Liquid, UN3264  R:34, S:23b-26-36/37/39-45	**100ml** **bulk**

Stock #	Description	Standard Selling Sizes
13879	**Tellurium, plasma standard solution, Specpure®, Te 1000µg/ml** Te in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14401	**Tellurium, plasma standard solution, Specpure®, Te 10,000µg/ml** Te in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
44632	**Tellurium, plasma standard solution, Specpure®, Te 1000µg/ml** Te in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
45266 NEW!	**Terbium, plasma standard solution, Specpure®, Tb 10µg/ml** Tb_4O_7 in 2% HNO_3, Liquid, UN3264  R:34, S:23b-26-36/37/39-45	**100ml** **bulk**
13860	**Terbium, plasma standard solution, Specpure®, Tb 1000µg/ml** Tb_4O_7 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14383	**Terbium, plasma standard solution, Specpure®, Tb 10,000µg/ml** Tb_4O_7 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13851	**Thallium, plasma standard solution, Specpure®, Tl 1000µg/ml** Tl in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14437	**Thallium, plasma standard solution, Specpure®, Tl 10,000µg/ml** Tl in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13824	**Thulium, plasma standard solution, Specpure®, Tm 1000µg/ml** Tm_2O_3 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14402	**Thulium, plasma standard solution, Specpure®, Tm 10,000µg/ml** Tm_2O_3 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
13863	**Tin, plasma standard solution, Specpure®, Sn 1000µg/ml** Sn in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
14384	**Tin, plasma standard solution, Specpure®, Sn 10,000µg/ml** Sn in 20% HCl, Liquid, UN1789, †  R:34, S:23b-26-36/37/39-45	**50ml** **100ml** **500ml** **bulk**
45267 NEW!	**Titanium, plasma standard solution, Specpure®, Ti 10µg/ml** Ti in 2% HNO_3/tr. HF, Liquid, UN3264  R:20/21/22-34, S:7/9-23b-26-36/37-45	**100ml** **bulk**
35768	**Titanium, plasma standard solution, Specpure®, Ti 1000µg/ml** Ti in 5% HNO_3/tr. HF, Liquid, UN3264, †  R:20/21/22-34, S:7/9-23-26-36/37-45	**50ml** **100ml** **500ml** **bulk**
35759	**Titanium, plasma standard solution, Specpure®, Ti 10,000µg/ml** Ti in 5% HNO_3/tr. HF, Liquid, UN3264, †  R:20/21/22-34, S:7/9-23-26-36/37-45	**50ml** **100ml** **500ml** **bulk**
38720	**Titanium, plasma standard solution, Specpure®, Ti 1000µg/ml** $(NH_4)_2TiF_6$ in H_2O/tr. F^-, Liquid, †  R:20/21/22-36/37/38, S:7/9-26-36/37-45	**50ml** **100ml** **500ml** **bulk**
38725	**Titanium, plasma standard solution, Specpure®, Ti 10,000µg/ml** $(NH_4)_2TiF_6$ in H_2O/tr. F^-, Liquid, †  R:20/21/22-36/37/38, S:7/9-26-36/37-45	**50ml** **100ml** **500ml** **bulk**

Single-Element Standards

Stock #	Description	Standard Selling Sizes
35770	**Tungsten, plasma standard solution, Specpure®, W 1000µg/ml** W in 5% HNO_3/tr. HF, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:20/21/22-34, S:7/9-23-26-36/37-45	
35772	**Tungsten, plasma standard solution, Specpure®, W 10,000µg/ml** W in 5% HNO_3/tr. HF, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:20/21/22-34, S:7/9-23-26-36/37-45	
42248	**Tungsten, plasma standard solution, Specpure®, W 1000µg/ml** $(NH_4)_2WO_4$ in H_2O, Liquid, †	**50ml** **100ml** **500ml** **bulk**
42249	**Tungsten, plasma standard solution, Specpure®, W 10,000µg/ml** $(NH_4)_2WO_4$ in H_2O, Liquid, †	**50ml** **100ml** **500ml** **bulk**
13850	**Vanadium, plasma standard solution, Specpure®, V 1000µg/ml** V_2O_5 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14385	**Vanadium, plasma standard solution, Specpure®, V 10,000µg/ml** V_2O_5 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
13819	**Ytterbium, plasma standard solution, Specpure®, Yb 1000µg/ml** Yb_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14439	**Ytterbium, plasma standard solution, Specpure®, Yb 10,000µg/ml** Yb_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
45268 NEW!	**Yttrium, plasma standard solution, Specpure®, Y 10µg/ml** Y_2O_3 in 2% HNO_3, Liquid, UN3264	**100ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
13855	**Yttrium, plasma standard solution, Specpure®, Y 1000µg/ml** Y_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14422	**Yttrium, plasma standard solution, Specpure®, Y 10,000µg/ml** Y_2O_3 in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
45269 NEW!	**Zinc, plasma standard solution, Specpure®, 10µg/ml** Zn in 2% HNO_3, Liquid, UN3264	**100ml** **bulk**
	R:34, S:23b-26-36/37/39-45	
13835	**Zinc, plasma standard solution, Specpure®, Zn 1000µg/ml** Zn in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14404	**Zinc, plasma standard solution, Specpure®, Zn 10,000µg/ml** Zn in 5% HNO_3, Liquid, UN3264, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
13875	**Zirconium, plasma standard solution, Specpure®, Zr 1000µg/ml** $ZrCl_2O$ in 5% HCl, Liquid, UN1789, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	
14386	**Zirconium, plasma standard solution, Specpure®, Zr 10,000µg/ml** $ZrCl_2O$ in 5% HCl, Liquid, UN1789, †	**50ml** **100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	

Isotopic Standards

Alfa Aesar offers a selection of isotope reference materials. These are non-radioactive, "stable" isotopes and can be handled like any aqueous metal standard.

Stock #	Description	Standard Selling Sizes
45273 NEW!	**Boron 11, ^{11}B, plasma standard solution, Specpure®, ^{11}B 100µg/ml** Matrix: H_2O, Liquid, UN3264	50ml bulk
45274 NEW!	**Cadmium 106, ^{106}Cd, plasma standard solution, Specpure®, ^{106}Cd 10µg/ml** Matrix: 2% HNO_3, Liquid, UN3264 R:34, S:23b-26-36/37/39-45	50ml bulk
45275 NEW!	**Chromium 50, ^{50}Cr, plasma standard solution, Specpure®, ^{50}Cr 10µg/ml** Matrix: 2% HNO_3, Liquid, UN3264 R:34, S:23b-26-36/37/39-45	50ml bulk
45276 NEW!	**Copper 65, ^{65}Cu, plasma standard solution, Specpure®, ^{65}Cu 10µg/ml** Matrix: 2% HNO_3, Liquid R:34, S:23b-26-36/37/39-45	50ml bulk
45277 NEW!	**Iron 57, ^{57}Fe, plasma standard solution, Specpure®, ^{57}Fe 10µg/ml** Matrix: 2% HNO_3, Liquid R:34, S:23b-26-36/37/39-45	50ml bulk
45278 NEW!	**Lead, Natural Pb, plasma standard solution, Specpure®, Natural Pb 100µg/ml** Matrix: 2% HNO_3, Liquid R:34, S:23b-26-36/37/39-45	50ml bulk
45279 NEW!	**Lead, NIST Pb, plasma standard solution, Specpure®, NIST Pb 100µg/ml** Matrix: 2% HNO_3, Liquid R:34, S:23b-26-36/37/39-45	50ml bulk
45280 NEW!	**Lithium 6, ^{6}Li, plasma standard solution, Specpure®, ^{6}Li 100µg/ml** Matrix: 2% HNO_3, Liquid, UN3264, † R:34, S:23b-26-36/37/39-45	100ml bulk
45281 NEW!	**Neodymium, Natural Nd, plasma standard solution, Specpure®, Natural Nd 10µg/ml** Matrix: 2% HNO_3, Liquid R:34, S:23b-26-36/37/39-45	50ml bulk
45282 NEW!	**Nickel 61, ^{61}Ni, plasma standard solution, Specpure®, ^{61}Ni 10µg/ml** Matrix: 2% HNO_3, Liquid, UN3264, † R:34, S:20-23-26-36/37/39-45	50ml bulk
45283 NEW!	**Selenium 78, ^{78}Se, plasma standard solution, Specpure®, ^{78}Se 10µg/ml** Matrix: 2% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	50ml bulk
45284 NEW!	**Selenium 82, ^{82}Se, plasma standard solution, Specpure®, ^{82}Se 10µg/ml** Matrix: 2% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	50ml bulk
45285 NEW!	**Strontium, Natural Sr, plasma standard solution, Specpure®, Natural Sr 100µg/ml** Matrix: 2% HNO_3, Liquid, UN3264 R:34, S:20-23-26-36/37/39-45	50ml bulk
45286 NEW!	**Strontium 86, ^{86}Sr, plasma standard solution, Specpure®, ^{86}Sr 10µg/ml** Matrix: 2% HNO_3, Liquid, UN3264 R:34, S:20-23-26-36/37/39-45	50ml bulk
45287 NEW!	**Tin 122, ^{122}Sn, plasma standard solution, Specpure®, ^{122}Sn 10µg/ml** Matrix: 2% HNO_3/tr. HF, Liquid, UN3264 R:34, S:20-23-26-36/37/39-45	50ml bulk

Isotopic Standards

Stock #	Description	Standard Selling Sizes
45288 NEW!	**Thallium 203, ^{203}Tl, plasma standard solution, Specpure®, ^{203}Tl 10µg/ml** Matrix: 2% HNO_3, Liquid, UN3264, †  R:34, S:20-23-26-36/37/39-45	**50ml** **bulk**
45289 NEW!	**Zinc 68, ^{68}Zn, plasma standard solution, Specpure®, ^{68}Zn 10µg/ml** Matrix: 2% HNO_3, Liquid, UN3264  R:34, S:20-23-26-36/37/39-45	**50ml** **bulk**

Specpure® Stock Multi-Element Standards

Alfa Aesar offers a wide selection of Multi-Element Calibration Standards in stock and ready for prompt shipment. Each multi-element solution is shipped with expiration date stickers and a Certificate of Analysis which states the actual concentrations of each element and NIST traceability. These multi-element solutions are designed to contain groups of elements which are matrix matched and commonly analyzed together.

Stock #	Description	Standard Selling Sizes
44428	**Alkali Metals, plasma standard solution, Specpure®, Ba,Be,Ca,Cs,K,Li,Mg,Na,Rb,Sr @ 100µg/ml** Matrix: 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
14657	**Heavy Metals, plasma standard solution, Specpure®, Ag, As, Ba, Cd, Cr, Hg, Pb, Se @ 100µg/ml** Matrix: 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**
44267	**Non Metals, plasma standard solution, Specpure®, As, B, P, S, Se, Si, Te @ 100µg/ml** Matrix: 5% HCl/tr. F^-, Liquid, UN3264, † R:20/21/22-34, S:7/9-26-36/37-45	**100ml** **500ml** **bulk**
14652	**Precious Metals, plasma standard solution, Specpure®, Au, Ir, Os, Pd, Pt, Re, Rh, Ru @ 100µg/ml** Matrix: 20% HCl, Liquid, UN1789, † R:34, S:23b-26-36/37/39-45	**100ml** **500ml** **bulk**
44270	**Refractory Metals, plasma standard solution, Specpure®, Al, B, Cr, Hf, Mo, Nb, Si, Ta, Ti, V, W, Zr @ 100µg/ml** Matrix: 5% HCl/tr. HF, Liquid, UN3264, † R:20/21/22-34, S:7/9-26-36/37-45	**100ml** **500ml** **bulk**
44268	**Semi Metals, plasma standard solution, Specpure®, As, Bi, Ga, Ge, In, Pb, Sb, Se, Sn, Te, Tl @ 100µg/ml** Matrix: 20% HCl/tr. HF, Liquid, UN3264, † R:20/21/22-34, S:7/9-26-36/37-45	**100ml** **500ml** **bulk**
44518	**Transition Metals, plasma standard solution, Specpure®, Cd, Co, Cr, Cu, Fe, Mn, Ni, V, Zn @ 100µg/ml** Matrix: 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**

Additional Multi-Element Standards

Stock #	Description	Standard Selling Sizes
42881	**Multi-Element Plasma Standard Solution 1, Specpure®** Matrix: dilute HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**100ml** **bulk**

Ag	50	Co	20	Mn	5
Al	100	Cr	25	Ni	50
B	15	Cu	20	Pb	200
Ba	5	Fe	15	Sr	1
Be	1	Ga	150	Tl	400
Bi	200	In	200	Zn	20
Cd	20				

Stock #	Description	Standard Selling Sizes
42882	**Multi-Element Plasma Standard Solution 2, Specpure®** Matrix: dilute HNO_3, Liquid, UN3264, † R:34, S:20-26-36/37/39-45-60	**100ml** **bulk**

K	10000	Li	250	Na	1000

Multi-Element Standards

Stock #	Description	Standard Selling Sizes
42884	**Multi-Element Plasma Standard Solution 3, Specpure®** Matrix: dilute HNO_3, Liquid, UN3264, †  R:34, S:20-26-36/37/39-45-60	**100ml** **bulk**

Ba	1000	Mg	1000	Sr	1000
Ca	1000				

42885	**Multi-Element Plasma Standard Solution 4, Specpure®** Matrix: dilute HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45				**100ml** **bulk**

Ag	1000	Cr	1000	Mn	1000
Al	1000	Cu	1000	Na	1000
B	1000	Fe	1000	Ni	1000
Ba	1000	Ga	1000	Pb	1000
Bi	1000	In	1000	Sr	1000
Ca	1000	K	1000	Tl	1000
Cd	1000	Li	1000	Zn	1000
Co	1000	Mg	1000		

Specpure® Semiquantitative Analysis Standards

The following two solutions contain almost all elements which can be determined by ICP and DCP. They are very useful for doing semi-quantitative analysis scans.

Stock #	Description	Standard Selling Sizes
44783	**Semiquantitative Standard 1, Specpure®** Matrix: 40% Aqua Regia, Liquid, UN3093, †  R:8-35, S:17-20-26-36/37/39-45	**100ml** **500ml** **bulk**

Elements, concentrations (µg/ml)					
Ag	10	Gd	10	Rb	10
Al	10	Hg	10	Sc	10
As	10	Ho	10	Se	10
Ba	10	La	10	Sm	10
Bi	10	Lu	10	Sr	10
Ca	10	Mg	10	Tb	10
Cd	10	Na	10	Tl	10
Ce	10	Nd	10	Tm	10
Dy	10	P	10	U	10
Er	10	Pb	10	Y	10
Eu	10	Pr	10	Yb	10
Ga	10				

Stock #	Description	Standard Selling Sizes
36770	**Semiquantitative Standard 2, Specpure®** Matrix: 40% Aqua Regia/tr. HF, Liquid, UN3093, Note: Certificate of Analysis included, †	**100ml** **500ml** **bulk**


R:8-35, S:17-20-26-36/37/39-45

Au	10	Li	10	Sb	10
B	10	Mn	10	Si	10
Be	10	Mo	10	Sn	10
Co	10	Nb	10	Ta	10
Cr	10	Ni	10	Te	10
Cu	10	Os	10	Ti	10
Fe	10	Pd	10	V	10
Ge	10	Pt	10	W	10
Hf	10	Re	10	Zn	10
Ir	10	Rh	10	Zr	10
K	10	Ru	10		

Section 5 Environmental Standards

Specpure® Environmental Multi-Element Standards

The following environmental standards are for use with EPA Method 200.7 and can be used for EPA Method 6010A and Standard Method 3120. Please inquire for Interference Check Standard Solutions, Mixed Calibration Standard Solutions, Primary Drinking Water Standard Solutions and Secondary Drinking Water Standard Solutions.

Specpure® Check Standards

Stock #	Description	Standard Selling Sizes
39145	**Multi-Element QC-7 Check Standard Solution, Specpure®** Matrix: 5% HNO_3/tr. F^-, Liquid, UN3264, †	**100ml** **500ml** **bulk**

R:20/21/22-34, S:7/9-23-26-36/37-45

Ag	100	Ba	100	Na	100
Al	100	K	1000	Si	50
B	100				

Stock #	Description	Standard Selling Sizes
39146	**Multi-Element QC-19 Check Standard Solution, Specpure®** Matrix: 5% HNO_3/tr. F^-/tr. tartaric acid, Liquid, UN3264, †	**100ml** **500ml** **bulk**

R:20/21/22-34, S:7/9-23-26-36/37-45

As	100	Fe	100	Sb	100
Be	100	Mg	100	Se	100
Ca	100	Mn	100	Ti	100
Cd	100	Mo	100	Tl	100
Co	100	Ni	100	V	100
Cr	100	Pb	100	Zn	100
Cu	100				

Stock #	Description	Standard Selling Sizes
41328	**Multi-Element QC-21 Check Standard Solution, Specpure®** Matrix: 5% HNO_3/tr. F^-/tr. tartaric acid, Liquid, UN3264, †	**100ml** **500ml** **bulk**

R:20/21/22-34, S:7/9-23-26-36/37-45

As	100	Fe	100	Sb	100
Be	100	Li	100	Se	100
Ca	100	Mg	100	Sr	100
Cd	100	Mn	100	Ti	100
Co	100	Mo	100	Tl	100
Cr	100	Ni	100	V	100
Cu	100	Pb	100	Zn	100

TCLP Standards

For use in Toxicity Characteristics Leachate Procedure Method 1311.

Stock #	Description	Standard Selling Sizes
36743	**TCLP Standard Solution 1, Specpure®** Matrix: 2% HNO_3, Liquid, UN3264, †	**100ml** **500ml** **bulk**

R:35, S:20-26-36/37/39-45

Ag	25	Cd	5	Pb	25
As	25	Cr	25	Se	5
Ba	500				

Stock #	Description	Standard Selling Sizes
36748	**TCLP Standard Solution 2, Specpure®, Hg 20µg/ml** Matrix: 2% HNO_3, Liquid, UN3264, †	**100ml** **500ml** **bulk**

R:34, S:23-26-36/37/39-45

Ground and Waste Water Pollution Standards

For use with US EPA methods manual 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes": Trace metals 21I, 21II and 21III methods.

Stock #	Description	Standard Selling Sizes
36740	**Ground & Waste Water Pollution Standard Solution 1, Specpure®** Matrix: 5% HNO_3, Liquid, UN3264, †	**100ml** **500ml** **bulk**


R:35, S:20-26-36/37/39-45

Al	500	Cr	100	Ni	100
As	100	Cu	100	Pb	100
Be	100	Fe	100	Se	25
Cd	25	Hg	5	V	250
Co	100	Mn	100	Zn	100

36745	**Ground & Waste Water Pollution Standard Solution 2, Specpure®** Matrix: 2% HNO_3/tr. tartaric acid, Liquid, UN3264, †	**100ml** **500ml** **bulk**


R:35, S:20-26-36/37/39-45

Ag	10	Sb	20	Tl	20

36750	**Ground & Waste Water Pollution Standard Solution 3, Specpure®** Matrix: 2% HNO_3, Liquid, UN3264, †	**100ml** **500ml** **bulk**


R:35, S:20-26-36/37/39-45

Ba	500	K	100	Mo	500
Ca	500	Mg	100	Na	500

42579	**Ground & Waste Water Pollution Standard Solution 4, Specpure®** Matrix: 2% HNO_3/tr. tartaric acid, Liquid, UN3264, †	**100ml** **500ml** **bulk**


R:35, S:20-26-36/37/39-45

Al	20	Fe	20	Tl	5
Be	5	Mn	10	V	20
Co	10	Ni	10	Zn	10
Cu	10	Sb	5		

42580	**Ground & Waste Water Pollution Standard Solution 5, Specpure®** Matrix: 2% HNO_3, Liquid, UN3264, †	**100ml** **500ml** **bulk**


R:35, S:20-26-36/37/39-45

Ca	500	Mg	100	Na	500
K	100				

Specpure® CLP Standards for ICP

Introduction

CLP Solution Standards are specifically designed for EPA certified environmental labs using ICP analysis in Superfund work. These products provide a virtually error-free method for preparing the required standards that save you time in the process.

Simple and Easy to Use

Alfa Aesar's Specpure® CLP Solution Standards are a collection of individually prepared standards for EPA established CLP protocol requirements. They are available in LabPaks™ for the complete ICP or GFAA analysis, or in kit form for each CLP protocol test.

Cost Effective

Alfa Aesar CLP Standards deliver more for your money. Each LabPak™ yields approximately 10 liters. Combine this fact with their overall ease-of-use, plus reduced repeat analysis, and it's easy to see how you can save both time and money.

Highest Quality Materials

As with all Alfa Aesar Specpure® grade products, these CLP standards are produced using the highest purity starting materials available. All standards are made from the same starting material, except for the ICV standard which is made from different material sources.

Additionally, we use only high-purity water passing 18MΩ/cm^2 resistivity and high purity distilled acids that are analyzed and certified to meet our required impurity levels.

Our attention to detail is evident in other important precautions as well. Container materials are selected for inertness and compatibility with specific solutions, and all containers are preleached in 50% HNO_3 (followed by 50% HCl for HCl matrix solutions) for one week and triple rinsed in high-purity water.

Alfa Aesar Quality

Alfa Aesar has taken great care in preparing these environmental standards. Our careful preparation and attention to detail will deliver you high-quality, time-saving and cost-effective products that help boost productivity and accuracy.

Each Alfa Aesar Specpure® solution is shipped with a detailed certificate of analysis and individual expiration date stickers.

CLP Protocol LabPak™ for ICP Analysis, Specpure®

This LabPak™ comes with all the necessary standard concentrates needed for the day to day operations to complete the EPA established CLP Protocol requirements. Minimal mixing and dilution of the standard concentrates make it easy by saving you time and money in preparing all the necessary CLP Protocol Standards. This LabPak™ contains the following CLP Protocol Test Kits for analysis by ICP:

CLP Protocol Test Kit	Quantity
Instrument Calibration (ICAL) Standards Kit (35417)	1
Initial Calibration Verification (ICV) Standards Kit (35418)	1
Continuing Calibration Verification (CCV) Standards Kit (35419)	1
Contract Required Detection Limits (CRDL) Standard (35420)	1
Interference Check Standard A (ICS-A) Solution (35256)	2
Interference Check Standard AB-1 (ICS-AB1) Solution (35421)	1
Interference Check Standard AB-2 (ICS-AB2) Solution (41330)	1
Water Spiking Standard A (WSS-A) Solution (35422)	1
Water Spiking Standard B (WSS-B) Solution (41331)	1
Soil Spiking Standard A (SSS-A) Solution (35423)	1
Soil Spiking Standard B (SSS-B) Solution (41332)	1
Laboratory Control Sample (LCS) Standards Kit (35424)	1
Initial Calibration Blank/Continuing Calibration Blank (ICB/CCB) Standards Kit (35259)	4

Stock #	Description	Standard Selling Sizes
35406	**CLP Protocol Test Kit for ICP Analysis, Specpure®** UN3264, †	**each**

Instrument Calibration (ICAL) Standards Kit, Specpure®

The ICAL Standards Kit comes complete with A & B standard concentrate solutions. Concentrations required by the CLP Protocol are obtained by diluting 1ml each of the A & B concentrates to 100ml.

Elements, concentrations (µg/ml)

Solution A-Matrix: 5% HNO_3				Solution B-Matrix: 20% HCl			
Ag	200	Fe	1,000	Al	1,000	Na	10,000
Ba	1,000	Mn	1,000	As	1,000	Mg	10,000
Be	400	Ni	1,000	Ca	10,000	Sb	1,000
Cd	500	Pb	1,000	Cr	1,000	Se	1,000
Co	1,000	Tl	1,000	K	10,000	V	1,000
Cu	1,000	Zn	1,000				

Stock #	Description	Standard Selling Sizes
35417	**Instrument Calibration(ICAL) Standards Kit, Specpure®** Liquid, UN3264, †	**2x100ml** **bulk**
44855	**Instrument Calibration(ICAL) Standard, Solution A, Specpure®** Liquid, UN3264, †	**100ml** **500ml** **bulk**
44856	**Instrument Calibration(ICAL) Standard, Solution B, Specpure®** Liquid, UN1789, †	**100ml** **500ml** **bulk**

Initial Calibration Verification (ICV) Standards Kit, Specpure®

The ICV Standards Kit comes complete with an A & B standard concentrate solution. Concentrations required by the CLP Protocol are obtained by diluting 1ml each of the A & B concentrates to 100ml. These concentrates are made from independent lots of raw materials.

Elements, concentrations (µg/ml)

Solution A-Matrix: 5% HNO_3				Solution B-Matrix: 20% HCl			
Ag	20	Fe	100	Al	100	Mg	1,000
Ba	100	Mn	100	As	100	Na	1,000
Be	40	Ni	100	Ca	1,000	Sb	100
Cd	50	Pb	100	Cr	100	Se	100
Co	100	Tl	100	K	1,000	V	100
Cu	100	Zn	100				

Stock #	Description	Standard Selling Sizes
35418	**Initial Calibration Verification(ICV) Standards Kit, Specpure®** Liquid, UN3264, †	**2x100ml** **bulk**
	R:34, S:23-26-36/37/39-45	

Continuing Calibration Verification (CCV) Standards Kit, Specpure®

The CCV Standards Kit comes complete with an A & B standard concentrate solution. Concentrations required by the CLP Protocol are obtained by diluting 1ml each of the A & B concentrates to 100ml.

Elements, concentrations (µg/ml)

Solution A-Matrix: 5% HNO_3				Solution B-Matrix: 20% HCl			
Ag	100	Fe	500	Al	500	Mg	5,000
Ba	500	Mn	500	As	500	Na	5,000
Be	200	Ni	500	Ca	5,000	Sb	500
Cd	250	Pb	500	Cr	500	Se	500
Co	500	Tl	500	K	5,000	V	500
Cu	500	Zn	500				

Stock #	Description	Standard Selling Sizes
35419	**Continuing Calibration Verification (CCV) Standards Kit, Specpure®** Liquid, UN3264, †	**2x100ml** **bulk**
	R:34, S:23-26-36/37/39-45	

Contract Required Detection Limits (CRDL) Standard, Specpure®

Elements, concentrations (µg/ml)

Ag	20	Cr	20	Sb	120
As	20	Cu	50	Se	10
Be	10	Mn	30	Tl	20
Cd	10	Ni	80	V	100
Co	100	Pb	6	Zn	40

Stock #	Description	Standard Selling Sizes
35420	**Contract Required Detection Limits (CRDL) Standard, Specpure®** Matrix: 5% HNO_3/tr. tartaric acid, Liquid, UN3264, †	**100ml** **500ml** **bulk**
	R:34, S:23-26-36/37/39-45	

Interference Check Standards, Specpure®

The concentration required by the CLP protocol for Interference Check Standard A is obtained by diluting ICS-A ten-fold. Interference Check Standard AB is obtained by diluting 1ml of ICS-AB1, 1ml of ICS-AB2 and 10ml of ICS-A concentrates to 100ml.

Stock #	Description	Standard Selling Sizes
35256	**Interference Check Standard A(ICS-A) Solution, Specpure®** Matrix: 20% HCl, Liquid, UN1789, †	**500ml** **bulk**

Al	5000	Fe	2000	Mg	5000
Ca	5000				

Stock #	Description	Standard Selling Sizes
35421	**Interference Check Standard AB-1(ICS-AB1) Solution, Specpure®** Matrix: 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**100ml** **bulk**

Ag	100	Co	50	Ni	100
Be	50	Cu	50	Pb	100
Cd	100	Mn	50	Zn	100

Stock #	Description	Standard Selling Sizes
41330	**Interference Check Standard AB-2(ICS-AB2) Solution, Specpure®** Matrix: 20% HCl, Liquid, UN1789, †	**100ml** **bulk**

Ba	50	Cr	50	V	50

Interference Check Standard for ILM04.0, Specpure®

For ILM04.0, Interference Check Sample Solution AB is obtained by diluting 10ml of ICS-A and 1ml of ICS-AB concentrates to 100ml.

Stock #	Description	Standard Selling Sizes
41730	**Interference Check Standard AB(ICS-AB) Solution, Specpure®** Matrix: 5% HNO_3/tr. tartaric acid, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**100ml** **500ml** **bulk**

Ag	20	Cr	50	Sb	60
As	10	Cu	50	Se	5
Ba	50	Mn	50	Tl	10
Be	50	Ni	100	V	50
Cd	100	Pb	5	Zn	100
Co	50				

Spiking Standards Solutions, Specpure®

The following two concentrates are typically used together. To prepare spiked samples, add 1ml of each solution to each water sample.

Stock #	Description	Standard Selling Sizes
35422	**Water Spiking Standard A (WSS-A) Solution, Specpure®** Matrix: 5% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**100ml** **bulk**

Ag	5	Cu	25	Pb	50
Be	5	Fe	100	Tl	200
Cd	5	Mn	50	Zn	50
Co	50	Ni	50		

CLP Standards

Stock #	Description	Standard Selling Sizes
41331	**Water Spiking Standard B (WSS-B) Solution, Specpure®** Matrix: 20% HCl, Liquid, UN1789, †	**100ml** **bulk**

Al	200	Cr	20	Se	200
As	200	Sb	50	V	50
Ba	200				

Initial Calibration Blank/Continuing Calibration Blank (ICB/CCB) Standards Kit, Specpure®

Stock #	Description	Standard Selling Sizes
35259	**Initial Calibration Blank/Continuing Calibration Blank(ICB/CCB), Specpure®** Matrix: 5% HCl/1% HNO_3, Liquid, UN3264, † R:34, S:23-26-36/37/39-45	**500ml** **bulk**

Specpure® ICP-MS Standards

Stock #	Description	Standard Selling Sizes
44651	**ICP-MS Internal Standard solution, Specpure®** Matrix: 5% HNO_3, Liquid, UN3264, †	**100ml** **bulk**

R:34, S:26

Elements, concentrations (µg/ml)							
Bi	100	In	100	Sc	100	Y	100
Ga	100	^{6}Li	100	Tb	100		

Stock #	Description	Standard Selling Sizes
42586	**ICP-MS Tuning Standard solution for HP®, Specpure®** Matrix: 5% HNO_3, Liquid, UN3264, †	**100ml** **bulk**

R:34, S:23-26-36/37/39-45

Elements, concentrations (µg/ml)					
Ce	10	Tl	10	Y	10
^{7}Li	10				

Specpure® ICP-MS Standards for Method 200.8

Stock #	Description	Standard Selling Sizes
42596	**ICP-MS Stock Standard solution A for 200.8, Rev. 5.4, Specpure®** Matrix: 5% HNO_3/tr. tartaric acid, Liquid, UN3264, †	**100ml** **bulk**

R:35, S:20-26-36/37/39-45

Elements, concentrations (µg/ml)					
Al	10	Cu	10	Se	50
As	10	Mn	10	Th	10
Be	10	Mo	10	Tl	10
Cd	10	Ni	10	U	10
Co	10	Pb	10	V	10
Cr	10	Sb	10	Zn	10

40485	**ICP-MS Stock Standard solution A for 200.8, Rev. 4.4, Specpure®** Matrix: 5% HNO_3/tr. tartaric acid, Liquid, UN3264, †	**100ml** **bulk**

R:35, S:20-26-36/37/39-45

Elements, concentrations (µg/ml)					
Al	10	Cu	10	Se	10
As	10	Mn	10	Th	10
Be	10	Mo	10	Tl	10
Cd	10	Ni	10	U	10
Co	10	Pb	10	V	10
Cr	10	Sb	10	Zn	10

40486	**ICP-MS Stock Standard solution B for 200.8, Specpure®** Matrix: 1% HNO_3, Liquid, UN3264, †	**100ml** **bulk**

R:34, S:23-26-36/37/39-45

Elements, concentrations (µg/ml)			
Ag	10	Ba	10

44789	**ICP-MS Internal Standard solution for 200.8 & CLP ILM05.2,Specpure®** Matrix: 5% HNO_3, Liquid, UN3264, †	**100ml** **bulk**

R:34, S:20-23-26-36/37/39-45-60

Elements, concentrations (µg/ml)							
^{209}Bi	10	^{6}Li	10	^{45}Sc	10	^{89}Y	10
^{115}In	10	^{175}Lu	10	^{159}Tb	10		

40483	**ICP-MS Tuning Standard solution for 200.8, Specpure®** Matrix: 1% HNO_3, Liquid, UN3264, †	**100ml** **bulk**

R:34, S:23-26-36/37/39-45

Elements, concentrations (µg/ml)					
Be	10	In	10	Pb	10
Co	10	Mg	10		

Specpure® ICP-MS Standards for Methods 6020 and 6020 CLP-M

Stock #	Description	Standard Selling Sizes
42602	**ICP-MS Calibration Standard solution for 6020 CLP-M, Specpure®** Matrix: 2% HNO_3/tr. tartaric acid, Liquid, UN3264  R:35, S:20-26-36/37/39-45	**100ml** **bulk**

Ag	10	Cr	10	Ni	10
Al	10	Cu	10	Pb	10
As	10	Fe	10	Sb	10
Ba	10	K	10	Se	10
Be	10	Mg	10	Tl	10
Ca	10	Mn	10	V	10
Cd	10	Na	10	Zn	10
Co	10				

40482	**ICP-MS Tuning Standard solution for 6020 CLP-M, Specpure®** Matrix: 2% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **bulk**

Co	10	Li	10	Tl	10
In	10				

44539	**ICP-MS Water Spike Standard solution for 6020 CLP-M, Specpure®** Matrix: 5% HNO_3/tr. tartaric acid, Liquid, UN3264, †  R:34, S:20-26-36/37/39-45-60	**100ml** **bulk**
42604	**ICP-MS Soil Spike Standard solution for 6020 CLP-M, Specpure®** Matrix: 2% HNO_3/tr. tartaric acid, Liquid, UN3264  R:34, S:23-26-36/37/39-45	**100ml** **bulk**

Ag	10	Co	20	Sb	20
As	10	Cr	50	Se	5
Ba	50	Cu	50	Tl	5
Be	5	Ni	25	V	30
Cd	10	Pb	20	Zn	50

44727	**ICP-MS Interferents A for 6020A ICS, Specpure®** Matrix: 5% HNO_3/tr. HF, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**500ml** **bulk**

Al	1000	Fe	2500	Na	2500
C	2000	K	1000	P	1000
Ca	3000	Mg	1000	S	1000
Cl	20,000	Mo	20	Ti	20

42650	**ICP-MS Analytes B for 6020 CLP-M, Specpure®** Matrix: 2% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml** **bulk**

Ag	5	Cr	20	Se	10
As	10	Cu	20	V	20
Cd	10	Mn	20	Zn	10
Co	20	Ni	20		

44713	**ICP-MS Interference Check Standard solution B for 6020, Specpure®** Matrix: 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36-45	**100ml** **bulk**

ICP-MS Standards

Stock #	Description	Standard Selling Sizes
40488	**ICP-MS Memory Check Standard solution B for 6020 CLP-M, Specpure®** Matrix: 2% HNO_3/tr. F^-/tr. tartaric acid, Liquid, d. 1.0, UN3264, †	**100ml** **500ml** **bulk**


R:34, S:23b-26-36/37/39-45

Ag	20	Cr	20	Sb	20
As	20	Cu	20	Se	20
Ba	20	Mn	20	Ti	20
Be	20	Mo	20	Tl	20
Cd	20	Ni	20	V	20
Co	20	Pb	20	Zn	20

43161	**ICP-MS Internal Standard for 6020, Specpure®** Matrix: 2% HNO_3, Liquid, UN3264, †	**100ml** **bulk**


R:34, S:23-26-36/37/39-45

^{209}Bi	10	^{6}Li	10	^{159}Tb	10
^{165}Ho	10	^{45}Sc	10	^{89}Y	10
^{115}In	10				

Section 6 Ion Chromatography Standards

Specpure® Ion Chromatography Standards

Alfa Aesar Ion Chromatography Standards save you money by eliminating the need to prepare and qualify your own IC standards. We've already done the work for you. Each of our standards is NIST traceable, so you can feel confident with your results when using them.

Specpure® is Alfa Aesar's trademark for a comprehensive range of standards. Our IC standards are made using Puratronic® starting materials (typically 99.999% pure) and 18 megaohm deionized water. All standards are pre-filtered to minimize column plugging and maximize shelf life. All Alfa Aesar standards are accompanied by a Certificate of Analysis which states the actual concentration and the traceability to NIST. Most are guaranteed to be stable for one year from the ship date, provided they are kept tightly capped and stored under normal laboratory conditions. Alfa Aesar's stringent quality guidelines, vast experience, and exceptional production control result in a standard you can trust.

Anion Standards

Stock #	Description	Standard Selling Sizes
42563	**Acetate, Ion chromatography standard solution, Specpure®, $CH_3CO_2^-$ 1000µg/ml** CH_3CO_2Na in H_2O, Liquid, Note: Guaranteed stable for six months from the ship date. Keep Refrigerated, †	**100ml 500ml bulk**
35552	**Bromide, Ion chromatography standard solution, Specpure®, Br^- 1000µg/ml** KBr in H_2O, Liquid, †	**100ml 500ml bulk**
35551	**Chloride, Ion chromatography standard solution, Specpure®, Cl^- 1000µg/ml** KCl in H_2O, Liquid, †	**100ml 500ml bulk**
42564	**Chromate, Ion chromatography standard solution, Specpure®, CrO_4^{-2} 1000µg/ml** K_2CrO_4 in H_2O, Liquid, †  R:49-46, S:53-45-60-61	**100ml 500ml bulk**
42565	**Dichromate, Ion chromatography standard solution, Specpure®, $Cr_2O_7^{-2}$ 1000µg/ml** $Na_2Cr_2O_7$ in H_2O, Liquid, †  R:45-46-20, S:53-45-60-61	**100ml 500ml bulk**
35550	**Fluoride, Ion chromatography standard solution, Specpure®, F^- 1000µg/ml** NaF in H_2O, Liquid, †	**100ml 500ml bulk**
42566	**Formate, Ion chromatography standard solution, Specpure®, HCO_2^- 1000µg/ml** HCO_2Na in H_2O, Liquid, Note: Guaranteed stable for six months from the ship date. Keep refrigerated, †	**100ml 500ml bulk**
42567	**Iodide, Ion chromatography standard solution, Specpure®, I^- 1000µg/ml** NaI in H_2O, Liquid, †	**100ml 500ml bulk**
35549	**Nitrate, Ion chromatography standard solution, Specpure®, NO_3^- 1000µg/ml** $NaNO_3$ in H_2O, Liquid, †	**100ml 500ml bulk**
40020	**Nitrite, Ion chromatography standard solution, Specpure®, NO_2^- 1000 µg/ml** $NaNO_2$ in H_2O, Liquid, Note: Guaranteed stable for six months from the ship date. Keep refrigerated, †	**100ml 500ml bulk**
42568	**Oxalate, Ion chromatography standard solution, Specpure®, $C_2O_4^{-2}$ 1000µg/ml** $Na_2C_2O_4$ in H_2O, Liquid, Note: Guaranteed stable for six months from the ship date, †	**100ml 500ml bulk**
35548	**Phosphate, Ion chromatography standard solution, Specpure®, PO_4^{-3} 1000µg/ml** KH_2PO_4 in H_2O, Liquid, Note: Keep refrigerated, †	**100ml 500ml bulk**
35547	**Sulfate, Ion chromatography standard solution, Specpure®, SO_4^{-2} 1000µg/ml** K_2SO_4 in H_2O, Liquid, †	**100ml 500ml bulk**

Cation Standards

Stock #	Description	Standard Selling Sizes
35560	**Ammonium, Ion chromatography standard solution, Specpure®, NH_4^+ 1000µg/ml** $(NH_4)_2SO_4$ in H_2O, Liquid, †	**100ml bulk**
45300 NEW!	**Barium, Ion chromatography standard solution, Specpure®, Ba^{+2} 1000µg/ml** $Ba(NO_3)_2$ in dil. HNO_3, Liquid, UN3264, †  R:34, S:20-26-36/37/39-45	**100ml bulk**
35558	**Calcium, Ion chromatography standard solution, Specpure®, Ca^{+2} 1000µg/ml** $CaCO_3$ in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml bulk**
35557	**Lithium, Ion chromatography standard solution, Specpure®, Li^+ 1000µg/ml** Li_2CO_3 in 5% HNO_3, Liquid, UN3264, †  R:60-61-34, S:53-20-23-26-36/37/39-45-60	**100ml bulk**
35556	**Magnesium, Ion chromatography standard solution, Specpure®, Mg^{+2} 1000µg/ml** Mg in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml bulk**
35555	**Potassium, Ion chromatography standard solution, Specpure®, K^+ 1000µg/ml** KNO_3 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml bulk**
35554	**Sodium, Ion chromatography standard solution, Specpure®, Na^+ 1000µg/ml** Na_2CO_3 in 5% HNO_3, Liquid, UN3264, †  R:34, S:23-26-36/37/39-45	**100ml bulk**
41696	**Sodium, Ion chromatography standard solution, Specpure®, Na^+ 1000µg/ml** NaCl in H_2O, Liquid, †	**100ml bulk**

Multi-Ion Standards

Alfa Aesar also supplies the multi-ion standards commonly used with Dionex and Waters ion chromatographs. Custom single and multi-ion standards are also available. Each solution is NIST traceable and comes with a Certificate of Analysis and an expiration date sticker.

Stock #	Description	Standard Selling Sizes
41693	**Multi Ion anion IC standard solution in H_2O, Specpure®** Liquid, Note: Br^-, Cl^-, F^-, NO_3^-, PO_4^{-3} and SO_4^{-2} at 100µg/ml. Keep refrigerated, †	**100ml bulk**
41694	**Multi Ion anion IC standard solution in H_2O, Specpure®** Liquid, Note: Cl^-, F^- and SO_4^{-2} at 100µg/ml, †	**100ml bulk**
35565	**Multi Ion anion IC standard solution, Specpure® (Dionex) in H_2O** Liquid, Note: F^- @ 20; Cl^- @ 30; NO_3^- @ 100; PO_4^{-3}, SO_4^{-2} @ 150µg/ml, †	**100ml bulk**
35564	**Multi Ion anion IC standard solution, Specpure® (Waters) in H_2O** Liquid, Note: F^- @ 100; Cl^- @ 200; Br^-, NO_3^-, SO_4^{-2} @ 400; HPO_4^{-2} @ 600 µg/ml. Keep refrigerated, †	**100ml bulk**
41695	**Multi Ion cation IC standard solution, Specpure® (Dionex) in 5% HNO_3** Liquid, UN3264, Note: Li^+ @ 50; Na^+ @ 200; Mg^{+2}, NH_4^+ @ 250; Ca^{+2}, K^+ @ 500µg/ml, †  R:34, S:23-26-36/37/39-45	**100ml bulk**

Section 7 Metallo-Organic Standards

Specpure® Oil-Based Standards for Wear Metal Analysis

Alfa Aesar Specpure® Oil-Based Standards were developed specifically for analysis of metals in organic matrices via ICP/DCP, AAS, Rotrode or XRF. These standards can be applied to many different industries, including aircraft, automotive, energy, environmental, and heavy equipment.

Our standards are prepared with proprietary organometallic compounds in a matrix of hydrocarbon oil. Like all Alfa Aesar Specpure® products, they are produced from the highest purity raw materials available, and are accompanied by a Certificate of Analysis.

Specpure® Single-Element Oil-Based Standards

Single Element Oil-Based Standards are available in concentrations of 1,000 µg/g and 5,000 µg/g. Please inquire for 10,000µg/g solutions.

Stock #	Description	Standard Selling Sizes
14229	**Aluminum, Oil based standard solution, Specpure®, Al 1000µg/g** Liquid, †	**50g** **bulk**
42432	**Aluminum, Oil based standard solution, Specpure®, Al 5000µg/g** Liquid, †	**50g** **bulk**
14207	**Antimony, Oil based standard solution, Specpure®, Sb 1000µg/g** Liquid  R:20/22-51/53, S:9-23-36-57	**50g** **bulk**
42433	**Antimony, Oil based standard solution, Specpure®, Sb 5000µg/g** Liquid  R:20/22-51/53, S:9-23-36-57	**50g** **bulk**
43864	**Arsenic, Oil based standard solution, Specpure®, As 1000µg/g** Liquid  R:23/25-50/53, S:4-9-20-23-36/39-45-57	**50g** **bulk**
14230	**Barium, Oil based standard solution, Specpure®, Ba 1000µg/g** Liquid	**50g** **bulk**
42434	**Barium, Oil based standard solution, Specpure®, Ba 5000µg/g** Liquid	**50g** **bulk**
14221	**Beryllium, Oil based standard solution, Specpure®, Be 1000µg/g** Liquid  R:45, S:53-20-23-36/39-45	**50g** **bulk**
14223	**Bismuth, Oil based standard solution, Specpure®, Bi 1000µg/g** Liquid	**50g** **bulk**
43865	**Bismuth, Oil based standard solution, Specpure®, Bi 5000µg/g** Liquid	**50g** **bulk**
14227	**Boron, Oil based standard solution, Specpure®, B 1000µg/g** Liquid	**50g** **bulk**
42435	**Boron, Oil based standard solution, Specpure®, B 5000µg/g** Liquid	**50g** **bulk**
14228	**Cadmium, Oil based standard solution, Specpure®, Cd 1000µg/g** Liquid  R:20/21/22-50/53, S:9-23-36/37-57	**50g** **bulk**
42436	**Cadmium, Oil based standard solution, Specpure®, Cd 5000µg/g** Liquid  R:20/21/22-50/53, S:9-23-36/37-57	**50g** **bulk**
14225	**Calcium, Oil based standard solution, Specpure®, Ca 1000µg/g** Liquid	**50g** **bulk**
42437	**Calcium, Oil based standard solution, Specpure®, Ca 5000µg/g** Liquid	**50g** **bulk**
14222	**Chromium, Oil based standard solution, Specpure®, Cr 1000µg/g** Liquid  R:40, S:23-36/37	**50g** **bulk**

Stock #	Description	Standard Selling Sizes
42438	**Chromium, Oil based standard solution, Specpure®, Cr 5000µg/g** Liquid  R:45, S:53-20-23-36/39-45	**50g** **bulk**
14226	**Cobalt, Oil based standard solution, Specpure®, Co 1000µg/g** Liquid	**50g** **bulk**
14218	**Copper, Oil based standard solution, Specpure®, Cu 1000µg/g** Liquid	**50g** **bulk**
42439	**Copper, Oil based standard solution, Specpure®, Cu 5000µg/g** Liquid	**50g** **bulk**
14220	**Iron, Oil based standard solution, Specpure®, Fe 1000µg/g** Liquid	**50g** **bulk**
42440	**Iron, Oil based standard solution, Specpure®, Fe 5000µg/g** Liquid	**50g** **bulk**
14224	**Lanthanum, Oil based standard solution, Specpure®, La 1000µg/g** Liquid	**50g** **bulk**
14208	**Lead, Oil based standard solution, Specpure®, Pb 1000µg/g** Liquid  R:45-61-62-20/22-33, S:53-45-60-61	**50g** **bulk**
42441	**Lead, Oil based standard solution, Specpure®, Pb 5000µg/g** Liquid  R:45-61-62-20/22-33, S:53-45-60-61	**50g** **bulk**
14215	**Lithium, Oil based standard solution, Specpure®, Li 1000µg/g** Liquid	**50g** **bulk**
42442	**Lithium, Oil based standard solution, Specpure®, Li 5000µg/g** Liquid	**50g** **bulk**
14219	**Magnesium, Oil based standard solution, Specpure®, Mg 1000µg/g** Liquid	**50g** **bulk**
42443	**Magnesium, Oil based standard solution, Specpure®, Mg 5000µg/g** Liquid	**50g** **2oz** **bulk**
14214	**Manganese, Oil based standard solution, Specpure®, Mn 1000µg/g** Liquid	**50g** **bulk**
42444	**Manganese, Oil based standard solution, Specpure®, Mn 5000µg/g** Liquid	**50g** **bulk**
43756	**Mercury, Oil based standard solution, Specpure®, Hg 1000µg/g** Liquid  R:26/27/28-33-50/53, S:13-28-36-45-53-60-61	**50g** **bulk**
14213	**Molybdenum, Oil based standard solution, Specpure®, Mo 1000µg/ml** Liquid	**50g** **bulk**
42445	**Molybdenum, Oil based standard solution, Specpure®, Mo 5000µg/g** Liquid	**50g** **bulk**
14211	**Nickel, Oil based standard solution, Specpure®, Ni 1000µg/g** Liquid  R:45, S:53-20-23-36/39-45	**50g** **bulk**
42446	**Nickel, Oil based standard solution, Specpure®, Ni 5000µg/g** Liquid  R:45, S:53-20-23-36/39-45	**50g** **bulk**
14210	**Phosphorus, Oil based standard solution, Specpure®, P 1000µg/g** Liquid	**50g** **bulk**
42447	**Phosphorus, Oil based standard solution, Specpure®, P 5000µg/g** Liquid	**50g** **bulk**
14216	**Potassium, Oil based standard solution, Specpure®, K 1000µg/g** Liquid	**50g** **bulk**
42448	**Potassium, Oil based standard solution, Specpure®, K 5000µg/g** Liquid	**50g** **bulk**
43129	**Scandium, Oil based standard solution, Specpure®, Sc 1000µg/g** Liquid	**50g** **bulk**
45305 NEW!	**Selenium, Oil based standard solution, Specpure®, Se 1000µg/g** Liquid  R:23/25-33-50/53, S:9-20-23-36/39-45-57	**50g** **bulk**

Single-Element Oil Based Standards

Stock #	Description	Standard Selling Sizes
14209	**Silicon, Oil based standard solution, Specpure®, Si 1000µg/g** Liquid	**50g** **bulk**
43867	**Silicon, Oil based standard solution, Specpure®, Si 5000µg/g** Liquid	**50g** **bulk**
14199	**Silver, Oil based standard solution, Specpure®, Ag 1000µg/g** Liquid	**50g** **bulk**
43868	**Silver, Oil based standard solution, Specpure®, Ag 5000µg/g** Liquid	**50g** **bulk**
14212	**Sodium, Oil based standard solution, Specpure®, Na 1000µg/g** Liquid	**50g** **bulk**
42449	**Sodium, Oil based standard solution, Specpure®, Na 5000µg/g** Liquid	**50g** **bulk**
14205	**Strontium, Oil based standard solution, Specpure®, Sr 1000µg/g** Liquid	**50g** **bulk**
43869	**Sulfur, Oil based standard solution, Specpure®, S 1000µg/g** Liquid	**50g** **bulk**
43870	**Sulfur, Oil based standard solution, Specpure®, S 5000µg/g** Liquid	**50g** **bulk**
45306 NEW!	**Thallium, Oil based standard solution, Specpure®, Tl 1000µg/g** Liquid R:20/22, S:9-23-36	**50g** **bulk**
14206	**Tin, Oil based standard solution, Specpure®, Sn 1000µg/g** Liquid	**50g** **bulk**
42450	**Tin, Oil based standard solution, Specpure®, Sn 5000µg/g** Liquid	**50g** **bulk**
14204	**Titanium, Oil based standard solution, Specpure®, Ti 1000µg/g** Liquid	**50g** **bulk**
42451	**Titanium, Oil based standard solution, Specpure®, Ti 5000µg/g** Liquid	**50g** **bulk**
42452	**Vanadium, Oil based standard solution, Specpure®, V 5000µg/g** Liquid	**50g** **bulk**
14201	**Yttrium, Oil based standard solution, Specpure®, Y 1000µg/g** Liquid	**50g** **bulk**
14200	**Zinc, Oil based standard solution, Specpure®, Zn 1000µg/g** Liquid	**50g** **bulk**
42453	**Zinc, Oil based standard solution, Specpure®, Zn 5000µg/g** Liquid	**50g** **bulk**
43127	**Zirconium, Oil based standard solution, Specpure®, Zr 1000µg/g** Liquid	**50g** **bulk**
43128	**Zirconium, Oil based standard solution, Specpure®, Zr 5000µg/g** Liquid	**50g** **bulk**
44012	**Matrix oil, 20 centistoke hydrocarbon oil** Liquid, † R:45, S:53-45	**1pint** **1gal** **bulk**
14621	**Matrix oil, 75 centistoke hydrocarbon oil** Liquid, † R:45, S:53-45	**1pint** **4x1pint** **1gal** **bulk**
43871	**Stabilizer for oil based standard solutions** Liquid R:36/37/38, S:23-26-37	**50g** **bulk**

Specpure® Multi-Element Oil-Based Standards

Stock #	Description	Standard Selling Sizes
36762	**JM-21 Multi-element Oil Based Standard, Specpure®, 100µg/g** Matrix: Hydrocarbon oil, Liquid, †	**100g** **bulk**

Ag	100	Cu	100	P	100
Al	100	Fe	100	Pb	100
B	100	Mg	100	Si	100
Ba	100	Mn	100	Sn	100
Ca	100	Mo	100	Ti	100
Cd	100	Na	100	V	100
Cr	100	Ni	100	Zn	100

36769	**JM-21 Multi-element Oil Based Standard, Specpure®, 900µg/g** Matrix: Hydrocarbon oil, Liquid, †	**100g** **bulk**

Ag	900	Cu	900	P	900
Al	900	Fe	900	Pb	900
B	900	Mg	900	Si	900
Ba	900	Mn	900	Sn	900
Ca	900	Mo	900	Ti	900
Cd	900	Na	900	V	900
Cr	900	Ni	900	Zn	900

36766	**JM Special, Multi-element Oil Based Standard, Specpure®, 900µg/g** Matrix: Hydrocarbon oil, Liquid, †	**100g** **bulk**

Ba	900	Mg	900	Zn	900
Ca	900	P	900		

43871	**Stabilizer for oil based standard solutions** Liquid ✖ R:36/37/38, S:23-26-37	**50g** **bulk**

Section 8 XRF Standards for Petroleum Products

Specpure® XRF Standards for Petroleum Products

Alfa Aesar offers a complete line of Specpure® calibration standards, designed specifically for the analysis of sulfur and chlorine in petroleum products by X-ray flourescence spectrometry.

All Specpure® standards are manufactured from the highest quality raw materials available. These standards are made up on a weight/weight basis using balances which are routinely calibrated using NIST-traceable weights. All Alfa Aesar standards are accompanied by a Certificate of Analysis which states the actual concentration and the traceability to NIST. They are guaranteed to be stable for one year from the ship date, provided they are kept tightly capped and stored under normal laboratory conditions.

Specpure® Sulfur Standards

Alfa Aesar offers a broad range of concentrations of sulfur in light mineral oil, heavy mineral oil, crude oil, residual oil, diesel fuel, isooctane and kerosene.

Alfa Aesar Specpure® sulfur standard solutions are stocked for prompt shipment.

Specpure® Sulfur in Light Mineral Oil Standards

Alfa Aesar offers a line of calibration standards specifically designed for the analysis of sulfur in light mineral oil (20cSt mineral oil). These standards are ideally suited for ASTM Methods D2622, D4294, D7039, D7217, D7220 and others.

Stock #	Description	Standard Selling Sizes
42155	**Sulfur in Light Mineral Oil standard solution, Specpure®, Blank (0.0000%) , †** R:45, S:53-45	100ml bulk
45315 NEW!	**Sulfur in Light Mineral Oil standard solution, Specpure®, 5µg/g (0.0005%) , †** R:45, S:53-45	100ml bulk
42156	**Sulfur in Light Mineral Oil standard solution, Specpure®, 10µg/g (0.0010%) , †** R:45, S:53-45	100ml bulk
45348 NEW!	**Sulfur in Light Mineral Oil standard solution, Specpure®, 15µg/g (0.0015%) , †** R:45, S:53-45	100ml bulk
45349 NEW!	**Sulfur in Light Mineral Oil standard solution, Specpure®, 20µg/g (0.0020%) , †** R:45, S:53-45	100ml bulk
42157	**Sulfur in Light Mineral Oil standard solution, Specpure®, 25µg/g (0.0025%) , †** R:45, S:53-45	100ml bulk
42158	**Sulfur in Light Mineral Oil standard solution, Specpure®, 50µg/g (0.0050%) , †** R:45, S:53-45	100ml bulk
45316 NEW!	**Sulfur in Light Mineral Oil standard solution, Specpure®, 75µg/g (0.0075%) , †** R:45, S:53-45	100ml bulk
42159	**Sulfur in Light Mineral Oil standard solution, Specpure®, 100µg/g (0.0100%) , †** R:45, S:53-45	100ml bulk
42160	**Sulfur in Light Mineral Oil standard solution, Specpure®, 200µg/g (0.0200%) , †** R:45, S:53-45	100ml bulk
42161	**Sulfur in Light Mineral Oil standard solution, Specpure®, 300µg/g (0.0300%) , †** R:45, S:53-45	100ml bulk
42162	**Sulfur in Light Mineral Oil standard solution, Specpure®, 400µg/g (0.0400%) , †** R:45, S:53-45	100ml bulk

Stock #	Description	Standard Selling Sizes
42163	**Sulfur in Light Mineral Oil standard solution, Specpure®, 500µg/g (0.0500%) , †**  R:45, S:53-45	**100ml bulk**
42164	**Sulfur in Light Mineral Oil standard solution, Specpure®, 750µg/g (0.0750%) , †**  R:45, S:53-45	**100ml bulk**
42165	**Sulfur in Light Mineral Oil standard solution, Specpure®, 1,000µg/g (0.10%) , †**  R:45, S:53-45	**100ml bulk**
42166	**Sulfur in Light Mineral Oil standard solution, Specpure®, 1,500µg/g (0.15%) , †**  R:45, S:53-45	**100ml bulk**
42167	**Sulfur in Light Mineral Oil standard solution, Specpure®, 3,000µg/g (0.30%) , †**  R:45, S:53-45	**100ml bulk**
42168	**Sulfur in Light Mineral Oil standard solution, Specpure®, 5,000µg/g (0.50%) , †**  R:45, S:53-45	**100ml bulk**
42169	**Sulfur in Light Mineral Oil standard solution, Specpure®, 7,500µg/g (0.75%) , †**  R:45, S:53-45	**100ml bulk**
42170	**Sulfur in Light Mineral Oil standard solution, Specpure®, 10,000µg/g (1.00%) , †**  R:45, S:53-45	**100ml bulk**
42171	**Sulfur in Light Mineral Oil standard solution, Specpure®, 20,000µg/g (2.00%) , †**  R:45-36/38, S:53-26-45	**100ml bulk**
42172	**Sulfur in Light Mineral Oil standard solution, Specpure®, 30,000µg/g (3.00%) , †**  R:45-36/38, S:53-26-45	**100ml bulk**
42173	**Sulfur in Light Mineral Oil standard solution, Specpure®, 40,000µg/g (4.00%) , †**  R:45-36/38, S:53-26-45	**100ml bulk**
42174	**Sulfur in Light Mineral Oil standard solution, Specpure®, 50,000µg/g (5.00%) , †**  R:45-36/38, S:53-26-45	**100ml bulk**

Specpure® Sulfur in Heavy Mineral Oil Standards

Alfa Aesar offers a line of calibration standards specifically designed for the analysis of sulfur in heavy mineral oil (75cSt mineral oil). These standards are ideally suited for ASTM Methods D-2622 and D-4294.

Stock #	Description	Standard Selling Sizes
40344	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, blank (0.0000%) , †**  R:45, S:53-45	**100ml bulk**
45317 NEW!	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 5µg/g (0.0005%) , †**  R:45, S:53-45	**100ml bulk**
41734	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 10µg/g (0.0010%) , †**  R:45, S:53-45	**100ml bulk**
45350 NEW!	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 15µg/g (0.0015%) , †**  R:45, S:53-45	**100ml bulk**
45351 NEW!	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 20µg/g (0.0020%) , †**  R:45, S:53-45	**100ml bulk**
41735	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 25µg/g (0.0025%) , †**  R:45, S:53-45	**100ml bulk**
41736	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 50µg/g (0.0050%) , †**  R:45, S:53-45	**100ml bulk**
45318 NEW!	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 75µg/g (0.0075%) , †**  R:45, S:53-45	**100ml bulk**

Sulfur Standards

Stock #	Description	Standard Selling Sizes
40345	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 100µg/g (0.0100%) , †**  R:45, S:53-45	100ml bulk
40346	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 200µg/g (0.0200%) , †**  R:45, S:53-45	100ml bulk
40347	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 300µg/g (0.0300%) , †**  R:45, S:53-45	100ml bulk
40348	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 400µg/g (0.0400%) , †**  R:45, S:53-45	100ml bulk
40349	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 500µg/g (0.0500%) , †**  R:45, S:53-45	100ml bulk
40350	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 750µg/g (0.0750%) , †**  R:45, S:53-45	100ml bulk
40351	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 1000µg/g (0.10%) , †**  R:45, S:53-45	100ml bulk
40352	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 1500µg/g (0.15%) , †**  R:45, S:53-45	100ml bulk
40353	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 3000µg/g (0.30%) , †**  R:45, S:53-45	100ml bulk
40354	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 5000µg/g (0.50%) , †**  R:45, S:53-45	100ml bulk
40355	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 7500µg/g (0.75%) , †**  R:45, S:53-45	100ml bulk
40356	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 10,000µg/g (1.00%) , †**  R:45, S:53-45	100ml bulk
40358	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 20,000µg/g (2.00%) , †**  R:45-36/38, S:53-26-45	100ml bulk
40359	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 30,000µg/g (3.00%) , †**  R:45-36/38, S:53-26-45	100ml bulk
40360	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 40,000µg/g (4.00%) , †**  R:36/38, S:23-26-37	100ml bulk
40361	**Sulfur in Heavy Mineral Oil standard solution, Specpure®, 50,000µg/g (5.00%) , †**  R:45-36/38, S:53-26-45	100ml bulk

Specpure® Sulfur in Crude Oil Standards

Stock #	Description	Standard Selling Sizes
41885	**Sulfur in Crude Oil standard solution, Specpure®, 1000µg/g (0.10%) , †**  R:45, S:53-45	100ml bulk
41886	**Sulfur in Crude Oil standard solution, Specpure®, 2500µg/g (0.25%) , †**  R:45, S:53-45	100ml bulk
41887	**Sulfur in Crude Oil standard solution, Specpure®, 5000µg/g (0.50%) , †**  R:45, S:53-45	100ml bulk
41888	**Sulfur in Crude Oil standard solution, Specpure®, 10,000µg/g (1.00%) , †**  R:45, S:53-45	100ml bulk
41889	**Sulfur in Crude Oil standard solution, Specpure®, 20,000µg/g (2.00%) , †**  R:45, S:53-45	100ml bulk

Stock #	Description	Standard Selling Sizes
41890	**Sulfur in Crude Oil standard solution, Specpure®, 30,000µg/g (3.00%) , †**  R:45, S:53-45	**100ml** **bulk**
41891	**Sulfur in Crude Oil standard solution, Specpure®, 40,000µg/g (4.00%) , †**  R:45, S:53-45	**100ml** **bulk**
41892	**Sulfur in Crude Oil standard solution, Specpure®, 50,000µg/g (5.00%) , †**  R:45-36/37/38-40, S:53-26-36/37-45	**100ml** **bulk**

Sulfur Standards

Specpure® Sulfur in Residual Oil Standards

Stock #	Description	Standard Selling Sizes
41751	**Sulfur in Residual Oil standard solution, Specpure®, 3500µg/g (0.35%) , †**  R:45-36/38, S:53-26-45	100ml bulk
41752	**Sulfur in Residual Oil standard solution, Specpure®, 7000µg/g (0.70%) , †**  R:45-36/38, S:53-26-45	100ml bulk
41753	**Sulfur in Residual Oil standard solution, Specpure®, 10,000µg/g (1.00%) , †**  R:45-36/38, S:53-26-45	100ml bulk
41755	**Sulfur in Residual Oil standard solution, Specpure®, 20,000µg/g (2.00%) , †**  R:45-36/38, S:53-26-45	100ml bulk
41756	**Sulfur in Residual Oil standard solution, Specpure®, 30,000µg/g (3.00%) , †**  R:45-36/38, S:53-26-45	100ml bulk
41757	**Sulfur in Residual Oil standard solution, Specpure®, 40,000µg/g (4.00%) , †**  R:36/38, S:26-45-53	100ml bulk

Specpure® Sulfur in Diesel Fuel Standards

Alfa Aesar offers a line of calibration standards specifically designed for the analysis of sulfur in diesel fuel. These standards are ideally suited for ASTM methods D2622, D4294, D7039, D7212, D7220 and others.

