

ACCORDO QUADRO

Università degli Studi di Udine

Università degli Studi di Trieste

SISSA

AGREEMENT NR. A-00842355-1

VALIDITA': 01.01.2019 - 31.12.2020

CODICE CLIENTE:

Università di Udine

36019069 UNIVERSITA' DEGLI STUDI UDINE
36018132 DIP. DI SCIENZE MATEMATICHE
36018245 DPIA
36018254 DIP.TO DI AREA MEDICA
20506500 DI4A

Università di Trieste

20500890 DIP. SCIENZE CHIMICHE E FARMACEUTICHE
36018385 DEAMS
36017851 DIP. DI MATEMATICA E GEOSCIENZE
36018130 DIP.DI INGEGNERIA E ARCHITETTURA
36016190 DIP. DI SCIENZE DELLA VITA
20549710 DIP. DI SCIENZE MEDICHE E DELLA SALUTE
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The life science business of Merck
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CONDIZIONI DI VENDITA E FORNITURA

NESSUN MINIMO D'ORDINE

PREZZO DEL PRODOTTO:

...è sempre inteso al netto di IVA, spese di trasporto, di consegna e di ogni eventuale altro onere

ORDINI WEB

...ordini superiori a 200,00 Euro (IVA esclusa) = porto franco

...ordini inferiori a 200,00 Euro = spese di trasporto 10,00 Euro.

IMBALLO:

...compreso ed adatto al trasporto

CONSEGNA:

...3gg. dal ricevimento dell'ordine (salvo il venduto)

1. Solventi ACS Grade e Technical Grade

Codice Prodotto	Descrizione	Prezzo di Listino	Prezzo Speciale
1031151000	1,4-DIOXANE EMPLURA	€ 73,00	€ 14,60
1031152500	1,4-DIOXANE EMPLURA	€ 153,00	€ 30,60
33065-1L-R	1-BUTANOL R. G., REAG. ACS, ≥99.5%	€ 58,50	€ 10,10
33065-2.5L-R	1-BUTANOL R. G., REAG. ACS, ≥99.5%	€ 138,00	€ 22,60
32291-1L-M	2,2,4-TRIMETHYLPENTANE PURISS. P.A., ≥99.5%	€ 57,90	€ 30,90
32291-2.5L-M	2,2,4-TRIMETHYLPENTANE PURISS. P.A., ≥99.5%	€ 144,50	€ 43,35
59300-1L	ISOPROPANOL, PURISS. P.A., ACS REAGENT, ≥99.8%	€ 37,00	€ 6,00
59300-2.5L	ISOPROPANOL, PURISS. P.A., ACS REAGENT, ≥99.8%	€ 68,50	€ 6,40
402893-1L-M	1-PROPANOL ACS REAGENT, ≥99.5%	€ 55,30	€ 9,50
402893-2.5L-M	1-PROPANOL ACS REAGENT, ≥99.5%	€ 97,70	€ 22,00
24201-1L-M	ACETONE PURISS., MEETS ANALYTICAL SPECIFICATION OF PH. EUR., ≥99%	€ 23,80	€ 3,80
24201-2.5L-M	ACETONE PURISS., MEETS ANALYTICAL SPECIFICATION OF PH. EUR., ≥99%	€ 51,00	€ 5,00
A6283-1L	ACETIC ACID, REAGENTPLUS, ≥99%	€ 48,80	€ 12,00
1000146025	ACETONE FOR ANALYSIS EMSURE, 25 L	€ 277,00	€ 58,20
360457-1L	ACETONITRILE, ACS REAGENT, ≥99.5%	€ 90,50	€ 5,50
360457-2.5L	ACETONITRILE, ACS REAGENT, ≥99.5%	€ 181,00	€ 13,00
32211-1L-M	CHLOROFORM PURISS. P.A., REAG. ISO, REAG	€ 66,90	€ 4,40
32211-2.5L-M	CHLOROFORM PURISS. P.A., REAG. ISO, 99.0-99.4%	€ 142,50	€ 10,60
33117-1L-M	CYCLOHEXANE PURISS. P.A., ACS REAGENT, ≥99.5%	€ 55,80	€ 5,40
33117-2.5L-M	CYCLOHEXANE PURISS. P.A., ACS REAGENT, ≥99.5%	€ 119,50	€ 12,50
24233-1L-M	DICHLOROMETHANE PURISS., MEETS ANALYTICAL SPECIFICATION OF PH. EUR., ≥99%	€ 34,30	€ 2,90
24233-2.5L-M	DICHLOROMETHANE PURISS., MEETS ANALYTICAL SPECIFICATION OF PH. EUR., ≥99%	€ 69,30	€ 5,90
32203-1L-M	DIETHYL ETHER CONTAINS BHT AS INHIBITOR, PURISS. P.A., ACS REAGENT ≥99.8%	€ 55,90	€ 3,90
32203-2.5L-M	DIETHYL ETHER CONTAINS BHT AS INHIBITOR, PURISS. P.A., ACS REAGENT ≥99.8%	€ 123,00	€ 6,50
D5879-1L	DIMETHYL SULFOXIDE, REAGENTPLUS, ≥99%	€ 73,50	€ 11,50
D5879-2.5L	DIMETHYL SULFOXIDE, REAGENTPLUS, ≥99%	€ 174,00	€ 22,55
32205-1L-M	ETHANOL ABSOLUTE, REAG. ISO, REAG. PH. EUR., ≥99.8%	€ 126,00	€ 15,90
32205-2.5L-M	ETHANOL ABSOLUTE, REAG. ISO, REAG. PH. EUR., ≥99.8%	€ 251,50	€ 32,50
33211-1L-M	ETHYL ACETATE PURISS. P.A., ACS REAGENT, ≥99.5%	€ 37,20	€ 3,00
33211-2.5L-M	ETHYL ACETATE PURISS. P.A., ACS REAGENT, ≥99.5%	€ 79,20	€ 6,30
H2198-1L	HEPTANE, REAGENTPLUS, 99%	€ 55,50	€ 10,70
H2198-2.5L	HEPTANE, REAGENTPLUS, 99%	€ 111,00	€ 22,40
32293-1L-M	HEXANE PURISS. P.A., ACS REAGENT, REAG. PH. EUR., ≥99%	€ 78,40	€ 8,00
32293-2.5L-M	HEXANE PURISS. P.A., ACS REAGENT, REAG. PH. EUR., ≥99%	€ 175,50	€ 17,00
33120-1L-M	N,N-DIMETHYLFORMAMIDE PURISS. P.A., ACS REAGENT, ≥99.8%	€ 65,60	€ 5,00
33120-2.5L-M	N,N-DIMETHYLFORMAMIDE PURISS. P.A., ACS REAGENT, ≥99.8%	€ 125,00	€ 9,50
D4551-250ML	N,N-DIMETHYLFORMAMIDE, FOR MOLECULAR BIOLOGY, ≥99%	€ 43,25	€ 8,90
D4551-500ML	N,N-DIMETHYLFORMAMIDE, FOR MOLECULAR BIOLOGY, ≥99%	€ 80,00	€ 7,70
1003972500	DIMETHYLFORMAMIDE FOR PEPTIDE SYNTHESIS	€ 93,50	€ 28,05
158941-1L-M	PENTANE REAGENT GRADE, 98%	€ 45,20	€ 8,00
158941-2.5L-M	PENTANE REAGENT GRADE, 98%	€ 90,50	€ 20,00
24587-1L-M	PETROLEUM ETHER PURISS., BP MIN. 75% 40-60 °C (min. 75%)	€ 33,40	€ 5,00
24587-2.5L-M	PETROLEUM ETHER PURISS., BP MIN. 75% 40-60 °C (min. 75%)	€ 79,20	€ 9,50
32299-2.5L-M	PETROLEUM ETHER PURISS. P.A., ACS REAGENT, BP≥ 90% 40-60 °C (≥ 90%)	€ 81,90	€ 7,25
1097280100	PYRIDINE FOR ANALYSIS EMSURE	€ 29,50	€ 8,85
8440081000	TERT-BUTYL METHYL ETHER FOR SYNTHESIS	€ 41,10	€ 8,00

