

Scale-up and method development resources



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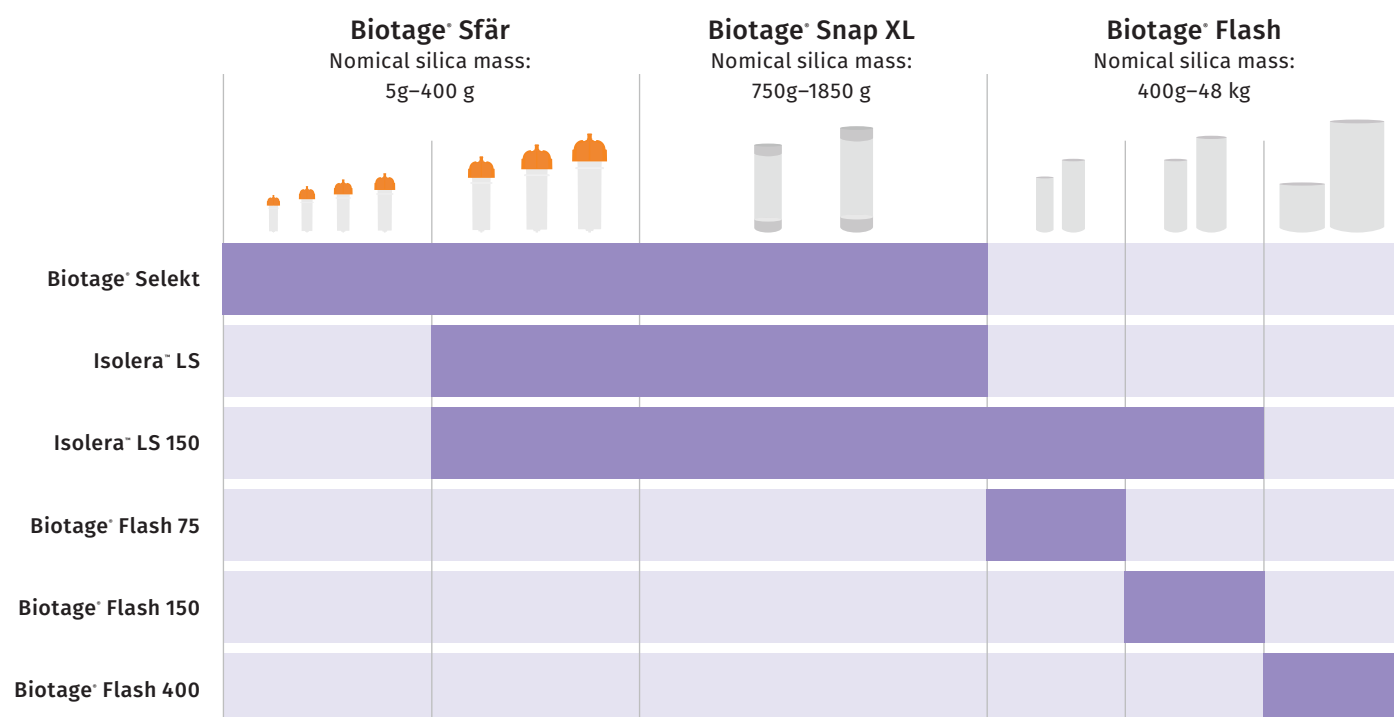
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Scalable column options



Media options

Phase	Media	Silica type	Typical particle size range (µm)	Pore volume mL/g	Typical surface area m ² /g	Typical pore diameter (Å)
Normal	Biotage® KP-Sil		40–63	0.8	500	55
	Biotage® Sfär Silica 60		50–70	1	725	50
	Biotage® HP-Sphere		25–33	1	725	50
	Biotage® Sfär HC		17–26	1	725	50
Reversed	Biotage® KP-C18-HS		40–63	0.9	400	100
	Biotage® Sfär C18		25–35	1.0	400	90
Specialty	Biotage® Sfär KP-Amino		40–65	0.6	200	-
	ISOLUTE®-Amino		40–63	0.8	500	55
	Carbon		60–100	-	1400–1800	-