These standards are manufactured from the highest quality raw materials available, including well characterized starting materials and sulfur-free diesel oil. These standards are made up on a weight/weight basis using balances which are routinely calibrated using NIST traceable weights.

Stock #	Description	Standard Selling Sizes
38764	**Sulfur in Diesel Fuel standard solution, Specpure®, blank (0.0000%) , †**  R:36/37/38-40, S:26-36/37	100ml bulk
45308 NEW!	**Sulfur in Diesel Fuel standard solution, Specpure®, 5µg/g (0.0005%) , †**  R:36/37/38-40, S:26-36/37	100ml bulk
45309 NEW!	**Sulfur in Diesel Fuel standard solution, Specpure®, 10µg/g (0.0010%) , †**  R:36/37/38-40, S:26-36/37	100ml bulk
45310 NEW!	**Sulfur in Diesel Fuel standard solution, Specpure®, 15µg/g (0.0015%) , †**  R:36/37/38-40, S:26-36/37	100ml bulk
45311 NEW!	**Sulfur in Diesel Fuel standard solution, Specpure®, 20µg/g (0.0020%) , †**  R:36/37/38-40, S:26-36/37	100ml bulk
45312 NEW!	**Sulfur in Diesel Fuel standard solution, Specpure®, 25µg/g (0.0025%) , †**  R:36/37/38-40, S:26-36/37	100ml bulk
45313 NEW!	**Sulfur in Diesel Fuel standard solution, Specpure®, 50µg/g (0.0050%) , †**  R:36/37/38-40, S:26-36/37	100ml bulk
45314 NEW!	**Sulfur in Diesel Fuel standard solution, Specpure®, 75µg/g (0.0075%) , †**  R:36/37/38-40, S:26-36/37	100ml bulk
38765	**Sulfur in Diesel Fuel standard solution, Specpure®, 100µg/g (0.010%) , †**  R:36/37/38-40, S:26-36/37	100ml bulk
38766	**Sulfur in Diesel Fuel standard solution, Specpure®, 200µg/g (0.020%) , †**  R:36/37/38-40, S:26-36/37	100ml bulk
38767	**Sulfur in Diesel Fuel standard solution, Specpure®, 300µg/g (0.030%) , †**  R:36/37/38-40, S:26-36/37	100ml bulk
38768	**Sulfur in Diesel Fuel standard solution, Specpure®, 400µg/g (0.040%) , †**  R:36/37/38-40, S:26-36/37	100ml bulk

Stock #	Description	Standard Selling Sizes
38769	**Sulfur in Diesel Fuel standard solution, Specpure®, 500µg/g (0.050%) ,** †  R:36/37/38-40, S:26-36/37	**100ml bulk**
38770	**Sulfur in Diesel Fuel standard solution, Specpure®, 750µg/g (0.075%) ,** †  R:36/37/38-40, S:26-36/37	**100ml bulk**
38771	**Sulfur in Diesel Fuel standard solution, Specpure®, 1000µg/g (0.10%) ,** †  R:36/37/38-40, S:26-36/37	**100ml bulk**
38773	**Sulfur in Diesel Fuel standard solution, Specpure®, 3000µg/g (0.30%) ,** †  R:36/37/38-40, S:26-36/37	**100ml bulk**
38774	**Sulfur in Diesel Fuel standard solution, Specpure®, 5000µg/g (0.50%) ,** †  R:36/37/38-40, S:26-36/37	**100ml bulk**
38776	**Sulfur in Diesel Fuel standard solution, Specpure®, 10,000µg/g (1.00%) ,** †  R:36/37/38-40, S:26-36/37	**100ml bulk**
38777	**Sulfur in Diesel Fuel standard solution, Specpure®, 15,000µg/g (1.50%) ,** †  R:36/37/38-40, S:26-36/37	**100ml bulk**
38778	**Sulfur in Diesel Fuel standard solution, Specpure®, 20,000µg/g (2.00%) ,** †  R:36/37/38-40, S:26-36/37	**100ml bulk**
38780	**Sulfur in Diesel Fuel standard solution, Specpure®, 30,000µg/g (3.00%) ,** †  R:36/37/38-40, S:26-36/37	**100ml bulk**
41697	**Sulfur in Diesel Fuel standard solution, Specpure®, 40,000µg/g (4.00%) ,** †  R:36/37/38-40, S:26-36/37	**100ml bulk**
41698	**Sulfur in Diesel Fuel standard solution, Specpure®, 50,000µg/g (5.00%) ,** †  R:36/37/38-40, S:26-36/37	**100ml bulk**
41699	**Sulfur in Diesel Fuel standard solution, Specpure®, 60,000µg/g (6.00%) ,** †  R:36/37/38-40, S:26-36/37	**100ml bulk**

Specpure® Sulfur in Isooctane Standards

Stock #	Description	Standard Selling Sizes
41314	**Sulfur in Isooctane standard solution, Specpure®, blank (0.0000%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**
45319 NEW!	**Sulfur in Isooctane standard solution, Specpure®, 5µg/g (0.0005%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**
41315	**Sulfur in Isooctane standard solution, Specpure®, 10µg/g (0.0010%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**
45352 NEW!	**Sulfur in Isooctane standard solution, Specpure®, 15µg/g (0.0015%)** UN1262  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**
45353 NEW!	**Sulfur in Isooctane standard solution, Specpure®, 20µg/g (0.0020%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**
44946 NEW!	**Sulfur in Isooctane standard solution, Specpure®, 25µg/g (0.0025%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**
41318	**Sulfur in Isooctane standard solution, Specpure®, 50µg/g (0.0050%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**

Sulfur Standards

Stock #	Description	Standard Selling Sizes
45321 NEW!	**Sulfur in Isooctane standard solution, Specpure®, 75µg/g (0.0075%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**
41319	**Sulfur in Isooctane standard solution, Specpure®, 100µg/g (0.0100%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**
41320	**Sulfur in Isooctane standard solution, Specpure®, 200µg/g (0.0200%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**
41321	**Sulfur in Isooctane standard solution, Specpure®, 300µg/g (0.0300%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**
41322	**Sulfur in Isooctane standard solution, Specpure®, 400µg/g (0.0400%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**
45322 NEW!	**Sulfur in Isooctane standard solution, Specpure®, 500µg/g (0.0500%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**
45323 NEW!	**Sulfur in Isooctane standard solution, Specpure®, 750µg/g (0.0750%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**
41324	**Sulfur in Isooctane standard solution, Specpure®, 1000µg/g (0.100%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**
41325	**Sulfur in Isooctane standard solution, Specpure®, 3000µg/g (0.300%)** UN1262, †  R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**100ml bulk**

Specpure® Sulfur in Kerosene Standards

Alfa Aesar offers a line of standards specifically designed for the analysis of sulfur in kerosene. These standards are ideally suited for ASTM methods D2622, D3120, D3246, D4294, D5453, D6334, D6445, and others.

Stock #	Description	Standard Selling Sizes
40536	**Sulfur in Kerosene standard solution, Specpure®, blank (0.000%)** UN1223, †  R:65, S:23-24-62	**100ml bulk**
41704	**Sulfur in Kerosene standard solution, Specpure®, 10µg/g (0.001%)** UN1223, †  R:65, S:23-24-62	**100ml bulk**
41705	**Sulfur in Kerosene standard solution, Specpure®, 50µg/g (0.005%)** UN1223, †  R:65, S:23-24-62	**100ml bulk**
40537	**Sulfur in Kerosene standard solution, Specpure®, 100µg/g (0.010%)** UN1223, †  R:65, S:23-24-62	**100ml bulk**
40538	**Sulfur in Kerosene standard solution, Specpure®, 300µg/g (0.030%)** UN1223, †  R:65, S:23-24-62	**100ml bulk**
40539	**Sulfur in Kerosene standard solution, Specpure®, 500µg/g (0.050%)** UN1223, †  R:65, S:23-24-62	**100ml bulk**

Stock #	Description	Standard Selling Sizes
40540	**Sulfur in Kerosene standard solution, Specpure®, 750µg/g (0.075%)** UN1223, †  R:65, S:23-24-62	**100ml** **bulk**
40541	**Sulfur in Kerosene standard solution, Specpure®, 1000µg/g (0.10%)** UN1223, †  R:65, S:23-24-62	**100ml** **bulk**

Specpure® Chlorine Standards

Chlorine in Heavy Mineral Oil Standards

These standards are manufactured from the highest quality raw materials available made up on a weight/weight basis using balances which are routinely calibrated using NIST-traceable weights. The matrix oil for these standards is a 75cSt mineral oil.

Stock #	Description	Standard Selling Sizes
40548	**Chlorine in Heavy Mineral Oil standard solution, Specpure®, blank (0.000%) ,** †  R:45, S:53-45	**100ml bulk**
42184	**Chlorine in Heavy Mineral Oil standard solution, Specpure®, 10µg/g (0.001%) ,** †  R:45, S:53-45	**100ml bulk**
40549	**Chlorine in Heavy Mineral Oil standard solution, Specpure®, 100µg/g (0.010%) ,** †  R:45, S:53-45	**100ml bulk**
40551	**Chlorine in Heavy Mineral Oil standard solution, Specpure®, 500µg/g (0.050%) ,** †  R:45, S:53-45	**100ml bulk**
40553	**Chlorine in Heavy Mineral Oil standard solution, Specpure®, 1000µg/g (0.10%) ,** †  R:45, S:53-45	**100ml bulk**
40558	**Chlorine in Heavy Mineral Oil standard solution, Specpure®, 10,000µg/g (1.00%) ,** †  R:45, S:53-45	**100ml bulk**
42185	**Chlorine in Heavy Mineral Oil standard solution, Specpure®, 50,000µg/g (5.00%) ,** †  R:22, S:23-36	**100ml bulk**

Standards for Lead in Gasoline

Lead in Isooctane Standards for XRF. Test Method ASTM D5059 Part A.

Stock #	Description	Standard Selling Sizes
45354 NEW!	**Lead in Isooctane standard solution, Specpure®, 0µg/g(0.0g/gal)** Matrix: Isooctane, Liquid, UN1262 R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	100g bulk
45324 NEW!	**Lead in Isooctane standard solution, Specpure®, 37µg/g(0.1g/gal)** Matrix: Isooctane, Liquid, UN1262 R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	100g bulk
45325 NEW!	**Lead in Isooctane standard solution, Specpure®, 370µg/g(1.0g/gal)** Matrix: Isooctane, Liquid, UN1262 R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	100g bulk
45326 NEW!	**Lead in Isooctane standard solution, Specpure®, 740µg/g(2.0g/gal)** Matrix: Isooctane, Liquid, UN1262 R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	100g bulk
45327 NEW!	**Lead in Isooctane standard solution, Specpure®, 1110µg/g(3.0g/gal)** Matrix: Isooctane, Liquid, UN1262 R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	100g bulk
45328 NEW!	**Lead in Isooctane standard solution, Specpure®, 1480µg/g(4.0g/gal)** Matrix: Isooctane, Liquid, UN1262 R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	100g bulk
45329 NEW!	**Lead in Isooctane standard solution, Specpure®, 1850µg/g(5.0g/gal)** Matrix: Isooctane, Liquid, UN1262 R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	100g bulk

Lead in Isooctane Standards for XRF. Test Method ASTM D5059 Part C.

Stock #	Description	Standard Selling Sizes
45330 NEW!	**Lead in Isooctane standard solution, Specpure®, 0µg/g(0.000g/gal)** Matrix: Isooctane, Liquid, UN1262, † R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	100g bulk
45331 NEW!	**Lead in Isooctane standard solution, Specpure®, 0.37µg/g(0.001g/gal)** Matrix: Isooctane, Liquid, UN1262 R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	100g bulk
45332 NEW!	**Lead in Isooctane standard solution, Specpure®, 1.85µg/g(0.005g/gal)** Matrix: Isooctane, Liquid, UN1262 R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	100g bulk
45333 NEW!	**Lead in Isooctane standard solution, Specpure®, 3.70µg/g(0.010g/gal)** Matrix: Isooctane, Liquid, UN1262 R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	100g bulk
45334 NEW!	**Lead in Isooctane standard solution, Specpure®, 18.5µg/g(0.050g/gal)** Matrix: Isooctane, Liquid, UN1262 R:11-38-50/53-65/67, S:9-16-29-33-60-61-62	100g bulk
45335 NEW!	**Lead in Isooctane standard solution, Specpure®, 37.0µg/g(0.100g/gal)** Matrix: Isooctane, Liquid, UN1262 R:11-38-50/53-65/67, S:9-16-29-33-60-61-62	100g bulk
45336 NEW!	**Lead in Isooctane standard solution, Specpure®, 111µg/g(0.300g/gal)** Matrix: Isooctane, Liquid, UN1262 R:11-38-50/53-65/67, S:9-16-29-33-60-61-62	100g bulk
45337 NEW!	**Lead in Isooctane standards, complete set for method ASTM D5059 Part C** Matrix: Isooctane, Liquid, UN1262 R:11-38-50/53-65/67, S:9-16-29-33-60-61-62	each bulk

Bismuth Internal Standards for Methods ASTM D5059 Parts A and C.

Stock #	Description	Standard Selling Sizes
45338	**Bismuth Internal Standard for method ASTM D5059 Part A and C, Bi @ 0.793g/L**	**100g**
NEW!	Matrix: Mineral Oil, Liquid	**bulk**

Section 9 Petroleum Viscosity Standards

Petroleum Viscosity Standards

Petroleum Viscosity Reference Standards

Alfa Aesar now carries petroleum viscosity standards, for use with standard methods such as ASTM D445.

Stock #	Description	Standard Selling Sizes
45339 NEW!	**Viscosity standard, Specpure®, nominally 9.5cSt @ 40° and 2.8cSt @ 100°** Liquid	**500ml bulk**
45340 NEW!	**Viscosity standard, Specpure®, nominally 30cSt @ 40° and 5.3cSt @ 100°** Liquid	**500ml bulk**
45341 NEW!	**Viscosity standard, Specpure®, nominally 54cSt @ 40° and 7.3cSt @ 100°** Liquid, †	**500ml bulk**
45342 NEW!	**Viscosity standard, Specpure®, nominally 102cSt @ 40° and 15.3cSt @ 100°** Liquid	**500ml bulk**
45343 NEW!	**Viscosity standard, Specpure®, nominally 110cSt @ 40° and 16.8cSt @ 100°** Liquid	**500ml bulk**
45344 NEW!	**Viscosity standard, Specpure®, nominally 130cSt @ 40° and 20cSt @ 100°** Liquid	**500ml bulk**
45345 NEW!	**Viscosity standard, Specpure®, nominally 300cSt @ 40° and 47cSt @ 100°** Liquid	**500ml bulk**
45346 NEW!	**Viscosity standard, Specpure®, nominally 520cSt @ 40° and 57cSt @ 100°** Liquid	**500ml bulk**
45347 NEW!	**Viscosity standard, Specpure®, nominally 920cSt @ 40° and 84cSt @ 100°** Liquid	**500ml bulk**

Section 10 Analytical Graphite Products

Analytical Graphite Products

Alfa Aesar offers a broad selection of Carbone of America Ultra Carbon graphite analytical products, including emission spectrographic electrodes and rotrodes; atomic absorption furnace tubes; and gas analysis, fusion and pyrolytic coated crucibles. Ultra Carbon originated the "F" graphite purification process in 1945. Today these high purity graphite products are continuously proven in laboratories throughout the world and remain the benchmark by which all others are measured.

Purity

Two levels of graphite purity are used in Ultra Carbon products:

Ultra "F" Purity 99.9995%- most stock electrodes, rods, and powders are of this purity level.

Ultra Superior Purity 99.9999%- available on request and recommended where an extremely low level blank concentration is required for low ppm and ppb determinations.

Certificates of Analysis detailing maximum allowable spot impurities, elements sought and detection levels using spectrographic analysis are available for Ultra "F" Purity and Ultra Superior Purity graphite products.

Typical Certificate of Analysis

Ultra "F" Purity Electrode

Maximum allowable spot impurities per element: 1 ppm

Total maximum allowable spot impurities: 5 ppm

All elements below were specifically sought. No other impurity lines were found and only those elements found are reported below. Values represent maximum concentrations (in ppm) with a confidence level of 95%.

Aluminum:	Nickel:
Boron:	Silicon: 0.5
Calcium:	Silver:
Chromium:	Tin:
Copper:	Titanium:
Iron:	Tungsten:
Lead:	Vanadium:
Magnesium: 0.3	Zinc:
Manganese:	Zirconium:
Molybdenum:	

The d.c arc cathode layer technique is employed for quantitative furnace control. A statistical sample is analyzed from each purification furnace lot. For the most part Raies ultimus lines are employed for the quantitative analysis of the metallic impurities and are reported on the certified test report in ppm. Those elements not reported are not detected utilizing 15 amp d.c. arc with an exposure period of 30 seconds.

Materials

The following grades of graphite materials are used in Ultra Carbon products:

AGKSP & U-2: adaptable to a wide range of spectrographic applications. AGKSP is recommended where very high thermal conductivity, uniform porosity, and structure are principal requirements.

U-7/SPK: a high density, extruded material offering high oxidation resistance, extremely low permeability to liquids and smooth burning characteristics. Its low thermal conductivity enables a high heat concentration to be maintained in the sample zone.

UF-4S: an extruded graphite specially adaptable as a crucible material and available on special order for other applications.

YU-40: an unpurified form of extruded graphite with the same properties as UF-4S.

Typical Properties

Grade	Density (g/cm^3)	Shore Hardness	Resistivity ohm-in x 10^{-4}
AGKSP	1.63	30	2.9
U-7/SPK	1.80	50	3.8
UF-4S	1.76	40	4.2

Graphite Powders

The following grades of graphite powders are available:

UCP-1 Briquetting Grade: Natural graphite used primarily for briquetting purposes.

UCP-2 Conducting Grade: Synthetic graphite formulated for use in diluting powdered samples. Controls the evaporation of elements in the plasma and prevents beading effect in the arc.

UCP-1-U Universal Grade: Natural graphite that is suitable for either briquetting or as a diluent in preparing powdered samples.

UCP-1-M Microcrystal Grade: Natural graphite for those who require extremely small particle size.

Graphite Powders

Stock #	Description	Standard Selling Sizes
14736	**Graphite powder, natural, microcrystal grade, APS 2-15 micron, 99.9995% (metals basis)** UCP-1-M grade, Ultra "F" purity, UN1325, † R:11-36/37, S:26	**28g** **113g** **227g** **454g** **bulk**
40798	**Graphite powder, synthetic, conducting grade, -325 mesh, 99.9995% (metals basis)** UCP-2 grade, Ultra "F" purity, Application(s): Lubricants, pigments, anodes arc-lamp carbons, coating cathode ray tubes, moderator in nuclear piles, UN1325, † R:11-36/37, S:26	**28g** **113g** **227g** **454g** **bulk**
40795	**Graphite powder, natural, briquetting grade, -200 mesh, 99.9995% (metals basis)** UCP-1 grade, Ultra "F" purity, UN1325, † R:11-36/37, S:26	**28g** **113g** **227g** **454g** **bulk**

Analytical Graphite Products

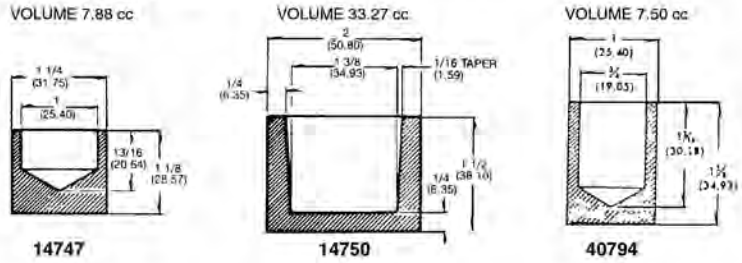
Stock #	Description	Standard Selling Sizes
40799	**Graphite powder, natural, universal grade, -200 mesh, 99.9995% (metals basis)** UCP-1-U grade, Ultra "F" purity, UN1325, †  R:11-36/37, S:26	**28g** **113g** **227g** **454g** **bulk**
14734	**Graphite powder, natural, high purity, -200 mesh, 99.9999% (metals basis)** Ultra Superior purity, UN1325, †  R:11-36/37, S:26	**28g** **bulk**
40797	**Graphite powder, synthetic, conducting grade, -200 mesh, 99.9995% (metals basis)** UCP-2 grade, Ultra "F" purity, UN1325, †  R:11-36/37, S:26	**28g** **113g** **227g** **454g** **bulk**
14735	**Graphite powder, natural, briquetting grade, -100 mesh, 99.9995% (metals basis)** UCP-1 grade, Ultra "F" purity, UN1325, †  R:11-36/37, S:26	**28g** **113g** **227g** **454g** **bulk**

Graphite Rods

Stock #	Description	Standard Selling Sizes
40765	**Graphite rod, 3.05mm (0.12in) dia x 305mm (12in) long, 99.9995% (metals basis)** AGKSP grade, Ultra "F" purity, Application(s): Commutar brushes, anodes, arc lamps, carbon coating, cathode ray tubes, moderator in nuclear piles, Note: Fragile. Handle With Care. Shore hardness 30, resistivity 2.9 x 10^{-4} ohm-in, †	**25pcs** **100pcs** **bulk**
40766	**Graphite rod, 6.15mm (0.242in) dia x 102mm (4in) long, 99.9995% (metals basis)** AGKSP grade, Ultra "F" purity, Note: Fragile. Handle With Care. Shore hardness 30, resistivity 2.9 x 10^{-4} ohm-in, †	**50pcs** **bulk**
40767	**Graphite rod, 6.15mm (0.242in) dia x 152mm (6in) long, 99.9995% (metals basis)** SPK grade, Ultra "F" purity, Note: Fragile. Handle With Care. Shore hardness 50, resistivity 3.8 x 10^{-4} ohm-in, †	**50pcs** **bulk**
14738	**Graphite rod, 6.15mm (0.242in) dia x 152mm (6in) long, 99.9995% (metals basis)** AGKSP grade, Ultra "F" purity, Note: Fragile. Handle With Care. Shore hardness 30, resistivity 2.9 x 10^{-4} ohm-in, †	**50pcs** **bulk**
40768	**Graphite rod, 6.15mm (0.242in) dia x 305mm (12in) long, 99.9995% (metals basis)** SPK grade, Ultra "F" purity, Note: Fragile. Handle With Care. Shore hardness 50, resistivity 3.8 x 10^{-4} ohm-in, †	**25pcs** **bulk**
14739	**Graphite rod, 6.15mm (0.242in) dia x 305mm (12in) long, 99.9995% (metals basis)** AGKSP grade, Ultra "F" purity, Note: Fragile. Handle With Care. Shore hardness 30, resistivity 2.9 x 10^{-4} ohm-in, †	**25pcs** **bulk**

Fusion Crucibles

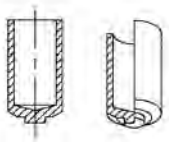
For the metallurgist who requires consistency in the fusion crucible being used, Ultra Carbon continues to be the source of reliability. Crucibles are manufactured from graphite materials that provide exceptional thermal uniformity and exactness to dimensional specifications. This quality is offered in designs available for immediate shipment from stock as well as for custom manufactured designs to your specifications.



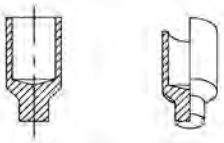
Stock #	Description	Standard Selling Sizes
40794	**Graphite, Fusion Crucible, drillpoint, unpurified, volume 7.5cc** Extruded graphite, YU-40 grade	**50pcs** **bulk**
42315	**Graphite fusion crucible lid for stock number 40794, 2.54cm (1.0in) dia, 6.35mm (0.25in) thick** Extruded graphite, YU-40 grade, †	**15pcs** **bulk**
14747	**Graphite, Fusion Crucible, drillpoint, unpurified, volume 7.88cc** Extruded graphite, YU-40 grade	**36pcs** **bulk**
43337	**Graphite fusion crucible lid for stock number 14747, 3.2cm (1.25in) dia, 0.48cm (0.19in) thick** Extruded graphite, YU-40 grade	**15pcs** **bulk**
14750	**Graphite, Fusion Crucible, tapered, unpurified, volume 33.27cc** Extruded graphite, YU-40 grade	**15pcs** **bulk**

Gas Analysis Crucibles

The Ultra Carbon Division graphite crucibles for the analysis of gas content in metals are made from materials exclusively designed for this application. This material, along with a special post treatment of the machined crucible results in a vessel with exceptionally sensitive characteristics for analyzing gases in metals. The most popular designs are made readily available for shipment to you from stock. Special prices are offered for large volume users.



Stock #	Description	Standard Selling Sizes
39809	**Graphite Gas Analysis Crucible; Ht (mm), 24.2; ID (mm), 9.2; OD (mm), 12.6; Tip Dia (mm), 4.75, post-round bottom** Ulta "F" purity, For N_2-O_2 analysis, †	**100pcs**

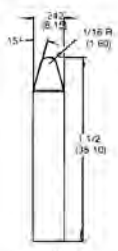


Stock #	Description	Standard Selling Sizes
39811	**Graphite Gas Analysis Crucible; Ht (mm), 24.5; ID (mm), 10.0; OD (mm), 12.7; Tip Dia (mm), 6.80** Ultra "F" purity, For O_2-H_2 analysis, †	**100pcs**

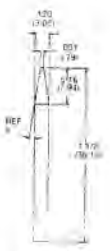
Counter Electrodes

The following electrodes are available in stock. Please inquire for details regarding our other electrode products.

14754



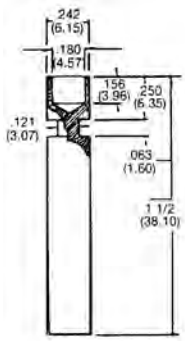
14751



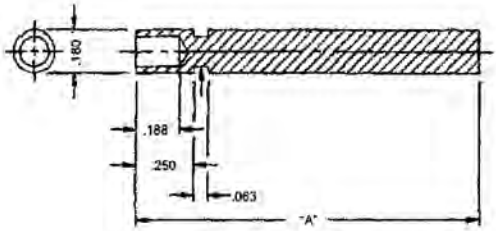
14746

Stock #	Description	Standard Selling Sizes
14754	**Graphite electrode, counter-flat top, 3.05mm dia, 38.10 mm long, 99.9995% (metals basis)** AGKSP grade, Ultra "F" purity, ASTM C-6	**100pcs**
14751	**Graphite electrode, counter-spherical tip, 6.15mm dia, 38.10 mm long, 99.9995% (metals basis)** AGKSP grade, Ultra "F" purity, ASTM C-5	**100pcs**
14746	**Graphite electrode, counter-pointed tip, 3.06mm dia, 38.10 mm long, 99.9995% (metals basis)** AGKSP grade, Ultra "F" purity, ASTM C-1	**100pcs**

Crater Electrodes



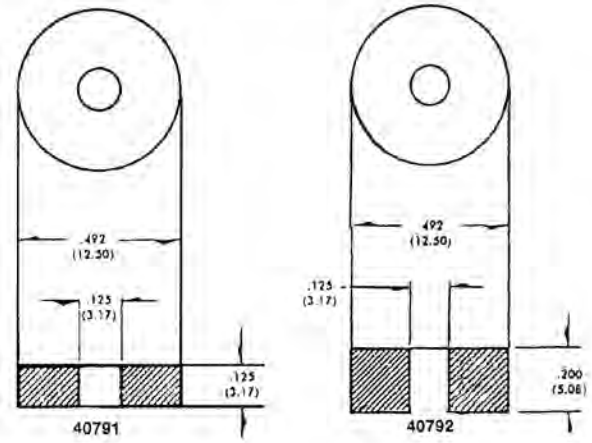
14743



40788

Stock #	Description	Standard Selling Sizes
40788	**Graphite electrode, crater-drillpoint/undercut, 4.57mm dia, 38.10mm length, volume 0.040cc, 99.9995% (metals basis)** AGKSP grade, Ultra "F" purity, ASTM S-14	**100pcs**
14743	**Graphite electrode, crater-drillpoint/undercut, 6.15mm dia, 38.10mm length, volume 0.072cc, 99.9995% (metals basis)** AGKSP grade, Ultra "F" purity, ASTM S-12	**100pcs**

Oil Analysis Disc (Rotrode) Electrodes



Ultra Carbon maintains a large inventory of standard disc and rod electrodes used in the analysis of oils. We can also supply this type of product to military specifications to customers that require this level of quality control and repeatability. Ultra Carbon continues to lead the way in providing quality and economy to those who are involved in oil analysis.

Stock #	Description	Standard Selling Sizes
40791	**Graphite electrode, rotrode disc, 99.9995% (metals basis)** AGKSP grade, Ultra "F" purity, ASTM D1, Application(s): Electrode for analysis by Emission Spectroscopy	**100pcs**
40792	**Graphite electrode, rotrode disc, 99.9995% (metals basis)** AGKSP grade, Ultra "F" purity, ASTM D2	**100pcs**

Section 11 Acids & Bases

Acids

Stock #	Description	Standard Selling Sizes
35569	**Acetic acid, 1% v/v aq. soln.** CH_3CO_2H, F.W. 60.05, Liquid, †	**500ml** **1L** **bulk**
35572	**Acetic acid, 4% v/v aq. soln.** CH_3CO_2H, F.W. 60.05, Liquid, †	**500ml** **1L** **bulk**
35567	**Acetic acid, 0.1N Standardized Solution** CH_3CO_2H, F.W. 60.05, Liquid, †	**1L** **4L** **20L** **bulk**
35566	**Acetic acid, 1.0N Standardized Solution** CH_3CO_2H, F.W. 60.05, Liquid, †	**1L** **4L** **20L** **bulk**
88556	**Acetic acid, Acculute Standard Volumetric Solution, Final Concentration 1.0N** CH_3CH_2OH, F.W. 60.05, Liquid, UN2790, Note: One unit makes one liter of 1.0N solution after dilution, † R:36/38, S:23-26-45	**1unit** **6units** **bulk**
33252	**Acetic acid, glacial, 99+%** CH_3CO_2H, F.W. 60.05, Liquid, m.p. 16.6°, b.p. 118.1°, f.p. 40°(104°F), d. 1.049, n_D^{20} 1.3721, Merck **14**,55, Fieser **2**,5 **5**,3 **7**,1 **8**,1 **19**,1 **21**,1, UN2789, † R:10-35, S:23-26-45	**250ml** **1L** **4L** **4x4L** **20L** **bulk**
36289	**Acetic acid, glacial, ACS, 99.7+%** CH_3CO_2H, F.W. 60.05, Liquid, m.p. 16.6°, b.p. 118.1°, f.p. 40°(104°F), d. 1.049, n_D^{20} 1.3721, Merck **14**,55, Fieser **2**,5 **5**,3 **7**,1 **8**,1 **19**,1 **21**,1, UN2789, † Maximum level of impurities: Color (APHA) 10, Dilution Test P.T., Evaporation Residue 0.001%, $(CH_3CO)_2O$ 0.01%, Cl 1ppm, SO_4 1ppm, Heavy Metals (as Pb) 0.5ppm, Fe 0.2ppm, Substances reducing dichromate P.T., Substances reducing permanganate P.T., Titratable base 0.0004meq/g R:10-35, S:23-26-45	**100ml** **500ml** **2L** **4x500ml** **bulk**
39745	**Acetic acid, glacial, 99.9+% (metals basis)** CH_3CO_2H, F.W. 60.05, Liquid, m.p. 16.6°, b.p. 118.1°, f.p. 40°(104°F), d. 1.049, n_D^{20} 1.3721, Merck **14**,55, Fieser **2**,5 **5**,3 **7**,1 **8**,1 **19**,1 **21**,1, UN2789, † R:10-35, S:23-26-45	**100ml** **500ml** **bulk**
10994	**Acetic acid, glacial, 99.9985% (metals basis)** CH_3CO_2H, F.W. 60.05, Liquid, m.p. 16.6°, b.p. 118.1°, f.p. 40°(104°F), d. 1.049, n_D^{20} 1.3721, Merck **14**,55, Fieser **2**,5 **5**,3 **7**,1 **8**,1 **19**,1 **21**,1, UN2789, † R:10-35, S:23-26-45	**25ml** **100ml** **500ml** **bulk**
38740	**Acetic acid, Environmental Grade, 99% min** CH_3CO_2H, F.W. 60.05, Liquid, m.p. 16.6°, b.p. 118.1°, f.p. 40°(104°F), d. 1.049, n_D^{20} 1.3721, Merck **14**,55, Fieser **2**,5 **5**,3 **7**,1 **8**,1 **19**,1 **21**,1, UN2789, Note: Certificate of Analysis included. Single sub-boiling quartz distillation, † R:10-35, S:23-26-45	**500ml** **2.5L** **bulk**
38739	**Acetic acid, Environmental Grade Plus, 99.4% min** CH_3CO_2H, F.W. 60.05, Liquid, m.p. 16.6°, b.p. 118.1°, f.p. 40°(104°F), d. 1.049, n_D^{20} 1.3721, Merck **14**,55, Fieser **2**,5 **5**,3 **7**,1 **8**,1 **19**,1 **21**,1, UN2789, Note: Certificate of Analysis included. Double sub-boiling quartz distillation., † R:10-35, S:23-26-45	**250ml** **500ml** **bulk**
41895	**Acetic acid-Trimethylpentane, 60/40 (v/v) soln.** $CH_3CO_2H/(CH_3)_3CCH_2CH(CH_3)_2$, Liquid, Application(s): Testing of peroxide, UN2924, † R:11-34-50/53-65-67, S:20-26-36/37/39-45-57-60	**100ml** **500ml** **bulk**
L17434	**Formic acid, 85%** ■ HCOOH, F.W. 46.03, m.p. 7-9°, b.p. 100-101°, f.p. 69°(156°F), d. 1.220, n_D^{20} 1.3710, Merck **14**,4241, Fieser **1**,404 **8**,232 **9**,226 **11**,243 **13**,137 **18**,163 **19**,148 **20**,168 **21**,193, UN3412, RTECS LQ4900000, BRN 1209246, † R:35, S:23-26-45	**1kg** **2.5kg** **bulk**

Stock #	Description	Standard Selling Sizes
36504	**Formic acid, ACS, 88+%** HCOOH, F.W. 46.03, Liquid, m.p. 7-9°, b.p. 100-101°, f.p. 69°(156°F), d. 1.220, n_D^{20} 1.3710, Merck **14**,4241, Fieser **1**,404 **8**,232 **9**,226 **11**,243 **13**,137 **18**,163 **19**,148 **20**,168 **21**,193, UN1779, RTECS LQ4900000, BRN 1209246, † Maximum level of impurities: Color (APHA) 15, Dilution test P.T., Evaporation residue 0.002%, CH_3COOH 0.4%, NH_4 0.005%, Cl 0.001%, SO_4 0.002%, SO_3 P.T., Heavy Metals (as Pb) 5ppm, Fe 5ppm R:35, S:23-26-45	**500ml** **2L** **4x500ml** **bulk**
36617	**Formic acid, ACS, 96+%** HCOOH, F.W. 46.03, Liquid, m.p. 7-9°, b.p. 100-101°, f.p. 69°(156°F), d. 1.220, n_D^{20} 1.3710, Merck **14**,4241, Fieser **1**,404 **8**,232 **9**,226 **11**,243 **13**,137 **18**,163 **19**,148 **20**,168 **21**,193, UN1779, RTECS LQ4900000, BRN 1209246, † Maximum level of impurities: Color (APHA) 15, Dilution test P.T., Evaporation residue 0.003%, CH_3COOH 0.4%, NH_4 0.005%, Cl 0.001%, SO_4 0.003%, SO_3 P.T., Heavy Metals (as Pb) 0.001%, Fe 0.001% R:35, S:23-26-45	**500g** **2kg** **4x500g** **bulk**
A13285	**Formic acid, 97% ■** HCOOH, F.W. 46.03, Liquid, m.p. 7-9°, b.p. 100-101°, f.p. 69°(156°F), d. 1.220, n_D^{20} 1.3710, Merck **14**,4241, Fieser **1**,404 **8**,232 **9**,226 **11**,243 **13**,137 **18**,163 **19**,148 **20**,168 **21**,193, UN1779, RTECS LQ4900000, BRN 1209246, † R:35, S:23-26-45	**500g** **2.5kg** **10kg** **bulk**
36490	**Hydriodic acid, ACS, 47%, stab. with 1.5% hypophosphorous acid ■** HI, F.W. 127.91, Liquid, d. 1.50, Merck **14**,4776, Fieser **1**,449 **6**,281 **7**,173 **8**,246 **9**,238 **10**,199 **15**,166 **18**,180 **21**,216, UN1787, RTECS MW3760000, † Maximum level of impurities: Chloride and bromide (as Cl) 0.05%, SO_4 0.005%, Stabilizer (H_3PO_2) 1.5%, Heavy Metals (as Pb) 0.001%, Fe 0.001% R:35, S:9-26-36/37/39-45	**100ml** **500ml** **bulk**
L10410	**Hydriodic acid, 57% w/w aq. soln., stab with 1.5% hypophosphorous acid ▲** *[Hydroiodic acid]* HI, F.W. 127.91, b.p. 126-127°, d. 1.701, Merck **14**,4776, Fieser **1**,449 **6**,281 **7**,173 **8**,246 **9**,238 **10**,199 **15**,166 **18**,180 **21**,216, UN1787, RTECS MW3760000, † R:35, S:9-26-36/37/39-45	**100g** **500g** **bulk**
36484	**Hydriodic acid, ACS, 55-58% ■** HI, F.W. 127.91, Liquid, d. 1.701, Merck **14**,4776, Fieser **1**,449 **6**,281 **7**,173 **8**,246 **9**,238 **10**,199 **15**,166 **18**,180 **21**,216, UN1787, RTECS MW3760000, Note: Suitable for use in methoxyl determinations, † Maximum level of impurities: I_2 0.75%, Residue after ignition 0.01%, Chloride and bromide (as Cl) 0.05%, PO_4 0.001%, SO_4 0.005%, Heavy Metals (as Pb) 0.001%, Fe 0.001% R:35, S:9-26-36/37/39-45	**50ml** **500ml** **4x500ml** **bulk**
A14475	**Hydrobromic acid, 45% w/v soln. in acetic acid** *[Hydrogen bromide]* HBr, F.W. 80.92, f.p. 65°(149°F), d. 1.40, Fieser **1**,450 **2**,214 **3**,154 **18**,180, UN3265, RTECS MW3850000, † R:35, S:20-23-26-36/37/39-45	**100ml** **500ml** **2.5L** **bulk**
36694	**Hydrobromic acid, ACS, 47.0-49.0% ■** *[Hydrogen bromide]* HBr, F.W. 80.92, Liquid, d. 1.490, Merck **14**,4778, Fieser **1**,450 **2**,214 **3**,154 **18**,180, UN1788, † Maximum level of impurities: Residue after ignition 0.002%, Cl 0.05%, I 0.003%, PO_4 0.001%, Sulfate and sulfite (as SO_4) 0.003%, Heavy Metals (as Pb) 5ppm, Fe 1ppm, Se 0.01ppm R:35-37, S:7/9-26-45	**250ml** **1L** **4x1L** **bulk**
14036	**Hydrobromic acid, 48% w/w aq. soln. ■** *[Hydrogen bromide]* HBr, F.W. 80.92, Liquid, d. 1.490, Merck **14**,4778, Fieser **1**,450 **2**,214 **3**,154 **18**,180, UN1788, † R:35-37, S:7/9-26-45	**940ml** **4x940ml** **bulk**
10991	**Hydrobromic acid, 48%, 99.9999% (metals basis) ■** *[Hydrogen bromide]* HBr, F.W. 80.92, Liquid, d. 1.490, Merck **14**,4778, Fieser **1**,450 **2**,214 **3**,154 **18**,180, UN1788, † R:35-37, S:7/9-26-45	**5ml** **100ml** **500ml** **bulk**

Acids & Bases

Stock #	Description	Standard Selling Sizes
43335	**Hydrochloric acid, 5% v/v aq. soln.** HCl, F.W. 36.46, Liquid, UN1789, †  R:36/37/38, S:26-45	**500ml** **1L** **4L** **bulk**
35611	**Hydrochloric acid, 10% v/v aq. soln.** HCl, F.W. 36.46, Liquid, UN1789, †  R:36/37/38, S:26-45	**500ml** **1L** **4L** **bulk**
35607	**Hydrochloric acid, 50% v/v aq. soln.** HCl, F.W. 36.46, Liquid, UN1789, †  R:36/37/38, S:26-45	**500ml** **1L** **4L** **bulk**
35648	**Hydrochloric acid, 0.01N Standardized Solution** HCl, F.W. 36.46, Liquid, †	**1L** **4L** **20L** **bulk**
35646	**Hydrochloric acid, 0.05N Standardized Solution** HCl, F.W. 36.46, Liquid, †	**1L** **4L** **20L** **bulk**
35644	**Hydrochloric acid, 0.1N Standardized Solution** HCl, F.W. 36.46, Liquid, †	**1L** **4L** **20L** **bulk**
35642	**Hydrochloric acid, 0.5N Standardized Solution** HCl, F.W. 36.46, Liquid, †	**1L** **4L** **20L** **bulk**
35640	**Hydrochloric acid, 1.0N Standardized Solution** HCl, F.W. 36.46, Liquid, UN1789, † S:26-60	**1L** **4L** **20L** **bulk**
35638	**Hydrochloric acid, 5.0N Standardized Solution** HCl, F.W. 36.46, Liquid, UN1789, †  R:36/37/38, S:26-45	**1L** **4L** **20L** **bulk**
44921 NEW!	**Hydrochloric acid, 6.0N Standardized Solution** HCl, Liquid, UN1789, †  R:36/37/38, S:26-45	**1L** **4L** **20L** **bulk**
88563	**Hydrochloric acid, Acculute Standard Volumetric Solution, Final Concentration 0.01N** HCl, F.W. 36.46, Liquid, UN1789, Note: One unit makes one liter of 0.01N solution after dilution, †  R:36/37/38, S:26-45	**1unit** **6units** **bulk**
88562	**Hydrochloric acid, Acculute Standard Volumetric Solution, Final Concentration 0.1N** HCl, F.W. 36.46, Liquid, UN1789, Note: One unit makes one liter of 0.1N solution after dilution, †  R:36/37/38, S:26-45	**1unit** **6units** **bulk**
88559	**Hydrochloric acid, Acculute Standard Volumetric Solution, Final Concentration 1.0N** HCl, F.W. 36.46, Liquid, UN1789, Note: One unit makes one liter of 1.0N solution after dilution, †  R:34-37, S:26-45	**1unit** **6units** **bulk**
L13091	**Hydrochloric acid, 36% w/w aq. soln.** HCl, F.W. 36.46, b.p. 81.5-110°, d. 1.19, Merck **14**,4780, Fieser **1**,308 **2**,215 **4**,250 **5**,322 **6**,283 **7**,172 **8**,246 **9**,239, UN1789, RTECS MW4025000, †  R:34-37, S:26-45	**1L** **2.5L** **bulk**

Stock #	Description	Standard Selling Sizes
33257	**Hydrochloric acid, ACS, HCl 36.5-38.0%** ■ *[Muriatic acid]* HCl, F.W. 36.46, Liquid, b.p. 81.5-110°, d. 1.19, Merck **14**,4780, Fieser **1**,308 **2**,215 **4**,250 **5**,322 **6**,283 **7**,172 **8**,246 **9**,239, Solubility: Soluble in water, alcohol, ether and benzene, Application(s): Acidizing petroleum wells, chemical intermediate, ore reduction, food processing, pickling and metal cleaning, general cleaning, and laboratory reagent, UN1789, RTECS MW4025000, Note: Free from suspended matter or sediment, † Maximum level of impurities: Color (APHA) 10, Residue after ignition 5ppm, Br 0.005%, SO_4 1ppm, SO_3 1ppm, Extractable organic substances 5ppm, Free chlorine (Cl) 1ppm, NH_4 3ppm, As 0.01ppm, Heavy Metals (as Pb) 1ppm, Fe 0.2ppm  R:34-37, S:26-45	**6lb** **6x6lb** **bulk**
38743	**Hydrochloric acid, Environmental Grade, 34-37.5%** HCl, F.W. 36.46, Liquid, single sub-boiling quartz distillation, b.p. 81.5-110°, d. 1.19, Merck **14**,4780, Fieser **1**,308 **2**,215 **4**,250 **5**,322 **6**,283 **7**,172 **8**,246 **9**,239, UN1789, RTECS MW4025000, Note: Certificate of Analysis included, †  R:34-37, S:26-45	**500ml** **2.5L** **bulk**
38744	**Hydrochloric acid, Environmental Grade Plus, 33-36%** HCl, F.W. 36.46, Liquid, double sub-boiling quartz distillation, b.p. 81.5-110°, d. 1.19, Merck **14**,4780, Fieser **1**,308 **2**,215 **4**,250 **5**,322 **6**,283 **7**,172 **8**,246 **9**,239, UN1789, RTECS MW4025000, Note: Certificate of Analysis included, †  R:34-37, S:26-45	**500ml** **bulk**
87617	**Hydrochloric acid, 99.999% (metals basis), 36.5% min** ■ HCl, F.W. 36.46, Liquid, b.p. 81.5-110°, d. 1.19, Merck **14**,4780, Fieser **1**,308 **2**,215 **4**,250 **5**,322 **6**,283 **7**,172 **8**,246 **9**,239, UN1789, RTECS MW4025000, †  R:34-37, S:26-45	**250ml** **1L** **2.5L** **bulk**
10990	**Hydrochloric acid, 99.999999% (metals basis), 33% min** ■ HCl, F.W. 36.46, Liquid, double distilled in quartz, b.p. 81.5-110°, d. 1.19, Merck **14**,4780, Fieser **1**,308 **2**,215 **4**,250 **5**,322 **6**,283 **7**,172 **8**,246 **9**,239, UN1789, RTECS MW4025000, †  R:34-37, S:26-45	**25ml** **250ml** **1L** **bulk**
33258	**Hydrofluoric acid, ACS, 48-51%** ■ HF, F.W. 20.01, Liquid, b.p. 112°, d. 1.16, Merck **14**,4790, Solubility: Very soluble in water, Application(s): Used in aluminum production, fluorocarbons, pickling stainless steel, etching glass, acidizing oil wells, gasoline production and processing uranium, UN1790, Note: Special handling precautions required. View MSDS prior to purchase. MSDS are available online at . Certificate of Analysis included, † Maximum level of impurities: H_2SIF_6 0.01%, Residue after ignition 5ppm, Cl 5ppm, PO_4 1ppm, Sulfate and sulfite (as SO_4) 5ppm, As 0.05ppm, Cu 0.1ppm, Heavy Metals (as Pb) 0.5ppm, Fe 1ppm  R:26/27/28-35, S:7/9-26-36/37-45	**10g** **100g** **500g** **4x500g** **bulk**
38745	**Hydrofluoric acid, Environmental Grade, 47-51%** HF, F.W. 20.01, Liquid, single sub-boiling quartz distillation, b.p. 112°, d. 1.16, Merck **14**,4790, UN1790, Note: Special handling precautions required. View MSDS prior to purchase. MSDS are available online at . Certificate of Analysis included, †  R:26/27/28-35, S:7/9-26-36/37-45	**500ml** **bulk**
38746	**Hydrofluoric acid, Environmental Grade Plus, 47-51%** HF, F.W. 20.01, Liquid, double sub-boiling quartz distillation, b.p. 112°, d. 1.16, Merck **14**,4790, UN1790, Note: Special handling precautions required. View MSDS prior to purchase. MSDS are available online at . Certificate of Analysis included, †  R:26/27/28-35, S:7/9-26-36/37-45	**250ml** **500ml** **1L** **bulk**
10989	**Hydrofluoric acid, 99.99% (metals basis) 40% min** ■ HF, F.W. 20.01, Liquid, b.p. 112°, d. 1.16, Merck **14**,4790, UN1790, Note: Special handling precautions required. View MSDS prior to purchase. MSDS are available online at , †  R:26/27/28-35, S:7/9-26-36/37-45	**25ml** **250ml** **1L** **bulk**
H27347 NEW!	**Hydrogen chloride, 1M in acetic acid** ■ HCl, F.W. 36.46, f.p. 40°(104°F), d. 1.050, UN2920, †  R:10-20-35, S:9-20-26-36/37/39-45	**100ml** **1L** **bulk**

Acids & Bases

Stock #	Description	Standard Selling Sizes
H27125 NEW!	**Hydrogen chloride, 1M in diethyl ether** ▲ △ HCl, F.W. 36.46, f.p. -40°(-40°F), d. 0.731, UN2924, †  R:12-19-22-23-35-66-67, S:4-7/9-20-26-33-36/37/39-45	**100ml** **500ml** **bulk**
H26914 NEW!	**Hydrogen chloride, 2M in diethyl ether** ▲ △ HCl, F.W. 36.46, b.p. ca 34°, f.p. -34°(-30°F), d. 0.747, UN2924, †  R:12-19-22-23-35-66-67, S:4-7/9-20-26-33-36/37/39-45	**100ml** **500ml** **bulk**
44605	**Hydrogen chloride, nominally 2.5M in ethanol** HCl, F.W. 36.46, Liquid, UN2924, †  R:11-23-35, S:4-9-20-23-26-36/37/39-45	**0.5mole** **2.5 Mole** **bulk**
A16935	**Hydrogen chloride, 4M in 1,4-dioxane, 99%** HCl, F.W. 36.46, Liquid, f.p. 17°(63°F), d. 1.04, UN2924, †  R:11-19-23-35-40-66, S:4-9-16-20-23-26-33-36/37/39-45	**0.1mole** **0.5mole** **bulk**
A11925	**Iodic acid, 99%** ▲ HIO_3, F.W. 175.91, m.p. 110° dec., d. 4.629, Merck **14**,5012, UN3085, †  R:8-34, S:17-20-26-36/37/39-45-60	**50g** **250g** **1kg** **bulk**
87681	**Iodic acid, ACS, 99.5%** ▲ HIO_3, F.W. 175.91, Powder, m.p. 110° dec., d. 4.629, Merck **14**,5012, UN3085, † Maximum level of impurities: Insoluble matter 0.01%, Residue after ignition 0.02%, Chloride and bromide (as Cl) 0.02%, Iodide P.T., Nitrogen compounds (as N) 0.1%, SO_4 0.015%, Heavy Metals (as Pb) 0.001%, Fe 0.002%  R:8-34, S:17-20-26-36/37/39-45-60	**50g** **250g** **bulk**
33267	**Metaphosphoric acid, ACS** ■ *[Phosphoric acid (meta)]* HPO_3 33.5-36.5%, bal. $NaPO_3$ (Stablizer), Crystalline, d. 2.2, Merck **14**,7345, Solubility: Decomposes in water. Soluble in alcohol, Application(s): Phosphorylating agent, dehydrating agent, dental cements, laboratory reagent, UN3260, † Maximum level of impurities: Stabilizer ($NaPO_3$) 57.0-63.0%, Cl 0.001%, NO_3 0.001%, SO_4 0.005%, As 1ppm, Heavy Metals (as Pb) 0.005%, Fe 0.005%, Substances reducing permanganate (as H_3PO_3) 0.02%  R:34, S:20-26-36/37/39-45	**10g** **100g** **500g** **bulk**
B20932	**Metaphosphoric acid** ■ d. 2.2, Merck **14**,7345, UN3260, †  R:34, S:20-26-36/37/39-45	**100g** **500g** **bulk**
35626	**Nitric acid, 0.1N Standardized Solution** *[Aqua fortis, Azotic acid]* HNO_3, F.W. 63.01, Liquid, †  R:36/38, S:23-26	**500ml** **1L** **bulk**
35624	**Nitric acid, 1.0N Standardized Solution** HNO_3, F.W. 63.01, Liquid, UN2031, †  R:34, S:23-26-36-45	**500ml** **1L** **bulk**
44528	**Nitric acid, 2.0N Standardized Solution** HNO_3, F.W. 63.01, Liquid, UN2031, †  R:34, S:23-26-36-45	**500ml** **1L** **bulk**
87920	**Nitric acid, 65-70%, 99.999% (metals basis)** HNO_3, F.W. 63.01, Liquid, m.p. -42°, b.p. 120.5°, d. 1.4134, Merck **14**,6577, Solubility: Very soluble in water and ether. Decomposes in alcohol, Application(s): In the manufacture of fertilizers and explosives, in organic synthesis, in metallurgy, in photoengraving, in etching steel, in rubber chemicals, and in reprocessing nuclear fuels, UN2031, †  R:8-35, S:23b-26-36-45	**10ml** **100ml** **500ml** **bulk**
10984	**Nitric acid, 65-70%, 99.9999% (metals basis)** HNO_3, F.W. 63.01, Liquid, m.p. -42°, b.p. 120.5°, d. 1.4134, Merck **14**,6577, UN2031, †  R:8-35, S:23b-26-36-45	**25ml** **250ml** **500ml** **bulk**
33260	**Nitric acid, ACS, 68.0-70.0%** HNO_3, F.W. 63.01, Liquid, m.p. -42°, b.p. 120.5°, d. 1.4134, Merck **14**,6577, UN2031, † Maximum level of impurities: Color (APHA) 10, Residue after ignition 5ppm, Cl 0.5ppm, SO_4 1ppm, As 0.01ppm, Heavy Metals (as Pb) 0.2ppm, Fe 0.2ppm  R:8-35, S:23b-26-36-45	**1lb** **7lb** **6x7lb** **bulk**

Stock #	Description	Standard Selling Sizes
38747	**Nitric acid, Environmental Grade, 68-70%** HNO_3, F.W. 63.01, Liquid, single sub-boiling quartz distillation, m.p. -42°, b.p. 120.5°, d. 1.4134, Merck **14**,6577, UN2031, Note: Certificate of Analysis included, †	**500ml** **2.5L** **bulk**
	R:8-35, S:23b-26-36-45	
38748	**Nitric acid, Environmental Grade Plus, 68-70%** HNO_3, F.W. 63.01, Liquid, double sub-boiling quartz distillation, m.p. -42°, b.p. 120.5°, d. 1.4134, Merck **14**,6577, UN2031, Note: Certificate of Analysis included, †	**250ml** **500ml** **1L** **bulk**
	R:8-35, S:23b-26-36-45	
33261	**Nitric acid, ACS, fuming, 90%** ■ HNO_3, F.W. 63.01, Liquid, m.p. -42°, d. 1.4826, Merck **14**,6577, UN2032, † Maximum level of impurities: Dilution test P.T., Residue after ignition 0.002%, Dissolved oxides 0.1% as N_2O_3, Cl 0.7ppm, SO_4 5ppm, As 0.3ppm, Heavy Metals (as Pb) 5ppm, Fe 2ppm	**1lb** **bulk**
	R:8-35, S:23-26-36-45	
A18067	**Orthophosphoric acid, 85% aq. soln.** *[Phosphoric acid (ortho)]* H_3PO_4, F.W. 98.00, m.p. 19-21°, d. 1.700, n_D^{20} 1.4310, Merck **14**,7344, Fieser **1**,860 **4**,387 **7**,255 **10**,317 **15**,266, UN1805, RTECS TB6300000, †	**500ml** **2.5L** **10L** **bulk**
	R:34, S:26-45	
33266	**Orthophosphoric acid, 85% w/w aq. soln., ACS** *[Phosphoric acid (ortho)]* H_3PO_4, F.W. 98.00, Liquid, m.p. 19-21°, d. 1.70, Merck **14**,7344, Fieser **1**,860 **4**,387 **7**,255 **10**,317 **15**,266, UN1805, RTECS TB6300000, † Maximum level of impurities: Color (APHA) 10, Insoluble matter 0.001%, Cl 3ppm, NO_3 5ppm, SO_4 0.003%, Volatile acids (as CH_3COOH) 0.001%, Sb 0.002%, Ca 0.002%, Mg 0.002%, As 1ppm, Heavy Metals (as Pb) 0.001%, Fe 0.003%, Mn 0.5ppm, K 0.005%, Na 0.025%, Reducing substances P.T.	**100g** **1kg** **4x1kg** **bulk**
	R:34, S:26-45	
35608	**Perchloric acid, 0.1N in Acetic Acid Standardized Solution** $HClO_4$, F.W. 100.46, Liquid, UN3264, †	**1L** **4L** **bulk**
	R:10-35, S:23-26-45	
44464	**Perchloric acid, ACS, 48-50%** $HClO_4$, F.W. 100.46, Liquid, m.p. -112°, d. 1.41, Merck **14**,7153, Fieser **1**,796 **2**,309 **3**,220 **5**,506 **6**,453 **7**,279 **8**,386 **11**,402 **12**,402, UN1802, RTECS SC7500000, † Maximum level of impurities: Color (APHA) 10, Residue after ignition 0.003%, Silicate and phosphate as SiO_2 5ppm, Cl 0.001%, Nitrogen compounds (as N) 0.001%, SO_4 0.001%, Heavy Metals (as Pb) 1ppm, Fe 1ppm	**100ml** **500ml** **2.5L** **bulk**
	R:5-8-35, S:23-26-36-45	
33263	**Perchloric acid, ACS, 60-62%** $HClO_4$, F.W. 100.46, Liquid, m.p. -112°, d. 1.54, Merck **14**,7153, Fieser **1**,796 **2**,309 **3**,220 **5**,506 **6**,453 **7**,279 **8**,386 **11**,402 **12**,402, UN1873, RTECS SC7500000, † Maximum level of impurities: Color (APHA) 10, Residue after ignition 0.003%, Silicate and phosphate as SiO_2 5ppm, Cl 0.001%, Nitrogen compounds (as N) 0.001%, SO_4 0.001%, Heavy Metals (as Pb) 1ppm, Fe 1ppm	**100ml** **500ml** **2L** **bulk**
	R:5-8-35, S:23-26-36-45	
87963	**Perchloric acid, ACS, 70%, redistilled** $HClO_4$, F.W. 100.46, Liquid, m.p. -112°, d. 1.67, Merck **14**,7153, Fieser **1**,796 **2**,309 **3**,220 **5**,506 **6**,453 **7**,279 **8**,386 **11**,402 **12**,402, UN1873, RTECS SC7500000, † Maximum level of impurities: Color (APHA) 10, Residue after ignition 0.003%, Silicate and phosphate (as SiO_2) 5ppm, Cl 0.001%, Nitrogen compounds (as N) 0.001%, SO_4 0.001%, Heavy Metals (as Pb) 1ppm, Fe 1ppm	**500ml** **2.5L** **bulk**
	R:5-8-35, S:23-26-36-45	
10983	**Perchloric acid, 70%, 99.9985% (metals basis)** $HClO_4$, F.W. 100.46, Liquid, m.p. -112°, d. 1.670, Merck **14**,7153, Fieser **1**,796 **2**,309 **3**,220 **5**,506 **6**,453 **7**,279 **8**,386 **11**,402 **12**,402, UN1873, RTECS SC7500000, †	**5ml** **50ml** **250ml** **bulk**
	R:5-8-35, S:23-26-36-45	
38749	**Perchloric acid, Environmental Grade, 67-71%** $HClO_4$, F.W. 100.46, Liquid, single sub-boiling quartz distillation, m.p. -112°, d. 1.67, Merck **14**,7153, Fieser **1**,796 **2**,309 **3**,220 **5**,506 **6**,453 **7**,279 **8**,386 **11**,402 **12**,402, UN1873, RTECS SC7500000, Note: Certificate of Analysis included, †	**500ml** **2.5L** **bulk**
	R:5-8-35, S:23-26-36-45	

