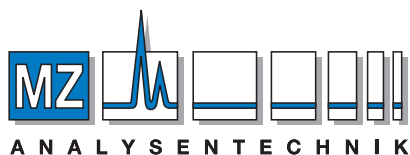


# Capillary Columns

● Capillary HPLC Columns .....	142
● Particle Type Capillary HPLC Columns.....	143
● Particle Type Capillary Micro Guard Columns .....	150
● Connection Kits for Capillary EX • EX-Nano Columns .....	151
● Monolithic Capillary HPLC Columns .....	152
● How to Connect MonoCap Columns .....	156
● Connection Kits .....	158



**AUTHORIZED DISTRIBUTOR**

MZ-Analysentechnik GmbH  
Barcelona-Allee 17 • D-55129 Mainz  
Tel +49 6131 880 96-0  
Fax +49 6131 880 96-20  
e-mail: [info@mz-at.de](mailto:info@mz-at.de)  
[www.mz-at.de](http://www.mz-at.de)

# Capillary HPLC Columns

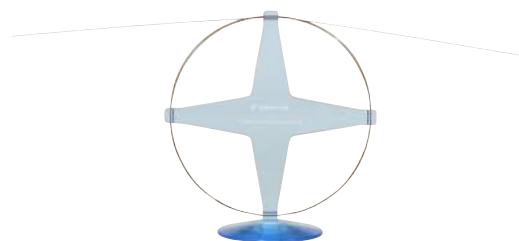
Capillary EX and Capillary EX-Nano HPLC columns are excellent in analyzing trace amounts of samples in proteomic and bioanalytical analysis with high sensitivity and high resolution. Capillary EX and Capillary EX-Nano columns are totally porous particle type columns, which the flow rate is generally set under 100  $\mu\text{L}/\text{min}$ .

MonoCap is another capillary column, however, uses the monolithic silica technology offering high throughput, high sensitivity and high resolution separation of peptides and protein digests.

MonoCap Fast-Flow provides high throughput analysis at half of the operating pressure compared to totally porous particle type columns. MonoCap Nano-flow deliver extremely high sensitivity in LC/MS due to the optimization of mesopore and throughpore sizes. Electro-spray emitter for ESI-LC/MS, MonoSpray offer minimized sample diffusion resulting in high sensitivity. MonoCap Trap columns are also available for on-line preconcentration or desalting of

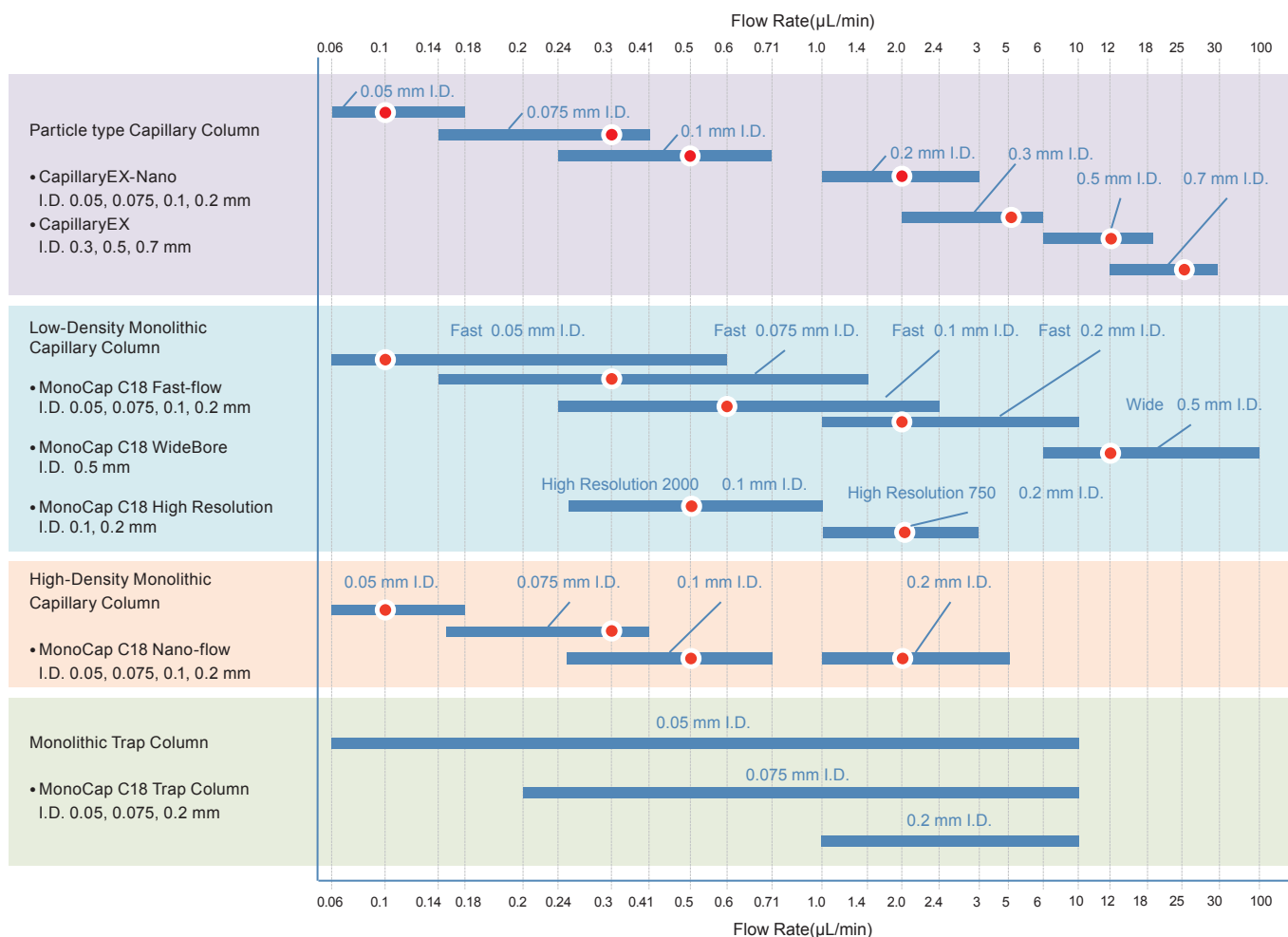
protein and peptide samples prior to HPLC separation with mass spectrometry detection.

The chart below illustrates the recommended use and flow rate ranges when using a 150 mm length column. The red circle indicates the linear velocity at 1 mm/s (Figure 1).



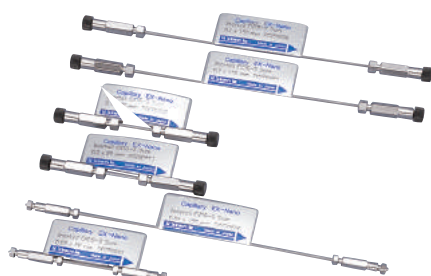
MonoCap High Resolution 2000

**Figure 1 : Recommended Operating Flow Rate Range**



# Particle Type Capillary HPLC Columns

Columns with I.D. sizes of 0.05, 0.075, 0.1 and 0.2 mm are Capillary EX-Nano columns. I.D. sizes of 0.3, 0.5 and 0.7 mm are Capillary EX columns. Capillary EX-Nano columns introduces a fused silica capillary tube having a very smooth and clean inner surface resulting in high theoretical plates. Capillary EX columns employs the same column hardware used in analytical columns, which is very easy to use.