Codice Prodotto	Descrizione	Prezzo di Listino	Prezzo Speciale
1018432500	TERT-BUTYL METHYL ETHER EMPLURA	€ 67,00	€ 13,50
360589-2.5L	TETRAHYDROFURAN, CONTAINS 250 PPM BHT AS INHIBITOR, ACS REAGENT, ≥99.0%	€ 128,00	€ 16,00
1081141000	TETRAHYDROFURAN EMPLURA, 1L	€ 48,50	€ 10,00
1081142500	TETRAHYDROFURAN EMPLURA, 2.5L	€ 102,00	€ 20,00
32249-1L-M	TOLUENE PURISS. P.A., ACS REAGENT, ≥99.7%	€ 37,60	€ 4,00
32249-2.5L-M	TOLUENE PURISS. P.A., ACS REAGENT, ≥99.7%	€ 89,60	€ 6,00
247642-500ML	XYLENES, ACS REAGENT, ≥98.5% XYLENES	€ 46,30	€ 11,50
247642-2.5L	XYLENES, ACS REAGENT, ≥98.5% XYLENES	€ 74,20	€ 18,90

2. Solventi Anidri

Codice Prodotto	Descrizione	Prezzo di Listino	Prezzo Speciale
296309-100ML	1,4-DIOXANE, ANHYDROUS, 99.8%	€ 57,50	€ 14,38
277258-100ML	2-METHYLBUTANE, ANHYDROUS, ≥99%	€ 73,00	€ 36,50
271004-1L	ACETONITRILE, ANHYDROUS, 99.8%	€ 122,00	€ 9,65
270997-250ML	DICHLOROMETHANE, ANHYDROUS, ≥99.8%	€ 72,00	€ 17,65
270997-1L	DICHLOROMETHANE, ANHYDROUS, ≥99.8%	€ 110,00	€ 52,95
276855-250ML	DIMETHYL SULFOXIDE, ANHYDROUS, ≥99.9%	€ 95,00	€ 19,80
322415-250ML	METHANOL, ANHYDROUS, 99.8%	€ 56,00	€ 19,50
227056-100ML	N,N-DIMETHYLFORMAMIDE, ANHYDROUS, 99.8%	€ 60,00	€ 8,90
186562-250ML	TETRAHYDROFURAN, ANHYDROUS, CONTAINS 25 PPM BHT AS INHIBITOR, ≥99.9%	€ 83,00	€ 22,30