Acids & Bases

Stock #	Description	Standard Selling Sizes
42553	**Sulfuric acid, 1.25% v/v aq. soln.** H_2SO_4, F.W. 98.08, Liquid, UN2796, †	**1L** **bulk**
	 R:36/38, S:23-26-37	
35606	**Sulfuric acid, 5% v/v aq. soln.** H_2SO_4, F.W. 98.08, Liquid, UN2796, †	**1L** **bulk**
	 R:36/38, S:26-30-45	
42552	**Sulfuric acid, 10% v/v aq. soln.** H_2SO_4, F.W. 98.08, Liquid, UN2796, †	**1L** **20L** **bulk**
	 R:36/38, S:26-30-45	
42554	**Sulfuric acid, 15% v/v aq. soln.** H_2SO_4, F.W. 98.08, Liquid, UN2796, †	**1L** **bulk**
	 R:35, S:26-30-45	
39669	**Sulfuric acid, 20% v/v aq. soln.** H_2SO_4, F.W. 98.08, Liquid, UN2796, †	**1L** **bulk**
	 R:35, S:26-30-45	
39668	**Sulfuric acid, 50% v/v aq. soln.** H_2SO_4, F.W. 98.08, Liquid, UN2796, †	**1L** **bulk**
	 R:35, S:26-30-45	
42555	**Sulfuric acid, 75% v/v aq. soln.** H_2SO_4, F.W. 98.08, Liquid, UN1830, †	**1L** **bulk**
	 R:35, S:26-30-45	
35649	**Sulfuric acid, 0.02N Standardized Solution** H_2SO_4, F.W. 98.08, Liquid, †	**1L** **4L** **20L** **bulk**
45048 NEW!	**Sulfuric acid, 0.05N Standardized Solution** H_2SO_4, F.W. 98.08, Liquid, †	**1L** **4L** **20L** **bulk**
35651	**Sulfuric acid, 0.1N Standardized Solution** H_2SO_4, F.W. 98.08, Liquid, †	**1L** **4L** **20L** **bulk**
45062 NEW!	**Sulfuric acid, 0.2N Standardized Solution** H_2SO_4, F.W. 98.08, Liquid, †	**1L** **4L** **20L** **bulk**
35653	**Sulfuric acid, 0.5N Standardized Solution** H_2SO_4, F.W. 98.08, Liquid, UN2796, †	**1L** **4L** **20L** **bulk**
	 R:36/38, S:26-30-45	
35655	**Sulfuric acid, 1.0N Standardized Solution** H_2SO_4, F.W. 98.08, Liquid, UN2796, †	**1L** **4L** **20L** **bulk**
	 R:36/38, S:26-30-45	
43082	**Sulfuric acid, 3.0N Standardized Solution** H_2SO_4, F.W. 98.08, Liquid, UN2796, †	**1L** **bulk**
	 R:35, S:26-30-45	
35613	**Sulfuric acid, 5.0N Standardized Solution** H_2SO_4, F.W. 98.08, Liquid, UN2796, †	**1L** **bulk**
	 R:35, S:26-30-45	
35610	**Sulfuric acid, 6.0N Standardized Solution** H_2SO_4, F.W. 98.08, Liquid, UN2796, †	**1L** **bulk**
	 R:35, S:26-30-45	
88568	**Sulfuric acid, Acculute Standard Volumetric Solution, Final Concentration 2.0N** H_2SO_4, F.W. 98.08, Liquid, UN2796, Note: One unit makes one liter of 2.0N solution after dilution, †	**1unit** **6units** **bulk**
	 R:35, S:26-30-45	

Stock #	Description	Standard Selling Sizes
33273	**Sulfuric acid, ACS, 95.0-98.0%** ■ H_2SO_4, F.W. 98.08, Liquid, d. 1.84, Merck **14**,8974, UN1830, † Maximum level of impurities: Color (APHA) 10, Residue after ignition 5ppm, Cl 0.2ppm, NO_3 0.5ppm, NH_4 2ppm, Substances reducing permanganate 2ppm as SO_2, As 0.01ppm, Heavy Metals (as Pb) 1ppm, Fe 0.2ppm, Hg 5ppb, Free from suspended or insoluble matter  R:35, S:26-30-45	**1kg** **4x1kg** **bulk**
38751	**Sulfuric acid, Environmental Grade, 93-98%** H_2SO_4, F.W. 98.08, Liquid, single sub-boiling quartz distillation, d. 1.84, Merck **14**,8974, UN1830, Note: Certificate of Analysis included, †  R:35, S:26-30-45	**500ml** **2.5L** **bulk**
38752	**Sulfuric acid, Environmental Grade Plus, 93-98%** H_2SO_4, F.W. 98.08, Liquid, double sub-boiling quartz distillation, d. 1.84, Merck **14**,8974, UN1830, Note: Certificate of Analysis included, †  R:35, S:26-30-45	**250ml** **500ml** **bulk**
11000	**Sulfuric acid, 99.9999% (metals basis), 92% min** ■ H_2SO_4, F.W. 98.08, Liquid, d. 1.84, Merck **14**,8974, UN1830, †  R:35, S:26-30-45	**10ml** **100ml** **500ml** **bulk**
39188	**Sulfuric acid, 15% fuming, ACS, 12-17% free SO_3** ■ *[Oleum]* $H_2SO_4 + SO_3$, Liquid, d. 1.9, Merck **14**,8974, Application(s): As a sulfating and sulfonating agent, as a dehydrating agent in nitrations, in dyes, and as a laboratory reagent, UN1831, Note: Reacts violently with water, † Maximum level of impurities: Residue after ignition 0.002%, NO_3 1ppm, NH_4 3ppm, As 0.03ppm, Fe 2ppm  R:14-35-37, S:26-30-45	**100g** **500g** **4x500g** **bulk**
39187	**Sulfuric acid, 30% fuming, ACS, 26.0-29.5% free SO_3** ■ $H_2SO_4 + SO_3$, Liquid, d. 1.9, Merck **14**,8974, UN1831, Note: Reacts violently with water, † Maximum level of impurities: Residue after ignition 0.002%, NO_3 1ppm, NH_4 3ppm, As 0.03ppm, Fe 2ppm  R:14-35-37, S:26-30-45	**100g** **500g** **4x500g** **bulk**

Bases

Stock #	Description	Standard Selling Sizes
35575	**Ammonium hydroxide, 10% v/v aq. soln.** *[Ammonia water]* NH_4OH, F.W. 35.05, Liquid, UN1760, †  R:34, S:26-36/37/39-45-61	**500ml** **1L** **4L** **bulk**
35574	**Ammonium hydroxide, 50% v/v aq. soln.** NH_4OH, F.W. 35.05, Liquid, UN2672, †  R:34-50, S:26-36/37/39-45-61	**500ml** **1L** **4L** **bulk**
35576	**Ammonium hydroxide, 0.1N Standardized Solution** NH_4OH, F.W. 35.05, Liquid, †	**1L** **4L** **bulk**
35614	**Ammonium hydroxide, 1.0N Standardized Solution** NH_4OH, F.W. 35.05, Liquid, †	**1L** **4L** **bulk**
35577	**Ammonium hydroxide, 5.0N Standardized Solution** NH_4OH, F.W. 35.05, Liquid, UN3082, †  R:36/37/38, S:26-36/37/39-45-61	**1L** **4L** **bulk**
88576	**Ammonium hydroxide, Acculute Standard Volumetric Solution, Final Concentration 0.1N** NH_4OH, F.W. 35.05, Liquid, Note: One unit makes one liter of 0.1N solution after dilution, †	**1unit** **6units** **bulk**
33285	**Ammonium hydroxide, ACS, 28.0-30.0% NH_3** NH_4OH, F.W. 35.05, Liquid, d. 0.90, Merck **14**,494, UN2672, † Maximum level of impurities: Residue after ignition 0.002%, CO_2 0.002%, Cl 0.5ppm, PO_4 2ppm, NO_3 2ppm, Sulfate (SO_4) 2ppm, Fe 0.2ppm, Substances reducing permanganate P.T., Heavy Metals (as Pb) 0.5ppm  R:34-50, S:26-36/37/39-45-61	**250g** **1kg** **5x1kg** **bulk**
87903	**Ammonium hydroxide, 25% NH_3, 99.99% (metals basis)** NH_4OH, F.W. 35.05, Liquid, d. 0.90, Merck **14**,494, UN2672, †  R:34-50, S:26-36/37/39-45-61	**250ml** **1L** **bulk**
38741	**Ammonium hydroxide, Environmental Grade, 20-22% NH_3** NH_4OH, F.W. 35.05, Liquid, single sub-boiling quartz distillation, d. 0.90, Merck **14**,494, UN2672, Note: Certificate of Analysis included, †  R:34, S:26-36/37/39-45-61	**500ml** **bulk**
38742	**Ammonium hydroxide, Environmental Grade Plus, 20-22% NH_3** NH_4OH, F.W. 35.05, Liquid, double sub-boiling quartz distillation, d. 0.90, Merck **14**,494, UN2672, Note: Certificate of Analysis included, †  R:34, S:26-36/37/39-45-61	**250ml** **500ml** **1L** **bulk**
35615	**Potassium hydroxide, 10% w/v aq. soln.** *[Potassium hydrate, Lye]* KOH, F.W. 56.11, Liquid, UN1814, †  R:35, S:26-36/37/39-45	**1L** **4L** **bulk**
10979	**Potassium hydroxide, 30% w/v aq. soln.** KOH, F.W. 56.11, Liquid, UN1814, †  R:22-35, S:26-36/37/39-45	**500ml** **1L** **bulk**
35621	**Potassium hydroxide, 50% w/v aq. soln.** KOH, F.W. 56.11, Liquid, UN1814, †  R:22-35, S:26-36/37/39-45	**500ml** **1L** **4L** **bulk**
35599	**Potassium hydroxide, 0.1N Standardized Solution** KOH, F.W. 56.11, Liquid, †  R:36/38, S:26-36/37/39-45	**1L** **4L** **20L** **bulk**
35595	**Potassium hydroxide, 0.5N Standardized Solution** KOH, F.W. 56.11, Liquid, UN1814, †  R:34, S:26-36/37/39-45	**1L** **4L** **20L** **bulk**

Stock #	Description	Standard Selling Sizes
35592	**Potassium hydroxide, 1.0N Standardized Solution** KOH, F.W. 56.11, Liquid, UN1814, †  R:35, S:26-36/37/39-45	**1L** **4L** **20L** **bulk**
42734	**Potassium hydroxide, 0.1N Standardized Solution in methanol** KOH, F.W. 56.11, Liquid, UN2924, †  R:11-23/24/25-36/38-39/23/24/25, S:7-16-26-36/37/39-45	**1L** **4L** **20L** **bulk**
42735	**Potassium hydroxide, 0.5N Standardized Solution in methanol** KOH, F.W. 56.11, Liquid, UN2924, †  R:11-23/24/25-34-39/23/24/25, S:7-16-26-36/37/39-45	**1L** **4L** **20L** **bulk**
42736	**Potassium hydroxide, 1.0N Standardized Solution in methanol** KOH, F.W. 56.11, Liquid, UN2924, †  R:11-23/24/25-35-39/23/24/25, S:7-16-26-36/37/39-45	**1L** **4L** **20L** **bulk**
88604	**Potassium hydroxide, Acculute Standard Volumetric Solution, Final Concentration 0.1N** KOH, F.W. 56.11, Liquid, UN1814, Note: One unit makes one liter of 0.1N solution after dilution, †  R:35, S:26-36/37/39-45	**1unit** **6units** **bulk**
88602	**Potassium hydroxide, Acculute Standard Volumetric Solution, Final Concentration 0.5N** KOH, F.W. 56.11, Liquid, UN1814, Note: One unit makes one liter of 0.5N solution after dilution, †  R:22-35, S:26-36/37/39-45	**1unit** **6units** **bulk**
88601	**Potassium hydroxide, Acculute Standard Volumetric Solution, Final Concentration 1.0N** KOH, F.W. 56.11, Liquid, UN1814, Note: One unit makes one liter of 1.0N solution after dilution, †  R:22-35, S:26-36/37/39-45	**1unit** **6units** **bulk**
A16199	**Potassium hydroxide, flake, 85%** KOH, F.W. 56.11, m.p. 360°, b.p. 1320-1324°, d. 2.044, Merck **14**,7640, UN1813, RTECS TT2100000, †  R:22-35, S:26-36/37/39-45	**500g** **2.5kg** **10kg** **bulk**
A18854	**Potassium hydroxide, pellets, 85%** △ ■ KOH, F.W. 56.11, m.p. 360°, b.p. 1320-1324°, d. 2.044, Merck **14**,7640, Fieser **1**,935 **4**,409 **5**,557 **6**,486 **7**,303 **8**,415 **9**,387 **11**,439 **21**,360, UN1813, RTECS TT2100000, †  R:22-35, S:26-36/37/39-45	**500g** **2.5kg** **bulk**
13451	**Potassium hydroxide, ACS, 85% min, K_2CO_3 2.0% max** △ ■ KOH, F.W. 56.11, Pellets, m.p. 360°, b.p. 1320-1324°, d. 2.044, Merck **14**,7640, Fieser **1**,935 **4**,409 **5**,557 **6**,486 **7**,303 **8**,415 **9**,387 **11439**, **21**,360, Solubility: Soluble in water, alcohol, and glycerol. Slightly soluble in ether, Application(s): In soap manufacture, in bleaching, as an electrolyte, as an absorbent, in dyestuffs, in liquid fertilizer, in electroplating, as a reagent, UN1813, RTECS TT2100000, Note: Usually contains 10-15% water, † Maximum level of impurities: Cl 0.01%, Nitrogen compounds (as N) 0.001%, PO_4 5ppm, SO_4 0.003%, Heavy Metals (as Ag) 0.001%, Fe 0.001%, Ni 0.001%, Ca 0.005%, Mg 0.002%, Na 0.05%  R:22-35, S:26-36/37/39-45	**50g** **500g** **2kg** **10kg** **bulk**
44273	**Potassium hydroxide, 99.99% (metals basis), 85% min** KOH, F.W. 56.11, Pellets, m.p. 360°, b.p. 1320-1324°, d. 2.044, Merck **14**,7640, Fieser **1**,935 **4**,409 **5**,557 **6**,486 **7**,303 **8**,415 **9387**, **11**,439 **21**,360, UN1813, RTECS TT2100000, Note: Contains Na <100ppm, †  R:22-35, S:26-36/37/39-45	**100g** **500g** **bulk**
35604	**Sodium hydroxide, 5% w/v aq. soln.** NaOH, F.W. 40.00, Liquid, UN3266, †  R:35, S:26-37/39-45	**500ml** **4L** **bulk**
35637	**Sodium hydroxide, 20% w/v aq. soln.** NaOH, F.W. 40.00, Liquid, UN1824, †  R:35, S:26-37/39-45	**500ml** **4L** **bulk**

Acids & Bases

Stock #	Description	Standard Selling Sizes
43771	**Sodium hydroxide, 25% w/v aq. soln.** NaOH, F.W. 40.00, Liquid, UN1824, †  R:35, S:26-37/39-45	**1L** **4L** **bulk**
87864	**Sodium hydroxide, 30% w/w aq. soln.** NaOH, F.W. 40.00, Liquid, UN1824, †  R:35, S:26-37/39-45	**100ml** **500ml** **bulk**
35639	**Sodium hydroxide, 40% w/v aq. soln.** NaOH, F.W. 40.00, Liquid, UN1824, †  R:35, S:26-37/39-45	**4L** **20L** **bulk**
33382	**Sodium hydroxide, 50% w/w aq. soln.** NaOH, F.W. 40.00, Liquid, d. 1.53, UN1824, †  R:35, S:26-37/39-45	**100g** **1kg** **5kg** **bulk**
35620	**Sodium hydroxide, 0.01N Standardized Solution** *[Caustic soda, Sodium hydrate]* NaOH, F.W. 40.00, Liquid, †	**1L** **4L** **20L** **bulk**
35623	**Sodium hydroxide, 0.05N Standardized Solution** NaOH, F.W. 40.00, Liquid, †	**1L** **4L** **20L** **bulk**
35625	**Sodium hydroxide, 0.1N Standardized Solution** NaOH, F.W. 40.00, Liquid, †  R:36/37/38, S:26-36	**1L** **4L** **20L** **bulk**
35627	**Sodium hydroxide, 0.5N Standardized Solution** NaOH, F.W. 40.00, Liquid, UN3266, †  R:34, S:26-37/39-45	**1L** **4L** **20L** **bulk**
35629	**Sodium hydroxide, 1.0N Standardized Solution** NaOH, F.W. 40.00, Liquid, UN3266, †  R:35, S:26-37/39-45	**1L** **4L** **20L** **bulk**
35631	**Sodium hydroxide, 2.0N Standardized Solution** NaOH, F.W. 40.00, Liquid, UN1824, †  R:35, S:26-37/39-45	**1L** **4L** **bulk**
35633	**Sodium hydroxide, 5.0N Standardized Solution** NaOH, F.W. 40.00, Liquid, UN1824, †  R:35, S:26-37/39-45	**1L** **4L** **bulk**
35635	**Sodium hydroxide, 10.0N Standardized Solution** NaOH, F.W. 40.00, Liquid, UN1824, †  R:35, S:26-37/39-45	**1L** **bulk**
88623	**Sodium hydroxide, Acculute Standard Volumetric Solution, Final Concentration 0.1N** NaOH, F.W. 40.00, Liquid, UN1824, Note: One unit makes one liter of 0.1N solution after dilution, †  R:35, S:26-37/39-45	**1unit** **6units** **bulk**
88620	**Sodium hydroxide, Acculute Standard Volumetric Solution, Final Concentration 0.5N** NaOH, F.W. 40.00, Liquid, UN1824, Note: One unit makes one liter of 0.5N solution after dilution, †  R:35, S:26-37/39-45	**1unit** **6units** **bulk**
88619	**Sodium hydroxide, Acculute Standard Volumetric Solution, Final Concentration 1.0N** NaOH, F.W. 40.00, Liquid, UN1824, Note: One unit makes one liter of 1.0N solution after dilution, †  R:35, S:26-37/39-45	**1unit** **6units** **bulk**
41281	**Sodium hydroxide monohydrate, 99.996% (metals basis)** △ ■ $NaOH \cdot H_2O$, F.W. 58.01 (40.00anhy), Crystalline, m.p. 318.4°, b.p. 1390°, d. 2.13, Merck **14**,8627, UN1823, †  R:35, S:26-37/39-45	**5g** **25g** **100g** **bulk**

Stock #	Description	Standard Selling Sizes
B24414	**Sodium hydroxide, pearl, 97%** △ ■ *[Caustic soda]* NaOH, F.W. 40.00, m.p. 318°, b.p. 1390°, d. 2.13, Merck **14**,8627, Fieser **5**,616 **7**,336 **8**,460 **18**,334, UN1823, RTECS WB4900000, †  R:35, S:26-37/39-45	**100g** **500g** **2.5kg** **bulk**
13455	**Sodium hydroxide (low chloride), ACS, 97.0% min** △ ■ NaOH, F.W. 40.00, Pellets, m.p. 318°, b.p. 1390°, d. 2.13, Merck **14**,8627, Fieser **5**,616 **7**,336 **8**,460 **18**,334, Solubility: Soluble in water, alcohol and glycerol, Application(s): In chemical manufacture, rayon and cellophane, as a neutralizing agent in petroleum refining, in pulp, paper detergents and textiles, and as a lab reagent. NaOH solutions precipitate most metals as hydroxides from aqueous solutions of the metal salts, UN1823, RTECS WB4900000, † Maximum level of impurities: Cl 0.005%, N 0.001%, PO_4 0.001%, SO_4 0.003%, Heavy Metals (as Ag) 0.002%, Fe 0.001%, Hg 0.1ppm, Ca 0.005%, Mg 0.002%, Ni 0.001%, K 0.02%, Na_2CO_3 1.0%  R:35, S:26-37/39-45	**2.5g** **100g** **500g** **2kg** **10kg** **2x12.5kg** **bulk**
A18395	**Sodium hydroxide, flake, 98%** △ ■ NaOH, F.W. 40.00, m.p. 318°, b.p. 1390°, d. 2.13, Merck **14**,8627, Fieser **5**,616 **7**,336 **8**,460 **18**,334, UN1823, RTECS WB4900000, †  R:35, S:26-37/39-45	**500g** **2.5kg** **10kg** **bulk**
A16037	**Sodium hydroxide, pellets, 98%** NaOH, F.W. 40.00, m.p. 318°, b.p. 1390°, d. 2.13, Merck **14**,8627, Fieser **5**,616 **7**,336 **8**,460 **18**,334, UN1823, RTECS WB4900000, †  R:35, S:26-37/39-45	**500g** **bulk**

Section 12 Indicators

Indicators

Indicator	Solution	Dry	Approximate pH Range	Color Change
α-Naphtholbenzein	--	A16125	0.0-0.8	green-yellow
Methyl Violet	42754	A12159	0.0-1.6	yellow-blue
Cresol Red	--	A17243	0.2-1.8	orange-yellow
Cresol Red sodium salt	42752	B21361	0.2-1.8	red-yellow
Methyl Green	42747	--	0.2-1.8	yellow-blue
Crystal Violet	--	22866 B21932	0.8-2.6	green-violet
Metanil Yellow	--	A17527	1.2-2.3	red-yellow
m-Cresol Purple	--	B24338	1.2-2.8	red-yellow
m-Cresol Purple sodium salt	38691	A18025	1.2-2.8	red-yellow
Thymol Blue	--	B21370 16272	1.2-2.8	red-yellow
Thymol Blue sodium salt	38692	B23007 42785	1.2-2.8	red-yellow
Xylenol Blue		A17457	1.2-2.8	red-yellow
Methyl Yellow	--	B21145	2.9-4.0	red-yellow
Tetrabromophenolphthalein ethyl ester potassium salt	--	L12674	3.0-4.2	yellow-blue
Bromophenol Blue	--	A18469 32641	3.0-4.6	yellow-blue
Bromophenol Blue sodium salt	38693	A16899 32639	3.0-4.6	yellow-blue
Tetrabromophenol Blue	--	B20123 B24310	3.0-4.6	greenish yellow-blue violet
Congo Red	--	B24310 44556	3.0-5.0	blue-red
Methyl Orange	38695	A17604 17874	3.2-4.4	red-yellow
Bromocresol Green	--	A17090	3.8-5.4	yellow-blue
Bromocresol Green sodium salt	38696	A17503	3.8-5.4	yellow-blue
Resazurin sodium salt	--	B21187	3.8-6.5	orange- dark violet
Ethyl Red	--	A18367	4.0-5.8	colorless-red
Methyl Red	38698	A16690 36682	4.2-6.2	pink-yellow
Methyl Red Hydrochloride	--	36668	4.2-6.2	pink-yellow
Methyl Red S sodium salt	44161	A17455 36667	4.2-6.2	pink-yellow

Indicators

Indicator	Solution	Dry	Approximate pH Range	Color Change
Alizarin Red S sodium salt	42746	42040	4.6-6.0	yellow-red
Methyl Purple	42753	--	4.8-5.4	purple-green
Chlorophenol Red	--	B21623	4.8-6.4	yellow-red
Chlorophenol Red sodium salt	38699	L10364	4.8-6.4	yellow-red
Bromocresol Purple	--	A19430	5.2-6.8	yellow-purple
Bromocresol Purple sodium salt	38700	A19082	5.2-6.8	yellow-purple
Alizarin	--	A14404	5.8-7.2	yellow-red
Bromothymol Blue	--	A17746 32638	6.0-7.6	yellow-blue
Bromothymol Blue sodium salt	38701	A17913	6.0-7.6	yellow-blue
Phenol Red	--	B21710 16294	6.8-8.2	yellow-red
Phenol Red sodium salt	38702	15897 B21948	6.8-8.2	yellow-red
Cresol Red	--	A17243	7.0-8.8	yellow-violet
Cresol Red sodium salt	42752	B21361	7.2-8.8	yellow-red
α-Naphtholphthalein	--	41221	7.3-	colorless-red
m-Cresol Purple	--	B24338	7.4-9.0	yellow-purple
m-Cresol Purple sodium salt	38691	A18025	7.4-9.0	yellow-purple
Thymol Blue	--	B21370 16272	8.0-9.2	yellow-blue
Thymol Blue sodium salt	38692	B23007 42785	8.0-9.2	yellow-blue
Xylenol Blue	--	A17457	8.0-9.6	yellow-violet
Phenophthalein	38703 38704	38705 A17135	8.0-10.0	colorless-red
o-Cresolphthalein	--	A12899	8.2-9.8	colorless-red
α-Naphtholbenzein	--	A16125	8.2-10.0	yellow-green-blue
α-Naphtholphthalein	--	41221	8.7-	green-blue
Thymolphthalein	38706	B23896 16245	8.8-10.5	colorless-blue
Alizarin Yellow R sodium salt	--	38707	10.1-12.1	yellow-red
Tropaeolin O	42772	38708	11.0-12.7	yellow-orange
Alizarin	--	A14404	11.0-13.0	red-violet

Section 13 pH Determination Materials

Specpure® pH Buffer Solutions

Specpure® pH buffer solutions are accompanied by a NIST-traceable Certificate of Analysis and individual expiration date stickers. These solutions are guaranteed for one year from date of shipment.

Stock #	Description	Standard Selling Sizes
40446	**Buffer solution, pH 1.00 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, d. 1.005, Application(s): Calibration of pH meters, †	**500ml** **1L** **4L** **bulk**
42415	**Buffer solution, pH 1.68 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
40447	**Buffer solution, pH 2.00 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
42416	**Buffer solution, pH 3.00 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
38713	**Buffer solution, pH 4.00 (±0.01 @ 25°C), Colored Red, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **20L** **bulk**
38714	**Buffer solution, pH 4.01 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
42417	**Buffer solution, pH 5.00 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
42418	**Buffer solution, pH 6.00 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
42419	**Buffer solution, pH 6.86 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
38712	**Buffer solution, pH 7.00 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
38711	**Buffer solution, pH 7.00 (±0.01 @ 25°C), Colored Green, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
40439	**Buffer solution, pH 7.00 (±0.01 @ 25°C), Colored Yellow, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
42420	**Buffer solution, pH 8.00 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
42421	**Buffer solution, pH 9.00 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
42422	**Buffer solution, pH 9.18 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**

Stock #	Description	Standard Selling Sizes
42423	**Buffer solution, pH 9.54 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
38710	**Buffer solution, pH 10.00 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
38709	**Buffer solution, pH 10.00 (±0.01 @ 25°C), Colored Blue, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
42424	**Buffer solution, pH 11.00 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**
42425	**Buffer solution, pH 12.00 (±0.01 @ 25°C), No Color, Specpure®, NIST Traceable** Liquid, †	**500ml** **1L** **4L** **bulk**

ColorpHast pH Strips

ColorpHast® pH Strips

Each unit contains 100 strips.

Stock #	Description	Standard Selling Sizes
35237	ColorpHast® pH Strips, Universal, four squares with different indicators on each strip, 0-14 pH range	1unit 6units
35235	ColorpHast® pH Strips, Intermediate, three squares with different indicators on each strip, 0-6 pH range	1unit 6units
35236	ColorpHast® pH Strips, Intermediate, three squares with different indicators on each strip, 2-9 pH range	1unit 6units
35234	ColorpHast® pH Strips, Intermediate, three squares with different indicators on each strip, 5-10 pH range	1unit 6units
35233	ColorpHast® pH Strips, Intermediate, three squares with different indicators on each strip, 7.5-14 pH range	1unit 6units
35232	ColorpHast® pH Strips, Narrow, one square with single indicator on each strip, 0-2.5 pH range	1unit 6units
35231	ColorpHast® pH Strips, Narrow, one square with single indicator on each strip, 2.5-4.5 pH range	1unit 6units
35230	ColorpHast® pH Strips, Narrow, one square with single indicator on each strip, 4-7 pH range	1unit 6units
35227	ColorpHast® pH Strips, Narrow, one square with single indicator on each strip, 6.5-10 pH range	1unit 6units
35228	ColorpHast® pH Strips, Narrow, one square with single indicator on each strip, 11-13 pH range	1unit 6units

ColorpHast® Store

Stock #	Description	Standard Selling Sizes
35229	ColorpHast® Store, 13 packages of 100 pH strips each covering 0-2.5, 2.6-4.5, 4-7, 6.5-10, 11-13 pH ranges	each

pH Meters

Waterproof pH Tester

The new waterproof housings of the pH waterproof testers provide complete protection in outdoor applications and harsh industrial environments, as well as accidental spills.

Features Include:

- Completely waterproof, can be fully immersed in water
- Easy-to-read LCD
- Positive push-button 'ON/OFF' switch
- 700 hours of battery life
- Automatic Temperature Compensation
- Sealed protective cap can be filled with water to keep electrode activated and to prolong its life

Specifications	39768	39769	44553
Range	0.0 to 14.0 pH	0.0 to 14.0 pH	0.0 to 14.0 pH
Resolution	0.1 pH	0.1 pH	0.1pH
Accuracy	±0.2 pH	±0.1 pH	±0.1 pH
Calibration	Manual 1 or 2 point	Manual 1 or 2 point	Automatic 1 or 2 point
Temperature Compensation	N/A	Automatic 0 to 50°C (32 to 212°F)	Automatic 0 to 50°C (32 to 212°F)
Environment	0 to 50°C (32 to 212°F) 100% RH	0 to 50°C (32 to 212°F) 100% RH	0 to 50°C (32 to 212°F) 100% RH
Battery Type/Life	4 x 1.4volt 700 hours	4 x 1.4volt 700 hours	4 x 1.5volt 350 hours
Dimensions	150 x 30 x 24mm (5.9 x 1.2 x 0.9in)	150 x 30 x 24mm (5.9 x 1.2 x 0.9in)	163 x 40 x 26mm (6.4 x 1.5 x 1in)
Weight	85 g (3oz.)	85 g (3oz.)	85 g (3oz.)

Stock #	Description	Standard Selling Sizes
39768	**Waterproof pH Meter**	**1each**
44553	**Waterproof pH Meter**	**1each**

Checker pH Meter

Checker pH Meter

Checker represents the latest generation of lightweight, pocket-sized pH tester.

Some of the Checker's features include:

- Large and easy-to-read LCD
- High accuracy with 0.01 pH resolution
- Two-point fast and accurate calibration
- Secure single action ON/OFF switch
- Usable with virtually any pH electrode
- Supplied with a rugged epoxy pH electrode
- Battery life 3000 hours of continuous use
- Wide range: 0.00 to 14.00

Specifications	39771
Range	0.00 to 14.00 pH
Resolution	0.01 pH
Accuracy	±0.2 pH
Calibration	Two point through Offset and Slope trimmers
Environment	0 to 50°C (32 to 122°F); 95% RH
Battery Type	2 x 1.4 Volts
Battery Life	3000 hours
Weight	63 g (2.2 oz.)

Stock #	Description	Standard Selling Sizes
39771	**Checker pH Meter with screw-type, epoxy-body electrode**	**1each**

Accessory

Stock #	Description	Standard Selling Sizes
39772	**Screw-type, Epoxy-body Electrode for 39771**	**1each**

Section 14 Quant Test Strips

Quant Test Strips

Quant Test Strips

Quant test strips offer a convenient method to semi-quantitatively measure ions in solution by a simple color comparison. Each kit incudes strips and reagents required to make 100 determinations.

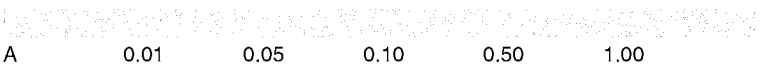
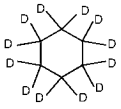
Stock #	Description	Standard Selling Sizes
23266	**Aluminum, Quant® Test Strips** UN1814, Note: Strips to measure 0-250ppm Al^{+3} in aqueous solution, †	**1kit**
23267	**Ammonium, Quant® Test Strips** UN1824, Note: Strips to measure 10-400ppm NH_4^{+1} in aqueous solution, †  R:35, S:20-26-36/37/39-45	**1kit**
23268	**Arsenic, Quant® Test Strips** NA1760, Note: Strips to measure 0.1-3.0ppm As^{+3}/As^{+5} in aqueous solution, †	**1kit**
23269	**Ascorbic Acid, Quant® Test Strips** *[Vitamin C, Quant® Test Strips]* Note: Strips to measure 50-2000ppm Vitamin C in aqueous solution, †	**1kit**
23270	**Calcium, Quant® Test Strips** NA1760, Note: Strips to measure 0-100ppm Ca^{+2} in aqueous solution, †	**1kit**
23271	**Chloride Quant® Test Strips** Note: Strips to measure 500-3000ppm Cl^- in aqueous solution	**1kit**
23274	**Chromate, Quant® Test Strips** UN2796, Note: Strips to measure 3-1000ppm CrO_4^{-2} in aqueous solution, †  R:35, S:26-30-45	**1kit**
23275	**Cobalt, Quant® Test Strips** Note: Strips to measure 10-1000ppm Co^{+2} in aqueous solution, †  R:36/38, S:23-26-36-45	**1kit**
23276	**Copper, Quant® Test Strips** Note: Strips to measure 10-300ppm Cu^{+1}/Cu^{+2} in aqueous solution, †	**1kit**
23273	**Cyanide, Quant® Test Strips** UN1993, Note: Strips to measure 0-30ppm CN^{-1} in aqueous solution, †	**1kit**
23277	**Formaldehyde, Quant® Test Strips** UN1824, Note: Strips to measure 0-100ppm HCHO in aqueous solution, †  R:35, S:26-37/39-45	**1kit**
23278	**Iron, Quant® Test Strips** Note: Strips to measure 3-500ppm Fe^{+2}/Fe^{+3} in aqueous solution, †	**1kit**
34933	**Lead, Quant® Test Strips** UN3082, Note: Strips to measure 20-500ppm Pb^{+2} in aqueous solution, †	**1kit**
38536	**Manganese, Quant® Test Strips** Note: Strips to measure 5-500ppm $Mn+^{2}$	**1each**
23280	**Molybdenum, Quant® Test Strips** UN2967, Note: Strips to measure 1-230ppm Mo^{+6} in aqueous solution, †	**1kit**
23281	**Nickel, Quant® Test Strips** Note: Strips to measure 10-900ppm Ni^{+2} in aqueous solution, †	**1kit**
23282	**Nitrate, Quant® Test Strips** Note: Strips to measure 10-500ppm NO_3^- in aqueous solution, †	**1kit**
23283	**Nitrite, Quant® Test Strips** Note: Strips to measure 1-50ppm NO_2^- in aqueous solution	**1kit**
41763	**Peracetic Acid, Quant® Test Strips** Note: Strips to measure 5-50ppm peracetic acid	**1kit**
23284	**Peroxide, Quant® Test Strips** Note: Strips to measure 1-25ppm O_2^{-2} in aqueous solution	**1kit**
23285	**Potassium, Quant® Test Strips** Note: Strips to measure 300-2000ppm K^+ in aqueous solution, †  R:36/38, S:23-26	**1kit**
23286	**Silver, Fixing Bath, Quant® Test Strips** *[Fixing bath, Quant® Test Strips]* Note: Strips to measure 0.5-10ppm Ag^{+1} in aqueous solution, †	**1kit**
23287	**Sulfate, Quant® Test Strips** Note: Strips to measure 200-1600ppm SO_4^{-2} in aqueous solution	**1kit**
23288	**Sulfite, Quant® Test Strips** Note: Strips to measure 10-500ppm SO_3^{-2} in aqueous solution, †	**1kit**

Stock #	Description	Standard Selling Sizes
35376	**Tin, Quant® Test Strips** UN1789, Note: Strips to measure 0-200ppm Sn^{+2}/Sn^{+4} in aqueous solution	**1kit**
35377	**Total Hardness Quant® Test Strips** Note: Range: 50-410mg/L (ppm) or 5-26°e, †	**1kit**
35378	**Total Hardness Quant® Test Strips** Note: Range: 75-500mg/L (ppm) or 6-30°e, †	**1kit**
23290	**Zinc, Quant® Test Strips** UN1824, Note: Strips to measure 10-250ppm Zn^{+2} in aqueous solution, †  R:35, S:26-37/39-45	**1kit**
35370	**Blank Quant® Test Strips, 100 test strips/package ,** †	**each**

Section 15 Solvents

NMR Solvents

Stock #	Description	Standard Selling Sizes
36469	**Acetic acid-d_4, 99.5% (Isotopic)** ◢ CD_3CO_2D, F.W. 64.08, Liquid, m.p. 17°, b.p. 118°, d. 1.12, UN2789  R:10-35, S:23-26-45	**5g** **10g** **bulk**
42260	**Acetone-d_6, 100%(Isotopic)** CD_3COCD_3, F.W. 64.13, Liquid in prescored ampoules, 0.75ml/ampoule, m.p. -94°, b.p. 56°, d. 0.872, n_D^{20} 1.3554, UN1090, Note: Minimum isotopic purity 99.96%  R:11-36-66-67, S:9-16-26	**2each** **10each** **bulk**
42261	**Acetone-d_6, 100% (Isotopic)** CD_3COCD_3, F.W. 64.13, Liquid in prescored ampoules, 0.5ml/ampoule, m.p. -94°, b.p. 56°, d. 0.872, n_D^{20} 1.3554, UN1090, Note: Minimum isotopic purity 99.96%  R:11-36-66-67, S:9-16-26	**2each** **10each** **bulk**
42262	**Acetone-d_6, 100%(Isotopic)** CD_3COCD_3, F.W. 64.13, Liquid, m.p. -94°, b.p. 56°, d. 0.872, n_D^{20} 1.3554, UN1090, Note: Minimum isotopic purity 99.96%  R:11-36-66-67, S:9-16-26	**1ml** **5ml** **bulk**
42263	**Acetone-d_6, 100%(Isotopic), contains 0.03% v/v TMS** CD_3COCD_3, F.W. 64.13, Liquid in prescored ampoules, 0.75ml/ampoule, m.p. -94°, b.p. 56°, d. 0.872, n_D^{20} 1.3554, UN1090, Note: Minimum isotopic purity 99.96%  R:11-36-66-67, S:9-16-26	**2each** **10each** **bulk**
16797	**Acetone-d_6, 99.9% (Isotopic)** CD_3COCD_3, F.W. 64.13, Liquid, m.p. -94°, b.p. 56°, d. 0.872, n_D^{20} 1.3554, UN1090  R:11-36-66-67, S:9-16-26	**10g** **5x10g** **bulk**
42458	**Acetone-d_6, 99.9% (Isotopic), contains 1% v/v TMS** CD_3COCD_3, F.W. 64.13, Liquid, m.p. -94°, b.p. 56°, d. 0.872, n_D^{20} 1.3554, UN1090  R:11-36-66-67, S:9-16-26	**10g** **25g** **bulk**
42266	**Acetonitrile-d_3, 100% (Isotopic)** CD_3CN, F.W. 44.08, Liquid in prescored ampoules, 0.75ml/ampoule, b.p. 81°, f.p. 5°(42°F), d. 0.863, Merck **14**,70, UN1648, Note: Minimum isotopic purity, 99.96%  R:11-20/21/22-36, S:16-36/37	**2each** **10each** **bulk**
42264	**Acetonitrile-d_3, 99.8%(Isotopic)** CD_3CN, F.W. 44.08, Liquid, b.p. 81°, f.p. 5°(42°F), d. 0.863, Merck **14**,70, UN1648  R:11-20/21/22-36, S:16-36/37	**2g** **10g** **50g** **bulk**
42265	**Benzene-d_6, 100%(Isotopic)** ◢ C_6D_6, F.W. 84.16, Liquid in prescored ampoules, 0.75ml/ampoule, m.p. 6.8°, b.p. 79.1°, f.p. -11°(12°F), d. 0.950, n_D^{20} 1.4986, UN1114, Note: Minimum isotopic purity 99.96%., †  R:45-46-11-36/38-48/23/24/25-65, S:53-45	**2each** **10each** **bulk**
42267	**Benzene-d_6, 100%(Isotopic), contains 0.03% v/v TMS** ◢ C_6D_6, F.W. 84.16, Liquid, in prescored ampoule, 0.75ml/ampoule, m.p. 6.8°, b.p. 79.1°, f.p. -11°(12°F), n_D^{20} 1.4986, UN1114, Note: Minimum isotopic purity 99.96%, †  R:45-46-11-36/38-48/23/24/25-65, S:53-45	**2each** **10each** **bulk**
89530	**Benzene-d_6, 99.5% (Isotopic)** ◢ C_6D_6, F.W. 84.16, Liquid, m.p. 6.8°, b.p. 79.1°, f.p. -11°(12°F), d. 0.950, n_D^{20} 1.4986, UN1114, †  R:45-46-11-36/38-48/23/24/25-65, S:53-45	**10g** **bulk**
42269	**Bromobenzene-d_5, 99% (Isotopic)** C_6D_5Br, F.W. 162.06, Liquid, b.p. 53°/23mm, f.p. 51°(124°F), d. 1.55, n_D^{20} 1.557, UN2514  R:10-38-51/53, S:61	**2g** **10g** **bulk**

Stock #	Description	Standard Selling Sizes
38993	**Carbon disulfide, HPLC Grade, 99.8+%** CS_2, F.W. 76.14, Liquid, m.p. -112°, b.p. 46°, f.p. -30°(-22°F), d. 1.2632, n_D^{20} 1.6270, Merck **14**,1811, UN1131, Note: Suitable for spectrophotometry, † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.05% R:11-36/38-48/23-62-63, S:16-33-36/37-45 **UV absorption - 1cm cell vs H_2O**  	**1L** **4x1L** **bulk**
44712	**Chlorobenzene-d_5, 99% (Isotopic)** C_6D_5Cl, F.W. 117.60, Liquid, b.p. 130°, f.p. 24°(75°F), d. 1.157, n_D^{20} 1.522, UN1134, BRN 1866335 R:10-20-51/53, S:24/25-61	**1g** **5g** **bulk**
42270	**Chloroform-d, 100% (Isotopic)** ◢ $CDCl_3$, F.W. 120.38, Liquid in prescored ampoules, 0.75ml/ampoule, m.p. -64°, b.p. 62°, d. 1.50, n_D^{20} 1.4445, UN1888, Note: Minimum isotopic purity 99.96% R:22-38-40-48/20/22, S:36/37	**2each** **10each** **bulk**
41388	**Chloroform-d, 100% (Isotopic), contains 0.03% v/v TMS** ◢ $CDCl_3$, F.W. 120.38, Liquid in prescored ampoules, 0.75ml/ampoule, m.p. -64°, b.p. 62°, d. 1.50, n_D^{20} 1.4445, UN1888, Note: Minimum isotopic purity 99.96% R:22-38-40-48/20/22, S:36/37	**5each** **10each** **bulk**
89541	**Chloroform-d, 99.8% (Isotopic)** ◢ $CDCl_3$, F.W. 120.38, Liquid, m.p. -64°, b.p. 62°, d. 1.50, n_D^{20} 1.4445, UN1888 R:22-38-40-48/20/22, S:36/37	**50g** **250g** **bulk**
41389	**Chloroform-d, 99.8% (Isotopic), contains 0.03% v/v TMS** ◢ $CDCl_3$, F.W. 120.38, Liquid, m.p. -64°, b.p. 62°, d. 1.50, n_D^{20} 1.4445, UN1888 R:22-38-40-48/20/22, S:36/37	**25g** **25ml** **100g** **5x100g** **bulk**
36470	**Chloroform-d, 99.8% (Isotopic), contains 1% v/v TMS** ◢ $CDCl_3$, F.W. 120.38, Liquid, m.p. -64°, b.p. 62°, d. 1.50, n_D^{20} 1.4445, UN1888 R:22-38-40-48/20/22, S:36/37	**25g** **100g** **500g** **bulk**
42271	**Cyclohexane-d_{12}, 99.5%(Isotopic)** C_6D_{12}, F.W. 96.24, Liquid in prescored ampoules, 1g/ampoule, m.p. 6.5°, b.p. 81°, f.p. -18°(-1°F), d. 0.89, n_D^{20} 1.4210, UN1145, BRN 1908842  R:11-38-50/53-65-67, S:9-16-33-60-61-62	**2each** **10each** **bulk**
42278	**Decahydronaphthalene-d_{18}, cis + trans, 99% (Isotopic)** ■ $C_{10}D_{18}$, F.W. 156.40, Liquid in prescored ampoules, b.p. 70-71°/17mm, f.p. 57° (135°F), d. 1.014, n_D^{20} 1.47450, UN3295 R:20/36/37/38/19, S:45/26/36/37/39/23e	**1g** **bulk**
14764	**Deuterium oxide, 99.8% (Isotopic)** ◢ *[Water, heavy]* D_2O, F.W. 20.03, Liquid, m.p. 3.82°, b.p. 101.4°, d. 1.105, n_D^{20} 1.338, Merck **14**,2940, †	**50g** **250g** **bulk**
43700	**Deuterium oxide, 99.95+% (Isotopic)** ◢ D_2O, F.W. 20.03, Liquid, m.p. 3.82°, b.p. 101.4°, d. 1.105, n_D^{20} 1.338, Merck **14**,2940, Note: 0.70ml/ampoule., †	**2each** **10each** **bulk**
42279	**1,2-Dibromoethane-d_4, 99%(Isotopic)** $BrCD_2CD_2Br$, F.W. 191.89, Liquid, m.p. 9°, b.p. 132°, d. 2.20, n_D^{20} 1.5360, UN1605 R:45-23/24/25-36/37/38-51/53, S:53-45-61	**5g** **25g** **bulk**
42280	**1,2-Dichlorobenzene-d_4, 99%(Isotopic)** $C_6D_4Cl_2$, F.W. 151.03, Liquid, m.p. -17°, b.p. 181°, f.p. 65°(150°F), d. 1.34, n_D^{20} 1.5509, UN1591 R:22-36/37/38-50/53, S:23-60-61	**1g** **5g** **bulk**
42281	**1,2-Dichloroethane-d_4, 99%(Isotopic)** $Cl(CD_2)_2Cl$, F.W. 102.99, Liquid, m.p. -35°, b.p. 83°, f.p. 15°(60°F), d. 1.307, n_D^{20} 1.4430, UN1184, Note: 1g size packaged in prescored ampoules R:45-11-22-36/37/38, S:53-45	**1g** **5g** **5x1g** **bulk**

NMR Solvents

Stock #	Description	Standard Selling Sizes
42334	**Dichloromethane-d_2, 100%(Isotopic)** ◪ CD_2Cl_2, F.W. 86.95, Liquid in prescored ampoules, 0.75ml/ampoule, d. 1.35, UN1593, Note: Minimum isotopic purity 99.96% R:40, S:23b-24/25-36/37	**2each** **10each** **bulk**
36500	**Dichloromethane-d_2, 99.9%(Isotopic)** ◪ CD_2Cl_2, F.W. 86.95, Liquid, d. 1.35, UN1593 R:40, S:23b-24/25-36/37	**1g** **5g** **bulk**
42335	**Dichloromethane-d_2, 99.9%(Isotopic)** ◪ CD_2Cl_2, F.W. 86.95, Liquid, in prescored ampoules, 0.75ml/ampoule, d. 1.35, UN1593 R:40, S:23b-24/25-36/37	**2each** **10each** **bulk**
42283	**Diethylene glycol dimethyl ether-d_{14}, 98% (Isotopic)** $(CD_3OCD_2CD_2)_2O$, F.W. 148.26, Liquid in prescored ampoules, m.p. -68°, b.p. 162°, d. 1.035, UN3271 R:61/20/21/22, S:53/45/36/37/39/23e	**1g** **5g** **bulk**
42282	**Diethyl ether-d_{10}, 99%(Isotopic)** $(C_2D_5)_2O$, F.W. 84.19, Liquid in prescored ampoules, m.p. -116°, b.p. 34.6°, f.p. -45°(-49°F), d. 0.82, UN1155 R:12-19-22-66-67, S:9-16-29-33	**1g** **bulk**
43854	**N,N-Dimethylacetamide-d_9, 99% (Isotopic)** $CD_3CON(CD_3)_2$, F.W. 96.19, Liquid, Ampouled under argon, m.p. -20°, b.p. 165°, d. 1.035, n_D^{20} 1.4380, † R:61-20/21, S:53-45	**1g** **bulk**
42284	**N,N-Dimethylformamide-d_7, 99.5%(Isotopic)** $DCON(CD_3)_2$, F.W. 80.14, Liquid in prescored ampoules, m.p. -61°, b.p. 153°, d. 1.04, UN2265 R:61-20/21-36, S:53-45	**1g** **5x1g** **bulk**
42285	**Dimethyl sulfoxide-d_6, 100% (Isotopic)** ■ $(CD_3)_2SO$, F.W. 84.17, Liquid, in prescored ampoules, 0.75ml/ampoule, m.p. 20°, b.p. 190°, f.p. 88°(190°F), d. 1.18, n_D^{20} 1.4760, Note: Minimum isotopic purity 99.96% R:36/37/38, S:23-26-36	**2each** **10each** **bulk**
42286	**Dimethyl sulfoxide-d_6, 100% (Isotopic), contains 0.03% v/v TMS** ■ $(CD_3)_2SO$, F.W. 84.17, Liquid, in prescored ampoules, 0.75ml/ampoule, m.p. 20°, b.p. 190°, f.p. 88°(190°F), d. 1.18, n_D^{20} 1.4760, Solubility: Minimum isotopic purity 99.96% R:36/37/38, S:23-26-36	**2each** **10each** **bulk**
36517	**Dimethyl sulfoxide-d_6, 99.9% (Isotopic)** ■ $(CD_3)_2SO$, F.W. 84.17, Liquid, m.p. 20°, b.p. 190°, f.p. 88°(190°F), d. 1.18, n_D^{20} 1.4760 R:36/37/38, S:23-26-36	**5x1g** **bulk**
A16893	**Dimethyl sulfoxide-d6, 99.5% (Isotopic)** ■ *[Methyl sulfoxide-d6]* C_2D_6OS, F.W. 84.17, Liquid, m.p. 20°, b.p. 190°, f.p. 88°(190°F), d. 1.18, n_D^{20} 1.4760 R:36/37/38, S:23-26-36	**10g** **50g** **bulk**
36516	**1,4-Dioxane-d_8, 99% (Isotopic)** ■ $C_4D_8O_2$, F.W. 96.16, Liquid, m.p. 12°, b.p. 101°, d. 1.13, UN1165 R:11-19-36/37-40-66, S:9-16-36/37-46	**1g** **bulk**
36502	**Ethanol-d_6, 99.5%(Isotopic)** ■ CD_3CD_2OD, F.W. 52.11, Liquid, b.p. 79°, d. 0.91, UN1170 R:11, S:7-16	**1g** **5g** **bulk**
16799	**Ethanol-d_6, anhydrous, 99+%(Isotopic)** ■ CD_3CD_2OD, F.W. 52.11, Liquid, b.p. 79°, d. 0.91, UN1170 R:11, S:7-16	**1g** **5g** **bulk**
42288	**Ethylene glycol-d_6, 98% (Isotopic)** $DOCD_2CD_2OD$, F.W. 68.02, Liquid, b.p. 86-87°/8mm, f.p. 111°(232°F), d. 1.189 R:22	**1g** **5g** **bulk**

Stock #	Description	Standard Selling Sizes
42287	**Ethylene glycol-d_6, 99.7% (Isotopic)** $DOCD_2CD_2OD$, F.W. 68.02, Liquid, b.p. 86-87°/8mm, f.p. 111°(232°F), d. 1.189 R:22	**1g** **bulk**
42289	**n-Heptane-d_{16}, 98% (Isotopic)** ■ $CD_3(CD_2)_5CD_3$, F.W. 116.33, Liquid in prescored ampoules, m.p. -91 to -89°, b.p. 97-99°, f.p. -4°(24°F), d. 0.794, n_D^{20} 1.3877, UN1206, RTECS MI7700000, BRN 1730763 R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**1g** **bulk**
42290	**1,1,1,3,3,3-Hexafluoroacetone trideuterate, 99.5%(Isotopic)** ◢ $CF_3COCF_3{\cdot}3D_2O$, F.W. 226.10 (166.02anhy), Liquid, m.p. 21°, d. 1.71, UN2552 R:25-36/37/38, S:20-26-36/37-45-60	**10g** **bulk**
A11500	**Hexafluorobenzene, 99%** C_6F_6, F.W. 186.06, Liquid, m.p. 4-5°, b.p. 80-81°, f.p. 10°(50°F), d. 1.616, n_D^{20} 1.3780, Merck **14**,4686, UN1993, RTECS DA3050000, BRN 1683438, † R:11-36/37/38, S:9-16-26-33	**10g** **50g** **250g** **bulk**
42291	**1,1,1,3,3,3-Hexafluoro-2-propanol-d_2, 98%(Isotopic)** ◢ $CF_3CD(OD)CF_3$, F.W. 170.05, Liquid, packaged in prescored ampoules, m.p. -40°, b.p. 59°, d. 1.60, UN1760 R:20/21/22-34, S:9-26-36/37/39-45	**1g** **5x1g** **bulk**
42312	**n-Hexane-d_{14}, 99%(Isotopic)** $CD_3(CD_2)_4CD_3$, F.W. 100.29, Liquid, m.p. -95°, b.p. 69°, f.p. -23°(-9°F), d. 0.767, UN1208 R:11-38-48/20-62-51/53-65-67, S:9-16-29-33-36/37-61-62	**1g** **5g** **bulk**
89571	**Methanol-d, 99.5+% (Isotopic)** CH_3OD, F.W. 33.05, m.p. -98°, b.p. 64.7°, f.p. 11°(54°F), d. 0.813, n_D^{20} 1.3270, UN1230, BRN 1730948, † R:11-23/24/25-39/23/24/25, S:7-16-36/37-45	**25g** **bulk**
42320	**Methanol-d_4, 100%(Isotopic)** CD_3OD, F.W. 36.07, Liquid , in prescored ampoules, 0.75ml/ampoule, m.p. -98°, b.p. 64.7°, d. 0.89, UN1230, Note: Minimum isotopic purity 99.96%, † R:11-23/24/25-39/23/24/25, S:7-16-36/37-45	**2each** **10each** **bulk**
36501	**Methanol-d_4, 99.8%(Isotopic)** CD_3OD, F.W. 36.07, Liquid, m.p. -98°, b.p. 64.7°, d. 0.89, UN1230, † R:11-23/24/25-39/23/24/25, S:7-16-36/37-45	**1g** **5g** **25g** **bulk**
42318	**Methanol-d_4, 99.8% (Isotopic)** CD_3OD, F.W. 36.07, Liquid, in prescored ampoules, 0.75ml/ampoule, m.p. -98°, b.p. 64.7°, d. 0.89, UN1230, † R:11-23/24/25-39/23/24/25, S:7-16-36/37-45	**2each** **10each** **bulk**
42319	**Methanol-d_4, 99.8% (Isotopic), contains 0.05% v/v TMS** CD_3OD, F.W. 36.07, Liquid , in prescored ampoules, 1g/ampoule, m.p. -98°, b.p. 64.7°, d. 0.89, UN1230, † R:11-23/24/25-39/23/24/25, S:7-16-36/37-45	**2each** **10each** **bulk**
42321	**Methylcyclohexane-d_{14}, 99.5%(Isotopic)** $C_6D_{11}CD_3$, F.W. 112.27, Liquid, m.p. -126°, b.p. 101°, d. 0.880, UN2296 R:11-38-51/53-65-67, S:9-16-33-61-62	**1g** **5g** **bulk**
42336	**1-Methyl-2-pyrrolidinone-d_9, 97%(Isotopic)** C_5D_9NO, F.W. 108.21, Liquid, m.p. -24°, b.p. 81-82°/10mm R:36/38, S:41	**1g** **5g** **bulk**
42337	**Nitrobenzene-d_5, 99%(Isotopic)** $C_6D_5NO_2$, F.W. 128.14, Liquid, m.p. 6°, b.p. 211°, f.p. 88°(190°F), d. 1.25, UN1662 R:23/24/25-40-48/23/24-62-51/53, S:28-36/37-45-61	**5g** **25g** **bulk**
42338	**Nitromethane-d_3, 99%(Isotopic)** ■ CD_3NO_2, F.W. 64.06, Liquid, m.p. -29°, b.p. 101°, d. 1.20, UN1261, † R:5-10-22, S:41	**5g** **10g** **25g** **bulk**

NMR Solvents

Stock #	Description	Standard Selling Sizes
42339	**n-Octane-d_{18}, 99%(Isotopic)** $CD_3(CD_2)_6CD_3$, F.W. 132.34, Liquid, m.p. -57°, b.p. 126°, f.p. 15.6°(60°F), d. 0.815, UN1262 R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**1g 5g bulk**
42340	**n-Pentane-d_{12}, 98%(Isotopic)** $CD_3(CD_2)_3CD_3$, F.W. 84.15, Liquid, m.p. -130°, b.p. 36°, d. 0.73, UN1265, † R:12-51/53-65-66-67, S:9-16-29-33-61-62	**1g 5g bulk**
42314	**2-Propanol-d_8, 99%(Isotopic)** $(CD_3)_2CDOD$, F.W. 68.15, Liquid, m.p. -89.5°, b.p. 82.4°, f.p. -11.7°(53°F), d. 0.90, UN1219 R:11-36-67, S:7-16-24/25-26	**1g 5g 25g bulk**
42343	**Pyridine-d_5, 100%(Isotopic)** C_5D_5N, F.W. 84.14, Liquid in prescored ampoules, 0.5ml/ampoule, m.p. -42°, b.p. 115°, f.p. 20°(68°F), d. 1.05, n_D^{20} 1.506, UN1282, BRN 114377, Note: Minimum isotopic purity 99.94% R:11-20/21/22, S:26-28	**2each 10each bulk**
36471	**Pyridine-d_5, 99.5%(Isotopic)** C_5D_5N, F.W. 84.14, Liquid, m.p. -42°, b.p. 115°, f.p. 20°(68°F), d. 1.05, n_D^{20} 1.506, UN1282, BRN 114377 R:11-20/21/22, S:26-28	**2g 10g bulk**
42341	**Pyridine-d_5, 99.5%(Isotopic)** C_5D_5N, F.W. 84.14, Liquid in prescored ampoules, 1ml/ampoule, m.p. -42°, b.p. 115°, f.p. 20°(68°F), d. 1.05, n_D^{20} 1.506, UN1282, BRN 114377 R:11-20/21/22, S:26-28	**2each 10each bulk**
42342	**Pyridine-d_5, 99.5%(Isotopic), contains 0.05% v/v TMS** C_5D_5N, F.W. 84.14, Liquid, m.p. -42°, b.p. 115°, f.p. 20°(68°F), d. 1.05, n_D^{20} 1.506, UN1282, BRN 114377 R:11-20/21/22, S:26-28	**5g 25g bulk**
42347	**1,1,2,2-Tetrachloroethane-d_2, 99.6%(Isotopic)** $Cl_2CDCDCl_2$, F.W. 169.86, Liquid, m.p. -44°, b.p. 147°, d. 1.620, n_D^{20} 1.4930, UN1702 R:7-26-51/53, S:38-45-61	**2g 10g 50g bulk**
42348	**Tetrahydrofuran-d_8, 100%(Isotopic)** C_4D_8O, F.W. 80.16, Liquid in prescored ampoules, 0.75ml/ampoule, m.p. -108°, b.p. 66°, d. 0.99, UN2056, Note: Minimum isotopic purity 99.95% R:11-19-36/37, S:16-29-33	**2each 10each bulk**
36551	**Tetrahydrofuran-d_8, 99.5% (Isotopic)** C_4D_8O, F.W. 80.16, Liquid, m.p. -108°, b.p. 66°, d. 0.99, UN2056 R:11-19-36/37, S:16-29-33	**1g bulk**
42356	**Toluene-d_8, 100%(Isotopic)** $C_6D_5CD_3$, F.W. 100.19, Liquid in prescored ampoules, 0.75ml/ampoule, m.p. -93°, b.p. 111°, f.p. 10°(50°F), d. 0.94, UN1294, Note: Minimum isotopic purity 99.94% R:11-38-48/20-63-65-67, S:36/37-46-62	**2each 10each bulk**
36477	**Toluene-d_8, 99.6%(Isotopic)** $CD_3C_6D_5$, F.W. 100.19, Liquid, m.p. -93°, b.p. 111°, f.p. 10°(50°F), d. 0.94, UN1294 R:11-38-48/20-63-65-67, S:36/37-46-62	**1g 10g bulk**
42357	**Trifluoroacetic acid-d, 99.5%(Isotopic)** ■ CF_3CO_2D, F.W. 115.03, Liquid in prescored ampoules, m.p. -15°, b.p. 72°, d. 1.50, UN2699, † R:20-35-52/53, S:9-26-27/28a-45-61	**10g 25g bulk**
42362	**2,2,2-Trifluoroethanol-d_2, 98%(Isotopic)** ■ CF_3CD_2OH, F.W. 102.02, Liquid, m.p. -44°, b.p. 77-80°, UN1992 R:10-20/21/22-37/38-41, S:9-23-26-36/37/39	**1g 5g bulk**

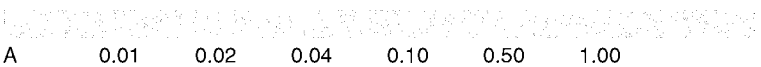
Stock #	Description	Standard Selling Sizes
42364	**2,2,2-Trifluoroethanol-d_3, 100%(Isotopic)** ■ CF_3CD_2OD, F.W. 103.06, Liquid, m.p. -44°, b.p. 77-80°, d. 1.45, UN1992, Note: Minimum isotopic purity 99.94% ✖ R:10-20/21/22-37/38-41, S:9-23-26-36/37/39	**1g** **5g** **bulk**
42363	**2,2,2-Trifluoroethanol-d_3, 99%(Isotopic)** ■ CF_3CD_2OD, F.W. 103.06, Liquid in prescored ampoules, m.p. -44°, b.p. 77-80°, d. 1.45, UN1992 ✖ R:10-20/21/22-37/38-41, S:9-23-26-36/37/39	**1g** **5x1g** **bulk**
36472	**o-Xylene-d_{10}, 98+%(Isotopic)** ◢ C_8D_{10}, F.W. 116.25, Liquid, m.p. 142°, b.p. 143-145°, d. 0.953, Merck **14**,10081, UN1307 ✖ R:10-20/21-38, S:25	**5g** **bulk**
36473	**p-Xylene-d_{10}, 99%(Isotopic)** ◢ C_8D_{10}, F.W. 116.25, Liquid, m.p. 12-13°, b.p. 137-138°, d. 0.948, Merck **14**,10081, UN1307 ✖ R:10-20/21-38, S:25	**5g** **bulk**