Capillary EX-Nano



Capillary EX

Phase	I.D. (mm)	Particle Size (µm)	Length 50 mm	Length 150 mm	Length 250 mm
			Cat.No.	Cat.No.	Cat.No.
InertSustain C18	0.05	3	5020-15038	5020-15088	5020-15138
		5	5020-15037	5020-15087	5020-15137
	0.075	3	5020-15188	5020-15238	5020-15288
		5	5020-15187	5020-15237	5020-15287
	0.1	3	5020-15338	5020-15388	5020-15438
		5	5020-15337	5020-15387	5020-15437
	0.2	3	5020-15488	5020-15538	5020-15588
		5	5020-15487	5020-15537	5020-15587
	0.3	3	5020-11539	5020-11589	-
		5	5020-11538	5020-11588	-
	0.5	3	5020-11639	5020-11689	-
		5	5020-11638	5020-11688	-
	0.7	3	5020-11739	5020-11789	-
		5	5020-11738	5020-11788	-
InertSustain AQ-C18	0.05	3	5020-89894	5020-89895	5020-89896
		5	5020-89792	5020-89793	5020-89794
	0.075	3	5020-89897	5020-89898	5020-89899
		5	5020-89795	5020-89796	5020-89797
	0.1	3	5020-89900	5020-89901	5020-89902
		5	5020-89798	5020-89799	5020-89800
	0.2	3	5020-89903	5020-89904	5020-89905
		5	5020-89801	5020-89802	5020-89803
	0.3	3	5020-89887	5020-89888	-
		5	5020-89784	5020-89785	-
	0.5	3	5020-89889	5020-89890	-
		5	5020-89786	5020-89787	-
	0.7	3	5020-89891	5020-89892	-
		5	5020-89788	5020-89789	-

Reversed Phase Columns

HILIC Columns

Normal Phase Columns

SEC Columns

Ion Exchange Columns

Application Specific Columns

Guard Columns

Preparative Columns

Capillary Columns

Applications

Cat. No. Index

# Particle Type Capillary HPLC Columns

Phase	I.D. (mm)	Particle Size (µm)	Length 50 mm	Length 150 mm	Length 250 mm
			Cat.No.	Cat.No.	Cat.No.
InertSustainSwift C18	0.05	3	5020-88183	5020-88184	5020-88185
		5	5020-88089	5020-88090	5020-88091
	0.075	3	5020-88186	5020-88187	5020-88188
		5	5020-88092	5020-88093	5020-88094
	0.1	3	5020-88189	5020-88190	5020-88191
		5	5020-88095	5020-88096	5020-88097
	0.2	3	5020-88192	5020-88193	5020-88194
		5	5020-88098	5020-88099	5020-88100
	0.3	3	5020-88176	5020-88177	-
		5	5020-88081	5020-88082	-
	0.5	3	5020-88178	5020-88179	-
		5	5020-88083	5020-88084	-
	0.7	3	5020-88180	5020-88181	-
		5	5020-88085	5020-88086	-
Inertsil ODS-HL	0.05	3	5020-87289	5020-87290	5020-87291
		5	5020-87193	5020-87194	5020-87195
	0.075	3	5020-87292	5020-87293	5020-87294
		5	5020-87196	5020-87197	5020-87198
	0.1	3	5020-87295	5020-87296	5020-87297
		5	5020-87199	5020-87200	5020-87201
	0.2	3	5020-87298	5020-87299	5020-87300
		5	5020-87202	5020-87203	5020-87204
	0.3	3	5020-87282	5020-87283	-
		5	5020-87185	5020-87186	-
	0.5	3	5020-87284	5020-87285	-
		5	5020-87187	5020-87188	-
	0.7	3	5020-87286	5020-87287	-
		5	5020-87189	5020-87190	-
Inertsil ODS-4	0.05	3	5020-15002	5020-15052	5020-15102
		5	5020-15001	5020-15051	5020-15101
	0.075	3	5020-15152	5020-15202	5020-15252
		5	5020-15151	5020-15201	5020-15251
	0.1	3	5020-15302	5020-15352	5020-15402
		5	5020-15301	5020-15351	5020-15401
	0.2	3	5020-15452	5020-15502	5020-15552
		5	5020-15451	5020-15501	5020-15551
	0.3	3	5020-11502	5020-11552	-
		5	5020-11501	5020-11551	-
	0.5	3	5020-11602	5020-11652	-
		5	5020-11601	5020-11651	-
	0.7	3	5020-11702	5020-11752	-
		5	5020-11701	5020-11751	-

Phase	I.D. (mm)	Particle Size (µm)	Length 50 mm	Length 150 mm	Length 250 mm	
			Cat.No.	Cat.No.	Cat.No.	
Inertsil ODS-3	0.05	3	5020-15005	5020-15055	5020-15105	Reversed Phase Columns
		4	5020-15004	5020-15054	5020-15104	
		5	5020-15003	5020-15053	5020-15103	
	0.075	3	5020-15155	5020-15205	5020-15255	HILIC Columns
		4	5020-15154	5020-15204	5020-15254	
		5	5020-15153	5020-15203	5020-15253	
	0.1	3	5020-15305	5020-15355	5020-15405	Normal Phase Columns
		4	5020-15304	5020-15354	5020-15404	
		5	5020-15303	5020-15353	5020-15403	
	0.2	3	5020-15455	5020-15505	5020-15555	SEC Columns
		4	5020-15454	5020-15504	5020-15554	
		5	5020-15453	5020-15503	5020-15553	
	0.3	3	5020-11505	5020-11555	-	Ion Exchange Columns
		4	5020-11504	5020-11554	-	
		5	5020-11503	5020-11553	-	
	0.5	3	5020-11605	5020-11655	-	Application Specific Columns
		4	5020-11604	5020-11654	-	
		5	5020-11603	5020-11653	-	
	0.7	3	5020-11705	5020-11755	-	Guard Columns
		4	5020-11704	5020-11754	-	
		5	5020-11703	5020-11753	-	
Inertsil ODS-SP	0.05	3	5020-15007	5020-15057	5020-15107	Preparative Columns
		5	5020-15006	5020-15056	5020-15106	
	0.075	3	5020-15157	5020-15207	5020-15257	Capillary Columns
		5	5020-15156	5020-15206	5020-15256	
	0.1	3	5020-15307	5020-15357	5020-15407	Applications
		5	5020-15306	5020-15356	5020-15406	
	0.2	3	5020-15457	5020-15507	5020-15557	Cat. No. Index
		5	5020-15456	5020-15506	5020-15556	
	0.3	3	5020-11507	5020-11557	-	
		5	5020-11506	5020-11556	-	
	0.5	3	5020-11607	5020-11657	-	
		5	5020-11606	5020-11656	-	
0.7	3	5020-11707	5020-11757	-		
	5	5020-11706	5020-11756	-		
Inertsil ODS-P	0.05	3	5020-15009	5020-15059	5020-15109	Applications
		5	5020-15008	5020-15058	5020-15108	
	0.075	3	5020-15159	5020-15209	5020-15259	Cat. No. Index
		5	5020-15158	5020-15208	5020-15258	
	0.1	3	5020-15309	5020-15359	5020-15409	
		5	5020-15308	5020-15358	5020-15408	
	0.2	3	5020-15459	5020-15509	5020-15559	
		5	5020-15458	5020-15508	5020-15558	
	0.3	3	5020-11509	5020-11559	-	
		5	5020-11508	5020-11558	-	
	0.5	3	5020-11609	5020-11659	-	
		5	5020-11608	5020-11658	-	
	0.7	3	5020-11709	5020-11759	-	
		5	5020-11708	5020-11758	-	
	InertSustain C8	0.05	3	5020-16191	5020-16192	5020-16193
5			5020-16090	5020-16091	5020-16092	
0.075		3	5020-16194	5020-16195	5020-16196	Cat. No. Index
		5	5020-16093	5020-16094	5020-16095	
0.1		3	5020-16197	5020-16198	5020-16199	
		5	5020-16096	5020-16097	5020-16098	
0.2		3	5020-16200	5020-16201	5020-16202	
		5	5020-16099	5020-16100	5020-16101	
0.3		3	5020-16184	5020-16185	-	
		5	5020-16082	5020-16083	-	
0.5		3	5020-16186	5020-16187	-	
		5	5020-16084	5020-16085	-	
0.7		3	5020-16188	5020-16189	-	
		5	5020-16086	5020-16087	-	