 Irregular shaped particle

 Spherical shaped particle



Column dimensions for calculations

Column	Inner diameter (cm)	Length (cm)	L/D ratio	Cylinder volume (mL)
Sfär 5 g	1.55	4.4	2.32	7
Sfär 10 g	2.05	5.50	2.68	18
Sfär 25 g	2.91	7.40	2.54	49
Sfär 50 g	3.85	7.90	2.05	92
SNAP 50 g	3.90	8.10	2.08	97
Sfär 100 g	3.85	15.70	4.08	183
SNAP 100 g	3.90	15.70	4.03	187
Sfär 200 g	5.80	14.60	2.52	386
Sfär 200 g	7.10	16.80	2.37	665
Sfär 350 g	5.80	24.60	4.24	650
750 g	8.20	29.10	3.55	1,536
1500 g	10.70	32.80	3.07	2,948
FL75M	7.50	15.00	2.00	662
FL75L	7.50	30.00	4.00	1,325
FL150M	15.00	30.00	2.00	5,299
FL150L	15.00	60.00	4.00	10,598
FL400M	40.00	30.00	0.75	37,680
FL400L	40.00	60.00	1.50	75,360

Note: This data is for guidance purposes and should be verified by practical measurements or loading experiments as part of normal process development.



Flow rate development tool (linear flow rate normalized, mL/min)

	Target (FL400L)@ 2L/min	Target (FL400L)@ 4L/min	Target (FL400L)@ 6L/min
Sfär 5 g	3	6.5	10.0
Sfär 10 g	5	11	16
Sfär 25 g	11	21	32
Sfär 50 g	19	37	57
Sfär 100 g	19	37	57
Sfär 200 g	42	84	126
Sfär 350 g	42	84	126
SNAP 750 g	84	168	252
SNAP 1500 g	143	286	429
FL75M	70	141	211
FL75L	70	141	211
FL150M	281	563	844
FL150L	281	563	844
FL400M	2000	4000	6000
FL400L	2000	4000	6000

Note: This data is for guidance purposes and should be verified by practical measurements or loading experiments as part of normal process development.



CV values for method development and scale up

	Normal Phase				Reversed Phase		Other		
	KP-Sil	SFAR (60 micron)	HP-Sphere (25 micron)	SFAR HC (20 micron)	KP-C18-HS	SFAR C18	KP-NH	Carbon	ISOLUTE-NH
SFÄR 5g	7	9	6	9	5	9	9	5	9
SFÄR 10g	13	15	15	15	14	17	11	9	15
SFÄR 25g	35	42	41	42	38	45	30	24	33
SFÄR 50g	65	80	76	80	70	85	56	46	66
SFÄR 100g	130	150	151	150	140	164	111	91	132
SFÄR 200g	273	310	320	310	295	328	235	191	264
SFÄR 350g	461	530	539	530	497	582	396	322	510
SNAP XL 750 / 950g	1145	1250	1230	1250	1180	1210	1080	802	1120
SNAP XL 1500 / 1850g	2260	2500	2450	2500	2360	2410	2190	1582	2279
Flash 75M	470	540	580	548	510	520	410	329	474
Flash 75L	1000	1080	1100	1204	1020	1040	820	700	1008
Flash 150M	4000	4250	4400	4909	4050	4100	3230	2800	4034
Flash 150L	7000	8500	8800	8106	8100	8200	6460	4900	7059
Flash 400M	28000	30500	31500	31750	32400	29200	25840	19600	28235
Flash 400L	56000	61000	63000	64432	64800	58400	51680	39200	56471

Note: This data is for guidance purposes and should be verified by practical measurements or loading experiments as part of normal process development.



