

HPCCC Instruments: Purification Scale Suitability and Solvent Consumption

Dynamic Extractions instruments replace the column in column chromatographic systems. As with any column chromatographic system, each DE instrument size covers an optimal load range as shown in the table.

Notes

- Calculations in the table are based upon typical loads and flow rates as described:
 - Analytical scale columns (Mini and Spectrum):** typical run flow rate 1ml/min, typical load up to 150mg.
Usable flow rates: 0.5 – 2ml/min. Maximum load up to approximately 1g
 - Spectrum Semi-preparative scale column:** typical run flow rate 6ml/min, typical load up to approximately 1.5g.
Usable flow rates 3 – 12ml/min. Maximum load: up to 5 – 6g
 - Midi Preparative scale column:** typical run flow rate 42ml/min, typical load up to 10 - 12g.
Usable flow rates: 20 – 80ml/min. Maximum load: up to approximately 40g

Scale Suitability of Dynamic Extractions Benchtop Instruments (40min run/injection)

Sample injection mass (g)		0.01	0.05	0.1	0.5	1	5	10	50	100
Analytical	No. of Injections Required	1	1	1	3	6	30	-	-	-
	Total Time Required (min)	40	40	40	180	240	1200	-	-	-
	Total Solvent Used (mL)	92	92	92	300	640	3100	-	-	-
	Target Compound Volume (mL)	7	7	7	21	42	210	-	-	-
	Target Compound Concentration (g/L)	1.4	7.1	14	24	24	21	-	-	-
	Solvent Usage per gram (L)	9.2	1.8	0.9	0.6	0.6	0.6	-	-	-
Semi-preparative	No. of Injections Required	-	1	1	1	1	4	8	40	-
	Total Time Required (min)	-	40	40	40	40	160	330	1650	-
	Total Solvent Used (L)	-	0.6	0.6	0.6	0.6	3.3	6.6	31	-
	Target Compound Volume (L)	-	0.04	0.04	0.04	0.04	0.3	0.5	2.4	-
	Target Compound Concentration (g/L)	-	1.2	2.4	12	24	20	20	21	-
	Solvent Usage per gram (L)	-	11	5.5	1.1	0.6	0.7	0.7	0.6	-
Preparative	No. of Injections Required	-	-	-	1	1	1	1	5	10
	Total Time Required (min)	-	-	-	40	40	40	40	200	400
	Total Solvent Used (L)	-	-	-	3.9	3.9	3.9	7.8	31	62
	Target Compound Volume (L)	-	-	-	0.3	0.3	0.3	0.6	2.3	4.6
	Target Compound Concentration (g/L)	-	-	-	1.7	3.4	17	17	22	22
	Solvent Usage per gram (L)	-	-	-	7.8	3.9	0.8	0.8	0.6	0.6

Discussion

- Run time includes filling column with stationary phase, elution at the run's chosen flow rate to dynamic equilibrium, injection and classical elution
- Higher loads increase throughput as do higher flow rates and *vice versa*
- Maximum load is sample dependent

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