# Particle Type Capillary HPLC Columns

Phase	I.D. (mm)	Particle Size (µm)	Length 50 mm	Length 150 mm	Length 250 mm
			Cat.No.	Cat.No.	Cat.No.
InertSustainSwift C8	0.05	3	5020-88489	5020-88490	5020-88491
		5	5020-88393	5020-88394	5020-88395
	0.075	3	5020-88492	5020-88493	5020-88494
		5	5020-88396	5020-88397	5020-88398
	0.1	3	5020-88495	5020-88496	5020-88497
		5	5020-88399	5020-88400	5020-88401
	0.2	3	5020-88498	5020-88499	5020-88500
		5	5020-88402	5020-88403	5020-88404
	0.3	3	5020-88482	5020-88483	-
		5	5020-88385	5020-88386	-
	0.5	3	5020-88484	5020-88485	-
		5	5020-88387	5020-88388	-
	0.7	3	5020-88486	5020-88487	-
		5	5020-88389	5020-88390	-
Inertsil C8-4	0.05	3	5020-15036	5020-15086	5020-15136
		5	5020-15035	5020-15085	5020-15135
	0.075	3	5020-15186	5020-15236	5020-15286
		5	5020-15185	5020-15235	5020-15285
	0.1	3	5020-15336	5020-15386	5020-15436
		5	5020-15335	5020-15385	5020-15435
	0.2	3	5020-15486	5020-15536	5020-15586
		5	5020-15485	5020-15535	5020-15585
	0.3	3	5020-11536	5020-11586	-
		5	5020-11535	5020-11585	-
	0.5	3	5020-11636	5020-11686	-
		5	5020-11635	5020-11685	-
	0.7	3	5020-11736	5020-11786	-
		5	5020-11735	5020-11785	-
Inertsil C8-3	0.05	3	5020-15015	5020-15065	5020-15115
		5	5020-15014	5020-15064	5020-15114
	0.075	3	5020-15165	5020-15215	5020-15265
		5	5020-15164	5020-15214	5020-15264
	0.1	3	5020-15315	5020-15365	5020-15415
		5	5020-15314	5020-15364	5020-15414
	0.2	3	5020-15465	5020-15515	5020-15565
		5	5020-15464	5020-15514	5020-15564
	0.3	3	5020-11515	5020-11565	-
		5	5020-11514	5020-11564	-
	0.5	3	5020-11615	5020-11665	-
		5	5020-11614	5020-11664	-
	0.7	3	5020-11715	5020-11765	-
		5	5020-11714	5020-11764	-
Inertsil WP300 C18	0.05	5	5020-15028	5020-15078	5020-15128
	0.075	5	5020-15178	5020-15228	5020-15278
	0.1	5	5020-15328	5020-15378	5020-15428
	0.2	5	5020-15478	5020-15528	5020-15578
	0.3	5	5020-11528	5020-11578	-
	0.5	5	5020-11628	5020-11678	-
	0.7	5	5020-11728	5020-11778	-
Inertsil WP300 C8	0.05	5	5020-15029	5020-15079	5020-15129
	0.075	5	5020-15179	5020-15229	5020-15279
	0.1	5	5020-15329	5020-15379	5020-15429
	0.2	5	5020-15479	5020-15529	5020-15579
	0.3	5	5020-11529	5020-11579	-
	0.5	5	5020-11629	5020-11679	-
	0.7	5	5020-11729	5020-11779	-

Phase	I.D. (mm)	Particle Size (µm)	Length 50 mm	Length 150 mm	Length 250 mm							
			Cat.No.	Cat.No.	Cat.No.							
InertSustain PFP	0.05	3	5020-87891	5020-87892	5020-87893	Reversed Phase Columns						
		5	5020-87791	5020-87792	5020-87793							
	0.075	3	5020-87894	5020-87895	5020-87896		HILIC Columns					
		5	5020-87794	5020-87795	5020-87796							
	0.1	3	5020-87897	5020-87898	5020-87899			Normal Phase Columns				
		5	5020-87797	5020-87798	5020-87799							
	0.2	3	5020-87900	5020-87901	5020-87902				SEC Columns			
		5	5020-87800	5020-87801	5020-87802							
	0.3	3	5020-87884	5020-87885	-					Ion Exchange Columns		
		5	5020-87784	5020-87785	-							
	0.5	3	5020-87886	5020-87887	-						Application Specific Columns	
		5	5020-87786	5020-87787	-							
	0.7	3	5020-87888	5020-87889	-							Guard Columns
		5	5020-87788	5020-87789	-							
InertSustain Phenylhexyl	0.05	3	5020-89183	5020-89184	5020-89185	Preparative Columns						
		5	5020-89089	5020-89090	5020-89091							
	0.075	3	5020-89186	5020-89187	5020-89188		Capillary Columns					
		5	5020-89092	5020-89093	5020-89094							
	0.1	3	5020-89189	5020-89190	5020-89191			Applications				
		5	5020-89095	5020-89096	5020-89097							
	0.2	3	5020-89192	5020-89193	5020-89194				Cat. No. Index			
		5	5020-89098	5020-89099	5020-89100							
	0.3	3	5020-89176	5020-89177	-							
		5	5020-89081	5020-89082	-							
	0.5	3	5020-89178	5020-89179	-							
		5	5020-89083	5020-89084	-							
	0.7	3	5020-89180	5020-89181	-							
		5	5020-89085	5020-89086	-							
InertSustain Phenyl	0.05	3	5020-16491	5020-16492	5020-16493	Applications						
		5	5020-16390	5020-16391	5020-16392							
	0.075	3	5020-16494	5020-16495	5020-16496		Cat. No. Index					
		5	5020-16393	5020-16394	5020-16395							
	0.1	3	5020-16497	5020-16498	5020-16499							
		5	5020-16396	5020-16397	5020-16398							
	0.2	3	5020-16500	5020-16501	5020-16502							
		5	5020-16399	5020-16400	5020-16401							
	0.3	3	5020-16484	5020-16485	-							
		5	5020-16382	5020-16383	-							
	0.5	3	5020-16486	5020-16487	-							
		5	5020-16384	5020-16385	-							
	0.7	3	5020-16488	5020-16489	-							
		5	5020-16386	5020-16387	-							
Inertsil Ph-3	0.05	3	5020-15017	5020-15067	5020-15117	Applications						
		5	5020-15016	5020-15066	5020-15116							
	0.075	3	5020-15167	5020-15217	5020-15267		Cat. No. Index					
		5	5020-15166	5020-15216	5020-15266							
	0.1	3	5020-15317	5020-15367	5020-15417							
		5	5020-15316	5020-15366	5020-15416							
	0.2	3	5020-15467	5020-15517	5020-15567							
		5	5020-15466	5020-15516	5020-15566							
	0.3	3	5020-11517	5020-11567	-							
		5	5020-11516	5020-11566	-							
	0.5	3	5020-11617	5020-11667	-							
		5	5020-11616	5020-11666	-							
	0.7	3	5020-11717	5020-11767	-							
		5	5020-11716	5020-11766	-							
InertSustain Amide	0.05	3	5020-88789	5020-88790	5020-88791	Applications						
		5	5020-88693	5020-88694	5020-88695							
	0.075	3	5020-88792	5020-88793	5020-88794		Cat. No. Index					
		5	5020-88696	5020-88697	5020-88698							
	0.1	3	5020-88795	5020-88796	5020-88797							
		5	5020-88699	5020-88700	5020-88701							
	0.2	3	5020-88798	5020-88799	5020-88800							
		5	5020-88702	5020-88703	5020-88704							
	0.3	3	5020-88782	5020-88783	-							
		5	5020-88685	5020-88686	-							
	0.5	3	5020-88784	5020-88785	-							
		5	5020-88687	5020-88688	-							
	0.7	3	5020-88786	5020-88787	-							
		5	5020-88689	5020-88690	-							