Mass values for method development and scale up

	Normal phase				Reversed phase		Other		
	KP-Sil	SFAR (60 micron)	HP-Sphere (25 micron)	SFAR HC (20 micron)	KP-C18-HS	SFAR C18	KP-NH	Carbon	ISOLUTE-NH
SFÄR 5g	5	5	5	5	6	6	5	4	6
SFÄR 10g	10	10	10	10	12	11	9	7	12
SFÄR 25g	26	25	25	25	31	27	23	18	30
SFÄR 50g	53	51	51	51	62	57	47	37	62
SFÄR 100g	102	99	98	98	121	110	91	75	120
SFÄR 200g	204	198	196	196	242	220	182	150	240
SFÄR 350g	363	352	348	348	429	380	322	250	424
SNAP XL 750 / 950g	800	780	750	750	950	850	716	560	919
SNAP XL 1500 / 1850g	1600	1560	1500	1500	1900	1700	1433	1125	1837
Flash 75M	360	350	345	345	425	380	330	250	432
Flash 75L	720	700	690	690	860	760	660	500	865
Flash 150M	2850	2850	2775	2732	3400	3000	2570	2025	3383
Flash 150L	5700	5600	5550	5464	6800	6000	5140	4050	6766
Flash 400M	20550	19950	19750	19701	24300	22100	18277	14400	24058
Flash 400L	41100	39900	39500	39402	48600	44200	36555	28850	48116

Note: This data is for guidance purposes and should be verified by practical measurements or loading experiments as part of normal process development.



Solvent polarity index

Polarity index	Solvent	BP (°C)
0	cyclohexane	80.7
0	Heptane	
0	n-hexane	68.9
0.3	n-decane	174.1
0.4	i-octane	99.2
0.4	octane	99.2
1.7	butyl ether	142.2
1.7	carbon tetrachloride	76.5
1.8	triethyl amine	89.5
2.2	i-propyl ether	68.3
2.3	toluene	101.6
2.4	xylene, p-	138
2.9	t-butyl methyl ether	55.2
3	benzene	80.1
3.3	benzyl ether	288.3
3.4	dichloromethane	40
3.4	methylene chloride	39.8
3.4-4.4	chloroform	61.2
3.7	dichloroethane	83.4
3.7	ethylene dichloride	83.5
3.9	butanol, 1-	117.2
3.9	i-butyl alcohol	117.7
4.2	tetrahydrofuran	66
4.3	ethyl acetate	77.1
4.3	propanol, 1-	97.2



Solvent polarity index

4.3	propanol, 2-	82.4–117.7
4.4	methyl acetate	56.3
4.5	cyclohexanone	155.7
4.5	methyl ethyl ketone (MEK)	80
4.5	nitrobenzene	210.8
4.6	benzonitrile	191.1
4.8	dioxane, 1,4-	101
4.8	dioxane, p	101.3
5.2	ethanol	78.3
5.3	nitroethane	114
5.3	pyridine	115.3
5.4	acetone	56.3
5.5	benzyl alcohol	205.5
5.7	methoxyethanol, 2-	124.6
6.2	acetic acid	117.9
6.2	acetonitrile	81.6
6.4	dimethyl formamide, N,N-	153
6.5	dimethyl sulfoxide	189
6.6	methanol	64.7
7.3	formamide	210.5
9	water	100



Solvent miscibility guide

cutoff @ 1 AU (nm)	Viscosity @ 20 °C (cPoise)	Solvent	Acetone	Acetonitrile	Dimethylformamide	Dimethylsulfoxide	1,4-Dioxane	Ethanol	Isopropanol	Methanol	Tetrahydrofuran	Water	Benzene	n-Butanol	Carbon tetrachloride	Chloroform	Cyclohexane	1,2-dichloroethane	Dichloromethane	Ethyl acetate	Diethyl ether	Heptane	Hexane	Isooctane	Methyl tert-butyl ether	Butanone	Pentane	Toluene	Xylene
330	0.36	Acetone																											
190	0.38	Acetonitrile																											
268	0.92	Dimethylformamide																											
268	2.24	Dimethylsulfoxide																											
215	1.37	1,4-Dioxane																											
210	1.20	Ethanol																											
120	2.30	Isopropanol																											
205	0.59	Methanol																											
215	0.55	Tetrahydrofuran																											
200	1.00	Water																											
280	0.65	Benzene																											
254	0.73	n-Butanol																											
263	0.97	Carbon tetrachloride																											
245	0.57	Chloroform																											
200	1.00	Cyclohexane																											
225	0.79	1,2-dichloroethane																											
235	0.44	Dichloromethane																											
260	0.45	Ethyl acetate																											
220	0.32	Diethyl ether																											
200	0.42	Heptane																											
200	0.31	Hexane																											
215	0.50	Isooctane																											
210	0.27	Methyl tert-butyl ether																											
329	6.45	Butanone																											
200	0.23	Pentane																											
285	0.59	Toluene																											
290	0.61	Xylene																											

