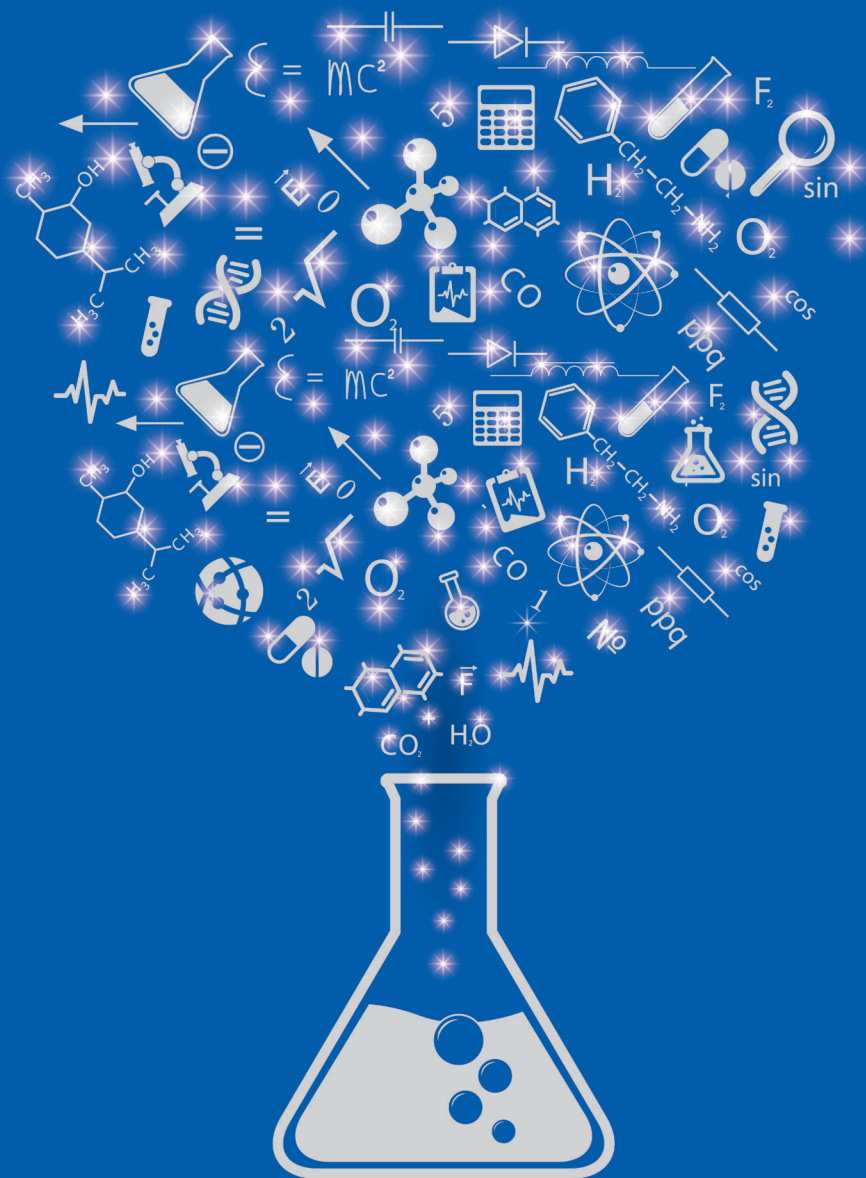


Chemical Essentials Handbook

Essentials & Storage Guidelines



Introduction

This handbook includes a selection of essential chemicals for analysis, synthesis, inorganic and life science applications, plus key information on safe storage, handling and packaging to support your chemistry.

Whatever your field of activity: industry, production, quality control, research, analysis or development, our team is available to provide you with the best service and support:

- Chemistry experience and expertise
- Large field sales force with highly experienced specialists to advise and support you
- Huge warehouse space ensures high product availability
- An experienced customer service team dedicated to making your contact with us easy and efficient.

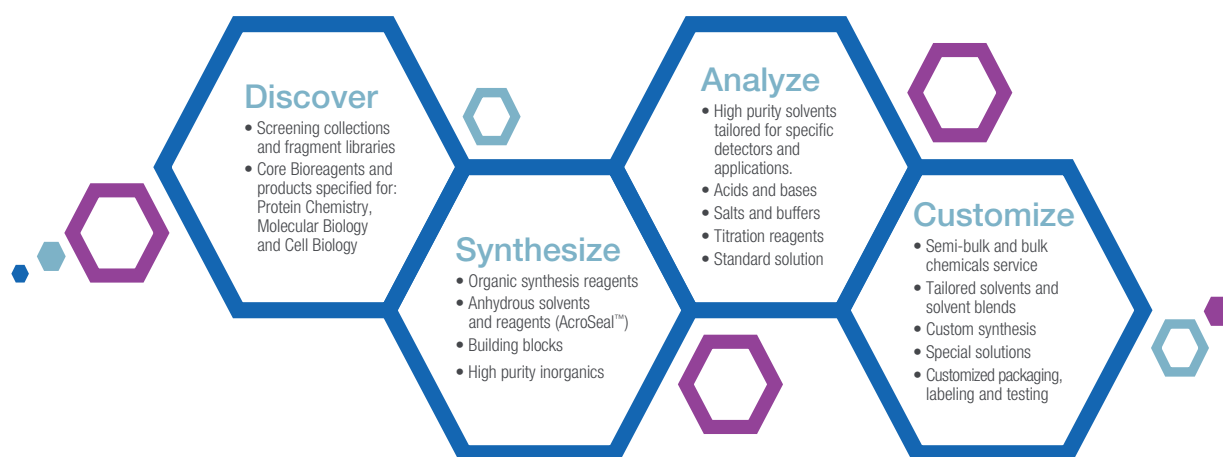


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Find the perfect chemicals for your discovery, synthesis and analysis

Our portfolio of brands and product grades offer a range of solutions for your chemistry applications.

For	Category/Application	Grades/Product Ranges
Analysis (Pages 4-7)	Liquid Chromatography	UHPLC-MS Optima LC-MS and Certified HPLC-MS UHPLC Gradient Certified Advanced HPLC Gradient Certified HPLC Gradient
	Gas Chromatography	Distol – For Pesticides and Residue analysis GC Headspace
	Elemental Analysis	Optima Grade TraceMetal Grade PrimarPlus Grade
	Molecular Spectroscopy and Micro Analysis	For Spectroscopy IR and For Spectrophometry UV For NMR
	Other Analysis	For Analysis Extra Pure and Specified Laboratory Reagent (SLR) For Electronic Use
	Titration	For Volumetry For pH Metry For Karl Fischer – Aqualine
Research (Pages 10-15)	Organic Synthesis	Building blocks Catalysts Deuterated products Extra dry solvents Functional reagents Organometallics Silica gel
	Inorganic Reagents	High purity inorganics - Puratronic High purity metal products - Premion Precious metal compounds Anhydrous materials - Ultra Dry Rare earth products - Reacton Fuel cells catalysts & compounds High purity materials for photovoltaics Cerion nanoparticles
Discovery (Pages 8-9)	Life Sciences	For Electrophoresis For Peptide Synthesis For Cell Biology For Molecular Biology For Proteomics and Genomics
	Drug Discovery	Heterocyclic building blocks Screening libraries Fragment collections
Production (Pages 16-17)	To support your scale up and production requirements all of our catalogue products are available in bulk and semi-bulk quantities	

Fisher Chemical

Find the perfect chemicals for your analytical application

- Rigorous quality assurance and testing procedures throughout the production process ensure the lot-to-lot consistency required for reproducible results
- Fisher Chemical™ products come in a variety of innovative packaging options designed for safety, environmental protection, convenient handling and storage, and preservation of product integrity
- High-volume solvent delivery systems, available in 10L to 1000L, offer environmentally friendly solvent handling solutions for your applications, enhancing safety and improving productivity within your lab
- For the complete portfolio of Thermo Scientific™ & Fisher Chemical products and promotions, please visit eu.fishersci.com



Grade	Application	Definition
UHPLC-MS	UHPLC-MS	Ultra high-purity solvents specifically qualified for UHPLC-MS instrumentation. Specification based on higher ionization efficiency to detect organic contaminants in full scan MS with the absence of an additive. Signal to noise specification greater than ten when measured with 250 ppt Propazine using MS/MS. Filtered at 0.1µm, packaged in borosilicate glass and tightened metal specifications minimizes metal ion adduct formation.
Optima LC-MS	LC-MS	Optima LC-MS grade products meet stringent purity requirements of LC-MS and UHPLC by addressing the need for minimal organic contamination with 0.1µm filtration to make particle free. Evaluated for 17 metal impurities at ppb concentrations for minimal metal mass adduct formation. High ionization efficiency to detect organic contaminants at 50 ppb max (positive) and 300 ppb max (negative) in full scan MS. Screened for UV-absorbing contaminants at every wavelength in the 200 to 400 nm range to afford smooth baselines and to reduce interferences.
LC-MS	LC-MS	Ideal mobile phase for routine LC-MS applications. Guaranteed for low level of trace metals and nonvolatile residue. Low level of absorbance, performance under gradient conditions. Filtered at 0.2µm.
UHPLC Gradient grade	UHPLC-UV	Solvent certified for UHPLC analysis with high UV transmission. Low background noise at 210nm and 254nm. Filtered at 0.1µm for ultra low particulates.
Advanced HPLC Gradient grade	HPLC Gradient grade	Advanced HPLC gradient grade specifically manufactured to guarantee a very low level of gradient baseline drift. Includes lot analysis and absorbance curve on the label. Filtered at 0.2µm.
HPLC Gradient grade	HPLC Gradient grade	HPLC solvents suitable for gradient analysis. Guaranteed for low absorbance/high UV transmission and low concentration of non-volatile impurities. In some instances may be suitable for fluorescence detection. Includes lot analysis and absorbance curve on the label. Filtered at 0.2µm.
HPLC Fluorescence	HPLC with Fluorescence and UV detectors	HPLC solvents suitable for Fluorescence and UV detectors. Guaranteed for low fluorescence between 250nm and 750nm emission & excitation wavelengths.
HPLC Electrochemical	HPLC with Electrochemical and UV detectors	HPLC solvents suitable for Electrochemical and UV detectors. Guaranteed for low electrochemical activity and low UV absorbance/high transmission. Includes lot analysis and absorbance curve on label.
GPC	GPC - Gel Permeation Chromatography	Solvents manufactured for gel permeation chromatography. Filtered to 0.2µm. Low water, residue and colour. Unique chemical range – Actual lot analysis on the pack label.
GC Headspace	GC-HS - Gas Chromatography Headspace	High purity solvents for accurate and reliable analysis of organic volatile impurities (OVIs) by gas chromatography headspace (GC-HS).
Distol	GC - Gas Chromatography	Range of solvents suitable for pesticide and petroleum residue analysis. Guaranteed to meet the ECD, NPD and FID detectors requirement.
Optima Grade	ICP-MS	Highest purity acids, bases and water specifically qualified for Ultra trace elemental analysis by ICP-MS instrument. Ultra-pure quality tested for up to 65 parameters at 1-100 ppt level.
Trace Metal™ Grade	ICP	Trace Metal grade qualified for trace elemental analysis by ICP instrument. Acids & reagents tested for up to 65 parameters at ppb levels.
Primar Plus™ Grade	AAS	Primar Plus grade suitable for trace elemental analysis by AAS instrument. Acids & reagents are tested for up to 40 parameters at 1 to 10 ppb level.
For Analysis	General analytical applications	Certified reagents for analytical applications. Tested for up to 18 guaranteed parameters. Actual lot analysis on the pack label.
For Analysis Conform Eur.Ph.	General analytical applications	Certified reagents for analytical application meeting the Eur.Ph requirement. Tested for up to 18 guaranteed parameters. Actual lot analysis on the pack label.
Specified Laboratory Reagents (SLR)	Laboratory applications	Specified Laboratory Reagents for general laboratory applications. Extra pure grade tested for up to 13 parameters.
Technical	General use	For general use in the laboratory.
Buffers	pH-Metry	Buffer NIST Standard solutions certified for pH measurement. Ready to use, with an accuracy factor of ±0.02 pH at 20°C. Also available as concentrates, packaged in ampules.
Volumetric solution	Volumetry	Standard solutions for volumetric analysis. Accuracy factor up to 0.999 - 1.001 NIST traceability. Ready to use.
Solute	Volumetry	Concentrated standard solutions for volumetric analysis. NIST traceability. Supplied in singles or pack of six sealed ampules.
Aqualine™	Karl Fischer titration	Karl Fischer reagents for the determination of moisture. Volumetric and coulometric reagents and standards. Pyridine free, rapid titration and a stable end-point. Supplied in single packs or in ampules.

The Fisher Chemical product range includes over 4,400 products. A selection of our most essential products from this range can be found in the list below.

MPC*	Product Name	Product Code	Merck	Honeywell	VWR
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* MPC= Manufacturer Product Code

UHPLC-MS: Ultrapure solvents specifically designed for UHPLC-MS application

A956	Acetonitrile, UHPLC-MS grade New!	15329865	1L				
A458	Methanol, UHPLC-MS grade New!	15319865	1L				
W8	Water, UHPLC-MS grade New!	15339865	1L				

LC-MS Optima: High purity solvents specifically qualified to meet the stringent purity requirements of LC-MS

A955	Acetonitrile, Optima LC-MS grade	10489553	1L	10001334	2,5L	100029	14261	
A461	Iso-propanol, Optima LC-MS grade	10091304	1L	10684355	2,5L		34965	
A456	Methanol, Optima LC-MS grade	10031094	1L	10767665	2,5L	106035	14262	
W6	Water, Optima LC-MS grade	10728098	1L	10505904	2,5L		14263	

LC-MS: Solvents qualified for routine LC-MS applications

A/0638	Acetonitrile, for HPLC-MS	10799704	1L	10616653	2,5L		34967	83640
M/4062	Methanol, for HPLC-MS	10532213	1L	10653963	2,5L		34966 646377	83638
W/0112	Water, for HPLC-MS	10434902	1L	10777404	2,5L		39253	83645

UHPLC-UV: Solvents qualified for routine UHPLC-UV applications

A/0650	Acetonitrile, for UHPLC gradient grade analysis	11317080	1L	11373230	2,5L	100030		83642
M/4070	Methanol, for UHPLC gradient grade analysis	11357080	1L	11313240	2,5L	106007		
W/0120	Water, for UHPLC gradient grade analysis	11307090	1L	11357090	2,5L	115333		

HPLC Gradient grade: Solvents qualified for routine Gradient grade Liquid chromatography

A/0627	Acetonitrile, HPLC for gradient analysis, meets Ph.Eur.	10794741	1L	10660131	2,5L	100030	34998 34851	20060 83639
P/7508	Isopropanol, HPLC for gradient analysis	10561802	2,5L			101040	650447	
M/4058	Methanol, HPLC for gradient analysis	10010280	1L	10499560	2,5L	106007	34885	20864
W/0106	Water, HPLC for gradient analysis	10367171	1L	10449380	2,5L	115333	34877 270733	23650

HPLC grade: Solvents qualified for routine Liquid chromatography

A/0626	Acetonitrile, for HPLC	10754361	1L	10407440	2,5L	114291	34881	20048
C/4966	Chloroform, for HPLC, stabilized with amylene	10050090	1L	10615492	2,5L	102444	34854	83626
E/0906	Ethyl acetate, for HPLC	10724181	1L	10456870	2,5L	100868	34858	83621
H/0106	Heptane, for HPLC, approx. 99% n-Heptane	10664912	1L	10598800	2,5L	104390	34873	24539
H/0405	Isohexane, for HPLC, contains <5% n-Hexane	10479170	1L	10214150	2,5L	104335		83622
P/7507	Isopropanol, for HPLC	10284250	1L	10674732	2,5L	101040	34863	20880
H/0406	Hexanes, for HPLC, 95% n-Hexane approx.	10499170	1L	10703611	2,5L		439207	
M/4056	Methanol, for HPLC	10365710	1L	10675112	2,5L	104391	34859	24575
T/0706	Tetrahydrofuran, for HPLC, unstabilized	10264350	1L	10578070	2,5L	106018	34860	20837

Solvents qualified for Gas chromatography

A/0603	Acetone, for residue analysis, Distol	10161510	1L	10171510	2,5L	100012	34480	83656
D/1853	Dichloromethane, for residue analysis, Distol, stabilized with amylene	10132140	1L	10500341	2,5L	106054	34488	83665
H/0403	Hexanes, for residue analysis, Distol, 95% n-Hexane approx.	10627412	1L	10010180	2,5L	104371	34484	83661
M/4053	Methanol, for residue analysis, Distol	10478410	1L	10667032	2,5L	106011	34485	83967
D160	DMAC, N,N-Dimethylacetamide, GC Headspace New!	15582393	1L			100399	44901	
D133	DMF, N,N-Dimethylformamide, GC Headspace New!	15562393	1L			100202	51781	
D139	DMSO, Dimethyl Sulfoxide, GC Headspace New!	15572393	1L			101900	51779	
N140	NMP, N-Methyl-2-Pyrrolidone, GC Headspace New!	15552413	1L				69337	
W10	Water, GC Headspace New!	15552233	1L			100577	53463	

* MPC= Manufacturer Product Code

Solvents for Analysis, Certified AR

A/0600	Acetone, Certified AR for analysis, meets Ph.Eur.	10395640	1L	10162180	2,5L	100014	24201 32201	20066
C/4960	Chloroform, 99.8+%, Certified AR for analysis, stabilized with amylene	10122190	1L	10293850	2,5L	102445	32211	22709
C/8921	Cyclohexane, Certified AR for analysis	10548800	1L	10253470	2,5L	109666	33117	23224
D/1852	Dichloromethane, Certified AR for analysis, stabilized with amylene	10160292	1L	10784941	2,5L	106050	24233	25630
D/2450	Diethyl ether, Certified AR for analysis, stabilized with BHT, meets Ph.Eur.	10306040	1L	10785901	2,5L		32222	
D/3841	Dimethylformamide, Certified AR for analysis	10560911	1L	10284140	2,5L	100921	32203	23811
D/4550	1,4-Dioxane, Certified AR for analysis, stabilized with BHT	10141470	1L	10080120	2,5L	103053	33120	23466
e/0650	Ethanol absolute 99.8+%, Certified AR for analysis, meets Ph.Eur., BP, USP	12468740	1L	12478740	2,5L	109671	33147	23540
E/0900	Ethyl acetate, Certified AR for analysis	10697212	1L	10386320	2,5L	100983	32221	20821
H/0160	n-Heptane, Certified AR for analysis	10000170	1L	10784751	2,5L	109623	33211	23882
H/0421	n-Hexane, Certified AR for analysis	10715911	2,5L			104379	32287	24551
H/0355	Hexanes, Certified AR for analysis, 95% n-Hexane approx	10764371	1L	10783601	2,5L	104367	32293	24577
P/7500	Isopropanol, Certified AR for analysis	10366430	1L	10315720	2,5L	104374		83992
M/4000	Methanol, Certified AR for analysis	10141720	1L	10284580	2,5L	109634	24137	20842
P/1021	n-Pentane, Certified AR for analysis	10366000	1L	10558250	2,5L	106009	24229	20847
P/1760	Petroleum ether 40-60°C, Certified AR for analysis, n-hexane < 2%	10151720	1L	10568060	2,5L	107177	76871	26185
T/0701	Tetrahydrofuran, Certified AR for analysis, stabilized with 0.025% BHT	10162350	1L	10559770	2,5L	101775	32299	23835
T/2300	Toluene, Certified AR for analysis	10102740	1L	10356390	2,5L	108325	32249 89681	28676