# Particle Type Capillary HPLC Columns

Phase	I.D. (mm)	Particle Size (µm)	Length 50 mm	Length 150 mm	Length 250 mm
			Cat.No.	Cat.No.	Cat.No.
Inertsil Amide	0.05	3	5020-15040	5020-15090	5020-15140
		5	5020-15039	5020-15089	5020-15139
	0.075	3	5020-15190	5020-15240	5020-15290
		5	5020-15189	5020-15239	5020-15289
	0.1	3	5020-15340	5020-15390	5020-15440
		5	5020-15339	5020-15389	5020-15439
	0.2	3	5020-15490	5020-15540	5020-15590
		5	5020-15489	5020-15539	5020-15589
	0.3	3	5020-11541	5020-11591	-
		5	5020-11540	5020-11590	-
	0.5	3	5020-11641	5020-11691	-
		5	5020-11640	5020-11690	-
	0.7	3	5020-11741	5020-11791	-
		5	5020-11740	5020-11790	-
Inertsil HILIC	0.05	3	5020-15025	5020-15075	5020-15125
		5	5020-15024	5020-15074	5020-15124
	0.075	3	5020-15175	5020-15225	5020-15275
		5	5020-15174	5020-15224	5020-15274
	0.1	3	5020-15325	5020-15375	5020-15425
		5	5020-15324	5020-15374	5020-15424
	0.2	3	5020-15475	5020-15525	5020-15575
		5	5020-15474	5020-15524	5020-15574
	0.3	3	5020-11525	5020-11575	-
		5	5020-11524	5020-11574	-
	0.5	3	5020-11625	5020-11675	-
		5	5020-11624	5020-11674	-
	0.7	3	5020-11725	5020-11775	-
		5	5020-11724	5020-11774	-
InertSustain NH2	0.05	3	5020-16791	5020-16792	5020-16793
		5	5020-16690	5020-16691	5020-16692
	0.075	3	5020-16794	5020-16795	5020-16796
		5	5020-16693	5020-16694	5020-16695
	0.1	3	5020-16797	5020-16798	5020-16799
		5	5020-16696	5020-16697	5020-16698
	0.2	3	5020-16800	5020-16801	5020-16802
		5	5020-16699	5020-16700	5020-16701
	0.3	3	5020-16784	5020-16785	-
		5	5020-16682	5020-16683	-
	0.5	3	5020-16786	5020-16787	-
		5	5020-16684	5020-16685	-
	0.7	3	5020-16788	5020-16789	-
		5	5020-16686	5020-16687	-
Inertsil NH2	0.05	3	5020-15021	5020-15071	5020-15121
		5	5020-15020	5020-15070	5020-15120
	0.075	3	5020-15171	5020-15221	5020-15271
		5	5020-15170	5020-15220	5020-15270
	0.1	3	5020-15321	5020-15371	5020-15421
		5	5020-15320	5020-15370	5020-15420
	0.2	3	5020-15471	5020-15521	5020-15571
		5	5020-15470	5020-15520	5020-15570
	0.3	3	5020-11521	5020-11571	-
		5	5020-11520	5020-11570	-
	0.5	3	5020-11621	5020-11671	-
		5	5020-11620	5020-11670	-
	0.7	3	5020-11721	5020-11771	-
		5	5020-11720	5020-11770	-
InertSustain Cyano	0.05	3	5020-89433	5020-89434	5020-89435
		5	5020-89339	5020-89340	5020-89341
	0.075	3	5020-89436	5020-89437	5020-89438
		5	5020-89342	5020-89343	5020-89344
	0.1	3	5020-89439	5020-89440	5020-89441
		5	5020-89345	5020-89346	5020-89347
	0.2	3	5020-89442	5020-89443	5020-89444
		5	5020-89348	5020-89349	5020-89350
	0.3	3	5020-89426	5020-89427	5020-89428
		5	5020-89331	5020-89332	-
	0.5	3	5020-89428	5020-89429	-
		5	5020-89333	5020-89334	-
	0.7	3	5020-89430	5020-89431	-
		5	5020-89335	5020-89335	-



Phase	I.D. (mm)	Particle Size (µm)	Length 50 mm	Length 150 mm	Length 250 mm
			Cat.No.	Cat.No.	Cat.No.
Inertsil CN-3	0.05	3	5020-15019	5020-15069	5020-15119
		5	5020-15018	5020-15068	5020-15118
	0.075	3	5020-15169	5020-15219	5020-15269
		5	5020-15168	5020-15218	5020-15268
	0.1	3	5020-15319	5020-15369	5020-15419
		5	5020-15318	5020-15368	5020-15418
	0.2	3	5020-15469	5020-15519	5020-15569
		5	5020-15468	5020-15518	5020-15568
	0.3	3	5020-11519	5020-11569	-
		5	5020-11518	5020-11568	-
	0.5	3	5020-11619	5020-11669	-
		5	5020-11618	5020-11668	-
	0.7	3	5020-11719	5020-11769	-
		5	5020-11718	5020-11768	-
Inertsil Diol	0.05	3	5020-15023	5020-15073	5020-15123
		5	5020-15022	5020-15072	5020-15122
	0.075	3	5020-15173	5020-15223	5020-15273
		5	5020-15172	5020-15222	5020-15272
	0.1	3	5020-15323	5020-15373	5020-15423
		5	5020-15322	5020-15372	5020-15422
	0.2	3	5020-15473	5020-15523	5020-15573
		5	5020-15472	5020-15522	5020-15572
	0.3	3	5020-11523	5020-11573	-
		5	5020-11522	5020-11572	-
	0.5	3	5020-11623	5020-11673	-
		5	5020-11622	5020-11672	-
	0.7	3	5020-11723	5020-11773	-
		5	5020-11722	5020-11772	-
Inertsil SIL-100A	0.05	3	5020-15027	5020-15077	5020-15127
		5	5020-15026	5020-15076	5020-15126
	0.075	3	5020-15177	5020-15227	5020-15277
		5	5020-15176	5020-15226	5020-15276
	0.1	3	5020-15327	5020-15377	5020-15427
		5	5020-15326	5020-15376	5020-15426
	0.2	3	5020-15477	5020-15527	5020-15577
		5	5020-15476	5020-15526	5020-15576
	0.3	3	5020-11527	5020-11577	-
		5	5020-11526	5020-11576	-
	0.5	3	5020-11627	5020-11677	-
		5	5020-11626	5020-11676	-
	0.7	3	5020-11727	5020-11777	-
		5	5020-11726	5020-11776	-
Inertsil AX	0.05	5	5020-15033	5020-15083	5020-15133
	0.075	5	5020-15183	5020-15233	5020-15283
	0.1	5	5020-15333	5020-15383	5020-15433
	0.2	5	5020-15483	5020-15533	5020-15583
	0.3	5	5020-11533	5020-11583	-
	0.5	5	5020-11633	5020-11683	-
	0.7	5	5020-11733	5020-11783	-
Inertsil CX	0.05	5	5020-15034	5020-15084	5020-15134
	0.075	5	5020-15184	5020-15234	5020-15284
	0.1	5	5020-15334	5020-15384	5020-15434
	0.2	5	5020-15484	5020-15534	5020-15584
	0.3	5	5020-11534	5020-11584	-
	0.5	5	5020-11634	5020-11684	-
	0.7	5	5020-11734	5020-11784	-

Reversed Phase Columns

HILIC Columns

Normal Phase Columns

SEC Columns

Ion Exchange Columns

Application Specific Columns

Guard Columns

Preparative Columns

Capillary Columns

Applications

Cat. No. Index

# Particle Type Capillary Micro Guard Columns

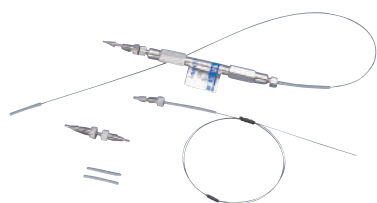


Capillary EX Micro Guard Columns

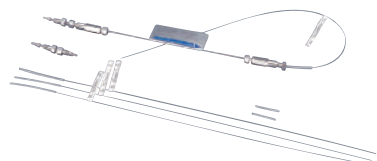
Capillary EX Micro Guard columns are available in 2 mm length which are ideal for the use of sample preconcentration and sample cleanup. Non-metal hardware is also available to eliminate metal contamination from the column hardware.