● Miscible

● Immiscible or sparingly soluble



Selected viscosity values for common backpressure analysis

Solvent	Viscosity (cP) at 20°C–25°C	Relative backpressure risk
Hexane	0.3	Very Low
Heptane	0.39	Low
Ethyl acetate	0.43	Low
Dichloromethane (DCM)	0.44	Low
Toluene	0.59	Low
Methanol	0.59	Medium
Acetonitrile	0.37	Low
Acetone	0.32	Very Low
Ethanol	1.07	High
Water	0.89	Medium-High
Isopropanol (IPA)	2.04	Very High
Water / Methanol (50%)	1.62	Very High
Water / Acetonitrile (20%)	1.1	High



How to scale up

● Example 1:

A 25 g Biotage® cartridge was used to develop a 2.3 gram purification. The requirement is now to purify 125 g. The scale-up factor is then 54.3. We therefore move right in the chart on the 25 g row to the interval between 32 and 60. The appropriate large scale cartridge is in the 800–2500 g range, which corresponds to the Biotage® Flash 150M cartridge.

● Example 2:

A 100 g Biotage® cartridge was used to develop a 6.5 gram purification. The requirement is now to purify 900 g. The scale-up factor is then 138. We therefore move right in the chart on the 100 g row to the interval between 50 and 200. The appropriate large scale cartridge is in the 5–20 kg range, which corresponds to the Biotage® Flash 400M cartridge.

4.6 x 250	20	–	32	–	40	–	48	–	80	–	136	–	160	–	300	–	320	–	600	–	1000	–	2000	–	8000	–	16000
5 g	10	–	16	–	20	–	24	–	40	–	68	–	80	–	150	–	160	–	300	–	500	–	1000	–	4000	–	8000
10 g	5	–	8	–	10	–	12	–	20	–	34	–	40	–	75	–	80	–	150	–	250	–	500	–	2000	–	4000
25 g	2	–	3	–	4	–	5	–	8	–	14	–	16	–	30	–	32	–	60	–	100	–	200	–	800	–	1600
30 g	2	–	3	–	3.5	–	4	–	7	–	12	–	14	–	25	–	27	–	50	–	83	–	167	–	667	–	1333
45 g	1.1	–	1.8	–	2.2	–	3	–	4.5	–	7.5	–	9	–	17	–	18	–	33	–	56	–	111	–	444	–	888
50 g			1.6	–	2	–	2.4	–	4	–	6.8	–	8	–	15	–	16	–	30	–	50	–	100	–	400	–	800
80 g				–	1.25	–	1.5	–	2.5	–	4.3	–	5	–	9.5	–	10	–	19	–	31	–	62	–	250	–	500
100 g							1.2	–	2	–	3.4	–	4	–	7.5	–	8	–	15	–	25	–	50	–	200	–	400
120 g									1.7	–	2.8	–	3.5	–	6.5	–	7	–	12	–	21	–	42	–	167	–	333
200 g											1.7	–	2	–	3.8	–	4	–	7.5	–	13	–	25	–	100	–	200
340 g													1.2	–	2.2	–	2.4	–	4.4	–	7.4	–	15	–	60	–	120
400 g															1.9	–	2	–	3.8	–	6.3	–	13	–	50	–	100
750 g																	1.1	–	2	–	3.5	–	7	–	27	–	54
800 g																			1.9	–	3.1	–	6.2	–	25	–	50
1.5 kg																					1.7	–	3.3	–	13.5	–	27
2.5 kg																							2	–	8	–	16
5.0 kg																									4	–	8
20 kg																											2
40 kg																											