Solvents, SLR, Extra-pure grade

A/0560	Acetone, extra pure, SLR	10266481	1L	10314930	2,5L	822251	179973	20065
C/4920	Chloroform, 99+%, extra pure, stabilized with amylene, SLR	10784143	1L	10102190	2,5L	822265	472476	22707
C/8920	Cyclohexane, extra pure, SLR	10477440	2,5L			102832	C100307	23223
D/1850	Dichloromethane, 99+%, extra pure, stabilized with amylene, SLR	10127611	1L	10458210	2,5L	822271		23367
D/2400	Diethyl ether, extra pure, SLR, stabilized with BHT	10263230	2,5L			100923	14775	23819
D/3840	Dimethylformamide, extra pure, SLR	10757894	1L	10745521	2,5L	103034	D5879	23470
D/4500	1,4-Dioxane, extra pure, SLR, stabilized with BHT	10478400	2,5L			103115	D201863	23532
E/0600	Ethanol 99%+, absolute, extra pure, SLR	12478730	2,5L			107017	24103	20816
E/0850	Ethyl acetate, extra pure, SLR	10204340	1L	10080130	2,5L	822277	16371	23880
H/0155	n-Heptane, extra pure, SLR	12606717	1L	10234530	2,5L	104365	H2198	24549
H/0420	n-Hexane, extra pure, SLR	10756481	2,5L			104368	15671	24580
M/3950	Methanol, extra pure, SLR	10626652	1L	10214490	2,5L	107018	179337 320390	20846
P/1440	Petroleum ether 40-60°C, extra pure, SLR	12616757	1L	10254200	2,5L			23826
T/2200	Toluene, 99+%, extra pure, SLR	10346390	2,5L			107019	179965	28675

Acids & Reagents for Trace Elemental Analysis

A466	Hydrochloric acid 32-35%, Optima™, for ultra trace elemental analysis	11954081	1L	11984081	500mL	101514	96208	83878
A508	Hydrochloric acid 34-37%, Trace Metal™, for trace metal analysis	11325870	1L	11355890	2,5L	100318	84415	83871
A467	Nitric acid 67-69%, Optima, for ultra trace elemental analysis	11964091	1L	11984091	500mL	101518	2650	83879
A509	Nitric acid 67-69%, Trace Metal, for trace metal analysis	11395790	1L	11395800	2,5L	100441	84385	83872
A468	Sulfuric acid 93-98%, Optima, for ultra trace elemental analysis	11924091	1L	11944091	500mL	101516	77239	
A510	Sulfuric acid 93-98%, Trace Metal, for trace metal analysis	11315830	1L	11345830	2,5L	100714	84716	83875
W9	Water, Optima, for ultra trace elemental analysis	11924391	1L	11934391	500mL	101262	14211	83877

Acids & Bases for Analysis, Certified AR

A/0400	Acetic acid glacial, Certified AR for analysis, meets Ph.Eur., BP, USP	10171460	1L	10304980	2,5L	100063	27225	20104
A/3280	Ammonia solution, 35%, Certified AR for analysis, d=0.88	10305220	1L	10111660	2,5L	105423	5002	21190
F/1900	Formic acid, 98-100%, Certified AR for analysis	10785711	1L	10141570	2,5L	100264	33015	20318
H/1200	Hydrochloric acid, 37%, Certified AR for analysis, d=1.18	10294190	1L	10316380	2,5L	100317	30721	20252
N/2300	Nitric acid 68 % d= 1.42, Certified AR, for analysis	10634732	1L	10654732	2,5L	100452	84380	20425
P/5640	Potassium hydroxide, Certified AR for analysis, pellets, meets Ph.Eur., BP	10448990	1Kg			105029	30603	26668
S/4920	Sodium hydroxide, Certified AR for analysis, pellets, meets Ph.Eur., BP	10675692	1Kg	10538260	5Kg	106469	S5881	28244
S/9240	Sulfuric acid min 95% d=1.83, Certified AR, for analysis	10294300	1L	10325960	2,5L	100731	30743	20700

Salts for analysis & SLR, Extra-pure grade

A/3440	Ammonium acetate, Certified AR for analysis	10478010	1Kg			101116	32301	21200
A/3400	Ammonium acetate, extra pure, SLR, crystals	10050030	1Kg			101115	A7262	21198
A/3920	Ammonium chloride, Certified AR, for analysis, meets analytical specification of Ph.Eur., BP	10070030	1Kg			101145	31107	21236
A/3880	Ammonium chloride, 99+%, extra pure, SLR	10785701	1Kg				A4514 11209	21235

MPC*	Product Name	Product Code	Merck	Honeywell	VWR
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* MPC= Manufacturer Product Code

C/1500	Calcium chloride dihydrate, Certified AR for analysis, meets Ph.Eur.	10325220 1Kg		102382	31307	22317
P/4120	Potassium carbonate anhydrous, Certified AR, for analysis, meets Ph.Eur.	10497280 1Kg		104928	60109	26726
P/4280	Potassium chloride, Certified AR for analysis	10684732 1Kg		104936	31248	26764
P/4240	Potassium chloride, extra pure, SLR, Eur. Ph.	10010310 1Kg			60130	26760
P/4800	Potassium dihydrogen orthophosphate, Certified AR for analysis	10793611 1Kg		104873	P0662	26936
P/5880	Potassium iodide, Certified AR for analysis	10386380 1Kg		105043	30315	26846
P/6120	Potassium nitrate, Certified AR for analysis, meets analytical specification of Ph.Eur., BP	10734001 1Kg		105063	31263	26869
S/2040	Sodium acetate trihydrate, Certified AR for analysis, crystal	10794571 1Kg		106267	32318	27652
S/3160	Sodium chloride, Certified AR for analysis, meets analytical specification of Ph.Eur.	10428420 1Kg		106404	31434	27810
S/3120	Sodium chloride, extra pure, SLR	10112640 1Kg			S9888	27800
S/4240	Sodium hydrogen carbonate, Certified AR for analysis, meets Ph.Eur.	10152780 1Kg		106329	31437	27778
S/6650	Sodium sulfate anhydrous, Certified AR for analysis, fine powder	10746292 1Kg		106649	31481	28114
S/6640	Sodium sulfate anhydrous, Certified AR for analysis, granular	10192730 1Kg		106637	71962	
S/6600	Sodium sulfate anhydrous, 99+%, extra pure	10224640 1Kg		106639	S9627	28111

Buffer NIST Standard Solutions & Concentrated

J/2820	Buffer solution pH 4,00 (phthalate), NIST Standard solution ready to use for pH measurement	10675492 1L	10030190 2,5L	109435	B5020	32095
J/2820C	Buffer concentrated solution pH 4 (phthalate),	10508050 6AMP		109884	38743	32084
J/2826	Buffer colour coded solution pH 4,00 (phthalate) Red, NIST Standard solution ready to use	15860064 1L	15870064 2,5L	109475	33665	32044
J/2850	Buffer solution pH 7,00 (phosphate), NIST Standard solution ready to use for pH measurement	10151570 1L	10457640 2,5L	109439	B4770	32096
J/2850C	Buffer concentrated solution pH 7,00 (phosphate), NIST Standard for pH measurement	10732371 1AMP	10204440 6AMP	109887	38746	
J/2855	Buffer colour coded solution pH 7,00 (phosphate) Yellow, NIST Standard solution ready to use	10477830 1L	10274480 2,5L	109477	33666	32045
J/2880	Buffer solution pH 10,00 (borate), NIST Standard solution ready to use for pH measurement	10429560 1L	10214200 2,5L	109438	B4895	32040
J/2880C	Buffer concentrated solution pH 10 (borate),	10132050 6AMP		109890	38749	
J/2885	Buffer colour coded solution pH 10,00 (borate) Blue, NIST Standard solution ready to use	10284240 1L	10723991 2,5L	109400	33668	

Karl Fischer reagents for titration by Volumetry

K/2000	Karl Fischer Aqualine™ Complete 5	10181570 1L	10676262 2,5L	188005	34805	
K/2250R	Karl Fischer Aqualine complete 5K	11433813 500mL	10092042 1L	188006	34816	
K/2300R	Karl Fischer Aqualine Matrix-K	11443813 500mL	10205592 1L	188008	34817	
K/2100	Karl Fischer Aqualine Solvent	10101580 1L	10264390 2,5L	188015	34800	
K/2110	Karl Fischer Aqualine solvent CM	10199511 1L	10510852 2,5L	188016	34812	
K/2200	Karl Fischer Aqualine Titrant 5	10528810 1L	10172050 2,5L	188010	34801	

Standard Volumetric solutions

J/3700	Ethylenediaminetetraacetic acid disodium salt solution 0,1M (0,2N), ready to use solution	10558230 1L	10568230 2,5L	108431	34550	28662
J/3720C	Ethylenediaminetetraacetic acid trisodium salt solution 0,1M (0,2N), Standard Concentrate	10059981 1AMP	10497060 6AMP	109992		
J/4320	Hydrochloric acid solution 1M (1N), NIST Standard solution ready to use, Eur.Ph., USP, BP	10467640 1L	10487830 2,5L	109057	318949	30024
J/4320C	Hydrochloric acid solution 1M (1N), NIST Standard Concentrate, for Volumetric analysis	10386040 1AMP	10528050 6AMP	109970	38283	32050
J/6630	Potassium hydroxide solution 1M (1N), NIST Standard solution ready to use, For Volumetric	10617032 1L	10020200 2,5L	109918	35112	31300
J/6630C	Potassium hydroxide solution 1M (1N), NIST Standard Concentrate, for Volumetric analysis	10736292 1AMP	10346140 6AMP	109107	38073	
J/7330	Silver nitrate solution 0,1M (0,1N), NIST Standard sol. ready to use, meets Ph.Eur., BP,USP	10060220 1L		109081	35375	30471
J/7330C	Silver nitrate solution 0,1M (0,1N), NIST Standard Concentrate, for Volumetric analysis	10745911 1AMP	10366330 6AMP	109990	38310	
J/7620	Sodium hydroxide solution 1M (1N), NIST Standard solution ready to use, meets Ph.Eur., BP	10528240 1L		109137	319511	31627
J/7620C	Sodium hydroxide solution 1M (1N), NIST Standard Concentrate, for Volumetric analysis	10326140 1AMP	10696642 6AMP	109956	38215	32066
J/7950	Sodium thiosulfate solution 0,1M (0,1N), NIST Standard solution ready to use	10429180 1L		109147	35245	31553
J/7950C	Sodium thiosulfate solution 0,1M (0,1N), NIST Standard Concentrate, for Volumetric analysis	10558240 1AMP	10677412 6AMP	109950	38200	32065
J/8430	Sulfuric acid solution 0,5M (1N), NIST Standard solution ready to use	10734761 1L		109072	72238	30144
J/8430C	Sulfuric acid solution 0,5M (1N), NIST Standard Concentrate, for Volumetric analysis	10191570 1AMP	10428030 6AMP	109981	38294	32053

Fisher Bioreagents

Find the perfect reagents for your discovery application

Material Grade	Definition
DNA Grade	Designates reagents suitable for use in Molecular Biology applications involving the manipulation of DNA. Tested for specific contaminants such as DNase and protease.
DNA Synthesis	Designates reagents suitable for use with automated DNA synthesis instrumentation.
Electrophoresis	Material used specifically for electrophoresis applications.
Genetic Analysis Grade	Material that is specially prepared for various molecular cloning applications. Tested for specific contaminants such as DNase and RNase.
IEF Grade	Material suitable for use with isoelectric focusing of proteins.
Islet Isolation Grade	Material suitable for isolation of pancreatic islets.
Molecular Biology Grade	Designates reagents suitable for use in Molecular Biology applications. Tested for specific contaminants such as nucleases and bacteria where appropriate.
Molecular Genetics	Reagent chemicals that have been specifically purified and assayed for Molecular Genetics applications.
PCR Grade	Material suitable for use in Polymerase Chain Reaction (PCR).
Peptide Synthesis	Designates reagents suitable for use with protein synthesis instrumentation.
Protein Electrophoresis Grade	Material used specifically for protein electrophoresis applications.
Sequencing	Material designed for use with automated DNA or protein sequencing equipment.
Super Pure	Material with a purity level exceeding the various monograph grades.
Tissue Culture Grade	Materials of superior quality where there are no published standards and that are suitable for use in Tissue Culture applications.
CellPURE™	Biological Buffers, ideal for cell cultivation, isolation of cells, enzyme assays, and other biochemical applications.
JustPURE™	"Good" buffers from Fisher Bioreagents with very high purity (assay > 99%) and only trace amounts of metal ions, useful for applications requiring tight control of elemental content.

Vital Reagents for Life Science

- Designed for a wide range of molecular biology, protein chemistry, cell biology and microbiology applications
- High-purity products that meet stringent industry specifications for critical factors such as purity, water content, levels of contaminants and absence of DNase, RNase and protease activity
- Reagents are suitable for the designated technique

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The Fisher Bioreagents™ product range includes approximately 1000 products. A selection of our most essential products from this range can be found in the list below.

MPC*	Product Name	Product Code	ST**	Sigma/ Merck	Bio-Rad
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* MPC= Manufacturer Product Code / ** Storage Conditions

Core Bioreagents

BP1605	Bovine serum albumin, fraction V, cold-ethanol precipitated	11483823	100g		RT	A4503	
BP1600	Bovine serum albumin, fraction V, heat shock treated, suitable for immunological studies	11403833	1Kg	11493823	100g	RT	A3294
BP1145	Chloroform, molecular biology grade, approx. 0.75% ethanol as a preservative	10727024	1L		RT	496189	
BP231	Dimethyl sulfoxide	10499683	1L	10103483	100mL	RT	34869
BP2818	Ethanol, Molecular Biology Grade	10517694	100mL	10644795	500mL	RT	E7023
BP120	Chloroform, Approx. 0.75% Ethanol as Preservat	10522965	1Kg	10618973	500mL	RT	E5134
BP227	Formamide, molecular biology	10796834	500mL		4°C	47671	
BP228	Formamide, super pure	10523525	100mL		4°C	F9037	
BP229	Glycerol, molecular biology	10021083	1L	12144481	4L	RT	G7893
BP2618	Isopropanol, Molecular Biology Grade	11398461	1L	11358461	2,5L	RT	I9516

MPC*	Product Name	Product Code			ST**	Sigma/ Merck	Bio-Rad
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* MPC= Manufacturer Product Code / ** Storage Conditions

BP1105	Methanol, peroxide-free, sequencing	10163383	1L	10785484	4L	RT	494437	
BP8201	70% Molecular Biology Ethanol solution New!	15542393	500mL	15420665	1L	RT		
BP8202	96% Molecular Biology Ethanol solution New!	15552393	500mL	15518181	1L	RT	E7148	
BP2944	PBS Tablets	10388739	100g			RT	P4417	
BP665	Phosphate buffered saline, 10X powder concentrate, white granular powder	10051163	2each			RT	P3813	31098
BP399	Phosphate buffered saline, 10X solution	10204733	1L	10468543	500mL	RT	79378	161-0780
BP358	Sodium chloride (dry basis), >99.5%	10316943	1Kg	10553515	2,5Kg	RT	31434	
BP166	Sodium dodecyl sulfate, white powder, electrophoresis	10593335	100g	10356463	500g	RT	L4509	161-0302
BP152	Tris base, white crystals or crystalline powder, molecular biology	10103203	500g	10376743	1Kg	RT	93362	161-0716
BP2471	Tris buffered saline, 10X Solution, pH 7.4, molecular biology	10776834	1L	10648973	100mL	RT	T5912	170-6435
BP337	Tween 20	10113103	100mL	10485733	500mL	RT	P2287	170-6531
BP2485	Water, Biotech grade, sterile	10091543	4L	10448153	20L	RT	W3513	
BP2819	Water, Molecular Biology Grade	10505854	1L	10154604	4L	RT	W4502	
BP2470	Water, DNA grade	10192813	1L			RT	W4502	163-2091
BP561	Water, for RNA work, DEPC-treated and nuclease-free, molecular biology	10245203	1L			RT	95289	700-7253
BP2484	Water, nuclease free	10336503	100mL	10295243	50mL	RT	95284	700-7253

Protein and Nucleic Acid for Electrophoresis

BP1356	Agarose, broad separation range for DNA/RNA, genetic analysis grade	10688973	100g			RT	A9539	161-3101
BP160	Agarose, low-EEO/multi-purpose, molecular biology grade	10766834	100g	10366603	500g	RT	A6013	161-3102
BP172	Dithiothreitol, white crystals or powder, for electrophoresis	10386833	25g	10592945	5g	4°C	D9163	161-0611
BP1302	Ethidium bromide, 1% solution, molecular biology	10132863	10mL			RT	E1510	161-0433
BP881	FastRUN™ Tris SDS PAGE Running Buffer, 10X New!	15596006	500mL	15586006	1L	RT		
BP310	HEPES (Fine White Crystals) for Molecular Biology	10756254	500g	10081113	1Kg	RT	54457	
BP300	MES, fine white crystals	10419123	100g			RT	M3671	
BP1105	Methanol, peroxide-free, sequencing	10163383	1L	10785484	4L	RT	494437	
BP308	MOPS (Fine White Crystals) for Molecular Biology	10234673	100g	10234723	500g	RT	69950	
BP1750I	Phenol, saturated, liquid, pH 6.6/7.9	10001173	400mL			4°C	P4557	
BP1700	Proteinase K, from Tritirachium album, DNase and RNase free	10103533	100mg	10172903	50mg	-20°C	P2308	
BP8200	Sodium Dodecyl Sulfate (SDS), Micropellets New!	15440685	100mL	15450685	500mL	RT	74255	
BP150	TEMED, Electrophoresis	10689543	20g			RT	T9281	
BP1332	Tris-acetate-EDTA (TAE) solution 50X, DNase RNase and protease free	10490264	1L	10542985	4L	RT	T4948	161-0743
BP1333	Tris-Borate-EDTA, 10X solution, electrophoresis	10727224	1L			RT	93290	161-0733
BP151	Triton X-100 for Electrophoresis	10102913	100mL	10254583	500mL	RT	T8532	161-0407
BP169	Urea, molecular biology grade, Colorless-to-White Crystals or Crystalline powder	10489683	10	10183333	500g	RT	51461	161-0731

Cell and Tissue Culture

BP9743	2XTY Broth, Granulated New!	15420685	2Kg	15430685	5Kg	RT		
BP9744	Agar, Granulated New!	15470665	2Kg	15480665	5Kg	RT		
BP1423	Agar	10153193	2Kg	10572775	500g	RT	A1296	
BP1760	Ampicillin Sodium Salt, crystalline powder	10419313	25g			4°C	A0166	166-0407EDU
BP2940	CellPURE* PBS 10X, Cell Culture Grade	10212990	4L			RT	P5493	
BP220	D-Sucrose, molecular biology	10638403	1Kg			RT	S0389	
BP381	Glycine, white crystals or crystalline powder	10467963	500g	10061073	1Kg	RT	G8898	161-0718
BP1755	Isopropyl-8-D-thiogalactopyranoside, dioxane-free	10356553	10g	10021793	100g	4°C	I6758	
BP906	Kanamycin Sulfate, white powder	10031553	5g			RT	K1377	
BP9745	LB Agar, (Lennox L Agar), Granulated New!	15400675	2Kg			RT		
BP9724	LB Agar, Miller	12887172	2Kg	11375992	500g	RT	L3147	
BP9723	LB Broth, Miller	11325992	2Kg	11345992	500g	RT	L3522	
BP9722	LB Broth, Lennox	11305992	500g			RT	L7658	
BP1426	LB Broth, Miller, (Powder)	11820715	1Box	10113293	500g	RT	L3522	
BP399	Phosphate Buffered Saline, 10X solution	10204733	1L	10468543	500mL	RT	79378	161-0780
BP2956	Puromycin Dihydrochloride	10054207	100mg			RT	P7255	
BP2963	Rapamycin	10798668	1mg			RT	R0395	
BP9737	SOB Broth (Capsules)	11396002	500g			RT	H8032	
BP9726	Tryptone (Granulated)	11385982	2Kg	11365982	500g	RT	T2559	
BP2958	Vancomycin	10014257	1g			RT	V1130	
BP2820	Water, Microbial Cell Culture Grade	11343892	500mL	11373892	1L	RT	W3500	
BP1422	Yeast Extract	10255153	100g	10225203	500g	RT	Y1625	
BP9727	Yeast Extract (Granulated)	11365992	2Kg	11385992	500g	RT	Y1626	

Together the Acros Organics and Alfa Aesar brands provide an additional range of life science research tools. The product lines focus on high quality reagents and biochemicals to support academic and biotech research. Manufacturing and supplying novel reagents for many life science research areas including, but not limited, to genomic & proteomic analysis, cell culture, molecular biology and imaging.