Phase	I.D. (mm)	Particle Size ( $\mu\text{m}$ )	Length (mm)	Wetted Part
				Metal
				Cat.No.
InertSustain C18	0.3	3	2	5020-11847
		5	2	5020-11846
InertSustain AQ-C18	0.3	3	2	5020-89893
		5	2	5020-89790
InertSustainSwift C18	0.3	3	2	5020-88182
		5	2	5020-88087
Inertsil ODS-HL	0.3	3	2	5020-87288
		5	2	5020-87191
Inertsil ODS-4	0.3	3	2	5020-11802
		5	2	5020-11801
Inertsil ODS-3	0.3	3	2	5020-11805
		5	2	5020-11803
Inertsil ODS-SP	0.3	3	2	5020-11807
		5	2	5020-11806
Inertsil ODS-P	0.3	3	2	5020-11809
		5	2	5020-11808
InertSustain C8	0.3	3	2	5020-16190
		5	2	5020-16088
InertSustainSwift C8	0.3	3	2	5020-88488
		5	2	5020-88391
Inertsil C8-4	0.3	3	2	5020-11836
		5	2	5020-11835
Inertsil C8-3	0.3	3	2	5020-11815
		5	2	5020-11814
Inertsil WP300 C18	0.3	5	2	5020-11828
Inertsil WP300 C8	0.3	5	2	5020-11829
InertSustain Phenylhexyl	0.3	3	2	5020-89182
		5	2	5020-89087
InertSustain Phenyl	0.3	3	2	5020-16490
		5	2	5020-16388
Inertsil Ph-3	0.3	3	2	5020-11817
		5	2	5020-11816
InertSustain Amide	0.3	3	2	5020-88788
		5	2	5020-88691
Inertsil Amide	0.3	3	2	5020-11849
		5	2	5020-11848
Inertsil HILIC	0.3	3	2	5020-11825
		5	2	5020-11824
InertSustain NH2	0.3	3	2	5020-16790
		5	2	5020-16688
Inertsil NH2	0.3	3	2	5020-11821
		5	2	5020-11820
InertSustain Cyano	0.3	3	2	5020-89432
		5	2	5020-89337
Inertsil CN-3	0.3	3	2	5020-11819
		5	2	5020-11818
Inertsil Diol	0.3	3	2	5020-11823
		5	2	5020-11822
Inertsil SIL-100A	0.3	3	2	5020-11827
		5	2	5020-11826
Inertsil AX	0.3	5	2	5020-11833
Inertsil CX	0.3	5	2	5020-11834

# Connection Kits for Capillary EX • EX-Nano Columns



Connection Kit for Capillary EX Columns  
(Top Image: Installed view, Bottom Image: Contents of Kit)



Connection Kit for Capillary EX-Nano Columns  
(Top Image: Installed view, Bottom Image: Contents of Kit)

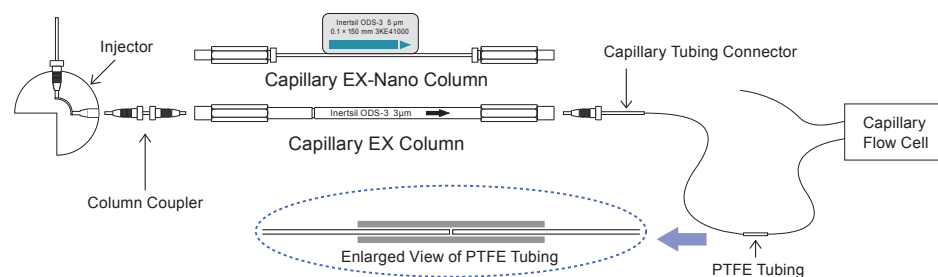
## Connection Kit for Capillary EX Columns (0.3, 0.5, 0.7 I.D. mm)

Contents of Kit	Cat.No.
<ul style="list-style-type: none"> <li>·Column Coupler</li> <li>·40 × 0.1 mm I.D. 1/16 inch O.D.Tubing (Both ends with male nuts including PEEK ferrules)</li> </ul>	5020-01880
<ul style="list-style-type: none"> <li>·Capillary Tubing Connector (Male nut, PEEK ferrule, 1/16 inch O.D. PTFE with sleeve)</li> </ul>	
<ul style="list-style-type: none"> <li>·PTFE Tubing 20 mm 2 pcs 1/16 inch O.D. (O.D. 0.375 mm Connection for Capillary Tubing)</li> </ul>	

## Connection Kit for Capillary EX-Nano Columns (0.05, 0.075, 0.1, 0.2 I.D. mm)

Contents of Kit	Cat.No.
<ul style="list-style-type: none"> <li>·Column Coupler</li> <li>·40 × 0.05 mm I.D. 1/16 inch O.D. Tubing (Both ends with male nuts including PEEK ferrules)</li> </ul>	5020-01881
<ul style="list-style-type: none"> <li>·Capillary Tubing Connector</li> <li>·300 × 0.05 mm I.D. 0.375 mm O.D. Tubing</li> <li>·300 × 0.03 mm I.D. 0.375 mm O.D. Tubing</li> <li>·300 × 0.02 mm I.D. 0.375 mm O.D. Tubing (Male nut, PEEK ferrule, 1/16 inch O.D. PTFE with sleeve)</li> </ul>	
<ul style="list-style-type: none"> <li>·PTFE Tubing 20 mm 2 pcs 1/16 inch O.D. (O.D. 0.375 mm Connection for Capillary Tubing)</li> </ul>	

## How To Connect



Reversed Phase Columns

HILIC Columns

Normal Phase Columns

SEC Columns

Ion Exchange Columns

Application Specific Columns

Guard Columns

Preparative Columns

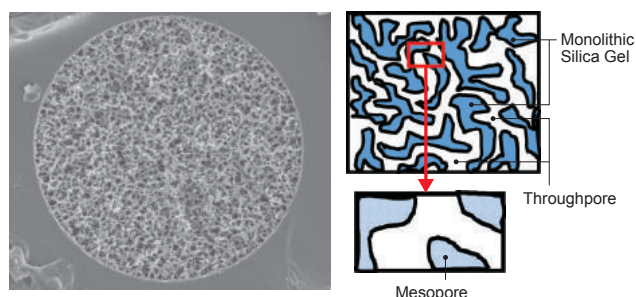
Capillary Columns

Applications

Cat. No. Index

# Monolithic Capillary HPLC Columns

## MonoCap Series



Structure of Monolithic Silica

GL Sciences' MonoCap series, created synthetically via sol-gel method, and an octadecyl silane chemically bonded, has a very uniform three dimensional structure that shows excellent reproducibility from batch-to-batch. The solid structure of GL Sciences' monolithic silica eliminates the need for frits or filters at the ends of the column, thereby reducing dead volume that might otherwise lead to band broadening or sample recovery. The high porosity of our monolithic silica allows high flow rates to be used without loss of resolution or creation of high operating pressure. An optimized balance of throughpores and mesopores provides the critically important combination of efficiency, separation speed, large volume sample-loading, and small volume sample-recovery.

MonoCap High Resolution provide extremely high efficiency, delivering over 200,000 plates for a 2,000 mm length column. The High Resolution Ultra type deliver over 300,000 plates.

The Fast-flow type is compatible with high flow rate analysis due to its' low flow resistance. In addition, the equilibration time can be minimized further by setting the flow rate high.

MonoCap Nano-flow is a high-density monolithic capillary column offering extremely high sensitivity in LC/MS due to the optimization of mesopore and throughpore sizes.

MonoCap Trap columns have a relatively big throughpore, which are available for on-line preconcentration or desalting of protein and peptide samples prior to HPLC separation with mass spectrometry detection.

### Physical Properties of MonoCap Series

Description	Monolithic Silica	Skeleton	Throughpore	Mesopore	Porosity	Functional Group	End-Capping	Max. Operating Pressure
MonoCap C18 High Resolution 750	High Purity Silica Gel	1 $\mu\text{m}$	2 $\mu\text{m}$	15 nm	85 %	Octadecyl	Yes	22 MPa (220 bar)
MonoCap C18 High Resolution 2000		1 $\mu\text{m}$	2 $\mu\text{m}$	15 nm	85 %	Octadecyl	Yes	35 MPa (350 bar)
MonoCap C18 High Resolution Ultra 2000		1 $\mu\text{m}$	2 $\mu\text{m}$	11 nm	85 %	Octadecyl	Yes	35 MPa (350 bar)
MonoCap C18 High Resolution 1000		1 $\mu\text{m}$	2 $\mu\text{m}$	15 nm	85 %	Octadecyl	Yes	35 MPa (350 bar)
MonoCap C18 High Resolution Ultra 1000		1 $\mu\text{m}$	2 $\mu\text{m}$	11 nm	85 %	Octadecyl	Yes	35 MPa (350 bar)
MonoCap HILIC-UP High Resolution 2000		1 $\mu\text{m}$	2 $\mu\text{m}$	12 nm	85 %	Octadecyl	No	35 MPa (350 bar)
MonoCap C18 Fast-flow		1 $\mu\text{m}$	2 $\mu\text{m}$	15 nm	85 %	Octadecyl	Yes	22 MPa (220 bar)
MonoCap C18 Nano-flow		1 $\mu\text{m}$	1 $\mu\text{m}$	11 nm	85 %	Octadecyl	Yes	22 MPa (220 bar)
MonoCap C18 WideBore		1 $\mu\text{m}$	2 $\mu\text{m}$	11 nm	85 %	Octadecyl	Yes	22 MPa (220 bar)
MonoCap C18 Trap Column		2 $\mu\text{m}$	5 $\mu\text{m}$	11 nm	85 %	Octadecyl	Yes	20 MPa (200 bar)
MonoCap Amide		1 $\mu\text{m}$	2 $\mu\text{m}$	15 nm	85 %	Octadecyl	No	22 MPa (220 bar)
MonoCap SCX		2 $\mu\text{m}$	5 $\mu\text{m}$	11 nm	85 %	Octadecyl	No	20 MPa (200 bar)

\* Based on monolithic technology, Merck KGaA, Darmstadt, Germany.