50 g – 80 g – 100 g – 120 g – 200 g – 340 g – 400 g – 750 g – 800 g – 1.5 kg – 2.5 kg – 5 kg – 20 kg – 40 kg

Required large scale media mass



Order information

Scale-up flash column part numbers

Column size (nominal)	KP-C18-HS (40-60 std)	SNAP C18 ULTRA/ Sfär C18 (HP Sphere C18) (30 micron)	KP-Sil (40-60 std)	Sfär 60 Silica (KP-Sphere)(60 micron)	HP-Sphere (25 micron)	Sfär HC Silica (20 micron)
5 g	FSL5-1118-0006	FSUD-0401-0006	FSKS-1107-0005	FSRS-0445-0005	FSUS-0442-0005	FSUS-0443-0005
10 g	FSL5-1118-0012	FSUD-0401-0012	FSKS-1107-0010	FSRS-0445-0010	FSUS-0442-0010	FSUS-0443-0010
25 g	FSL5-1118-0030	FSUD-0401-0030	FSKS-1107-0025	FSRS-0445-0025	FSUS-0442-0025	FSUS-0443-0025
50 g	FSL5-1118-0060	FSUD-0401-0060	FSKS-1107-0050	FSRS-0445-0050	FSUS-0442-0050	FSUS-0443-0050
100 g	FSL5-1118-0120	FSUD-0401-0120	FSKS-1107-0100	FSRS-0445-0100	FSUS-0442-0100	FSUS-0443-0100
200 g	FSL5-1118-0240	FSUD-0401-0240	FSKS-1107-0200	FSRS-0445-0200	FSUS-0442-0200	FSUS-0443-0200
350 g	FSL5-1118-0400	FSUD-0401-0400	FSKS-1107-0350	FSRS-0445-0350	FSUS-0442-0350	FSUS-0443-0350
750 g	FSL0-1118-0950	FSUL-0401-0950	FSK0-1107-0750	FSK0-0445-0750	FSUL-0442-0750	FSUL-0443-0750
1500 g	FSL0-1118-1850	FSUL-0401-1850	FSK0-1107-1500	FSK0-0445-1500	FSUL-0442-1500	FSUL-0443-1500
FL75M	FL0-1118-19040	FSUL-0401-19040	FK0-1107-19045	F75M-0445-19045	F75M-0442-19045	F75M-0443-19045
FL75L	FL0-1118-19070	FSUL-0401-19070	FK0-1107-19075	F75L-0445-19075	F75L-0442-19075	F75L-0443-19075
FL150M	FL0-1118-25070	FSUL-0401-25070	FK0-1107-25075	F150M-0445-25075	FL150M-0442-25075	F150M-0443-25075
FL150L	FL0-1118-25150	FSUL-0401-25150	FK0-1107-25155	F150L-0445-25155	F150L-0442-25155	F150L-0443-25155
FL400M	FL0-1118-50070	FSUL-0401-50070	FK0-1107-50070	F400M-0445-50070	F400M-0442-50070	F400M-0443-50070
FL400L	FL0-1118-50150	FSUL-0401-50150	FK0-1107-50150	F400L-0445-50150	F400L-0442-50150	F400L-0443-50150