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Specifications for Chemical Synthesis

Pure	Basic specification, suitable for chemical synthesis and general laboratory work.
Extra pure	Extended specifications for exacting chemical synthesis.
For analysis ACS	The specification complies with the recommendations of the American Chemical Society.
Extra dry	Extra dry solvents with water content of 50 ppm or lower at the time of manufacture, filtered over 0.2µm PTFE filter and filled under inert gas.
Extra dry over molecular sieves	Extra dry solvents with water content of 50 ppm or lower at the time of manufacture, filled under inert gas and stored over molecular sieve for enduring shelf life.
For spectroscopy	The solvents show a very low absorption in the UV or IR spectrum and a high purity.
For NMR	Deuterium labeled compounds and solvents for NMR spectroscopy.

The Acros Organics product range includes over 33,000 products. A selection of our most essential products from this range can be found in the list below.

MPC*	CAS Number	Product Name	Product Code		Sigma/Merck
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* MPC= Manufacturer Product Code

Boronic acids

33057	73183-34-3	Bis(pinacolato)diboron, 98%	10651823 5g	10544634 25g	473294
37838	N/A	4-Methoxy-3-pyridineboronic acid hydrate, 97%	10711994 1g		
13036	98-80-6	Phenylboronic acid, 98+%, may contain varying amounts of anhydride	10041420 10g	10667672 50g	78181, P20009
36773	191162-39-7	Quinoline-3-boronic acid, 97%	10437592 5g		709522
36638	214360-73-3	4-(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)aniline, 97%	10407212 1g	10661843 5g	518751
36751	181219-01-2	4-(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)pyridine, 97%	10552992 5g	10202382 1g	578770

Catalysts

14827	1122-58-3	4-Dimethylaminopyridine, 99%	10091630 25g	10133480 100g	
19470	546-68-9	Titanium(IV) isopropoxide, 98+%	10792041 250mL	10164953 1L	

MPC*	CAS Number	Product Name	Product Code	Sigma/ Merck
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Catalysts - metal

34868	95464-05-4	1,1'-Bis(diphenylphosphino)ferrocene-palladium(II)dichloride dichloromethane adduct	10393652 5g	10726392 1g	379670
29925	13965-03-2	Bis(triphenylphosphine)palladium(II) chloride, 98%	10333432 5g	10492061 2.5g	208671, 15253
40501	26023-84-7	Hydrogen hexachloroplatinate(IV) hydrate, ACS reagent	10627751 1g	10106990 5g	520896, 206083, P7082
19537	26023-84-7	Hydrogen hexachloroplatinate(IV) hydrate, ca. 40% Pt	10695642 1g	10114310 5g	81080
19518	3375-31-3	Palladium(II) acetate, 47.5% Pd	10522221 2g	10767234 1g	205869, 76044, 520764
36935	15170-57-7	Platinum(II) acetylacetonate, 98%	10652043 5g	10561882 1g	282782, 55944
19532	1314-15-4	Platinum(IV) oxide, 83% Pt	10563941 1g	10606683 5g	206032, 81090
19535	16921-30-5	Potassium hexachloroplatinate(V), ca. 40% Pt	10348000 1g	10216350 5g	206067, 60260, 520861
26863	15956-28-2	Rhodium(II) acetate dimer, anhydrous, ca 46% Rh	10134970 250mg	10083250 1g	209058, 83725
19548	14898-67-0	Ruthenium(III) chloride hydrate, 35 - 40% Ru	10154450 5g	10723201 1g	463779, 84050, 206229
20238	14221-01-3	Tetrakis(triphenylphosphine)palladium(0), 99%	10492391 5g	10762051 1g	697265, 87645
31877	51364-51-3	Tris(dibenzylideneacetone)dipalladium(0), 97%	10170292 5g	10155760 500mg	

Catalysts - phase transfer

22716	57-09-0	Hexadecyltrimethylammonium bromide, 99+%	10541671 500g	10645852 100g	H5882
16838	32503-27-8	Tetrabutylammonium hydrogen sulfate, 98%	10593911 25g	10743551 100g	86868, 155837
21291	2052-49-5	Tetrabutylammonium hydroxide, 1M solution in methanol	10410301 100mL	10022740 800mL	86882, 230189
17661	2052-49-5	Tetrabutylammonium hydroxide, 40 wt.% (1.5M) solution in water	10459480 250g	10782791 50g	86880, 178780
21816	4368-51-8	Tetraheptylammonium bromide, 99%	10042880 25g	10154713 100g	87301, T6533

Catalysts - solid supported

19962	12135-22-7	Palladium hydroxide on carbon, powder, unreduced, 20% Pd, moisture ca 60%	10743201 10g	10002620 50g	330094
42298	5/3/7440	Palladium on activated carbon, 10% Pd, (50% wet with water for safety), unreduced	10741832 25g	10697391 10g	205699
19503	5/3/7440	Palladium on activated carbon, 10% Pd, unreduced	10471811 10g	10687342 50g	205699, 75990
19502	5/3/7440	Palladium on activated carbon, unreduced, 5% Pd	10012520 10g	10451431 100g	276707, 75992
19507	5/3/7440	Palladium on calcium carbonate, poisoned with 3.5% lead, 5% Pd	10216730 10g	10154020 50g	205737
19524	6/4/7440	Platinum on activated carbon, 10% Pt, ca. .50% moisture	10552601 10g	10013863 1g	205958, 80983
19523	6/4/7440	Platinum on activated carbon, 5% Pt	10318290 10g		205931, 80981
19957	7440-16-6	Rhodium on alumina, 5% Rh, powder	10431631 5g	10276970 25g	

Cesium compounds

19204	534-17-8	Cesium carbonate, 99.5%, for analysis	10553941 100g	10695072 25g	562572, 20960, 441902
18950	7647-17-8	Cesium chloride, 99+%, for analysis	10531831 50g	10532021 250g	562599, 20968, C6914
18951	13400-13-0	Cesium fluoride, 99%, for analysis	10781271 25g	10358280 100g	198323, 20990

Chromatography

36668	1344-28-1	Aluminium oxide, neutral, Brockmann I, for chromatography, 50-200µm, 60A	10058681 1Kg	10571954 2.5Kg	06300, 199974, A1522
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MPC*	CAS Number	Product Name	Product Code			Sigma/ Merck
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* MPC= Manufacturer Product Code

20545	1343-88-0	Florisil™, 60-100 mesh, for column chromatography	10174830 500g	10793011 1Kg	15025, 24278, 46385, 220744
41929	7631-86-9	Silica gel, for chromatography, 0.030-0.200 mm, 60 A	10433165 1Kg	10667571 250g	60741, 288616
24036	7631-86-9	Silica gel, for chromatography, 0.035-0.070 mm, 60 A	10318090 1Kg	10273542 5Kg	645524, 12479, 227196
24037	7631-86-9	Silica gel, for chromatography, 0.060-0.200 mm, 60 A	10730941 1Kg	15678625 5Kg	288624
36005	7631-86-9	Silica gel, for column chrom., ultra-pure, 40-60µm, 60A	10407982 1Kg	10619004 5Kg	645524, 60752, 227196
36006	7631-86-9	Silica gel, for column chrom., ultra-pure, 60-200µm, 60A	10732643 1Kg	10078971 250g	60738, 288624

Deuterated solvents

16625	865-49-6	Chloroform-d, for NMR, 99.8 atom % D	10205790 100mL	10225740 50mL	151823
32068	865-49-6	Chloroform-d, for NMR, 100 atom % D, packaged in 0.75 ml ampoules	10698021 7.5mL		444731
42677	865-49-6	Chloroform-d, for NMR, 99.8 atom % D, AcroSeal™	10547054 100mL		151823
35142	865-49-6	Chloroform-d, for NMR, 99.8 atom % D, stabilized with silver foil	10204801 100mL	10796422 25mL	530735
20956	865-49-6	Chloroform-d, for NMR, 99.8+ atom % D, contains 0.03 v/v% TMS	10348680 100mL	10021621 25mL	225789
16630	7789-20-0	Deuterium oxide, for NMR, 99.8 atom % D	10584321 10mL	10255880 100mL	
32075	811-98-3	Methanol-d4, for NMR, packaged in 0.75 ml ampoules, 99.8 atom % D	10053560 7.5mL		441384
35147	811-98-3	Methanol-d4, for NMR, with 0.03% TMS, in 0.75 ml ampoules, 99.8 atom % D	10525671 7.5mL		530530
16629	2206-27-1	Methyl sulfoxide-d6, for NMR, 99.9 atom % D	10317300 10mL	10591801 50mL	151874
32077	2206-27-1	Methyl sulfoxide-d6, for NMR, packaged in 0.75 ml ampoules, 99.9 atom % D	10761731 7.5mL		545880
35145	2206-27-1	Methyl sulfoxide-d6, for NMR, with 0.03% TMS, 99.9 atom % D	10113481 25mL	10716622 10mL	296147
35254	2206-27-1	Methyl sulfoxide-d6, for NMR, with 0.03% TMS, in 0.75 ml ampoules, 99.9 atom % D	10214991 7.5mL		545880

Dry solvents

32681	151823	Acetonitrile, 99.9+%, Extra Dry, AcroSeal	10193051 100mL	10203042 1L	151823
32696	444731	Isopropanol, 99.8%, Extra Dry, AcroSeal	10058701 1L	10787962 100mL	444731
32695	151823	Methanol, 99.9%, Extra Dry, AcroSeal	10511732 1L	10747582 100mL	151823
32697	530735	Tetrahydrofuran, 99.85%, Extra Dry, stabilized, AcroSeal	10613372 100mL	10168751 1L	530735
32687	225789	N,N-Dimethylformamide, 99.8%, Extra Dry, AcroSeal	10295761 100mL	10098721 1L	225789

Dry solvents - Extra Dry over Molecular Sieves

34846	441384	Dichloromethane, 99.8%, Extra Dry over Molecular Sieve, Stabilized, AcroSeal	10487532 100mL	10387841 1L	441384
36433	530530	Diethyl ether, 99.5%, Extra Dry over Molecular Sieve, Stabilized, AcroSeal	10059031 100mL	10417372 1L	530530
36434	151874	1,4-Dioxane, 99.5%, Extra Dry over Molecular Sieve, stabilized, AcroSeal	10762393 100mL	10352702 1L	151874
36439	545880	Methanol, 99.8%, Extra Dry over Molecular Sieve, AcroSeal	10323442 100mL	10649492 1L	545880
34843	296147	N,N-Dimethylformamide, 99.8%, Extra Dry over Molecular Sieve, AcroSeal	10045421 100mL	10534341 1L	296147
34845	545880	Tetrahydrofuran, 99.5%, Extra Dry over Molecular Sieve, Stabilized, AcroSeal	10292182 100mL	10798552 1L	545880

Drying Agents

34961	10043-52-4	Calcium chloride, 96%, extra pure, powder, anhydrous	10021681 500g	10515671 25g	22313, 06991, 12095, 21074, C4901
41348	7487-88-9	Magnesium sulfate, 97%, pure, anhydrous	10731252 500g	10003812 2.5Kg	203726, 63135, 208094, M7506
19727	70955-01-0	Molecular sieves 4A, 8 to 12 mesh	10216450 500g	10368000 5Kg	208604, 334308
39203	1327-36-2	Silica gel orange, for drying purposes, non toxic grade, 2-5 mm	10647444 1Kg	10116863 5Kg	94098
35740	7631-86-9	Silica gel, for drying purposes, non-toxic grade, 3-6 mm	10440983 1Kg	10574321 5Kg	85330, 13767
17456	109-63-7	Boron trifluoride etherate, approx. 48% BF3	10296130 100g	10042110 25g	
15181	530-62-1	1,1'-Carbonyldiimidazole, 97%	10675392 10g	10123010 25g	
32756	2446-83-5	Diisopropyl azodicarboxylate, 94%	10091781 100g	10329040 25g	
12064	124-09-4	1,6-Hexanediamine, 99.5+%	10560551 100g	10604782 500g	
16800	25561-30-2	N,O-Bis(trimethylsilyl)trifluoroacetamide, 98+%	10790671 25g	10409100 100g	
41678	30525-89-4	Paraformaldehyde, 96%, extra pure	10424131 500g	10342243 1Kg	

MPC*	CAS Number	Product Name	Product Code			Sigma/ Merck
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16888	865-47-4	Potassium tert-butoxide, 98+%, pure	10626762	500g	10419100	100g	
27785	1070-89-9	Sodium bis(trimethylsilyl)amide, pure, 2M solution in THF, AcroSeal™	10053530	100mL	10379150	800mL	
16855	25895-60-7	Sodium cyanoborohydride, 95%	10082110	50g	10541231	10g	
19038	26628-22-8	Sodium azide, 99%, extra pure	10430471	500g	10592211	100g	

Functional reagents - coupling reagents

10587	100-39-0	Benzyl bromide, 98%	10418440	100mL	10366260	500mL	
11390	538-75-0	N,N'-Dicyclohexylcarbodiimide, 99%	10030880	100g	10548290	1Kg	
17506	358-23-6	Trifluoromethanesulfonic anhydride, 98+%	10071571	1mL	10173760	50mL	

Functional reagents - Grignard reagents

38628	745038-86-2	Isopropylmagnesium chloride - Lithium chloride complex, 1.3M solution in THF, AcroSeal	10365023	100mL	10043912	800mL	656984
21285	1068-55-9	Isopropylmagnesium chloride, 2.0M solution in THF, AcroSeal	10267032	100mL	10726243	800mL	230111, 59570
18354	75-16-1	Methylmagnesium bromide, 3M solution in diethyl ether, AcroSeal	10434862	100mL	10097542	800mL	189898, 67742
25256	676-58-4	Methylmagnesium chloride, 3M (22 wt.%) solution in THF, AcroSeal	10560522	100mL	10114870	800mL	189901, 67743
20939	1826-67-1	Vinylmagnesium bromide, 0.7M solution in THF, AcroSeal	10759344	100mL	10198262	800mL	225584, 95008
25259	3536-96-7	Vinylmagnesium chloride, 1.9M (16.5 wt.%) solution in THF, AcroSeal	10507763	100mL	10043260	800mL	476552, 95010

Functional reagents - halogenating agents

19666	7726-95-6	Bromine, 99.6%, for analysis	10531451	1L	10062600	250mL	16040, 277576
40284	7726-95-6	Bromine, 99+%, extra pure	10278312	100mL	10483683	500mL	207888
11078	506-68-3	Cyanogen bromide, 97%	10040780	100g	10465852	500g	16774, C91492
21611	38078-09-0	Diethylaminosulfur trifluoride, 95%	10206610	5g	10286650	25g	31942, 235253
16983	75-11-6	Diiodomethane, 99+%, stabilized	10160312	25g	10183940	100g	158429, 66880,
12317	10035-10-6	Hydrobromic acid, pure, ca. 48 wt% solution in water	10376900	2.5L	10001260	1L	295418, 268003
12318	37348-16-6	Hydrogen bromide, pure, 33 wt% solution in glacial acetic acid	11334996	2.5L	10011200	500mL	18735
19656	7553-56-2	Iodine, 99.5%, extra pure, resublimed	10626782	100g	10082470	500g	03551, 266426
10745	128-08-5	N-Bromosuccinimide, 99%	10655332	100g	10478820	500g	B81255
29957	516-12-1	N-Iodosuccinimide, 98%	10512661	10g	10359450	100g	58070, 220051
15089	15219-34-8	Oxalyl bromide, 98%	10112291	25g	10662762	100g	113034, 75758
12961	79-37-8	Oxalyl chloride, 98%	10497900	100g	10113280	25g	71241, 320420
20135	7789-23-3	Potassium fluoride, 99%, extra pure, anhydrous	10482201	25g	10072910	1Kg	307599, P1179

Functional reagents - organolithiums

18127	109-72-8	n-Butyllithium, 1.6M solution in hexanes, AcroSeal	10161902	100mL	10325592	800mL	186171, 20160
21335	109-72-8	n-Butyllithium, 2.5M solution in hexanes, AcroSeal	10030462	100mL	10181852	800mL	230707
18128	594-19-4	tert-Butyllithium, 1.9M solution in pentane, AcroSeal					456721, 20190, 186198
26883	4111-54-0	Lithium diisopropylamide, 2M sol. in THF/n-heptane/ethylbenzene, AcroSeal	10174680	100mL	10511691	800mL	361798, 62491
18875	917-54-4	Methylolithium, 1.6 M sol. in diethyl ether (± 5% w/v), AcroSeal	10409690	100mL	10386212	800mL	67740, 197343

Functional reagents - reagents in solution

38533	18107-18-1	(Trimethylsilyl)diazomethane, 2M solution in hexanes	10401923	25mL	10413962	5mL	362832, 92738
13371	7664-41-7	Ammonia, ca. 7N solution in methanol	10001310	1L	10761394	2.5L	499145
19890	10294-33-4	Boron tribromide, 1M solution in methylene chloride	10552221	100mL	10398190	10mL	211222, 15692

MPC*	CAS Number	Product Name	Product Code		Sigma/ Merck
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* MPC= Manufacturer Product Code

17668	10294-34-5	Boron trichloride, 1M solution in methylene chloride, AcroSeal	10011621	100mL	10332963	800mL	178934, 15708
40276	373-57-9	Boron trifluoride, 12% (1.5M) in methanol	10186840	500g	10521944	1Kg	264121, 15715, B1127
12318	37348-16-6	Hydrogen bromide, pure, 33 wt% solution in glacial acetic acid	11334996	2.5L	10011200	500mL	18735
36847	7647-01-0	Hydrogen chloride, pure, 2N solution in diethyl ether, AcroSeal	10364552	100mL	10782164	800mL	455180
13370	7647-01-0	Hydrogen chloride, pure, 5 to 6N solution in 2-propanol	10214950	1L	11613069	2.5L	
13148	106-96-7	Propargyl bromide, 80 wt.% solution in toluene, stabilized	10285370	50mL	10665182	250mL	P51001, 81831