### End-fittings of MonoCap Monolithic Capillary HPLC Columns

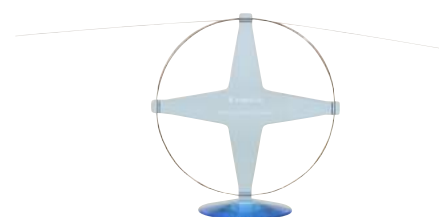
MonoCap C18 High Resolution 750  
 MonoCap C18 Fast-flow  
 MonoCap Nano-flow  
 MonoCap C18 WideBore  
 MonoCap Amide  
 MonoCap SCX

1. Metal Hardware  
 End-fittings are Parker Style (UP type).  
 Valco 1/32 inch (6-40 UNF) end-fittings can also be arranged upon request, indicate 1/32 inch when ordering.
2. PEEK Hardware  
 1/16 inch male nut, ferrule and PTFE sleeve are included.

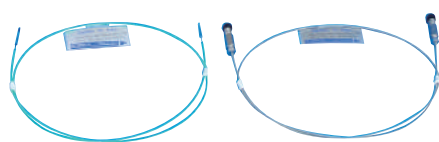
MonoCap C18 High Resolution 2000  
 MonoCap C18 High Resolution Ultra 2000  
 MonoCap C18 High Resolution 1000  
 MonoCap C18 High Resolution Ultra 1000  
 MonoCap HILIC-UP High Resolution

End-fittings are not included.  
 The connection kits shown at page 156 must be purchased separately once.

## MonoCap C18 High Resolution/MonoCap C18 High Resolution Ultra



MonoCap High Resolution 2000



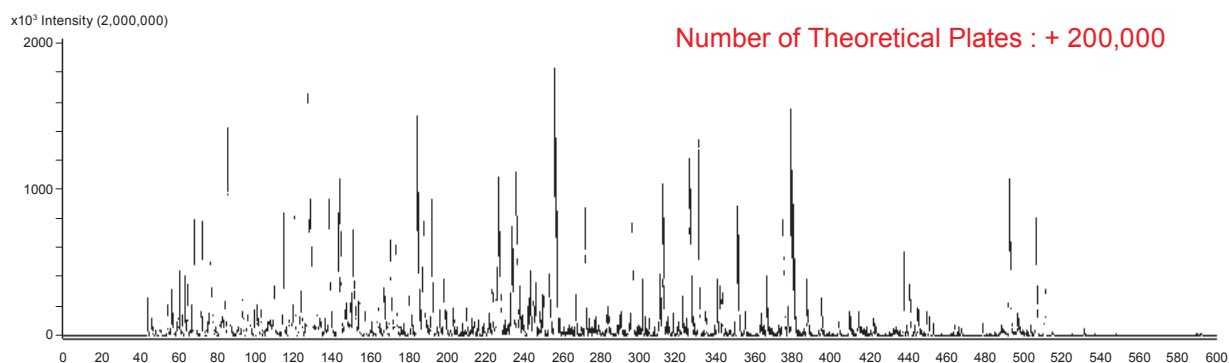
PEEK Metal

MonoCap High Resolution 750

Maximizing all the benefits and advantages of monolithic technology, MonoCap High Resolution and High Resolution Ultra are appropriate for the efficient separation of peptides and protein digests.

MonoCap High Resolution 750 deliver over 60,000 plates, while 2000 deliver over 300,000 plates.

The newly-introduced High Resolution Ultra type deliver over 300,000 plate number.

**Figure 1 : Analysis of Tryptic Digests**


### Conditions

Column : MonoCap C18 High Resolution 2000 (2000 mm × 0.1 mm I.D.)  
 Trap column : MonoCap C18 Trap Column (50 mm × 0.075 mm I.D.)  
 Eluent : A) 0.1 % HCOOH in CH<sub>3</sub>CN  
 B) 0.1 % HCOOH in H<sub>2</sub>O  
 A/B = 10/90 - 600 min - 45/55, v/v

Flow Rate : 0.5 μL/min  
 Injection Vol : 5 μL  
 Detection : MS (TIC *m/z* 500 - 1500)  
 Sample : Tryptic digest of proteins

## Ordering Information

### MonoCap C18 High Resolution Ultra 2000

I.D. (mm)	Length (mm)	Cat. No.
0.075	2000	5020-10006
0.1	2000	5020-10018

### MonoCap C18 High Resolution Ultra 1000

I.D. (mm)	Length (mm)	Cat. No.
0.075	1000	5020-10066
0.1	1000	5020-10067

### MonoCap C18 High Resolution 750

I.D. (mm)	Length (mm)	Hardware Material	Cat. No.
0.1	750	Metal	5020-10113
		PEEK	5020-10013
0.2	750	Metal	5020-10123
		PEEK	5020-10023

### MonoCap C18 High Resolution 2000

I.D. (mm)	Length (mm)	Cat. No.
0.075	2000	5020-10005
0.1	2000	5020-10015

### MonoCap C18 High Resolution 1000

I.D. (mm)	Length (mm)	Cat. No.
0.3 (1/16 inch)	1000	5020-10007
0.3 (1/32 inch)	1000	5020-10008

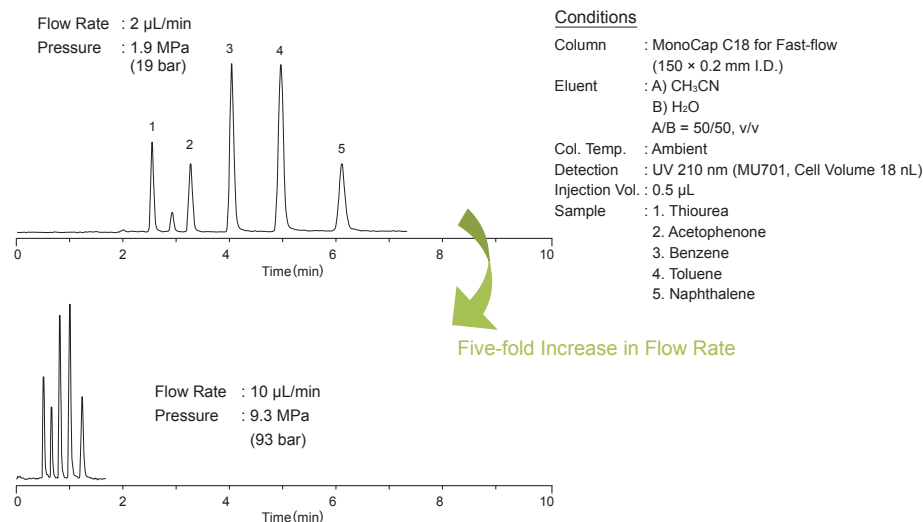
### MonoCap HILIC-UP High Resolution 2000

I.D. (mm)	Length (mm)	Cat. No.
0.1	2000	5020-10019

# Monolithic Capillary HPLC Columns

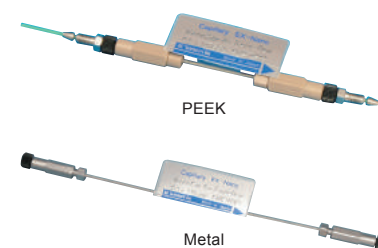
## MonoCap C18 Fast-flow

**Figure 1 : Workable at High Flow Rates without Sacrificing Efficiency**



Workable at a broad range of linear velocity from 0.5 to 5 mm/s without sacrificing efficiency and separation at high speed. The number of theoretical plates produced by MonoCap C18 Fast-flow is nearly equivalent to a totally porous particle type capillary column packed with a 5 µm packing material. Columns are protected by either metal or PEEK hardware.