Column size (nominal)	KP-NH (60 micron)	Isolute amino (40-60 std)	Carbon (4021)	Diaion™ HP20	HP20ss
5 g	FSAD-0909-0005	FSN0-0454-0005	FSCS-4021-0005	FSHS-2030-0005	FSHS-2530-0005
10 g	FSAD-0909-0011	FSN0-0454-0011	FSCS-4021-0010	FSHS-2030-0010	FSHS-2530-0010
25 g	FSAD-0909-0028	FSN0-0454-0028	FSCS-4021-0025	FSHS-2030-0025	FSHS-2530-0025
50 g	FSAD-0909-0055	FSN0-0454-0055	FSCS-4021-0050	FSHS-2030-0050	FSHS-2530-0050
100 g	FSAD-0909-0110	FSN0-0454-0110	FSCS-4021-0100	FSHS-2030-0100	FSHS-2530-0100
200 g	FSAD-0909-0220	FSN0-0454-0220	FSCS-4021-0200	FSHS-2030-0200	FSHS-2530-0200
350 g	FSAD-0909-0380	FSN0-0454-0380	FSCS-4021-0350	FSHS-2030-0350	FSHS-2530-0350
750 g	FSN0-0909-0900	FSN0-0454-0900	FSCS-4021-0750	FSHS-2030-0750	FSHS-2530-0750
1500 g	FSN0-0909-1800	FSN0-0454-1800	FSCS-4021-1500	FSHS-2030-1500	FSHS-2530-1500
FL75M	FPNH-75M	FPNH-0454-19040	C1YR-4021-19043	FT6-2030-19045	FT6-2530-19040
FL75L	FPNH-75L	FPNH-0454-19070	C1YR-4021-19073	FT6-2030-19075	FT6-2530-19070
FL150M	FPNH-150M	FPNH-0454-25070	C1YR-4021-25075	FT6-2030-25075	FT6-2530-25070
FL150L	FPNH-150L	FPNH-0454-25150	C1YR-4021-25155	FT6-2030-25155	FT6-2530-25150
FL400M	FPNH-400M	FPNH-0454-50070	C1YR-4021-50075	FT6-2030-50070	FT6-2530-50070
FL400L	FPNH-400L	FPNH-0454-50150	C1YR-4021-50155	FT6-2030-50150	FT6-2530-50150



Biotage® Flash 75/150 main system/parts

Product number	Product name
SF-022-19041	Flash 75M system
SF-022-19071	Flash 75L system
SF-022-25071	Flash 150M system
SF-022-25151	Flash 150L system
419997	Flash 150M sub-assembly for Isolera™ LS
419998	Flash 150L sub-assembly for Isolera™ LS
FB-012-19040SP	Flash 75M Radial Compression Barrel
FB-012-19070SP	Flash 75L Radial Compression Barrel
FB-012-25070SP	Flash 150M Radial Compression Barrel
FB-012-25150SP	Flash 150L Radial Compression Barrel
FC-022-19041SP	Flash 75M Radial Compression Module
FC-022-19071SP	Flash 75L Radial Compression Module
FC-022-25071SP	Flash 150M Radial Compression Module
FC-022-25151SP	Flash 150L Radial Compression Module
SIM-0502SP	SIM 500
SIM-1002SP	SIM 1000
SIM-2002SP	SIM 2000

Biotage® Flash 400 main system/parts

Product number	Product name
SF-521-50150	Flash 400M system (facelift)
SF-521-50150-23	Flash 400L system (classic)
SF-521-50070-23	Flash 400L system (facelift)
FB-012-50070-22SP	Flash 400M Radial Compression Barrel
FB-012-50070-23SP	Flash 400M Radial Compression Barrel
FB-012-50150-22SP	Flash 400L Radial Compression Barrel
FB-012-50150-23SP	Flash 400L Radial Compression Barrel
FC-022-50070-22SP	Flash 400M Radial Compression Module
FC-022-50070-23SP	Flash 400M Radial Compression Module
FC-022-50150-22SP	Flash 400L Radial Compression Module
FC-022-50150-23SP	Flash 400L Radial Compression Module
FCW-022-50150-23SP	Flash 400 M/L skid mount
FCW-022-50070-23SP	Flash 400 M/L skid mount