Oxidation reagents

25579	937-14-4	3-Chloroperoxybenzoic acid, 70-75%, balance 3-Chlorobenzoic acid and water	10430711	100g	10252652	25g	273031, 25800
33311	87413-09-0	Dess-Martin periodinane, 15 wt.% solution in dichloromethane	10562861	50mL	15394978	10mL	
11330	84-58-2	2,3-Dichloro-5,6-dicyano-1,4-benzoquinone, 98%	10449020	10g	10366270	100g	D60400, 35680
20246	7722-84-1	Hydrogen peroxide, for analysis, 35 wt.% solution in water, stabilized	10002780	1L	10773201	500mL	95299, 31642
21925	7681-52-9	Sodium hypochlorite, 13% active chlorine	10401841	500mL	10296650	2.5L	71696, 13440
19838	7790-28-5	Sodium periodate, 99%, for analysis	10216830	100g	10731281	500g	71860, 30323
20770	1313-60-6	Sodium peroxide, 96%	10626792	500g	10174880	100g	71880, 223417

Phosphine ligands

36864	98327-87-8	(±)-2,2'-Bis(diphenylphosphino)-1,1'-binaphthyl, 98%	10438172	5g	10658503	1g	481084, 17386
37806	161265-03-8	9,9-Dimethyl-4,5-bis(diphenylphosphino)xanthene, 98%	10397432	5g	10024762	1g	37806
35329	16523-54-9	Chlorodicyclohexylphosphine, 97%	10324402	1g	10008851	5g	481408
14042	603-35-0	Triphenylphosphine, 99%	10337120	250g	10734851	1Kg	93090, T84409
36383	51805-45-9	Tris(2-carboxyethyl)phosphine hydrochloride, 98%	10252952	10g	10583182	1g	93284, C4706

Protection and deprotection of functional groups

14949	108-24-7	Acetic anhydride, 99+%, pure	10467350	1L	10542351	2.5L	110043, 45840, 539996, A6404
10575	98-88-4	Benzoyl chloride, 99%, pure	10294650	2.5L	10697242	1L	320153, 12940, 240540
15294	501-53-1	Benzyl chloroformate, 97 wt%, stabilized	10667312	100g	10771394	500g	23160, 119938
11012	75-77-4	Chlorotrimethylsilane, 98%	10591082	100mL	10510011	250mL	C72854, 92361, 386529
11563	77-76-9	2,2-Dimethoxypropane, 98+%	10274330	500mL	10214290	1L	00660, D136808
18977	24424-99-5	Di-tert-butyl dicarbonate, 97%	10763191	100g	10206680	500g	199133, 34660
19467	24424-99-5	Di-tert-butyl dicarbonate, 99%	10276630	100g	10696962	25g	361941, 50431, 199133
17094	28920-43-6	9-Fluorenylmethyl chloroformate, 98%	10523541	5g	10387540	25g	23185, 160512
12058	999-97-3	1,1,1,3,3,3-Hexamethyldisilazane, 98%	10568470	100mL	10489220	500mL	379212, 52620, H4875
13903	98-59-9	p-Toluenesulfonyl chloride, 99+%	10437720	500g	10443883	100g	240877, 89730
20944	27607-77-8	Trimethylsilyl trifluoromethanesulfonate, 99%	10042630	10mL	10042640	50mL	91741, 225649

Reducing Agents

18379	1191-15-7	Diisobutylaluminium hydride, 1M solution in hexane, AcroSeal™	10309812	100mL	10002410	400mL	
18393	18162-48-6	tert-Butylchlorodimethylsilane, 98%	10275710	25g	10712041	100g	

MPC*	CAS Number	Product Name	Product Code			Sigma/ Merck
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* MPC= Manufacturer Product Code

19834	7440-66-6	Zinc, 98+%, dust (stable acc. to UN classification class 4)	10139232	100g	10276490	1Kg	
19671	10217-52-4	Hydrazine hydrate, 100% (Hydrazine, 64%)	10246540	100g	10276440	500g	225819
27010	11/1/5470	Hydroxylamine hydrochloride, 99+%	10442441	100g	10164490	1Kg	55469, 159417
19781	7439-89-6	Iron, 99%, powder, -70 mesh (<212 micron)	10217073	100g	10193970	500g	44890
41942	5137-46-2	Sodium biphenyl, 20%w/w solution in diethylene glycol diethyl ether, offered as 20 x 15mL	10255821	300mL			14446, 277134
18986	7646-69-7	Sodium hydride, 60% dispersion in mineral oil, in soluble bags	10104210	100g	10367270	1Kg	199230, 71620
33214	7646-69-7	Sodium hydride, 60% dispersion in mineral oil, in soluble bags, in resealable cans	10297520	100g	10338750	500g	452912, 71620
16959	7775-14-6	Sodium hydrosulfite, ca. 85%, tech.	10255550	1Kg	10685032	25g	71699, 157953
20287	7772-98-7	Sodium thiosulfate, 98.5%, extra pure, anhydrous	10072510	1Kg	10092910	500g	72049, 217263, S1648
21292	617-86-7	Triethylsilane, 99%	10022750	25g	10318590	100g	89706, 230197
21492	6485-79-6	Triisopropylsilane, 98%	10134650	50g	11925821	250g	233781, 92095
21573	688-73-3	Tri-n-butyltin hydride, 97%	10032680	50g	10615862	10g	234788, 90915

Reducing Agents - Aluminium hydrides and borohydrides

17706	13292-87-0	Borane-methyl sulfide complex, 94%, AcroSeal	10542201	800mL	10275750	100mL	179825, 15587
17508	14044-65-6	Borane-tetrahydrofuran complex, 1M solution in THF, Stabilized, AcroSeal	10781641	100mL	10781831	800mL	176192, 15594
20108	1191-15-7	Diisobutylaluminium hydride, 1.2M (20 wt%) solution in toluene, AcroSeal	10667114	800mL	10143011	100mL	82068, 192724
19032	16853-85-3	Lithium aluminium hydride, 95%, powder	10665832	25g	10042470	10g	199877, 62420, 531502
18930	16940-66-2	Sodium borohydride, 98+%, powder	10772421	100g	10695632	500g	686018, 71320, 213462
29182	56553-60-7	Sodium triacetoxyborohydride, 97%	10677431	100g	10184970	25g	316393

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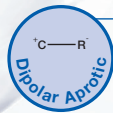
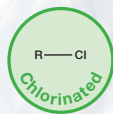
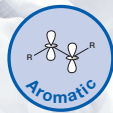
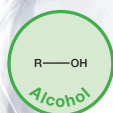
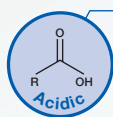
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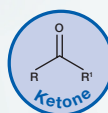
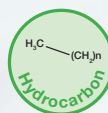
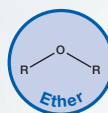
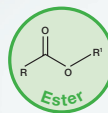
NMR Proton Shifts for Residual Solvent Impurities

Solvent Type

Solvent	Synonyms	Mol Wt	BP °C	Linear Formula	H-Signal	Multi	CDCl ₃	D ₂ O	CD ₃ OD	(CD ₃) ₂ SO	(CD ₃) ₂ CO	CD ₃ CN	C ₆ D ₆
Acetic Acid	Ethanoic acid	60.05	118	CH ₃ COOH	CH ₃	s	2.13	2.08	1.99	1.95	1.96	1.96	1.55
Formic Acid	Methanoic Acid	46.02	101	HCOOH	H	s	8.02	8.22	8.08	8.18	8.11	8.03	–
1-Butanol	<i>n</i> -Butanol / 1-Hydroxybutane / <i>n</i> -Butyl alcohol	74.12	117.6	CH ₃ (CH ₂) ₃ OH	CH ₃	t	0.94	0.91	0.93	0.86	0.90	0.91	–
					CH ₂ (3)	m	1.39	1.35	1.38	1.30	1.31-1.41	1.29-1.39	–
					CH ₂ (2)	m	1.56	1.53	1.51	1.39	1.44-1.52	1.42-1.49	–
2-Butanol	<i>sec</i> -Butanol / 2-Butyl alcohol / 2-Hydroxybutane	74.12	99	CH ₃ CH(OH)CH ₂ CH ₃	CH ₂ (1)	m	3.65	3.61	3.54	3.38	3.49-3.56	3.45-3.51	–
					CH ₃ (1)	d	1.19	1.11	1.13	1.02	1.09	1.08	–
					CH ₂	m	1.48	1.42	1.44	1.32	1.33-1.47	1.33-1.42	–
<i>tert</i> -Butanol	<i>t</i> -Butyl alcohol / 2-Methyl-2-propanol	74.12	83	(CH ₃) ₃ COH	CH ₃	s	1.28	1.24	1.40	1.11	1.18	1.16	1.05
					CH	m	3.73	3.71	3.63	3.49	3.56-3.66	3.54-3.62	–
Ethanol	Ethyl alcohol	46.06	78	C ₂ H ₆ O	CH ₃	t	1.25	1.17	1.19	1.06	1.12	1.12	0.96
Ethylene Glycol	Ethane-1,2-diol / 1,2-Dihydroxyethane	62.06	196-198	HOCH ₂ CH ₂ OH	CH	s	3.76	3.65	3.59	3.34	3.28	3.51	3.41
					CH ₂	m	3.64	3.69	3.53	3.35-3.40	3.37	3.44-3.50	–
1-Hexanol	<i>n</i> -Hexanol / Hexyl alcohol / Caproic alcohol	102.18	156-157	CH ₃ (CH ₂) ₅ OH	CH ₃	t	0.86-0.93	0.88	0.87-0.94	0.86	0.88	0.89	–
					CH ₂ (3-5)	m	1.24-1.44	1.24-1.39	1.26-1.40	1.19-1.32	1.24-1.39	1.22-1.38	–
					CH ₂ (2)	m	1.52-1.61	1.50-1.59	1.48-1.57	1.36-1.44	1.45-1.55	1.43-1.51	–
<i>iso</i> -Amyl alcohol	3-Methyl-1-butanol / <i>iso</i> -Pentyl alcohol	88.15	130	(CH ₃) ₂ CHCH ₂ CH ₂ OH	CH ₃	d	0.92	0.90	0.91	0.85	0.89	0.89	–
					CH ₂ OH	q	1.47	1.44	1.42	1.31	1.39	1.37	–
					CH	m	1.66-1.78	1.61-1.71	1.64-1.77	1.65	1.72	1.67	–
<i>iso</i> -Butanol	<i>iso</i> -Butyl alcohol / 2-Methyl-1-propanol	74.12	108	(CH ₃) ₂ CHCH ₂ OH	CH ₃	d	0.92	0.88	0.90	0.82	0.87	0.86	–
					CH	m	1.77	1.75	1.70	1.60	1.68	1.66	–
					CH ₂	m	3.41	3.38	3.30	3.15	3.26-3.34	3.25	–
Methanol	Methyl alcohol	32.04	64.7	CH ₃ OH	CH ₃	s	3.49	3.34	3.34	3.16	3.31	3.28	3.07
Pentanol	<i>n</i> -Amyl alcohol / Pentyl alcohol	88.15	137-139	CH ₃ (CH ₂) ₄ OH	CH ₃	t	0.91	0.88	0.92	0.86	0.89	0.90	–
					CH ₂ (3-4)	m	1.31	1.31	1.34	1.27	1.27-1.37	1.25-1.38	–
					CH ₂ (2)	m	1.58	1.55	1.53	1.41	1.45-1.55	1.43-1.52	–
1-Propanol	<i>n</i> -Propanol / Propyl alcohol	60.10	97	CH ₃ CH ₂ CH ₂ OH	CH ₃	t	0.93	0.90	0.92	0.87	0.89	0.88	–
					CH ₂ (2)	m	1.60	1.55	1.54	1.45	1.44-1.55	1.43-1.52	–
					CH ₂ (1)	t	3.60	3.56	3.49	3.38	3.44-3.51	3.40-3.47	–
2-Propanol	IPA / Isopropanol / <i>iso</i> -Propyl alcohol	60.10	82	(CH ₃) ₂ CHOH	CH ₃	d	1.20	1.18	1.14	1.04	1.10	1.09	0.95
					CH	m	4.03	4.02	3.92	3.78	3.90	3.67	3.87
Anisole	Methoxybenzene / Methyl phenyl ether	108.14	154	C ₆ H ₅ OCH ₃	CH ₃	s	3.76	3.85	3.77	3.76	3.78	3.77	–
					CH (<i>o/p</i>)	m	6.93	7.06	6.90	6.93	6.88-6.95	6.89-6.98	–
					CH (<i>m</i>)	m	7.29	7.41	7.25	7.29	7.24-7.31	7.27-7.34	–
Benzene		78.11	80.09	C ₆ H ₆		s	7.37	7.44	7.33	7.37	7.36	7.37	7.15
Pyridine		79.10	115-116	C ₅ H ₅ N	CH (2)	m	8.62	8.52	8.53	8.58	8.58	8.57	8.53
					CH (3)	m	7.29	7.45	7.44	7.39	7.35	7.33	6.66
					CH (4)	m	7.68	7.87	7.85	7.79	7.76	7.73	6.98
Toluene	Methylbenzene	92.14	111	C ₆ H ₅ CH ₃	CH ₃	s	2.36	–	2.32	2.30	2.32	2.33	2.11
					CH (<i>o/p</i>)	m	7.17	–	7.16	7.18	7.10-7.20	7.10-7.30	7.02
					CH (<i>m</i>)	m	7.25	–	7.16	7.25	7.10-7.20	7.10-7.30	7.13
<i>p</i> -Xylene	1,4-Dimethylbenzene / <i>p</i> -Xylol	106.17	138	C ₆ H ₄ (CH ₃) ₂	CH ₃	s	2.30	2.30	2.26	2.24	2.26	2.27	–
					CH	s	7.06	7.18	7.02	7.05	–	–	–
Chloroform	Trichloromethane / Formyl trichloride	119.38	61	CHCl ₃	CH	s	7.26	–	7.88	8.32	8.02	7.58	6.15
1,2-Dichloroethane	EDC / Ethylene dichloride / Glycol dichloride	98.96	81-85	ClCH ₂ CH ₂ Cl	CH ₂	s	3.73	–	3.78	3.90	3.87	3.81	2.90
Dichloromethane	DCM / Methylene dichloride	84.93	39-40	CH ₂ Cl ₂	CH ₂	s	5.30	–	5.48	5.76	5.63	5.44	4.27
Acetonitrile	AcCN / Methyl cyanide / Cyanomethane	41.04	81-82	CH ₃ CN	CH ₃	s	2.10	2.06	2.03	2.07	2.05	1.96	1.55
Dimethylformamide	DMF / Formyl dimethylamine	73.09	153	HCON(CH ₃) ₂	CH	s	8.02	7.91	7.98	7.95	7.96	7.92	7.63
					CH ₃	s	2.96	3.00	2.99	2.89	2.94	2.89	2.36
					CH ₃	s	2.88	2.86	2.85	2.73	2.78	2.77	1.86
Dimethyl sulfoxide	DMSO / Methyl sulfoxide / (Methylsulfinyl)methane	78.13	189	(CH ₃) ₂ SO	CH ₃	s	2.62	2.71	2.65	2.54	2.52	2.50	1.68



Solvent	Synonyms	Mol Wt	BP °C	Linear Formula	H-Signal	Multi	CDCl ₃	D ₂ O	CD ₃ OD	(CD ₃) ₂ SO	(CD ₃) ₂ CO	CD ₃ CN	C ₆ D ₆
<i>n</i> -Butyl acetate	1-Butyl acetate	116.16	126-127	CH ₃ CO ₂ (CH ₂) ₃ CH ₃	CH ₃ CH ₂	t	0.94	0.91	0.94	0.89	0.92	0.92	-
					CH ₂	m	1.38	1.37	1.39	1.32	1.32-1.43	1.31-1.42	-
					CH ₂	m	1.61	1.63	1.61	1.54	1.54-1.62	1.54-1.63	-
					CH ₃ CO	s	2.04	2.09	2.01	1.99	1.97	1.97	-
Ethyl acetate	EtOAc / Ethyl ethanoate / Acetoxyethane	88.11	75-78	CH ₃ CO ₂ C ₂ H ₅	CH ₃ CH ₂	t	1.26	1.24	1.24	1.18	1.20	1.20	0.92
					CH ₃ CO	s	2.05	2.07	2.01	1.99	1.97	1.97	1.65
					CH ₂	q	4.12	4.14	4.09	4.03	4.05	4.06	3.89
Ethyl formate	Ethyl methanoate / Formic acid ethyl ester	74.08	54	HCO ₂ C ₂ H ₅	CH ₃	t	1.29	1.29	1.27	1.24	-	-	-
					CH ₂	q	4.22	4.28	4.20	4.17	-	-	-
					CH	s	8.04	8.16	8.06	8.23	-	-	-
<i>iso</i> -Propyl acetate	iPrOAc / 1-Methyl ethyl acetate / 2-Propyl acetate	102.13	88.8	CH ₃ CO ₂ CH(CH ₃) ₂	(CH ₃) ₂ CH	d	1.23	1.25	1.22	1.17	1.19	1.19	-
					CH ₃ CO	s	2.02	2.07	1.99	1.96	1.94	1.94	-
					CH	m	4.99	4.98	4.95	4.86	4.91	4.91	-
Methyl acetate	Methyl ethanoate / Methyl acetic ester	74.08	57.4	CH ₃ CO ₂ CH ₃	CH ₃ CO	s	2.05	2.09	2.02	1.92	1.98	1.99	-
<i>n</i> -Propyl acetate	Acetic acid propyl ester / Propyl ethanoate	102.13	102	CH ₃ CO ₂ CH ₂ CH ₂ CH ₃	CH ₃ CH ₂	t	0.94	0.92	0.94	0.88	0.92	0.92	-
					CH ₂ CH ₃	m	1.65	1.65	1.64	1.57	1.61	1.61	-
					CH ₃ CO	s	2.05	2.09	2.02	2.00	1.98	1.98	-
					CH ₂ CO	t	4.02	4.06	4.01	3.95	3.97	3.97	-
<i>tert</i> -Butyl methyl ether	MTBE / 2-Methyl-2-methoxy propane	88.15	54-56	(CH ₃) ₃ COCH ₃	CCH ₃	s	1.19	1.22	1.15	1.11	1.19	1.14	1.07
Diethyl ether	Ether / Ethoxyethane	74.12	34.6	(CH ₃ CH ₂) ₂ O	CH ₃	t	1.20	1.17	1.17	1.09	1.11	1.12	1.11
					CH ₂	q	3.48	3.56	3.49	3.38	3.41	3.42	3.26
1,2-Dimethoxyethane	DME / Dimethylglycol	90.12	84-86	CH ₃ OCH ₂ CH ₂ OCH ₃	CH ₃	s	3.40	3.37	3.35	3.24	3.28	3.28	3.24
Tetrahydrofuran	THF / Oxolane / Diethylene oxide	72.11	66	C ₄ H ₈ O	CH ₂	s	3.55	3.60	3.52	3.43	3.46	3.45	3.33
					CH ₂ O	m	3.76	3.74	3.71	3.60	3.63	3.64	3.57
Cyclohexane		84.16	81	C ₆ H ₁₂	CH ₂	s	1.43	-	1.45	1.40	1.43	1.44	1.40
<i>n</i> -Heptane	Heptane / Dipropyl methane	100.21	98	CH ₃ (CH ₂) ₅ CH ₃	CH ₃	t	0.89	-	0.90	0.86	0.88	0.89	-
<i>n</i> -Hexane		86.18	69	CH ₃ (CH ₂) ₄ CH ₃	CH ₂	m	1.28	-	1.31	1.26	1.21-1.35	1.21-1.35	-
					CH ₃	t	0.88	-	0.90	0.86	0.88	0.89	0.89
					CH ₂	m	1.26	-	1.29	1.25	1.28	1.28	1.24
					CH	m	1.33	-	1.31-1.39	1.32	1.34	1.30-1.39	-
Methylcyclohexane	MCH	98.19	101	CH ₃ CH(CH ₂) ₅	CH ₂ CH (ax)	m	0.82-0.93	-	0.82-0.94	0.80-0.90	0.87-0.93	0.88-0.94	-
<i>n</i> -Pentane		72.15	36	CH ₃ (CH ₂) ₃ CH ₃	CH ₃	d	0.86	-	0.87	0.84	0.84	0.86	-
					CH ₂ (4) (ax)	m	1.06-1.17	-	1.09-1.20	1.04-1.14	1.07-1.17	1.08-1.18	-
					CH ₂ (3) (ax)	m	1.17-1.28	-	1.26	1.14-1.25	1.24	1.25	-
					CH	m	1.33	-	1.31-1.39	1.32	1.34	1.30-1.39	-
Acetone	2-Propanone / Dimethylketone	58.08	56	CH ₃ COCH ₃	CH ₃	s	2.17	2.22	2.15	2.09	2.08	1.55	
2-Hexanone	MBK / Methyl butyl ketone / Propyl acetone	100.16	127	CH ₃ (CH ₂) ₃ COCH ₃	CH ₃	t	0.91	0.88	0.91	0.85	-	-	-
					CH ₂	m	1.32	1.30	1.32	1.24	-	-	-
					CH ₂	m	1.56	1.53	1.53	1.43	-	-	-
					CH ₂ CO	t	2.42	2.56	2.47	2.41	-	-	-
Isobutyl methyl ketone	MIBK / 4-Methylpentan-2-one / Isopropylacetone	100.16	117.4	(CH ₃) ₂ CHCH ₂ COCH ₃	CH ₃ CO	s	2.13	2.21	2.12	2.07	-	-	-
					(CH ₃) ₂ CH	d	0.92	0.90	0.85	0.85	0.88	0.88	-
					CH	m	2.13	2.08	2.00	2.00	2.02-2.11	2.02-2.08	-
					CH ₃ CO	s	2.12	2.21	2.05	2.05	2.06	2.05	-
Methyl ethyl ketone	MEK / Ethyl methyl ketone / 2-Butanone	72.11	80	C ₂ H ₅ COCH ₃	CH ₂	d	2.30	2.43	2.28	2.28	2.31	2.29	-
					CH ₃ CH ₂	t	1.06	1.26	1.01	0.91	0.96	0.96	0.85
					CH ₃ CO	s	2.14	2.19	2.12	2.07	2.07	2.06	1.58
Triethylamine	TEA / Diethylaminoethane	101.19	90	(C ₂ H ₅) ₃ N	CH ₂ CH ₃	q	2.46	3.18	2.50	2.43	2.45	2.43	1.81
					CH ₃	t	1.03	0.99	1.05	0.93	0.96	0.96	0.96
Formamide	Methanamide / Formic amide	45.04	210	HCONH ₂	CH	s	8.22	8.06	8.04	7.97	-	-	-
Grease	Long chain, linear aliphatic hydrocarbons				CH ₃	m	0.86	-	0.88	-	0.87	0.86	0.92
					CH ₂	br s	1.26	-	1.29	-	1.29	1.27	1.36
Silicone Grease	Poly(dimethylsiloxane)				CH ₃	s	0.07	-	0.10	-	0.13	0.08	0.29
Water		18.02	100	H ₂ O	H ₂ O	s	1.56	-	4.87	3.33	2.84	2.13	-