End-fittings are 1/16 inch (10-32 UNF). 1/32 inch end-fittings are also available upon request.



I.D. (mm)	Length (mm)	50	150	250
	Material of Hardware	Cat.No.	Cat.No.	Cat.No.
0.05	Metal	5020-10102	5020-10101	5020-10100
	PEEK*	5020-10002	5020-10001	5020-10000
0.075	Metal	5020-10211	5020-10212	5020-10213
	PEEK*	5020-10221	5020-10222	5020-10223
0.1	Metal	5020-10112	5020-10111	5020-10110
	PEEK*	5020-10012	5020-10011	5020-10010
0.2	Metal	5020-10122	5020-10121	5020-10120
	PEEK*	5020-10022	5020-10021	5020-10020

## MonoCap C18 Nano-flow



MonoCap C18 Nano-flow produces higher number of theoretical plates compared to a totally porous particle type capillary column packed with a 3 µm packing material. It can be operated at a wide range of flow rate with low back pressure and achieve very high sensitive results in Nano-LC-ESI/MS applications. Columns are protected by either metal or PEEK hardware.

I.D. (mm)	Length (mm)	50	150
	Material of Hardware	Cat.No.	Cat.No.
0.05	Metal	5020-10143	5020-10141
	PEEK*	5020-10043	5020-10041
0.075	Metal	5020-10231	5020-10232
	PEEK*	5020-10241	5020-10242
0.1	Metal	5020-10153	5020-10151
	PEEK*	5020-10053	5020-10051
0.2	Metal	5020-10163	5020-10161
	PEEK*	5020-10063	5020-10061

\* All 50 mm length PEEK columns does not come with a hardware and will be supplied with 3 pcs of columns only.

## MonoCap C18 WideBore



The MonoCap C18 Fast-flow is also available in 0.5 mm I.D. size, which can be used at a wide range of flow rate from 6 to 100  $\mu\text{L}/\text{min}$  without sacrificing efficiency. The number of theoretical plates produced by MonoCap C18 WideBore is nearly equivalent to a totally porous particle type capillary column packed with a 5  $\mu\text{m}$  packing material. Columns are protected by metal hardware.

I.D. (mm)	Length (mm)	50	150	250
	Material of Hardware	Cat.No.	Cat.No.	Cat.No.
0.5	Metal	5020-10202	5020-10201	5020-10200

## MonoCap C18 Trap Column



MonoCap C18 Trap Column with Hardware  
(Top Image: 1/16 inch End-fittings, Bottom Image: 1/32 inch End-fittings)

MonoCap Trap columns have a relatively big throughpore and workable at a high flow rate such as 10  $\mu\text{L}/\text{min}$ . This benefit makes MonoCap Trap columns to be appropriate for on-line preconcentration or desalting of protein and peptide samples prior to HPLC separation with mass spectrometry detection.

End-fittings are 1/16 inch (10-32 UNF). 1/32 inch end-fittings are also available upon request.

I.D. (mm)	Length (mm)	50	100	150
	Hardware	Cat.No.	Cat.No.	Cat.No.
0.05	With Hardware	5020-10026	5020-10038	-
	Without Hardware	5020-10027	5020-10039	
0.075	With Hardware	5020-10028	5020-10036	
	Without Hardware	5020-10029	5020-10037	
0.2	With Hardware	5020-10033	-	5020-10031
	Without Hardware	5020-10034		

## MonoCap Amide



Amide groups are chemically bonded to the monolithic silica and makes it suitable for the analysis of sugars via HILIC mode. As the back pressure is significantly low, a 500 mm length MonoCap Amide column deliver over 40,000 plates offering high efficiency. Generally, HILIC mode uses acetonitrile at a concentration between 65-95 % in an aqueous buffer such as ammonium acetate or ammonium formate, which have high solubility in organic solvents. Columns are protected by either metal or PEEK hardware.

I.D. (mm)	Length (mm)	150	250	500
	Material of Hardware	Cat.No.	Cat.No.	Cat.No.
0.075	Metal	5020-10191	5020-10192	5020-10193
	PEEK	5020-10091	5020-10092	5020-10093
0.1	Metal	5020-10181	5020-10182	5020-10183
	PEEK	5020-10081	5020-10082	5020-10083
0.2	Metal	5020-10171	5020-10172	5020-10173
	PEEK	5020-10071	5020-10072	5020-10073

## MonoCap SCX

MonoCap SCX is bonded with benzene sulfonic acid groups (strong cation exchange) and appropriate for 2D LC applications for the separation of biomolecules such as peptides and proteins.

I.D. (mm)	Length (mm)	50	150	250	500
	Material of Hardware	Cat.No.	Cat.No.	Cat.No.	Cat.No.
0.2	Metal	5020-10174	5020-10175	5020-10176	5020-10177
	PEEK	5020-10074	5020-10075	5020-10076	5020-10077

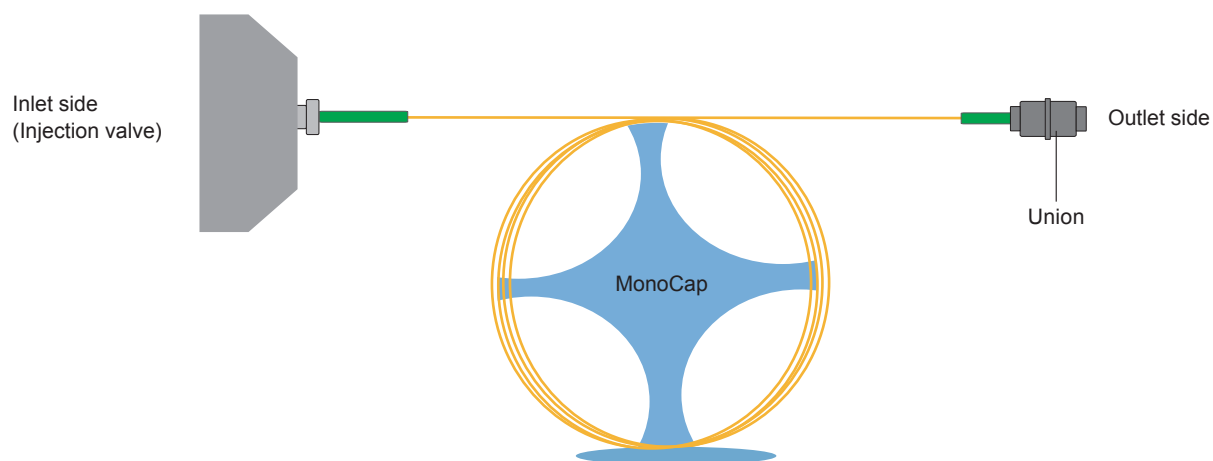
# How to Connect MonoCap Columns

## How to Connect MonoCap High Resolution Columns

Connect the inlet side of the column to auto sampler or injection valve directly, or from the piping to connect a union. Using a union to connect with the outlet side of column to detector (UV, MS). Please use the connection parts or connection kits for capillary LC columns.

### Example of how to connect

Connect the inlet side directly to injection valve, and the outlet side to the detector via the union.

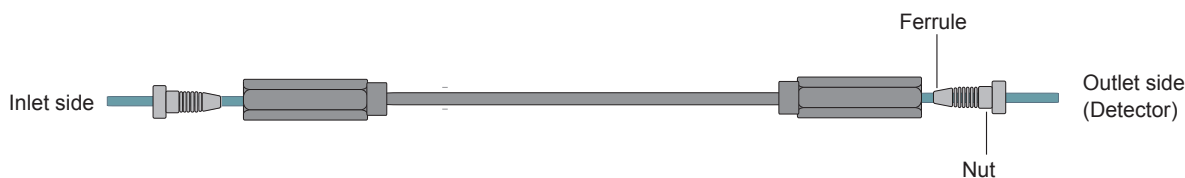




## How to Connect MonoCap (Metal Hardware) Columns

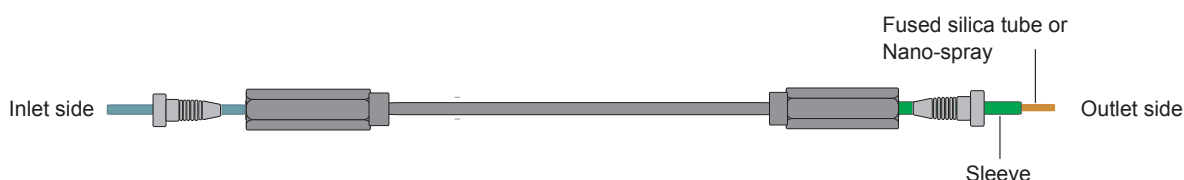
Connect the column inlet side to the piping from the auto sampler and the injection valve.  
Connect the column outlet side to detector (UV, MS).