3. Solventi HPLC Grade

Codice Prodotto	Descrizione	Prezzo di Listino	Prezzo Speciale
650447-1L	2-PROPANOL, HPLC Plus, FOR HPLC, GC AND RESIDUE ANALYSIS, =99.9%	€ 68,30	€ 12,15
34850-1L-M	ACETONE FOR HPLC, =99.8%	€ 41,40	€ 5,70
34850-2.5L-M	ACETONE FOR HPLC, =99.8%	€ 86,70	€ 11,50
34881-1L-M	ACETONITRILE FOR HPLC-GC, =99.8%	€ 99,40	€ 6,50
34881-2.5L-M	ACETONITRILE FOR HPLC-GC, =99.8% (GC)	€ 205,50	€ 15,50
1000291000	ACETONITRILE HYPERGRADE FOR LC-MS	€ 112,00	€ 33,60
1142912500	ACETONITRILE ISOCRATIC GRADE FOR LIQUID CHROMATOGRAPHY	€ 129,00	€ 21,50
34856-1L	DICHLOROMETHANE, FOR HPLC, ≥99.8%, CONTAINS AMYLENE AS STABILIZER	€ 58,00	€ 6,70
34856-2.5L	DICHLOROMETHANE, FOR HPLC, ≥99.8%, CONTAINS AMYLENE AS STABILIZER	€ 128,00	€ 13,30
34858-1L	ETHYL ACETATE, FOR HPLC, ≥99.7%	€ 46,50	€ 4,79
34858-2.5L	ETHYL ACETATE, FOR HPLC, ≥99.7%	€ 103,00	€ 9,60
270504-1L	HEXANE, FOR HPLC, ≥95%	€ 72,50	€ 6,50
270504-2.5L	HEXANE, FOR HPLC, ≥95%	€ 142,00	€ 12,50
34860-1L-R	METHANOL, FOR HPLC, ≥99.9%	€ 27,00	€ 3,10
34860-2.5L-R	METHANOL, FOR HPLC, ≥99.9%	€ 53,00	€ 6,70
1060351000	METHANOL HYPERGRADE FOR LC-MS	€ 43,25	€ 13,00
1060352500	METHANOL HYPERGRADE FOR LC-MS	€ 90,00	€ 21,00
34956-2.5L-M	PENTANE FOR HPLC, =99.0%	€ 131,00	€ 25,00
34956-1L-M	PENTANE FOR HPLC, =99.0%	€ 80,00	€ 13,50
34865-2.5L	TETRAHYDROFURAN, INHIBITOR-FREE, FOR HPLC, ≥99.9%	€ 299,00	€ 22,50
270733-2.5L	WATER, FOR HPLC	€ 48,50	€ 9,70

4. Solventi Deuterati

Codice Prodotto	Descrizione	Prezzo di Listino	Prezzo Speciale
151793-10G	ACETONE-D ₆ , 99.9 ATOM % D	€ 64,00	€ 17,00
151807-10G-GL	ACETONITRILE-D ₃ , ≥99.8 ATOM % D	€ 68,00	€ 20,20
612200-100G	CHLOROFORM-D, 99.8 ATOM % D, CONTAINS 0.05% (V/V) TMS	€ 48,00	€ 16,75
151823-100G	CHLOROFORM-D, 99.8 ATOM % D	€ 47,75	€ 13,50
151882-25G	DEUTERIUM OXIDE, 99.9 ATOM % D	€ 41,25	€ 12,10
151874-10G-GL	DIMETHYL SULFOXIDE-D ₆ , 99.9 ATOM % D	€ 36,25	€ 12,00
156914-10X0.75ML	DIMETHYL SULFOXIDE-D ₆ 100%, ≥99.96 ATOM % D	€ 173,00	€ 14,48
151947-10G-GL	METHANOL-D ₄ , ≥99.8 ATOM % D	€ 121,00	€ 14,70
441384-10X1ML	METHANOL-D ₄ , ≥99.8 ATOM % D	€ 99,00	€ 14,70
441384-10X0.75ML	METHANOL-D ₄ , ≥99.8 ATOM % D	€ 88,00	€ 11,90
532975-10X0.5ML	PYRIDINE-D ₅ , ≥99.5 ATOM % D	€ 89,00	€ 26,00
244511-1L	TOLUENE, ANHYDROUS, 99.8% ATOM % D	€ 72,50	€ 10,20