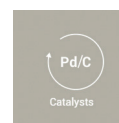
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Example Product Grades

Grade	Definition
ACS Grade	Products whose specifications are defined in the American Chemical Society Reagent Chemicals book.
Premion®	High purity precious metal compounds and pure elements. The minimum purity (metals basis) for Premion pure elements is 99.99% and Premion compounds is 99.95%. Premion pure elements and their compounds include: Platinum (Pt), Palladium (Pd), Rhodium (Rh), Iridium (Ir), Ruthenium (Ru), Osmium (Os), Silver (Ag) and Gold (Au).
Puratronic®	High purity base metals and salts. Each Puratronic compound has a minimum purity of 99.99% (many exceed 99.999%).
REacton	High purity rare earth metals, alloys and compounds. Recognized as a benchmark for high purity rare earths, the REacton brand encompasses the entire Lanthanide series (excluding promethium) along with scandium and yttrium. REacton rare earths feature extremely low impurity levels. Under the REacton name, we offer a broad range of high purity rare earth materials, including Oxides, Halides, Carbonates, Nitrates, Acetates and more.
Specpure®	Analytical standard solutions. Specpure standards are produced using the highest quality raw materials and ASTM Type 1 deionized water for the greatest calibration accuracy possible. All Specpure standards are shipped with a batch-specific Certificate of Analysis. Specpure atomic absorption standard solution concentrations are accurate to ±1.0% and plasma solutions to ±0.3%.
Ultra Dry	A comprehensive line of ultra dry materials. Ultra dry compounds are manufactured under exacting conditions to ensure that oxygen and water impurities are in the parts per million range. Only high purity starting materials are used in the manufacturing process, which results in overall purities of 99.9% to 99.999%. All ultra dry salts are ampouled under argon, and most are available in -10 mesh beads and powder form.

The Alfa Aesar product range includes over 46,000 products.

A selection of our most essential products from this range can be found in the list below.

MPC*	CAS Number	Product Name	Product Code			Sigma/Merck
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* MPC= Manufacturer Product Code

High Purity Inorganics

010626	25838-59-9	Aluminum nitrate hydrate, Puratronic®, 99.999% (metals basis excluding Hg)	11340809	25g	11350809	500g	
042573	1344-28-1	Aluminum oxide, alpha-phase, 99.95% min (metals basis)	11309188	100g	11399178	500g	342742
010700	1317-38-0	Copper(II) oxide, Puratronic®, 99.995% (metals basis)	11350969	25g	11340969	100g	203130
011856	10025-82-8	Indium(III) chloride, anhydrous, 99.999% (metals basis)	11331928	1g	11351928	10g	308293

MPC*	CAS Number	Product Name	Product Code			Sigma/ Merck
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* MPC= Manufacturer Product Code

044836	12030-24-9	Indium(III) sulfide, 99.995% (metals basis)	11306249	2g	11396239	10g	554359
044314	10101-63-0	Lead(II) iodide, ultra dry, 99.999% (metals basis)	11458410	5g	11468410	25g	204439
010862	7647-14-5	Sodium chloride, Puratronic®, 99.999% (metals basis)	11377017	25g	11387017	100g	
010836	13933-33-0	Tetraammineplatinum(II) chloride monohydrate, Premion®, 99.995% (metals basis)	11376967	1g	11386967	5g	

Organometallics

H58012		Allylzinc bromide, 0.5M in THF, packaged under Argon in resealable ChemSeal bottles	15445305	50mL			
H58897	226570-68-9	4-Cyanobutylzinc bromide, 0.5M in THF, packaged under Argon in resealable ChemSeal bottles	15475425	50mL			497894
H58247		Cyclobutylzinc bromide, 0.5M in THF, packaged under Argon in resealable ChemSeal bottles	15405345	50mL			
H58852	7565-57-3	Cyclohexylzinc bromide, 0.5M in THF, packaged under Argon in resealable ChemSeal bottles	15415425	50mL			498033
H58008	126403-68-7	Cyclopropylzinc bromide, 0.5M in THF, packaged under Argon in resealable ChemSeal bottles	15435305	50mL			680982
H58023	131379-39-0	3-(Ethoxycarbonyl)propylzinc bromide, 0.5M in THF, packaged under Argon in resealable ChemSeal bottles	15475305	50mL			498491
H58536	77047-87-1	Isopropylzinc bromide, 0.5M in THF, packaged under Argon in resealable ChemSeal bottles	15435375	50mL			680966
H58659	38111-44-3	Phenylzinc bromide, 0.5M in THF, packaged under Argon in resealable ChemSeal bottles	15425395	50mL			524719
H58544	218777-23-2	2-Pyridylzinc bromide, 0.5M in THF, packaged under Argon in resealable ChemSeal bottles	15465375	50mL			499382

PMCC

011051	26023-84-7	Dihydrogen hexachloroplatinate(IV) hydrate, 99.9% (metals basis)	11351698	1g	11361698	5g	
039742	15804-32-7	Gold(III) acetate, 99.9% (metals basis)	11314717	0.5g	11394707	1g	
011035	10102-05-3	Palladium(II) nitrate hydrate, 99.8% (metals basis), Pd 39% min	11321668	2g	11311668	10g	282782
010526	15170-57-7	Platinum(II) 2,4-pentanedionate, Pt 48.0% min	11306048	1g	11396038	5g	

Pure Elements

000905	7726-95-6	Bromine liquid, 99.8%	15400977	25g	15410977	250g	
010146	7440-46-2	Cesium, 99.98% (metals basis)	11351198	1g	11341198	5g	
040317	7440-57-5	Gold shot, semi-spherical, 6.35mm (0.25in) & down, Premion r, 99.999% (metals basis)	11353878	1g	11363878	5g	
010195	7440-57-5	Gold wire, 0.2mm (0.008in) dia, 99.9% (metals basis)	11311258	1m	11301258	5m	
040328		Gold wire, 14kt, red, 1.63mm (0.064in) dia, Au 58.3% min	11303898	10cm	11323898	25cm	
010283	7440-06-4	Platinum gauze, 52 mesh woven from 0.1mm (0.004in) dia wire, 99.9% (metals basis)	11301368	25x25mm	11335769	50X50mm	
013374	7440-06-4	Platinum slug, 6.35mm (0.25in) dia x 12.7mm (0.50in) length, Premion r, 99.99+% (metals basis)	15434755	1g			
011435	7440-22-4	Silver wire, 2.0mm (0.08in) dia, annealed, 99.9% (metals basis)	11301279	50cm	11391269	250cm	
013783	7440-62-2	Vanadium foil, 0.127mm (0.005in) thick, 99.8% (metals basis)	11311319	50x100mm	11321319	100X200mm	
010441	7440-67-7	Zirconium sponge, 0.8-25.4mm (0.03-1.0in), 99.5%, Zr & Hf	11305948	50g	11385938	1Kg	267651

Solvents

022927	75-05-8	Acetonitrile, HPLC Grade, 99.7+% min	11328207	1L	15401117	2500mL	34881
022914	67-68-5	Dimethyl sulfoxide, HPLC Grade, 99.9+%	11378167	1L	15431107	2500mL	34869
033361	64-17-5	Ethanol, Alcohol Reagent, anhydrous, denatured, ACS, 94-96%	15416115	1L			
019393	67-56-1	Methanol, Semiconductor Grade, 99.9% min	11383557	100mL	11393557	1L	
022909	67-56-1	Methanol, ultrapure, HPLC Grade, 99.8+%	11318157	1L	15401107	2500mL	646377
043848	71-23-8	1-Propanol, ACS, 99.5+%	11410630	500mL	11380508	1L	402893
036644	67-63-0	2-Propanol, ACS, 99.5% min	11348078	1L	11328078	4L	673773
022904	109-99-9	Tetrahydrofuran, UV, HPLC Grade, 99.7+% min, unstab.	11378137	1L	15471097	2500mL	34865
022934	7732-18-5	Water, ultrapure, HPLC Grade	11348217	1L	11338217	4L	270733

Specialized Chemical Services

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- Additional testing services
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High-volume solvent delivery systems incorporate safety features to protect the lab and the environment by offering a combination of mechanical and manual controls to prevent unwanted solvent flow. The bottle-free, closed system eliminates the potential for glass bottle breakage and makes the risk of spills and exposure to vapors negligible.

Reduce lab-operating costs

Increase lab efficiency by eliminating:

- Repeated solvent testing
- Multiple lots of material
- Bottle rinsing
- Disposal costs

Environmentally friendly solution

- Reduce the amount of solid waste generated in your laboratory
- Minimize the release of flammable or toxic solvent liquids and vapors
- Eliminate bottle rinsing – empty containers are returned, cleaned and refilled

For your applications

- High-performance liquid chromatography (HPLC)
- Preparative chromatography and high-volume gas chromatography sample preparation
- Process synthesis and extractions



Our Labels

What's on the label



GHS information











Product specific information



LOT analysis

GHS Pictograms Explained

<p>GHS01 Exploding bombs = Explosive, self reactive; heating may cause fire or explosion.</p> 	<p>GHS02 Flame = Flammable, chemicals can catch fire easily and burst into flames.</p> 	<p>GHS03 Flame over circle = Oxidizing, can react with other materials causing them to burn or explode.</p> 
<p>GHS04 Gas cylinder = Gas under pressure: chemical can explode, rocket or harm health if the cylinder is heated, ruptured or leaking.</p> 	<p>GHS05 Corrosion = Corrosive: may cause skin corrosion/ burns; eye damage; eat away clothing, working surfaces, and or metals.</p> 	<p>GHS06 Skull and crossbones = Toxic: highly poisonous material; can cause immediate and possibly serious health problems.</p> 
<p>GHS07 Exclamation mark = Other Hazard irritant (skin and eye), skin sensitizer, acute toxicity, narcotic effects, respiratory track irritant, harmful if swallowed, toxic if inhaled.</p> 	<p>GHS08 Health hazard = Specific health hazard including—Carcinogenic; Mutagenic; Toxic for Reproduction: may cause asthma or damage to specific organs of the body.</p> 	

Chemical Storage/Handling Recommendations

Chemical Incompatibility

Chemicals should react in the lab, not in the stockroom. The inadvertent mixing of inventory can produce toxic vapor/gas, fire or explosion. Stay safe in the storeroom; adhere to the following prescribed precautions and consult the chemical compatibility tables (below) for caustic combinations. For product specific information, refer to the Material Safety Data Sheet (MSDS) provided with purchase.

General Guidelines

- Protect eyes and skin: lab safety glasses with side shields, lab coats and closed-toe shoes must be worn for basic personal protection
- Safely space shelves and racks to accommodate the upright removal of the largest chemical container; prevent tipping and dripping with adequate clearance
- Identify and substitute safer chemical alternatives
- Keep hazardous materials away from heat and direct sunlight to prevent the degradation of chemicals and deterioration of storage containers and labels
- Do not store hazardous materials (except cleaners) under sinks
- Avoid chemical stockpiling; procure hazardous materials as needed
- Limit fume hood storage of hazardous materials
- Conduct periodic cleanouts to minimize accumulation of chemicals
- Keep all food (including gum), beverages, tobacco and open cosmetics outside the work area

Acids and Bases

Isolate acids:

- From reactive metals, including sodium, potassium and magnesium
- From sodium cyanide, iron sulfide, calcium carbide and other compounds that can react to produce toxic fumes/gases
- Place combustible organic carboxylic acids (i.e., acetic acid) in a flammable storage locker; store inorganic acids in acid storage cabinets
- Store acids and bases in air-tight containers with snug-fitting caps; avoid loose lids or glass stoppers; use vented caps when necessary to prevent over-pressurization
- Keep piranha etch and aqua regia in a fume hood at all times
- Use non-aluminum drip trays for aqueous sodium and potassium hydroxide solutions; isolate nitric acid when utilizing secondary containment
- Safely transfer containers of acid and base solutions using bottle carriers
- Never pour water into acid; slowly add the acid to the water and stir



Flammable and Combustible Liquids

- The main legislation for storing flammable liquids in Fire Resistant Cabinets in Europe is EN14470 Part 1. There are additional local country standards that exist which you should also be aware of
- The safe storage and handling of chemicals is essential in any volume, but generally you should consider whether the risk of the spread of fire is mitigated by using suitable fire resistant cabinets
- Anyone storing or planning to store highly flammable and/ or flammable liquids should pay particular attention to their local legislation



	Acids, Inorganic	Acids, Oxidizing	Acids, Organic	Alkalis (Bases)	Oxidizers	Poisons, Inorganic	Poisons, Organic	Water-Reactives	Organic Solvents
Acids, inorganic			X	X		X	X	X	X
Acids, oxidizing			X	X		X	X	X	X
Acids, organic	X	X		X	X	X	X	X	
Alkalis (bases)	X	X	X				X	X	X
Oxidizers			X				X	X	X
Poisons, inorganic	X	X	X				X	X	X
Poisons, organic	X	X	X	X	X	X			
Water-reactives	X	X	X	X	X	X			
Organic solvents	X	X		X	X	X			

X indicates incompatibility between two chemical product groups. Incompatible products should not be stored in close proximity.

Chemical Incompatibilities table

Chemical	Store Separately From
Acetic acid	Chromic acid, nitric acid, perchloric acid, peroxides, permanganates and other oxidizers
Acetone	Concentrated nitric and sulfuric acid mixtures, and strong bases
Acetylene	Chlorine, bromine, copper, fluorine, silver, mercury
Alkali metals	Water, carbon tetrachloride or other chlorinated hydrocarbons, carbon dioxide, halogens
Ammonia, anhydrous	Mercury, chlorine, calcium hypochlorite, iodine, bromine, hydrofluoric acid
Ammonium nitrate	Acids, metal powders, flammable liquids, chlorates, nitrites, sulfur, finely divided organic or combustible materials
Aniline	Nitric acid, hydrogen peroxide
Arsenic materials	Any reducing agent
Azides	Acids
Bromine	Ammonia, acetylene, butadiene, butane, methane, propane (or other petroleum gases), hydrogen, sodium carbide, turpentine, benzene, finely divided metals
Calcium oxide	Water
Carbon (activated)	Calcium hypochlorite, all oxidizing agents
Carbon tetrachloride	Sodium
Chlorates	Ammonium salts, acids, metal powders, sulfur, finely divided organic or combustible materials
Chromic acid and chromium trioxide	Acetic acid, naphthalene, camphor, glycerol, glycerin, turpentine, alcohol, flammable liquids in general
Chlorine	Same as Bromine
Chlorine dioxide	Ammonia, methane, phosphine, hydrogen sulfide
Copper	Acetylene, hydrogen peroxide
Cumene hydroperoxide	Acids, organic or inorganic
Cyanides	Acids
Flammable liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Hydrocarbons	Fluorine, chlorine, bromine, chromic acid, sodium peroxide
Hydrocyanic acid	Acids
Hydrofluoric acid	Ammonia, aqueous or anhydrous bases and silica
Hydrogen peroxide	Copper, chromium, iron, most metals or their salts, alcohols, acetone, organic materials, aniline, nitromethane, flammable liquids
Hydrogen sulfide	Fuming nitric acid, other acids, oxidizing gases, acetylene, ammonia (aqueous or anhydrous), hydrogen
Hypochlorites	Acids, activated carbon
Iodine	Acetylene, ammonia (aqueous or anhydrous), hydrogen
Mercury	Acetylene, fulminic acid, ammonia
Nitrates	Sulfuric acid
Nitric acid (concentrated)	Acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases, copper, brass, any heavy metals
Nitrites	Acids
Nitroparaffins	Inorganic bases, amines
Oxalic acid	Silver, mercury
Oxygen	Oils, grease, hydrogen; flammable liquids, solids, or gases
Perchloric acid	Acetic anhydride, bismuth and its alloys, alcohol, paper, wood, grease and oils
Peroxides, organic	Acids (organic or mineral), avoid friction, store cold
Phosphorus (white)	Air, oxygen, alkalis, reducing agents
Potassium	Carbon tetrachloride, carbon dioxide, water
Potassium chlorate and perchlorate	Sulfur and other acids, alkali metals, magnesium and calcium
Potassium permanganate	Glycerin, ethylene glycol, benzaldehyde, sulfuric acid
Selenides	Reducing agents
Silver	Acetylene, oxalic acid, tartaric acid, ammonium compounds, fulminic acid
Sodium	Carbon tetrachloride, carbon dioxide, water
Sodium nitrite	Ammonium nitrate and other ammonium salts
Sodium peroxide	Ethyl or methyl alcohol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerin, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulfides	Acids
Sulfuric Acid	Potassium chlorate, potassium perchlorate, potassium permanganate (or compounds with similar light metals: sodium, lithium, etc.)
Tellurides	Reducing agents

(From Manufacturing Chemists' Association, Guide for Safety in the Chemical Laboratory, pp. 215–217, Van Nostrand)

Chemical Resistance and Physical Properties of Plastics

Resin Codes

ECTFE: Ethylene- chlorotrifluoroethylene copolymer	PFA: Perfluoroalkoxy
ETFE: Ethylenetetrafluoroethylene	PMMA: Polymethyl methacrylate
FEP: Fluorinated ethylene propylene	PMP: Polymethylpentene
FLPE: Fluorinated high-density polyethylene	PP: Polypropylene
FLPP: Fluorinated polypropylene	PS: Polystyrene
HDPE: High-density polyethylene	PSF: Polysulfone
LDPE: Low-density polyethylene	PTFE: Polytetrafluoroethylene
NYL: Nylon (polyamide)	PUR: Polyurethane
PPCO: Polypropylene copolymer	PVC: Polyvinyl chloride
PC: Polycarbonate	PVDF: Polyvinylidene fluoride
PETG: Polyethylene terephthalate copolyester	TPE: Thermoplastic elastomer
PK: Polyketone	XLPE: Cross-linked high-density polyethylene

Do not store strong oxidizing agents in plastic labware except if made of FEP, PFA or PTFE. Other plastics will become brittle after prolonged exposure.