Stock #	Description	Standard Selling Sizes
36289	**Acetic acid, glacial, ACS, 99.7+%** CH_3CO_2H, F.W. 60.05, Liquid, m.p. 16.6°, b.p. 118.1°, f.p. 40°(104°F), d. 1.049, n_D^{20} 1.3721, Merck **14**,55, Fieser **2**,5 **5**,3 **7**,1 **8**,1 **19**,1 **21**,1, UN2789, † Maximum level of impurities: Color (APHA) 10, Dilution Test P.T., Evaporation Residue 0.001%, $(CH_3CO)_2O$ 0.01%, Cl 1ppm, SO_4 1ppm, Heavy Metals (as Pb) 0.5ppm, Fe 0.2ppm, Substances reducing dichromate P.T., Substances reducing permanganate P.T., Titratable base 0.0004meq/g R:10-35, S:23-26-45	**100ml** **500ml** **2L** **4x500ml** **bulk**
38740	**Acetic acid, Environmental Grade, 99% min** CH_3CO_2H, F.W. 60.05, Liquid, m.p. 16.6°, b.p. 118.1°, f.p. 40°(104°F), d. 1.049, n_D^{20} 1.3721, Merck **14**,55, Fieser **2**,5 **5**,3 **7**,1 **8**,1 **19**,1 **21**,1, UN2789, Note: Certificate of Analysis included. Single sub-boiling quartz distillation, † R:10-35, S:23-26-45	**500ml** **2.5L** **bulk**
38739	**Acetic acid, Environmental Grade Plus, 99.4% min** CH_3CO_2H, F.W. 60.05, Liquid, m.p. 16.6°, b.p. 118.1°, f.p. 40°(104°F), d. 1.049, n_D^{20} 1.3721, Merck **14**,55, Fieser **2**,5 **5**,3 **7**,1 **8**,1 **19**,1 **21**,1, UN2789, Note: Certificate of Analysis included. Double sub-boiling quartz distillation., † R:10-35, S:23-26-45	**250ml** **500ml** **bulk**
30698	**Acetone, ACS, 99.5+%** CH_3COCH_3, F.W. 58.08, Liquid, m.p. -94°, b.p. 56°, f.p. -17°(1°F), d. 0.791, n_D^{20} 1.3590, Merck **14**,66, Fieser **2**,13 **3**,4 **6**,9, UN1090, RTECS AL3150000, BRN 635680, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 0.001%, Solubility in water P.T., Titratable acid 0.0003meq/g, Titratable base 0.0006meq/g, Aldehyde as (HCHO) 0.002%, Isopropyl alcohol 0.05%, Methanol 0.05%, Substances reducing permanganate P.T., H_2O 0.5% R:11-36-66-67, S:9-16-26	**10ml** **500ml** **1L** **4L** **4x1L** **bulk**
22928	**Acetone, HPLC Grade, 99.5+%** CH_3COCH_3, F.W. 58.08, Liquid, m.p. -94°, b.p. 56°, f.p. -17°(1°F), d. 0.791, n_D^{20} 1.3590, Merck **14**,66, Fieser **2**,13 **3**,4 **6**,9, UN1090, RTECS AL3150000, BRN 635680, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, Chlorinated pesticide 5ppt, H_2O 0.50% R:11-36-66-67, S:9-16-26 **UV absorption - 1cm cell vs H_2O** A 0.005 0.01 0.10 1.00	**1L** **4L** **4x1L** **4x4L** **bulk**
32451	**Acetone, Spectrophotometric Grade, 99.5+%** CH_3COCH_3, F.W. 58.08, Liquid, m.p. -94°, b.p. 56°, f.p. -17°(1°F), d. 0.791, n_D^{20} 1.3590, Merck **14**,66, Fieser **2**,13 **3**,4 **6**,9, UN1090, RTECS AL3150000, BRN 635680, Note: Meets ACS spectrophotometric requirements. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, H_2O 0.50% R:11-36-66-67, S:9-16-26 **UV absorption - 1cm cell vs H_2O** A 0.01 0.02 0.10 1.00	**1L** **4L** **4x1L** **4x4L** **bulk**
19392	**Acetone, Semiconductor Grade, 99.5%** CH_3COCH_3, F.W. 58.08, Liquid, m.p. -94°, b.p. 56°, f.p. -17°(1°F), d. 0.791, n_D^{20} 1.3590, Merck **14**,66, Fieser **2**,13 **3**,4 **6**,9, UN1090, RTECS AL3150000, BRN 63580, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 5ppm, Acidity 0.3µeq/g, Alkalinity 0.5µeq/g, H_2O 0.5%, Solubility in H_2O P.T., Cl 0.2ppm, PO_4 0.1ppm R:11-36-66-67, S:9-16-26	**1L** **4L** **4x1L** **bulk**

Stock #	Description	Standard Selling Sizes
43053	**Acetone, Environmental Grade, 99.5+%** CH_3COCH_3, F.W. 58.08, Liquid, m.p. -94°, b.p. 56°, f.p. -17°(1°F), d. 0.791, n_D^{20} 1.3590, Merck **14**,66, Fieser **2**,13 **3**,4 **6**,9, Application(s): Suitable for pesticide residue analysis, UN1090, RTECS AL3150000, BRN 635680, † Maximum level of impurities: Evaporation residue 5ppm, Halogenated residue (as Heptachlorepoxide by GC/ECD) 10ng/l, Water 0.5% R:11-36-66-67, S:9-16-26	**1L** **4L** **4x4L** **bulk**
36423	**Acetonitrile, ACS, 99.5+%,** *[Methyl cyanide]* CH_3CN, F.W. 41.05, Liquid, m.p. -48° to -45°, b.p. 80-82°, f.p. 5°(41°F), d. 0.786, n_D^{20} 1.3440, Merck **14**,70, Fieser **2**,13 **15**,1 **18**,2 **19**,1, UN1648, RTECS AL7700000, BRN 741857, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 0.005%, Titratable acid 8µeq/g, Titratable base 0.6µeq/g, H_2O 0.3% R:11-20/21/22-36, S:16-36/37	**500ml** **1L** **4L** **4x1L** **4x4L** **bulk**
22927	**Acetonitrile, HPLC Grade, 99.7+% min,** *[Methyl cyanide]* CH_3CN, F.W. 41.05, Liquid, m.p. -48° to -45°, b.p. 80-82°, f.p. 5°(41°F), d. 0.786, n_D^{20} 1.3440, Merck **14**,70, Fieser **2**,13 **15**,1 **18**,2 **19**,1, UN1648, RTECS AL7700000, BRN 741857, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, Chlorinated pesticides 5ppt, H_2O 0.03% R:11-20/21/22-36, S:16-36/37 **UV absorption - 1cm cell vs H_2O** A 0.01 0.02 0.05 0.10 1.00	**1L** **4L** **4x1L** **4x4L** **bulk**
42880	**Acetonitrile, HPLC Grade (Far UV), 99.8+%,** *[Methyl cyanide]* CH_3CN, F.W. 41.05, Liquid, m.p. -48° to -45°, b.p. 80-82°, f.p. 5°(41°F), d. 0.786, n_D^{20} 1.3440, Merck **14**,70, Fieser **2**,13 **15**,1 **18**,2 **19**,1, Application(s): Suitable for far UV analysis, UN1648, RTECS AL7700000, BRN 741857, Note: Viscosity (20°C) 0.36cP-Polarity 6.2. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 0.001%, H_2O 0.02%, Titrable acid 0.001% R:11-20/21/22-36, S:16-36/37 **Minimum Transmission - 1cm cell vs. HPLC water** T(%) 100 97 90 80 30	**1L** **4L** **bulk**
42879	**Acetonitrile, Supergradient HPLC Grade (Far UV), 99.9+%,** *[Methyl cyanide]* CH_3CN, F.W. 41.05, Liquid, m.p. -48° to -45°, b.p. 80-82°, f.p. 5°(41°F), d. 0.786, n_D^{20} 1.3440, Merck **14**,70, Fieser **2**,13 **15**,1 **18**,2 **19**,1, Application(s): Suitable for gradient HPLC, UN1648, RTECS AL7700000, BRN 741857, Note: Viscosity (20°C) 0.36cP-Polarity 6.2. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 0.001%, H_2O 0.02%, Titratable acid 0.001% R:11-20/21/22-36, S:16-36/37 **Minimum Transmission - 1cm cell vs. HPLC water** T(%) 100 99 80 47	**1L** **4L** **bulk**

Specialty Solvents

Stock #	Description	Standard Selling Sizes
32470	**Acetonitrile, Spectrophotometric Grade, 99.7+%,** *[Methyl cyanide]* CH_3CN, F.W. 41.05, Liquid, m.p. -48 to -45°, b.p. 80-82°, f.p. 5°(41°F), d. 0.786, n_D^{20} 1.3440, Merck **14**,70, Fieser **2**,13 **15**,1 **18**,2 **19**,1, UN1648, RTECS AL7700000, BRN 741857, Note: Meets ACS spectrophotometric requirements. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, H_2O 0.03% R:11-20/21/22-36, S:16-36/37 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.02 0.05 0.10 1.00	**1L** **4L** **4x1L** **bulk**
40972	**Acetonitrile, Environmental Grade, 99.7+%,** *[Methyl cyanide]* CH_3CN, F.W. 41.05, Liquid, m.p. -48 to -45°, b.p. 80-82°, f.p. 5°(41°F), d. 0.786, n_D^{20} 1.3440, Merck **14**,70, Fieser **2**,13 **15**,1 **18**,2 **19**,1, Application(s): Suitable for environmental, pesticide residue, and GC analysis, UN1648, RTECS AL7700000, BRN 741857, † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.05%, Halogenated residue 10ng/l (GC-ECD) 0.01% R:11-20/21/22-36, S:16-36/37	**1L** **4L** **4x1L** **bulk**
33290	**Benzene, ACS, 99.0% min** C_6H_6, F.W. 78.11, Liquid, m.p. 5°, b.p. 80°, f.p. -11°(12°F), d. 0.874, n_D^{20} 1.5010, Merck **14**,1066, UN1114, RTECS CY1400000, BRN 969212, † Maximum level of impurities: Color (APHA) 10, Evaporation Residue 0.001%, Substances darkened by sulfuric acid P.T., Thiophene P.T. (limit about 1ppm), Sulfur compounds (as S) 0.005%, H_20 0.05% R:45-46-11-36/38-48/23/24/25-65, S:53-45	**500ml** **1L** **4L** **4x1L** **bulk**
39196	**Benzene, HPLC Grade, 99.5%** C_6H_6, F.W. 78.11, Liquid, m.p. 5°, b.p. 80°, f.p. -11°(12°F), d. 0.874, n_D^{20} 1.5010, Merck **14**,1066, UN1114, RTECS CY1400000, BRN 969212, Note: Filtered through 0.2µ filters., † R:45-46-11-36/38-48/23/24/25-65, S:53-45 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.02 0.06 0.15 1.0	**1L** **4L** **bulk**
33291	**Benzene, Spectrophotometric Grade, 99.5+%** C_6H_6, F.W. 78.11, Liquid, m.p. 5°, b.p. 80°, f.p. -11°(12°F), d. 0.874, n_D^{20} 1.5010, Merck **14**,1066, UN1114, RTECS CY1400000, BRN 969212, Note: Filtered through 0.2µ filters., † R:45-46-11-36/38-48/23/24/25-65, S:53-45 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.02 0.06 0.15 1.0	**1L** **4L** **bulk**
31068	**1-Butanol, ACS, 99.4+%** *[n-Butyl alcohol]* $CH_3(CH_2)_3OH$, F.W. 74.12, Liquid, m.p. -90 to -89°, b.p. 117-118°, f.p. 35°(95°F), d. 0.810, n_D^{20} 1.3990, Merck **14**,1540, UN1120, RTECS EO1400000, BRN 969148, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 0.005%, Titratable acid 0.0008meq/g, Carbonyl compounds (as butyraldehyde) 0.01%, Butyl ether 0.2%, H_2O 0.1% R:10-22-37/38-41-67, S:7/9-13-26-37/39-46	**500ml** **1L** **4L** **4x1L** **4x4L** **bulk**

Stock #	Description	Standard Selling Sizes
22925	**1-Butanol, HPLC Grade, 99%** $CH_3(CH_2)_3OH$, F.W. 74.12, Liquid, m.p. -90 to -89°, b.p. 117-118°, f.p. 35°(95°F), d. 0.810, n_D^{20} 1.3990, Merck **14**,1540, UN1120, RTECS EO1400000, BRN 969148, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.05% R:10-22-37/38-41-67, S:7/9-13-26-37/39-46 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.02 0.04 0.10 0.50 1.00	**1L** **4L** **4x1L** **bulk**
32443	**1-Butanol, Ultrapure, Spectrophotometric Grade, 99.0+%** $CH_3(CH_2)_3OH$, F.W. 74.12, Liquid, m.p. -90 to -89°, b.p. 117-118°, f.p. 35°(95°F), d. 0.810, n_D^{20} 1.3990, Merck **14**,1540, UN1120, RTECS EO1400000, BRN 969148, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.1% R:10-22-37/38-41-67, S:7/9-13-26-37/39-46 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.02 0.04 0.10 0.50 1.00	**1L** **4L** **4x1L** **bulk**
39119	**2-Butanone, ACS, 99+%** *[Methyl ethyl ketone, MEK]* $CH_3COCH_2CH_3$, F.W. 72.11, Liquid, m.p. -87°, b.p. 80°, f.p. -3°(26°F), d. 0.805, n_D^{20} 1.3790, Merck **14**,6072, Fieser **1**,678, UN1193, RTECS EL6475000, BRN 741880, † Maximum level of impurities: Color (APHA) 15, Residue after evaporation 0.0025%, Titratable acid 0.0005meq/g, H_2O 0.20% R:11-36-66-67, S:9-16	**500ml** **1L** **4L** **4x1L** **bulk**
22924	**2-Butanone, HPLC Grade, 99.5+%** *[Methyl ethyl ketone, MEK]* $CH_3COCH_2CH_3$, F.W. 72.11, Liquid, m.p. -87°, b.p. 80°, f.p. -3°(26°F), d. 0.805, n_D^{20} 1.3790, Merck **14**,6072, Fieser **1**,678, UN1193, RTECS EL6475000, BRN 741880, † Maximum level of impurities: Color (APHA) 15, Residue after evaporation 0.0025%, Titratable acid 0.0005meq/g, H_2O 0.20% R:11-36-66-67, S:9-16	**1L** **4L** **4x1L** **bulk**
39197	**n-Butyl acetate, HPLC Grade, 99.5+%** $CH_3CO_2(CH_2)_3CH_3$, F.W. 116.16, Liquid, m.p. -78°, b.p. 124-126°, f.p. 22°(72°F), d. 0.881, n_D^{20} 1.3940, Merck **14**,1535, UN1123, RTECS AF350000, BRN 1741921, † Maximum level of impurities: Evaporation residue 0.0005%, H_2O 0.05% R:10-66-67, S:25-60 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.02 0.04 0.20 1.0	**250ml** **1L** **4L** **4x1L** **bulk**
19395	**n-Butyl acetate, Semiconductor Grade, 99% min** $CH_3CO_2(CH_2)_3CH_3$, F.W. 116.16, Liquid, m.p. -78°, b.p. 124-126°, f.p. 22°(72°F), d. 0.881, n_D^{20} 1.3940, Merck **14**,1535, UN1123, RTECS AF350000, BRN 1741921, † Maximum level of impurities: Color (APHA) 15, Residue after evaporation 10ppm, Acidity 2.0meq/g, H_2O 0.05%, PO_4 0.5ppm R:10-66-67, S:25-60	**1L** **4L** **4x1L** **bulk**
33278	**tert-Butyl alcohol, ACS, 99+%** *[2-Methyl-2-propanol, tert-Butanol]* $(CH_3)_3COH$, F.W. 74.12, Liquid, m.p. 25°, b.p. 83°, f.p. 11°(52°F), d. 0.786, n_D^{20} 1.3870, Merck **14**,1542, UN1120, RTECS EO1925000, BRN 906698, † Maximum level of impurities: Color (APHA) 20, Residue after evaporation 0.003%, Titratable acid 0.001 meq/g, Carbonyl compounds (as formaldehyde) 0.01%, H_2O 0.1% R:11-20, S:9-16	**250ml** **1L** **4L** **4x1L** **bulk**

Specialty Solvents

Stock #	Description	Standard Selling Sizes
40477	**tert-Butyl methyl ether, HPLC Grade, 99+%** *[Methyl tert-butyl ether]* $(CH_3)_3COCH_3$, F.W. 88.15, Liquid, m.p. -109°, b.p. 55-56°, f.p. -25°(-13°F), d. 0.742, n_D^{20} 1.3690, Merck **14**,6032, Fieser **4**,333, Application(s): Chromatography solvent, UN2350, RTECS KN5250000, BRN 1730942, † Maximum level of impurities: Evaporation residue 2ppm, H_2O 0.05% R:11-38, S:9-16-24 **UV absorption - 1cm cell vs H_20**  A 0.005 0.10 0.30 0.75	**1L** **4L** **4x1L** **4x4L** **bulk**
41839	**tert-Butyl methyl ether, HPLC grade, 99+%, packaged under Argon in resealable ChemSeal™ bottles** *[Methyl tert-butyl ether]* $(CH_3)_3COCH_3$, F.W. 88.15, Liquid, m.p. -109°, b.p. 55-56°, f.p. -25°(-13°F), d. 0.742, n_D^{20} 1.3690, Merck **14**,6032, Fieser **4**,333, Application(s): Chromatography solvent, UN2350, RTECS KN5250000, BRN 1730942, † R:11-38, S:9-16-24	**250ml** **1L** **bulk**
38993	**Carbon disulfide, HPLC Grade, 99.8+%** CS_2, F.W. 76.14, Liquid, m.p. -112°, b.p. 46°, f.p. -30°(-22°F), d. 1.2632, n_D^{20} 1.6270, Merck **14**,1811, UN1131, Note: Suitable for spectrophotometry, † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.05% R:11-36/38-48/23-62-63, S:16-33-36/37-45 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.05 0.10 0.50 1.00	**1L** **4x1L** **bulk**
39785	**Carbon disulfide, ACS, 99.9+%** CS_2, F.W. 76.14, Liquid, m.p. -112°, b.p. 46°, f.p. -30°(-22°F), d. 1.2632, n_D^{20} 1.6270, Merck **14**,1811, Application(s): Electronic vacuum tubes, in the manufacturing of carbon tetrachloride, rayon, soil disinfectants, as a solvent, UN1131, † Maximum level of impurities: Color (APHA) 10, Evaporation Residue 0.002%, Hydrogen sulfide (H_2S) P.T. (limit about 1.5ppm, Sulfur dioxide (SO_2) P.T. (limit about 2.5ppm), H_2O 0.05% R:11-36/38-48/23-62-63, S:16-33-36/37-45	**500ml** **2L** **4x500ml** **bulk**
36401	**Chlorobenzene, ACS, 99.5%** C_6H_5Cl, F.W. 112.56, Liquid, m.p. -45°, b.p. 130-133°, f.p. 28°(82°F), d. 1.106, n_D^{20} 1.5240, Merck **14**,2121, UN1134, RTECS CZ0175000, BRN 605632, † Maximum level of impurities: Color (APHA) 30, Evaporation residue 0.02%, Titratable acid 0.004meq/g R:10-20-51/53, S:24/25-61	**500ml** **1L** **4L** **4x1L** **bulk**
22922	**Chlorobenzene, HPLC Grade, 99.5%** C_6H_5Cl, F.W. 112.56, Liquid, m.p. -45°, b.p. 130-133°, f.p. 28°(82°F), d. 1.106, n_D^{20} 1.5240, Merck **14**,2121, UN1134, RTECS CZ0175000, BRN 605632, † Maximum level of impurities: Evaporation residue 2ppm, H_2O 0.03% R:10-20-51/53, S:24/25-61 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.02 0.04 0.05 1.00	**1L** **4L** **4x1L** **bulk**
22921	**Chlorobenzene, Spectrophotometric Grade, 99.9%** C_6H_5Cl, F.W. 112.56, Liquid, m.p. -45°, b.p. 130-133°, f.p. 28°(82°F), d. 1.106, n_D^{20} 1.5240, Merck **14**,2121, UN1134, RTECS CZ0175000, BRN 605632, † Maximum level of impurities: Evaporation residue 2ppm, H_2O 0.03% R:10-20-51/53, S:24/25-61 **UV absorption - 1cm cell vs H_2O**  A 0.005 0.02 0.04 0.05 1.00	**500ml** **1L** **4L** **4x1L** **bulk**

Stock #	Description	Standard Selling Sizes
39198	**1-Chlorobutane, HPLC Grade, 99.5+%** *[n-Butyl chloride]* $CH_3(CH_2)_3Cl$, F.W. 92.57, Liquid, m.p. -123°, b.p. 77-78°, f.p. -12°(10°F), d. 0.886, n_D^{20} 1.4024, Merck **14**,1560, UN1127, RTECS EJ6300000, BRN 1730909, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 1ppm, H_2O 0.02% R:11, S:9-16-29 **UV absorption - 1cm cell vs H_2O** A 0.005 0.005 0.03 0.50 1.00	**250ml** **1L** **4L** **4x1L** **bulk**
32614	**Chloroform, ACS, 99.8+%** *[Trichloromethane]* $CHCl_3$, F.W. 119.38, Liquid, m.p. -63°, b.p. 60.5-61.5°, d. 1.492, n_D^{20} 1.4460, Merck **14**,2141, Fieser **1**,29 **3**,140 **4**,22 **5**,28 **8**,92 **12**,517 **15**,84, UN1888, RTECS FS9100000, BRN 1731042, † Maximum level of impurities: Color (APHA) 10, Residue after evaporation 0.001%, Acetone and aldehyde P.T. (limit about 0.005% as $(CH_3)_2CO$), Acid and chlorine P.T., Free chlorine (Cl) P.T., Pb 0.05ppm, Substances darkened by sulfuric acid P.T. R:22-38-40-48/20/22, S:36/37	**1L** **4L** **4x4L** **bulk**
22920	**Chloroform, HPLC Grade, 99.5+% min** $CHCl_3$, F.W. 119.38, Liquid, m.p. -63°, b.p. 60.5-61.5°, d. 1.492, n_D^{20} 1.4460, Merck **14**,2141, Fieser **1**,29 **3**,140 **4**,22 **5**,28 **8**,92 **12**,517 **15**,84, UN1888, RTECS FS9100000, BRN 1731042, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, Chlorinated pesticides 5ppt, H_2O 0.03% R:22-38-40-48/20/22, S:36/37 **UV absorption - 1cm cell vs H_2O** A 0.01 0.02 0.05 0.15 1.00	**1L** **4L** **4x1L** **bulk**
43685	**Chloroform, HPLC Grade, 99.5+% min, stab. with amylene** $CHCl_3$, F.W. 119.38, Liquid, m.p. -63°, b.p. 60.5-61.5°, d. 1.492, n_D^{20} 1.4460, Merck **14**,2141, Fieser **1**,29 **3**,140 **4**,22 **5**,28 **8**,92 **12**,517 **15**,84, UN1888, RTECS FS9100000, BRN 1731042, † R:22-38-40-48/20/22, S:36/37 **UV absorption - 1cm cell vs H_2O** A 0.01 0.02 0.05 0.15 1.00	**1L** **4L** **4x1L** **4x4L** **bulk**
32442	**Chloroform, Spectrophotometric Grade, 99.5+%** $CHCl_3$, F.W. 119.38, Liquid, m.p. -63°, b.p. 60.5-61.5°, d. 1.492, n_D^{20} 1.4460, Merck **14**,2141, Fieser **1**,29 **3**,140 **4**,22 **5**,28 **8**,92 **12**,517 **15**,84, UN1888, RTECS FS9100000, BRN 1731042, Note: Meets ACS Spectrophotometric Requirements. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, Chlorinated pesticides 5ppt, H_2O 0.04% R:22-38-40-48/20/22, S:36/37 **UV absorption - 1cm cell vs H_2O** A 0.01 0.02 0.05 0.15 1.00	**1L** **4L** **4x1L** **bulk**
40974	**Chloroform, Environmental Grade, 99.8+%, stab. with ethanol** $CHCl_3$, F.W. 119.38, Liquid, m.p. -63°, b.p. 60.5-61.5°, d. 1.492, n_D^{20} 1.4460, Merck **14**,2141, Fieser **1**,29 **3**,140 **4**,22 **5**,28 **8**,92 **12**,517 **15**,84, Application(s): Suitable for pesticide analysis, environmental and GC analysis, UN1888, RTECS FS9100000, BRN 1731042, Note: Submicron filtered, † Maximum level of impurities: Evaporation residue 2ppm, Halogenated residue 10 ng/l (GC-ECD) R:22-38-40-48/20/22, S:36/37	**1L** **4L** **4x1L** **bulk**

Specialty Solvents

Stock #	Description	Standard Selling Sizes
22864	**Cyclohexane, ACS, 99+%** C_6H_{12}, F.W. 84.16, Liquid, m.p. 6.5°, b.p. 80-81°, f.p. -18°(-1°F), d. 0.779, n_D^{20} 1.4260, Merck **14**,2723, UN1145, RTECS GU6300000, BRN 1900225, † Maximum level of impurities: Color (APHA) 10 Evaporation residue 0.002%, Substances darkened by sulfuric acid P.T., H_2O 0.02% R:11-38-50/53-65-67, S:9-16-25-33-60-61-62	**500ml** **1L** **4L** **4x1L** **bulk**
22919	**Cyclohexane, HPLC Grade, 99% min** C_6H_{12}, F.W. 84.16, Liquid, m.p. 6.5°, b.p. 80-81°, f.p. -18°(-1°F), d. 0.779, n_D^{20} 1.4260, Merck **14**,2723, UN1145, RTECS GU6300000, BRN 1900225, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, Chlorinated pesticides 5ppt, H_2O 0.02% R:11-38-50/53-65-67, S:9-16-25-33-60-61-62 **UV absorption - 1cm cell vs H_2O** A 0.01 0.05 0.30 0.75 1.00	**1L** **4L** **4x1L** **bulk**
40975	**Cyclohexane, Environmental Grade, 99.7+%** C_6H_{12}, F.W. 84.16, Liquid, m.p. 6.5°, b.p. 80-81°, f.p. -18°(-1°F), d. 0.779, n_D^{20} 1.4260, Merck **14**,2723, Application(s): Suitable for pesticide residue, environmental and GC analysis, UN1145, RTECS GU6300000, BRN 1900225, Note: Submicron filtered Maximum level of impurities: Halogenated residue 10mg/l (GC-ECD) heptachlor epoxite, Residue after evaporation 5ppm, H_2O 0.02% R:11-38-50/53-65-67, S:9-16-25-33-60-61-62	**4L** **4x4L** **bulk**
44814	**Cyclopentane, HPLC Grade** C_5H_{10}, F.W. 70.14, Liquid, m.p. -95 to -93°, b.p. 47-49°, f.p. -37°(-34°F), d. 0.748, n_D^{20} 1.4060, Merck **14**,2741, Application(s): For HPLC and Spectrophotometry, UN1146, RTECS GY2390000, BRN 1900195, Note: Contains 75+% cyclopentane. Remainder consists of C_5 and C_6 hydrocarbons, † Maximum level of impurities: Evaporation residue 3ppm, H_2O 0.02% R:11-52/53, S:9-16-29-33-61 **UV absorption - 1cm cell vs H_2O** λ(nm) 400 240 220 210 198 A 0.01 0.01 0.10 0.50 1.00	**250ml** **1L** **4L** **4x1L** **bulk**
19385	**1,2-Dichlorobenzene, HPLC Grade, 98% min** $C_6H_4Cl_2$, F.W. 147.00, Liquid, m.p. -18°, b.p. 180°, f.p. 68°(154°F), d. 1.306, n_D^{20} 1.5510, Merck **14**,3056, UN1591, RTECS CZ4500000, BRN 606078, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.02% R:22-36/37/38-50/53, S:23-60-61 **UV absorption - 1cm cell vs H_2O** A 0.005 0.03 0.05 0.15 1.00	**1L** **4L** **4x1L** **bulk**
32154	**1,2-Dichlorobenzene, Spectrophotometric Grade, 98%** $C_6H_4Cl_2$, F.W. 147.00, Liquid, m.p. -18°, b.p. 180°, f.p. 68°(154°F), d. 1.306, n_D^{20} 1.5510, Merck **14**,3056, UN1591, RTECS CZ4500000, BRN 606078, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.02% R:22-36/37/38-50/53, S:23-60-61 **UV absorption - 1cm cell vs H_2O** A 0.005 0.03 0.05 0.15 1.00	**1L** **4L** **4x1L** **bulk**

Stock #	Description	Standard Selling Sizes
39121	**1,2-Dichloroethane, ACS, 99+%** *[EDC, Ethylene chloride]* $ClCH_2CH_2Cl$, F.W. 98.96, Liquid, m.p. -35°, b.p. 83°, f.p. 15°(59°F), d. 1.256, n_D^{20} 1.4443, Merck **14**,3797, UN1184, RTECS KI0525000, BRN 605264, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 0.002%, Titratable acid 0.0003meq/g, H_2O 0.03% R:45-11-22-36/37/38, S:53-45	**500ml** **1L** **4L** **4x1L** **bulk**
22918	**1,2-Dichloroethane, HPLC Grade, 99% min** *[EDC, Ethylene chloride]* $ClCH_2CH_2Cl$, F.W. 98.96, Liquid, m.p. -35°, b.p. 83°, f.p. 15°(59°F), d. 1.256, n_D^{20} 1.4443, Merck **14**,3797, UN1184, RTECS KI0525000, BRN 605264, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, H_2O 0.02% R:45-11-22-36/37/38, S:53-45 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.10 0.30 0.60 1.00	**1L** **4L** **4x1L** **bulk**
32462	**1,2-Dichloroethane, Spectrophotometric Grade, 99+%** *[EDC, Ethylene chloride]* $ClCH_2CH_2Cl$, F.W. 98.96, Liquid, m.p. -35°, b.p. 83°, f.p. 15°(59°F), d. 1.256, n_D^{20} 1.4443, Merck **14**,3797, UN1184, RTECS KI0525000, BRN 605264, Note: Meets ACS Spectrophotometric Requirements. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, H_2O 0.02% R:45-11-22-36/37/38, S:53-45 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.10 0.30 0.60 1.00	**1L** **4L** **4x1L** **bulk**
39116	**Dichloromethane, ACS, 99.5+%, stab. with amylene** CH_2Cl_2, F.W. 84.93, Liquid, m.p. -95°, b.p. 39-40°, d. 1.325, n_D^{20} 1.4244, Merck **14**,6063, Fieser **1**,676 **2**,273 **4**,337 **7**,239 **18**,131, UN1593, RTECS PA8050000, BRN 1730800, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 0.002%, Titratable acid 0.0003meq/g, Free halogens P.T., H_2O 0.02% R:40, S:23-24/25-36/37	**500ml** **1L** **2.5L** **4L** **4x1L** **bulk**
22917	**Dichloromethane, HPLC Grade, 99.7+%, stab. with amylene** CH_2Cl_2, F.W. 84.93, Liquid, m.p. -95°, b.p. 39-40°, d. 1.325, n_D^{20} 1.4244, Merck **14**,6063, Fieser **1**,676 **2**,273 **4**,337 **7**,239 **18**,131, UN1593, RTECS PA8050000, BRN 1730800, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, Chlorinated pesticides 5ppt, H_2O 0.02%, Free halogens P.T. R:40, S:23-24/25-36/37 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.05 0.20 0.55 1.00	**250ml** **1L** **4L** **4x1L** **bulk**
32440	**Dichloromethane, Spectrophotometric Grade, 99.7+%, stab. with amylene** CH_2Cl_2, F.W. 84.93, Liquid, m.p. -95°, b.p. 39-40°, d. 1.325, n_D^{20} 1.4244, Merck **14**,6063, Fieser **1**,676 **2**,273 **4**,337 **7**,239 **18**,131, UN1593, RTECS PA8050000, BRN 1730800, Note: Meets ACS Spectrophotometric Requirements. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, H_2O 0.02%, Free halogens P.T. R:40, S:23-24/25-36/37 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.05 0.20 0.55 1.00	**1L** **4L** **4x1L** **bulk**

Specialty Solvents

Stock #	Description	Standard Selling Sizes
42006	**Dichloromethane, Environmental Grade, 99.8+%, stab. with amylene** CH_2Cl_2, F.W. 84.93, Liquid, m.p. -95°, b.p. 39-40°, d. 1.325, n_D^{20} 1.4244, Merck **14**,6063, Fieser **1**,676 **2**,273 **4**,337 **7**,239 **18**,131, Application(s): Suitable for pesticide residue analysis., UN1593, RTECS PA8050000, BRN 1730800, † Maximum level of impurities: Color (APHA) 10, Cl 10ppm, Halogenated residue 10ng/l heptachlorepoxide, Evaporation residue 3ppm, H_2O 0.02% R:40, S:23-24/25-36/37	**1L** **4L** **4x1L** **4x4L** **bulk**
43464	**Diethylene glycol diethyl ether, HPLC Grade, 99+%** *[2-Ethoxyethyl ether]* $(CH_3CH_2OCH_2CH_2)_2O$, F.W. 162.23, Liquid, m.p. -44°, b.p. 188-190°, f.p. 71°(160°F), d. 0.909, n_D^{20} 1.4120, Merck **14**,3118, RTECS KN3160000, BRN 1699259, Note: Filtered through 0.2µ filter, † R:19-36, S:23-26 **UV absorption - 1cm cell vs H_2O** 	**250ml** **bulk**
	A 0.01 0.01 0.04 0.10 1.00	
33224	**Diethyl ether, ACS, 98% min, stab. with 0.001% BHT and 3% ethanol** *[Ether, Ethyl ether]* $(C_2H_5)_2O$, F.W. 74.12, Liquid, m.p. -116°, b.p. 34.6°, f.p. -45°(-49°F), Merck **14**,3806, Solubility: Soluble in H_2SO_4. Sparingly soluble in water. Miscible in most organic solvents, Application(s): Widely used as a solvent. Dissolves P, S, Br_2 and I_2, UN1155, Note: d_4^{20} 0.7134, n_D^{15} 1.35555., † Maximum level of impurities: Color (APHA) 10, Peroxide (as H_2O_2) 1ppm, Evaporation residue 0.001%, Titratable acid 0.0002meq/g, Carbonyl as (HCHO) 0.001% R:12-19-22-66-67, S:9-16-29-33	**500g** **6x500g** **bulk**
16767	**Diethyl ether, anhydrous, ACS, 99% min** $(C_2H_5)_2O$, F.W. 74.12, Liquid, m.p. -116°, b.p. 34.6°, f.p. -45°(-49°F), d. 0.715, Merck **14**,3806, UN1155, Note: d_4^{20} 0.7134, n_D^{15} 1.35555, † Maximum level of impurities: Color (APHA) 10,Peroxide (as H_2O_2) 1ppm, Evaporation residue 0.001%, Titratable acid 0.0002meq/g, Carbonyl (as HCHO) 0.001%, Alcohol (CH_3CH_2OH) P.T. (limit about 0.05%), H_2O 0.03% R:12-19-22-66-67, S:9-16-29-33	**50g** **500g** **6x500g** **bulk**
38990	**Diethyl ether, HPLC Grade, 99%, stab. with ethanol** $(C_2H_5)_2O$, F.W. 74.12, Liquid, m.p. -116°, b.p. 34.6°, f.p. -45°(-49°F), Merck **14**,3806, UN1155, Note: d_4^{20} 0.7134, n_D^{15} 1.35555. Filtered through 0.2µ filters., † R:12-19-22-66-67, S:9-16-29-33	**1L** **4L** **4x1L** **4x4L** **bulk**
	A 0.005 0.08 0.30 1.00	
40976	**Diethyl ether, Spectrophotometric Grade, 99+%** $(C_2H_5)_2O$, F.W. 74.12, Liquid, m.p. -116°, b.p. 34.6°, f.p. -45°(-49°F), Merck **14**,3806, Application(s): Solvent for U.V. spectrophotometric and general use, UN1155, Note: d_4^{20} 0.7134, n_D^{15} 1.35555., † Maximum level of impurities: Evaporation residue 5ppm, Peroxides (as H_2O_2) 5ppm, H_2O 0.05% R:12-19-22-66-67, S:9-16-29-33 **UV absorption - 1cm cell vs H_2O** 	**1L** **4L** **4x1L** **bulk**
	A 0.005 0.08 0.30 1.00	
22916	**N,N-Dimethylacetamide, HPLC Grade, 99.5+%** $CH_3CON(CH_3)_2$, F.W. 87.12, Liquid, m.p. -20°, b.p. 163-165°, f.p. 66°(151°F), d. 0.937, n_D^{20} 1.4373, Merck **14**,3227, Fieser **1**,270 **2**,144 **4**,165, RTECS AB7700000, BRN 1737614, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.05% R:61-20/21, S:53-45 **UV absorption - 1cm cell vs H_2O** 	**1L** **4L** **4x1L** **bulk**
	A 0.01 0.03 0.05 0.15 1.00	

Stock #	Description	Standard Selling Sizes
39117	**N,N-Dimethylformamide, ACS, 99.8+%** $HCON(CH_3)_2$, F.W. 73.09, m.p. -61°, b.p. 153°, f.p. 57°(135°F), d. 0.944, n_D^{20} 1.4310, Merck **14**,3243, Fieser **1**,273 **9**,182 **11**,198 **12**,203 **14**,148 **16**,144 **18**,146 **19**,137 **21**,178, UN2265, RTECS LQ2100000, BRN 605365, † Maximum level of impurities: Appearance Clear, Color (APHA) 15, Evaporation residue 0.005%, Titratable base 0.003meq/g, Titratable acid 0.0005meq/g, H_2O 0.15% R:61-20/21-36, S:53-45	**500ml** **1L** **4L** **4x1L** **4x4L** **bulk**
22915	**N,N-Dimethylformamide, HPLC Grade, 99.7+%** $HCON(CH_3)_2$, F.W. 73.09, Liquid, m.p. -61°, b.p. 153°, f.p. 57°(135°F), d. 0.944, n_D^{20} 1.4310, Merck **14**,3243, Fieser **1**,273 **9**,182 **11**,198 **12**,203 **14**,148 **16**,144 **18**,146 **19**,137 **21**,178, UN2265, RTECS LQ2100000, BRN 605365, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.05% R:61-20/21-36, S:53-45 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.03 0.10 0.30 1.00	**1L** **4L** **4x1L** **6x1L** **4x4L** **bulk**
41859	**N,N-Dimethylformamide, HPLC grade, 99.7+%, packaged under Argon in resealable ChemSeal™ bottles** $HCON(CH_3)_2$, F.W. 73.09, Liquid, m.p. -61°, b.p. 153°, f.p. 57°(135°F), d. 0.944, n_D^{20} 1.4310, Merck **14**,3243, Fieser **1**,273 **9**,182 **11**,198 **12**,203 **14**,148 **16**,144 **18**,146 **19**,137 **21**,178, UN2265, RTECS LQ2100000, BRN 605365, Note: Same HPLC specifications as 22915, † R:61-20/21-36, S:53-45	**250ml** **1L** **bulk**
13808	**N,N-Dimethylformamide, Spectrophotometric Grade, 99.7+%** $HCON(CH_3)_2$, F.W. 73.09, Liquid, m.p. -61°, b.p. 153°, f.p. 57°(135°F), d. 0.944, n_D^{20} 1.4310, Merck **14**,3243, Fieser **1**,273 **9**,182 **11**,198 **12**,203 **14**,148 **16**,144 **18**,146 **19**,137 **21**,178, UN2265, RTECS LQ2100000, BRN 605365, Note: Meets ACS spectrophotometric requirements. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.1% R:61-20/21-36, S:53-45 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.03 0.10 0.30 1.00	**1L** **4L** **4x1L** **bulk**
36480	**Dimethyl sulfoxide, ACS, 99.9+%** ■ *[Methyl sulfoxide]* $(CH_3)_2SO$, F.W. 78.13, Clear, Colorless Liquid, m.p. 18.4°, b.p. 189°, f.p. 95°(203°F), d. 1.101, n_D^{20} 1.4790, Merck **14**,3259, Fieser **1**,296 **14**,150 **15**,146 **16**,149 **17**,127 **18**,149 **20**,154 **21**,180, RTECS PV6210000, BRN 506008, † Maximum level of impurities: Appearance Clear, Colorless Liquid, Evaporation residue 0.01%, Titratable acid 0.001meq/g, H_2O 0.1% R:36/37/38, S:23-26-36	**500ml** **1L** **4L** **4x1L** **4x4L** **bulk**
22914	**Dimethyl sulfoxide, HPLC Grade, 99.9+%** ■ $(CH_3)_2SO$, F.W. 78.13, Liquid, m.p. 18.4°, b.p. 189°, f.p. 95°(203°F), d. 1.101, n_D^{20} 1.4790, Merck **14**,3259, Fieser **1**,296 **14**,150 **15**,146 **16**,149 **17**,127 **18**,149 **20**,154 **21**,180, RTECS PV6210000, BRN 506008, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.1% R:36/37/38, S:23-26-36 **UV absorption - 1cm cell vs H_2O**  A 0.005 0.02 0.20 0.50 1.00	**1L** **4L** **4x1L** **bulk**
42780	**Dimethyl sulfoxide, HPLC grade, 99.9+%, packaged under Argon in resealable ChemSeal™ bottles** ■ $(CH_3)_2SO$, F.W. 78.13, Liquid, m.p. 18.4°, b.p. 189°, f.p. 95° (203°F), d. 1.101, n_D^{20} 1.4790, Merck **14**,3259, Fieser **1**,296 **14**,150 **15**,146 **16**,149 **17**,127 **18**,149 **20**,154 **21**,180, RTECS PV6210000, BRN 506008, Note: Same HPLC specifications as 22914, † R:36/37/38, S:23-26-36	**250ml** **1L** **4x1L** **bulk**

Specialty Solvents

Stock #	Description	Standard Selling Sizes
32434	**Dimethyl sulfoxide, Spectrophotometric Grade, 99.9+%** ■ $(CH_3)_2SO$, F.W. 78.13, Liquid, m.p. 18.4°, b.p. 189°, f.p. 95°(203°F), d. 1.101, n_D^{20} 1.4790, Merck **14**,3259, Fieser **1**,296 **14**,150 **15**,146 **16**,149 **17**,127 **18**,149 **20**,154 **21**,180, RTECS PV6210000, BRN 506008, Note: Meets ACS spectrophotometric requirements. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 6ppm, H_2O 0.1% R:36/37/38, S:23-26-36 **UV absorption - 1cm cell vs H_2O** A 0.005 0.02 0.20 0.50 1.00	**1L** **4L** **4x1L** **bulk**
39118	**1,4-Dioxane, ACS, 99+%** ■ $C_4H_8O_2$, F.W. 88.11, Liquid, m.p. 11.8°, b.p. 100-102°, f.p. 12°(54°F), d. 1.034, n_D^{20} 1.4220, Merck **14**,3300, Fieser **1**,333, UN1165, RTECS JG8225000, BRN 102551, † Maximum level of impurities: Freezing point not below 11.0°, Color (APHA) 20, Peroxide 0.005%, Evaporation residue 0.005%, Titratable acid 0.0016meq/g, Carbonyl (as HCHO) 0.01%, H_2O 0.05% R:11-19-36/37-40-66, S:9-16-36/37-46	**500ml** **1L** **4x500ml** **4L** **bulk**
22913	**1,4-Dioxane, HPLC Grade, 99% min** ■ $C_4H_8O_2$, F.W. 88.11, Liquid, m.p. 11.8°, b.p. 100-102°, f.p. 12°(54°F), d. 1.034, n_D^{20} 1.4220, Merck **14**,3300, Fieser **1**,333, UN1165, RTECS JG8225000, BRN 102551, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.03% R:11-19-36/37-40-66, S:9-16-36/37-46 **UV absorption - 1cm cell vs H_2O** A 0.01 0.15 0.30 1.00	**1L** **4L** **4x1L** **bulk**
43167	**1,4-Dioxane, HPLC Grade, 99% min, packaged under Argon in resealable ChemSeal™ bottles** ■ $C_4H_8O_2$, F.W. 88.11, Liquid, m.p. 11.8°, b.p. 100-102°, f.p. 12°(54°F), d. 1.034, n_D^{20} 1.4220, Merck **14**,3300, Fieser **1**,333, UN1165, RTECS JG8225000, BRN 102551, Note: Specifications: Same HPLC specifications as 22913, † R:11-19-36/37-40-66, S:9-16-36/37-46	**250ml** **1L** **bulk**
33361	**Ethanol, Alcohol Reagent, anhydrous, denatured, ACS, 94-96%** ■ CH_3CH_2OH, F.W. 46.08, Liquid, m.p. -130°, b.p. 78°, f.p. 8°(48°F), d. 0.7893, n_D^{20} 1.3610, Merck **14**,3760, UN1170, RTECS KQ6300000, BRN 1718733, † Maximum level of impurities: Specially denatured alcohol formula 3A (200 proof)(v/v) 94.0-96.0%, Isopropyl alcohol (2-propanol)(v/v) 4.0-6.0%, Appearance P.T., Color (APHA) 10, Refractive index, n_D^{25} 1.3589-1.3599, Evaporation residue 0.001%, Specific gravity at 25° 0.785-0.795, H_2O (by Karl Fischer titrn) 0.5%, Specially denatured alcohol formula 3A consists of 5 volumes of methanol and 100 volumes of 200 proof ethanol. R:11-20/21/22-36-68/20/21/22-67, S:7-16-24/25-26-36/37-45	**500ml** **1L** **4L** **4x1L** **bulk**
22930	**Ethanol, anhydrous, denatured, HPLC Grade, 90%, 5% methanol, 5% isopropanol** ■ CH_3CH_2OH, F.W. 46.08, Liquid, m.p. -130°, b.p. 78°, f.p. 8°(48°F), d. 0.7893, n_D^{20} 1.3610, Merck **14**,3760, UN1170, RTECS KQ6300000, BRN 1718733, † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.1% R:11-20/21/22-36-68/20/21/22-67, S:7-16-24/25-26-36/37-45 **UV absorption - 1cm cell vs H_2O** λ(nm) 270 250 230 220 210 A 0.01 0.05 0.20 0.50 1.00	**1L** **4L** **4x4L** **bulk**

Stock #	Description	Standard Selling Sizes
44134	**Ethanol, anhydrous, denatured, HPLC Grade, 90%, packaged under Argon in resealable ChemSeal™ bottles** CH_3CH_2OH, Liquid, UN1170, † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.1%  R:11-20/21/22-36-68/20/21/22-67, S:7-16-24/25-26-36/37-45 **UV absorption - 1cm cell vs H_2O** λ(nm) 270 250 230 220 210 A 0.01 0.05 0.20 0.50 1.00	**100ml** **bulk**
22931	**Ethanol, anhydrous, denatured, Spectrophotometric Grade, 90%, 5% methanol, 5% isopropanol** ■ CH_3CH_2OH, F.W. 46.08, Liquid, m.p. -130°, b.p. 78°, f.p. 8°(48°F), d. 0.7893, n_D^{20} 1.3610, Merck **14**,3760, UN1170, RTECS KQ6300000, BRN 1718733, Note: Meets ACS Spectrophotometric Requirements, † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.1%, Reagent alcohol 0.05%  R:11-20/21/22-36-68/20/21/22-67, S:7-16-24/25-26-36/37-45 **UV absorption - 1cm cell vs H_2O** A 0.01 0.05 0.20 0.50 1.00	**1L** **4L** **4x4L** **bulk**
44014	**Ethanol, denatured, Spectrophotometric Grade, 90%, packaged under Argon in resealable ChemSeal™ bottles** ■ CH_3CH_2OH, F.W. 46.08, Liquid, m.p. -130°, b.p. 78°, f.p. 8°(48°F), d. 0.7893, n_D^{20} 1.3610, Merck **14**,3760, UN1170, RTECS KQ6300000, BRN 1718733, Note: Denatured with 5% Methanol, 5% Isopropanol, † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.1%  R:11-20/21/22-36-68/20/21/22-67, S:7-16-24/25-26-36/37-45 **UV absorption - 1cm cell vs H_2O** A 0.01 0.05 0.20 0.50 1.00	**250ml** **1L** **bulk**
31344	**Ethyl acetate, ACS, 99.5+%** $CH_3CO_2CH_2CH_3$, F.W. 88.11, Liquid, m.p. -84°, b.p. 77°, f.p. -3°(26°F), d. 0.902, n_D^{20} 1.3720, Merck **14**,3757, UN1173, RTECS AH5425000, BRN 506104, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 0.003%, H_2O 0.2%, Titratable acid 0.0009meq/g, Substances darkened by sulfuric acid P.T.  R:11-36-66-67, S:16-23-26-29-33	**500ml** **1L** **4L** **4x1L** **20L** **bulk**
22912	**Ethyl acetate, HPLC Grade, 99.5+%** $CH_3CO_2CH_2CH_3$, F.W. 88.11, Liquid, m.p. -84°, b.p. 77°, f.p. -3°(26°F), d. 0.902, n_D^{20} 1.3720, Merck **14**,3757, UN1173, RTECS AH5425000, BRN 506104, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, Chlorinated pesticides 5ppt, H_2O 0.05%  R:11-36-66-67, S:16-23-26-29-33 **UV absorption - 1cm cell vs H_2O** A 0.01 0.05 0.10 0.50 1.00	**1L** **4L** **4x1L** **bulk**

Specialty Solvents

Stock #	Description	Standard Selling Sizes
39177	**Ethyl acetate, Spectrophotometric Grade, 99.5+%** $CH_3CO_2CH_2CH_3$, F.W. 88.11, Liquid, m.p. -84°, b.p. 77°, f.p. -3°(26°F), d. 0.902, n_D^{20} 1.3720, Merck **14**,3757, UN1173, RTECS AH5425000, BRN 506104, Note: Meets ACS Spectrophotometric requirements. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, Chlorinated pesticides 5ppt, H_2O 0.10% R:11-36-66-67, S:16-23-26-29-33 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.05 0.10 0.50 1.00	**1L** **4L** **4x1L** **bulk**
40977	**Ethyl acetate, Environmental Grade, 99.5+%** $CH_3CO_2CH_2CH_3$, F.W. 88.11, Liquid, m.p. -84°, b.p. 77°, f.p. -3°(26°F), d. 0.902, n_D^{20} 1.3720, Merck **14**,3757, Application(s): Pesticide residue, environmental, and GC analysis, UN1173, RTECS AH5425000, BRN 506104, † Maximum level of impurities: Color (APHA) 10, H_2O 0.05%, Evaporation residue 5ppm, Halogenated residue 5ppt (GC-ECD) Note: Submicron filtered R:11-36-66-67, S:16-23-26-29-33	**1L** **4L** **4x1L** **bulk**
44529 NEW!	**Ethylene glycol, Spectrophotometric grade, 99+%** $HOCH_2CH_2OH$, F.W. 62.07, Liquid, m.p. -13°, b.p. 196-198°, f.p. 119°(246°F), d. 1.113, n_D^{20} 1.4310, Merck **14**,3798, Fieser **1**,375 **5**,296 **9**,217 **15**,156 **18**,157, Application(s): For use in spectrophotometry, RTECS KW2975000, BRN 505945, † R:22 **UV absorption - 1cm cell vs H_2O**  A 0.05 0.10 0.30 1.00	**1L** **4x1L** **bulk**
36646	**Glycerol, ACS, 99.5+%** ■ $HOCH_2CH(OH)CH_2OH$, F.W. 92.09, Liquid, m.p. 18°, b.p. 182°/20mm, f.p. 160°(320°F), d. 1.260, n_D^{20} 1.4740, Merck **14**,4484, RTECS MA8050000, BRN 635685, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 0.005%, Neutrality P.T., Chlorinated compounds (as Cl) 0.003%, Sulfate 0.001%, Acrolein and glucose P.T., Fatty acid esters (as butyric acid) 0.05%, Substances darkened by sulfuric acid P.T., Heavy Metals (as Pb) 2ppm, H_2O 0.5% R:36, S:26-36	**500ml** **1L** **4L** **4x1L** **bulk**
38988	**Glycerol, ultrapure, HPLC Grade** ■ $HOCH_2CH(OH)CH_2OH$, F.W. 92.09, Liquid, m.p. 18°, b.p. 182°/20mm, f.p. 160°(320°F), d. 1.260, n_D^{20} 1.4740, Merck **14**,4484, RTECS MA8050000, BRN 635685, Note: Suitable for spectrophotometry, chromatography. Filtered through 0.2µ filters., † Maximum level of impurities: H_2O 0.05% R:36, S:26-36 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.02 0.05 0.10 0.30 1.00	**500ml** **1L** **4L** **4x1L** **bulk**
32450	**Glycerol, ultrapure, Spectrophotometric Grade** ■ $HOCH_2CH(OH)CH_2OH$, F.W. 92.09, Liquid, m.p. 18°, b.p. 182°/20mm, f.p. 160°(320°F), d. 1.260, n_D^{20} 1.4740, Merck **14**,4484, RTECS MA8050000, BRN 635685, † Maximum level of impurities: H_2O 0.1% R:36, S:26-36 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.02 0.05 0.10 0.30 1.00	**100ml** **1L** **4L** **4x1L** **bulk**

Stock #	Description	Standard Selling Sizes
22911	**n-Heptane, HPLC grade, 99+%** $CH_3(CH_2)_5CH_3$, F.W. 100.21, Liquid, m.p. -91°, b.p. 97-99°, f.p. -4°(24°F), d. 0.684, n_D^{20} 1.3877, Merck **14**,4659, UN1206, RTECS MI7700000, BRN 1730763, Note: Suitable for spectrophotometry, chromatography, residue analysis -GC. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, Chlorinated pesticides 5ppt, H_2O 0.02% R:11-38-50/53-65-67, S:9-16-29-33-60-61-62 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.20 0.50 1.00	**250ml** **1L** **4L** **4x4L** **bulk**
32441	**n-Heptane, Spectrophotometric Grade, 99+% n-Heptane 96% min** $CH_3(CH_2)_5CH_3$, F.W. 100.21, Liquid, m.p. -91°, b.p. 97-99°, f.p. -4°(24°F), d. 0.684, n_D^{20} 1.3877, Merck **14**,4659, UN1206, RTECS MI7700000, BRN 1730763, Note: Meets ACS spectrophotometric requirements. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, H_2O 0.03% R:11-38-50/53-65-67, S:9-16-29-33-60-61-62 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.20 0.50 1.00	**1L** **4L** **4x1L** **bulk**
40978	**n-Heptane, Environmental Grade, 96+%** $CH_3(CH_2)_5CH_3$, F.W. 100.21, Liquid, m.p. -91°, b.p. 97-99°, f.p. -4°(24°F), d. 0.684, n_D^{20} 1.3877, Merck **14**,4659, Application(s): Pesticide residue, environmental, and GC analysis, UN1206, RTECS MI7700000, BRN 1730763, Note: Submicron filtered, halogenated residue: 10 ng/l (GC-ECD), † R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**1L** **4L** **4x1L** **bulk**
39199	**n-Hexane, HPLC Grade, 95+%** $CH_3(CH_2)_4CH_3$, F.W. 86.18, Liquid, Distilled in Glass, m.p. -95°, b.p. 69°, f.p. -23°(-9°F), d. 0.659, n_D^{20} 1.3750, Merck **14**,4694, UN1208, RTECS MN9275000, BRN 1730733, † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.03% R:11-38-48/20-62-51/53-65-67, S:9-16-29-33-36/37-61-62	**1L** **4L** **4x1L** **bulk**
32454	**n-Hexane, Spectrophotometric Grade, 95+%** $CH_3(CH_2)_4CH_3$, F.W. 86.18, Liquid, m.p. -95°, b.p. 69°, f.p. -23°(-9°F), d. 0.659, n_D^{20} 1.3750, Merck **14**,4694, UN1208, RTECS MN9275000, BRN 1730733, Note: Meets ACS spectrophotometric requirements. Filtered through 0.2µ filters, † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.02% R:11-38-48/20-62-51/53-65-67, S:9-16-29-33-36/37-61-62 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.10 0.30 1.00	**1L** **4L** **4x1L** **bulk**
41727	**n-Hexane, Spectrophotometric Grade, 95+%, packaged under Argon in resealable ChemSeal™ bottles** $CH_3(CH_2)_4CH_3$, F.W. 86.18, Liquid, m.p. -95°, b.p. 69°, f.p. -23°(-9°F), d. 0.659, n_D^{20} 1.3750, Merck **14**,4694, UN1208, RTECS MN9275000, BRN 1730733, Note: Same specifications as 32454, † R:11-38-48/20-62-51/53-65-67, S:9-16-29-33-36/37-61-62	**200ml** **800ml** **bulk**
42100	**n-Hexane, Environmental grade, 95+%** $CH_3(CH_2)_4CH_3$, F.W. 86.18, Liquid, m.p. -95°, b.p. 69, f.p. -23°(-9F), d. 0.659, n_D^{20} 1.3750, Merck **14**,4694, Application(s): Pesticide residue, environmental and GC analysis, UN1208, RTECS MN9275000, BRN 1730733, Note: Note: Submicron filtered, † Maximum level of impurities: Evaporation residue 2ppm, Halogenated residue 10ng/l (GC-ECD) R:11-38-48/20-62-51/53-65-67, S:9-16-29-33-36/37-61-62	**1L** **4L** **4x1L** **4x4L** **bulk**

Specialty Solvents

Stock #	Description	Standard Selling Sizes
33321	**Hexanes, ACS, 98.5+%** C_6H_{14}, F.W. 86.18, Liquid, Mix of 5 Isomers, b.p. 68-72°, f.p. -22°(-7°F), d. 0.672, n_D^{20} 1.3788, UN1208, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 0.001%, Water-soluble titratable acid 0.003meq/g, Sulfur compounds (as S) 0.005%, Thiophene P.T. R:11-38-48/20-62-51/53-65-67, S:9-16-29-33-36/37-61-62	**500ml** **1L** **2.5L** **4L** **4x1L** **bulk**
22910	**Hexanes, saturated C_6 Hydrocarbons (85% n-hexane), HPLC grade, 99+%** C_6H_{14}, F.W. 86.18, Liquid, b.p. 68-72°, f.p. -22°(-7°F), d. 0.672, n_D^{20} 1.3788, UN1208, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, Chlorinated pesticides 5ppt, H_2O 0.02% R:11-38-48/20-62-51/53-65-67, S:9-16-29-33-36/37-61-62 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.10 0.30 1.00	**1L** **4L** **4x1L** **bulk**
42386	**Hexanes, Environmental Grade** C_6H_{14}, F.W. 86.18, Liquid, b.p. 68-72°, f.p. -22°(-7°F), d. 0.672, n_D^{20} 1.3788, UN1208, † Maximum level of impurities: Evaporation residue 2ppm, Halogenated residue 10 ng/l (GC-ECD) Note: Submicron filtered. Mixure of isomers. Typically 85+% n-hexane, 99.8% C_6 isomers. R:11-38-48/20-62-51/53-65-67, S:9-16-29-33-36/37-61-62	**1L** **4L** **bulk**
36643	**Isobutanol, ACS, 99+%** *[Isobutyl alcohol]* $(CH_3)_2CHCH_2OH$, F.W. 74.12, Liquid, m.p. -108°, b.p. 107-108°, f.p. 28°(82°F), d. 0.802, n_D^{20} 1.3960, Merck **14**,5131, UN1212, RTECS NP9625000, BRN 1730878, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 0.001%, Solubility in water P.T., Titratable acid 0.0005meq/g, H_2O 0.1%, Carbonyl compounds 0.01% (butyraldehyde) and 0.02% (2-butanone) R:10-37/38-41-67, S:7/9-13-26-37/39-46	**500ml** **1L** **4L** **4x1L** **bulk**
22908	**Isobutanol, HPLC Grade, 99+%** $(CH_3)_2CHCH_2OH$, F.W. 74.12, Liquid, m.p. -108°, b.p. 107-108°, f.p. 28°(82°F), d. 0.802, n_D^{20} 1.3960, Merck **14**,5131, UN1212, RTECS NP9625000, BRN 1730878, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.05% R:10-37/38-41-67, S:7/9-13-26-37/39-46 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.10 0.50 1.00	**1L** **4L** **4x1L** **bulk**
32433	**Isobutanol, Spectrophotometric Grade, 99+%** $(CH_3)_2CHCH_2OH$, F.W. 74.12, Liquid, m.p. -108°, b.p. 107-108°, f.p. 28°(82°F), d. 0.802, n_D^{20} 1.3960, Merck **14**,5131, UN1212, RTECS NP9625000, BRN 1730878, Note: Meets ACS spectrophotometric requirements. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.10% R:10-37/38-41-67, S:7/9-13-26-37/39-46 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.10 0.50 1.00	**1L** **4L** **4x1L** **bulk**
31721	**Methanol, ACS, absolute, low acetone 99.8+%** *[Methyl alcohol]* CH_3OH, F.W. 32.04, Liquid, m.p. -98°, b.p. 64.7°, f.p. 11°(52°F), d. 0.791, n_D^{20} 1.3290, Merck **14**,5957, UN1230, RTECS PC1400000, BRN 1098229, † Maximum level of impurities: Appearance clear, Color (APHA) 10, H_2O 0.1%, Evaporation residue 0.001%, Solubility in water P.T., Carbonyl compounds 0.001% each of acetone, formaldehyde, and acetaldehyde, Titratable acid 0.0003meq/g, Titratable base 0.0002meq/g, Substances darkened by sulfuric acid P.T., Substances reducing permanganate P.T. R:11-23/24/25-39/23/24/25, S:7-16-36/37-45	**500ml** **1L** **4L** **4x1L** **bulk**