5. Acidi e Basi

Codice Prodotto	Descrizione	Prezzo di Listino	Prezzo Speciale
15663-1KG	BORIC ACID, FOR MOLECULAR BIOLOGY	€ 96,00	€ 27,65
84380-1L-M	NITRIC ACID PURISS. P.A., =65%	€ 36,70	€ 6,90
438081-2.5L	PHOSPHORIC ACID, ≥85 WT. % SOLUTION IN WATER	€ 190,00	€ 57,00
221473-500G	POTASSIUM HYDROXIDE ACS REAGENT, =85%	€ 20,50	€ 6,90
06203-1KG	SODIUM HYDROXIDE PELLETS, EXTRA PURE, 98-100.5%	€ 28,50	€ 7,00
06203-5KG	SODIUM HYDROXIDE PELLETS, EXTRA PURE, 98-100.5%	€ 108,00	€ 33,50
258105-1L-PC	SULFURIC ACID, 95-98%, ACS REAGENT	€ 71,00	€ 15,90
302031-100ML	TRIFLUOROACETIC ACID, FOR HPLC, ≥99.0%	€ 81,00	€ 12,90

6. Sali Inorganici, Reagenti e Altro

Codice Prodotto	Descrizione	Prezzo di Listino	Prezzo Speciale
238813-1G	6-HYDROXY-2,5,7,8-TETRAMETHYLCHROMAN-2-CARBOXYLIC ACID, 97%	€ 47,60	€ 21,42
237698-10G	(S)-(+)-2-BUTANOL, 99%	€ 293,00	€ 117,20
162973-10G	2-[2-(2-CHLOROETHOXY)ETHOXY]ETHANOL, 96%	€ 37,60	€ 22,56
458910-5ML	2-(BOC-AMINO)ETHANETHIOL, 97%	€ 79,80	€ 43,89
T63002-500G	2,2,2-TRIFLUOROETHANOL, REAGENTPLUS, ≥99.0%	€ 264,00	€ 28,73
124281-1G	3-TERT-BUTYLPHENOL, 99%	€ 47,90	€ 16,76
123056-10G	2-(4-AMINOPHENYL)ETHYLAMINE, 97%	€ 226,50	€ 79,30
525626-1G	4-((N-BOC)AMINOMETHYL)ANILINE, 97%	€ 62,70	€ 12,00
716006-1G	6,13-BIS(TRIISOPROPYLSILYLETHYNYL)PENTACENE, ≥99.0%	€ 793,00	€ 308,40
320102-100ML	ACETIC ANHYDRIDE, REAGENTPLUS, ≥99.0%	€ 20,30	€ 11,80
09913-100G	AMMONIUM PEROXODISULFATE, FOR MOLECULAR BIOLOGY, ≥98.0%	€ 32,00	€ 6,15
223506-500G	CALCIUM CHLORIDE DIHYDRATE, ACS REAGENT, ≥99.0%	€ 24,00	€ 12,00
571024-5G	CHLOROSULFONIC ACID, 99%	€ 34,20	€ 13,70
F0127-1KG	D-(-)-FRUCTOSE	€ 78,50	€ 31,40
G8270-1KG	D-(+)-GLUCOSE	€ 57,00	€ 22,80
S7903-1KG	SUCROSE BIOXTRA, ≥99.5%	€ 90,00	€ 36,00
E9884-500G	ETHYLENEDIAMINETETRAACETIC ACID, ACS REAGENT, 99.4-100.6%	€ 93,00	€ 37,20
F8775-500ML	FORMALDEHYDE, MOLECULAR BIOLOGY REAGENT, 36.5-38% IN H ₂ O	€ 86,50	€ 12,10
212881-5G	EUROPIUM(III) CHLORIDE HEXAHYDRATE, 99.9%	€ 131,00	€ 72,05