Do not place plastic labware directly in a flame or on a hotplate unless specified.

Use these charts as a reference only. They are recommendations, not guarantees, of fitness for particular uses. Test materials under actual conditions before using them for your applications.

Chemical Resistance Summary

Classes of substances; temperature 68°F (20°C)	ECTFE/ETFE	FEP/PTFE/PFA	FLPE	HDPE/XLPE	LDPE	NYL	PC	PETG	PK	PMMA	PMP	PP/PPCO	PS	PSF	PUR	PVC	PVDF	TPE‡
Acids, weak or dilute	E	E	E	E	E	F	E	E	E	G	E	E	E	E	G	E	E	E
Acids†, strong or concentrated	G	E	E	E	E	N	N	N	G	N	E	E	F	G	F	E	E	F
Alcohols, aliphatic	E	E	E	E	E	N	G	E	G	N	E	E	E	G	F	E	E	E
Aldehydes	E	E	G	G	G	F	F	N	E	G	G	G	N	F	G	N	E	N
Bases	E	E	F	E	E	F	N	N	G	F	E	E	E	E	N	E	E	E
Esters	E	E	E	G	G	E	N	N	E	N	G	G	N	N	N	N	G	N
Hydrocarbons, aliphatic	E	E	E	G	F	E	F	E	E	G	F	G	N	G	E	E	E	N
Hydrocarbons, aromatic	E	E	E	G	F	E	N	N	E	N	F	F	N	N	N	N	E	N
Hydrocarbons, halogenated	E	E	G	F	N	G	N	N	E	N	N	F	N	N	N	N	N	N
Ketones	G	E	E	G	G	E	N	N	E	N	F	G	N	N	N	N	N	N
Oxidizing agents, strong	F	E	F	F	F	N	N	N	G	N	F	F	N	G	N	G	G	N

E = Excellent resistance

No damage after 30 days of constant exposure.

G = Good resistance

Little or no damage after 30 days of constant exposure.

F = Fair resistance

Some effect after 7 days of constant exposure. Depending on the material, the effect may be cracking, crazing, loss of strength or discoloration. Solvents may cause softening, swelling, and permeation losses with PA, PP, PMP, LDPE and HDPE; the solvent effects on these materials are normally reversible.

N = Not recommended

Not recommended for continuous use. Immediate damage may occur. Depending on the material, the effect will be severe cracking, crazing, loss of strength, discoloration, deformation, dissolution or permeation loss.

† For oxidizing acids, see table entry "Oxidizing agents, strong." ‡ TPE gaskets

Solvent Miscibility

	Acetone	Acetonitrile	Carbon tetrachloride	Chloroform	Cyclohexane	1,2 Dichloroethane	Dichloroethane	Diethyl ether	Dimethylformamide	Dimethylsulfoxide	1,4 Dioxane	Ethanol	Ethyl acetate	Heptane	Hexane	Methanol	Methyl-tert-butyl ether	Pentane	Propan-1-ol	Propan-2-ol	Tetrahydrofuran	Toluene	2, 2, 4, Trimethylpentane	Water		
Acetone																										
Acetonitrile																										
Carbon tetrachloride																										
Chloroform																										
Cyclohexane		●																								
1,2 Dichloroethane																										
Dichloroethane																										
Diethyl ether																										
Dimethylformamide									●																	
Dimethylsulfoxide										●																
1,4 Dioxane																										
Ethanol																										
Ethyl acetate																										
Heptane																										
Hexane		●																								
Methanol		●																								
Methyl-tert-butyl ether															●	●										
Pentane																										
Propan-1-ol																										
Propan-2-ol																										
Tetrahydrofuran																										
Toluene																										
2, 2, 4, Trimethylpentane		●																								
Water			●	●	●	●	●	●	●	●			●	●	●		●	●					●	●		

● indicates that solvents are not miscible

Chemical Resistance of Labware Materials

How to Use This Chart

Use This Chart as a General Guide Only.

Test each chemical before storing in labware.

The first letter of each pair represents the resistance rating at 20°C; the second at 50°C.

E = Excellent resistance

No damage after 30 days of constant exposure.

G = Good resistance

Little or no damage after 30 days of constant exposure.

F = Fair resistance

Some effect after 7 days of constant exposure. Depending on the material, the effect may be cracking, crazing, loss of strength or discoloration. Solvents may cause softening, swelling, and permeation losses with PA, PP, PMP, LDPE and HDPE; the solvent effects on these materials are normally reversible.

N = Not recommended

Not recommended for continuous use. Immediate damage may occur. Depending on the material, the effect will be severe cracking, crazing, loss of strength, discoloration, deformation, dissolution or permeation loss.

Examples

EE = Acetic Acid, 50% - LDPE gives excellent resistance at both 20°C and 50°C.

GF = n-Amyl acetate - PPE/PPCO gives good resistance at 20°C but resistance is reduced to fair at 50°C.

Warning!

Do not store strong oxidizing agents in plastic containers except those made of Teflon™ FEP, PFA or PTFE. Other plastics will become brittle after prolonged exposure.

CHEMICAL	LDPE	HDPE	PP/PPCO	PMP	FEP/PTFE/PFA	ECTFE/ETFE	PC	PVC	PSF	PVDF	PS	NYL	Stainless Steel	Glass	Ceramic
Acetaldehyde	GN	GF	GN	GN	EE	GF	FN	GN	NN	EE	NN	EG	EE	EE	EE
Acetamide, sat.	EE	EE	EE	EE	EE	EE	NN	NN	NN	—	EE	EE	EE	EE	EE
Acetic acid, 5%	EE	EE	EE	EE	EE	EE	EG	EE	EE	EE	EG	FN	EE	EE	EE
Acetic acid, 50%	EE	EE	EE	EE	EE	EG	EG	EG	GG	EE	GG	NN	EE	EE	EE
Acetone	NN	NN	EE	EE	EE	GF	NN	NN	NN	NN	NN	EE	EE	EE	EE
Acetonitrile	EE	EE	FN	FN	EE	EE	NN	NN	NN	EE	NN	EE	EG	EE	EE
Acrylonitrile	EE	EE	FN	FN	EE	EG	NN	NN	NN	GF	NN	EG	EG	EE	EE
Adipic acid	EG	EE	EE	EE	EE	EE	EE	EG	GG	—	EE	EF	EG	EE	EE
Alanine	EE	EE	EE	EE	EE	EE	NN	NN	NN	—	EE	EG	—	—	—
Allyl alcohol	EE	EE	EE	EG	EE	EE	GF	GF	GF	—	GF	NN	EE	EG	EG
Aluminum hydroxide	EG	EE	EG	EG	EE	EE	FN	EG	GG	EE	GG	EE	EE	NN	EE
Aluminum salts	EE	EE	EE	EE	EE	EE	EG	EE	EE	EE	GG	NN	GG	EE	EE
Amino acids	EE	EE	EE	EE	EE	EE	EE	EE	EE	EE	EE	EG	—	—	—
Ammonia	EE	EE	EE	EE	EE	EE	NN	EG	GF	EE	GF	FF	EE	EE	EE
Ammonium acetate, sat.	EE	EE	EE	EE	EE	EE	EE	EE	EE	EE	EE	EG	EE	EE	EE
Ammonium glycolate	EG	EE	EG	EG	EE	EE	GF	EE	GG	EE	EE	GG	—	—	—
Ammonium hydroxide, 5%	EE	EE	EE	EE	EE	EE	FN	EE	GG	EE	EF	GF	EE	EE	EE
Ammonium hydroxide, 30%	EG	EE	EG	EG	EE	EE	NN	EG	GG	EE	GF	FN	EE	EE	EE
Ammonium oxalate	EG	EE	EG	EG	EE	EE	EE	EE	EE	EE	EE	GF	EE	EE	EE
Ammonium salts	EE	EE	EE	EE	EE	EE	EG	EG	EE	EE	GG	NN	EE	EE	EE
n-Amyl acetate	GF	EG	GF	GF	EE	EE	NN	NN	NN	EE	NN	EE	EE	EE	EG
Amyl chloride	NN	FN	NN	NN	EE	EE	NN	NN	NN	EE	NN	EG	EG	EE	EE
Aniline	EG	EG	GF	GF	EE	GN	FN	NN	NN	EF	NN	GF	EG	EE	EE
Benzaldehyde	EG	EE	EG	EG	EE	EF	FN	NN	FF	EE	NN	EG	GG	EE	EE
Benzene	FN	NN	GF	GF	EE	EG	NN	NN	NN	EE	NN	EE	GG	EE	EE
Benzoic acid, sat.	EE	EE	EG	EG	EE	EE	EG	EG	FF	EE	GG	NN	EG	EE	EE
Benzyl acetate	EG	EE	EG	EG	EE	EG	FN	NN	NN	—	NN	EG	GG	EE	EE
Benzyl alcohol	NN	FN	NN	NN	EE	EE	NN	GF	NN	EE	NN	NN	GG	EE	EE
Bromine	NN	FN	NN	NN	EE	EG	FN	GN	NN	EE	NN	NN	EE	EG	GG
Bromobenzene	NN	FN	NN	NN	EE	GN	NN	NN	NN	EE	NN	EG	GG	GG	GG
Bromoform	NN	NN	NN	NN	EE	GF	NN	NN	NN	EE	NN	FF	GG	EE	EE
Butadiene	NN	FN	NN	NN	EE	EE	NN	FN	NN	EE	NN	FF	GG	EE	EE
n-Butyl acetate	GF	EG	GF	GF	EE	EG	NN	NN	NN	EE	NN	EE	GG	EE	EE
n-Butyl alcohol	EE	EE	EE	EG	EE	EE	GF	GF	GF	EE	EG	NN	EE	EE	EE
sec-Butyl alcohol	EG	EE	EG	EG	EE	EE	GF	GG	GF	EE	GG	NN	EE	EE	EE
tert-Butyl alcohol	EG	EE	EG	EG	EE	EE	GF	EG	GF	EE	EE	EE	EE	EE	EE
Butyric acid	NN	FN	NN	NN	EE	EE	FN	GN	GG	EE	NN	FN	GG	EE	EE
Calcium hydroxide, conc.	EE	EE	EE	EE	EE	EE	NN	EE	GG	EE	GG	NN	GG	NN	EE
Calcium hypochlorite, sat.	EE	EE	EE	EG	EE	EE	FN	GF	EE	EE	GF	NN	EE	EE	EE
Carbazole	EE	EE	EE	EE	EE	EE	NN	NN	NN	—	EE	EE	—	—	—
Carbon disulfide	NN	NN	NN	NN	EE	EF	NN	NN	NN	EE	NN	EG	EE	EE	EE
Carbon tetrachloride	FN	GF	GF	NN	EE	EE	NN	GF	NN	EE	NN	EE	GG	EE	EE
Cedarwood oil	NN	FN	NN	NN	EE	EG	FN	FF	EE	EE	NN	EG	—	—	—
Cellosolve acetate	EG	EE	EG	EG	EE	EG	FN	FN	NN	EG	NN	EE	GG	EE	EE
Chlorine, 10% in air	GN	EF	GN	GN	EE	EE	EG	EE	NN	EE	FN	NN	FF	EE	EE
Chlorine, 10% (moist)	GN	GF	FN	GN	EE	EE	GF	EG	NN	EE	NN	NN	FF	EE	EE
Chloroacetic acid	EE	EE	EG	EG	EE	EE	FN	FN	NN	EE	GN	NN	GG	EE	EE
p-Chloroacetophenone	EE	EE	EE	EE	EE	EE	NN	NN	NN	—	NN	EG	—	—	—
Chloroform	FN	FN	GF	NN	EE	GF	NN	NN	NN	EE	NN	FF	EE	EE	EE
Chromic acid, 10%	EE	EE	EE	EE	EE	EE	GF	EG	NN	EE	EE	NN	GG	EE	EE
Chromic acid, 50%	EE	EE	GF	GF	EE	EE	FN	EF	NN	EE	FF	NN	FF	EE	NN
Cinnamon oil	NN	FN	NN	NN	EE	EG	GF	NN	FF	—	NN	GF	EE	—	—
Citric acid, 10%	EE	EE	EE	EE	EE	EE	EG	GG	EE	EE	EG	NN	GG	EE	EE
Cresol	NN	FN	GF	NN	EE	EG	NN	NN	NN	EE	NN	NN	EE	EE	EE
Cyclohexane	FN	FN	FN	NN	EE	EG	EG	GF	NN	EE	NN	EE	EE	EE	EE
DeCalin	GF	EG	GF	FN	EE	EE	NN	EG	NN	—	NN	EE	—	—	—
o-Dichlorobenzene	FN	FF	FN	FN	EE	EF	NN	NN	NN	EE	NN	EG	GG	EE	EE
p-Dichlorobenzene	FN	GF	GF	GF	EE	EF	NN	NN	NN	EE	NN	EG	GG	EE	EE
Diethyl benzene	NN	FN	NN	NN	EE	EG	FN	NN	NN	—	NN	EE	GG	EE	EE
Diethyl ether	NN	FN	NN	NN	EE	EG	NN	FN	NN	EG	NN	EE	GG	EE	EE
Diethyl ketone	NN	NN	GG	GF	EE	GF	NN	NN	NN	NN	NN	EE	GG	EE	EE
Diethyl malonate	EE	EE	EE	EG	EE	EE	FN	GN	FF	EG	NN	EE	—	—	—
Diethylene glycol	EE	EE	EE	EE	EE	EE	GF	FN	GG	EE	GG	EE	EE	EE	EE
Diethylene glycol ethyl ether	EE	EE	EE	EE	EE	EE	FN	FN	FF	—	NN	EE	EE	EE	EE
Dimethyl formamide	EE	EE	EE	EE	EE	GG	NN	FN	NN	NN	NN	FN	GF	EE	EE
Dimethylsulfoxide	EE	EE	EE	EE	EE	EG	NN	NN	NN	—	EG	EE	EE	EE	EE
1,4-Dioxane	GF	GG	GF	GF	EE	EF	GF	FN	GF	NN	NN	EF	GG	EE	EE
Dipropylene glycol	EE	EE	EE	EE	EE	EE	GF	GF	GG	—	EE	EE	—	—	—
Ether	NN	FN	NN	NN	EE	EG	NN	FN	NN	EG	NN	EE	EE	EE	EE
Ethyl acetate	EE	EE	EE	FN	EE	EE	NN	NN	NN	NN	NN	EE	GG	EE	EE
Ethyl alcohol (absolute)	EG	EE	EG	EG	EE	EE	EG	EG	EG	EE	FN	NN	EE	EE	EE
Ethyl alcohol, 40%	EG	EE	EG	EG	EE	EE	EG	EE	EG	EE	GF	NN	EE	EE	EE
Ethyl benzene	FN	GF	FN	FN	EE	GF	NN	NN	NN	—	NN	EE	GG	—	—
Ethyl benzoate	FF	GG	GF	GF	EE	EG	NN	NN	NN	NN	NN	EE	—	—	—
Ethyl butyrate	GN	GF	GN	FN	EE	EG	NN	NN	NN	NN	NN	EE	EG	—	—
Ethyl chloride, liquid	FN	FF	FN	FN	EE	EE	NN	NN	NN	EE	NN	GF	EE	EE	EE
Ethyl cyanoacetate	EE	EE	EE	EE	EE	EE	FN	FN	FF	NN	GN	GF	—	—	—
Ethyl lactate	EE	EE	EE	EE	EE	EE	FN	FN	FF	NN	FN	EG	—	—	—
Ethylene chloride	GN	GF	FN	NN	EE	EE	NN	NN	NN	EE	NN	EG	GG	EE	EE
Ethylene glycol	EE	EE	EE	EE	EE	EE	GF	EE	EE	EE	EE	EE	GG	EE	EE
Ethylene glycol methyl ether	EE	EE	EE	EE	EE	EE	FN	FN	FF	—	NN	EE	—	—	—
Ethylene oxide	FF	GF	FF	FN	EE	EE	FN	FN	EE	EE	NN	EE	GG	EE	EE
Fluorides	EE	EE	EE	EE	EE	EE	EE	EE	EE	EE	GG	EE	—	—	—
Fluorine	FN	GN	FN	FN	EG	EF	GF	EG	NN	—	NN	NN	EG	EE	—
Formaldehyde, 10%	EE	EE	EE	EG	EE	EE	EG	GF	GF	EE	FN	GF	EE	EE	EE