Stock #	Description	Standard Selling Sizes
44571	**Methanol, Biograde, 99.8+%** CH_3OH, F.W. 32.04, Liquid, m.p. -98°, b.p. 64.7°, f.p. 11°(52°F), d. 0.791, n_D^{20} 1.3290, Merck **14**,5957, Application(s): In nucleic acid and peptide synthesis, UN1230, RTECS PC1400000, BRN 1098229, Note: Filtered through 0.2 µ filter, †  R:11-23/24/25-39/23/24/25, S:7-16-36/37-45	**4L** **4x4L** **bulk**
22909	**Methanol, ultrapure, HPLC Grade, 99.8+%** CH_3OH, F.W. 32.04, Liquid, m.p. -98°, b.p. 64.7°, f.p. 11°(52°F), d. 0.791, n_D^{20} 1.3290, Merck **14**,5957, UN1230, RTECS PC1400000, BRN 1098229, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, Chlorinated pesticides 5ppt, H_2O 0.08%  R:11-23/24/25-39/23/24/25, S:7-16-36/37-45 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.15 0.25 0.60 1.00	**1L** **4L** **4x4L** **bulk**
32435	**Methanol, ultrapure, Spectrophotometric Grade, 99.8+%** CH_3OH, F.W. 32.04, Liquid, m.p. -98°, b.p. 64.7°, f.p. 11°(52°F), d. 0.791, n_D^{20} 1.3290, Merck **14**,5957, UN1230, RTECS PC1400000, BRN 1098229, Note: Meets ACS spectrophotometric requirements. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.10%  R:11-23/24/25-39/23/24/25, S:7-16-36/37-45 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.15 0.25 0.60 1.00	**1L** **4L** **4x4L** **bulk**
40980	**Methanol, Environmental Grade, 99.8+%** CH_3OH, F.W. 32.04, Liquid, m.p. -98°C, b.p. 64.7, f.p. 11°(52°F), d. 0.791, n_D^{20} 1.3290, Merck **14**,5957, Application(s): Suitable for environmental, pesticide, and GC analysis, UN1230, RTECS PC1400000, BRN 1098229, Note: Submicron flitered, † Maximum level of impurities: Evaporation residue 2ppm, Halogenated residue 5 ng/l (GC-ECD)  R:11-23/24/25-39/23/24/25, S:7-16-36/37-45	**1L** **4L** **4x1L** **4x4L** **bulk**
19393	**Methanol, Semiconductor Grade, 99.9% min** CH_3OH, F.W. 32.04, Liquid, m.p. -98°, b.p. 64.7°, f.p. 11°(52°F), d. 0.791, n_D^{20} 1.3290, Merck **14**,5957, UN1230, RTECS PC1400000, BRN 1098229, † Maximum level of impurities: Color (APHA) 10, Acidity 0.3meq/g, Alkalinity 0.1meq/g, Evaporation residue 5ppm, H_2O (by Karl Fischer titrn) 0.05%, Solubility in H_2O P.T., Cl 0.2ppm, PO_4 0.5ppm  R:11-23/24/25-39/23/24/25, S:7-16-36/37-45	**100ml** **1L** **4L** **4x1L** **bulk**
31733	**2-Methoxyethanol, ACS, 99.3+%** *[Ethylene glycol monomethyl ether]* $CH_3OCH_2CH_2OH$, F.W. 76.10, Liquid, m.p. -85°, b.p. 124-125°, f.p. 46°(115°F), d. 0.965, n_D^{20} 1.4020, Merck **14**,6038, Solubility: Miscible with water, alcohol, glycerol, ether, acetone, DMF, UN1188, RTECS KL5775000, BRN 1731074, † Maximum level of impurities: Color (APHA) 10, Titratable acid 0.002meq/g, H_2O 0.1%  R:60-61-10-20/21/22, S:53-45	**250ml** **1L** **4L** **4x4L** **bulk**
32444	**2-Methoxyethanol, Spectrophotometric Grade, 99% min** $HOCH_2CH_2OCH_3$, F.W. 76.10, Liquid, m.p. -85°, b.p. 124-125°, f.p. 46°(115°F), d. 0.965, n_D^{20} 1.4020, Merck **14**,6038, UN1188, RTECS KL5775000, BRN 1731074, Note: Suitable for UV spectroscopy, † Maximum level of impurities: Evaporation residue 0.001%, H_2O 0.05%  R:60-61-10-20/21/22, S:53-45 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.05 0.20 1.0	**1L** **4L** **4x1L** **bulk**

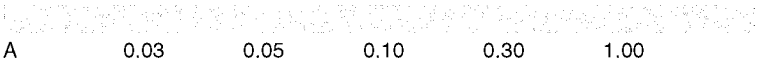
Specialty Solvents

Stock #	Description	Standard Selling Sizes
33346	**4-Methyl-2-pentanone, ACS, 98.5+%** *[Methyl isobutyl ketone, Isopropyl acetone]* $C_6H_{12}O$, F.W. 100.16, Liquid, m.p. -84°, b.p. 117-118°, f.p. 13°(55°F), d. 0.801, n_D^{20} 1.3960, Merck **14**,5207, UN1245, RTECS SA9275000, BRN 605399, † Maximum level of impurities: Color (APHA) 15, Evaporation residue 0.005%, Titratable acid 0.002meq/g, H_2O 0.1% R:11-20-36/37-66, S:9-16-29	**500ml** **1L** **4x500ml** **bulk**
43170	**4-Methyl-2-pentanone, HPLC Grade, 99+%** $C_6H_{12}O$, F.W. 100.16, Liquid, m.p. -84°, b.p. 117-118°, f.p. 13°(55°F), d. 0.801, n_D^{20} 1.3960, Merck **14**,5207, UN1245, RTECS SA9275000, BRN 605399, Note: Filtered through 0.2m filters,, † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.1%, Color (APHA) 10 R:11-20-36/37-66, S:9-16-29 **UV absorption - 1cm cell vs H_2O** A 0.01 0.15 0.25 0.50 1.00	**1L** **4L** **4x1L** **4x4L** **bulk**
43894	**1-Methyl-2-pyrrolidinone, ACS grade, 99.0+%** C_5H_9NO, F.W. 99.13, Liquid, m.p. -24°, b.p. 81-82°/10mm, f.p. 86°(187°F), d. 1.033, n_D^{20} 1.4700, Merck **14**,6117, Fieser **1**,696 **2**,281 **9**,316, RTECS UY5790000, BRN 106420, † Maximum level of impurities: Color (APHA) 50, H_2O 0.05%, Free amines (as CH_3NH_2) 0.01%, Cl 1ppm R:36/38, S:41	**500ml** **1L** **4L** **4x1L** **4x4L** **bulk**
38986	**1-Methyl-2-pyrrolidinone, HPLC Grade, 99.5%** C_5H_9NO, F.W. 99.13, Liquid, m.p. -24°, b.p. 81-82°/10mm, f.p. 86°(187°F), d. 1.033, n_D^{20} 1.4700, Merck **14**,6117, Fieser **1**,696 **2**,281 **9**,316, RTECS UY5790000, BRN 106420, Note: Filtered through 0.2µ filters. Suitable for spectrophotometry, chromatography., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.05% R:36/38, S:41 **UV absorption - 1cm cell vs H_2O** A 0.01 0.03 0.01 0.50 1.00	**1L** **4L** **4x1L** **bulk**
39176	**1-Methyl-2-pyrrolidinone, Spectrophotometric Grade, 99.5+%** C_5H_9NO, F.W. 99.13, Liquid, m.p. -24°, b.p. 81-82°/10mm, f.p. 86°(187°F), d. 1.033, n_D^{20} 1.4700, Merck **14**,6117, Fieser **1**,696 **2**,281 **9**,316, RTECS UY5790000, BRN 106420, Note: Filtered through 0.2µ filters. Suitable for spectrophotometry, chromatography., † Maximum level of impurities: Evaporation residue 6ppm, H_2O 0.05% R:36/38, S:41 **UV absorption - 1cm cell vs H_2O** A 0.01 0.03 0.01 0.50 1.00	**1L** **4L** **4x1L** **bulk**
44063	**1-Methyl-2-pyrrolidinone, Biograde, 99.5%** ■ C_5H_9NO, F.W. 99.13, Liquid, packaged under Argon, m.p. -24°, b.p. 81-82°/10mm, f.p. 86°(187°F), d. 1.033, n_D^{20} 1.4700, Merck **14**,6117, Fieser **1**,696 **2**,281 **9**,316, Application(s): Suitable for Biotech applications, RTECS UY5790000, BRN 106420, Note: Amines (as dimethylamine) <10ppm. H_2O 200ppm, † R:36/38, S:41 **UV absorption - 1cm cell vs H_2O** A 0.01 0.03 0.01 0.50 1.00	**1L** **4L** **4x4L** **bulk**

Stock #	Description	Standard Selling Sizes
44255	**n-Pentane, capillary GC grade. 98+%** $CH_3(CH_2)_3CH_3$, F.W. 72.15, Liquid, m.p. -130°, b.p. 36°, f.p. -49°(57°F), d. 0.626, n_D^{20} 1.3580, Merck **14**,7116, Application(s): For organic residue analysis, UN1265, Note: 99.9+% C_5 isomers. Filtered through 0.2µ filters., † Maximum level of impurities: Color APHA 10, ECD Responsive Residue (as Heptachlor Epoxide) 10 ppt, FID Responsive Residue (as 2-Octanol) 5 ppb, Residue after Evaporation 1 ppm, Water 0.02% R:12-51/53-65-66-67, S:9-16-29-33-61-62	**4L** **4x4L** **bulk**
22907	**n-Pentane, HPLC Grade, 99% min** $CH_3(CH_2)_3CH_3$, F.W. 72.15, Liquid, m.p. -130°, b.p. 36°, f.p. -49°(-57°F), d. 0.626, n_D^{20} 1.3580, Merck **14**,7116, UN1265, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, H_2O 0.01% R:12-51/53-65-66-67, S:9-16-29-33-61-62 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.15 0.50 1.00	**1L** **4L** **4x1L** **4x4L** **bulk**
H27427 NEW!	**Pentane, HPLC Grade, 99+% (n-Pentane, 95% min)** $CH_3(CH_2)_3CH_3$, F.W. 72.15, m.p. -130°, b.p. 36°, f.p. -49°(-57°F), d. 0.626, n_D^{20} 1.3580, Merck **14**,7116, UN1265, † R:12-51/53-65-66-67, S:9-16-29-33-61-62	**1L** **2.5L** **bulk**
32449	**n-Pentane, Spectrophotometric Grade, 99+% min.** $CH_3(CH_2)_3CH_3$, F.W. 72.15, Liquid, m.p. -130°, b.p. 36°, f.p. -49°(-57°F), d. 0.626, n_D^{20} 1.3580, Merck **14**,7116, UN1265, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, H_2O 0.01% R:12-51/53-65-66-67, S:9-16-29-33-61-62 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.15 0.50 1.00	**1L** **4L** **4x1L** **4x4L** **bulk**
40981	**n-Pentane, Environmental Grade, 98+%** $CH_3(CH_2)_3CH_3$, F.W. 72.15, Liquid, m.p. -130°, b.p. 36°, f.p. -49°(-57°F), d. 0.626, n_D^{20} 1.3580, Merck **14**,7116, Application(s): Suitable for environmental, pesticide, and GC analysis, UN1265, † R:12-51/53-65-66-67, S:9-16-29-33-61-62	**1L** **4L** **4x1L** **4x4L** **bulk**
42085	**Petroleum ether 35/60, ACS** *[Ligroin]* Liquid, b.p. 35-60°, f.p. -49°(-57°F), d. 0.640, n_D^{20} 1.3630, UN1268, † Maximum level of impurities: Color (APHA) ≤ 10, Boiling range 35-60°, Evaporation residue ≤ 0.001%, Acidity P.T. R:45-11-65, S:53-45	**1L** **4L** **4x1L** **20L** **4x4L** **bulk**
38985	**Petroleum ether 35/60, HPLC Grade** Liquid, b.p. 35-60°, f.p. -49°(-57°F), d. 0.640, n_D^{20} 1.3630, UN1268, † Maximum level of impurities: Evaporation residue 5ppm, Chlorinated pesticides 5ppt, H_2O 0.03% Note: Filtered through 0.2µM filters. Suitable for liquid chromatography, residue analysis. R:45-11-65, S:53-45	**1L** **4L** **4x1L** **bulk**
40982	**Petroleum ether 35/60, Environmental Grade** Liquid, b.p. 35-60°, f.p. -49°(-57°F), d. 0.640, n_D^{20} 1.3630, Application(s): Suitable for environmental and pesticide analysis, UN1268, † R:45-11-65, S:53-45	**1L** **4L** **4x1L** **bulk**
43848	**1-Propanol, ACS, 99.5+%** $CH_3CH_2CH_2OH$, F.W. 60.10, Liquid, m.p. -127°, b.p. 97°, f.p. 15°(59°F), d. 0.804, n_D^{20} 1.3850, Merck **14**,7842, UN1274, RTECS UH8225000, BRN 1098242, † Maximum level of impurities: Color (APHA) 10, Residue after evaporation 0.001%, Titratable acid 0.0004meq/g, Carbonyl compounds (as C_2H_5CHO) 0.03%, Ethanol (CH_3CH_2OH) 0.01%, Methanol (CH_3OH) 0.01%, Isopropyl alcohol(CH_3CHOCH_3) 0.05%, Water (H_2O) 0.2%, Solubilities in water P.T. R:11-41-67, S:7-16-24-26-39	**500ml** **1L** **4L** **4x4L** **bulk**

Specialty Solvents

Stock #	Description	Standard Selling Sizes
22932	**1-Propanol, HPLC Grade, 99% min** *[n-Propyl alcohol]* $CH_3CH_2CH_2OH$, F.W. 60.10, Liquid, m.p. -127°, b.p. 97°, f.p. 15°(59°F), d. 0.804, n_D^{20} 1.3850, Merck **14**,7842, UN1274, RTECS UH8225000, BRN 1098242, Note: Filtered through 0.2µ filters. Suitable for spectophotometry, chromatography., † Maximum level of impurities: Evaporation residue 3ppm, H_2O 0.08% R:11-41-67, S:7-16-24-26-39 **UV absorption - 1cm cell vs H_2O** A 0.005 0.05 0.50 1.00	**1L** **4L** **4x1L** **bulk**
22933	**1-Propanol, Spectrophotometric Grade, 99%** $CH_3CH_2CH_2OH$, F.W. 60.10, Liquid, m.p. -127°, b.p. 97°, f.p. 15°(59°F), d. 0.804, n_D^{20} 1.3850, Merck **14**,7842, UN1274, RTECS UH8225000, BRN 1098242, Note: Meets ACS spectrophotometric requirements. Filtered through 0.2µ filters. Suitable for spectophotometry, † Maximum level of impurities: Evaporation residue 4ppm, H_2O 0.08% R:11-41-67, S:7-16-24-26-39 **UV absorption - 1cm cell vs H_2O** A 0.005 0.05 0.50 1.00	**1L** **4L** **4x1L** **bulk**
36644	**2-Propanol, ACS, 99.5% min** *[IPA, Isopropanol]* $(CH_3)_2CHOH$, F.W. 60.10, Liquid, m.p. -90 to -88°, b.p. 80-83°, f.p. 12°(53°F), d. 0.785, n_D^{20} 1.3770, Merck **14**,5208, Solubility: Miscible with water, alcohol, ether, chloroform, Application(s): Solvent for gums, resins, alkaloids, essential oils. Denaturant for ethyl alcohol. In antifreeze compositions, UN1219, RTECS NT8050000, BRN 635639, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 0.001%, Solubility in water P.T., Carbonyl compounds as propionaldehyde or acetone 0.002%, H_2O 0.2%, Titratable acid or base 0.0001meq/g R:11-36-67, S:7-16-24/25-26	**1L** **4L** **4x1L** **4x4L** **bulk**
22906	**2-Propanol, HPLC Grade, 99.7+%** $(CH_3)_2CHOH$, F.W. 60.10, Liquid, m.p. -90 to -88°, b.p. 80-83°, f.p. 12°(53°F), d. 0.785, n_D^{20} 1.3770, Merck **14**,5208, UN1219, RTECS NT8050000, BRN 635639, † Maximum level of impurities: Evaporation residue 3ppm, H_2O 0.05%, Chlorinated pesticides 5ppt R:11-36-67, S:7-16-24/25-26 **UV absorption - 1cm cell vs H_2O** A 0.01 0.15 0.30 0.70 1.00	**1L** **4L** **4x4L** **bulk**
39194	**2-Propanol, Spectrophotometric Grade, 99.7+%** $(CH_3)_2CHOH$, F.W. 60.10, Liquid, m.p. -90 to -88°, b.p. 80-83°, f.p. 12°(53°F), d. 0.785, n_D^{20} 1.3770, Merck **14**,5208, UN1219, RTECS NT8050000, BRN 635639, Note: Meets ACS spectrophotometric requirements. Filtered through 0.2µ filters. Suitable for spectophotometry, chromatography, residue analysis -GC, † Maximum level of impurities: Evaporation residue 3ppm, H_2O 0.05% R:11-36-67, S:7-16-24/25-26 **UV absorption - 1cm cell vs H_2O** A 0.01 0.15 0.30 0.70 1.00	**1L** **4L** **4x1L** **bulk**
19397	**2-Propanol, Semiconductor Grade, 99.5% min** $(CH_3)_2CHOH$, F.W. 60.10, Liquid, m.p. -90 to -88°, b.p. 80-83°, f.p. 12°(53°F), d. 0.785, n_D^{20} 1.3770, Merck **14**,5208, UN1219, RTECS NT8050000, BRN 635639, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 5ppm, Solubility in H_2O P.T., H_2O (by Karl Fischer titrn) 0.05%, Acidity 0.2meq/g, Alkalinity 0.1meq/g, Cl 0.2ppm, PO_4 0.5ppm R:11-36-67, S:7-16-24/25-26	**500ml** **1L** **4L** **4x1L** **4x4L** **bulk**

Stock #	Description	Standard Selling Sizes
40983	**2-Propanol, GC Grade, 99.7+%** $(CH_3)_2CHOH$, F.W. 60.10, Liquid, m.p. -90 to -88°, b.p. 80-83°, f.p. 12°(53°F), d. 0.785, n_D^{20} 1.3770, Merck **14**,5208, Application(s): Suitable for environmental, pesticide, and GC analysis, UN1219, RTECS NT8050000, BRN 635639, † Maximum level of impurities: Color (APHA) 10, Halogenated residue 5ppt (GC-ECD) heptachlor epoxide, Evaporation residue 5ppm, H_2O 0.10% R:11-36-67, S:7-16-24/25-26	**1L** **4L** **4x1L** **bulk**
19378	**Pyridine, ACS, 99.0% min** C_5H_5N, F.W. 79.10, Liquid, m.p. -42°, b.p. 115°, f.p. 20°(68°F), d. 0.978, n_D^{20} 1.5100, Merck **14**,7970, Fieser **1**,958 **2**,349 **4**,414 **6**,497 **11**,448 **12**,416, UN1282, RTECS UR8400000, BRN 103233, † Maximum level of impurities: Evaporation residue 0.002%, H_2O 0.1%, Cl 0.001%, SO_4 0.001%, NH_3 0.002%, Cu 5ppm, Reducing substances P.T., Solubility in water P.T. R:11-20/21/22, S:26-28	**500ml** **1L** **4L** **4x1L** **bulk**
22905	**Pyridine, HPLC Grade, 99.5+%** C_5H_5N, F.W. 79.10, Liquid, m.p. -42°, b.p. 115°, f.p. 20°(68°F), d. 0.978, n_D^{20} 1.5100, Merck **14**,7970, Fieser **1**,958 **2**,349 **4**,414 **6**,497 **11**,448 **12**,416, UN1282, RTECS UR8400000, BRN 103233, Note: Filtered through 0.2µ filters. Suitable for spectrophotometry, chromatography., † Maximum level of impurities: Evaporation residue 4ppm, H_2O 0.05% R:11-20/21/22, S:26-28 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.10 0.30 1.00	**1L** **4L** **4x1L** **bulk**
32436	**Pyridine, Ultrapure, Spectrophotometric Grade, 99.5+%** C_5H_5N, F.W. 79.10, Liquid, m.p. -42°, b.p. 115°, f.p. 20°(68°F), d. 0.978, n_D^{20} 1.5100, Merck **14**,7970, Fieser **1**,958 **2**,349 **4**,414 **6**,497 **11**,448 **12**,416, UN1282, RTECS UR8400000, BRN 103233, Note: Meets ACS spectrophotometric requirements. Suitable for spectophotometry, † Maximum level of impurities: Evaporation residue 4ppm, H_2O 0.07% R:11-20/21/22, S:26-28 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.10 0.30 1.00	**250ml** **1L** **4L** **4x1L** **bulk**
32437	**Tetrachloroethylene, Ultrapure, Spectrophotometric Grade, 99+%** *[Perchloroethylene]* $Cl_2C=CCl_2$, F.W. 165.83, Liquid, m.p. -22°, b.p. 120-121°, d. 1.623, n_D^{20} 1.5055, Merck **14**,9190, UN1897, RTECS KX3850000, BRN 1361721, † Maximum level of impurities: Evaporation residue <0.0005%, H_2O 0.05% R:40-51/53, S:23-36/37-61 **UV absorption - 1cm cell vs H_2O**  A 0.03 0.05 0.10 0.30 1.00	**1L** **4L** **4x1L** **bulk**
30760	**Tetrahydrofuran, ACS, 99+%, stab. with 250ppm BHT** C_4H_8O, F.W. 72.11, Liquid, m.p. -108°, b.p. 66°, f.p. -17°(1°F), d. 0.889, n_D^{20} 1.4070, Merck **14**,9211, Fieser **1**,1140 **2**,398 **3**,278 **5**,649 **6**,570, UN2056, RTECS LU5950000, BRN 102391, † Maximum level of impurities: Color (APHA) 20, Peroxide (as H_2O_2) 0.015%, Residue after evaporation 0.03%, H_2O 0.05% R:11-19-36/37, S:16-29-33	**500ml** **1L** **4L** **4x1L** **bulk**
38994	**Tetrahydrofuran, non-UV, HPLC Grade, 99.7+%, stab. with 250ppm BHT** C_4H_8O, F.W. 72.11, Liquid, m.p. -108°, b.p. 66°, f.p. -17°(1°F), d. 0.889, n_D^{20} 1.4070, Merck **14**,9211, Fieser **1**,1140 **2**,398 **3**,278 **5**,649 **6**,570, UN2056, RTECS LU5950000, BRN 102391, Note: Filtered through 2µ filters., † R:11-19-36/37, S:16-29-33	**1L** **4L** **4x1L** **bulk**

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Stock #	Description	Standard Selling Sizes
22904	**Tetrahydrofuran, UV, HPLC Grade, 99.7+% min, unstab.** C_4H_8O, F.W. 72.11, Liquid, m.p. -108°, b.p. 66°, f.p. -17°(1°F), d. 0.889, n_D^{20} 1.4070, Merck **14**,9211, Fieser **1**,1140 **2**,398 **3**,278 **5**,649 **6**,570, UN2056, RTECS LU5950000, BRN 102391, Note: Filtered through 0.2µ filters. Suitable for spectophotometry, chromatography., † Maximum level of impurities: Acidity (CH_3COOH) 0.005%, Evaporation residue 5ppm, Peroxides (as H_2O_2) 0.02%, H_2O 0.03% R:11-19-36/37, S:16-29-33 **UV absorption - 1cm cell vs H_2O** A 0.01 0.18 0.50 1.00	**250ml** **1L** **4L** **4x1L** **bulk**
44505	**Tetrahydrofuran, Biograde, 99.8%, unstab.** C_4H_8O, F.W. 72.11, Liquid, m.p. -108°, b.p. 66°, f.p. -17°(1°F), d. 0.889, n_D^{20} 1.4070, Merck **14**,9211, Fieser **1**,1140 **2**,398 **3**,278 **5**,649 **6**,570, Application(s): Nucleic acid and peptide synthesis, UN2056, RTECS LU5950000, BRN 102391, Note: Water <100ppm, † Maximum level of impurities: Color (APHA) 10, Peroxide (as H_2O_2) 0.015%, Residue after evaporation 5 ppm H_2O 0.01% R:11-19-36/37, S:16-29-33 **UV absorption - 1cm cell vs H_2O** A 0.01 0.17 0.50 1.00	**1L** **4L** **4x1L** **bulk**
32468	**Tetrahydrofuran, Spectrophotometric Grade, 99.7+%, unstab.** C_4H_8O, F.W. 72.11, Liquid, distilled in glass, m.p. -108°, b.p. 66°, f.p. -17°(1°F), d. 0.889, n_D^{20} 1.4070, Merck **14**,9211, Fieser **1**,1140 **2**,398 **3**,278 **5**,649 **6**,570, UN2056, RTECS LU5950000, BRN 102391, Note: Filtered through 0.2µ filters. Suitable for spectophotometry, † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.03%, Acidity (CH_3COOH) 0.005%, Peroxides (as H_2O_2) 0.03% R:11-19-36/37, S:16-29-33 **UV absorption - 1cm cell vs H_2O** A 0.01 0.18 0.50 1.00	**100ml** **1L** **4L** **4x1L** **bulk**
41819	**Tetrahydrofuran, Spectrophotometric grade, 99.7+%, unstab., packaged under Argon in resealable ChemSeal™ bottles** C_4H_8O, F.W. 72.11, Liquid, m.p. -108°, b.p. 66°, f.p. -17°(1°F), d. 0.889, n_D^{20} 1.4070, Merck **14**,9211, Fieser **1**,1140 **2**,398 **3**,278 **5**,649 **6**,570, UN2056, RTECS LU5950000, BRN 102391, Note: Water <100ppm, † R:11-19-36/37, S:16-29-33	**250ml** **1L** **4x1L** **bulk**
31755	**Toluene, ACS, 99.5%** *[Methylbenzene]* $C_6H_5CH_3$, F.W. 92.14, Liquid, m.p. -93°, b.p. 111°, f.p. 4°(40°F), d. 0.867, n_D^{20} 1.4967, Merck **14**,9529, Solubility: Very slightly soluble in water. Miscible with alcohol, chloroform, ether, glacial acetic acid, carbon disulfide, UN1294, RTECS XS5250000, BRN 635760, † Maximum level of impurities: Color (APHA) 10, Residue after evaporation 0.001%, Substances darkened by sulfuric acid P.T., Sulfuric compounds (as S) 0.003%, H_2O 0.03% R:11-38-48/20-63-65-67, S:36/37-46-62	**500ml** **1L** **4L** **4x1L** **bulk**

Stock #	Description	Standard Selling Sizes
22903	**Toluene, HPLC Grade, 99.7% min** $C_6H_5CH_3$, F.W. 92.14, Liquid, m.p. -93°, b.p. 111°, f.p. 4°(40°F), d. 0.867, n_D^{20} 1.4967, Merck **14**,9529, UN1294, RTECS XS5250000, BRN 635760, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 4ppm, Chlorinated pesticides 5ppt, H_2O 0.03% R:11-38-48/20-63-65-67, S:36/37-46-62 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.10 0.18 0.50 1.00	**1L** **4L** **4x1L** **bulk**
19376	**Toluene, Spectrophotometric Grade, 99.7+%** $C_6H_5CH_3$, F.W. 92.14, Liquid, m.p. -93°, b.p. 111°, f.p. 4°(40°F), d. 0.867, n_D^{20} 1.4967, Merck **14**,9529, UN1294, RTECS XS5250000, BRN 635760, Note: Meets ACS spectrophotometric requirements. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 4ppm, H_2O 0.03% R:11-38-48/20-63-65-67, S:36/37-46-62 **UV absorption - 1cm cell vs H_2O**  A 0.01 0.1 0.40 0.70 1.00	**1L** **4L** **4x1L** **4x4L** **bulk**
19399	**Toluene, Semiconductor Grade, 99% min** $C_6H_5CH_3$, F.W. 92.14, Liquid, m.p. -93°, b.p. 111°, f.p. 4°(40°F), d. 0.867, n_D^{20} 1.4967, Merck **14**,9529, UN1294, RTECS XS5250000, BRN 635760, † Maximum level of impurities: Color (APHA) 10, Acidity 0.2meq/g, Evaporation residue 2ppm, H_2O 0.03%, Substances darkened by H_2SO_4 P.T., Sulfur compounds (as S) 0.003%, Cl 2ppm, PO_4 0.5ppm R:11-38-48/20-63-65-67, S:36/37-46-62	**500ml** **1L** **4L** **4x1L** **bulk**
43061	**Toluene, Environmental Grade, 99.8+%** $C_6H_5CH_3$, F.W. 92.14, Liquid, m.p. -93°, b.p. 111°, f.p. 4°(40°F), d. 0.867, n_D^{20} 1.4967, Merck **14**,9529, Application(s): Suitable for pesticide residue analysis, UN1294, RTECS XS5250000, BRN 635760, Note: Submicron filtered, † Maximum level of impurities: Color (APHA) 10, Halogenated residue by GC-ECD, (as Heptachlorepoxide) 5ng/L, Water 0.03% R:11-38-48/20-63-65-67, S:36/37-46-62	**1L** **4L** **4x4L** **bulk**
19401	**Trichloroethylene, ACS, 99.5% min** *[Trichloroethene]* $ClCH=CCl_2$, F.W. 131.39, Liquid, m.p. -85°, b.p. 87°, f.p. None, d. 1.46, n_D^{20} 1.476, Merck **14**,9639, Fieser **9**,479 **10**,414 **11**,552 **19**,359, Solubility: Miscible with ether, alcohol, chloroform, UN1710, RTECS KX4550000, BRN 1736782, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 0.001%, Titratable acid 0.0001meq/g, Titratable base 0.0003meq/g, H_2O 0.02%, Heavy Metals (as Pb) 1ppm, Free halogens P.T. R:45-36/38-52/53-67, S:53-45-61	**500ml** **1L** **4L** **4x1L** **bulk**
43487	**Trichloroethylene, Spectrophotometric Grade, 99.5+%** $ClCH=CCl_2$, F.W. 131.39, Liquid, m.p. -85°, b.p. 87°, f.p. None, d. 1.46, n_D^{20} 1.476, Merck **14**,9639, Fieser **9**,479 **10**,414 **11**,552 **19**,359, UN1710, RTECS KX4550000, BRN 1736782, Note: Filtered through 0.2µ filter, † Maximum level of impurities: Color (APHA) 10, Residue after evaporation 3ppm, H_2O 0.02% R:45-36/38-52/53-67, S:53-45-61	**1L** **4L** **4x1L** **4x4L** **bulk**
41963	**Trichloroethylene, Electronic Grade, 99.5+%** $ClCH=CCl_2$, F.W. 131.39, Liquid, m.p. -85°, b.p. 87°, f.p. None, d. 1.46, n_D^{20} 1.476, Merck **14**,9639, Fieser **9**,479 **10**,414 **11**,552 **19**,359, UN1710, RTECS KX4550000, BRN 1736782, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 0.001%, Titratable acid 0.0001meq/g, Titratable base 0.0003meq/g, H_2O 0.02%, Heavy metals (as Pb) 1ppm, Free halogen P.T., (Al, Ag, Au, B, Ba, Ca, Cd, Cr, Co, Cu, Fe, Ga, Ge, K, Li, Mg, Mn, Na, Ni, Si, Sn, Sr, Zn) ≤ 1ppm R:45-36/38-52/53-67, S:53-45-61	**1L** **4L** **4x4L** **bulk**

Specialty Solvents

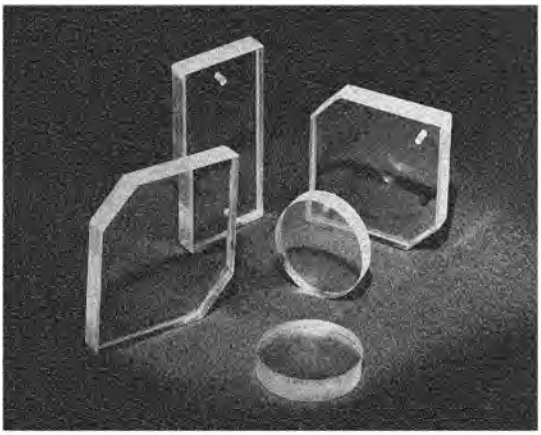
Stock #	Description	Standard Selling Sizes
39744	**Trichloroethylene, Semiconductor Grade, 99+%** $ClCH=CCl_2$, F.W. 131.39, Liquid, m.p. -85°, b.p. 87°, f.p. None, d. 1.46, n_D^{20} 1.476, Merck **14**,9639, Fieser **9**,479 **10**,414 **11**,552 **19**,359, UN1710, RTECS KX4550000, BRN 1736782, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 5ppm, Acidity 0.1meq/g, H_2O (by coulometry) 0.005%, Cl 1ppm, PO_4 0.1ppm R:45-36/38-52/53-67, S:53-45-61	**1L** **4L** **bulk**
A14365	**Trifluoroacetic acid, biochemical grade, 99.5+%** ■ CF_3CO_2H, F.W. 114.02, Liquid, m.p. -15°, b.p. 72-73°, d. 1.480, n_D^{20} 1.2840, Merck **14**,9681, Fieser **1**,1219 **6**,613 **11**,557, **15**,338 **17**,369 **18**,375 **20**,395 **21**,446, UN2699, RTECS AJ9625000, BRN 742035, † R:20-35-52/53, S:9-26-27/28a-45-61	**50g** **250g** **1kg** **bulk**
44630	**Trifluoroacetic acid, HPLC Grade, 99.5+%** ■ CF_3CO_2H, F.W. 114.02, Liquid, m.p. -15°, b.p. 72-73°, d. 1.480, n_D^{20} 1.2840, Merck **14**,9681, Fieser **1**,1219 **6**,613 **11**,557, **15**,338 **17**,369 **18**,375 **20**,395 **21**,446, UN2699, RTECS AJ9625000, BRN 742035, Note: Water 0.1%, † R:20-35-52/53, S:9-26-27/28-45-61 **UV absorption - 0.1% solution** λ(nm) 300 250 230 210 A 0.005 0.01 0.15 1.00	**100ml** **500ml** **4x100ml** **4x500ml** **bulk**
31787	**2,2,4-Trimethylpentane, ACS, 99+%** *[Isooctane]* $(CH_3)_2CHCH_2C(CH_3)_3$, F.W. 114.23, Liquid, m.p. -107°, b.p. 98-99°, f.p. -7°(19°F), d. 0.692, n_D^{20} 1.3910, Merck **14**,5193, Solubility: Soluble in benzene, toluene, xylene, chloroform, ether, CS_2, CCl_4, and DMF, Application(s): Solvent, thinner, in determination of fuel octane numbers, UN1262, RTECS SA3320000, BRN 1696876, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 0.001%, Water-soluble titratable acid 0.003meq/g, Sulfur compounds (as S) 0.005% R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**500ml** **1L** **4L** **4x1L** **bulk**
22901	**2,2,4-Trimethylpentane, HPLC Grade, 99.7+%** $(CH_3)_2CHCH_2C(CH_3)_3$, F.W. 114.23, Liquid, m.p. -107°, b.p. 98-99°, f.p. -7°(19°F), d. 0.692, n_D^{20} 1.3910, Merck **14**,5193, UN1262, RTECS SA3320000, BRN 1696876, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 3ppm, Chlorinated pesticides 5ppt, H_2O 0.02% R:11-38-50/53-65-67, S:9-16-29-33-60-61-62 **UV absorption - 1cm cell vs H_2O** A 0.01 0.10 0.20 1.00	**1L** **4L** **4x1L** **4x4L** **bulk**
41904	**2,2,4-Trimethylpentane, Environmental Grade, 99.5+%** $(CH_3)_2CHCH_2C(CH_3)_3$, F.W. 114.23, Liquid, m.p. -107°, b.p. 98-99°, f.p. -7°(19°F), d. 0.692, n_D^{20} 1.3910, Merck **14**,5193, Application(s): Suitable for pesticide residue analysis, UN1262, RTECS SA3320000, BRN 1696876, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Color (APHA) 10, Halogenated residue 5ppt (GC-ECD), Evaporation residue 3ppm, H_2O 0.02% Note: Filtered through 0.2µ filters R:11-38-50/53-65-67, S:9-16-29-33-60-61-62	**1L** **4L** **4x4L** **bulk**
36645	**Water, Reagent (Deionized water), ACS** H_2O, F.W. 18.02, Liquid, m.p. 0°, b.p. 100°, d. 1.000, n_D^{20} 1.3330, Merck **14**,10039, † Maximum level of impurities: Specific conductance at 25° $2.0x10^{-6}ohm^{-1}cm^{-1}$, Silicate (as SiO_2) 0.01ppm, Heavy Metals (as Pb) 0.01ppm, Substances reducing permanganate P.T., Cl 0.4ppm, NO_3 0.4ppm, PO_4 1ppm, SO_4 1ppm	**1L** **4L** **4x1L** **bulk**
22934	**Water, ultrapure, HPLC Grade** H_2O, F.W. 18.02, Liquid, m.p. 0°, b.p. 100°, d. 1.000, n_D^{20} 1.3330, Merck **14**,10039, † Maximum level of impurities: Appearance clear, Color (APHA) 10, Evaporation residue 3ppm. **UV absorption - 1cm cell vs H_2O** A 0.005 0.005 0.005 0.010 0.010	**1L** **4L** **4x4L** **bulk**

Stock #	Description	Standard Selling Sizes
19391	**Water, ultrapure, Spectrophotometric Grade** H_2O, F.W. 18.02, Liquid, m.p. 0°, b.p. 100°, d. 1.000, n_D^{20} 1.3330, Merck **14**,10039, Note: Meets ACS spectrophotometric requirements, † Maximum level of impurities: Evaporation residue 2ppm, Specific conductance at 25° 1.5µ mhos/cm, SiO_2 0.01ppm, Heavy metals (as Pb) 0.01ppm, Substances reducing permanganate P.T. **UV absorption - 1cm cell vs H_2O**  A 0.005 0.005 0.005 0.010 0.010	**1L** **4L** **4x1L** **bulk**
22902	**o-Xylene, HPLC Grade, 96% min** $(CH_3)_2C_6H_4$, F.W. 106.17, Liquid, m.p. -25 to -23°, b.p. 143-145°, f.p. 32°(89°F), d. 0.877, n_D^{20} 1.5050, Merck **14**,10081, UN1307, RTECS ZE2450000, BRN 1815558, Note: Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.04% ✖ R:10-20/21-38, S:25 **UV absorption - 1cm cell vs H_2O**  A 0.005 0.01 0.05 0.20 1.00	**1L** **4L** **4x1L** **bulk**
32471	**o-Xylene, Spectrophotometric Grade, 96% min** $(CH_3)_2C_6H_4$, F.W. 106.17, Liquid, m.p. -25 to -23°, b.p. 143-145°, f.p. 32°(89°F), d. 0.877, n_D^{20} 1.5050, Merck **14**,10081, UN1307, RTECS ZE2450000, BRN 1815558, Note: Meets ACS spectrophotometric requirements. Filtered through 0.2µ filters., † Maximum level of impurities: Evaporation residue 5ppm, H_2O 0.05% ✖ R:10-20/21-38, S:25 **UV absorption - 1cm cell vs H_2O**  A 0.005 0.01 0.05 0.20 1.00	**1L** **4L** **4x1L** **bulk**
16371	**Xylenes, ACS, 98.5+% (Assay, isomers plus ethylbenzene)** $(CH_3)_2C_6H_4$, F.W. 106.17, Liquid, m.p. <-25°, b.p. 137-144°, f.p. 29°(84°F), d. 0.860, n_D^{20} 1.4970, Merck **14**,10081, UN1307, RTECS ZE2100000, BRN 1901563, Note: Contains a mixture of the ortho, meta, and para isomers of xylene. May also contain ethylbenzene, † Maximum level of impurities: Color (APHA) 10, Evaporation residue 0.002%, Substances darkened by sulfuric acid P.T., Sulfur compounds (as S) 0.003%, H_2O 0.05% ✖ R:10-20/21-38, S:25	**500ml** **1L** **4L** **4x1L** **bulk**
19402	**Xylenes, Semiconductor Grade** $(CH_3)_2C_6H_4$, F.W. 106.17, Liquid, m.p. <-25°, b.p. 137-144°, f.p. 29°(84°F), d. 0.860, n_D^{20} 1.4970, Merck **14**,10081, UN1307, RTECS ZE2100000, BRN 1901563, Note: Contains a mixture of the ortho, meta, and para isomers of xylene. May also contain ethylbenzene, † ✖ R:10-20/21-38, S:25	**1L** **4L** **4x1L** **bulk**

Section 16 Infrared Spectroscopy Products

IR Crystal Window Products

Infrared Spectroscopy Products
IR Crystal Windows



Alfa Aesar is pleased to offer a line of optical transmission windows for infrared spectroscopy. Disc or rectangular windows are available either polished or unpolished. A polishing kit is offered for those who wish to polish their own windows. Please inquire for sizes not listed. When ordering drilled crystals, please specify center or diagonal drilling.

Window Selection Guide - Unpolished Crystal Windows

	NaCl	KCl	KBr
Crystal Size Discs	**Stock #**	**Stock #**	**Stock #**
13mm x 2mm	38383	38387	38391
25mm x 5mm	38384	38388	38392
32mm x 3mm	38385	38389	38393
Rectangles			
30mm x 15mm x 4mm	38395	38401	38407
38.5mm x 19.5mm x 4mm	38397	38403	38409
41mm x 23mm x 6mm	38399	38405	38411

Window Selection Guide - Polished Crystal Windows

Crystal Size Disks	NaCl Stock #	KCl Stock #	KBr Stock #	CaF_2 Stock #
13mm x 1mm	38443	38444	38445	38446
13mm x 2mm	38413	38418	38423	38428
22mm x 4mm	38414	38419	38424	38429
25mm x 2mm	38449	38450	38451	38452
25mm x 4mm	38415	38420	38425	38430
32mm x 3mm	38416	38421	38426	38431
32mm x 3mm (drilled)	38417	38422	38427	38432
38mm x 6mm	42148	42147	42146	42145
Rectangles				
30mm x 15mm x 4mm	38455	38456	38457	38458
30mm x 15mm x 4mm (drilled)	38461	38462	38463	38464
38.5mm x 19.5mm x 4mm	38467	38468	38469	38470
38.5mm x 19.5mm x 4mm (drilled)	38473	38474	38475	38476
41mm x 23mm x 6mm	38479	38480	38481	38482

Crystal Size Disks	BaF_2 Stock #	ZnS Stock #	AgCl Stock #
13mm x 1mm	38447	41883	41739
13mm x 2mm	38433	38438	41740
25mm x 2mm	38453	38454	41742
25mm x 4mm	38435	—	41743
32mm x 3mm	38436	—	41744
32mm x 3mm (drilled)	38437	—	41745
Rectangles			
30mm x 15mm x 2mm	—	38460	—
30mm x 15mm x 4mm	38459	—	41873
38.5mm x 19.5mm x 2mm	—	38472	—
38.5mm x 19.5mm x 2mm (drilled)	—	38478	—
38.5mm x 19.5mm x 4mm	38471	—	41875
41mm x 23mm x 2mm	—	38484	—

IR Crystal Window Products

IR Crystal Window Polishing Kit

The Crystal Polishing Kit contains everything needed by the spectroscopist for repolishing and buffing most infrared transmission crystals, including KRS-5. Two ground glass discs are provided -- one for fine grinding and the other to which self-stick polishing pads may be affixed. Supplied with the Polishing Kit are 400 and 600 Grinding Compound, Cerium Oxide Polishing Compound, KRS-5 Polishing Compound (ideal for resurfacing KRS-5 crystals), Finger Cots, 3 Camel Hair Brushes, 2 Polishing Pads, 2 Ground-Glass Plates, 5 Polyethylene Squeeze Bottles with the above-mentioned compounds contained therein, fitted mahogany base and instructions.

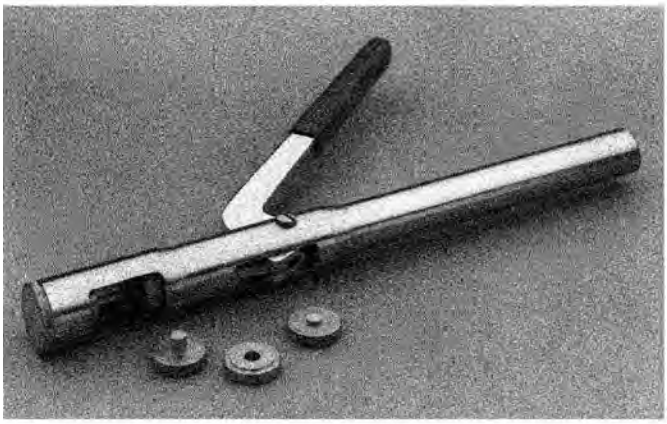
Complete Kit

Stock #	Description	Standard Selling Sizes
39798	**Crystal Polishing Kit**	**1each**

Kit Components

Stock #	Description	Standard Selling Sizes
39800	**Silicon carbide, 400 grinding compound, 2oz** SiC, F.W. 40.10, Application(s): Grinding compound for polishing IR crystal windows, †  R:36/37/38-40, S:26-36/37	**pkg**
39801	**Silicon carbide, 600 grinding compound, 2oz** SiC, F.W. 40.10, Application(s): Grinding compound for polishing IR crystal windows, †  R:36/37/38-40, S:26-36/37	**pkg**
39807	**Aluminum oxide, polishing compound, 2oz** Al_2O_3, F.W. 101.96, 0.3 Micron Particles, Application(s): Polishing compound for IR crystal windows, †  R:37, S:22-36-38	**pkg**
39802	**Cerium(IV) oxide, polishing compound, 2oz** CeO_2, F.W. 172.12, <0.3 micron particles, Application(s): Polishing compound for IR crystal windows, †	**pkg**
39804	**Glass Polishing Plate**	**1each**
39805	**Finger Cots - Large (12/pkg)**	**pkg**
39806	**Camel Hair Brushes (3/pkg)**	**pkg**
39808	**Polishing Pads, 6in green (6/pkg)**	**pkg**

KBr Quick Press Kit



The Quick Press is a hand-held press for making KBr discs with diameters of 7mm, 4mm, and 2mm. The Quick Press is easy to use. The KBr pellet is formed using only the pressure of a firm handshake applied steadily to the handle. The pellet is retained in the collar that separates the two polished dies and can be slipped into a standard holder that will fit the slide mount in any spectrophotometer for analysis.

Stock #	Description	Standard Selling Sizes
39786	**KBr Quick Press Kit with 7mm die set**	**1each**
39787	**7mm Die Set for KBr Quick Press Kit**	**1each**
39788	**4mm Die Set for KBr Quick Press Kit**	**1each**
39789	**2mm Die Set for KBr Quick Press Kit**	**1each**
43316	**KBr little pellet press** Application(s): Pressing pellets for infrared analysis, Note: Includes one press body, two bolts, and sample holder	**1each**

Mortars and Pestles

Stock #	Description	Standard Selling Sizes
39791	**Agate Mortar and Pestle, 65mm OD**	**1each**
39792	**Agate Mortar and Pestle, 95mm OD**	**1each**

KBr & KCl Powders

Stock #	Description	Standard Selling Sizes
39793	**Potassium bromide, Spectroscopy Grade, Ultrapure** KBr, F.W. 119.01, Powder, m.p. 730°, b.p. 1435°, d. 2.75, n_D^{20} 1.559, Merck **14**,7618, Fieser **21**,358, RTECS TS7650000, †	**100g**
39794	**Potassium bromide, FTIR Grade** KBr, F.W. 119.01, Powder, m.p. 730°, b.p. 1435°, d. 2.75, n_D^{20} 1.559, Merck **14**,7618, Fieser **21**,358, RTECS TS7650000, †	**25g** **100g**
39795	**Potassium chloride, Spectroscopy Grade, Ultrapure** KCl, F.W. 74.55, Powder, m.p. 773°, b.p. 1500° subl., d. 1.984, n_D^{20} 1.490, Merck **14**,7621, Fieser **6**,480, RTECS TS8050000, †	**100g**

KBr and KCl Cuttings and Chunks

Stock #	Description	Standard Selling Sizes
39796	**Potassium bromide, Spectroscopy Grade** KBr, F.W. 119.01, Random Cuttings, Chunks, m.p. 730°, b.p. 1435°, d. 2.75, n_D^{20} 1.559, Merck **14**,7618, Fieser **21**,358, RTECS TS7650000, †	**0.25lb** **1lb**

Disposable IR Cards

Stock #	Description	Standard Selling Sizes
43931	Disposable IR cards, 5x10cm, NaCl window, 9.5mm aperture	5pcs 25pcs
43930	Disposable IR cards, 5x10cm, NaCl window, 15mm aperture	5pcs 25pcs
43929	Disposable IR cards, 5x10cm, NaCl window, 19mm aperture	5pcs 25pcs
43937	Disposable IR cards, 5x10cm, KBr window, 9.5mm aperture	5pcs 25pcs
43936	Disposable IR cards, 5x10cm, KBr window, 15mm aperture	5pcs 25pcs
43935	Disposable IR cards, 5x10cm, KBr window, 19mm aperture	5pcs 25pcs
43934	Disposable IR cards, 5x10cm, KCl window, 9.5mm aperture	5pcs 25pcs
43933	Disposable IR cards, 5x10cm, KCl window, 15mm aperture	5pcs 25pcs
43932	Disposable IR cards, 5x10cm, KCl window, 19mm aperture	5pcs 25pcs

Disposable IR Cards Cover Slips

Stock #	Description	Standard Selling Sizes
44527 NEW!	Cover slips, KBr, used with 19mm aperture IR cards, #43935	25pcs

Polystyrene Test Film

Stock #	Description	Standard Selling Sizes
44502 NEW!	Polystyrene Test Film	1each

Section 17 Mass Spectrometry Standards

Mass Spectrometry Standards

Stock #	Description	Standard Selling Sizes
A11014	**Bis(pentafluorophenyl)phenylphosphine, 97%** *[Decafluorotriphenylphosphine, Phenylbis(pentafluorophenyl)-phosphine]* $C_{18}H_5F_{10}P$, F.W. 442.20, m.p. 59-64°, b.p. 105°/0.3mm, f.p. >110°(230°F), BRN 6253897 R:36/37/38, S:26-37	**250mg** **1g** **bulk**
L16595	**Perfluorokerosene-941** b.p. 110-180°/0.5mm, n_D^{20} 1.3470	**1g** **bulk**
L16596	**Perfluorokerosene-H** b.p. 210-240°, d. 1.970, n_D^{20} 1.3200	**1g** **5g** **bulk**
L16597	**Perfluorokerosene-L** b.p. 70-200°, d. 1.860, n_D^{20} 1.2990	**1g** **5g** **bulk**
A19126	**Perfluorotributylamine, Mass Spec Std** *[FC-43, Heptacosafluorotri-n-butylamine]* $[CF_3(CF_2)_3]_3N$, F.W. 671.10, Liquid, m.p. -52°, b.p. 177-180°, d. 1.880, n_D^{20} 1.2890, RTECS YA1000000, BRN 1813883, † R:36/37/38, S:26-37	**1g** **5g** **25g** **bulk**
L02748	**Tris(pentafluorophenyl)phosphine, 95%** $C_{18}F_{15}P$, F.W. 532.15, m.p. 115-116°, BRN 773243 R:36/37/38, S:26-36	**1g** **5g** **bulk**
L16883	**2,4,6-Tris(heptafluoropropyl)-1,3,5-triazine, Mass Spec Std.** $C_{12}F_{21}N_3$, F.W. 585.12, b.p. 165°, d. 1.716, n_D^{20} 1.3080, BRN 381010 S:24/25	**1g** **5g** **bulk**
L16678	**2,4,6-Tris(perfluoroheptyl)-1,3,5-triazine, Mass Spec Std** $C_{24}F_{45}N_3$, F.W. 1185.22, m.p. 29-31°, b.p. 150°/1.5mm S:24/25	**100mg** **500mg** **bulk**
L16679	**2,4,6-Tris(perfluorononyl)-1,3,5-triazine, Mass Spec Std** $C_{30}F_{57}N_3$, F.W. 1485.26, m.p. 82-84° S:22-24/25	**1g** **bulk**
B22001	**2,4,6-Tris(trifluoromethyl)-1,3,5-triazine, 98%** $C_6F_9N_3$, F.W. 285.07, b.p. 95-96°, f.p. None, d. 1.596, n_D^{20} 1.3220, RTECS XZ2800000, BRN 302339 R:20-36/37/38, S:9-23-26-36/37	**1g** **5g** **bulk**
L16698	**Ultramark 1621, Mass Spec Std** n_D^{20} 1.3530 R:36/37/38, S:26-37	**250mg** **1g** **bulk**
L16695	**Ultramark 1960F** b.p. 128°/0.2mm	**1g** **bulk**
L16696	**Ultramark 2500F** b.p. 183-210°/0.7mm	**1g** **bulk**
L16697	**Ultramark 3200F** b.p. >210°/0.7mm	**1g** **bulk**

Section 18 Spectroflux® Analytical Fluxes

Spectroflux® Analytical Fluxes

Introduction

The analysis of refractory materials can be reduced to a simple, accurate procedure with the use of Spectroflux analytical fluxes.

Refractory materials such as ores, slags and minerals are often very resistant to acid attack, making the preparation of a sample solution difficult and time consuming. Selection of an effective method of disintegrating the sample matrix to a reproducible form is a prerequisite for speedy, precise and accurate analysis. Flux fusion is such a method.

Fusion with a molten alkali metal borate flux provides a rapid and simple means of dissolving chemically stable materials to yield glass-like solid solutions. This method eliminates any inhomogeneity of particle size, density or composition in the sample.

Samples of a wide variety of materials may thus be prepared in a simple manner for analysis by instrumental or chemical techniques.

Analytical Techniques

Spectroflux® analytical fluxes can be used in conjunction with direct reading optical or X-ray fluorescence (XRF) spectrometers, atomic absorption (AA) spectrometers, Inductively Coupled Plasma Emission Spectroscopy (ICP) techniques, spectrophotometers, polarographs, ion selective electrodes or classical analytical techniques. Whichever method is chosen, Spectroflux® analytical fluxes offer the analyst the benefits of speed and analytical precision.

Sample Preparation Guidelines

Many different procedures have been described in the literature for preparation of solid solution bead samples suitable for XRF analysis.

The general method for the preparation of materials for analysis involves taking known weights of the flux and sample in appropriate ratio, e.g. 10:1, fusing and allowing the melt to cool to produce a stable, transparent, homogeneous and crack-free bead. To ensure that the same ratio of flux to sample is used for each separate analysis, it is essential to ignite the sample before weighing. The weight of the flux used should then be adjusted to compensate for the observed loss on ignition of the sample -- alternatively, a mathematical correction may be applied.

The flux should also be ignited at about 700˚C to remove any moisture absorbed during storage.

The ignited sample and flux are transferred into a non-wetting platinum alloy crucible and the contents are thoroughly mixed with a chemically inert rod. The uncovered crucible is placed in a muffle furnace, or over a gas burner at 900˚C to 1150˚C and swirled occasionally until the mixture is completely molten and homogeneous. Samples containing high concentrations of alumina and zirconia necessitate heating at 1200˚C.

A platinum alloy casting dish mounted on a ceramic support is heated at the same temperature as the crucible for 2 minutes (5 to 10 minutes for aluminas and zirconias). After removal from the furnace, the molten mixture is poured from the crucible into the casting dish. Once the bead has solidified, a jet of air is directed at the base of the casting dish to cool the bead.

Spectrofluxes have been used successfully with commercially available automatic fusion equipment such as the Philips MagiX, PerlX, PW 1400, LECO, Claisse fluxy, M4, Diano 8000 and others.

Techniques for Specific Materials

1. Where samples are particularly difficult to dissolve, oxidizing agents such as lithium or sodium nitrate may be added to the flux to speed up the dissolution of the sample.

2. Samples that contain sulfides should be roasted in a ceramic crucible in air, before being mixed with the flux, or fused with the flux in the presence of sodium or lithium nitrate. This ensures conversion of sulfides to sulfates and their retention in the solid solution. Sulfur is lost from fusions in graphite crucibles and when using ammonium nitrate as an oxidizing agent.

3. Samples containing large amounts of organic matter or carbon should be ignited in air at 500˚C for several hours prior to fusion.

4. Ferro-alloy samples must be fully oxidized prior to fusion with flux. Using lithium tetraborate, in-situ with an oxidizing mixutre, avoids pre-oxidation of samples, such as steel plant dust and refractories containing metals.

5. Samples which need to be fused at 1200˚C, e.g. aluminas, must be fused for the same period of time due to the loss of flux that occurs by volatilization. It is also possible to compensate for losses on fusion by adding an internal standard to the flux/sample mixture.

6. The non-wetting properties of Platinum 5% Gold crucibles can be enhanced by using a flux containing a small quantity of the halo-acids HBr and HI or alkali metal bromides and iodide. Halides increase the fluidity of the melt, aiding both mixing and removal of molten mixtures. This is particularly useful in the case of copper, cobalt and chromium bearing samples, which are prone to sticking.

7. Chrome-bearing materials containing up to 50% CrO_3 may be dissolved in mixture comprising $5Li_2B_4O_7$:$5LiBO_2$:0.4 sample.

X-Ray Fluorescence Spectrometry

Precision is a significant feature of X-ray spectrometry. However, the spectrometer can only yield accurate analyses if systematic errors associated with the sample are eliminated. Errors due to mineralogical, particle size and surface finish effects must be minimized. Refractory materials are particularly heterogeneous and fusion with Spectroflux analytical fluxes provides the simplest method of eliminating mineral identity and particle size interference while reducing inter-element effects.

The methods employed to compensate for inter-element effects are:

1. The use of mathematical corrections to compensate for enhancement and absorption

2. Calibration over narrow concentration ranges using closely matched standards

3. The use of multiple dilution with a flux

4. Incorporation of a strong absorber, e.g. lanthanum oxide (La_2O_3), into the solid solution at concentrations such that variations in sample composition have little effect on the total absorption of the matrix for the elements under analysis

Flux fusion techniques, therefore, have a major role to play in eliminating the various interference effects.

Atomic Absorption Spectrophotometry (AA)

In the analysis of silicate rocks and minerals by AA spectrophotometry, borate flux fusion is an excellent method of sample decomposition since it is rapid and applicable over a wide range of sample compositions. This method requires no chemical separations and enables a large number of elements to be determined in a single-fluxed sample.

Spectroflux Analytical Fluxes

Inductively Coupled Plasma Spectrophotometry (ICP)

ICP is widely used in routine trace analyses in cements and refractories. Borate fluxes are used in the normal way to provide a melt, which can be either directly dissolved into solution, or cooled and then dissolved in the relevant acid.

Chemical Analysis

Flux fusion and dissolution of the resulting solid solution in dilute acid provide a rapid means of obtaining a sample solution for chemical analysis of materials resistant to direct acid attack. When a sample has been fused with a borate flux and if the presence of boron interferes with the analytical procedure, the boron can be removed by repeated evaporation with methanol, saturated with hydrogen chloride. This method of sample preparation has also been successfully employed in spectrophotometric and polarographic analyses.

Optical Emission Spectrography

Borate fluxes perform a dual function in optical emission spectrographic analysis. First, they provide simple and effective means of disintegrating the sample into a glass-like solid of uniform composition. Referred to as 'iso-formation', this ensures that the same type of sample is always presented to the spectrograph. Secondly, a borate flux acts as a spectrochemical 'buffer', so that the spectral emission of the elements under examination is not affected by variations in sample composition. Alkali-metal borates are particularly useful as spectrochemical buffers since their spectra introduce very little line interference. Inter-element effects can be minimized by the use of a flux containing internal standards, e.g. cobalt or strontium.

Flux Selection

The ideal flux will:

- act as a solvent for a range of compositions
- possess a low melting point to minimize volatilization of flux and sample, facilitate handling, minimize power costs and prolong crucible life
- possess low viscosity when molten to aid mixing during fusion, pouring from crucible and rapid dissolution of sample
- produce a transparent bead at minimum dilution with a wide range of samples free from devitrification
- be non-hygroscopic to aid weighing and storage
- have controlled, high density particle size to aid homogeneous mixing, rapid melting and economic use of platinum labware
- exhibit low loss of fusion, i.e. have low water content and be non-volatile to avoid excessive correction and pre-firings

Our expertise in this area has led to improvements from which you can benefit. The preparative routes used by Alfa Aesar are designed to yield Spectroflux analytical fluxes that incorporate:

- low loss on fusion
- controlled particle size
- high bulk density
- homogeneity
- low levels of impurity elements

Flux selection is dependent on the acidity/basicity of both sample and Spectroflux analytical flux. In decreasing order of basicity the pure alkali metal borate fluxes can be grouped as follows:

$$LiBO_2 > Na_2B_4O_7 > Li_2B_4O_7$$

Samples can be broadly grouped into three categories:

Acidic	e.g. SiO_2, P_2O_5
Basic	e.g. M_2O, MO or M_2O_3 (M=Metal) such as Na_2O, MgO, or Al_2O_3
Ampohoteric	e.g. Fe_2O_3

Properties of Major Fluxes

Spectroflux® 100 Lithium tetraborate ($Li_2B_4O_7$)

An 'acidic' flux suited to dissolution of samples containing a high concentration of basic oxides, carbonate rocks and aluminosilicates. High silica bearing samples dissolve slowly (1h); in contrast with aluminas and aluminosilicates (20 min) at 1200°C. Beads produced from $Li_2B_4O_7$, which are significantly less hygroscopic than those prepared using $Na_2B_4O_7$, do not generate interfering X-ray emissions, and have a lower absorption for light element radiations. By using $Li_2B_4O_7$, sodium can be included in the analytical program.

Spectroflux® 100A Lithium metaborate ($LiBO_2$)

Rapidly dissolves a wide range of aluminosilicates, in particular, the more acidic oxide compositions. However, materials containing in excess of 85% Al_2O_3 tend to promote devitrification of the bead, due to undissolved particulates. $LiBO_2$ is generally used when an aqueous medium is required for analysis, e.g. AA spectrometry.

Due to its relatively low melting point, fusion can be effected over a gas burner and the melt is free-flowing even at 1000°C. $LiBO_2$ will not cast in the absence of a sample to give a clear transparent bead. Beads made with $LiBO_2$ are less likely to crack than those prepared using $Li_2B_4O_7$.

Spectroflux® 100B ($4LiBO_2$:$1Li_2B_4O_7$)

A eutectic composition specially formulated to dissolve aluminosilicates ranging from 100% SiO_2 to 100% Al_2O_3. It combines the superior melt characteristics of $LiBO_2$ with the ability of $Li_2B_4O_7$ to dissolve high alumina samples rapidly. Strongly basic materials such as magnesite and calcite, when fused with 100B, will not produce stable beads.

Spectroflux® 105, 106, 108 and 112

Based on an alkali metal borate, each of these fluxes contains lanthanum oxide as a heavy absorber to minimize inter-element effects, thus allowing the analysis of a wide range of materials on the same calibration curves. Sensitivity is slightly reduced for light elements; overlap of LaM line with NaK line occurs and minor interferences are experienced when determining Mg, Ti and Mn. Lanthanum oxide (La_2O_3) increases the basicity of the flux and assists in the formation of a glass.

Spectroflux® 100E, 104, 108, 118, 128 and 161

Based on an alkali metal borate, each of these fluxes contains nitrate or carbonate additions to provide an oxidizing flux for use with samples containing reduced species.