Codice Prodotto	Descrizione	Prezzo di Listino	Prezzo Speciale
G6279-500ML	GLYCEROL BIOXTRA, ≥99%	€ 92,00	€ 7,60
H3375-500G	HEPES, ≥99.5%	€ 367,00	€ 110,00
254169-500MG	GOLD(III) CHLORIDE HYDRATE, 99.995% TRACE METAL BASIS	€ 162,00	€ 40,50
50046-250G	GLYCINE, FOR MOLECULAR BIOLOGY, ≥99.0%	€ 58,00	€ 15,60
50950-1KG	GUANIDINE HYDROCHLORIDE, ≥98%	€ 71,50	€ 14,95
H5882-500G	HEXADECYLTRIMETHYLAMMONIUM BROMIDE, ≥98%	€ 131,00	€ 72,05
326720-5G	HEXAFLUOROBENZENE, ≥99.5%, NMR GRADE	€ 52,70	€ 18,44
G1251-1KG	L-GLUTAMIC ACID, REAGENTPLUS, ≥99%	€ 96,50	€ 53,00
33801-250G-R	L-(+)-TARTARIC ACID, PURISS. P.A., 99.5-101.0%	€ 32,50	€ 19,50
G4251-25G	L-GLUTATHIONE REDUCED, ≥98.0%	€ 304,00	€ 162,00
M9625-100G	L-METHIONINE, REAGENT GRADE, ≥98.0%	€ 86,50	€ 47,57
M8250-250G	MES FREE ACID HYDRATE, ≥99.5%	€ 266,00	€ 119,70
P0380-100G	L-PROLINE, REAGENTPLUS, ≥99%	€ 158,00	€ 79,00
208337-1KG	MAGNESIUM CHLORIDE, POWDER	€ 75,00	€ 37,50
18512-2.5L	PARAFFIN PURISS., EXTRA PURE, VISCOUS LIQUID	€ 85,00	€ 46,75
P6148-500G	PARAFORMALDEHYDE, REAGENT GRADE	€ 43,50	€ 15,22
P7626-5G	PHENYLMETHYLSULFONYL FLUORIDE, ≥98.5%	€ 91,50	€ 36,60
PVP40-500G	POLYVINYLPYRROLIDONE AV. MOL. WT. 40,000	€ 245,00	€ 85,75
60220-1KG-M	POTASSIUM PHOSPHATE MONOBASIC, BUFFER SUBSTANCE, PURISS. P.A., 99.5-100.5%	€ 75,80	€ 40,00
209619-500G	POTASSIUM CARBONATE, ACS REAGENT, ≥99%	€ 47,10	€ 14,70
P3911-500G	POTASSIUM CHLORIDE, ACS REAGENT, 99.0-100.5%	€ 32,50	€ 9,00
236497-500G	POTASSIUM ACETATE, ACS REAGENT, ≥99%	€ 109,00	€ 32,70
P52652-1L	PROPYLENE CARBONATE, REAGENTPLUS, 99%	€ 42,50	€ 17,50
31437-1KG-M	SODIUM BICARBONATE PURISS. P.A., ACS REAGENT, 99.7%	€ 28,50	€ 22,00
60737-1KG	SILICA GEL 60 FOR COLUMN CHROMATOGRAPHY, HIGH PURITY GRADE, PORE SIZE 60 Å, 230-400 MESH, 40-63 µm PARTICLE SIZE	€ 108,00	€ 22,90
13418-1KG-M	SODIUM CARBONATE PURISS., 99.5-100.5%	€ 34,80	€ 26,25
32319-1KG-R	SODIUM ACETATE ANHYDROUS, R. G., REAG. ACS	€ 67,50	€ 29,50
71380-1KG-M	SODIUM CHLORIDE PURISS. P.A., =99.5%	€ 27,40	€ 6,50
13464-1KG-M	SODIUM SULFATE PURISS., 99.5-100.5%	€ 23,30	€ 5,85
563218-25G	SODIUM NITRITE, 99.999% METAL BASIS	€ 92,00	€ 32,20
71645-1KG	SODIUM PHOSPHATE DIBASIC DIHYDRATE, ≥98%	€ 56,50	€ 13,20
S9390-2.5KG	SODIUM PHOSPHATE DIBASIC, HEPTAHYDRATE, ACS REAGENT, 98.0-102.0%	€ 205,00	€ 26,90
T0886-100ML	TRIETHYLAMINE, ≥99%	€ 26,90	€ 16,15
93352-1KG	TRIZMA BASE, ≥99%	€ 176,00	€ 29,30
205168-250G	YTTRIUM OXIDE, 99.99%	€ 424,00	€ 127,20
M6250-100ML	2-MERCAPTOETHANOL, ≥99.0%	€ 37,50	€ 13,15

7. TLC

Codice Prodotto	Descrizione	Prezzo di Listino	Prezzo Speciale
1057350001	SILICA GEL 60, WITH FLUORESCENT INDICATOR F254, 25 TLC PLASTIC SHEETS, 20X20 CM	€ 232,00	€ 85,00
1057500001	SILICA GEL 60, WITH FLUORESCENT INDICATOR F254, 50 TLC PLASTIC SHEETS, 4X8 CM	€ 63,50	€ 27,30