CHEMICAL	LDPE	HDPE	PP/PPCO	PMP	FEP/PTFE/PFA	ECTFE/ETFE	PC	PVC	PSF	PVDF	PS	NYL	Stainless Steel	Glass	Ceramic
Formaldehyde, 40%	EG	EE	EG	EG	EE	EE	EG	GF	GF	EE	NN	GF	EE	EE	EE
Formic acid, 3%	EG	EE	EG	EG	EE	EE	EG	GF	GG	EE	EG	NN	GG	EE	EE
Formic acid, 50%	EG	EE	EG	EG	EE	EE	EG	GF	GG	EE	FF	NN	GG	EE	EE
Formic acid, 98 to 100%	EG	EE	EG	FF	EE	EE	FF	FN	FF	EE	FF	NN	GG	EE	EE
Freon® TF	EG	EG	EG	FN	EE	EG	GF	GF	EG	EE	FN	—	EE	EE	EE
Fuel oil	FN	GF	EG	GF	EE	EE	EG	EE	EG	EE	NN	EE	EE	EE	EE
Gasoline	FN	GG	GF	GF	EE	EE	FF	GN	FF	EE	NN	EE	EE	EE	EE
Glacial acetic acid	EG	EE	EG	EG	EE	EE	NN	EG	FN	EG	NN	NN	EG	EE	EE
Glycerine	EE	EE	EE	EE	EE	EE	EE	EE	EE	EE	EE	EE	EE	EE	EE
n-Heptane	FN	GF	FF	FF	EE	EE	EG	GF	EG	EE	NN	EE	EE	EE	EE
Hexane	NN	GF	GF	FN	EE	EE	FN	GN	EG	EE	NN	EE	EE	EE	EE
Hydrochloric acid, 1 to 5%	EE	EE	EE	EG	EE	EE	EE	EE	EE	EE	EE	NN	NN	EE	EE
Hydrochloric acid, 20%	EE	EE	EE	EG	EE	EE	GF	EG	EE	EE	EE	NN	NN	EE	EE
Hydrochloric acid, 35%	EE	EE	EG	EG	EE	EE	NN	GF	EE	EE	FF	NN	NN	EE	EE
Hydrofluoric acid, 4%	EG	EE	EG	EG	EE	EE	GF	GF	GF	EE	GF	NN	NN	NN	—
Hydrofluoric acid, 48%	EE	EE	EE	EE	EE	EE	NN	GF	FN	EE	NN	NN	NN	NN	NN
Hydrogen peroxide, 3%	EE	EE	EE	EE	EE	EE	EE	EE	EE	EE	EG	NN	GG	EE	EG
Hydrogen peroxide, 30%	EG	EE	EG	EG	EE	EE	EE	EE	EE	EE	EG	NN	GG	EE	EG
Hydrogen peroxide, 90%	EG	EE	EG	EG	EE	EE	EE	EG	EE	EE	EG	NN	GG	EE	EG
Isobutyl alcohol	EE	EE	EE	EG	EE	EE	EG	EG	EG	EE	GG	NN	EE	EE	EE
Isopropyl acetate	GF	EG	GF	GF	EE	EG	NN	NN	NN	—	NN	EE	GG	EE	EE
Isopropyl alcohol	EE	EE	EE	EE	EE	EE	EE	EG	EE	EE	EG	NN	GG	EE	EE
Isopropyl benzene	FN	GF	FN	NN	EE	EG	NN	NN	NN	—	NN	EG	—	—	—
Kerosene	FN	GG	GF	GF	EE	GF	EE	EE	GF	EE	NN	EE	EE	EE	EE
Lactic acid, 3%	EG	EE	EG	EG	EE	EE	EG	GF	EE	EG	GG	NN	GG	EE	EE
Lactic acid, 85%	EE	EE	EG	EG	EE	EG	EG	GF	EE	GF	GG	NN	GG	EE	EE
Methoxyethyl oleate	EG	EE	EG	EG	EE	EE	FN	NN	NN	—	NN	EG	—	—	—
Methyl alcohol	EE	EE	EE	EE	EE	EE	GF	FF	GF	EE	FN	NN	EE	EE	EE
Methyl ethyl ketone	NN	NN	EG	NN	EE	GF	NN	NN	NN	NN	NN	EE	EE	EE	EE
Methyl isobutyl ketone	NN	NN	GF	FF	EE	GF	NN	NN	NN	GN	NN	EE	GG	EE	EE
Methyl propyl ketone	GF	EG	GF	FF	EE	EG	NN	NN	NN	NN	NN	EE	EE	—	—
Methylene chloride	FN	FN	FN	FN	EE	GG	NN	NN	NN	NN	NN	GF	GG	EE	EE
Mineral oil	GN	EE	EE	EG	EE	EE	EG	EG	EE	EE	EE	EE	EE	EE	EE
Nitric acid, 1 to 10%	EE	EE	EE	EE	EE	EE	EG	EG	EF	EE	GN	NN	EE	EE	EE
Nitric acid, 50%	GN	GN	FN	GN	EE	EE	GF	GF	GF	EG	NN	NN	EG	EG	NN
Nitric acid, 70%	FN	GN	NN	GF	EE	EE	NN	FN	NN	GF	NN	NN	GG	EE	NN
Nitrobenzene	NN	FN	NN	NN	EE	EG	NN	NN	NN	EN	NN	FF	GG	EE	EE
n-Octane	EE	EE	EE	EE	EE	EE	GF	FN	GF	EE	NN	EE	EE	EE	EE
Orange oil	FN	GF	GF	FF	EE	EE	FF	FN	FF	EE	NN	GF	EE	EE	EE
Ozone	EG	EE	EG	EE	EE	EE	EG	EG	EE	EE	FF	EG	EG	—	—
Perchloric acid	GN	GN	GN	GN	GF	EG	NN	GN	NN	EE	GF	NN	FF	EE	EE
Perchloroethylene	NN	NN	NN	NN	EE	EE	NN	NN	NN	EE	NN	EE	EG	EE	EE
Phenol, crystals	GN	GF	GN	FG	EE	EE	NN	FN	FF	EE	NN	NN	GG	EE	EE
Phosphoric acid, 1 to 5%	EE	EE	EE	EE	EE	EE	EE	EE	EE	EE	GG	NN	NN	EE	EE
Phosphoric acid, 85%	EE	EE	EG	EG	EE	EE	EG	EG	EE	EE	EG	NN	NN	EE	EE
Pine oil	GN	EG	EG	GF	EE	EG	GF	FN	FF	EE	NN	GF	EE	—	—
Potassium hydroxide, 1%	EE	EE	EE	EE	EE	EE	FN	EE	EE	EE	GG	FF	EG	GF	GF
Potassium hydroxide, conc.	EE	EE	EE	EE	EE	EE	NN	EG	EE	EG	GG	FF	EG	NN	NN
Propane gas	NN	FN	NN	NN	EE	EE	FN	EG	FF	EE	NN	FF	GF	NN	NN
Propylene glycol	EE	EE	EE	EE	EE	EE	GF	FN	GG	—	EE	EE	GG	EE	EE
Propylene oxide	EG	EE	EG	EG	EE	FN	GF	FN	GG	FN	NN	EE	EE	—	—
Resorcinol, sat.	EE	EE	EE	EE	EE	EE	GF	FN	NN	—	GF	NN	—	—	—
Resorcinol, 5%	EE	EE	EE	EE	EE	EF	GF	GN	NN	—	GF	NN	—	—	—
Salicylaldehyde	EG	EE	EG	EG	EE	EN	GF	FN	FF	EG	NN	EG	—	—	—
Salicylic acid, powder	EE	EE	EE	EG	EE	EE	EG	GF	EE	EE	EE	EG	GG	EE	EE
Salicylic acid, sat.	EE	EE	EE	EE	EE	EE	EG	GF	EE	EE	EG	NN	GG	EE	EE
Salt solutions, metallic	EE	EE	EE	EE	EE	EE	EE	EE	EE	EE	GG	FF	EG	—	—
Silver acetate	EE	EE	EE	EE	EE	EE	EG	GG	EE	EE	GG	EF	—	—	—
Silver nitrate	EG	EE	EG	EE	EE	EE	EE	EG	EE	EE	GF	NN	GG	EE	EE
Sodium acetate, sat.	EE	EE	EE	EE	EE	EE	EG	GF	EE	EE	GG	FF	GG	EE	EE
Sodium hydroxide, 1%	EE	EE	EE	EE	EE	EE	FN	EE	EE	EE	GG	EE	GG	GE	GE
Sodium hydroxide, 50% to sat.	GG	EE	EE	EE	EE	EE	NN	NN	EG	EE	EE	GF	GF	NN	NN
Sodium hypochlorite, 15%	EE	EE	GF	EE	EE	EE	GF	EE	EE	EE	EE	NN	NN	EE	EG
Stearic acid, crystals	EE	EE	EE	EE	EE	EE	EG	EG	GG	EE	EG	EF	EG	EE	EE
Sulfuric acid, 1 to 6%	EE	EE	EE	EE	EE	EE	EE	EG	EE	EE	EG	NN	FN	EE	EG
Sulfuric acid, 20%	EE	EE	EG	EG	EE	EE	EG	EG	EE	EE	EG	NN	NN	EE	GG
Sulfuric acid, 60%	EG	EE	EG	EG	EE	EE	GF	EG	EE	EE	GN	NN	NN	EE	NN
Sulfuric acid, 98%	GG	GG	FN	GG	EE	EE	NN	GN	NN	EG	NN	NN	NN	EE	NN
Sulfur dioxide, liq., 46 psi	NN	FN	NN	NN	EE	EG	GN	FN	GG	EE	NN	NN	FN	NN	NN
Sulfur dioxide, wet or dry	EE	EE	EE	EE	EE	EE	EG	EG	GG	GE	FN	NN	FN	EE	EE
Sulfur salts	FN	GF	FN	FN	EE	EG	FN	NN	GG	GF	NN	NN	—	—	—
Tartaric acid	EE	EE	EE	EE	EE	EE	EG	EG	EE	EE	GG	EF	FF	EE	EE
Tetrahydrofuran	FN	GF	GF	FF	EE	EE	GF	NN	NN	NN	FN	NN	EE	EE	EE
Thionyl chloride	NN	NN	NN	NN	EE	EE	NN	NN	NN	—	NN	NN	NN	EE	EE
Toluene	FN	GG	GF	FF	EE	EE	FN	NN	NN	EE	NN	EE	EE	EE	EE
Tributyl citrate	GF	EG	GF	GF	EE	EG	NN	FN	FF	EF	NN	EG	—	—	—
Trichloroethane	NN	FN	NN	NN	EG	NN	NN	NN	NN	—	NN	EE	GG	EE	EE
Trichloroethylene	NN	FN	NN	NN	EE	EG	NN	NN	NN	EE	NN	EE	GG	EE	EE
Triethylene glycol	EE	EE	EE	EE	EE	EE	EG	GF	EE	—	EG	EE	—	—	—
Tripropylene glycol	EE	EE	EE	EE	EE	EE	EG	GF	EE	—	EG	EE	—	—	—
Turpentine	FN	GG	GF	FF	EE	EE	FN	GF	NN	EE	NN	EE	EE	EE	EE
Undecyl alcohol	EF	EG	EG	EG	EE	EG	GF	EF	FF	EE	GG	EE	—	—	—
Urea	EE	EE	EE	EG	EE	EE	NN	GN	FF	EE	EG	EE	GG	EE	EE
Vinylidene chloride	NN	FN	NN	NN	EE	GF	NN	NN	NN	EE	NN	NN	GG	—	—
Xylene	GN	GF	FN	FN	EE	EG	NN	NN	NN	EE	NN	EE	GG	EE	EE
Zinc stearate	EE	EE	EE	EE	EE	EE	EE	EG	EE	EE	EE	EE	EE	EE	EE

Effects of Chemicals on Labware

Chemicals may affect the weight, strength, color, dimensions, flexibility and surface appearance of labware.

The basic models of interaction that cause these changes are:

- (1) chemical attack on the polymer chain, with resultant reduction in physical properties, including oxidation; reaction of functional groups in or on the chain; and depolymerization;
- (2) physical change, including absorption of solvents, resulting in softening and swelling of the plastic; permeation of solvent through the plastic; or dissolution in a solvent; and
- (3) stress-cracking from the interaction of a “stress-cracking agent” with molded-in or external stresses.

The reactive combination of compounds of two or more classes may cause a synergistic or undesirable chemical effect. Other factors affecting chemical resistance include: temperature, pressure, internal or external stresses (such as centrifugation), and length of exposure to and concentration of the chemical. As temperature increases, resistance to attack decreases.



Warning!

The plastic resin information in these tables, excluding stainless steel, glass and ceramic, has been provided by Thermo Scientific™ Nalgene™ and is reprinted with their permission. It should be used ONLY as a guide for selecting labware for testing.

Test the labware for 72 hours under expected or proposed conditions of use, BEFORE putting into service. Test with care to avoid injury or property damage.

Thermo Fisher Scientific does not warrant (neither express nor imply) that the information in these tables is accurate or complete.

Physical Constants

Name and symbol	Value and units
Velocity of light, c	2.997902×10^{10} cm/s
Planck constant, h	6.62377×10^{27} erg s/molecule
Avogadro constant, N	6.02380×10^{23} molecule/mol
Faraday constant, F	96,493.1 C/equivalent
Absolute temperature of ice point, T (°C)	273.15 K
Pressure-volume product for 1 mol of gas at 0°C and zero pressure (PV) $P=0$; $T=0^\circ\text{C}$	2271.16 J/mol
Gas constant	
$P=0$	8.31469 J/mol°
$R=(PV) T=0^\circ\text{C}$ T (°C)	1.98726 cal/mol°
Boltzmann constant	1.38031×10^{16} erg/molecule°
$k=R/N$	11.96171 Jcm/mol
Constant relating wave number and energy $Z=Nhc$	2.858917 cal cm/mole
Standard atmosphere, atm	1,013,250 dynes/cm ²
Thermocaloric calorie	4.1840 J (exact)

Common Conversion Factors

Parts per Million	Parts per Billion	Percent
10,000 ppm	10,000,000 ppb	1.0%
1,000 ppm	1,000,000 ppb	.1%
100 ppm	100,000 ppb	.01%
10 ppm	10,000 ppb	.001%
1 ppm	1,000 ppb	.0001%
0.1 ppm	100 ppb	.00001%
0.01 ppm	10 ppb	.000001%

Glossary of Elemental Forms

Below are descriptions of the standard elemental forms as found on alfa.com and our literature.

Form	Description
Bar	A rectangular or cylindrical piece of material
Cubes	Uniform sized, cubic shaped pieces of material
Disc	A cylindrical piece of material with a diameter much larger than the thickness
Felt	Compressed, porous, nonwoven fabric
Fiber	A pure monofilament form of solid material having an extremely high length to diameter ratio
Flake	Powder with a flat, irregular shape
Foil	A thin sheet of pure material, 0.025mm-2mm
Gauze	A wire cloth material consisting of wires of a pure material woven into a grid having consistent openings
Granules	Uniform, amorphous pieces of material
Ingot	A cast, usually rectangular piece of material
Lump	A solid piece of amorphous material, larger than a granule
Mossy	Pieces formed by dropping molten metal into water
Needles	Uniform, elongated pieces of material
Pellets	Somewhat regular shaped pieces of material
Pieces	Solid pieces of material, larger than a granule
Plate	A sheet of fabricated pure material >2mm thick
Powder	Solid material with a very small particle size
Ribbon	A thin width of foil, offered in rolls of varying length
Rod	A uniform strand of a pure material having a diameter ≥ 2.0 mm
Shot	Spherical to semi-spherical pieces of material of varying sizes
Slugs	Short cylindrical pieces of material of varying lengths and diameters
Spheres	Uniform sized, spherical pieces of material
Splatter	Pieces formed by dropping molten metal onto a cooling surface
Sputtering target	A disc of high purity material used as an atomic sputtering source for ion bombardment
Sponge	Pieces with a high surface area resulting from complex surface morphology
Thin foil	A very thin sheet of unsupported pure material 1.1-24.0 micron thick
Tubing	A uniform strand of a pure material having a hollowed core
Turnings	Small concentric shavings machined from a larger form
Ultrathin foil	An extremely thin sheet of pure material, supported or unsupported ≤ 1 micron thick
Wire	A uniform strand of a pure material having a diameter ≤ 2.0 mm
Yarn	A parallel collection of a definite number of fiber strands, usually three to several hundred