Isolera™ LS main system/parts

ISO-1LSW-150L	Isolera™ LS 150L System
ISO-1LSW-150M	Isolera™ LS 150M System
ISO-1LSV	Isolera™ LS, One Channel, Ext Col. Bed, 200-400 nm UV
ISO-1LSW	Isolera™ LS, One Channel, Ext Col. Bed, 200-800 nm UV-VIS
SER-ISLS-150-IN	Installation and Familiarization - Isolera™ LS 150
S-150L-KIT	Upgrade connection kit for Isolera™ LS and Flash 150L System
ISO-1LS-150M-KIT	Upgrade connection kit for Isolera™ LS and Flash 150M System

UV monitor

UV-FL150	UV Monitor for Biotage® Flash 150 system
UV-FL400	UV Monitor for Biotage® Flash 400 system
UV-UPGRD FL150/400	UV Monitor upgrade for Biotage® Flash 400 (from 150)
416239SP	Flow Cell, 2mm, 1/4" SS for Biotage® Flash 75/150 systems
416240SP	FlowCell, TriClamp, 2mm, 1/2" SS for Biotage® Flash 400 system

Media for POC or analytical / method development

9401-0100	Biotage® Sfär C18, 100 g
9401-1000	Biotage® Sfär C18, 1Kg
9443-0100	Biotage® Sfär Silica HC, 20µm, 100 g
9443-1000	Biotage® Sfär Silica HC, 20µm, 1 Kg
9445-0100	Biotage® Sfär Silica 60 µm, 100 g
9445-1000	Biotage® Sfär Silica 60 µm, 1 Kg
9454-0100	ISOLUTE® Flash NH2, 100 g
9454-1000	ISOLUTE® Flash NH2, 1 Kg
K0-1107-0100	Biotage® KP-SIL, 100 g
K0-1107-1000	Biotage® KP-SIL, 1 Kg
L0-1118-00100	KP-C18-HS, 100 g
L0-1118-01000	KP-C18-HS, 1 Kg
N0-0909-0100	Biotage® Sfär KP-Amino, 100 g
N0-0909-1000	Biotage® Sfär KP-Amino, 1 Kg



Chemistry media

Product number	Product name
180-0050-B	ISOLUTE® Si-Thiol 500 mg/3 mL (50/pk)
180-0050-BG	ISOLUTE® Si-Thiol 500 mg/3 mL (Tablets) (50/pk)
180-0050-C	ISOLUTE® Si-Thiol 500 mg/6 mL (30/pk)
180-0100-C	ISOLUTE® Si-Thiol 1 g/6 mL (30/pk)
180-0100-D	ISOLUTE® Si-Thiol 1 g/15 mL (20/pk)
9180-0100	ISOLUTE® Si-Thiol, 100 g
9180-1000	ISOLUTE® Si-Thiol, 1 kg
9180-10000	ISOLUTE® Si-Thiol, 10kg
9180-25000	ISOLUTE® Si-Thiol, 25 kg
9536-0100	ISOLUTE® Si-Propylsulfonic Acid (SCX-2), 100 g
9536-1000	ISOLUTE® Si-Propylsulfonic Acid (SCX-2), 1 kg
9536-10000	ISOLUTE® Si-Propylsulfonic Acid (SCX-2), 10 kg
9536-25000	ISOLUTE® Si-Propylsulfonic Acid (SCX-2), 25 kg
CR-4021-01000	Flash Activated Carbon, Bulk, 1Kg

Service

SER-150-IN	Installation and Familiarization - Biotage® Flash 75/150
SER-150-IQOQ	Qualification Package - IQ/OQ - Biotage® Flash 75/150
SER-400-IN	Installation and Familiarization - Biotage® Flash 400
SER-400-IQOQ	Qualification Package - IQ/OQ - Biotage® Flash 400
SER-IND-UV-IQOQ	Qualification Package - IQ/OQ - UV Monitor Industrial Flas
UV-UPGRD FL150/400	UV Monitor upgrade for Biotage® Flash 400 (from 150)



For local office contact information,
visit [biotage.com/contact](https://www.biotage.com/contact)

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