8. Info e Novità

¹H NMR Chemical Shift Laboratory Data Guide

Compounds	CDCl ₃	(CD ₃) ₂ SO	C ₅ D ₅ N or C ₅ H ₅ N	C ₆ D ₆ or C ₆ H ₆	D ₂ O
Acetic acid	2.13	1.95	2.13	1.63	2.16
Acetone	2.17	2.12	2.00	1.62	2.22
Acetonitrile	1.98	2.09	1.85	0.67	2.05
Benzene	7.37	7.40	7.33	7.30	7.44
Bromoform	6.85	7.75	7.86	5.89	Insoluble
n-Butanol	3.67 (t)	3.41 (t)	3.80 (t)	3.38 (t)	3.60 (t)
	0.94 (t)	0.89 (t)	0.89 (t)	0.83 (t)	0.89 (t)
t-Butanol	1.28	1.14	1.37	1.06	1.23
Chloroform	7.27	8.35	8.41	6.41	Insoluble
Cyclohexane	1.43	1.42	1.38	1.40	Insoluble
1,2-Dibromoethane	3.63	3.84	3.70	2.88	3.79
Dichloroacetic acid	5.98	6.68	6.72	5.43	6.21
1,2-Dichloroethane	3.73	3.93	3.78	2.99	3.92
Dichloromethane	5.30	5.79	5.62	4.46	Insoluble
Diethyl ether	3.48 (q)	3.42 (q)	3.38 (q)	3.27 (q)	3.56 (q)
	1.20 (t)	1.13 (t)	1.12 (t)	1.10 (t)	1.17 (t)
N,N-Dimethylformamide-d ₇	8.01	7.98	2.72	2.40	7.91
	2.95	2.92	2.66	1.98	3.00
	2.88	2.76			2.86
Dioxane	3.70	3.61	3.61	3.38	3.75
Ethanol	3.72 (q)	3.49 (q)	3.86 (q)	3.39 (q)	3.46 (q)
	1.24 (t)	1.09 (t)	1.29 (t)	0.97 (t)	1.16 (t)
Ethyl acetate	4.12 (q)	4.08 (q)	4.06 (q)	3.91 (q)	4.14 (q)
	2.04	2.02	1.94	1.68	2.08
	1.25 (t)	1.21 (t)	1.10(t)	0.94(t)	1.23 (t)
Ethyl formate	8.04	8.23	8.22	7.60	8.16
	4.22 (q)	4.17 (q)	4.14 (q)	3.83 (q)	4.28 (q)
	1.29 (t)	1.24 (t)	1.10 (t)	0.85 (t)	1.29 (t)
Formic acid	8.02	8.18	8.54	7.24	8.22
Methanol	3.48	3.20	3.57	3.09	3.35
Methyl acetate	3.67	3.61	3.55	3.28	3.68
	2.05	2.02	1.92	1.63	2.09
Methyl iodide	2.16	2.21	Reactive	1.47	Insoluble
Methyl sulfoxide	2.62	2.52	2.49	1.91	2.70
Nitromethane	4.32	4.44	4.39	3.09	4.41
1-Propanol	3.60 (t)	1.45 (m)	3.75 (t)	3.76 (t)	3.61 (t)
	1.60 (m)	0.87 (t)	1.70 (m)	1.40 (m)	1.57 (m)
	0.93 (t)		0.97 (t)	0.80 (t)	0.89 (t)
2-Propanol	4.03 (m)	1.06 (d)	4.16 (m)	3.76 (m)	1.18 (d)
	1.20 (d)		1.29 (d)	1.01 (d)	
Propionic acid	2.42 (q)	2.26 (q)	2.46 (q)	2.02 (q)	2.47 (q)
	1.18 (t)	1.03 (t)	1.20 (t)	0.89 (t)	1.10 (t)
Pyridine	8.60 (m)	8.61 (m)	8.71 (m)	8.50 (m)	8.50 (m)
	7.69 (m)	7.83 (m)	7.58 (m)	7.05 (m)	7.90 (m)
	7.28 (m)	7.40 (m)	7.21 (m)	6.70 (m)	7.46 (m)
1,1,2,2-Tetrachloroethane	5.96	6.92	6.90	4.96	Insoluble
Tetrahydrofuran	3.74 (m)	3.63 (m)	3.67 (m)	3.01 (m)	3.75 (m)
	1.85 (m)	1.78 (m)	1.64 (m)	0.87 (m)	1.88 (m)

Compounds	CDCl ₃	(CD ₃) ₂ SO	C ₅ D ₅ N or C ₅ H ₅ N	C ₆ D ₆ or C ₆ H ₆	D ₂ O
Toluene	7.19	7.22	7.22	7.10	Insoluble
	2.34	2.32	2.22	2.13	
1,1,1-Trichloroethane	1.72	2.80	2.61	1.58	Insoluble
Trimethylphosphate	3.80 (d)	3.72 (d)	3.71 (d)	3.37 (d)	3.82 (d)

NMR Solvents Reference Data

Name & Cat. No.	CAS. No.	Mol. Wt.	Density at 25 °C	mp (°C) ^a	bp (°C) ^a	δ _H (Mult) ^b	J _{HD}	δ _C (Mult) ^b	J _{CD} (J _{CF})
Acetic acid-d ₄ (151785)	1186-52-3	64.08	1.119	15-16	115.5	11.53 (1)		178.4 (br)	
						2.03 (5)	2	20.0 (7)	20
Acetone-d ₆ (151793)	666-52-4	64.12	0.872	-93.8	55.5			206.0 (13)	0.9
						2.04 (5)	2.2	29.8 (7)	20
Acetonitrile-d ₃ (151807)	2206-26-0	44.07	0.844	-48	80.7			118.2 (br)	
						1.93 (5)	2.5	1.3 (7)	21
Benzene-d ₆ (151815)	1076-43-3	84.15	0.950	6.8	79.1	7.15 (br)		128.0 (3)	24
Chloroform-d (151823)	865-49-6	120.38	1.500	-64	60.9	7.24 (1)		77.0 (3)	32
Cyclohexane-d ₁₂ (151866)	1735-17-7	96.23	0.893	4-7	80.7	1.38 (br)		26.4 (5)	19
Deuterium oxide (151882)	7789-20-0	20.03	1.107	3.8	101.4	4.84 (DSS)			
						4.81 (TSP)			
Dichloromethane-d ₂ (444324)	1665-00-5	86.94	1.362	-97	40	5.32 (3)	1	53.8 (5)	27
<i>N,N</i> -Dimethylformamide-d ₇ (189979)	4472-41-7	80.14	1.030	-61	153	8.01 (br)		162.7 (3)	30
						2.91 (5)	2	35.2 (7)	21
						2.74 (5)	2	30.1 (7)	21
Dimethyl sulfoxide-d ₆	2206-27-1	84.17	1.190	16-19	189	2.49 (5)	1.7	39.5 (7)	21
1,4-Dioxane-d ₈	17647-74-4	96.15	1.129	10-12	99	3.53 (m)		66.5 (5)	22
Ethanol-d ₆ (186414)	1516-08-1	52.11	0.892	-114	78	5.19 (1)			
						3.55 (br)		56.8 (5)	22
						1.11 (m)		17.2 (7)	19
Methanol-d ₄ (151947)	811-98-3	36.07	0.888	-98	65.4	4.89 (1)		49.0 (7)	21.4
						3.30 (5)	1.7		
2-Propanol-d ₈ (175897)	22739-76-0	68.14	0.890	-89.5	82	5.12 (1)			
						3.89 (br)		62.9 (3)	21.5
Pyridine-d ₅ (532975)	7291-22-7	84.13	1.050	-42	114.4	8.71 (br)		149.9 (3)	27.5
						7.55 (br)		135.5 (3)	24.5
						7.19 (br)		123.5 (3)	25
Tetrahydrofuran-d ₈ (184314)	1693-74-9	80.16	0.985	-106	65-66	3.58 (br)		67.4 (5)	22
						1.73 (br)		25.3 (br)	20.5
Toluene-d ₈ (434388)	2037-26-5	100.19	0.943	-93	110			137.5 (1)	
						7.09 (m)		128.9 (3)	23
						7.00 (br)		128.0 (3)	24
						6.98 (m)		125.2 (3)	24
						2.09 (5)	2.3	20.4 (7)	19
Trifluoroacetic acid-d (152005)	599-00-8	115.03	1.493	-15.4	75	11.50 (1)		164.2 (4)	(44)
								116.6 (4)	(283)
2,2,2-Trifluoroethanol-d ₃ (396532)	77253-67-9	103.06	1.415	-44	77-80	5.02 (1)		126.3 (4)	(277)
						3.88 (4 x 3)	2 (9)	61.5 (4 x 5)	22 (36)