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1

1 H Hydrogen [1s ¹] 1.0079	2 He Helium [1s ²] 4.0026	3 Li Lithium [He]2s ¹ 6.941	4 Be Beryllium [He]2s ² 9.0122	5 B Boron [He]2s ² 2p ¹ 10.811	6 C Carbon [He]2s ² 2p ² 12.0107	7 N Nitrogen [He]2s ² 2p ³ 14.0064	8 O Oxygen [He]2s ² 2p ⁴ 15.9994	9 F Fluorine [He]2s ² 2p ⁵ 18.9984	10 Ne Neon [He]2s ² 2p ⁶ 20.1797	11 Na Sodium [Ne]3s ¹ 22.9898	12 Mg Magnesium [Ne]3s ² 24.305	13 Al Aluminum [Ne]3s ² 3p ¹ 26.9815	14 Si Silicon [Ne]3s ² 3p ² 28.0855	15 P Phosphorus [Ne]3s ² 3p ³ 30.9738	16 S Sulfur [Ne]3s ² 3p ⁴ 32.066	17 Cl Chlorine [Ne]3s ² 3p ⁵ 35.453	18 Ar Argon [Ne]3s ² 3p ⁶ 39.948	19 K Potassium [Ar]4s ¹ 39.0983	20 Ca Calcium [Ar]4s ² 40.078	21 Sc Scandium [Ar]3d ¹ 4s ² 44.9559	22 Ti Titanium [Ar]3d ² 4s ² 47.867	23 V Vanadium [Ar]3d ³ 4s ² 50.9415	24 Cr Chromium [Ar]3d ⁵ 4s ¹ 51.996	25 Mn Manganese [Ar]3d ⁵ 4s ² 54.938	26 Fe Iron [Ar]3d ⁶ 4s ² 55.8457	27 Co Cobalt [Ar]3d ⁷ 4s ² 58.9332	28 Ni Nickel [Ar]3d ⁸ 4s ² 58.6934	29 Cu Copper [Ar]3d ¹⁰ 4s ¹ 63.546	30 Zn Zinc [Ar]3d ¹⁰ 4s ² 65.39	31 Ga Gallium [Ar]3d ¹⁰ 4s ² 4p ¹ 69.723	32 Ge Germanium [Ar]3d ¹⁰ 4s ² 4p ² 72.631	33 As Arsenic [Ar]3d ¹⁰ 4s ² 4p ³ 74.9216	34 Se Selenium [Ar]3d ¹⁰ 4s ² 4p ⁴ 78.96	35 Br Bromine [Ar]3d ¹⁰ 4s ² 4p ⁵ 79.904	36 Kr Krypton [Ar]3d ¹⁰ 4s ² 4p ⁶ 83.80	37 Rb Rubidium [Kr]5s ¹ 85.4678	38 Sr Strontium [Kr]5s ² 87.62	39 Y Yttrium [Kr]4d ¹ 5s ² 88.9059	40 Zr Zirconium [Kr]4d ² 5s ² 91.224	41 Nb Niobium [Kr]4d ⁴ 5s ¹ 92.9064	42 Mo Molybdenum [Kr]4d ⁵ 5s ¹ 95.94	43 Tc Technetium [Kr]4d ⁵ 5s ² 98.9062	44 Ru Ruthenium [Kr]4d ⁷ 5s ¹ 101.07	45 Rh Rhodium [Kr]4d ⁸ 5s ¹ 102.9055	46 Pd Palladium [Kr]4d ¹⁰ 106.42	47 Ag Silver [Kr]4d ¹⁰ 5s ¹ 107.8682	48 Cd Cadmium [Kr]4d ¹⁰ 5s ² 112.411	49 In Indium [Kr]4d ¹⁰ 5s ² 5p ¹ 114.818	50 Sn Tin [Kr]4d ¹⁰ 5s ² 5p ² 118.710	51 Sb Antimony [Kr]4d ¹⁰ 5s ² 5p ³ 121.760	52 Te Tellurium [Kr]4d ¹⁰ 5s ² 5p ⁴ 127.60	53 I Iodine [Kr]4d ¹⁰ 5s ² 5p ⁵ 126.905	54 Xe Xenon [Kr]4d ¹⁰ 5s ² 5p ⁶ 131.29	55 Cs Cesium [Xe]6s ¹ 132.905	56 Ba Barium [Xe]6s ² 137.33	57 La Lanthanum [Xe]5d ¹ 6s ² 138.905	58 Ce Cerium [Xe]4f ¹ 5d ¹ 6s ² 140.12	59 Pr Praseodymium [Xe]4f ³ 6s ² 140.9077	60 Nd Neodymium [Xe]4f ⁴ 6s ² 144.24	61 Pm Promethium [Xe]4f ⁵ 6s ² (147)	62 Sm Samarium [Xe]4f ⁶ 6s ² 150.36	63 Eu Europium [Xe]4f ⁷ 6s ² 151.96	64 Gd Gadolinium [Xe]4f ⁷ 5d ¹ 6s ² 157.25	65 Tb Terbium [Xe]4f ⁹ 6s ² 158.9254	66 Dy Dysprosium [Xe]4f ¹⁰ 6s ² 162.50	67 Ho Holmium [Xe]4f ¹¹ 6s ² 164.9304	68 Er Erbium [Xe]4f ¹² 6s ² 167.26	69 Tm Thulium [Xe]4f ¹³ 6s ² 168.9342	70 Yb Ytterbium [Xe]4f ¹⁴ 6s ² 173.04	71 Lu Lutetium [Xe]4f ¹⁴ 5d ¹ 6s ² 174.967	72 Hf Hafnium [Xe]4f ¹⁴ 5d ² 6s ² 178.49	73 Ta Tantalum [Xe]4f ¹⁴ 5d ³ 6s ² 180.9479	74 W Tungsten [Xe]4f ¹⁴ 5d ⁴ 6s ² 183.85	75 Re Rhenium [Xe]4f ¹⁴ 5d ⁵ 6s ² 186.207	76 Os Osmium [Xe]4f ¹⁴ 5d ⁶ 6s ² 190.23	77 Ir Iridium [Xe]4f ¹⁴ 5d ⁷ 6s ² 192.222	78 Pt Platinum [Xe]4f ¹⁴ 5d ⁹ 6s ¹ 195.08	79 Au Gold [Xe]4f ¹⁴ 5d ¹⁰ 6s ¹ 196.9665	80 Hg Mercury [Xe]4f ¹⁴ 5d ¹⁰ 6s ² 200.59	81 Tl Thallium [Xe]4f ¹⁴ 5d ¹⁰ 6s ² 6p ¹ 204.383	82 Pb Lead [Xe]4f ¹⁴ 5d ¹⁰ 6s ² 6p ² 207.2	83 Bi Bismuth [Xe]4f ¹⁴ 5d ¹⁰ 6s ² 6p ³ 208.9804	84 Po Polonium [Xe]4f ¹⁴ 5d ¹⁰ 6s ² 6p ⁴ (209)	85 At Astatine [Xe]4f ¹⁴ 5d ¹⁰ 6s ² 6p ⁵ (210)	86 Rn Radon [Xe]4f ¹⁴ 5d ¹⁰ 6s ² 6p ⁶ (222)	87 Fr Francium [Rn]7s ¹ (223)	88 Ra Radium [Rn]7s ² 226.0254	89 Ac Actinium [Rn]6d ¹ 7s ² (227)	90 Th Thorium [Rn]6d ² 7s ² 232.0381	91 Pa Protactinium [Rn]6d ³ 7s ² 231.0369	92 U Uranium [Rn]6d ³ 7s ² 238.0289	93 Np Neptunium [Rn]6d ⁴ 7s ² 237.0482	94 Pu Plutonium [Rn]6d ⁴ 7s ² (242)	95 Am Americium [Rn]6d ³ 7s ² (243)	96 Cm Curium [Rn]6d ³ 7s ² (247)	97 Bk Berkelium [Rn]6d ³ 7s ² (247)	98 Cf Californium [Rn]6d ³ 7s ² (251)	99 Es Einsteinium [Rn]6d ³ 7s ² (252)	100 Fm Fermium [Rn]6d ³ 7s ² (257)	101 Md Mendelevium [Rn]6d ³ 7s ² (258)	102 No Nobelium [Rn]6d ³ 7s ² (259)	103 Lr Lawrencium [Rn]6d ³ 7s ² (260)	104 Rf Rutherfordium [Rn]6d ⁴ 7s ² (261)	105 Db Dubnium [Rn]6d ⁴ 7s ² (262)	106 Sg Seaborgium [Rn]6d ⁴ 7s ² (263)	107 Bh Bohrium [Rn]6d ⁴ 7s ² (264)	108 Hs Hassium [Rn]6d ⁴ 7s ² (265)	109 Mt Meitnerium [Rn]6d ⁴ 7s ² (266)	110 Ds Darmstadtium [Rn]6d ⁴ 7s ² (268)	111 Rg Roentgenium [Rn]6d ⁴ 7s ² (271)	112 Cn Copernicium [Rn]6d ⁴ 7s ² (285)	113 Uut Ununtrium [Rn]6d ⁴ 7s ² 7p ¹ (286)	114 Fl Flerovium [Rn]6d ⁴ 7s ² 7p ² (289)	115 Uup Ununpentium [Rn]6d ⁴ 7s ² 7p ³ (289)	116 Lv Livermorium [Rn]6d ⁴ 7s ² 7p ⁴ (293)	117 Uus Ununseptium [Rn]6d ⁴ 7s ² 7p ⁵ (294)	118 Uuo Ununoctium [Rn]6d ⁴ 7s ² 7p ⁶ (294)
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Manufacturing **Custom Synthesis** **Customized Packaging**

Tailored Specifications **Testing Services** **Bulk and Semi-bulk Chemicals**

Mixtures and Blends **Reduced waste** **Sourcing Support**

key

Numbers in brackets are mass numbers of the most stable or most common isotope. Atomic weights conform to the Bulletin of the International Union of Pure and Applied Chemistry, volume 59, number 6 1984. Stated to Ar(Cr)=12.

filling of electrons:

- on a level
- on a level
- on a level
- on a level

A – Z index

Product Name	Page no.
Tris-acetate-EDTA (TAE) solution 50X, DNase RNase and protease free	9
Acetic acid glacial, Certified AR for analysis, meets Ph.Eur., BP, USP	6
Acetic anhydride, 99+%, pure	14
Acetone, Certified AR for analysis, meets Ph.Eur.	6
Acetonitrile	5, 12, 19
Agar	9
Agarose	9
Allylzinc bromide, 0.5M in THF, ChemSeal	19
Aluminum nitrate hydrate, Puratronic, 99.999%	18
Aluminum oxide, alpha-phase, 99.95% min	18
Aluminium oxide, neutral, Brockmann I, for chromatography, 50-200µm, 60A	11
Ammonia solution, 35%, Certified AR for analysis, d=0.88	6
Ammonia, ca. 7N solution in methanol	13
Ammonium acetate	6
Ammonium chloride	6
Ampicillin Sodium Salt, crystalline powder	9
Benzoyl chloride, 99%, pure	14
Benzyl bromide, 98%	13
Benzyl chloroformate, 97 wt%, stabilized	14
Borane-methyl sulfide complex, 94%, AcroSeal	15
Borane-tetrahydrofuran complex, 1M solution in THF, Stabilized, AcroSeal	15
Tris-Borate-EDTA, 10X solution, electrophoresis	9
Boron tribromide, 1M solution in methylene chloride	13
Boron trichloride, 1M solution in methylene chloride, AcroSeal	13
Boron trifluoride etherate, approx. 48% BF3	12
Boron trifluoride, 12% (1.5M) in methanol	14
Bovine serum albumin, fraction V	8
Bromine	13
Bromine liquid, 99.8%	19
N-Bromosuccinimide, 99%	13
Buffer solutions for pH measurement	7
tert-Butylchlorodimethylsilane, 98%	14
n-Butyllithium solution	13
tert-Butyllithium, 1.9M solution in pentane, AcroSeal	13
Tri-n-butyltin hydride, 97%	15
Calcium chloride dihydrate, Certified AR for analysis, meets Ph.Eur.	7
Calcium chloride, 96%, extra pure, powder, anhydrous	12
1,1'-Carbonyldiimidazole, 97%	12
Tris(2-carboxyethyl)phosphine hydrochloride, 98%	14
CellPURE PBS 10X, Cell Culture Grade	9
Cesium, 99.98%	19
Cesium carbonate, 99.5%, for analysis	11
Cesium chloride, 99+%, for analysis	11
Cesium fluoride, 99%, for analysis	11
Chlorodicyclohexylphosphine, 97%	14
Chloroform	5, 6, 8
Chloroform-d, for NMR	12
3-Chloroperoxybenzoic acid, 70-75%, balance 3-Chlorobenzoic acid and water	14
Chlorotrimethylsilane, 98%	14
Copper(II) oxide, Puratronic, 99.995%	18
4-Cyanobutylzinc bromide, 0.5M in THF, ChemSeal	19
Cyanogen bromide, 97%	13
Cyclobutylzinc bromide, 0.5M in THF, ChemSeal	19
Cyclohexane	6
Cyclohexylzinc bromide, 0.5M in THF, ChemSeal	19
Cyclopropylzinc bromide, 0.5M in THF, ChemSeal	19
Dess-Martin periodinane, 15 wt.% solution in dichloromethane	14
Deuterium oxide, for NMR, 99.8 atom % D	12
Tris(dibenzylideneacetone)dipalladium(0), 97%	11
2,3-Dichloro-5,6-dicyano-1,4-benzoquinone, 98%	14
Dichloromethane	5, 6, 11, 12
N,N'-Dicyclohexylcarbodiimide, 99%	13
Diethyl ether	6, 12
Diethylaminosulfur trifluoride, 95%	13

Product Name	Page no.
Dihydrogen hexachloroplatinate(IV) hydrate, 99.9%	15
Diiodomethane, 99+%, stabilized	13
Diisobutylaluminium hydride solution	14, 15
Diisopropyl azodicarboxylate, 94%	12
2,2-Dimethoxypropane, 98+%	14
4-Dimethylaminopyridine, 99%	10
9,9-Dimethyl-4,5-bis(diphenylphosphino)xanthene, 98%	14
Dimethyl sulfoxide	8, 19
Dimethylformamide	6, 12
1,4-Dioxane	6, 12
(±)-2,2'-Bis(diphenylphosphino)-1,1'-binaphthyl, 98%	14
1,1'-Bis(diphenylphosphino)ferrocene-palladium(II)dichloride dichloromethane adduct	11
Di-tert-butyl dicarbonate	14
Dithiothreitol, white crystals or powder, for electrophoresis	9
Ethanol	6, 8, 19
Ethidium bromide, 1% solution, molecular biology	9
3-(Ethoxycarbonyl)propylzinc bromide, 0.5M in THF, ChemSeal	19
Ethyl acetate	5, 6
Ethylenediaminetetraacetic acid disodium salt solution 0,1M	7
Ethylenediaminetetraacetic acid disodium Salt Dihydrate	7
Florisoril, 60-100 mesh, for column chromatography	12
Formamide	8
Formic acid, 98-100%, Certified AR for analysis	6
9-Fluorenylmethyl chloroformate, 98%	14
Glycerol, molecular biology	8
Glycine, white crystals or crystalline powder	9
Gold(III) acetate, 99.9%	19
Gold shot	19
Gold wire	19
HEPES (Fine White Crystals) for Molecular Biology	8
Heptane, for HPLC, approx. 99% n-Heptane	5
n-Heptane	6
n-Hexane	6
Hexadecyltrimethylammonium bromide, 99+%	11
1,1,1,3,3,3-Hexamethyldisilazane, 98%	14
1,6-Hexanediamine, 99.5+%	12
Hexanes	5, 6
Hydrazine hydrate, 100% (Hydrazine, 64%)	14
Hydrobromic acid, pure, ca. 48 wt% solution in water	13
Hydrochloric acid	6
Hydrochloric acid solution 1M	7
Hydrogen bromide, pure, 33 wt% solution in glacial acetic acid	13, 14
Hydrogen chloride, solution	14
Hydrogen hexachloroplatinate(IV) hydrate	11
Hydrogen peroxide, for analysis, 35 wt.% solution in water, stabilized	14
Hydroxylamine hydrochloride, 99+%	15
Indium(III) chloride, anhydrous, 99.999%	18
Indium(III) sulfide, 99.995%	19
Iodine, 99.5%, extra pure, resublimed	13
N-Iodosuccinimide, 98%	13
Iron, 99%, powder, -70 mesh (<212 micron)	15
Isohexane, for HPLC, contains <5% n-Hexane	5
Isopropanol	5, 6, 8, 12
Isopropyl-8-D-thiogalactopyranoside, dioxane-free	9
Isopropylmagnesium chloride - Lithium chloride complex, 1.3M solution in THF, AcroSeal	13
Isopropylmagnesium chloride, 2.0M solution in THF, AcroSeal	13
Isopropylzinc bromide, 0.5M in THF, ChemSeal	19
Kanamycin sulfate	9
Kanamycin Sulfate, white powder	9
Karl Fischer Aqualine	7
LB Agar, Miller	9
LB Broth, Lennox	9
LB Broth, Miller	9
Lead(II) iodide, ultra dry, 99.999%	19

Product Name	Page no.
Lithium aluminium hydride, 95%, powder	15
Lithium diisopropylamide, 2M sol. in THF/n-heptane/ethylbenzene, AcroSeal	13
Magnesium sulfate, 97%, pure, anhydrous	12
MES, fine white crystals	9
Methanol	5, 6, 8, 9, 19
Methanol-d4, for NMR	12
4-Methoxy-3-pyridineboronic acid hydrate, 97%	10
Methyl sulfoxide-d6, for NMR	12
Methylithium, 1.6 M sol. in diethyl ether (\pm 5% w/v), AcroSeal	13
Methylmagnesium bromide, 3M solution in diethyl ether, AcroSeal	13
Methylmagnesium chloride, 3M (22 wt.%) solution in THF, AcroSeal	13
Molecular sieves 4A, 8 to 12 mesh	12
MOPS (Fine White Crystals) for Molecular Biology	9
Nitric acid	6
Oxalyl bromide, 98%	13
Oxalyl chloride, 98%	13
Palladium hydroxide on carbon, powder, unreduced, 20% Pd, moisture ca 60%	11
Palladium on activated carbon	11
Palladium on calcium carbonate, poisoned with 3.5% lead, 5% Pd	11
Palladium(II) acetate, 47.5% Pd	11
Palladium(II) nitrate hydrate, 99.8%, Pd 39% min	19
Paraformaldehyde, 96%, extra pure	12
n-Pentane, Certified AR for analysis	6
Petroleum ether 40-60°C	6
Phenol, saturated, liquid, pH 6.6/7.9	9
Phenylboronic acid, 98+%, may contain varying amounts of anhydride	10
Phenylzinc bromide, 0.5M in THF, ChemSeal	19
Phosphate buffered saline, solutions, powdered and tablets	9
Bis(pinacolato)diboron, 98%	10
Platinum on activated carbon	11
Platinum(II) acetylacetonate, 98%	11
Platinum(IV) oxide, 83% Pt	11
Platinum(II) 2,4-pentanedionate, Pt 48.0% min	19
Platinum gauze, 99.9%	19
Platinum slug, 99.99+%	19
Potassium carbonate anhydrous, Certified AR, for analysis, meets Ph.Eur.	7
Potassium chloride	7
Potassium dihydrogen orthophosphate, Certified AR for analysis	7
Potassium fluoride, 99%, extra pure, anhydrous	13
Potassium hexachloroplatinate(IV), ca. 40% Pt	11
Potassium hydroxide solution 1M (1N)	7
Potassium hydroxide, Certified AR for analysis, pellets, meets Ph.Eur., BP	6
Potassium iodide, Certified AR for analysis	7
Potassium nitrate, Certified AR for analysis, meets analytical specification of Ph.Eur., BP	7
Potassium tert-butoxide, 98+%, pure	13
1-Propanol	19
2-Propanol	19
Propargyl bromide, 80 wt.% solution in toluene, stabilized	14
Proteinase K, from Tritirachium album, DNase and RNase free	9
Puromycin Dihydrochloride	9
2-Pyridylzinc bromide, 0.5M in THF, ChemSeal	19
Quinoline-3-boronic acid, 97%	10
Rapamycin	9
Rhodium on alumina, 5% Rh, powder	11
Rhodium(II) acetate dimer, anhydrous, ca 46% Rh	11
Ruthenium(III) chloride hydrate, 35 - 40% Ru	11
Silica gel orange, for drying purposes, non toxic grade, 2-5 mm	12
Silica gel, for chromatography	12
Silica gel, for drying purposes, non-toxic grade, 3-6 mm	12
Silver nitrate solution 0,1M (0,1N)	7
Silver wire, 99.9%	19
SOB Broth (Capsules)	9

Product Name	Page no.
Sodium acetate trihydrate, Certified AR for analysis, crystal	7
Sodium azide, 99%, extra pure	13
Sodium biphenyl, 20%w/w solution in diethylene glycol diethyl ether, offered as 20 x 15mL	15
Sodium bis(trimethylsilyl)amide, pure, 2M solution in THF, AcroSeal	13
Sodium borohydride, 98+%, powder	15
Sodium chloride	7, 9, 19
Sodium cyanoborohydride, 95%	13
Sodium Dodecyl Sulfate (SDS)	9
Sodium hydride, 60% dispersion in mineral oil, in soluble bags	15
Sodium hydrogen carbonate, Certified AR for analysis, meets Ph.Eur.	7
Sodium hydroxide solution 1M (1N)	7
Sodium hydroxide, Certified AR for analysis, pellets, meets Ph.Eur., BP	6
Sodium hydrosulfite, ca. 85%, tech.	15
Sodium hypochlorite, 13% active chlorine	14
Sodium periodate, 99%, for analysis	14
Sodium peroxide, 96%	14
Sodium sulfate anhydrous	7
Sodium thiosulfate solution 0,1M (0,1N)	7
Sodium thiosulfate, 98.5%, extra pure, anhydrous	15
Sodium triacetoxylborohydride, 97%	15
D-Sucrose, molecular biology	9
Sulfuric acid	6
Sulfuric acid solution 0,5M (1N)	7
TEMED, Electrophoresis	9
Tetraammineplatinum(II) chloride monohydrate, 99.995%	19
Tetrabutylammonium hydrogen sulfate, 98%	11
Tetrabutylammonium hydroxide, 1M solution in methanol	11
Tetrabutylammonium hydroxide, 40 wt. % (1.5M) solution in water	11
Tetraheptylammonium bromide, 99%	11
Tetrahydrofuran	5, 6, 12, 19
Tetrakis(triphenylphosphine)palladium(0)	11
4-(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)aniline, 97%	10
4-(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)pyridine, 97%	10
Titanium(IV) isopropoxide, 98+%	10
Toluene	6
p-Toluenesulfonyl chloride, 99+%	14
Triethylsilane, 99%	15
Trifluoromethanesulfonic anhydride, 98+%	13
Triisopropylsilane, 98%	15
(Trimethylsilyl)diazomethane, 2M solution in hexanes	13
N,O-Bis(trimethylsilyl)trifluoroacetamide, 98+%	12
Trimethylsilyl trifluoromethanesulfonate, 99%	14
Triphenylphosphine, 99%	14
Bis(triphenylphosphine)palladium(II) chloride, 98%	11
Tris base, white crystals or crystalline powder, molecular biology	9
Tris buffered saline, 10X Solution, pH 7.4, molecular biology	9
Triton X-100 for Electrophoresis	9
Tryptone (Granulated)	9
Tween 20	9
Urea, molecular biology grade, Colorless-to-White Crystals or Crystalline powder	9
Vancomycin	9
Vanadium foil, 99.8%	19
Vinylmagnesium bromide, 0.7M solution in THF, AcroSeal	13
Vinylmagnesium chloride, 1.9M (16.5 wt.%) solution in THF, AcroSeal	13
Water	5, 6, 9, 19
Yeast Extract	9
Zinc, 98+%, dust (stable acc. to UN classification class 4)	14
Zirconium sponge, 99.5%, Zr & Hf	19



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