Spectroflux® 110 and 110A

Formulated for silicate and calcareous materials, these compositions are more acidic than Spectroflux® 100B.

Spectroflux® 120 and 120A

Both compositions have a relatively low melting point due to the presence of alkali metal fluoride. Fusions using these compositions should be carried out in a well-ventilated fume cupboard.

Spectroflux® 1000, 1010 and 1010A

Pre fused fluxes; often used in the steel and cement industry.

Spectroflux Analytical Fluxes

Spectroflux® 200 Series

These are sodium analogues of the Spectroflux 100 Series. Sodium borate beads are hygroscopic by nature.

Special Fluxes

Alfa Aesar will gladly consider producing fluxes to suit customers' needs. We already have over 100 unlisted special fluxes!

Flux Fusion: Typical Applications

Spectroflux analytical fluxes are used throughout industry for effecting rapid dissolution of many different types of chemically stable inorganic materials.

- aluminosilicate refractories
- aluminum ores: aluminas
- carbides
- cement, raw mix and finished; concrete
- catalyst supports
- chrome ores and refractories
- coal ashes and furnace deposits
- copper ores; slags and concentrates
- iron ores: iron and related slags; iron sinters; steel slags ferro-alloys
- lead ores and slags
- manganese ores and slags
- metal alloys
- niobium and tantalum ores
- rare earth ores
- silicate; aluminosilicate; phosphate and carbonate rocks; minerals and ores
- soils
- tin ore and concentrates
- titanium ores
- tungsten ores
- welding fluxes
- zircons: silicon and boron carbides

Platinum Alloy Crucibles

Unalloyed platinum and graphite crucibles are quite often used to fuse samples of refractory materials, but both suffer from the disadvantage that they are wetted by the fusion mixture.

To overcome this disadvantage Johnson Matthey has developed a special range of platinum laboratory apparatus indluding gold/platinum, gold/rhodium/platinum and the highly resistant zirconia grain stabilized platinum (ZGS) alloy. All types of casting dishes and lids for automatic fusion equipment can also be supplied by Alfa Aesar.

Stock #	Description	Standard Selling Sizes
12078	**Spectroflux 100, Lithium tetraborate** m.p. ≈920°, Application(s): A general purpose acidic flux for fusing basic oxides, carbonates, alumino-silicates, glass, ceramics, cement steel, aluminum, concrete mixes, soils, magnesites, bauxites and rare earth oxides. Dissolves most refractories. Not suitable for highly acidic samples. Samples must be fully oxidized, † ✖ R:36/37/38, S:26-36/37/39-45	**bulk**
96149	**Spectroflux 100, Lithium tetraborate (100-500 micron)** m.p. 920°, Application(s): An acidic flux for fusing basic oxides, carbonates, alumino silicates, glass, ceramics, cement, steel, aluminum, concrete mixes, soils, magnesites, bauxites and rare earth oxides, † ✖ R:36/37/38, S:26-36/37/39-45	**bulk**

Stock #	Description	Standard Selling Sizes
41951	**Spectroflux 100, low phosphorus, Lithium tetraborate, phosphorus <20ppm** m.p. 920°, Application(s): A general purpose flux with a low phosphorus content. Dissolves most refractories. Often used in testing of ceramics. Not suitable for highly acidic samples. Samples must be fully oxidized, †  R:36/37/38, S:26-36/37/39-45	**bulk**
12079	**Spectroflux 100A, Lithium metaborate** m.p. ≈845°, Solubility: Soluble in water, Application(s): A basic flux. Recommended for acidic samples. Often used in testing of ceramics and steel. Will not dissolve highly basic refractories. Samples must be fully oxidized. For use with AA and ICP instrumentation, †  R:22-36/37/38, S:26-36/37	**bulk**
12080	**Spectroflux 100B, Lithium metaborate & Lithium tetraborate, 80:20 w/w%** m.p. ≈840°, Application(s): Intermediate acidity. Will dissolve entire aluminosilicate range. Samples must be fully oxidized. Often used in testing of ceramics and glass, †  R:22-36/37/38, S:26-36/37/39-45	**bulk**
97890	**Spectroflux 100D, Lithium metaborate & Lithium tetraborate, 64.7:35.3 w/w%** Application(s): Specialized applications, †  R:36/37/38, S:26-36/37/39-45	**bulk**
12082	**Spectroflux 104, Lithium tetraborate & Lithium carbonate, 55.5:44.5 w/w%** m.p. ≈740°, Application(s): A basic oxidizing flux. Suitable for sulfate, phosphate, and other acidic minerals. Will oxidize traces of reduced species, †  R:22-36/37/38, S:26-36/37	**bulk**
12083	**Spectroflux 105, Lithium tetraborate, Lithium carbonate & Lanthanum oxide, 47:37:16 w/w%** 47:37:16 w/w%, m.p. ≈700°, Application(s): A basic oxidizing flux. Suitable for sulfate, phosphate, and other acidic minerals. Will oxidize traces of reduced species. Used where computer signal processing is limited, Note: Contains La as a heavy absorber, †  R:61-62-22-36/37/38, S:26-36/37/39-45	**bulk**
12321	**Spectroflux 106, Lithium tetraborate & Lanthanum oxide, 85:15 w/w%** m.p. ≈900°, Application(s): Non-oxidizing, intermediate activity flux with heavy absorber. Samples must be fully oxidized. Often used in testing of steel, †  R:36/37/38, S:26-36/37/39-45	**bulk**
12320	**Spectroflux 107, Lanthanum oxide & Lithium tetraborate, 18.2:81.8 w/w%** m.p. ≈900°, Application(s): Often used in testing of cement, †  R:36/37/38, S:26-36/37/39-45	**bulk**
12085	**Spectroflux 108, Lithium tetraborate, Lanthanum oxide & Sodium nitrate, 76.2:14.3:9.5 w/w%** m.p. ≈790°, Application(s): A strongly oxidizing acidic flux. Suitable for samples containing significant amounts of reduced species, UN1479, †  R:8-36/37/38, S:17-26-37	**bulk**
12086	**Spectroflux 110, Lithium tetraborate & Lithium metaborate, 66.5:33.5 w/w%** m.p. ≈875°, Application(s): Intermediate activity flux. Suitable for aluminosilicates and calcareous refractories. Often used in testing of cement and steel. Samples must be fully oxidized, †  R:36/37/38, S:26-36/37/39-45	**bulk**
12087	**Spectroflux 110A, Lithium tetraborate & Lithium metaborate, 50:50 w/w%** m.p. ≈870°, Application(s): Intermediate acidity. Suitable for chrome ore bearing samples up to 50% by weight. Often used in testing of glass. Samples must be fully oxidized, †  R:22-36/37/38, S:26-36/37	**bulk**
96153	**Spectroflux 112, Lithium tetraborate, Lathanum oxide & Lithium Iodide, 82:15:3 w/w%** Application(s): Specialized applications, †	**bulk**
12088	**Spectroflux 118, Lithium tetraborate & Sodium nitrate, 75:25 w/w%** m.p. ≈680°, Application(s): A strongly oxidizing acidic flux. Will oxidize significant concentrations of reduced species during fusion, UN1498, †  R:8-36/37/38, S:26-36/37-38-45	**bulk**

Spectroflux Analytical Fluxes

Stock #	Description	Standard Selling Sizes
12089	**Spectroflux 120, Lithium tetraborate & Lithium fluoride, 80:20 w/w%** m.p. ≈780°, Application(s): A low viscosity, low melting, acidic flux. Suitable for fusion on gas burners. Samples must be fully oxidized, †  R:36/37/38, S:26-37	**bulk**
36222	**Spectroflux® 120A, Lithium tetraborate & Lithium fluoride, 90:10 w/w%** m.p. ≈780°, Application(s): Often used in testing of petroleum, †  R:22-36/37/38, S:26-36/37	**bulk**
97429	**Spectroflux 125, 51% Lithium tetraborate, 27% Lithium metaborate, 12% Lanthanum Oxide, 10% Lithium Fluoride Fused Flux ,** †  R:22-36/37/38, S:26-36/37/39-45	**bulk**
12090	**Spectroflux 128, Lithium tetraborate, Lithium metaborate & Sodium nitrate, 33.0:61.5:5.5 w/w%** m.p. ≈840°, UN1498, †  R:8-36/37/38-62, S:26-36/37-38-45	**bulk**
12092	**Spectroflux 161, Lithium tetraborate & Lithium nitrate, 90:10 w/w%** m.p. ≈870°, Application(s): Often used in testing of aluminum, UN1498, †  R:8-36/37/38, S:26-36	**bulk**
12093	**Spectroflux 200, Sodium tetraborate** m.p. ≈740°, Application(s): Often used in testing of ceramics and steel, †  R:22, S:26-36/37	**bulk**
96569	**Spectroflux 1000, Lithium tetraborate (fused), (<800 micron)** Application(s): Often used in testing of cement, †  R:36/37/38, S:26-36/37/39-45	**bulk**
96689	**Spectroflux 1000B, Lithium metaborate & Lithium tetraborate, 80:20 w/w%, fused ,** †  R:22-36/37/38, S:26-36/37	**bulk**
96713	**Spectroflux 1000D, Lithium metaborate & Lithium tetraborate, 64.7:35.3 w/w%, fused. ,** †  R:36/37/38, S:26-37	**bulk**
96571	**Spectroflux 1010, Lithium tetraborate & Lithium metaborate, 66.5:33.5 w/w%, fused**  R:22-36/37/38, S:26-36/37	**bulk**
96572	**Spectroflux 1010A, Lithium tetraborate & Lithium metaborate, 50:50 w/w%, fused ,** †  R:22-36/37/38, S:26-36/37	**bulk**

Section 19 Labware

Precious Metal Labware

Why Alfa Aesar?

Alfa Aesar, a Johnson Matthey company, offers its customers the unique opportunity to order all of their laboratory products from one source, from platinum labware to reagent grade chemicals.

The analytical laboratory is a vital part of all industrial plants and research facilities. While many analytical techniques have evolved over the years, one fundamental practice remains the same; the use of high-purity inert materials. In this category, platinum has properties that make it the ideal choice. It offers a high degree of inertness and can be readily fabricated into a wide variety of products, from evaporating and special purpose dishes, beakers and electrodes to microchemistry apparatus and utensils.

Our Zirconia Grain Stabilized (ZGS) line is also available in most labware items. ZGS offers enhanced high temperature strength and, therefore, longer life at the same weight as conventional platinum.

Johnson Matthey, Alfa Aesar's parent company, has been manufacturing and marketing platinum labware for over 140 years. With the development of the oxy-hydrogen blowpipe in 1801 in Philadelphia, it was possible to melt such materials as platinum, iridium and rhodium. In 1832 the inventor of the blowpipe, Robert Hare, hired a young man as an instrument maker at the University of Pennsylvania. That young man was Joaquim Bishop. He became familiar with Hare's oxy-hydrogen blowpipe and his achievements in melting platinum, and he is said to have made some improvements to Hare's process. It is not, therefore, surprising to find that he left the University in 1839 to become a "Machinist and Philosophical Instrument Maker".

In 1842 Bishop took up the refining and fabricating of platinum, employing the blowpipe in the process. In 1845 he was awarded a silver medal for "skill and ingenuity in the manufacture of platinum scientific instruments" by the Franklin Institute.

In 1858 he moved out of Philadelphia to Radnor, Pennsylvania, in search of space and privacy. In 1865 he moved again to Sugartown, a few miles south of Malvern, Pennsylvania, and there he bought an estate of 43 acres where he built a fabrication shop, a smiths' shop for forging, a melting room and a refining laboratory. Metal was melted in 20-ounce units and a great variety of small laboratory essentials were produced. The staff was only two or three in number and Bishop himself was his own skilled workman and salesman.

Joaquim Bishop was active in the business until about two years before his death in 1886. His assistant Edwin Cox carried on the business until 1890 when Bishop's grandson and heir, J. B. Matlack, came of age. In January of 1903, the workshop and refinery, with all papers and records, were completely destroyed by fire. The business, however, was immediately reorganized, with Matlack as President and Charles H. Kerk as Secretary and Treasurer. In 1909 the company was incorporated as J. Bishop & Co. Platinum Works and continued until 1931 when it was acquired by London-based Johnson Matthey & Co., Ltd. It became Matthey Bishop, Inc. in 1967 and Johnson Matthey, Inc. in 1980.

To this day, platinum is without equal in its usage in many laboratory applications.

Platinum resists the action of almost all acids and is unaffected by a wide variety of corrosive substances. It has a high melting point (1769°C), a low heat capacity, and can be heated in air without any weight loss due to oxidation.

This section of our catalog provides you with a comprehensive guide to our laboratory products line. We will be happy to provide you with immediate price and delivery information, and to quote on non-standard items. Complete scrap recovery and refining services are also offered for worn or damaged items, which can be remade to the item of your choice.

ZGS Platinum

ZGS Platinum Materials for Even Better Performance

The use of Platinum and its alloys (up to 25%) is well established in the automotive, chemical, glass, electrical and dental industries. However, these applications often require high-temperature operation of these alloys. At high temperatures conventional platinum group metals are subject to grain growth and, therefore, are weak and subject to creep deformation. They can also be subject to contamination failure.

Johnson Matthey has developed zirconia grain stabilized (ZGS) platinum that is resistant to grain growth and, therefore, contamination and deformation at high temperatures.

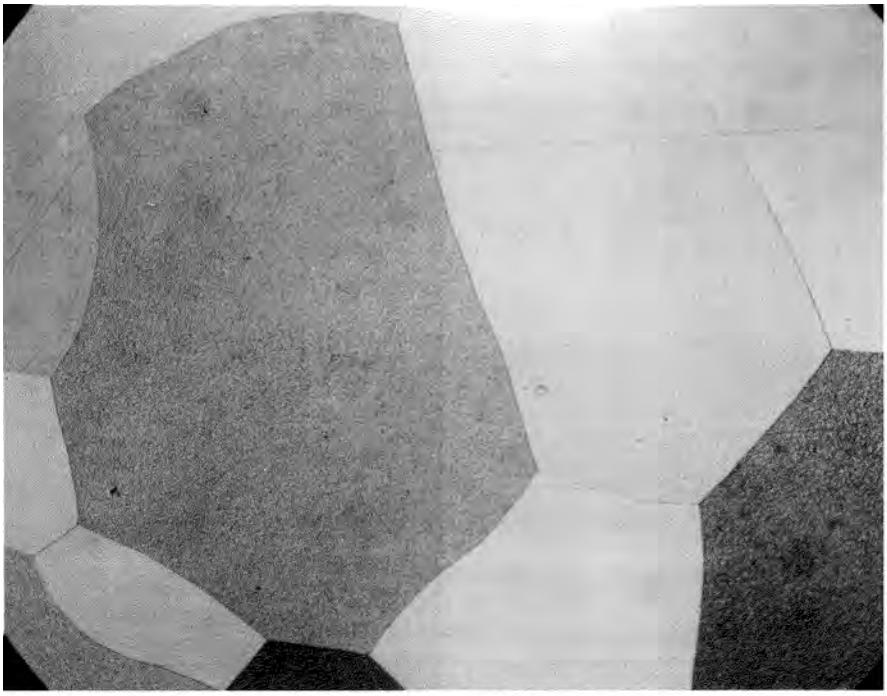
An exclusive development by Johnson Matthey, ZGS platinum now makes available a superior material that offers significantly improved performance over conventional platinum materials. ZGS platinum materials are produced by incorporating a fine insoluble phase, dispersed uniformly throughout the platinum metal matrix, a process called dispersion strengthening.

The principle of grain stabilization has been established in the base metal world for some time. The difficulty had always been in achieving production of grain-stabilized material on a large scale and to a consistent property specification. However, experts at Johnson Matthey developed a unique process to meet these requirements, and has been using it for over 15 years.

Metallurgical Stability at Elevated Temperatures

Zirconia grain stabilization provides greater resistance to grain growth, dislocation movement and grain boundary sliding. These problems normally occur in conventional platinum at high temperatures, causing sagging, bulging and cracking.

In ZGS platinum and ZGS platinum 10% rhodium, the finely dispersed ZrO_2 ceramic particles are evenly distributed in the grains and on the grain boundaries. The dispersant in the regions between the grains resists or impedes grain growth and grain boundary sliding. The dispersion within the grain impedes the movement of dislocations within the grain itself. Note its effectiveness in the accompanying microstructure photographs.



100x magnification of pure platinum sheet after heating for 500 hours at 1400° C shows typical grain growth

100x magnification of ZGS platinum sheet after same heat and time shows how the grain growth has been greatly retarded.

ZGS Platinum

How ZGS Behaves at Room Temperature

Property	100% Pt	Pt 10% Rh	Pt 20% Rh	ZGS Pt	ZGS Pt 10% Rh
Specific Gravity (g/cm^3)	21.4	20.0	18.8	21.4	19.8
Electrical Resistivity at 0°C (32°F) (microhm. cms)	10.6	18.4	20.0	11.12	21.2
Temp Coeff. of Electrical Resistivity 0-10°C (32-212°F)	0.0039	0.0017	0.0014	0.0031	0.0016
Ultimate Tensile Strength (kpsi-annealed)	18.0	48.0	70.0	26.5	51.5
Hardness (VHN)	40	90	115	60	110

How ZGS Alloys Behave at Working Temperatures

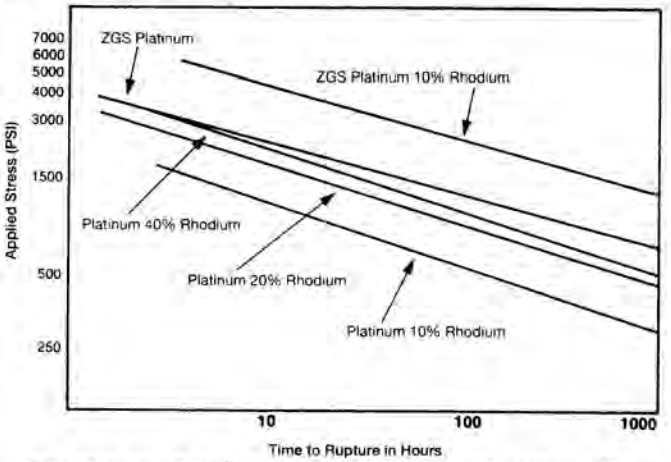


Fig. 1

Stress rupture properties of ZGS platinum, ZGS platinum 10% rhodium and the commercially important conventional alloys. The curves refer to tests carried out at 1400° C in air on 1.5mm thick sheet specimens.

Figure 1 illustrates graphically the dramatic improvement in high-temperature life achieved by grain stabilization.

The time to failure at 1400°C under a stress of 1425 psi shows that ZGS Pt lasts up to twice as long as the best conventional Pt-Rh alloy and ZGS Pt 10% Rh lasts more than 10 times as long as ZGS Pt.

In terms of the rate of deformation before failure, ZGS materials are at least 1,000 times better than Pt 25% Rh.

Ultimate Tensile Strength at Elevated Temperatures (KPSI-Annealed)

Temperature (°C)	100% Pt	Pt 10% Rh	Pt 20% Rh	ZGS Pt	ZGS Pt 10%
1000	3.4	11.9	33.4	7.4	23.7
1100	2.4	8.8	23.5	6.5	20.3
1200	1.85	6.8	14.4	5.4	18.2
1300	1.14	5.5	9.95	5.1	13.4
1400	0.57	4.4	7.1	4.1	12.1
1500	-	3.4	5.5	3.4	10.2

Why Use ZGS?

- It resists contamination failure for extended periods and extends crucible life.
- ZGS offers an opportunity to reduce component weight while maintaining material integrity.
- ZGS is produced in 500 troy ounce batches which are totally consistent in properties.
- Products are available in ZGS Platinum, ZGS Platinum 10% Rhodium and ZGS Platinum 5% Gold. Other alloys available upon request.

Successful ZGS Platinum Applications Include:

- Products where high temperature causes creep, distortion and ultimately failure of unsupported conventional platinum and its alloys. ZGS platinum-rhodium bushings, used for the production of continuous filament glass fiber, resist creep-induced sagging and eliminate the need for costly structural platinum supports.
- Glass-carrying apparatus designed with thinner wall sections, yet having 50% greater useful life.
- Lightweight thermocouple sheaths fabricated with walls one-half the conventional thickness.
- Coreless stirrers, ZGS platinum often makes possible the elimination of molybdenum and ceramic cores, improving service life and reducing potential inservice problems.

Your Choice of Materials

Only a few metals are required to produce a wide array of durable labware. The basic noble metals group consists of platinum, rhodium, ruthenium, osmium, palladium, iridium, gold and silver. Ruthenium and osmium, however, are unworkable in their pure form, and are only offered under special circumstances. On the following page, we have assembled information on the most common metals and alloy combinations for labware.

Platinum

Pure platinum has excellent resistance to chemical attack by acids and fusion mixtures. The bulk of our laboratory ware is manufactured with Johnson Matthey labware platinum. This contains 99.8% pure platinum, plus small amounts of iridium and rhodium for added strength and durability.

Platinum-Rhodium

When physical conditions require high labware strength at all temperatures, a platinum 10% rhodium alloy offers superior performance to pure platinum. It is not recommended for applications that involve repeated fusions, since it is slightly more susceptible to chemical attack than pure platinum.*

*Rhodium oxides may form which could volatilize off causing weight loss and a weakened material.

ZGS Platinum

After repeated use at very high temperatures, pure platinum labware begins to sag, bulge and crack. Johnson Matthey Inc. developed ZGS platinum to compensate for this metallurgical instability. ZGS platinum is a grain stabilized platinum with enhanced high-temperature properties. As a result of its greater strength at high temperatures, ZGS platinum offers the opportunity for longer life and better resistance to low-level contamination. More specific information on ZGS platinum is contained on the data sheet that follows later in this catalog.

Platinum-Gold Non-Wetting Alloys

Platinum 5% gold is commonly used in sample preparations of glass beads for X-ray fluorescence analysis in the glass, cement and ceramic industries. This is because of the "non-wetting" property, conferred on the platinum by the gold addition, which results in easy removal of samples after fusion.

Also, Alfa Aesar offers extra strength and durability in its exclusive ZGS platinum 5% gold formula. The ZGS product is a stronger, more creep-resistant, high-temperature alloy. It also provides superior resistance to low-level contamination. Additional information on platinum-gold non-wetting alloys is contained in a data sheet that follows later in this catalog.

Silver

Silver apparatus is sometimes preferred for fusions with alkali hydroxides.

Gold

Gold is sometimes used for hydrofluoric acid treatment of siliceous materials.

Iridium

Pure iridium crucibles are widely used for the growing of crystals from high-purity melts at temperatures of up to 2200°C. Further details on iridium crucibles are available upon request.

Platinum Labware Scrap Recovery Program

Alfa Aesar's Platinum Labware Recovery program is unique in the industry, offering you a cost-effective way to purchase new labware by returning your used labware for credit.
Additional benefits to the Program include:

- The highest reclaim available
- Many replacement crucibles in stock for same day shipment
- Most credits issued within 72 hours of receipt of material

Turn your used crucibles into new ones!
Call 1-888-343-8025 extension 6459.
Return authorization numbers issued for customers only. Other terms may apply.

Non-Wetting Platinum-Gold Apparatus

Flux fusions are widely employed on a routine basis for the preparation of samples for X-ray fluorescence and other instrumental and classical analysis techniques.

Several types of automatic equipment are available for this work, and specially designed crucibles and molds are produced by Johnson Matthey for use with this equipment. Although the table lists standard sizes only, crucibles and molds for automatic equipment such as Claisse, Perl X2, LECO and Herzog are also available. Normally, non-wetting Pt 5% Au alloy is used for this work, although any alloy or material may be specified.

Johnson Matthey developed ZGS platinum 5% gold especially for non-wetting applications. It combines the workability and non-wetting properties of ordinary platinum 5% gold with the hot strength of rhodium platinum alloys, yet is easier to fabricate and offers better stability. Its resistance to contamination makes it ideal for use in X-ray fluorescence sample preparation.

ZGS platinum 5% gold from Johnson Matthey is dispersion strengthened to give it up to twice the working life of ordinary non-wetting gold-platinum labware. Its grain structure is stabilized by the introduction of very fine zirconia particles dispersed evenly throughout the platinum-gold matrix in minute quantities. The nobility of the alloy is fully maintained at this trace particle level.

Dispersion strengthening properties are maintained up to 90% of the true melting point of the alloy -- approximately 2705°F. The strengthening process also helps prevent the gold from leaching out, which assures that the labware will keep its non-stick characteristics throughout its longer life.

Claisse Form Crucibles

Stock No.*	Fig No.	Capacity (ml)	Dimensions (mm) Top Dia	Bottom Dia	Ht	Approx Wt (g)
20110	121	20	34 (crucible) 41 (rim)	21	35	26.0
21135	121	25	35 (crucible) 44 (rim)	21	35	26.0
21827	121	25	37 (crucible) 43 (rim)	20	32	30.0

Claisse Form Molds

Stock No.*	Fig No.	Dimensions (mm) Top Dia	Ht	Approx Wt (g)
21830	122	30 (mold) 37 (rim)	5.5	16.0
21651	122	31 (mold) 40 (rim)	5.5	15.0
21828	122	32 (mold) 41 (rim)	7.0	30.0
20087	122	35 (mold) 44 (rim)	6.6	42.0
21136	122	38 (mold) 47 (rim)	6.0	29.0
20296	122	39 (mold) 47 (rim)	5.0	20.0
21423	122	40 (mold) 49 (rim)	6.6	26.0
21824	122	40 (mold) 49 (rim)	6.6	34.5

Uranium Fusion Dish

Stock No.*	Fig No.	Dimensions (mm) Top Dia	Ht	Approx Wt (g)
20041	123	17.46 (crucible) 17.84 (rim)	3.18	2.3

Note: Weights are for 5% Au, 95% Pt, those for ZGS 5% Au, 95% Pt and 3% Au, 10% Rh, 87% Pt are similar.

*Stock numbers reflect Platinum 5% Gold alloy.

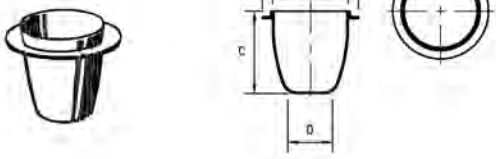


Fig. 121

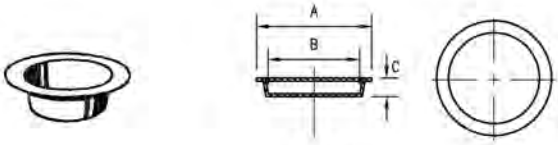


Fig. 122

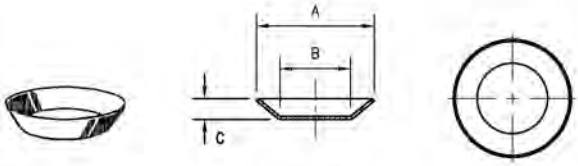


Fig. 123

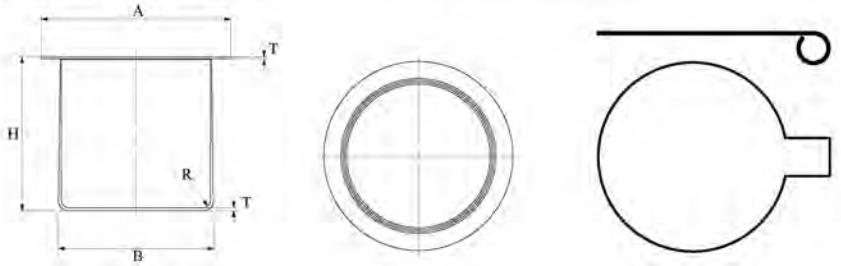
Crucibles and Molds for Sample Bead Preparation used in XRF, ICP, AA Analysis

Crucible for Philips Perl'X

	Dimensions (mm)						
Stock No.*	H	B	A	T_1	T_2	R	Est. wt. (g)
21353	40	41	50	0.5	0.8	2.0	83
21876	40	41	50	0.5	0.9	2.0	116
21404	40	41	48	0.5	0.8	4.5	78
21657 (lid)	-	-	-	-	-	-	28

Note: Weights are for 5% Au, 95% Pt, those for ZGS 5% Au, 95% Pt and 3% Au, 10% Rh, 87% Pt are similar.

*Stock numbers reflect Platinum 5% Gold alloy.

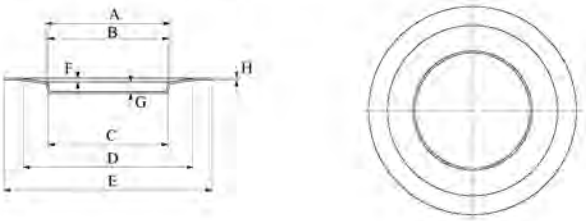


Casting Mold for Philips Perl'X

	Dimensions (mm)								
Stock No.*	A	B	C	D	E	F	G	H	Est. wt. (g)
21831	32	30.5	31.5	45	55	1	3	0.5	26
21832	32	30.5	31.5	45	55	1	3	0.7	41
21406	32	30.5	31.5	45	55	1	3	1	52
21405	32	30.5	31.5	55	65	1	10	1	63

Note: Weights are for 5% Au, 95% Pt, those for ZGS 5% Au, 95% Pt and 3% Au, 10% Rh, 87% Pt are similar.

*Stock numbers reflect Platinum 5% Gold alloy.

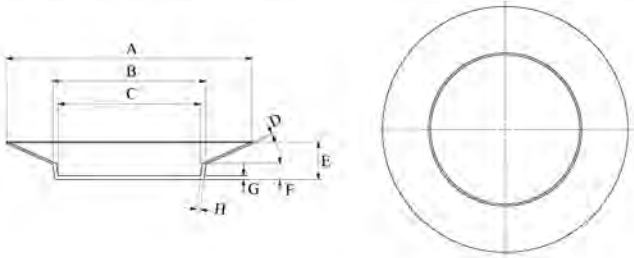


Casting Mold for Philips Perl'X

	Dimensions (mm)								
Stock No.*	A	B	C	D	E	F	G	H	Est. Wt. (g)
21403	65	40.5	39.5	0.5	10.0	3	1.0	1.0	63
21758	65	31.5	30.5	0.5	10.0	3	1.0	1.0	56
21720	65	32.0	30.5	0.5	11.5	3	1.0	1.0	60

Note: Weights are for 5% Au, 95% Pt, those for ZGS 5% Au, 95% Pt and 3% Au, 10% Rh, 87% Pt are similar.

*Stock numbers reflect Platinum 5% Gold alloy.

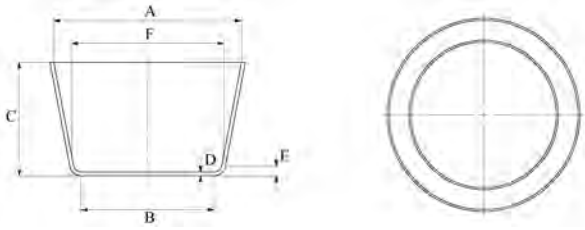


Casting Crucible for Herzog Automatic Fusion Machine

	Dimensions (mm)						
Stock No.*	A	B	C	D	E	F	Est wt. (g)
21385	50	38.5	30	1.0	3.5	39.5-40.0	83
21875	50	38.5	30	1.5	3.5	39.5-40.0	180

Note: Weights are for 5% Au, 95% Pt, those for ZGS 5% Au, 95% Pt and 3% Au, 10% Rh, 87% Pt are similar.

*Stock numbers reflect Platinum 5% Gold alloy.

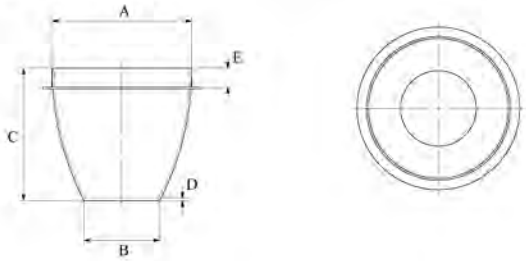


Crucible for Leco FX-100 and FX-200 Automatic Fluxer

	Dimensions (mm)					
Stock No.*	A	B	C	D	E	Est. wt. (g)
20321	37	20	35.0	0.6	5	45
21747	35	21	38.5	0.45	5	35

Note: Weights are for 5% Au, 95% Pt, those for ZGS 5% Au, 95% Pt and 3% Au, 10% Rh, 87% Pt are similar.

*Stock numbers reflect Platinum 5% Gold alloy.

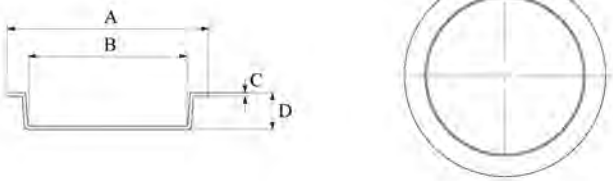


Casting Mold for Leco FX-100 and FX-200 Automatic Fluxer

	Dimensions (mm)				
Stock No.*	A	B	C	D	Est. wt. (g)
20322	44	35	.76	0.8	32
20886	47	39	-	6.5	45.5

Note: Weights are for 5% Au, 95% Pt, those for ZGS 5% Au, 95% Pt and 3% Au, 10% Rh, 87% Pt are similar.

*Stock numbers reflect Platinum 5% Gold alloy.



Crucibles

All Johnson Matthey crucibles are designed to withstand hard and varied use. Reinforced tops and bottoms can be supplied for added strength without adversely affecting capacity or fit of the cover. Non-standard crucible sizes and lids are available upon request.

Most crucibles are constructed of platinum, but customers may also request specially manufactured crucibles made from our list of alloys.

Platinum Labware Scrap Recovery Program

Alfa Aesar's Platinum Labware Recovery program is unique in the industry, offering you a cost-effective way to purchase new labware by returning your used labware for credit. Additional benefits to the Program include:

- The highest reclaim available
- Many replacement crucibles in stock for same day shipment
- Most credits issued within 72 hours of receipt of material

Turn your used crucibles into new ones!
Call 1-888-343-8025 extension 6459.
Return authorization numbers issued for customers only. Other terms may apply.

Low Form Crucibles - Wide Bottom - Fig. 22

Low Form - Wide Bottom Dimensions (mm)								
Cap (ml)	Top Dia (A)	Bottom Dia (B)	Ht (C)	Wall (D)	Crucible Wt (g)	Stock No.*	Std Cover Only wt (g)	Stock No.*
8	28	17	17	0.17	6.0	**20489**	1.5	**20700**
10	29	17	20	0.17	7.0	**20095**	2.0	**20004**
15	35	23	20	0.21	11.0	**20122**	3.0	**20181**
20	36	23	25	0.23	15.0	**20015**	4.0	**20016**
25	37	23	30	0.25	19.0	**20178**	6.0	**20182**
30	43	27	27	0.26	22.0	**20017**	6.0	**20018**
35	43	27	30	0.27	25.0	**20480**	6.5	**20467**
40	44	27	34	0.29	30.0	**20338**	7.0	**20187**
50	49	30	34	0.31	37.0	**20248**	8.0	**20072**
60	50	30	39	0.31	42.0	**20690**	9.0	**20691**
70	51	30	44	0.31	47.0	**21101**	12.0	**21125**
80	56	34	42	0.31	51.0	**21102**	14.0	**21126**
90	57	34	46	0.29	52.0	**21103**	15.0	**21127**
100	57	34	50	0.30	59.0	**20211**	23.0	**20212**
110	65	40	42	0.34	68.0	**20891**	24.0	**20727**
125	66	40	46	0.45	97.0	**21104**	25.0	**21128**
200	85	55	44	0.52	150.0	**21108**	30.0	**21129**
250	87	55	52	0.52	174.0	**21109**	40.0	**21131**

Note: Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

*Stock numbers reflect Platinum only. Platinum alloy dimensions may vary.

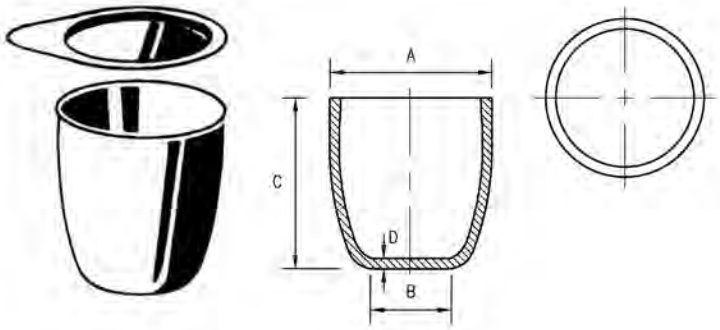


Fig. 22

Low Form Crucibles - Wide Bottom Reinforced — Fig. 22A

Low Form - Wide Bottom Dimensions (mm)								
Cap (ml)	Top Dia (A)	Bottom Dia (B)	Ht (C)	Wall (D)	Crucible wt (g)	Stock No.*	Std Cover Only wt (g)	Stock No.*
8	28	17	17	0.23	80	**20003**	1.5	**20700**
10	29	17	20	0.22	9.0	**21111**	2.0	**20004**
15	35	23	20	0.27	14.0	**20179**	3.0	**20181**
20	36	23	25	0.28	18.0	**20180**	4.0	**20016**
25	37	23	30	0.30	23.0	**20147**	6.0	**20182**
30	43	27	27	0.32	27.0	**20166**	6.0	**20018**
35	43	27	30	0.35	32.0	**21132**	6.5	**20467**
40	44	27	34	0.35	36.0	**20554**	7.0	**20187**
50	49	30	34	0.38	45.0	**20071**	8.0	**20072**
60	50	30	39	0.40	54.0	**20484**	9.0	**20691**
70	51	30	44	0.41	63.0	**21113**	12.0	**21125**
80	56	34	42	0.44	72.0	**20852**	14.0	**21126**
90	57	34	46	0.45	81.0	**21115**	15.0	**21127**
100	57	34	50	0.45	88.0	**20114**	23.0	**20212**
110	65	40	42	0.48	95.0	**21117**	24.0	**20727**
125	66	40	46	0.53	114.0	**21121**	25.0	**21128**
200	85	55	44	0.62	180.0	**21123**	30.0	**21129**
250	87	55	52	0.62	210.0	**21124**	40.0	**21131**

Note: Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

*Stock numbers reflect Platinum only.

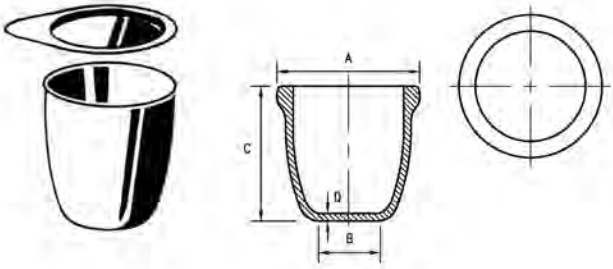


Fig. 22A

Standard Form Crucibles — Fig. 25

Standard Form Dimensions (mm)										
Cap (ml)	Top Dia (A)	Bottom Dia (B)	Ht (C)	Wall (D)	Crucible Wt (g)	Stock No.	Standard Cover Only wt (g)	Stock No.*	Capsule Cover Only wt (g)	Stock No.*
5	21	12	18	0.15	4.0	**20277**	1.5	**20990**	-	
8	23	12	26	0.16	6.0	**20157**	1.8	**20991**	-	
10	24	12	31	0.15	7.0	**20023**	2.0	**20013**	6.0	**20014**
15	30	17	27	0.20	11.0	**20024**	3.0	**20149**	8.0	**21001**
20	32	17	34	0.22	15.0	**20025**	4.0	**20124**	9.0	**20184**
25	32	17	40	0.23	19.0	**20019**	5.0	**20020**	10.0	**21002**
30	38	23	34	0.25	22.0	**20150**	6.0	**20177**	11.0	**21003**
35	39	23	38	0.26	25.0	**20141**	6.5	**20155**	-	
40	39	23	43	0.27	30.0	**20502**	7.0	**20314**	13.0	**21005**
50	45	27	40	0.31	38.0	**20042**	8.0	**20043**	14.0	**21006**
60	46	27	46	0.33	46.0	**20002**	8.0	**20619**	15.0	**21007**
70	47	27	52	0.31	50.0	**20985**	13.0	**20992**	17.0	**21008**
80	52	30	49	0.30	51.0	**20104**	14.0	**20993**	19.0	**21009**
90	53	30	53	0.28	52.0	**20986**	17.0	**20994**	21.0	**21010**
100	54	30	58	0.29	59.0	**20096**	17.0	**20142**	23.0	**21011**
110	58	34	54	0.33	68.0	**20987**	17.0	**20995**	23.0	**21012**
125	59	34	60	0.33	76.0	**20238**	17.0	**20996**	23.0	**21013**
150	68	40	53	0.40	100.0	**20988**	23.0	**20669**	-	
200	70	40	67	0.43	135.0	**20143**	25.0	**20997**	-	
250	72	40	79	0.44	165.0	**20275**	30.0	**20198**	-	
500	95	55	91	0.53	306.0	**20989**	45.0	**20998**	-	

Note: Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

*Stock numbers reflect Platinum only.

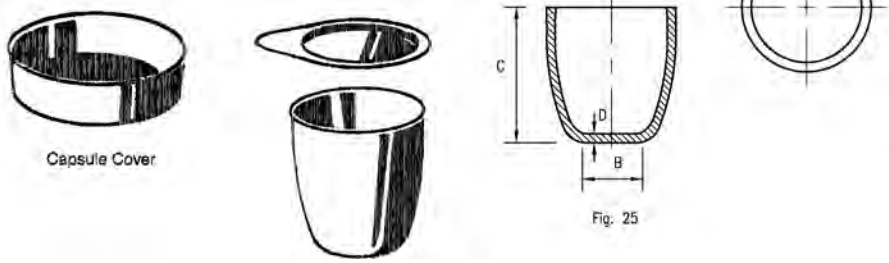


Fig. 25

Standard Form Reinforced Crucibles — Fig. 27

Standard Form Dimensions (mm)										
Cap (ml)	Top Dia (A)	Bottom Dia (B)	Ht (C)	Wall (D)	Crucible wt (g)	Stock No.	Std Cover Only wt (g)	Capsule** Stock No.*	Capsule** Cover Only wt (g)	Capsule** Stock No.*
5	21	12	18	0.19	5.0	**20010**	1.5	**20990**	-	
8	23	12	26	0.21	8.0	**20427**	1.8	**20991**	-	
10	24	12	31	0.20	9.0	**20012**	2.0	**20013**	6.0	**20014**
15	30	17	27	0.25	14.0	**20251**	3.0	**20149**	8.0	**21001**
20	32	17	34	0.26	18.0	**20123**	4.0	**20124**	9.0	**20184**
25	32	17	40	0.28	23.0	**20111**	5.0	**20020**	10.0	**21002**
30	38	23	34	0.31	27.0	**20284**	6.0	**20177**	11.0	**21003**
35	39	23	38	0.33	32.0	**20200**	6.5	**20155**	-	
40	39	23	43	0.33	36.0	**20233**	7.0	**20314**	13.0	**21005**
50	45	27	40	0.37	45.0	**20049**	8.0	**20043**	14.0	**21006**
60	46	27	46	0.38	54.0	**20869**	8.0	**20619**	15.0	**21007**
70	47	27	52	0.39	63.0	**20103**	13.0	**20992**	17.0	**21008**
80	52	30	49	0.42	72.0	**21018**	14.0	**20993**	19.0	**21009**
90	53	30	53	0.44	81.0	**21019**	17.0	**20994**	21.0	**21010**
100	54	30	58	0.44	90.0	**20498**	17.0	**20142**	23.0	**21011**
110	58	34	54	0.45	95.0	**21020**	17.0	**20995**	23.0	**21012**
125	59	34	60	0.45	106.0	**21021**	17.0	**20996**	23.0	**21013**
150	68	40	53	0.46	114.0	**20666**	23.0	**20669**	-	
200	70	40	67	0.48	150.0	**21022**	25.0	**20997**	-	
250	72	40	79	0.49	180.0	**20118**	30.0	**20198**	-	
500	95	55	92	0.60	346.0	**21023**	45.0	**20998**	-	

Note: Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

*Stock numbers reflect Platinum only.

**Diameter of hole must be specified when ordering.

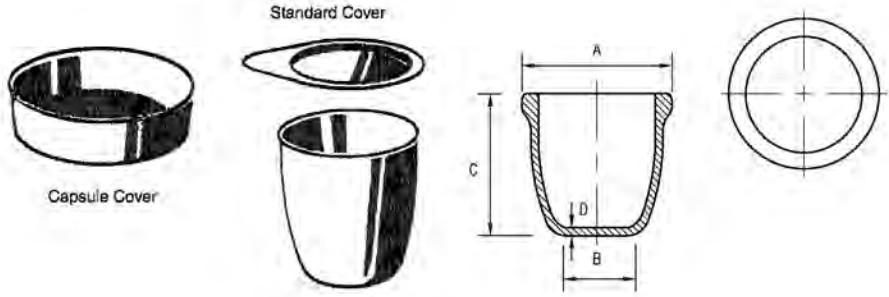


Fig. 27

Crucibles and casting molds/dishes are available in a number of designs and patterns including Claisse, Perl X2, Perl X3, Labor Scheops, Leco, and Herzog. These crucibles can be supplied in either 5% Gold 95% Platinum alloy or ZGS 5% Gold 95% Platinum alloy.

Special Crucibles, Beakers and Combustion Boats

Special crucibles, beakers and combustion boats can be supplied in platinum and platinum alloys. Sizes other than standard are available on special order.

Combustion Boats

Stock No.	Combustion Boats	Dimensions (mm) Length	Width	Depth	Approx. Weight(g)*
20033	Standard Form Fig. 83	38	9.5	9.5	3
20052		51	9.5	9.5	4
20051		64	9.5	9.5	5
21581		76	9.5	9.5	8
21565		89	9.5	9.5	10
20267		102	9.5	9.5	12
22024		38	9.5	5.0	7

Standard Form
Fig. 83

Volatile Matter Form - Fig. 21

Stock No.	Dimensions (mm) Cap (ml)	Top Dia (A)	Ht (B)	Approx Weights (g)* Crucible	Cover, Flanged or Capsule**
21511	10.0	25	30	8.0	6.0
21510	15.0	29	33	12.0	8.0
21509	20.0	32	36	16.0	9.0
21508	25.0	34	38	20.0	10.0
21495	30.0	37	41	24.0	11.0
21506	40.0	42	44	32.0	13.0
21517	50.0	43	46	42.0	14.0

Note: Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

*Stock numbers reflect Platinum only.

**Diameter of hole must be specified when ordering.

Fig. 21X

Flanged Cover

Fig. 21Y

Capsule Cover

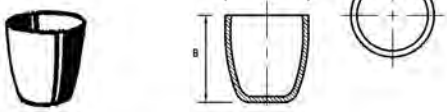


Fig. 21

Beakers

Stock No.	Dimensions (mm) Cap (ml)	Dia	Ht	Wall Thickness	Approx Weights (g)* Beaker	Cover Plain Type
21577	30	37	34	0.25	27.5	6.0
21570	30	37	34	0.30	33.0	6.0
21572	100	51	54	0.30	69.6	14.0
21571	100	51	54	0.38	87.0	14.0
21573	250	70	67	0.38	147.0	25.0
21575	250	70	67	0.45	177.0	25.0
21576	500	89	87	0.38	250.0	34.0
21578	500	89	87	0.45	300.0	34.0
21579	1000	100	134	0.45	490.0	41.0
21580	1000	100	134	0.56	600.0	41.0

*Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data. When ordering, please specify figure number and capacity in ml.

Evaporating Dishes

Johnson Matthey manufactures standard form evaporating dishes of semi-round bottom type, in capacities from 10-700ml. They can be supplied with reinforced tops or bottoms and covers upon request. Pouring lips are provided on all standard dishes.

Standard Form Dishes - Semi-Round Bottom — Fig. 5

Standard Forms (mm)							
Cap (ml)	Dia (A)	Ht (B)	Wall (C)	Dish wt (g)	Stock No.*	Std Cover Only wt (g)	Stock No.*
8	31	14	0.12	4.0	**21032**	2.0	**21038**
10	32	17	0.13	5.0	**21033**	4.0	**20250**
15	40	17	0.12	6.0	**20549**	6.0	**20464**
20	41	21	0.11	7.0	**21034**	6.0	**20615**
25	42	24	0.12	8.0	**20309**	6.5	**20609**
35	52	22	0.14	12.0	**20612**	13.5	**21039**
40	53	25	0.15	15.0	**35416**	13.5	**21040**
50	54	29	0.15	17.0	**20086**	13.5	**20409**
60	61	28	0.16	20.0	**20628**	17.0	**21041**
75	62	33	0.17	25.0	**20710**	22.0	**20887**
100	74	30	0.19	33.0	**20152**	25.0	**20172**
125	76	37	0.21	42.0	**21035**	28.0	**21042**
150	78	42	0.22	50.0	**20299**	28.0	**20318**
175	90	36	0.22	55.0	**20191**	31.0	**21043**
200	91	40	0.24	65.0	**20153**	34.0	**21044**
250	93	47	0.25	80.0	**20499**	41.0	**20422**
300	103	34	0.27	94.0	**20105**	50.0	**21045**
350	105	51	0.28	111.0	**20026**	50.0	**21046**
400	107	57	0.29	128.0	**21036**	58.0	**21047**
500	117	58	0.32	160.0	**21037**	67.0	**21048**

Note: Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

*Stock numbers reflect Platinum only.

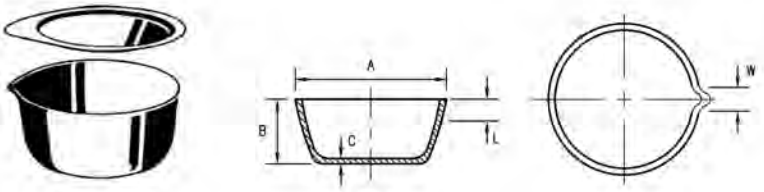


Fig. 5

Standard Form Dishes - Semi-Round Bottom Reinforced - Fig. 1

Standard Form (mm)							
Cap (ml)	Dia (A)	Ht (B)	Wall (C)	Dish wt (g)	Stock No.*	Std Cover Only wt (g)	Stock No.*
8	31	14	0.16	5.0	**21024**	2.0	**21038**
10	32	17	0.16	6.0	**21025**	4.0	**20250**
15	40	17	0.18	9.0	**20462**	6.0	**20464**
20	41	21	0.18	11.0	**20879**	6.0	**20615**
25	42	24	0.17	12.0	**20534**	6.5	**20609**
35	52	22	0.19	16.0	**20478**	13.5	**21039**
40	53	25	0.21	20.0	**21026**	13.5	**21040**
50	54	29	0.23	25.0	**20133**	13.5	**20409**
60	61	28	0.22	27.0	**20486**	17.0	**21041**
75	62	33	0.23	33.0	**35368**	22.0	**20887**
100	74	30	0.24	40.0	**20307**	25.0	**20172**
125	76	37	0.24	48.0	**20848**	28.0	**21042**
150	78	42	0.24	55.0	**20308**	28.0	**20318**
175	90	36	0.26	66.0	**21027**	31.0	**21043**
200	91	40	0.26	72.0	**20108**	34.0	**21044**
250	93	47	0.28	88.0	**20278**	41.0	**20422**
300	103	34	0.30	105.0	**21028**	50.0	**21045**
350	105	51	031	123.0	**21029**	50.0	**21046**
400	107	57	0.32	141.0	**21030**	58.0	**21047**
500	117	58	0.36	177.0	**21031**	67.0	**21048**

Note: Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

*Stock numbers reflect Platinum only.

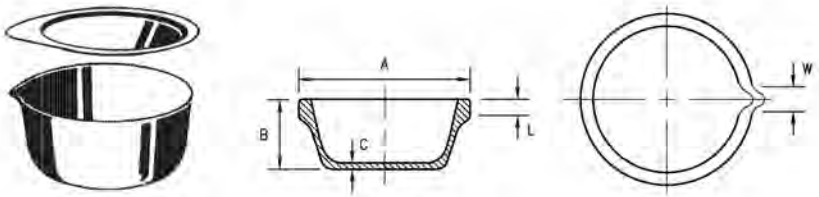


Fig. 1

Standard Form Dishes - Round Bottom - Fig. 6

Std Form - Round Bottom Dimensions (mm)							
Cap (ml)	Dia (A)	Ht (B)	Wall (C)	Dish Wt (g)	Stock No.*	Std Cover Only Wt (g)	Stock No.*
8	34	14.5	0.12	4.0	**21049**	4.0	**21060**
10	35	16.5	0.13	5.0	**21050**	5.0	**20640**
15	45	16.5	0.12	6.0	**35386**	6.0	**21062**
20	46	19.5	0.11	7.0	**21051**	8.5	**21063**
25	47	22.5	0.14	10.0	**20888**	13.5	**21064**
35	58	23.0	0.13	12.0	**21052**	13.5	**21065**
40	58	24.5	0.15	15.0	**21053**	17.0	**21066**
50	59	28.5	0.15	17.0	**20117**	17.0	**21067**
60	66	28.5	0.17	22.0	**21054**	22.0	**21068**
75	67	32.5	0.17	23.0	**20311**	25.0	**21069**
100	82	32.0	0.18	33.0	**20097**	28.0	**21070**
125	84	37.0	0.19	40.0	**21055**	31.0	**21071**
150	85	41.5	0.20	48.0	**20079**	31.0	**21072**
175	98	39.0	0.21	55.0	**21056**	34.0	**21073**
200	99	43.0	0.23	66.0	**20873**	34.0	**21074**
250	100	49.0	0.24	80.0	**21057**	41.0	**21075**
300	115	48.0	0.25	94.0	**21058**	50.0	**21076**
350	116	53.0	0.28	117.0	**20027**	50.0	**21077**
400	117	57.5	0.29	132.0	**21059**	58.0	**21078**
500	126	62.0	0.31	165.0	**21060**	63.0	**21079**

Note: Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

*Stock numbers reflect Platinum only.

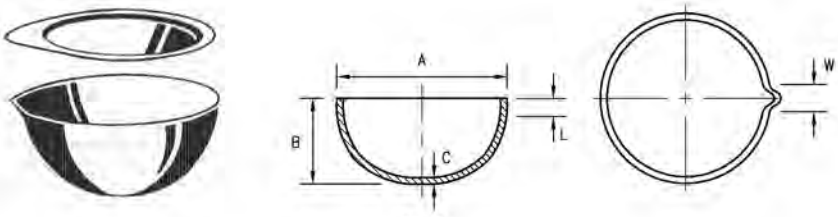


Fig. 6

Standard Form Dishes - Round Bottom Reinforced - Fig. 2

Standard Form - Round Bottom Dimensions (mm)

Standard Cap (ml)	Dia (A)	Ht (B)	Wall (C)	Dish wt (g)	Stock No.*	Cover Only wt (g)	Stock No.*
8	34	14.5	0.15	5.0	**21080**	4.0	**21061**
10	35	16.5	0.15	6.0	**20494**	5.0	**20640**
15	45	16.5	0.15	8.0	**21081**	6.0	**21062**
20	46	19.5	0.15	9.0	**21082**	8.5	**21063**
25	47	22.5	0.17	12.0	**21083**	13.5	**21064**
35	58	23.0	0.18	16.0	**21084**	13.5	**21065**
40	58	24.5	0.21	20.0	**21085**	17.0	**21066**
50	59	28.5	0.21	24.0	**21086**	17.0	**21067**
60	66	28.5	0.21	27.0	**20657**	22.0	**21068**
75	67	32.5	0.23	33.0	**21087**	25.0	**21069**
100	82	32.0	0.21	39.0	**21088**	28.0	**21070**
125	84	37.0	0.21	44.0	**21270**	31.0	**21071**
150	85	41.5	0.20	48.0	**21089**	31.0	**21072**
175	98	39.0	0.25	65.0	**21090**	34.0	**21073**
200	99	43.0	0.25	73.0	**20406**	34.0	**21074**
250	100	49.0	0.27	88.0	**21091**	41.0	**21075**
300	115	48.0	0.28	104.0	**21092**	50.0	**21076**
350	116	53.0	0.31	138.0	**21093**	50.0	**21077**
400	117	57.5	0.32	145.0	**21094**	58.0	**21078**
500	126	62.0	0.35	182.0	**21095**	63.0	**21079**

Note: Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

*Stock numbers reflect Platinum only.

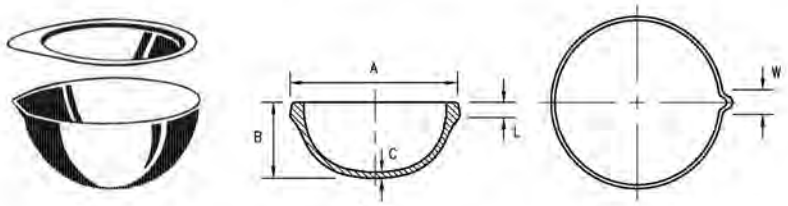


Fig. 2

Special Analysis Dishes

Iron & Steel Analysis (Blair Form with Wire Rim)

Stock No.	Capacity (ml)	Dimensions (mm) Diameter	Height	Approx Wt. (g)*
20163	30	48	25	16.0
21507	50	57	28.5	22.0
21539	100	68	30	40.0
21538	125	70	35	45.0
21537	200	86	42	65.0
21536	225	87	47	71.0
21803	250	89	51	75.0
21534	280	91	55	81.0
21533	300	92	58	85.0
21532	400	110	54	125.0
21531	500	112	60	150.0

*Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data. When ordering, please specify figure number and capacity in ml.

Fig. 7

Flat Bottom Perpendicular Sides

Stock No.	Capacity (ml)	Dimensions (mm) Diameter	Height	Approx Wt. (g)*
21524	15	30	16	10.0
20466	20	40	18	15.0
21522	30	45	18	20.0
21566	40	51	19	20.0
21521	55	57	22	28.0
21540	80	63	25	32.0
21520	100	68	30	35.0
21519	125	71	30	40.0
21741	150	83	30	48.0
21458	175	83	35	51.0
21864	200	83	40	56.0
21798	250	85	40	70.0
21467	300	90	50	80.0
21466	400	100	55	100.0

*Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

Fig. 9

Water Analysis

Stock No.	Fig. No.	Cap (ml)	Dimensions (mm) Dia	Ht	Approx Weight (g)
20410	12	50	64	22	18.0
20313	13	100	76	29	20.0

*Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

Fig. 12

Fig. 13

Sugar Incineration

Fig. 14	Fig. 15	Cap (ml)	Dimensions (mm) Dia	Ht	Approx Wt. (g)*
21459	**21470**	8	31	12	7.0
21457	**21456**	10	34	13	8.0
21455	**21454**	12	36	13	9.0
21453	**21452**	15	41	16	12.0
21451	**21450**	20	45	16	15.0
21449	**21481**	25	48	17	18.0
21483	**21460**	30	41	25	18.0
21492	**21491**	30	51	17	20.0
21490	**21489**	35	56	19	21.0

*Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

Fig. 14

Fig. 15

Sugar Analysis

Stock No.	Capacity (ml)	Dimensions (mm) Diameter	Height	Approx Wt. (g)*
21488	10	32	16	5.0
21487	18	41	18	9.5
21486	20	41	19	10.0
21485	25	41	22	12.0
21484	30	48	22	14.0
20525	35	48	25	16.0
20323	100	70	35	40.0

Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

Fig. 16

Fuel Cup (ASTM D-129-64)

Stock No.	Dimensions (mm) Capacity (ml)	Diameter	Height	Approx Wt. (g)*
20297	5	27	12	11.0

*Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data. When ordering, please specify figure number and capacity in ml.

Fig. YP440

Incinerating Dish

Stock No.	Dimensions (mm) Capacity (ml)	Diameter	Height	Approx Wt. (g)*
21836	30	54	16	15.0

*Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

Fig. 19

Incineration Tray

Stock No.	Fig No.	Dimensions (mm) Cap (ml)	Length	Width	Ht	Approx. Wt (g)*
20134	17	12	52	27	10	9.0
21478	17	15	48	35	10	16.0
21818	17	25	63	41	11	24.0
20254	18	12	38	38	10	12.5
21469	18	20	50	50	10	21.0

*Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

Fig. 17

Fig. 18

Mineral Analysis

Stock No.	Dimensions (mm) Capacity (ml)	Diameter	Height	Approx Wt. (g)*
21474	38	35	10	11.5
21472	38	35	20	16.6

*Weights are for platinum. Conversion factors for other materials and alloys appear in Reference Data.

Fig. YP442

Fig. YP448

Micro Chemical Apparatus

Standard Micro Crucible

Stock No.	Fig.	Cap (ml)	Dimensions (mm) Dia	Ht	Wall	Approx Weight (g) Crucible Only	With Cover
20047	YP-66	1.3	12	14	0.25	3.0	3.7
20199			12	14	0.56	7.0	-

Fig. YP-66

Standard Micro Crucible

Stock No.	Fig.	Cap (ml)	Dimensions (mm) Dia	Ht	Wall	Approx Weight (g)
20119	YP-67	20.0	28	40	0.18	12.0

Fig. YP-67

Micro Boat

Stock No.	Fig.	Dimensions (mm) Length	Width	Ht	Overall Length	Approx Weight (g)
20519	YP-69	12	4	4	16	0.6

Fig. YP-69

Micro Dish

Stock No.	Fig.	Dimensions (mm) Dia	Ht	Approx Weight (g)
35415	YP-70	10	2	0.10

Fig. YP-70

Combustion Boats

Stock No.	Desc.	Fig. No.	Dimensions (mm) Length	Width	Ht	Overall Length	Approx Weight (g)
20301	ACS - Size A (1.5mg samples)	A	6.5	4.5	4	8.5	0.55
20022	ACS - Size B (5.25mg samples)	B	12	5	4	16	0.7
20099	ACS - Size C (samples up to 50mg)	C	34	5	4	38.5	1.8

Spiral Cathode Electrode

Stock No.	Fig.	Dimensions (mm) Dia	Stem Dia	Overall Dia	Approx Weight (g)
20289	YP-72	45	1	125	12.5

Fig. YP-72

Platinum Alloy-Tipped Forceps

Stock No.	Fig.	Dimensions (mm) Tip Contact Length	Overall Length	Approx Weight (g)
20203	YP-96	13	178	7.0

Fig. YP-96

Spatulas

Stock No.	Fig.	Length (mm)	Approx Weight (g)
21667	YP-97	50	0.8
21668	YP-97	80	1.35
20185	YP-97	120	2.0
21669	YP-97	124	2.0

Fig. YP-97

Micro Pregl Boat

Stock No.	Fig.	Dimensions (mm) Length	Width	Ht	Approx Weight (g)
20100	YP-98	35	5	4	0.8

Fig. YP-98

Utensils

Tongs

Stock No.	Description	Fig. No.	Length (mm)	Approx Weight (g)
20085	Platinum-tipped, stainless steel	50-1	254	2.0
20195	Hollow platinum tips, reinforced and heavy duty	50-2	254	5.0
20032	Solid platinum tips	51	240	6.0
20088	Platinum tips extending over end	52	318	18.0
20089	Platinum tips inserted in end	53	308	12.0

*When ordering, please specify figure number.