^aMelting and boiling points (in °C) are those of the corresponding natural abundance compound (except for D₂O) and are intended only to indicate the useful liquid range of the materials.

^bThe multiplicity “br” indicates a broad peak without resolvable fine structure, while “m” denotes a broad peak with fine structure.

Flash Chromatography and TLC Laboratory Data Guide

Solvent Systems for Column Chromatography and TLC

Less Polar Substrates										More Polar Substrates	
Indoles; Pyrroles; Azaindoles; Pyrazoles		Ketones; Indanones; Aldehydes		Alkylamino heterocycles (e.g., Alkylaminopyridines)		Phenols; Hydroxy acids; Hydroxyheterocycles		Carboxylic acids		Heteroarylamines; Diamines; Diols	
Cyclohexane	60	Cyclohexane	95	Cyclohexane	90	Chloroform	200	Toluene	90	Chloroform	95
DCM	40	EtOAc	5	TEA	7	EtOH	10	EtOAc	8	MeOH	5
				EtOH	3	AcOH	1	AcOH	2		
Cyclohexane	40	Cyclohexane	90	Cyclohexane	70	Chloroform	100	Toluene	83	Chloroform	90
DCM	60	EtOAc	10	TEA	20	EtOH	10	EtOAc	14	MeOH	10
				EtOH	10	AcOH	1	AcOH	3	NH4OH	1
Cyclohexane	20	Cyclohexane	75	Cyclohexane	60			Toluene	75	Cyclohexane	60
DCM	80	EtOAc	25	TEA	20			EtOAc	20	TEA	20
				EtOH	20			AcOH	5	EtOH	20
		Cyclohexane	65	Cyclohexane	40					Cyclohexane	40
		EtOAc	35	TEA	30					TEA	30
				EtOH	30					EtOH	30
		Cyclohexane	50								
		EtOAc	50								

Less Polar System

More Polar System

Flash Chromatography

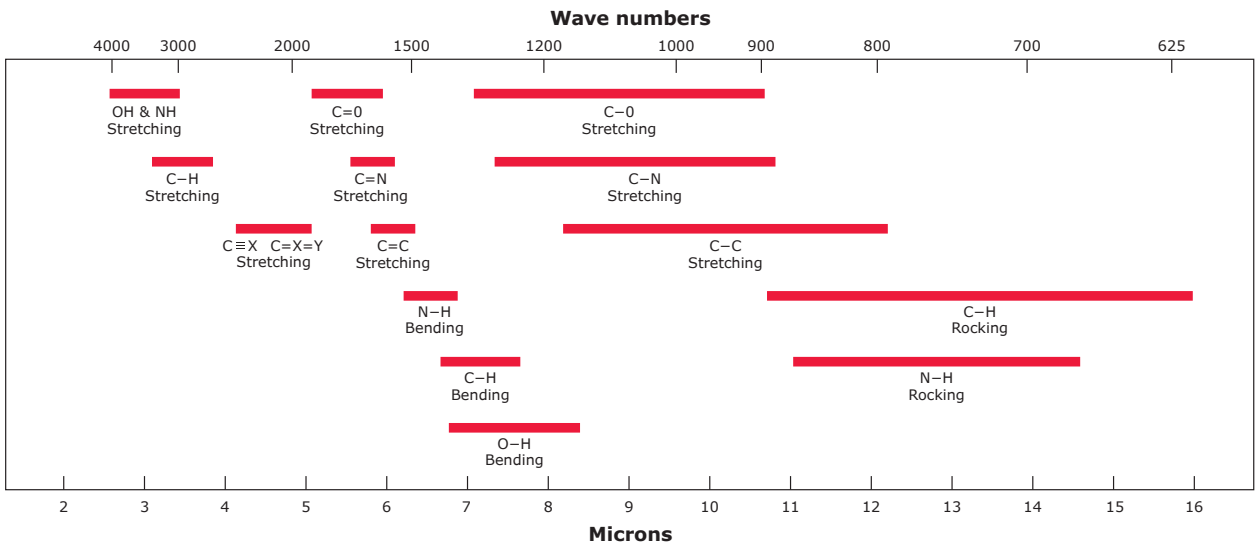
For compounds differentiated by ΔR_f ≥ 0.15; compound of interest at R_f ≈ 0.35