### <Example 1>



### <Example 2>

If connect to the nano-ion source or directly to nano-spray, tighten the joint with a sleeve.



## How to Connect MonoCap (PEEK Hardware) Columns

Connect the column inlet side to the piping from the auto sampler and the injection valve.  
Using a union to connect the column outlet side to detector (UV, MS).

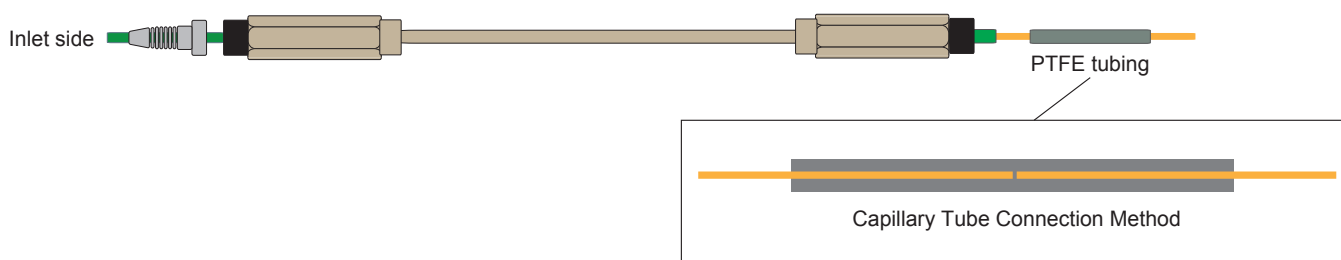
### <Example 1>

Connect the column inlet side directly to auto sampler (or injection valve), and connect the outlet side by a union.



### <Example 2>

Connect column inlet side to auto sampler (or injection valve) directly, and using a PTFE tubing to connect to fused silica tubing.



Reversed Phase Columns

HILIC Columns

Normal Phase Columns

SEC Columns

Ion Exchange Columns

Application Specific Columns

Guard Columns

Preparative Columns

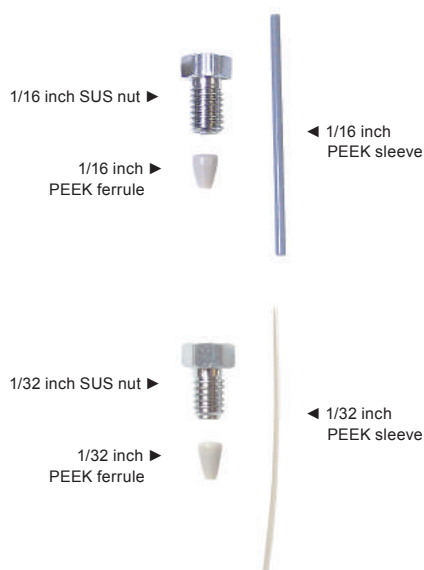
Capillary Columns

Applications

Cat. No. Index

# Connection Kits

## Capillary Tubing Connector Kit



### For 1/16 inch

Applicable Products	Content	Cat. No.
MonoCap High Resolution MonoCap (Metal columns) Capillary EX-Nano, Capillary -EX	Nut ZN1-10 : 6 pcs Ferrule ZF1PK-10 : 6 pcs Sleeve F-230 (color : grey 40 mm) 6 pcs	5020-10380

### For 1/32 inch

Applicable Products	Content	Cat. No.
MonoCap High Resolution MonoCap (Metal columns) Capillary EX-Nano, Capillary -EX	Nut 6 pcs Ferrule : 6 pcs Sleeve (color: nature 40 mm) 6 pcs	5020-10381

Description	Content	Cat.No.
Connection Kit for MonoCap C18 High Resolution 2000	1/16 inch PEEK Ferrule, SUS Nut, Sleeve 2 pcs each 1/32 inch PEEK Ferrule, SUS Nut, Sleeve 2 pcs each	5020-10017

Description	Qty.	Cat. No.
PTFE Tubing 20 mm 2 pcs 1/16 inchO.D. (Connect to 0.375 mm capillary tubing)	10 pcs	5020-10382

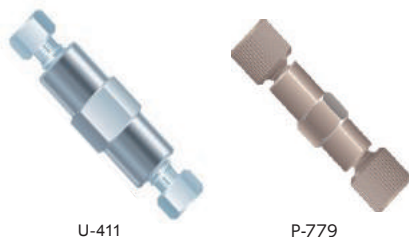
## Connection Kit for MonoCap C18 Trap Column



MonoCap C18 Trap Column Connection Kit 1/16 inch

Description	Cat.No.
MonoCap C18 Trap Column Connection Kit 1/16 inch (Union-Sleeve-Capillary Tubing 2 pcs each Nut-Ferrule 4 pcs each)	5020-10044
MonoCap C18 Trap Column Connection Kit 1/32 inch (Union-Sleeve-Capillary Tubing 2 pcs each Nut-Ferrule 4 pcs each)	5020-10045
MonoCap C18 Trap Column Assembly Parts 1/16 inch (Nut-Ferrule 4 pcs each)	5020-10046
MonoCap C18 Trap Column Assembly Parts 1/32 inch (Nut-Ferrule 4 pcs each)	5020-10047

## Union



U-411

P-779



UH-432



UH-436

### • Specification

Applicable Tubing O.D. : 1/16 inch

Maximum Pressure : 137.8 MPa (1378 bar) : SUS, 41.4 MPa (414 bar) : PEEK

P/N	Description	Screw Type	Orifice Diameter (µm)	Cat.No.
U-435	SUS ZDV Union	10-32UNF	250	6010-72352
U-411	SUS ZDV Union	10-32UNF	178	6010-72351
P-779	PEEK Nano Tight Union	10-32UNF	125	6010-72321

\* Fittings are attached

### • Specification

Applicable Tubing O.D. : 1/32 inch

Maximum Pressure : 103 MPa (1030 bar) : UH-432, 34.5 MPa (345 bar) : MU.5XCPK

P/N	Description	Screw Type	Orifice Diameter (µm)	Cat.No.
UH-432	Micro Tight Union 1/32 inch	5/16-24 Coned	150	6010-77070
MU.5XCPK	1/32 inch Microvolume Connectors (PEEK)		150	6010-73570

\* Fittings are attached

### • Specification

Applicable Tubing O.D. : 360 µm

Maximum Pressure : 103 MPa (1030 bar) : SUS

P/N	Description	Screw Type	Orifice Diameter (µm)	Cat.No.
UH-436	Micro Tight Union	5/16-24 Coned	150	6010-77071

\* Fittings are attached

## Tubing for Capillary Columns

	Applicable Columns' I.D. (mm)	Tubing Size	Length (m)	Qty. (pcs)	Cat. No.		
Fused Silica Capillary Tubing	0.05 - 0.3	I.D. : 0.03 mm O.D. : 0.375 mm	0.2	10	5020-10383		
			0.3	10	5020-10384		
			0.5	10	5020-10385		
			1	2	5020-10386		
	0.5 - 0.7	I.D. : 0.05 mm O.D. : 0.375 mm	0.2	10	5020-10387		
			0.3	10	5020-10388		
			0.5	10	5020-10389		
			1	2	5020-10390		
PEEK Tubing	Applicable Columns' I.D. (mm)	PEEK Tubing	Length (m)	Qty. (pcs)	Cat. No.		
			0.05 - 0.7	I.D. : 0.065 mm O.D. : 1/16 inch	0.05	10	5020-10391
					0.1	10	5020-10392
					0.3	10	5020-10393
					0.5	2	5020-10394

Reversed Phase Columns

HILIC Columns

Normal Phase Columns

SEC Columns

Ion Exchange Columns

Application Specific Columns

Guard Columns

Preparative Columns

Capillary Columns

Applications

Cat. No. Index