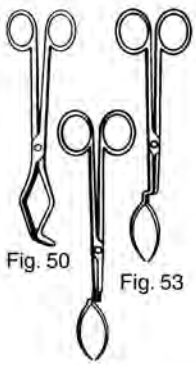


Fig. 50 Fig. 53

Fig. 52

Triangles

Stock No.	Description	Fig. No	For Crucibles with Capacity
21544	Twisted Ends	70	10 to 80ml
21545	Flat Ends	71	10 to 80ml

Fig. 70

Spatulas

Stock No.	Fig. No.	Length (mm)	Approx Weight (g)
20303	89	75	6.0
21554	90	100	8.0
20094	91	125	16.5


Fig. 89

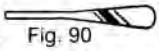


Fig. 90


Fig. 91

Platinum Tipped Tweezers

Stock No.	Fig. No.	Length (mm)	Approx Weight (g)
20050	56	75	6.0


Fig. 56

Inoculation Loops

Stock No.	Description	Fig No.	Loop Int Dia(mm)	Wire Dia(mm)	Shank Length(mm)
21231	Platinum 3.5% Rhodium	BR100	4	0.91	25
21236	Platinum 3.5% Rhodium	BR102	4	0.91	75
21226	Platinum 15% Iridium	IN100	1	0.30	45
20965	Platinum 15% Iridium	IN104	2	0.41	45
21387	Platinum 15% Iridium	IN105	3	0.41	45
21235	Platinum 5% Ruthenium	IN120	3	0.41	45
21227	Platinum 15% Iridium	IN108	3	0.51	45
21287	Platinum 15% Iridium	IN108	3	0.51	70
21228	Platinum 15% Iridium	IN109	5	0.51	45
21233	Platinum 3.5% Rhodium	IN110	1.45	0.41	25
21229	Platinum 3.5% Rhodium	IN111	1.45	0.41	50
98123	Platinum 3.5% Rhodium	IN112	1.45	0.41	75
21239	Platinum 5% Iridium	IN115	3	0.51	45
21243	Platinum 5% Ruthenium	IN121	5	0.41	45

Electrodes

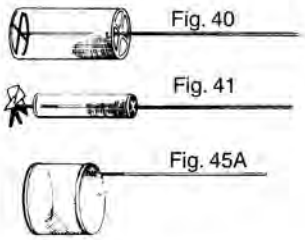
In constructing general service electrodes, platinum is the only material that offers sufficiently high electrical conductivity, mechanical strength and resistance to electrolyte and chemical attack. For most analysis, the best cathode is an ordinary gauze cylinder. This material offers greater surface area than equal weight of plain or perforated foil, and allows the electrolyte to circulate more freely.

Johnson Matthey designs its electrodes with a round stem that is flattened at the point of the gauze attachment. Additionally, the gauze is welded to the frame to prevent sagging. Large fillets are also provided at all joints in the frame structure for support. Johnson Matthey designs its electrodes for long service life, and we can modify them to accommodate any special application.

Our electrodes are designed to minimize sharp bends and awkward shapes that might cause solution entrapment. All seams and joints are welded - no rivets or solder is employed. Usually furnished with a bright finish, electrodes can also be supplied with satin or brushed finish. When desired, identification numbers can be added.

Only the most commonly used electrodes are included in this catalog. Many hundreds of special electrodes have been produced by Johnson Matthey, and can be supplied to meet individualized specifications. The stems and reinforcements of the electrodes shown below are supplied in platinum 5% ruthenium. Other alloys are available upon request.

Gauze Forms



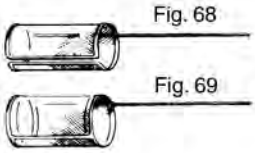
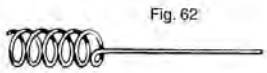
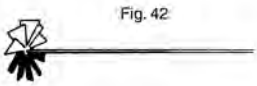


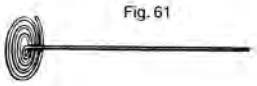
Figure Number	Dimensions (mm) Cylinder Dia	Cylinder Ht	Overall Ht	Stock No.	Approx Weight (g) Type 36/2 Gauze*	Stock No.	Type 39/1 Gauze**
40	25	50	100	**20283**	22.0	**20481**	16.5
41 (propeller has 25mm dia)	13	50	125	**21873**	16.0	**20330**	13.0
45A	50	40	150	--	--	**20270**	11.0
68, Open Cylinder	25	50	125	**20076**	18.0	**20075**	12.0
69, Closed Cylinder	25	50	125	**20078**	17.0	**20077**	11.0

* Type 36/2 gauze has openings nominally 0.36mm square, wire dia 0.2mm. (45x45)
** Type 39/1 gauze has openings nominally 0.39mm square, wire dia 0.1mm. (52x52)

Wire Forms







Stock No.	Fig. No.	Dimensions (mm) Cylinder Dia	Cylinder Ht	Overall Ht	Approx Weight (g)
20319	62	16	50	125	10
20304	61	25	-	125	10
20201	42	25	-	100	6

Care and Use

Platinum ware can be heated in many atmospheres commonly employed for laboratory experimentation such as:

- Air, nitrogen and oxygen
- Oxides of nitrogen
- Bromine and iodine vapors
- Hydrogen
- Carbon dioxide

Platinum ware is suitable for numerous chemical research applications such as ignitions, fusions, evaporations and glass production. These are usually accomplished in oxidizing atmospheres.

In addition, platinum has characteristics that make it exceptionally qualified for electrolytic usage in the laboratory. In the construction of electrodes, platinum provides an excellent combination of electrical conductivity, mechanical strength and resistance to electrolytic and chemical attack. Both cathode and anode remain constant in weight during electrolysis, and deposits can be easily dissolved after weighing without damage to the electrodes.

Platinum laboratory ware can provide numerous advantages when properly employed. Some of the basic guidelines for use in various applications are outlined here.

Operating Temperatures

The following maximum operating temperatures are recommended for all applications:

Material	Temperature
Platinum	1400°C
ZGS Platinum	1500°C
Platinum 10% Rhodium	1550°C
ZGS Platinum 10% Rhodium	1600°C
Platinum 5% Gold	1300°C
ZGS Platinum 5% Gold	1400°C

Ignitions

Platinum ware is widely used for ignitions. Although platinum is subject to attack during ignition by an easily reducible substance, the risk of damage can be avoided by taking proper precautions in accord with the materials involved.

Ignition of filtered precipitates

Platinum laboratory ware can be utilized in ignitions of the following precipitates:
Barium sulfate
Alkaline earth carbonates, oxalates, etc.
Sulfates of metals not readily reducible

Oxides not readily reducible include Al_2O_3, MgO, BaO, CaO, SrO, TiO_2, ZrO_2, ThO_2, MoO_3, WO_3, Ta_2O_5, Cr_2O_3, Mn_3O_4, and in the absence of carbonaceous matter: ZnO, Co_3O_4, NiO, CdO.

The moist filter paper containing the precipitate is dried in a platinum crucible or dish by preheating on a hot plate or suitable gauze over a gas burner. After drying, the dish is transferred to the area in front of the hot open muffle of a furnace operating at 800°C. Within 10 to 15 minutes, the paper will become completely charred. The dish should then be placed about 2 in. inside the muffle where it should remain until nearly all carbonaceous matter has been burned off. The removal of the last traces of carbon and the decomposition of the precipitate may require a somewhat higher temperature. This can be applied without detriment to the platinum, providing that reducing conditions are avoided. Free access to recirculating air is recommended. Where suitable care is exercised to assure safety, such precipitates as $MgNH_4PO_4$, $MgNH_4AsO_4$ and $CaWO_4$ may be ignited.

Determination of ash in organic material

A shallow dish should be used, and the contents heated well forward in a hot open muffle until combustion is nearly complete. Combustion can be accelerated if the surface is disturbed from time to time. After all carbonaceous matter has burnt away, final combustion can be conducted in the hot zone of the muffle.

Determination of volatile matter in fuels

Particular care should be exercised in this operation. In as much as it is essential that a nonoxidizing atmosphere be maintained in the crucible to prevent loss of free carbon, there is danger of contamination of the platinum dish. This is particularly true if the fuel is rich in sulfur or phosphorous compounds.

Care and Use

Fusions

Fusions in platinum ware should always be performed under oxidizing conditions, using materials that are free from organic substances. During fusion and cooling, the material should come in contact only with platinum or a clean refractory. Commonly used fusion agents affect platinum in the following manner:

- **Sodium carbonate.** When sodium carbonate is employed, the loss of weight of the platinum amounts to only a fraction of a milligram.
- **Sodium carbonate mixed with sodium nitrate or nitrite.** Nitrates or nitrites in the fusion mixture cause heavier losses of platinum than sodium carbonate by itself, but the losses are not likely to exceed one to two milligrams under ordinary laboratory conditions.
- **Sodium borate or sodium metaphosphate.** Platinum is unaffected by borax at low temperatures. Sodium metaphosphate attacks the metal only at very high temperatures or under reducing conditions.
- **Alkali bifluorides.** When alkali bifluorides are used, the loss of weight of the platinum is practically nil.
- **Alkali chlorides or alkali earth chlorides.** Both attack platinum above 1000˚C in the presence of air which liberates chlorine from the fused salt. In a neutral atmosphere, these chlorides are inert.
- **Alkali bisulfates.** When alkali bisulfates are involved, platinum is attacked slightly above 700˚C. The attack can be diminished by adding ammonium sulfate.

When any of the previous fusion agents (except alkali bifluorides) are employed, traces of platinum should be sought in making an accurate analysis. Platinum can be precipitated with the hydrogen sulfide group.

Evaporations

Platinum laboratory ware can be employed in evaporations containing the following:
1. Sulfuric acid with or without hydrofluoric acid
2. Hydrofluoric acid
3. Hydrofluoric and nitric acid when the halides (especially chlorides) are absent
4. Hydrochloric acid in the absence of oxidizing agents that yield nascent chlorine
5. Alkali hydroxides or carbonates where contamination of the solution with silica must be avoided
6. Sodium peroxide solutions

Electrolytic Operations

Electrochemical methods of analysis have been widely adopted because of their speed, simplicity and economy. In multiple analyses of a routine nature such as the determination of copper in brasses and aluminum alloys, several solutions can be electrolyzed simultaneously. In single determinations, the analyst can attend other operations while electrolysis is in progress.

Platinum electrodes can be used to advantage in numerous applications:
1. As anodes in most electrolytes except strongly acid chloride solutions.
2. As cathodes for the deposition of metals from acid, alkaline or ammoniacal solutions. For the deposition of zinc, gallium and bismuth, the platinum should first be copper-plated to prevent superficial alloying with the deposited metal.

Glass Production

When producing glass in a platinum alloy vessel, all batch materials must be fully oxidized and silica-bearing refractory materials must be avoided in order to insure long vessel life. When cleaning the vessel to remove glass residue, soak in 50% hydrofluoric acid at no more than 180˚F. Do not allow HF to boil. This process may take several days. To speed up glass removal, occasionally remove vessel from acid bath and scrub soft glass residue away. **Make sure skin is protected; hydrofluoric acid will leave serious burns**.

Conditions to Avoid When Using Platinum Labware and Platinum Fabricated Products.

When heated, platinum can be attacked by certain atmospheres, solids, fusions and vapors. The following should be avoided, as noted, when high temperatures (greater than 1000˚C) are involved:

Atmospheres

1. **Ammonia:** Darkens the surface and makes it less lustrous. In time, it will develop pores and create a crystalline appearance.
2. **Sulfur dioxide:** Promotes the formation of sulfur trioxide. As a result, the platinum surface is coated with platinous sulfide.
3. **Chlorine:** Converts the metal into a mass of crystals because of the alternate formation and decomposition of platinous chloride.
4. **Volatile chlorides:** Especially those that decompose readily.
5. **Highly carburetted gases and vapors:** They aggressively attack the metal with the possible formation of PtC_2 and make it very brittle. Hence, platinum ware should never be heated in the reducing zone of a gas flame.

Liquids

1. **Aqua Regia.**
2. **Hydrochloric acid and oxidizing agents.**
3. **Concentrated sulfuric acid:** It is harmful when extended periods are involved. In most laboratory applications, the action is so slow that it is usually negligible.
4. **Concentrated phosphoric acid:** The action is noticeable only after prolonged heating.

Solids (including their fusions and vapors)

1. **Sulfur, selenium and tellurium:** The action of sulfur vapor is very slow and prolonged heating is required to produce any serious effects. Selenium and tellurium combine readily with platinum.

2. **Phosphorus, arsenic and antimony:** Combine with platinum readily.

3. **Magnesium pyrophosphate:** Harmful above 900˚C.

4. **Silica and borax:** Harmful at high temperatures.

5. **Molten lead, zinc, tin, bismuth, silver, gold or copper,** or mixtures that form these metals by reduction. All combine readily with platinum to form a lower melting point eutectic alloy.

6. **Fused alkali oxides and peroxides,** to a lesser degree in the presence of air, alkali hydroxides.

7. **Fused nitrates:** The action is intensified by the presence of alkali hydroxides or carbonates, but is not severe in any case.

8. **Fused cyanides:** Plantinocyanides are formed.

9. **Iron oxide above 1200˚C:** At this temperature, oxygen is liberated and the iron combines with the platinum.

10. **Silica, silicates, alumina and magnesia above 1600˚C:** At lower temperatures, no action occurs.

11. **Fused alkali and alkali chlorides in the presence of air at 1000˚C or above.**

12. **Lead and bismuth oxides above 1250˚C.**

Physical Properties of the Platinum Group Metals and Other Precious Metals

Table 1. Physical Properties of the Platinum Group Metals and Other Precious Metals

	Platinum		Palladium	Iridium	Rhodium	Ruthenium	Osmium	Gold	Silver
	Mechanical Grade	Thermopure							
①Atomic weight Amu	195.09		106.4	192.2	102.91	107.07	190.2	196.97	107.87
①Specific gravity g/cm³	21.45		12.02	22.65	12.41	12.45	22.61	19.32	10.49
①Density, lb/cu in. @ 68 F	.775		.434	.818	.448	.450	.815	.698	.379
②Melting point, °F IPTS-68 °C	3214 1768		2829 1554	4429 2443	3560 1960	4190 2310	5522 3050	1947.97 1064.43	1762.47 961.93
Thermal conductivity, Btu/Ft²/In/°F/hr(32-212 F)	493		522	1015	1044	725	609	2030	2900
②Coefficient of expansion, in./in./°F x 10⁻⁶ (32-212 F)	4.94		6.53	3.8	4.6	5.1	2.6	7.9	10.9
③Specific heat @ 32 F Btu/lb/°F @ 212 F	0.0315 0.0325		0.0584 —	0.0307(68 F)	0.0589 —	0.0551 —	0.0309 0.0314	0.0312(64 F)	0.0559 0.0588
Resistivity @ 32 F ohms/cir mil ft @ 68 F @ 212 F	58.86 63.66 81.99		54.0 64.8 —	28.3(3)	30.1 36.1 —	47 84 —	54 57.1 —	13.1 14.1 —	9.56 8.84 —
①Mean temperature coefficient of resistance per °C, (0-100 C) (32-212 F)	.0039	.00392	.0038	.0043	.0046	.0042	.0042	.0034	.0041
③Tensile strength Annealed psi 50% RA	26-23,000 35,000	17-19,000 34,000	25,000 47,000	150,000 —	100,000 —	72,000	— —	19,000 32,000	18,000 50,000
③Vickers hardness (similar to Brinell)- Annealed 10mm ball, 50% RA 3000 kg load)	40-42 106		40-42 118	200-240 351	100-102 401	200-350 —	300-670 —	25 66	26 90

	95 Pt 5 Ir	90 Pt 10 Ir	80 Pt 20 Ir	75 Pt 25 Ir	95 Pt 5 Rh	90 Pt 10 Rh	80 Pt 20 Rh	95 Pt 5 Ru	90 Pt 10 Ru	60 Pd 40 Ag
①Specific gravity g/cm³	21.51	21.56	21.58	21.74	20.70	18.99	18.72	20.70	20.00	11.35
①Density, lb/cu in. @ 68 F	.777	.779	.783	.785	.748	.722	.676	.748	.723	.410
②Melting point, °F °C	3227-3245 1775-1785	3236-3272 1780-1800	3290-3362 1810-1850	3398-3470 1870-1910	3308 1820	3362 1850	3452 1900	3236 1780	3281 1805	2426-2534 1330-1390
Thermal conductivity, Btu/Ft²/In/°F/hr(32-212 F)	—	215	175	113	—	208	—	—	—	217
Resistivity @ 32 F ohms/cir mil ft @ 68 F @ 212 F	— 114 —	— 150 —	— 192 —	— 198 —	— 185 —	114.0 115.2 —	— 124.8 —	— 189 —	— 258 —	— 252 —
①Mean temperature coefficient of resistance per °C, 0-100 C (32-212 F)	.0019	.0012	.0008	.0006	⑦.0021	.0017	.0014	.00085 (25-100 C)	.00083 (20-100 C)	.00002
③Tensile strength Annealed psi 50% RA	40,000 70,000	55,000 95,000	97,500 150,000	125,000 170,000	30,000 70,000	47,000 84,000	70,000 130,000	60,000 115,000	85,000 150,000	54,000 100,000
③Vickers hardness (similar to Brinell)- Annealed 10mm ball, 50% RA 3000 kg load)	78 149	110 215	210 245	252 327	69 77	95 173	120 215	125 211	173 298	89 183

References: ① Periodic Chart of the Elements ② ASM Metals Handbook ③ Johnson Matthey and Co. Limited

Comparative Table of Metric, Troy and Avoirdupois Weights

Comparitive Table of Metric, Troy and Avoirdupois Weights

	Gram	Troy Oz.	Av. Oz.	Troy Dwt.	Troy Gr.	Troy Lbs.	Av. Lbs.	Kg.
Gram	1	0.0321507	0.035274	.643014	15.4324	.002679	.002205	.001
Troy oz.	31.103	1	1.09714	20	480	.083333	.068571	.031103
Avoirdupois oz.	28.350	.911458	1	18.22917	437.5	.075955	.0625	.028349
Troy dwt.	1.55517	.05	.054857	1	24	.0041667	.0034286	.001555
Troy gr.	0.0648	.002083	.002286	.041666	1	.0001736	.0001428	.00006479
Troy lb.	373.242	12	13.1657	240	5760	1	.822857	0.37324
Avoirdupois lb.	453.59	14.5833	16	291.667	7000	1.215278	1	0.45359
Kilograms	1000	32.15074	35.27396	643.015	15432.356	2.67923	2.20462	1

Weight Conversion Factors

To convert platinum weights to other precious metals, use the following factors: Weight of Metal Desired = Appropriate Multiplier x Platinum Weight.

Table 2. Weight Conversion Factors

To convert platinum weights to other precious metals, use the following factors: Weight of Metal Desired = Appropriate Multiplier X Platinum Weight.

Metal or Alloy	Multiplier
Platinum (Pt)	1.000
Palladium (Pd)	.5604
Pd-50% Pt	.7178
Pd-5% Ru	.5614
Pd-8% Ru	.5619
Pd-11% Ru	.5625
Pd-20% Ag	.5400
Pd-25% Ag	.5406
Pd-40% Ag	.5295
Pd-40% Cu	.4930
Iridium (Ir)	1.0559
Pt-5% Ir	1.0027
Pt-10% Ir	1.0053
Pt-15% Ir	1.0080
Pt-20% Ir	1.0107
Pt-25% Ir	1.0134
Pt-30% Ir	1.0161
Rhodium (Rh)	.5786
Pt-3½ % Rh	.9752
Pt-5% Rh	.9648
Pt-6% Rh	.9581
Pt-10% Rh	.9321
Pt-13% Rh	.9135
Pt-20% Rh	.8728
Pt-25% Rh	.8459
Pt-30% Rh	.8207
Pt-40% Rh	.7744
Pt-50% Rh	.7330

Metal or Alloy	Multiplier
Ruthenium (Ru)	.5804
Pt-5% Ru	.9651
Pt-8% Ru	.9453
Pt-10% Ru	.9326
Pt-11% Ru	.9263
Gold (Au)	.9007
Pt-5% Au	.9944
Au-10% Cu	.8069
Au-30% Pt	.9282
Silver (Ag)	.4890
Ag-3% Pd	.4908
Ag-10% Pd	.4952
Ag-20% Pd	.5016
Ag-30% Pd	.5074
Ag-50% Pd	.5220
Ag-3% Pt	.4968
Nickel (Ni)	.4150
Pt-3% Ni	.9957
Pt-5% Ni	.9343
Pt-10% Ni	.8766
Tungsten (W)	.8990
Pt-4% W	.9955
Pt-8% W	.9910
Special Alloys	
90% Pt-5% Pd-5% Rh	.9299
69% Au-25% Ag-6% Pt	.7500

Platinum Sheet Data

Table 3. Platinum Sheet Data

Gram Weight per square inch	Thickness in inches	Thickness in mm	Gram Weight per square cm
0.1582	.00045	0.0114	0.0245
0.1758	.0005	0.0127	0.0272
0.3515	.001	0.0254	0.0545
0.5273	.0015	0.0381	0.0817
0.7031	.002	0.0508	0.1090
0.8789	.0025	0.0635	0.1362
1.055	.003	0.0762	0.1635
1.230	.0035	0.0889	0.1907
1.406	.004	0.1016	0.2179
1.582	.0045	0.1143	0.2452
1.758	.005	0.1270	0.2725
1.933	.0055	0.1397	0.2996
2.109	.006	0.1524	0.3269
2.461	.007	0.1778	0.3815
2.812	.008	0.2032	0.4359
3.164	.009	0.2286	0.4904
3.515	.010	0.2540	0.5448
3.867	.011	0.2794	0.5994
4.219	.012	0.3048	0.6539
4.570	.013	0.3302	0.7084
4.922	.014	0.3556	0.7629
5.273	.015	0.3810	0.8173
5.625	.016	0.4064	0.8719
5.976	.017	0.4318	0.9263
6.328	.018	0.4572	0.9808
6.679	.019	0.4826	1.035
7.031	.020	0.5080	1.090
7.382	.021	0.5334	1.144
7.734	.022	0.5588	1.199
8.085	.023	0.5842	1.253
8.437	.024	0.6096	1.308
8.789	.025	0.6350	1.362
9.140	.026	0.6604	1.417
9.492	.027	0.6858	1.471
9.843	.028	0.7112	1.526
10.19	.029	0.7366	1.579
10.55	.030	0.7620	1.635
10.90	.031	0.7874	1.690
11.25	.032	0.8128	1.744
11.60	.033	0.8382	1.798
11.95	.034	0.8636	1.852
12.30	.035	0.8890	1.907
12.66	.036	0.9144	1.962
13.00	.037	0.9398	2.015
13.36	.038	0.9652	2.071
13.71	.039	0.9906	2.125
14.06	.040	1.016	2.179
14.41	.041	1.041	2.234
14.76	.042	1.067	2.288
15.12	.043	1.092	2.344
15.47	.044	1.118	2.398
15.82	.045	1.143	2.452
16.17	.046	1.168	2.506
16.52	.047	1.194	2.561
16.87	.048	1.219	2.615
17.23	.049	1.245	2.671
17.58	.050	1.270	2.725
17.93	.051	1.295	2.779
18.28	.052	1.321	2.833
18.63	.053	1.346	2.888
18.98	.054	1.372	2.942
19.33	.055	1.397	2.996
19.69	.056	1.422	3.052
20.04	.057	1.448	3.106
20.39	.058	1.473	3.160
20.74	.059	1.499	3.215
21.09	.060	1.524	3.269
21.44	.061	1.549	3.323
21.80	.062	1.575	3.379
22.15	.063	1.600	3.433
22.50	.064	1.626	3.488
22.85	.065	1.651	3.542
23.20	.066	1.676	3.596
23.55	.067	1.702	3.650
23.90	.068	1.727	3.705
24.26	.069	1.753	3.760
24.61	.070	1.778	3.815
24.96	.071	1.803	3.869
25.31	.072	1.829	3.923
25.66	.073	1.854	3.977
26.01	.074	1.880	4.032
26.37	.075	1.905	4.087
26.72	.076	1.930	4.142
27.07	.077	1.956	4.196
27.42	.078	1.981	4.250
27.77	.079	2.007	4.304
28.12	.080	2.032	4.359
28.47	.081	2.057	4.413
28.83	.082	2.083	4.469
29.18	.083	2.108	4.523
29.53	.084	2.134	4.577
29.88	.085	2.159	4.631
30.23	.086	2.184	4.686
30.58	.087	2.210	4.740
30.94	.088	2.235	4.796
31.29	.089	2.261	4.850
31.64	.090	2.286	4.904
31.99	.091	2.311	4.958
32.34	.092	2.337	5.013
32.69	.093	2.362	5.067
33.04	.094	2.388	5.121
33.40	.095	2.413	5.177
33.75	.096	2.438	5.231
34.10	.097	2.464	5.286
34.45	.098	2.489	5.340
34.80	.099	2.515	5.394
35.15	.100	2.540	5.448
43.94	.125	3.175	6.811

Resistance in Ohms/Foot (at 20°C) of Platinum and Selected Alloys

Table 5. Resistance in Ohms per Foot (at 20°C) of Platinum and Selected Alloys

Dia.	Plat.	5% Ir	10% Ir	15% Ir	20% Ir	25% Ir	30% Ir	3½% Rh	10% Rh	13% Rh	20% Rh	30% Rh	40% Rh
.010"	.640	1.143	1.503	1.713	1.866	1.985	2.105	.998	1.154	1.173	1.250	1.130	1.052
.011"	.529	.945	1.242	1.416	1.542	1.640	1.740	.825	.954	.969	1.033	.934	.869
.012"	.444	.794	1.044	1.190	1.296	1.378	1.462	.693	.801	.815	.868	.785	.731
.013"	.379	.676	.889	1.014	1.104	1.175	1.246	.591	.683	.694	.740	.669	.622
.014"	.344	.615	.808	.921	1.003	1.067	1.132	.537	.620	.631	.672	.608	.566
.015"	.284	.508	.668	.761	.829	.882	.936	.444	.513	.521	.556	.502	.468
.016"	.250	.446	.587	.669	.729	.775	.822	.390	.451	.458	.488	.441	.411
.017"	.221	.396	.520	.593	.646	.687	.728	.345	.399	.406	.433	.391	.364
.018"	.198	.353	.464	.529	.576	.613	.650	.308	.356	.362	.386	.349	.325
.019"	.177	.317	.416	.475	.517	.550	.583	.276	.320	.325	.346	.313	.291
.020"	.160	.286	.376	.428	.467	.496	.526	.250	.289	.293	.313	.283	.263
.021"	.145	.259	.341	.338	.423	.450	.477	.226	.262	.266	.283	.256	.239
.022"	.132	.236	.311	.354	.386	.410	.435	.206	.238	.242	.258	.234	.217
.023"	.121	.216	.284	.324	.353	.375	.398	.189	.218	.222	.236	.214	.199
.024"	.111	.198	.261	.297	.324	.345	.365	.173	.200	.204	.217	.196	.183
.025"	.102	.183	.241	.274	.299	.318	.337	.160	.185	.188	.200	.181	.168
.026"	.095	.169	.222	.253	.276	.294	.311	.148	.171	.174	.185	.167	.156
.027"	.088	.157	.206	.235	.256	.272	.289	.137	.158	.161	.171	.155	.144
.028"	.082	.146	.192	.218	.238	.253	.268	.127	.147	.150	.159	.144	.134
.029"	.076	.136	.179	.204	.222	.236	.250	.119	.137	.139	.149	.134	.125
.030"	.071	.127	.167	.190	.207	.221	.234	.111	.128	.130	.139	.126	.117
.031"	.067	.119	.156	.178	.194	.207	.219	.104	.120	.122	.130	.118	.109
.032"	.063	.112	.147	.167	.182	.194	.206	.097	.113	.115	.122	.110	.103
.033"	.059	.105	.138	.157	.171	.182	.193	.092	.106	.108	.115	.104	.097
.034"	.055	.099	.130	.148	.161	.172	.182	.086	.100	.101	.108	.098	.091
.035"	.052	.093	.123	.140	.152	.162	.172	.081	.094	.096	.102	.092	.086
.036"	.049	.088	.116	.132	.144	.153	.162	.077	.089	.091	.096	.087	.081
.037"	.047	.083	.110	.125	.136	.145	.154	.073	.084	.086	.091	.083	.077
.038"	.044	.079	.104	.119	.129	.137	.146	.069	.080	.081	.087	.078	.073
.039"	.042	.075	.099	.113	.123	.131	.138	.066	.076	.077	.082	.074	.069
.040"	.040	.071	.094	.107	.117	.124	.132	.062	.072	.073	.078	.071	.066

Platinum Wire Data

Table 4. Platinum Wire Data

Gram Weight per ft.	Diam. in inches	B. & S. Gauge	Diam. in mm	Gram Weight per meter	Gram Weight per ft.	Diam. in inches	B. & S. Gauge	Diam. in mm	Gram Weight per meter	Gram Weight per ft.	Diam. in inches	B. & S. Gauge	Diam. in mm	Gram Weight per meter
0.00331	.001	50	0.0254	0.01086	2.415	.027		0.6858	7.924	12.74	.062		1.575	41.80
0.00747	.0015	47	0.0381	0.02451	2.597	.028	21	0.7112	8.521	12.94	.0625		1.588	42.46
0.01325	.002	44	0.0508	0.04347	2.786	.029		0.7366	9.141	13.15	.063		1.600	43.15
0.02071	.0025	42	0.0635	0.06795	2.982	.030		0.7620	9.784	13.57	.064	14	1.626	44.52
0.02982	.003	41	0.0762	0.09784	3.184	.031		0.7874	10.45	14.00	.065		1.651	45.93
0.04059	.0035	39	0.0889	0.1332	3.393	.032	20	0.8128	11.13	14.43	.066		1.676	47.34
0.05301	.004	38	0.1016	0.1739	3.608	.033		0.8382	11.84	14.87	.067		1.702	48.79
0.06709	.0045	37	0.1143	0.2201	3.830	.034		0.8636	12.57	15.32	.068		1.727	50.26
0.08283	.005	36	0.1270	0.2718	4.059	.035		0.8890	13.32	15.77	.069		1.753	51.74
0.1002	.0055	35	0.1397	0.3288						16.23	.070		1.778	53.25
0.1194	.006		0.1524	0.3918	4.294	.036	19	0.9144	14.09	16.70	.071		1.803	54.79
0.1400	.0065		0.1651	0.4593	4.536	.037		0.9398	14.88					
					4.784	.038		0.9652	15.70	17.18	.072	13	1.829	56.37
0.1623	.007	33	0.1778	0.5325	5.039	.039		0.9906	16.53	17.66	.073		1.854	57.94
0.1865	.0075		0.1905	0.6119	5.301	.040	18	1.016	17.39	18.14	.074		1.880	59.52
0.2122	.008	32	0.2032	0.6962	5.569	.041		1.041	18.27	18.64	.075		1.905	61.16
0.2392	.0085		0.2159	0.7848	5.844	.042		1.067	19.17	19.14	.076		1.930	62.80
0.2683	.009	31	0.2286	0.8803	6.126	.043		1.092	20.10	19.64	.077		1.956	64.44
0.2991	.0095		0.2413	0.9813	6.414	.044		1.118	21.04	20.16	.078		1.981	66.14
0.3312	.010	30	0.2540	1.087	6.709	.045	17	1.143	22.01	20.68	.079		2.007	67.85
0.4008	.011	29	0.2794	1.315	7.011	.046		1.168	23.00	21.20	.080		2.032	69.56
0.4771	.012		0.3048	1.565	7.319	.047		1.194	24.01	21.74	.081	12	2.057	71.33
					7.633	.048		1.219	25.04	22.28	.082		2.083	73.10
0.5596	.013	28	0.3302	1.837	7.955	.049		1.245	26.10	22.82	.083		2.108	74.87
0.6492	.014	27	0.3556	2.130	8.283	.050		1.270	27.18	23.38	.084		2.134	76.71
0.7454	.015		0.3810	2.446						23.94	.085		2.159	78.55
0.8483	.016	26	0.4064	2.783	8.618	.051	16	1.295	28.28	24.50	.086		2.184	80.38
0.9576	.017		0.4318	3.142	8.959	.052		1.321	29.39	25.08	.087		2.210	82.29
1.074	.018	25	0.4572	3.524	9.307	.053		1.346	30.54	25.66	.088		2.235	84.19
1.196	.019		0.4826	3.924	9.661	.054		1.372	31.70	26.24	.089		2.261	86.09
1.325	.020	24	0.5080	4.347	10.02	.055		1.397	32.88	26.84	.090		2.286	88.06
1.461	.021		0.5334	4.794	10.39	.056		1.422	34.09	27.44	.091	11	2.311	90.03
1.603	.022		0.5588	5.259	10.76	.057	15	1.448	35.30	28.04	.092		2.337	92.00
1.753	.023	23	0.5842	5.752	11.15	.058		1.473	36.58	28.66	.093		2.362	94.03
1.908	.024		0.6096	6.260	11.53	.059		1.499	37.83	29.28	.094		2.388	96.07
2.071	.025	22	0.6350	6.795	11.93	.060		1.524	39.14	29.90	.095		2.413	98.10
2.240	.026		0.6604	7.349	12.33	.061		1.549	40.45	30.53	.096		2.438	100.2

Platinum Wire Data

Table 4. Platinum Wire Data

Gram Weight per ft.	Diam. in Inches	B. & S. Gauge	Diam. in mm	Gram Weight per meter
31.17	.097		2.464	102.3
31.82	.098		2.489	104.4
32.47	.099		2.515	106.5
33.13	.100		2.540	108.7
33.80	.101		2.565	110.9
34.47	.102	10	2.591	113.1
35.15	.103		2.616	115.3
35.84	.104		2.642	117.6
36.53	.105		2.667	119.9
37.23	.106		2.692	122.2
37.93	.107		2.718	124.4
38.64	.108		2.743	126.8
39.36	.109		2.769	129.1
40.09	.110		2.794	131.5
40.82	.111		2.819	133.9
41.56	.112		2.845	136.4
42.31	.113		2.870	138.8
43.06	.114	9	2.896	141.3
43.82	.115		2.921	143.8
44.58	.116		2.946	146.3
45.35	.117		2.972	148.8
46.13	.118		2.997	151.4
46.92	.119		3.023	153.9
47.71	.120		3.048	156.5
48.49	.121		3.073	159.1
49.31	.122		3.099	161.8
50.12	.123		3.124	164.4
50.94	.124		3.150	167.1
51.77	.125		3.175	169.9
52.60	.126		3.200	172.6
53.44	.127		3.226	175.3
54.28	.128	8	3.251	178.1
55.13	.129		3.277	180.9
55.99	.130		3.302	183.7
56.86	.131		3.327	186.6
57.73	.132		3.353	189.4
58.61	.133		3.378	192.3
59.49	.134		3.404	195.2
60.38	.135		3.429	198.1
61.28	.136		3.454	201.1
62.18	.137		3.480	204.0
63.10	.138		3.505	207.0
64.01	.139		3.531	210.0
64.94	.140		3.556	213.1
65.87	.141		3.581	216.1
66.81	.142		3.607	219.2
67.75	.143		3.632	222.3
68.70	.144	7	3.658	225.4
69.66	.145		3.683	228.6
70.62	.146		3.708	231.7
71.59	.147		3.734	234.9
72.57	.148		3.759	238.1
73.56	.149		3.785	241.4
74.55	.150		3.810	244.6
75.54	.151		3.835	247.8
76.55	.152		3.861	251.2
77.56	.153		3.886	254.5
78.57	.154		3.912	257.8
79.60	.155		3.937	261.2
80.63	.156		3.962	264.5
81.67	.157		3.988	268.0
82.71	.158		4.013	271.4
83.76	.159		4.039	274.8
84.82	.160		4.064	278.3
85.88	.161		4.089	281.8
86.95	.162	6	4.115	285.3
88.03	.163		4.140	288.8
89.11	.164		4.166	292.4
90.20	.165		4.191	295.9
91.30	.166		4.216	299.6
92.40	.167		4.242	303.2
93.51	.168		4.267	306.8
94.63	.169		4.293	310.5
95.75	.170		4.318	314.2
96.88	.171		4.343	317.9
98.02	.172		4.369	321.6
99.16	.173		4.394	325.3
100.3	.174		4.420	329.1
101.5	.175		4.445	333.0
102.6	.176		4.470	336.6
103.8	.177		4.496	340.6
105.0	.178		4.521	344.5
106.2	.179		4.547	348.4
107.3	.180		4.572	352.1
108.5	.181		4.597	356.0
109.7	.182	5	4.623	359.9
111.0	.183		4.648	364.2
112.2	.184		4.674	368.1
113.4	.185		4.699	372.1
114.6	.186		4.724	376.0
115.9	.187		4.750	380.3
117.1	.188		4.775	384.2
118.3	.189		4.801	388.1
119.6	.190		4.826	392.4
120.9	.191		4.851	396.7
122.1	.192		4.877	400.5
123.4	.193		4.902	404.9
124.7	.194		4.928	409.1
126.0	.195		4.953	413.4
127.3	.196		4.978	417.7
128.6	.197		5.004	421.9
129.9	.198		5.029	426.2
131.2	.199		5.055	430.5
132.5	.200		5.080	434.7
133.9	.201		5.105	439.3
135.2	.202		5.131	443.6
136.5	.203		5.156	447.9
137.9	.204	4	5.182	452.4
139.2	.205		5.207	456.7
140.6	.206		5.232	461.3
142.0	.207		5.258	465.9
143.3	.208		5.283	470.2
144.7	.209		5.309	474.8
146.1	.210		5.334	479.4
147.5	.211		5.359	483.9
148.9	.212		5.385	488.5
150.3	.213		5.410	493.1
151.7	.214		5.436	497.7
153.2	.215		5.461	502.6
154.6	.216		5.486	507.2
156.0	.217		5.512	511.8
157.5	.218		5.537	516.8
158.9	.219		5.563	521.4
160.4	.220		5.588	526.3
161.8	.221		5.613	530.9
163.3	.222		5.639	535.8
164.8	.223		5.664	540.7
166.2	.224		5.690	545.3
167.7	.225		5.715	550.2
169.2	.226		5.740	555.1
170.7	.227		5.766	560.1
172.2	.228		5.791	565.0
173.7	.229	3	5.817	570.0
175.3	.230		5.842	575.0
176.8	.231		5.867	580.1
178.3	.232		5.893	585.0
179.8	.233		5.918	589.9
181.4	.234		5.944	595.2
183.0	.235		5.969	600.3
184.5	.236		5.994	605.4
186.1	.237		6.020	610.6
187.7	.238		6.045	615.7
189.3	.239		6.071	620.9
190.8	.240		6.096	626.1
192.4	.241		6.121	631.3
194.0	.242		6.147	636.6
195.6	.243		6.172	641.9
197.3	.244		6.198	647.2
198.9	.245		6.223	652.5
200.5	.246		6.248	657.8
202.1	.247		6.274	663.2
203.8	.248		6.299	668.6
205.4	.249		6.325	674.0
207.1	.250		6.350	679.4

Non-Precious Metal Labware

Introduction

The information in this section is designed to acquaint you with the wide range of refractory metal crucibles now available to help reduce laboratory costs. They provide long life, increase efficiency and lower long-run costs making them an indispensable part of a laboratory's analytical equipment.

You will find precision is the hallmark of this fine line of Johnson Matthey crucibles now offered by Alfa Aesar. Research and experimentation have developed a method of deep drawing exotic metals and alloys into laboratory vessels of unusually high precision in virtually unlimited shapes and sizes. This provides you with crucibles that are unparalleled when judged on the basis of cost, efficiency and length of service.

Standard crucibles are offered in the following metals and alloys:

Zirconium

Each zirconium crucible is handmade to an exacting tolerance for uniform wall thickness. Only high-purity zirconium material is used -- produced under the most stringent requirements to ensure ultimate tensile strength, yield strength, elongation and chemical purity.

Zirconium crucibles hold several advantages over other materials:

1. Improper heating over a Bunsen burner will not cause the reducible contents to be converted into harmful, low-fusing metals which may react with the vessel.
2. Special apparatus is not required for handling hot zirconium crucibles.
3. Sudden contact with cold, metallic surfaces will have no deleterious effect on a zirconium crucible.
4. The only cleaning agent which should not be used to clean zirconium crucibles is hydrofluoric acid.
5. Zirconium crucibles require a minimum of specialized care so smoothing and shaping is not a special consideration.
6. The inherent strength of zirconium precludes the necessity of reinforced rims and thicker bottoms.

Inconel® Alloy 601

Inconel® nickel-chromium-iron alloy 601 is a general purpose engineering material for applications that require resistance to heat and corrosion. Inconel has excellent resistance to oxidation in the 1000 to 1200 degree Centigrade temperature range and also has good corrosion resistance to many acid and aqueous salt solutions. The limiting chemical composition of the alloy is as follows:

Limiting Chemical Composition, %, of Inconel® alloy 601.

Nickel	58.0-63.0
Chromium	21.0-25.0
Iron	Remainder
Aluminum	1.0-1.7
Carbon	0.10 max
Manganese	1.0 max
Sulfur	0.015 max
Silicon	0.50 max
Copper	1.0 max

Inconel® nickel-chromium-iron alloy 601 may be your answer to high-temperature applications requiring resistance to oxidation and spalling. In addition to its resistance to corrosive oxidation, the alloy is also unaffected by rapid changes from hot to cold, and it also retains its mechanical strength at elevated temperatures. The high resistance of Inconel® Alloy 601 to oxidation, carburization or sulfidation make it well suited for vessels used in determining moisture, volatiles, fixed-carbon and ash located in most coal and coke products, or wood pulp or fiber.

It has also been recommended for use in drying and ashing biological materials whose residues are soluble in dilute acid or alkali for subsequent analysis. Trace-level determinations of principal constituent elements are excluded.

Smoothing and reshaping after use is not necessary. Uniform heating is assured, since the inherent strength of Inconel® alloy 601 laboratory ware precludes the necessity of reinforced rims and thicker bottoms. The vessels can be cleaned simply by scouring with sea-sand or some other mild abrasive.
NOTE: Strong alkaline or oxidizing fusions are not recommended with Inconel® Alloy 601 laboratory ware.

*Inconel is a trademark for products of Huntington Alloys, Inc.

Nickel

In the analytical laboratory, nickel crucibles offer high resistance to dilute alkalies at a very low cost per crucible. In some instances, nickel crucibles are preferable to zirconium: for instance, sodium peroxide fusions in which zirconium itself is to be determined; also in analysis for columbium (niobium), tantalum or low phosphorus.

Although significant amounts of nickel can be introduced into samples, it can be removed easily by several ammonia separations. Life expectancy of a nickel crucible is from 4 to 6 fusions. They present an advantage, other than cost, if small amounts of zirconium are present, or if its removal with Mandelic Acid is unsuccessful. If small amounts of phosphorus are to be determined because of extremely low solubility of zirconium phosphate, then nickel must be used.

Corrosion Resistance of Nickel Solutions

Nickel is completely resistant to phosphoric acid as well as being highly resistant to the corrosive effect of the strongest alkalies. Nickel, however, is less than satisfactory when used for salt solutions containing oxidants such as ferric chloride or solutions of mineral acids containing oxidizing salts.

Nickel should not be used for:

1. Hypochlorite solutions when available chlorine is over 3 gram/liter
2. Strongly oxidizing acids such as nitric acid
3. Sulfurous acid and ammonium hydroxide in concentrations over 1%.

Wet and dry gases

No dry gases are actively corrosive to nickel at atmospheric temperature. Nickel is also resistant to dry hydrogen chloride, hydrogen fluoride, and chlorine up to about 535˚C. Nickel is not affected by steam at temperatures usually encountered. It is corroded by gases containing sulfur.
NICKEL FORMS A TIGHTLY ADHERING OXIDE FILM AT 400˚C IN OXIDIZING ATMOSPHERES AT TEMPERATURES TO 600˚C.
In choosing crucibles for laboratory work, nickel can be effective with regard to cost per crucible, and for use in fusions where zirconium or other metals cannot be used.

Molybdenum

Molybdenum is a refractory metal recognized for its excellent strength at high temperatures, its high melting point of 2610˚C (4370˚F) and its high resistance to corrosion. It serves a definite purpose in the laboratory.

This high melting point makes molybdenum excellent for use as vapor deposition boats and dishes. Vessels of molybdenum have also been used for such applications as processing nuclear fuel pellets at temperatures up to 1650˚C (3000˚F), and molybdenum crucibles are durable and will withstand repeated rough handling.

In air or oxygen-containing atmospheres, molybdenum is not oxidized to any considerable degree at temperatures below 400˚C (750˚F). At 400˚C (750˚F) and up molybdic oxide is formed and begins to sublime. It is recommended that for high temperature applications, except for brief periods, fusions should be performed in a vacuum or inert atmosphere. The crucibles could then be heated up to about 2100˚C (3800˚F).

Tantalum

Exhibiting a melting point of 2996˚C (5432˚F), among the refractory metals tantalum is outranked only by tungsten (3410˚C/6170˚F). Tantalum, long recognized for its superior strength at high temperatures, is also one of the most corrosion resistant metals available, exhibiting a resistance to acid attack comparable to that of glass and platinum. Due to these qualities, strength at high temperatures and excellent corrosion resistance, laboratory crucibles fabricated from tantalum are suitable for a variety of applications.

Tantalum has been used widely in the electronics, nuclear, aerospace and chemical industries in such areas as heat exchangers, where heat must be transferred to or from acids and other corrosive fluids and vapors. It is also a superior material for the fabrication of heat shields, heating elements, etc.

Tantalum is inert to most organic and inorganic compounds up to temperatures of about 150˚C (300˚F). The metal displays almost complete immunity to attack by most acids, and is impervious to liquid metals up to 900˚C (1650˚F). Like glass, one of the few exceptions to tantalum's general acid resistance is hydrofluoric acid, which will attack tantalum readily. Strong alkalies, oxalic acid and fuming sulfuric acid should also be avoided when using tantalum, as well as any solution containing fluorine ions.

Tantalum exhibits excellent resistance to most acids, especially hydrochloric, sulfuric, nitric, and aqua regia at normal temperatures, and is also completely resistant to attack by many molten metals, including sodium, lithium, magnesium, potassium, and mercury in temperatures to 1100°C (2000°F).

Tantalum is less resistant to alkaline solutions. Concentrated alkaline solutions will attack tantalum at room temperature. The degree of attack is somewhat dependent on temperature and concentration, but in general strong alkalies above room temperature should be avoided.

Most gases, including either wet or dry chlorine or bromine are not reactive with tantalum at temperatures below 150°C (300°F). As temperature and concentration of such gases as oxygen, nitrogen, chlorine, hydrogen chloride and ammonia are increased, oxidation becomes more rapid. Fluorine, hydrogen, fluoride and gaseous SO_3 attack tantalum at all temperatures.

Salts and their solutions generally do not attack tantalum unless they are prone to alkaline hydrolysis or contain fluorine ions. Chlorides and bromides such as ferric chloride, mercuric and stannous up to 175°C (350°F) are satisfactory for use with tantalum.

Heating and vaporization elements made of tantalum are frequently used in flameless atomic absorption equipment, thus eliminating the "carry-over" of ions often found when using graphite elements.

Copper

Copper is considered one of the most important metallic elements, due to its unique physical and chemical properties. Copper provides high electrical and thermal conductivities, corrosive resistance, easy workability and low toxicity. With similar reactivity to silver and gold, it is classified as a noble metal.

Aluminium

Aluminium is the most abundant metallic element on the earth and has many desirable physical and chemical properties. A highly impervious oxide film (approximately 5nm-thick) is resistant to corrosion by seawater, and other aqueous and chemical solutions. Additionally, this element offers chemical stability in the presence of most organic compounds. Aluminium's reactivity increases with temperature, therefore, the use of aluminium labware at high temperatures is not recommended.

Beakers with Pour Lip

Aluminum Beakers

Stock #	Cap(ml)	Top Dia(mm)	Bottom Dia(mm)	Ht(mm)
39046	125	56	48	57
39047	250	63	57	92
39048	500	87	76	114
39049	1000	108	95	137
39050	2000	137	117	171

Copper Beakers

Stock #	Cap(ml)	Top Dia(mm)	Bottom Dia(mm)	Ht(mm)
39051	60	46	40	51
39052	125	56	48	67
39053	250	63	57	92
39054	500	87	76	114
39055	1000	108	95	137
39056	2000	137	117	171

Nickel Beakers

Stock #	Cap(ml)	Top Dia(mm)	Bottom Dia(mm)	Ht(mm)
39057	60	46	40	51
39058	125	56	48	67
39059	250	63	57	92
39060	500	87	76	114
39061	1000	108	95	137
39062	2000	137	117	171

Zirconium Crucibles for Automatic Fusion Equipment

Listed below are some fluxes that can be used in zirconium crucibles.

Sodium Peroxide Fusion
Used with very refractory or high-silica materials such as chromite, magnetite, illmenite, rutile, silicon, silicon carbide, and certain alloys and steels. An excellent general flux for almost any material.

Sodium Carbonate Fusion
Decomposes most silicates of aluminum, calcium, chromium, nickel; also halides of silver; and sulfates of barium and lead.

Lithium Salt Fusion
Flux for oxide and silicate materials when sodium and potassium need to be determined or when large amounts of sodium would interfere with x-ray fluorescence or atomic absorption procedures.

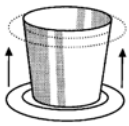
While prolonged exposure to air at temperatures of more than 750˚C can have a negative effect on zirconium, this can be reduced by either: (1) using the cooler, but reducing, portion of the flame, or (2) enveloping the crucible in an inert atmosphere.

Three Styles Available

Slide-On Ring

A removable ring that slides up, fitting approximately 0.20 in. below the top of the crucible

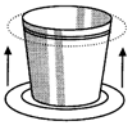
Stock #	Top Dia (mm)	Bottom Dia (mm)	Ht (mm)	Ring/Rim OD (mm)
35882	36	25	35	44
35924	42	29	44	48
35986	47	36	35	54



Snap-On Ring

Also removable, but snap-fits into a machined groove located approximately 0.20 in. below the top of the crucible.

Stock #	Top Dia (mm)	Bottom Dia (mm)	Ht (mm)	Ring/Rim OD (mm)
35903	39	29	33	44
36020	42	29	44	48
35966	47	38	36	50

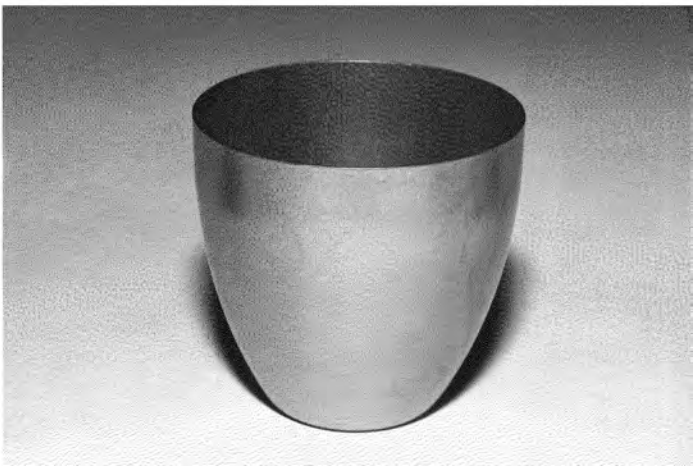


Flanged Rim

A formed rim, integral to the crucible (not welded on), at the crucible's top edge.

Stock #	Top Dia (mm)	Bottom Dia (mm)	Ht (mm)	Ring/Rim OD (mm)
35945	39	29	33	44
35999	42	29	44	48
35902	47	36	35	54

High Form Crucibles



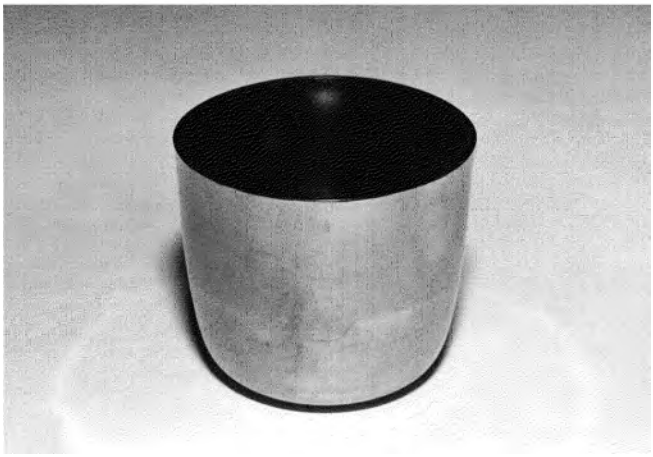
Nickel Crucibles

Stock #	Cap(ml)	Top Dia(mm)	Bottom Dia(mm)	Depth(mm)
35883	20	38	22	35.00
35904	30	41	25	43.00
35925	50	44	32	51.00
35946	75	54	37	57.00
35967	100	61	37	62.00
35998	150	71	37	68.00
36019	250	84	50	78.00
36040	500	101	62	91.00

Nickel Crucible Covers

Stock #	Description
36000	Nickel Cover for Crucible 35883, 20ml
36059	Nickel Cover for Crucible 35904, 30ml
36021	Nickel Cover for Crucible 35925, 50ml
35987	Nickel Cover for Crucible 35946, 75ml
35965	Nickel Cover for Crucible 35967, 100ml
35944	Nickel Cover for Crucible 35998, 150ml
35923	Nickel Cover for Crucible 36019, 250ml
35901	Nickel Cover for Crucible 36040, 500ml

Low Form Crucibles



Zirconium Crucibles

Stock #	Cap(ml)	Top Dia(mm)	Bottom Dia(mm)	Depth(mm)
35884	15	33	25	23.00
35905	20	33	25	30.00
35926	25	45	38	23.00
35947	35	46	38	30.00
35968	45	46	38	35.00
35997	55	47	38	43.00
36018	75	51	41	43.00
36083	100	59	50	46.00
36058	250	82	66	60.00
36039	500	102	89	66.00

Zirconium Crucible Covers

Stock #	Description
36001	Zirconium Cover for Crucible 35884, 15ml
36041	Zirconium Cover for Crucible 35905, 20ml
36069	Zirconium Cover for Crucible 35926, 25ml
36060	Zirconium Cover for Crucible 35947, 35ml
36022	Zirconium Cover for Crucible 35968, 45ml
35985	Zirconium Cover for Crucible 35997, 55ml
35964	Zirconium Cover for Crucible 36018, 75ml
35943	Zirconium Cover for Crucible 36083, 100ml
35922	Zirconium Cover for Crucible 36058, 250ml
35900	Zirconium Cover for Crucible 36039, 500ml

Low Form Crucibles (Continued)

Nickel Crucibles

Stock #	Cap(ml)	Top Dia(mm)	Bottom Dia(mm)	Depth(mm)
35885	15	36	32	23.00
35906	20	33	25	30.00
35927	25	45	38	23.00
35948	35	46	38	30.00
35969	45	46	38	35.00
35996	55	47	38	43.00
36017	75	51	41	43.00
36057	100	59	50	46.00
36084	250	82	66	60.00
36038	500	102	89	66.00

Nickel Crucible Covers

Stock #	Description
36002	Nickel Cover for Crucible 35885, 15ml
36042	Nickel Cover for Crucible 35906, 20ml
36082	Nickel Cover for Crucible 35927, 25ml
36061	Nickel Cover for Crucible 35948, 35ml
36023	Nickel Cover for Crucible 35969, 45ml
35984	Nickel Cover for Crucible 35996, 55ml
35963	Nickel Cover for Crucible 36017, 75ml
35942	Nickel Cover for Crucible 36057, 100ml
35921	Nickel Cover for Crucible 36084, 250ml
35899	Nickel Cover for Crucible 36038, 500ml

Inconel® Alloy 601 Crucibles

Stock #	Cap(ml)	Top Dia(mm)	Bottom Dia(mm)	Depth(mm)
35886	15	33	25	23.00
35907	20	33	25	30.00
35928	25	45	38	23.00
35949	35	46	38	30.00
35970	45	46	38	35.00
35994	55	47	38	43.00
36016	75	51	41	43.00
36056	100	59	50	46.00
36085	250	82	66	60.00
36037	500	102	89	66.00

Low Form Crucibles (Continued)

Inconel® Alloy 601 Crucible Covers

Stock #	Description
36003	Inconel Cover for Crucible 35886, 15ml
36043	Inconel Cover for Crucible 35907, 20ml
36081	Inconel Cover for Crucible 35928, 25ml
36062	Inconel Cover for Crucible 35949, 35ml
36024	Inconel Cover for Crucible 35970, 45ml
35983	Inconel Cover for Crucible 35994, 55ml
35962	Inconel Cover for Crucible 36016, 75ml
35941	Inconel Cover for Crucible 36056, 100ml
35920	Inconel Cover for Crucible 36085, 250ml
35898	Inconel Cover for Crucible 36037, 500ml

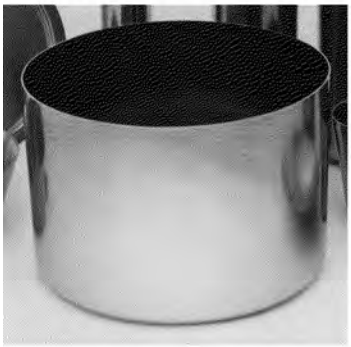
Tantalum Crucibles

Stock #	Cap(ml)	Top Dia(mm)	Bottom Dia(mm)	Depth(mm)
35887	15	36	32	23.00
35929	25	45	38	23.00
35950	35	46	38	30.00
35971	45	46	38	35.00
36015	75	51	41	43.00
36036	500	102	89	66.00

Tantalum Crucible Covers

Stock #	Description
36044	Tantalum Cover for Crucible 35950, 35ml
36025	Tantalum Cover for Crucible 35971, 45ml
35897	Tantalum Cover for Crucible 36036, 500ml

Straight Wall Crucibles



Zirconium Crucibles

Stock #	Cap(ml)	Outside Dia(mm)	Depth(mm)
35888	5	21	18
35909	10	27	22
35930	15	33	22
35951	20	33	29
35972	25	45	22
35992	35	46	29
36014	45	46	34
36070	55	47	41
36106	75	51	41
36054	100	59	45
36097	250	82	59
36087	500	101	65
36035	1000	127	89

Straight Wall Crucibles (Continued)

Zirconium Crucible Covers

Stock #	Description
36005	Zirconium Cover for Crucible 35888, 5ml
36045	Zirconium Cover for Crucible 35909, 10ml
36079	Zirconium Cover for Crucible 35930, 15ml
36107	Zirconium Cover for Crucible 35951, 20ml
36064	Zirconium Cover for Crucible 35972, 25ml
36093	Zirconium Cover for Crucible 35992, 35ml
36111	Zirconium Cover for Crucible 36014, 45ml
36026	Zirconium Cover for Crucible 36070, 55ml
35980	Zirconium Cover for Crucible 36106, 75ml
35960	Zirconium Cover for Crucible 36054, 100ml
35939	Zirconium Cover for Crucible 36097, 250ml
35918	Zirconium Cover for Crucible 36087, 500ml
35896	Zirconium Cover for Crucible 36035, 1000ml

Nickel Crucibles

Stock #	Cap(ml)	Outside Dia(mm)	Depth(mm)
35889	5	21	18
35910	10	27	22
35931	15	33	22
35952	20	33	29
35973	25	45	22
35991	35	46	29
36013	45	46	34
36071	55	47	41
36112	75	51	41
36053	100	59	45
36098	250	82	59
36088	500	101	65
36034	1000	127	89

Straight Wall Crucibles (Continued)

Nickel Crucible Covers

Stock #	Description
36006	Nickel Cover for Crucible 35889, 5ml
36078	Nickel Cover for Crucible 35910, 10ml
36109	Nickel Cover for Crucible 35931, 15ml
36094	Nickel Cover for Crucible 35952, 20ml
36065	Nickel Cover for Crucible 35973, 25ml
36113	Nickel Cover for Crucible 35991, 35ml
36046	Nickel Cover for Crucible 36013, 45ml
36027	Nickel Cover for Crucible 36071, 55ml
35981	Nickel Cover for Crucible 36112, 75ml
35959	Nickel Cover for Crucible 36053, 100ml
35938	Nickel Cover for Crucible 36098, 250ml
35917	Nickel Cover for Crucible 36088, 500ml
35895	Nickel Cover for Crucible 36034, 1000ml

Inconel® Alloy 601 Crucibles

Stock #	Cap(ml)	Outside Dia(mm)	Depth(mm)
35890	5	21	18
35911	10	27	22
35932	15	33	22
35953	20	33	29
35974	25	45	22
35990	35	46	29
36012	45	46	34
36072	55	47	41
36099	75	51	41
36052	100	59	45
36102	250	82	59
36090	500	101	65
36033	1000	127	89

Straight Wall Crucibles (Continued)

Inconel® Alloy 601 Crucible Covers

Stock #	Description
36007	Inconel Cover for Crucible 35890, 5ml
36095	Inconel Cover for Crucible 35911, 10ml
36066	Inconel Cover for Crucible 35932, 15ml
36103	Inconel Cover for Crucible 35953, 20ml
36047	Inconel Cover for Crucible 35974, 25ml
36077	Inconel Cover for Crucible 35990, 35ml
36089	Inconel Cover for Crucible 36012, 45ml
36028	Inconel Cover for Crucible 36072, 55ml
35979	Inconel Cover for Crucible 36099, 75ml
35958	Inconel Cover for Crucible 36052, 100ml
35937	Inconel Cover for Crucible 36102, 250ml
35916	Inconel Cover for Crucible 36090, 500ml
35894	Inconel Cover for Crucible 36033, 1000ml

Molybdenum Crucibles

Stock #	Cap(ml)	Outside Dia(mm)	Depth(mm)
35891	5	21	18
35912	10	27	22
35933	15	33	22
35954	20	33	29
35975	25	45	22
35989	35	46	29
36011	45	46	34
36073	55	47	41
36051	75	51	41
36032	100	59	45

Straight Wall Crucibles (Continued)

Molybdenum Crucible Covers

Stock #	Description
36008	Molybdenum Cover for Crucible 35891, 5ml
36067	Molybdenum Cover for Crucible 35912, 10ml
36076	Molybdenum Cover for Crucible 35933, 15ml
36048	Molybdenum Cover for Crucible 35954, 20ml
36029	Molybdenum Cover for Crucible 35975, 25ml
35978	Molybdenum Cover for Crucible 35989, 35ml
35957	Molybdenum Cover for Crucible 36011, 45ml
35936	Molybdenum Cover for Crucible 36073, 55ml
35915	Molybdenum Cover for Crucible 36051, 75ml
35893	Molybdenum Cover for Crucible 36032, 100ml

Tantalum Crucibles

Stock #	Cap(ml)	Outside Dia(mm)	Depth(mm)
35892	5	21	18
35913	10	27	22
35988	35	46	29
36091	100	59	45
36108	250	82	59
36050	500	101	65
36031	1000	127	89

Tantalum Crucible Covers

Stock #	Description
36075	Tantalum Cover for Crucible 35913, 10ml
36096	Tantalum Cover for Crucible 35955, 20ml
35956	Tantalum Cover for Crucible 36091, 100ml
35935	Tantalum Cover for Crucible 36108, 250ml
36115	Tantalum Cover for Crucible 36031, 1000ml

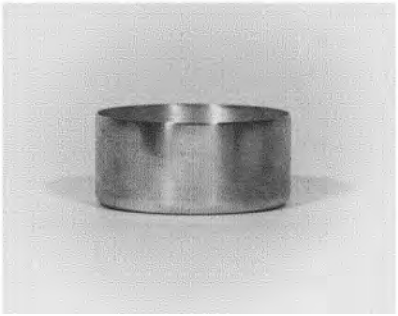
Vacuum Evaporation/Aperture Cleaning Metal Boats

Stock #	Description	Thickness (mm)	Length (mm)	#/Pk
41215	Molybdenum boat	0.05	75	5
41217	Tantalum boat	0.05	75	5
42981	Tungsten boat	0.05	32	5

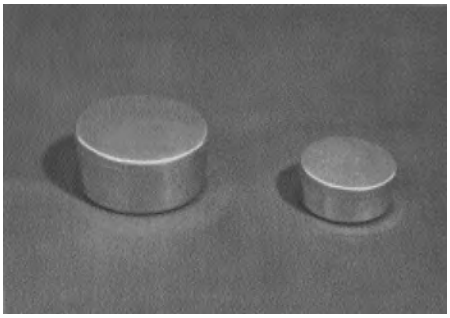
Tungsten Wire Baskets

Stock #	# Turns	ID (mm)	Ht (mm)	Wire Leads (cm)	#/Pk
41177	9	4	7	3.5	10
41178	8	7	9	5.0	10
41176	8	9	14	4.0	10

Aluminum Dishes, Flat Bottom & Straight Sides



Stock #	Dia(mm)	Wall Ht(mm)
39069	51	12.5
39070	51	23
39071	63	44
39072	76	25
39073	90	51
39074	126	25
39075	204	25
39076	204	51



Stock #	Dia(mm)	Wall Ht(mm)
39077	51	12.5
39078	51	23
39079	63	44
39080	76	25
39081	90	51
39082	126	25
39083	204	25
39084	204	51

Pour Plates

Pour plates provide an excellent heat-sink for quenching fusions or pouring fluid melts to solidify into a button for rapid, easy handling and solution.
Alkali metal carbonates, bisulfates or lithium fluxes are readily employed without contamination. These pour plates also provide safe handling of carbonate or bisulfate fluxings in platinum ware cleaning. Copper plate is readily cleaned with cold, diluted aqueous ammonia washing.