Column Diameter (mm)	Vol. of Eluant (mL)	Typical Sample Loading (mg)		Typical Fraction Size (mL)
		ΔR _f ≥ 0.2	ΔR _f ≥ 0.1	
10	100	100	40	5
20	200	400	160	10
30	400	900	360	20
40	600	1,600	600	30
50	1,000	2,500	1,000	50

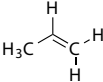
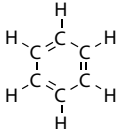
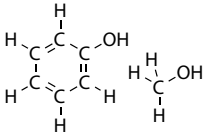
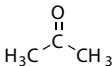
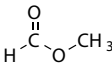
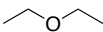
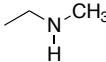
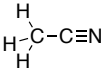
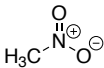
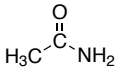
Recommendations:
40 - 63 μm silica gel (400 - 230 mesh silica gel 60) and a pressure-driven flow rate of 2.0 in/min (5 cm/min).
Depth of silica = 5 - 6 in. (12.5 - 15 cm).
For higher viscosity solvents (cyclohexane, dioxane, 2-propanol, ethanol, etc.) the flow rate should be reduced slightly.

Still, W. C. et al. J. Org. Chem., 43, 2923 (1978)

Need to determine the identity of your product?



Principal IR Absorptions for Certain Functional Groups above 1400 cm⁻¹

Functional Group Names	Example Compound	Example Structure	Absorption Ranges Frequency (cm ⁻¹) (Look for a single absorption in these regions unless stated otherwise.)	Type of Vibration (causing IR absorption)
Alkanes	Methane		3000-2800 (m to s) (Note: The absorptions can be seen as several distinct peaks in this region.)	H-C-H Asymmetric & Symmetric Stretch
			1500-1450	H-C-H Bend
Alkenes	1-Propene		3100-3000 (m)	C=C-H Asymmetric Stretch
			1675-1600 (v)	C-C=C Symmetric Stretch
Alkynes	Propyne	$\text{HC} \equiv \text{C}-\text{CH}_3$	3300-3200 (s)	$\text{C}\equiv\text{H}$ Stretch
			2200-2100 (v)	$\text{C}\equiv\text{C}$ Stretch
Aromatic Rings	Benzene		3100-3000 (v)	C=C-H Asymmetric Stretch
			1600-1580	C-C=C Symmetric Stretch
			1500-1450	C-C=C Asymmetric Stretch
Alcohols, Phenols	Phenol, Methanol (Alcohol)		3600-3100 (Note: Phenols MUST have Aromatic Ring Absorptions too.)	Hydrogen-bonded O-H Stretch (This peak usually appears much broader than the other IR absorptions.)
			1300-1000 (s)	(C - O Stretch)
Ketones	Acetone		1750-1625 (s)	C=O Stretch
Aldehydes	Ethanol		1750-1625 (s)	C=O Stretch
			2850-2690 (m) (Note: This appears as two separate peaks)	C-H Stretch off C=O
			2750-2700	C-H Stretch off C=O
Carboxylic Acids	Formic Acid		3400-2400 (v) (Note: This peak always covers the entire region with a VERY BROAD peak.)	H-bonded O-H Stretch (Note: This peak can obscure other peaks in this region.)
			1730-1660	C=O Stretch
Esters	Methyl Formate		1755-1650 (s)	C=O Stretch
			(1300-1000)	(C - O Stretch)
Ethers	Diethyl Ether (Ethyl Ether)		(1300-1000)	(C - O Stretch)
Amines: Primary	Ethylamine		3500-3200 (m) (Two Peaks)	N-H Stretch
			1640-1560	N-H Bend
Amines: Secondary	Ethylamine		3500-3200 (m) (One Peak)	N-H Stretch
			1550-1450	N-H Bend
Nitriles	Methanenitrile		2300-2200 (m)	$\text{C}\equiv\text{N}$ Stretch
Nitro Groups	Nitromethane		1600-1500 (s) (Note: Both peaks are < 200 cm ⁻¹ apart.)	N=O Stretch
			1400-1300 (s) (Note: Both peaks are < 200 cm ⁻¹ apart.)	N=O Bend
Amides	Methanamide		3500-3100 (m)	N-H Stretch (Similar to amines)
			1670-1600 (s)	C=O Stretch
			1640-1550 (s)	N-H Bend



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