Available in either copper or stainless steel, these pour plates are fabricated from one solid piece of high-purity metal. Outside diameter is 6 in. Material thickness is 1/8 in. Plates are finished with a 4 in. diameter flat depression in the center and raised edges to avoid spillage.

Stock #	Material	OD(in)	Thickness (in)	Depression (in)	Net Wt (lb)
37993	Stainless Steel (304SS)	6	1/8	4	0.9
37994	Copper	6	1/8	4	1.1

Cleaning Kit for Laboratory Crucibles

Crucible cleaning kit contains all the materials you'll need to safely clean most types of laboratory crucibles, including metallic crucibles such as zirconium, nickel, molybdenum, tantalum and platinum, as well as crucibles of ceramic or glass.

Kit includes a supply of liquid cleaner, variety of abrasive materials and instructions to:

Extend the life of your laboratory crucibles by safely cleaning them for reuse, without damaging the crucibles.

Reduce sample contamination, either from residue resulting from unclean crucibles, or contamination from the cleaning materials themselves.

Reduce the amount of time necessary to clean your crucibles by supplying effective, safe cleaning agents, with cleaning instructions

Stock #	Description	Standard Selling Sizes
37995	**Cleaning Kit for Laboratory Crucibles**	**1each**

Poly(tetrafluoroethylene) (PTFE) Labware

PTFE Labware

Alfa Aesar is pleased to offer this complete range of laboratory products in PTFE. PTFE is uniquely suitable for many laboratory applications because of its almost total chemical inertness and its wide range of working temperatures with an upper limit of about 290˚C. Additionally, PTFE has a built-in safety factor since the material remains rigid if heated above its notional melting point of 327˚C, and articles in PTFE do not melt and deform if overheated although some decomposition will commence at about 400˚C.

PTFE is the most important member of a family of fluoropolymers which are characterized by exceptional chemical inertness and a wide range of working temperatures.

PTFE is processed using the technology of powder forming with final sintering at about 390˚C. Because of the method of processing formed PTFE may contain microscopic voids which, under some circumstances, may be penetrated by certain chemical reagents - no reaction will occur, but some discoloration may be noticed. Likewise, because of the method of processing, some shedding of the surface may occur at PTFE-PTFE interfaces.

PTFE is one of the best non-stick materials known.

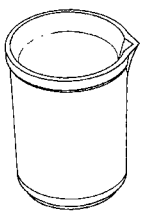
PROPERTY	PTFE
Clarity	Opaque
m.p. ˚C	327
Max temp continuous use ˚C	260-290
Max temp intermittent use ˚C	315
Coefficient of friction - static	0.01
Chemical resistance	Excellent
Electrical resistance	Excellent

Beakers

Isostatically molded from pure PTFE, inert and with super smooth internal finish. Base machined flat for good heat transfer -- use at temperatures to 260˚C with controlled hot plates, ovens, etc. With pouring spout.

Safety Note: Even when heated in excess of 400˚C, PTFE articles retain their shape although some decomposition will commence. Other fluorocarbons such as FEP and PFA do no have this property and articles in these materials will soften and collapse at temperatures in excess of their melting point.

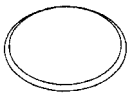
Stock #	Cap(ml)	Dia(mm)	Ht(mm)
38084	10	24	33
38085	25	32	47
38086	50	43	60
38087	100	54	68
38088	250	66	97
38089	500	80	125
38090	1000	100	155
38091	2000	120	210



Beaker Covers - Watch Glasses

Pressed from pure PTFE and used to cover beakers, etc. during digestions and for spotting out.

Stock #	Dia(mm)	Fits Beakers
38092	30	5-10ml
38093	40	25ml
38094	50	50ml
38095	65	100ml
38096	80	250ml
38097	100	500ml
38098	125	1000ml
38099	150	2000ml



PTFE Dropping Bottles and Vials

PTFE dropping bottles are completely inert and leak-free. For use with aggressive or valuable reagents. Flexible and with PTFE cap.

Vials are for storage/shipping of valuable or aggressive materials, and have a superfine internal finish with tapered inner for ease of removal of contents. The thick-walled construction enables them to be used for small scale reactions at low pressure.

Fig. 1

Fig. 2

PTFE Dropping Bottles, Fig. 1

Stock #	Cap(ml)	Ht(mm)	Dia(mm)
38105	25	80	33
38106	50	100	43

PTFE Bottles, Fig. 2

Isostatically molded from pure PTFE and of heavy wall construction with super smooth internal finish. Inert and usable to 280˚C. With screw cap.

Stock #	Cap(ml)	Ht(mm)	Dia(mm)	Mouth Dia(mm)
38109	10	50	26	12
38110	25	61	33	19
38111	50	76	43	25
38112	100	88	52	35
38113	250	115	67	42
38114	500	150	80	52
38115	1000	185	100	57
38116	2000	240	120	60

Tweezers-Forceps

Totally inert and non-contaminating. Use up to 280˚C.

Square Ends

Stock #	Length(mm)
38260	100
38261	200

Sharp Ends

Stock #	Length(mm)
38262	100
38263	200

Quartz Products

Fused quartz has many desirable properties including high chemical purity, high corrosion resistance, high melting point, extreme hardness, low coefficient of thermal expansion, excellent electrical insulation qualities, and optical transmission from ultra-violet to infra-red.

The fused quartz products offered below are manufactured by fusing naturally occuring crystalline silica. For additional products, please inquire.

Quartz Slides

Stock #	Description	Standard Selling Sizes
42295	**Quartz microscope slide, fused, 25.4x25.4x1.0mm (1.0x1.0x0.0394in)**	**1pc** **5pcs**
42296	**Quartz microscope slide, fused, 50.8x25.4x1.0mm (2.0x1.0x0.0394in)**	**1pc** **5pcs**
42297	**Quartz microscope slide, fused, 76.2x25.4x1.0mm (3.0x1.0x0.0394in)**	**1pc** **5pcs**
43210	**Quartz, cover slip for microscope slide, fused, 25.4x25.4x0.15-0.25mm (1.0x1.0x0.006-0.01in)**	**1pc** **5pcs**
43211	**Quartz, cover slip for microscope slide, fused, 25.4mm (1.0in) dia x 0.15-0.25mm (0.006-0.01in) thick**	**1pc** **5pcs**

Quartz Crucibles

Stock #	Description	Standard Selling Sizes
43498	**Quartz crucible, fused; Ht(mm), 57; Top OD(mm), 43; Base OD(mm), 22; Volume(ml), 30**	**1pc**

Quartz Discs

Stock #	Description	Standard Selling Sizes
42298	**Quartz disc, fused, 50.8mm (2.0in) dia x 1.59mm (0.06in) thick** Ground and polished	**each**
42299	**Quartz disc, fused, 50.8mm (2.0in) dia x 3.18mm (0.13in) thick** Ground and polished	**each**
42300	**Quartz disc, fused, 76.2mm (3.0in) dia x 1.59mm (0.06in) thick** Ground and polished	**each**
42301	**Quartz disc, fused, 76.2 (3.0 in) dia x 3.18mm (0.13in) thick** Ground and polished	**each**

Quartz Rods

Stock #	Description	Standard Selling Sizes
42292	**Quartz rod, fused, 2.0mm (0.079in) dia**	**12in** **48in**
42293	**Quartz rod, fused, 5.0mm (0.197in) dia**	**12in** **48in**
42294	**Quartz rod, fused, 10.0mm (0.394in) dia**	**12in** **48in**

Quartz Tubing

Stock #	Description	Standard Selling Sizes
42272	**Quartz tubing, fused, 12mm (0.472in) OD, 8mm (0.315in) ID**	**12in** **48in**
42273	**Quartz tubing, fused, 18mm (0.709in) OD, 15mm (0.59in) ID**	**12in** **48in**
43645	**Quartz tubing, fused, 19mm (0.748in) OD, 16mm (0.630in) ID**	**12in** **48in**

Stock #	Description	Standard Selling Sizes
42274	**Quartz tubing, fused, 25mm (0.984in) OD, 22mm (0.866in) ID**	**12in** **48in**
42275	**Quartz tubing, fused, 6.35mm (0.25in) OD for compression type fittings**	**12in** **48in**
42276	**Quartz tubing, fused, 12.7mm (0.5in) OD for compression type fittings**	**12in** **48in**

High Purity Oxide Ceramics

Alfa Aesar is pleased to offer this broad line of oxide ceramic shapes comprised of high purity alumina (Al_2O_3), zirconia (ZrO_2), or magnesia (MgO). While ceramics are generally defined as inorganic, nonmetallic materials that are processed or consolidated at high temperatures, oxide ceramics is the designation given to materials manufactured of pure metal oxides without the admixtures of silicates during the ceramic process.

These high performance oxide ceramics display superior characteristics both at elevated temperature and at high frequencies, and are resistant to corrosive liquids and gases. Oxide ceramics are also inert to oxidation and are not subject to radiation damage.

Advanced oxide ceramics such as described in this catalog use raw materials which have gone through a succession of purification and processing steps before they can be pressed into their respective shapes. Alfa Aesar's line of ceramics includes tubes, multibore tubes, rods, beads, tubes for heating coils, insulating powders, crucibles, boats, combustion trays, etc.

Alfa Aesar's line of Friatec-Degussit® alumina ceramics have superior wear resistance and can exhibit excellent hardness properties (i.e. Al-23). They also provide superb insulation resistance at elevated temperatures. The compressive strength of alumina ceramics is 7-10 times that of its flexural strength which provides significant advantages when design or operating characteristics of end use applications involve compression. Because alumina provides excellent thermal conductivity, these ceramics perform extremely well as heat dissipating materials. Our line of zirconia and magnesia ceramics provide increased working temperature characteristics and offer useful alternatives to alumina.

Dimensions of shapes other than those described in this catalog are available on request. In addition, other ceramic materials can be made into many of the shapes described in this catalog. Please contact our Specialty Sales Department for items not listed.

The Advantages

The special features of the crucibles, boats, and combustion trays are as follows:

- extreme purity
- extreme resistance to corrosion
- good thermal conductivity
- stability in oxidizing and reducing atmospheres
- ultra high vacuum resistance
- stability at high temperatures
- a good resistance to thermal shock

Additional characteristics:

- top safety in operation
- reliability
- long life time according to normal working procedures of the oxide ceramics.

High Purity Oxide Ceramics
Typical Properties

Material	Units	Al-23	Al-24	Al-25	ZrO_2/Y_2O_3	MgO
Principal Constituent		99.7% Al_2O_3	99.7% Al_2O_3	99.7% Al_2O_3	90% *ZrO_2	98%
Typical Minimum		99.5% Al_2O_3	99.5% Al_2O_3	99.5% Al_2O_3	90%	98%
Apparent Density	g/cm^3	3.7-3.95	3.4-3.6	2.8-3.1	5.8	2.96
Main Grain Size	µm	10	40	70	20-30	-
Open Porosity	%	0	0-5	20-30	0	3-4
Average Pore Size	µm	-	5	5-20	-	-
Hardness (Knoop, 100g)	N/mm^2 (MPa)	23000	-	-	-	-
Compressive Strength	N/mm^2 (MPa)	3500	1000	300	2000	800
Bending Strength	N/mm^2(MPa)	300	150	70	250	40
Modulus of Elasticity	GPa	380	-	-	1.5	-
Resistance to Thermal Shock		good	very good	very good	-	-
Melting Point	°C	2030	2030	2030	-	-
Maximum Working Temperature	°C	1950	1950	1950	2000	2400
Specific Heat	J/kg K	900	-	-	550	-
Thermal Conductivity at 100°C	W/m K	30	-	-	2	50
Thermal Conductivity at 1000°C	W/m K	5	4	3	-	-
Coefficient of Linear Expansion between 0 and 1000°C	10^{-6}/K	8.5	8.5	8.5	10	16
Emissivity at 1000°C	%	21	-	-	-	-
Specific Electrical Resistance at 20°C	Ohm-cm	$>10^{14}$	-	-	-	-
500°C		10^{10}	-	-	-	-
1000°C		10^7	-	-	-	-
1500°C		10^4	-	-	-	-
Dielectric Constant at 10 MHz, 20°C		9.2	-	-	-	-
Dielectric Loss Factor d at 10 MHz, 20°C		2×10^{-4}	-	-	-	-
Electrical Breakdown Strength (dry-pressed and slip-cast parts)	kV eff/mm	22	-	-	-	-

* The balance is % Y_2O_3.

The details of these products and instruments and of their plants and processes are based on extensive research work and operational experience. These data are supplied verbally and in writing to the best of our knowledge and belief. This, however, does not exempt the user from verifying their own responsibility involved in their application. This also applies - particularly for shipments abroad - to safeguard third-party protective rights and applications, and methods of procedure not expressly specified by us in writing.

Our liability is thus limited in all cases to compensation in the same extent and scope as provided for quality deficiencies. In addition, our Technical Service is available for further advice and cooperation in the solving of manufacturing and application problems.

Ceramics

Tolerances:

The accuracy of the size of the sintered parts depends essentially on the material and the method of manufacture.

In general: Diameter: ±5% (but not less than ±0.1mm)
Length: ±1%
Linearity: Typical deviation 0.5% of total length

For tubes and rods with diameter less than 3mm: Diameter ±5% (but not less than ±0.05mm); Length ±1% (Linearity: Maximum deviation 0.5% of total length).

For insulating beads: Tolerances ±3% (but not less than ±0.1mm).

All dimensions are given in mm.

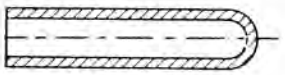
Protective and Insulating Tube Guidelines

Based on thermocouple length.

Nominal Length of Thermocouple	180	250	355	500	710	1000	1400	2000
Length of Protective Tube	200	270	375	530	740	1030	430	2030
Length of Insulating Tube	205	275	380	560	770	1060	1460	2060

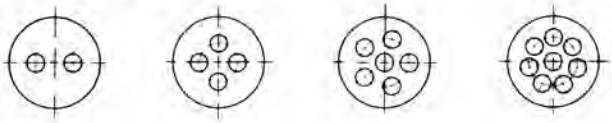
Protective Tubes (One End Closed)

AI-23



	Dimensions			Tube Length/Availability							
Stock #	OD (mm)	ID (mm)	Wall (mm)	200 mm	270 mm	375 mm	530 mm	740 mm	1030 mm	1430 mm	2030 mm
30044	8	5	1.5	✓	✓	✓	✓	✓	✓	✓	✓
30046	10	6	2	✓	✓	✓	✓	✓	✓	✓	✓
30048	12	8	2	✓	✓	✓	✓	✓	✓		✓
30050	15	10	2.5	✓	✓	✓	✓	✓	✓	✓	✓
30052	20	15	2.5	✓	✓	✓	✓	✓	✓	✓	✓
30054	24	18	3	✓	✓	✓	✓	✓	✓	✓	✓

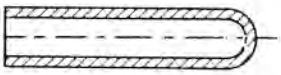
Multibore Insulating Tubes



Al-23

Stock #	Dimensions OD (mm)	# Bores	Bore (mm)	Tube Length/Availability 205 mm	275 mm	380 mm	560 mm	770 mm	1060 mm	1460 mm	2060 mm
32550	4	2	0.8	✓	✓	✓	✓	✓	✓	✓	✓
32556	6	2	1.5	✓	✓	✓	✓	✓	✓	✓	✓
32558	8	2	1.6	✓	✓	✓	✓	✓	✓	✓	✓
32552	4	4	0.8	✓	✓	✓	✓	✓	✓	✓	✓
32554	5.5	4	1.2	✓	✓	✓	✓	✓	✓	✓	✓
32560	8.5	4	1.5	✓	✓	✓	✓	✓	✓	✓	✓

Tubes, One End Closed



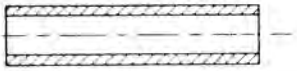
Al-23

Stock #	Dimensions (mm) OD	ID	Tube Length/Availability 100 mm	200 mm	300 mm	400 mm	600 mm	800 mm	1000 mm
30059	3	1.6	✓	✓	✓	✓	✓	✓	✓
30062	4	2	✓	✓	✓	✓	✓	✓	✓
30064	6	3	✓	✓	✓	✓	✓	✓	✓
30066	7	4	✓	✓	✓	✓	✓	✓	✓
30067	8	5	✓	✓	✓	✓	✓	✓	✓
30069	10	6	✓	✓	✓	✓	✓	✓	✓
30072	11	7	✓	✓	✓	✓	✓	✓	✓
30073	12	8	✓	✓	✓	✓	✓	✓	✓
30074	15	10	✓	✓	✓	✓	✓	✓	✓
30076	16	12	✓	✓	✓	✓	✓	✓	✓
30077	20	15	✓	✓	✓	✓	✓	✓	✓
30078	24	18	✓	✓	✓	✓	✓	✓	✓
30079	25	20	✓	✓	✓	✓	✓	✓	✓
30080	30	25	✓	✓	✓	✓	✓	✓	
30081	35	29	✓	✓	✓	✓	✓	✓	
30082	40	34	✓	✓	✓	✓	✓	✓	
30083	45	38	✓	✓	✓	✓	✓	✓	
30084	50	42	✓	✓	✓	✓	✓	✓	
30085	55	47	✓	✓	✓	✓	✓	✓	
30086	60	50	✓	✓	✓	✓	✓	✓	
30088	70	60	✓	✓	✓	✓	✓	✓	
30089	80	70	✓	✓	✓	✓	✓	✓	

AI-24

Stock #	Dimensions (mm) OD	ID	Tube Length/Availability 100 mm	200 mm	300 mm	400 mm	600 mm	800 mm	1000 mm
30091	15	10	✓	✓	✓	✓	✓	✓	✓
30093	24	18	✓	✓	✓	✓	✓	✓	✓

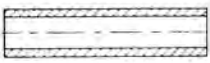
Tubes, Both Ends Open



AI-23

Stock #	Dimensions (mm) OD	ID	Tube Length/Availability 100 mm	200 mm	300 mm	400 mm	600 mm	800 mm	1000 mm
31553	3	1.6	✓	✓	✓	✓	✓	✓	✓
31554	4	2	✓	✓	✓	✓	✓	✓	✓
31555	5	3	✓	✓	✓	✓	✓	✓	✓
31556	6	3	✓	✓	✓	✓	✓	✓	✓
31558	7	4	✓	✓	✓	✓	✓	✓	✓
31560	8	5	✓	✓	✓	✓	✓	✓	✓
31562	10	6	✓	✓	✓	✓	✓	✓	✓
31563	11	7	✓	✓	✓	✓	✓	✓	✓
31564	12	8	✓	✓	✓	✓	✓	✓	✓
31566	15	10	✓	✓	✓	✓	✓	✓	✓
31568	16	12	✓	✓	✓	✓	✓	✓	✓
31570	20	15	✓	✓	✓	✓	✓	✓	✓
31572	24	18	✓	✓	✓	✓	✓	✓	✓
31573	25	20	✓	✓	✓	✓	✓	✓	✓
31574	30	25	✓	✓	✓	✓	✓	✓	✓
31575	35	29	✓	✓	✓	✓	✓	✓	✓
31577	40	34	✓	✓	✓	✓	✓	✓	✓
31578	45	38	✓	✓	✓	✓	✓	✓	✓
31579	50	42	✓	✓	✓	✓	✓	✓	✓
31580	55	47	✓	✓	✓	✓	✓	✓	✓
31581	60	50	✓	✓	✓	✓	✓	✓	✓
31582	65	55	✓	✓	✓	✓	✓	✓	✓
31584	70	60	✓	✓	✓	✓	✓	✓	✓
31585	80	70	✓	✓	✓	✓	✓	✓	✓

Tubes, Both Ends Open (cont.)



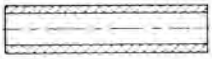
AI-24

Stock #	Dimensions (mm) OD	ID	Tube Length/Availability 100 mm	200 mm	300 mm	400 mm	600 mm	800 mm	1000 mm
31601	10	6	✓	✓	✓	✓	✓	✓	✓
31602	12	8	✓	✓	✓	✓	✓	✓	✓
31603	15	10	✓	✓	✓	✓	✓	✓	✓
31604	20	15	✓	✓	✓	✓	✓	✓	✓
31605	24	18	✓	✓	✓	✓	✓	✓	✓
31606	30	24	✓	✓	✓	✓	✓	✓	✓
31607	40	32	✓	✓	✓	✓	✓	✓	✓
31608	50	40	✓	✓	✓	✓	✓	✓	✓
31609	60	50	✓	✓	✓	✓	✓	✓	✓
31610	70	54	✓	✓	✓	✓	✓	✓	✓

AI-25

Stock #	Dimensions (mm) OD	ID	Tube Length/Availability 100mm	200mm	300mm	400mm	500mm
31612	40	32	✓	✓	✓	✓	✓
31613	50	40	✓	✓	✓	✓	✓
31614	60	50	✓	✓	✓	✓	✓
31615	70	54	✓	✓	✓	✓	✓

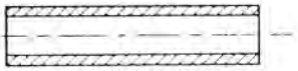
Tubes, Both Ends Open (Thin Walls)



AI-23

Stock #	Dimensions (mm) OD	ID	Tube Length/Availability 100mm	200mm	300mm	400mm
31703	3	2	✓	✓	✓	✓
31704	4	3	✓	✓	✓	✓
31705	5	4	✓	✓	✓	✓
31706	6	5	✓	✓	✓	✓
31707	7	6	✓	✓	✓	✓
31708	8	7	✓	✓	✓	✓
31709	10	9	✓	✓	✓	✓
31710	12	11	✓	✓	✓	✓
31711	16	15	✓	✓	✓	✓
31712	20	19	✓	✓	✓	✓

Tubes, Both Ends Open (Thin Insulating Tubes)



AI-23

Stock #	Dimensions (mm) OD	ID	Tube Length/Availability 100mm	200mm	250mm	300mm	400mm
31475	0.5	0.2	✓	✓	✓	✓	
31476	0.6	0.3	✓	✓	✓	✓	
31477	0.8	0.4	✓	✓		✓	
31478	1	0.5	✓	✓		✓	
31479	1	0.6	✓	✓		✓	
31480	1.1	0.6	✓	✓		✓	
31482	1.2	0.8	✓	✓	✓	✓	
31484	1.5	1	✓	✓		✓	✓
31485	1.6	0.8	✓	✓		✓	✓
31486	1.7	1.1	✓	✓		✓	✓
31487	2	1	✓	✓		✓	✓
31488	2	1.2	✓	✓	✓	✓	✓
31489	2	1.5	✓	✓		✓	✓
31490	2.5	1.3	✓	✓	✓	✓	✓
31492	2.7	1.7	✓	✓		✓	✓

Solid Rods, Round

AI-23

Stock #	Diameter (mm)	Rod Length/Availability 100 mm	200 mm	250 mm	300 mm	400 mm	600 mm	800 mm	1000 mm
32920	0.5	✓	✓	✓	✓				
32921	0.6	✓	✓		✓				
32922	0.8	✓	✓	✓	✓				
32923	1.0	✓	✓	✓	✓				
32924	1.2	✓	✓	✓	✓				
32925	1.5	✓	✓	✓	✓	✓			
32926	2	✓	✓	✓	✓	✓			
32927	3	✓	✓	✓	✓	✓	✓	✓	✓
32929	4	✓	✓	✓	✓	✓	✓	✓	✓
32931	5	✓	✓	✓	✓	✓	✓	✓	✓
32933	6	✓	✓	✓	✓	✓	✓	✓	✓
32935	8	✓	✓	✓	✓	✓	✓	✓	✓
32937	10	✓	✓	✓	✓	✓	✓	✓	✓
32939	12	✓	✓	✓	✓	✓	✓	✓	✓

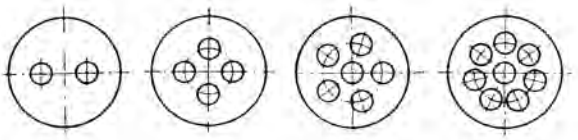
Boron Nitride

Stock #		Diameter(mm)	Length(mm)
45850	NEW!	6.4	300
45912	NEW!	12.7	300

Glass Ceramic

Stock #		Diameter(mm)	Length(mm)
45762	NEW!	6.4	300
45818	NEW!	12.7	300

Multibore Tubes, Round

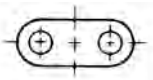


AI-23

Stock #	# Bores	OD	Bore	100 mm	200 mm	250 mm	300 mm	400 mm	600 mm	800 mm	1000 mm
	Dimensions			Tube Length/Availability							
32564	2	0.90	0.20	✓	✓	✓	✓	✓			
32565	2	1.20	0.30	✓	✓	✓	✓	✓			
32566	2	1.55	0.40	✓	✓	✓	✓	✓			
32567	2	2.00	0.50	✓	✓	✓	✓	✓			
32568	2	2.50	0.70	✓	✓	✓	✓	✓			
32648	2	3.00	0.80	✓	✓	✓	✓	✓	✓	✓	✓
32650	2	4.00	0.80	✓	✓	✓	✓	✓	✓	✓	✓
32652	2	4.00	1.20	✓	✓	✓	✓	✓	✓	✓	✓
32654	2	5.00	1.20	✓	✓	✓	✓	✓	✓	✓	✓
32656	2	6.00	1.50	✓	✓	✓	✓	✓	✓	✓	✓
32658	2	8.00	1.60	✓	✓	✓	✓	✓	✓	✓	✓
32600	4	1.20	0.20	✓	✓	✓	✓	✓			
32602	4	2.35	0.50	✓	✓	✓	✓	✓			
32603	4	2.80	0.70	✓	✓	✓	✓	✓			
32708	4	4.00	0.80	✓	✓	✓	✓	✓	✓	✓	✓
32710	4	5.00	1.00	✓	✓	✓	✓	✓	✓	✓	✓
32712	4	5.50	1.20	✓	✓	✓	✓	✓	✓	✓	✓
32718	4	8.50	1.50	✓	✓	✓	✓	✓	✓	✓	✓
32601	6	2.00	0.40	✓	✓	✓	✓	✓			
32714	6	8.00	0.80	✓	✓	✓	✓	✓	✓	✓	✓
32716	8	8.00	0.80	✓	✓	✓	✓	✓	✓	✓	✓

2-Bore Tubes, Oval Cross Section

AI-23

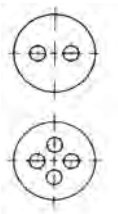


Stock #	# Bores	OD	Bore	100 mm	200 mm	250 mm	300 mm	400 mm
	Dimensions			Insulator Length/Availability				
32776	2	1.55/0.90	0.25	✓	✓	✓	✓	✓
32777	2	2.30/1.40	0.70	✓	✓	✓	✓	✓
32774	2	3.00/1.50	0.80	✓	✓	✓	✓	✓
32775	2	4.20/2.20	1.20	✓	✓		✓	✓

Insulating Beads

Al-23

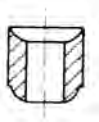
Stock #	# Bores	OD(mm)	Bore(mm)	Length(mm)
32911	2	4	0.80	4
32912	2	4	0.80	10
32914	4	4	0.80	4
32915	4	4	0.80	10



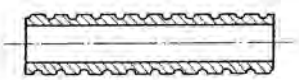
Fish Spine Beads

Al-23

Stock #	OD(mm)	Bore(mm)	Length(mm)
32905	3.5	1.0	3.0
32906	4.0	1.5	4.7
32907	5.0	2.5	5.0
32908	7.0	3.8	7.0
32909	8.5	5.0	10.0



Tubes For Heating Coils



Al-23

*Approximate

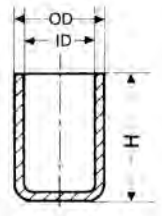
	Dimensions (mm)					Tube Length/Availability				
Stock #	OD	ID	Thread Breadth	Thread Depth	Thread Pitch*	100 mm	200 mm	300 mm	400 mm	500 mm
33204	21	15	1.0	1.0	1.5	✓	✓	✓	✓	✓
33205	27	20	1.0	1.0	1.5	✓	✓	✓	✓	✓
33206	33	25	1.0	1.0	1.5	✓	✓	✓	✓	✓
33207	38	29	1.5	1.2	2.0	✓	✓	✓	✓	✓
33208	44	34	2.0	1.6	2.5	✓	✓	✓	✓	✓
33209	50	38	2.0	2.0	2.5	✓	✓	✓	✓	✓
33210	60	47	2.5	2.0	5.0	✓	✓	✓	✓	✓

Ceramics

Crucibles, Cylindrical, Flat Base

Al-23

Stock #	Dimensions (mm) Height x OD x ID	Vol (ml)
32950	15 x 10 x 8	0.7
32951	30 x 20 x 16	6
32952	40 x 30 x 26	20
32953	50 x 35 x 30	40
32954	60 x 40 x 36	60
32955	75 x 50 x 44	110
32956	100 x 65 x 55	225
32957	150 x 85 73	600



Al-24

Stock #	Dimensions (mm) Height x OD x ID	Vol (ml)
32961	30 x 20 x 16	6
32962	40 x 30 x 26	20
32963	50 x 35 x 30	40
32964	60 x 40 x 36	60
32965	75 x 50 x 44	110
32966	100 x 65 x 55	225
32967	150 x 85 x 73	600

Al-25

Stock #	Dimensions (mm) Height x OD x ID	Vol (ml)
32969	160 x 145 x 125	1760
32968	200 x 120 x 100	1500

MgO

Stock #		Height(mm)	OD(mm)
45733	NEW!	25	25
45854	NEW!	32	32
46021	NEW!	38	38
45680	NEW!	44	44
46108	NEW!	51	51
45900	NEW!	76	76

$MgAl_2O_4$

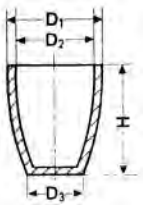
Stock #	Dimensions (mm) Height x OD x ID	Vol (ml)
44595	35x23x20	10

ZrO_2, 10% Y_2O_3 Stabilized

Stock #	Dimensions (mm) Height x OD	Vol (ml)
41273	37x20	5
41274	43x24	10
41275	72x37	50
41276	90x45	100
41277	112x55	200

Crucibles, Conical, Flat Bottom, High Form

Al-23



Stock #	Dimensions (mm) Height	D1	D2	D3	Vol(mm)
33009	25	20	17	11	4
33010	30	25	21	13	9
33011	38	30	26	15	15
33012	45	35	31	18	23
33013	55	45	40	22	49
33014	65	60	53	30	75
33015	90	73	67	35	160

$MgAl_2O_4$

Stock #	Dimensions (mm) Height	D1	D3	Vol(mm)
41288	35	32	22	10
41289	58	51	34	50
41290	72	62	41	100
41291	90	77	50	200

Crucibles, Conical, Round Bottom, High Form

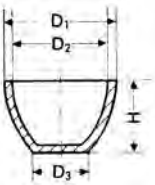
ZrO_2, 10% Y_2O_3 Stabilized, Conical, Round Bottom, High Form

Stock #	Dimensions (mm) Height	D1	D3	Vol(mm)
41297	29	26	18	5
41298	34	30	20	10
41299	54	46	28	50
41300	68	56	35	100
41301	85	69	42	200

Crucibles, Conical, Flat Bottom, Low Form

AI-23

Stock #	Dimensions (mm) Height	D1	D2	D3	Vol(mm)
33042	20	25	22	13	5
33043	24	30	26	15	8
33044	32	40	36	20	21
33045	37	43	38	22	26
33046	40	50	45	25	40
33047	55	65	59	33	80
33048	60	88	80	44	125



ZrO_2, 10% Y_2O_3 Stabilized, Conical, Flat Bottom, Low Form

Stock #	Dimensions (mm) Height	D1	D3	Vol(mm)
41284	27	36	26	10
41285	44	58	41	50
41286	55	71	50	100
41287	69	88	61	200
44843	42	56	29	50

ZrO_2, 10% Y_2O_3 Stabilized, Conical Round Bottom, Low Form

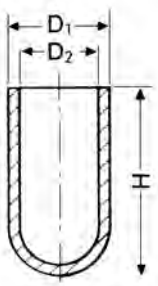
Stock #	Dimensions (mm) Height	D1	D3	Vol(mm)
41292	21	29	18	5
41293	26	35	20	10
41294	42	56	29	50
41295	51	67	35	100
41296	63	82	42	200

Crucibles, Tammann

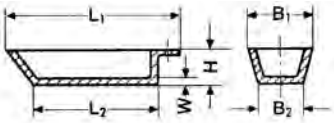
Al-23

*Approximate

Stock #	Dimensions (mm) Height x OD x ID	Vol(ml)	Tammann #
33052	30 x 6 x 3	0.2ml	-
33053	50 x 8 x 5	1	-
33054	80 x 10 x 6	2.3	-
33055	100 x 12 x 8	5	-
33056	100 x 15 x 10	8	-
33058	100 x 20 x 15	17	-
33061	100 x 25 x 20	30	-
33057	190 x 16 x 12	22	Ia
33059	190 x 24 x 20	60	Ib
33062	190 x 34 x 28	123	Ic
33060	280 x 24 x 20	90	IIa
33063	280 x 34 x 28	180	IIb
33064	280 x 44 x 38	300	IIc, IIIa
33065	280 x 55 x 47	490	IIIb
33066	280 x 68 x 58	790	IIIc
33067	390 x 68 x 58	1070	IVa



Boats



Al-23

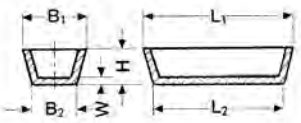
Stock #	L (mm)	B (mm)	H (mm)	W (mm)	Vol (ca ml)
33171	48	9	6	2	0.6
33170	32	9	6	2	0.4
33174	69	9	6	2	1.0
33172	50	15	8	2.5	1.7
33175	87	15	8	2.5	3.4
33179	112	15	8	2.5	4.7
33176	92	18	10	3	5.7
33180	118	18	10	3	7.5
33173	58	23	13	3	4.3
33177	92	23	13	3	7.5
33181	124	23	13	3	10.3
33178	102	31	17	3	19.0
33182	130	31	17	3	36.0

Rectangular Trays

MgO

Stock #		Length(mm)	Width(mm)	Height(mm)
45634	NEW!	100	25	12.7
45749	NEW!	50	50	12.7
45827	NEW!	100	50	12.7
45954	NEW!	75	75	25.4
45865	NEW!	150	75	25.4
45791	NEW!	100	100	25.4
45699	NEW!	150	100	25.4

Combustion Trays



AI-23

Stock #	L (mm)	B (mm)	H (mm)	W (mm)	Vol (ca ml)
33183	50	25	20	3	14.0
33184	50	50	20	3	33.0
33185	75	50	20	4	45.0
33186	100	50	30	4	100.0

AI-24

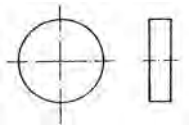
Stock #	L (mm)	B (mm)	H (mm)	W (mm)	Vol (ca ml)
33187	145	85	30	5	240

AI-25

Stock #	L (mm)	B (mm)	H (mm)	W (mm)	Vol (ca ml)
33188	205	125	50	10	820

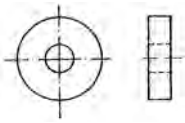
Discs, Round

Al-23 Without Hole



Stock #	OD(mm)	Thick(mm)
33107	10	3
33108	15	3
33109	20	3
33110	25	4
33111	30	5
33112	35	5
33113	40	6
33114	45	6
33115	50	6
33116	52	6
33117	55	6
33118	60	7
33119	70	7
33120	80	8

Al-23 With Hole



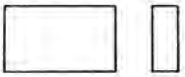
Stock #	OD(mm)	Thick(mm)	Hole Dia(mm)
33136	20	3	6
33137	25	4	6
33138	30	5	6
33139	35	5	6
33140	40	6	8
33141	45	6	8
33142	50	6	10
33143	52	6	10
33144	55	6	10
33145	60	7	10
33146	70	7	10
33147	80	8	10

Al-25 Without Hole

Stock #	OD(mm)	Thick(mm)
33128	130	15
33129	150	20
33130	200	25

Ceramics

Plates, Rectangular



Al-23

Stock #	Length(mm)	Width(mm)	Thick(mm)
33155	50	25	4
33156	50	50	4
33157	75	50	4
33158	100	50	4

Al-25

Stock #	Length(mm)	Width(mm)	Thick(mm)
33159	105	50	10
33161	145	70	15
33160	115	115	15
33162	145	85	15
33163	205	125	15

Boron Nitride

Stock #		Length(mm)	Width(mm)	Thickness(mm)
45668	NEW!	125	125	6.4
45598	NEW!	125	125	12.7

Glass Ceramic

Stock #		Length(mm)	Width(mm)	Thickness(mm)
45540	NEW!	100	150	6.4
45635	NEW!	100	150	9.5
45720	NEW!	100	150	12.7

MgO

Stock #	Length(mm)	Width(mm)	Thick(mm)
40622	100	50	10
40623	115	115	15
40624	145	70	15

Bars

Boron Nitride

Stock #		Length(mm)	Width(mm)	Height(mm)
45541	NEW!	300	6.4	6.4
45721	NEW!	300	12.7	12.7

Grinding Pieces

Al-23

Stock #	Ht(mm)	# Pcs/Kg	1kg
33189	5	3540	✓
33190	10	440	✓
33191	15	157	✓
33192	20	53	✓
33193	30	15	✓

ZrO_2 /10% Y_2O_3 Stabilized

Stock #	Dia(mm)	250g	1kg
43285	5	✓	✓
43286	10	✓	✓

Poco Electron Beam Crucibles and Hearth Shields
Carbon Graphite Crucibles

Typical Purity Analysis
(Total ash range of 5ppm or less)

Elements Detected	PPM Range
Iron (Fe), Silicon (Si), Aluminum (Al), Magnesium (Mg)	Trace to 5
Vanadium (V), Nickel (Ni), Chromium (Cr), Titanium (Ti), Copper (Cu) Boron (B), Manganese (Mn), Lithium (Li), Cadmium (Cd), Molybdenum (Mo), Lead (Pb), Silver (Ag), Zinc (Zn), Calcium (Ca), Potassium (K), Sodium (Na), Molybdenum (Mo)	Below detectability level

Poco Electron Beam Crucibles

Stock #	Vol (mm)	Top OD (mm)	Ht (mm)	Wall Thickness (mm)	Angle
43950	0.32	14.22	9.75	2.36	15°
40819	1.8	21.97	14.30	2.36	15°
38677	2.8	19.84	11.10	1.58	14°
43198	3.7	28.58	13.20	2.36	15°
38680	4.4	29.64	14.30	2.36	15°
38675	8.2	37.59	17.02	3.18	15°
38684	16.9	50.80	26.97	6.35	15°
38683	17.0	51.56	25.91	6.35	15°
41866	28.6	56.18	35.56	2.36	15°
38681	30.2	50.80	26.97	2.36	15°
38682	30.4	51.56	25.91	2.36	15°
38678	47.6	56.18	35.56	2.36	15°
38676	94.7	82.55	38.86	6.35	15°

POCO Hearth Shields

Reduce downtime, extend hearth life and lower maintenance costs

Designed for use with POCO's Electronic Beam Crucibles, POCO Hearth Shields give users three important field-tested and proven advantages.

1. Acting as a physical barrier, the hearth shield eliminates bonding of the evaporant with those areas of the hearth it covers. This reduces downtime for cleaning.

2. With less cleaning necessary, the risk of damage to the hearth from both cleaning and handling is greatly reduced. This provides longer hearth life.

3. Less cleaning, less handling damage, less downtime all add up to lowered maintenance costs to the user. More productive time is gained for each hearth.

When used in conjunction with the matching POCO Crucible, the shield is designed to avoid contact with the crucible to minimize the possibility of their "welding" together. Best results are obtained when both shield and crucible are used together.

The following POCO hearth shields are available. We can also offer Electron Beam Crucibles in most metals, including Molybdenum, Tungsten and Nickel, as well as ceramic, at standard configurations.

Stock #	Description
38685	POCO Hearth Shield, 99.995%; For Use With Crucibles, 38678 & 38679
38686	POCO Hearth Shield, 99.995%; For Use With Crucibles, 38680
38687	POCO Hearth Shield, 99.995%; For Use With Crucibles, 38682 & 38683
38688	POCO Hearth Shield, 99.995%; For Use With Crucibles, 38682 & 38684

Spheres

Ruby Spheres

Specifications for Grade 25 Ruby Spheres	
Diameter tolerance per half	±0.000025 in.
"V" block out of round in 120˚ angle	±0.000025 in.
Basic diameter tolerance	±0.0001 in.
Maximum surface roughness (arithmetic average)	1.5 micro-inch

Stock #	Dia(mm)	2 pcs	5 pcs	10 pcs	25 pcs	50 pcs	100 pcs
42072	0.25						✓
42073	0.50		✓		✓		✓
42074	0.75		✓		✓		✓
42075	1.00		✓		✓		✓
42041	1.19 (3/64 in)		✓		✓		✓
42076	1.25		✓		✓		✓
42077	1.50		✓		✓		✓
42042	1.59 (1/16in)		✓		✓		✓
42078	1.75		✓		✓		✓
42079	2.00		✓		✓		✓
42043	2.38 (3/38in)		✓		✓		✓
42080	2.50		✓		✓		✓
42081	3.00		✓		✓		✓
42044	3.18 (1/8in)		✓		✓		✓
42082	3.50		✓		✓		✓
42083	4.00	✓		✓		✓	
42045	4.76 (3/16in)	✓		✓		✓	
42084	5.00	✓		✓		✓	

Sapphire Spheres

Specifications for Grade 25 Sapphire Spheres	
Diameter tolerance per half	±0.000025 in.
"V" block out of round in 120° angle	±0.000025 in.
Basic diameter tolerance	±0.0001 in.
Maximum surface roughness (arithmetic average)	1.5 micro-inch

Stock #	Dia(mm)	2 pcs	5 pcs	10 pcs	25 pcs	50 pcs	100 pcs
42070	0.25						✓
42069	0.50		✓		✓		
44439	0.794 (1/32in), grade 25		✓		✓		
42067	1.00		✓		✓		✓
42046	1.19 (3/64in)		✓		✓		✓
42066	1.25		✓		✓		✓
42065	1.50		✓		✓		✓
42047	1.59 (1/16in)		✓		✓		
42064	1.75		✓		✓		✓
42063	2.00		✓		✓		✓
42048	2.38 (3/32in)		✓		✓		✓
42062	2.50		✓		✓		
42061	3.00		✓		✓		✓
42049	3.18 (1/8in)		✓		✓		✓
42060	3.50		✓		✓		✓
42059	4.00	✓		✓		✓	
42050	4.78 (3/16in)	✓		✓		✓	
42058	5.00	✓		✓		✓	

Aluminum Nitride Products

Aluminum Nitride

Aluminum nitride ceramics exhibit exceptional characteristics, making them useful in various applications.

- Unusually high thermal conductivity combined with good electrical insulation characteristics.
- Exceptional stability when exposed to many molten salts.
- Thermal stability up to at least 1800°C
- Favorable mechanical characteristics extending into the high temperature range.
- Low thermal expansion and resistance to thermal shock.
- Special optical and acoustic characteristics.

Physical Properties	
Flexural strength	300 ± 5MPa
Coefficient of thermal expansion	$5.6x10^{-6}K^{-1}$ (20-1000°C)
Thermal conductivity	100-200 $Wm^{-1}K^{-1}$
Insulation resistance	$>10^{12}\Omega cm$ (20°C)

Aluminum Nitride Rods

Stock #	Description	Standard Selling Sizes
42998	**Aluminum nitride Rod, Round; Diameter (mm), 10**	**150mm 200mm 270mm 300mm bulk**
43000	**Aluminum nitride Rod, Round; Diameter (mm), 22**	**150mm 200mm bulk**

Aluminum Nitride Crucibles

Stock #	Description	Standard Selling Sizes
43789	**Aluminum nitride crucible, Cylindrical, Flat Base;Height x OD x ID (mm), 25 x 20 x 15; Vol(ml), 5**	**2pcs 10pcs bulk**
43350	**Aluminum nitride crucible, Cylindrical, Flat Base;Height x OD x ID (mm), 37 x 33.5 x 28.7; Vol(ml), 20**	**1pc 5pcs bulk**
43790	**Aluminum nitride cover for crucible stock # 43789, 5mm thick**	**2pcs 10pcs bulk**

Aluminum Nitride Paste

Stock #	Description	Standard Selling Sizes
43959	**Aluminum nitride paste** ◪ AlN, d. 1.98, Note: Air set in 1-4 hours, heat cure in 2 hours at 200°, †	**25g 100g 500g 2kg bulk**

Glassy Carbon

Glassy carbon, a brittle form of carbon with a randomized structure, has certain specific properties making it appropriate for fields of application outside the scope of carbon types previously known.

Glassy Carbon Specifications

Characteristic properties	Units	Type 1	Type 2
Bulk density	g/cm^3	1.54	1.42
Ash values acc. to DIN 51903	ppm	<100	<100
Maximum service temperature (under Argon)	°C	1100	3000
Open porosity	%	0	0
Permeability coefficient (He gas)	cm^2/s	10-11	10^{-9}
Vickers hardness	HV1	340	230
Flexural strength[1]	N/ mm^2	210	260
Compressive strength[2]	N/ mm^2	580	480
Young's modulus[1]	kN/ mm^2	35	35
Coefficient of thermal expansion (20-200°C)	1/K	3.5×10^{-6}	2.6×10^{-6}
Thermal conductivity (30°C)	W/(Km)	4.6	6.3

[1] =4-point bending test; geometry of specimen: circular rod, diameter 3mm, length 60mm
[2] =geometry of specimen: circular rod, diameter 7mm, length 10 mm

Glassy carbon offers high purity, corrosion resistance, thermal stability and a structure impermeable to both gases and liquids. Alfa Aesar's glassy carbon products are subjected to a high temperature heat treatment which imparts special material properties including significantly improved corrosion resistance and strength. Advantanges over more traditional materials are:

- Resistance to all wet decomposition agents
- No memory effects (uncontrolled adsorption and release of foreign elements)
- No contamination of analytical samples
- Stability to acid and alkaline melts
- No wetting effect of metal melts
- Good resistance to thermal shock allows rapid heating and cooling times
- Resistive to abrasive wear
- Good electrical conductivity

Applications

- Vessels for ultra-high purity materials technology, e.g. semiconductor connections and crystal-growing, e.g. doped halogenide crystals
- Crucibles for high-temperature differential thermal/thermal gravimetric analyses
- Specimen holders and cuvettes for atomic absorption and atomic emission spectroscopy and multi-element analyses with plasma excitation, e.g. by the ICP (inductively coupled plasma) method
- Protective tubes for thermo-elements and viewing tubes for pyrometers
- Shaping tools for the glass industry
- Electrochemistry: cyclic voltammetry, organic electrosynthesis

Glassy Carbon Spherical Powders

Stock #	Description	Standard Selling Sizes
38004	**Glassy carbon spherical powder, 0.4-12 micron, type 1** UN1325, † R:11	**10g** **50g** **250g** **bulk**
38008	**Glassy carbon spherical powder, 0.4-12 micron, type 2** UN1325, † R:11	**10g** **50g** **250g** **bulk**

Glassy Carbon

Stock #	Description	Standard Selling Sizes
43489	**Glassy carbon spherical powder, 10-20 micron, type 1** UN1325, †  R:11	**50g** **250g** **bulk**
43490	**Glassy carbon spherical powder, 10-20 micron, type 2** UN1325, †  R:11	**50g** **250g** **bulk**
41260	**Glassy carbon spherical powder, 20-50 micron, type 1** UN1325, †  R:11	**10g** **50g** **250g** **bulk**
41261	**Glassy carbon spherical powder, 20-50 micron, type 2** UN1325, †  R:11	**10g** **50g** **250g** **bulk**
43925	**Glassy carbon spherical powder, 40-80 micron, type 1** UN1325, †  R:11	**10g** **50g** **250g** **bulk**
44370	**Glassy carbon spherical powder, 40-80 micron, type 2** UN1325, †  R:11	**10g** **50g** **250g** **bulk**
38005	**Glassy carbon spherical powder, 80-200 micron, type 1** UN1325, †  R:11	**10g** **50g** **250g** **bulk**
38014	**Glassy carbon spherical powder, 80-200 micron, type 2** UN1325, †  R:11	**10g** **50g** **250g** **bulk**
42130	**Glassy carbon spherical powder, 200-400 micron, type 1** UN1325, †  R:11	**10g** **50g** **250g** **bulk**
42550	**Glassy carbon spherical powder, 200-400 micron, type 2** UN1325, †  R:11	**10g** **50g** **250g** **bulk**
42129	**Glassy carbon spherical powder, 400-630 micron, type 1** UN1325, †  R:11	**50g** **250g** **bulk**
41481	**Glassy carbon spherical powder, 400-630 micron, type 2** UN1325, †  R:11	**50g** **250g** **bulk**
41497	**Glassy carbon spherical powder, 630-1000 micron, type 1** UN1325, †  R:11	**50g** **250g** **bulk**
41530	**Glassy carbon spherical powder, 630-1000 micron, type 2** UN1325, †  R:11	**50g** **250g** **bulk**
41498	**Glassy carbon spherical powder, 1000-2000 micron, type 1** UN1325, †  R:11	**50g** **250g** **bulk**
41531	**Glassy carbon spherical powder, 1000-2000 micron, type 2** UN1325, †  R:11	**50g** **250g** **bulk**

Glassy Carbon Splinter Powders

Stock #	Description	Standard Selling Sizes
38001	**Glassy carbon splinter powder, 0.4-12 micron, type 1** UN1325, †  R:11	**10g** **50g** **250g** **bulk**
38007	**Glassy carbon splinter powder, 0.4-12 micron, type 2** UN1325, †  R:11	**10g** **50g** **250g** **bulk**
41258	**Glassy carbon splinter powder, 20-50 micron, type 1** UN1325, †  R:11	**10g** **50g** **250g** **bulk**
41259	**Glassy carbon splinter powder, 20-50 micron, type 2** UN1325, †  R:11	**10g** **50g** **250g** **bulk**
38002	**Glassy carbon splinter powder, 80-200 micron, type 1** UN1325, †  R:11	**10g** **50g** **250g** **bulk**
38013	**Glassy carbon splinter powder, 80-200 micron, type 2** UN1325, †  R:11	**10g** **50g** **250g** **bulk**
42811	**Glassy carbon splinter powder, 200-400 micron, type 1** UN1325, †  R:11	**50g** **250g** **bulk**
42813	**Glassy carbon splinter powder, 200-400 micron, type 2** UN1325, †  R:11	**50g** **250g** **bulk**
42812	**Glassy carbon splinter powder, 400-630 micron, type 1** UN1325, †  R:11	**50g** **250g** **bulk**
42814	**Glassy carbon splinter powder, 400-630 micron, type 2** UN1325, †  R:11	**50g** **250g** **bulk**
42520	**Glassy carbon splinter powder, 630-1000 micron, type 1** UN1325, †  R:11	**50g** **250g** **bulk**
42521	**Glassy carbon splinter powder, 630-1000 micron, type 2** UN1325, †  R:11	**50g** **250g** **bulk**
42518	**Glassy carbon splinter powder, 1000-2000 micron, type 1** UN1325, †  R:11	**50g** **250g** **bulk**
42519	**Glassy carbon splinter powder, 1000-2000 micron, type 2** UN1325, †  R:11	**50g** **250g** **bulk**
42514	**Glassy carbon splinter powder, 2000-3150 micron, type 1** UN1325, †  R:11	**50g** **250g** **bulk**
42515	**Glassy carbon splinter powder, 2000-3150 micron, type 2** UN1325, †  R:11	**50g** **250g** **bulk**

Glassy Carbon

Stock #	Description	Standard Selling Sizes
42516	**Glassy carbon splinter powder, 3150-4000 micron, type 1** UN1325, † 	**50g** **250g** **bulk**
42517	**Glassy carbon splinter powder, 3150-4000 micron, type 2** UN1325, † 	**50g** **250g** **bulk**

Glassy Carbon Plates

Stock #	Description	Standard Selling Sizes
38024	**Glassy carbon plate, 1mm (0.04in) thick, type 1** ≈3.85g/50x50mm, †	**50x50mm** **100x100mm** **bulk**
38021	**Glassy carbon plate, 1mm (0.04in) thick, type 2** ≈3.55g/50x50mm, †	**50x50mm** **100x100mm** **bulk**
38025	**Glassy carbon plate, 2mm (0.08in) thick, type 1** ≈7.7g/50x50mm, †	**50x50mm** **100x100mm** **bulk**
38022	**Glassy carbon plate, 2mm (0.08in) thick, type 2** ≈7.1g/50x50mm, †	**50x50mm** **100x100mm** **bulk**
42821	**Glassy carbon plate, 3mm (0.1in) thick, type 1** ≈2.9g/25x25mm, †	**25x25mm** **50x50mm** **100x100mm** **bulk**
42820	**Glassy carbon plate, 3mm (0.1in) thick, type 2** ≈2.6g/25x25mm, †	**25x25mm** **50x50mm** **100x100mm** **bulk**
38026	**Glassy carbon plate, 4mm (0.16in) thick, type 1** ≈3.8g/25x25mm, †	**25x25mm** **50x50mm** **100x100mm** **bulk**
38023	**Glassy carbon plate, 4mm (0.16in) thick, type 2** ≈3.6g/25x25mm, †	**25x25mm** **50x50mm** **100x100mm** **bulk**

Glassy Carbon Rods

Stock #	Description	Standard Selling Sizes
38009	**Glassy carbon rod, 1mm (0.04in) dia, type 1** ≈0.01g/cm, †	**50mm** **100mm** **200mm** **bulk**
37996	**Glassy carbon rod, 1mm (0.04in) dia, type 2** ≈0.01g/cm, †	**50mm** **100mm** **200mm** **bulk**
38010	**Glassy carbon rod, 2mm (0.08in) dia, type 1** ≈0.05g/cm, †	**50mm** **100mm** **200mm** **bulk**
37997	**Glassy carbon rod, 2mm (0.08in) dia, type 2** ≈0.04g/cm, †	**50mm** **100mm** **200mm** **bulk**
42822	**Glassy carbon rod, 3mm (0.1in) dia, type 1** ≈0.11g/cm, †	**50mm** **100mm** **200mm** **250mm** **bulk**

Stock #	Description	Standard Selling Sizes
42824	**Glassy carbon rod, 3mm (0.1in) dia, type 2** ≈0.10g/cm, †	**50mm** **100mm** **200mm** **bulk**
42823	**Glassy carbon rod, 4mm (0.16in) dia, type 1** ≈0.19g/cm, †	**50mm** **100mm** **200mm** **bulk**
42825	**Glassy carbon rod, 4mm (0.16in) dia, type 2** ≈0.18g/cm, †	**50mm** **100mm** **200mm** **bulk**
38011	**Glassy carbon rod, 5mm (0.2in) dia, type 1** ≈0.30g/cm, †	**50mm** **100mm** **200mm** **250mm** **bulk**
37998	**Glassy carbon rod, 5mm (0.2in) dia, type 2** ≈0.28g/cm, †	**50mm** **100mm** **200mm** **bulk**
45004 NEW!	**Glassy carbon rod, 6mm (0.24in) dia, type 1** ≈0.44g/cm, †	**50mm** **100mm** **200mm** **bulk**
45005 NEW!	**Glassy carbon rod, 6mm (0.24in) dia, type 2** ≈0.40g/cm, †	**50mm** **100mm** **200mm** **bulk**
38012	**Glassy carbon rod, 7mm (0.28in) dia, type 1** ≈0.59g/cm, †	**50mm** **100mm** **200mm** **bulk**
37999	**Glassy carbon rod, 7mm (0.28in) dia, type 2** ≈0.55g/cm, †	**50mm** **100mm** **200mm** **bulk**

Glassy Carbon Beakers

Stock #	Vol(ml)	Dia(mm)	Ht(mm)
39022	30	36	50
39023	100	54	70
39024	250	75	82
39025	400	90	86

Glassy Carbon Boats

Stock #	Vol(ml)	Length L1(mm)	Width(mm)	Ht(mm)
39026	2	29	16	10
39027	3	53	16	10
39028	10	103	16	10
40997	15	119	22	12
40999	40	76	33	25

Glassy Carbon Conical Crucibles

Stock #	Vol(ml)	Top Dia(mm)	Bottom Dia(mm)	Ht(mm)
39003	10	31	17	27
39004	20	35	18	38
39005	30	44	22	45
39006	60	52	25	56
38376	100	70	34	53
39007	150	64	33	74

Glassy Carbon Cylindical Crucibles

Stock #	Vol(ml)	Dia(mm)	Ht(mm)
39008	10	24	39
39009	20	30	47
39010	30	36	45
39011	50	40	56
39012	130	56	85
39013	140	47	104
39014	260	73	85

Glassy Carbon Crucibles for Crystal Growth

Stock #	Vol(ml)	Top Dia(mm)	Bot Dia(mm)	Ht(mm)	Angle
39015	7	14	14	100	90°
39016	25	19	19	140	60°
39017	30	24	19	160	30°
39018	125	40	38	150	90°
39019	400	57	57	195	90°

Glassy Carbon Tapered Crucibles for Crystal Growth

Stock #	Vol(ml)	Top Dia(mm)	Ht(mm)
40952	0.07	6	11
40953	17	31	43
40954	18	24	87
40955	37	51	30
40956	105	59	59
40957	190	45	168
40958	277	73	85
40959	370	69	133

Glassy Carbon Evaporating Dishes

Stock #	Vol(ml)	Top Dia(mm)	Bottom Dia(mm)	Ht(mm)
39029	20	47	26	22
38372	100	108	73	27
39030	300	141	66	40

Glassy Carbon Electron Beam Evaporating Crucible Liners

Stock #	Vol(ml)	Top Dia(mm)	Bot Dia(mm)	Ht(mm)	Angle
40960	4	29	22	15	15°
40961	7	34	26	17	15°
40962	8	34	24	18	15°
40963	10	38	28	20	15°
40964	16	47	37	18	15°
40965	30	50	35	26	15°

Glassy Carbon Lids

Stock #	Top Dia(mm)	Bottom Dia(mm)
39020	37	23
39021	typically 50	36
38377	92	72

Glassy Carbon Foam

Stock #	Length(in)	Width(in)	Thickness(in)
44794	6"	6"	1"

Алматы (7273)495-231
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Курган (3522)50-90-47
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Ноябрьск (3496)41-32-12
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Саранск (8342)22-96-24
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35
Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Улан-Удэ (3012)59-97-51
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Чебоксары (8352)28-53-07
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
Якутск (4112)23-90-97
Ярославль (4852)69-52-93

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