

# Agilent Load & Lock Columns

Innovative, easy-to-use DAC/SAC columns that provide superior results

## Data Sheet



### Introduction

Preparative and process liquid chromatography typically involves multiple, large injections of valuable materials so that flawless purification is critical. Agilent Load & Lock columns combine excellent packed bed stability with enhanced flow distribution to deliver the highest possible purification quality with maximum speed, flexibility, and ease-of-use. With a complete line of Load & Lock columns with inside diameters of 1, 2, and 3 in (27, 50, and 75 mm) and with dynamic or static axial compression (DAC/SAC), Agilent offers versatile column solutions for high performance, high throughput, and high yield preparative and pilot-scale purification.

### Features

- Unique fluid/sample distribution technology for increased sample loading, minimized peak broadening, and reduced back pressure
- Optional column water jacket promotes separation at elevated temperatures, improving resolution by enhancing the mass transfer of large solutes
- Excellent solution of choice for hazardous environments
- Easy to pack or unpack with any commercially available media within a few minutes
- Dynamic Axial Compression (DAC) or Static Axial Compression (SAC) design on the same column
- Sample loading 20 % greater than most other DAC type columns, saving time and reducing operating costs
- Maximum mobility – column and packing station are combined in one easy-to-move skid, wherever it's needed

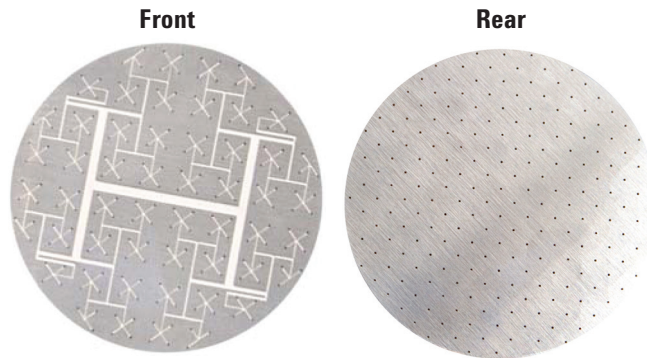


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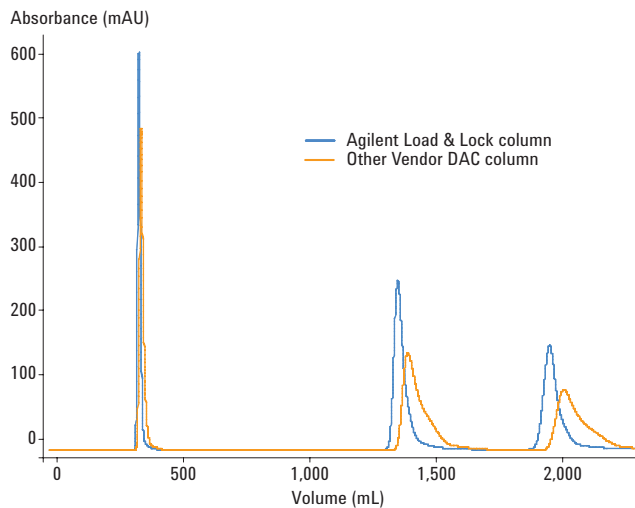
## Technical Details

### Maximum performance sample loading and bed stability

Fluid/sample distribution is the key parameter to effective column separations. Agilent has introduced a unique high performance system that enhances flow distribution within the column. These proprietary systems improve column performance by diffusing the sample more efficiently over the complete bed surface, providing exceptional separation efficiency to maximize plate count, extend column lifetime, and enhance sample loadability by up to 20 % to produce more purified material per hour and reduce production costs.



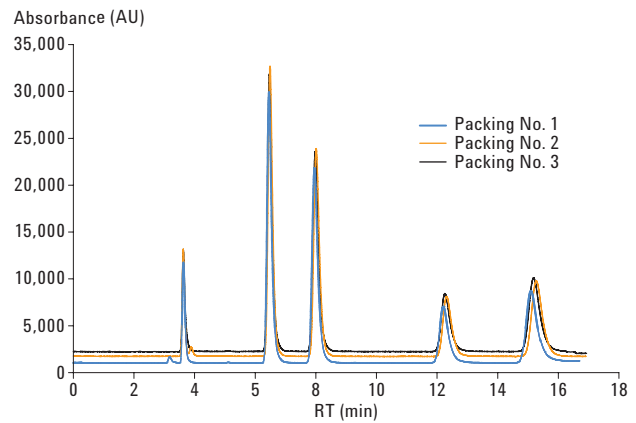
A proprietary fluid and sample distribution plate diffuses the sample more efficiently.



The outstanding efficiency of Agilent Load & Lock columns (used in DAC mode) is apparent in this comparison with a DAC column from another vendor.

### Temperature control for highest reproducibility

A water jacket is the most effective and lowest cost technique for column temperature control. When the enclosure is connected to a hot or cold water source, such as a circulating bath, it provides accurate and inexpensive temperature control for the preparative LC column. This is most useful when the separation is temperature dependent, or when processing thermally sensitive samples. The stainless steel water jacket is welded to the Load & Lock column and cannot be removed from the column body. The maximum allowable temperature is 60 °C. The Load & Lock columns improve the productivity of your laboratory or pilot plant by delivering excellent reproducibility, column to column.



Packing No.	Nth/meter	As	RT (min)
1	40,606	1.27	15.18
2	41,522	1.22	15.28
3	41,164	1.30	15.26

A packing study using a 2-in id Load & Lock column demonstrates excellent reproducibility

### Load & Lock Packing Station for easy operation

Requiring only compressed air, the Load & Lock packing station uses no power supply, making it safe to use with any type of solvent. It is the solution of choice for hazardous environments. Both packing stations consist of a hydraulic cylinder, and are controlled by an air-driven constant pressure hydraulic pumping system. The Packing Station requires an air source of 6 bar (90 psi), and provides for either dynamic or static axial compression operations.

Load & Lock columns can be packed using a variety of different methods depending on the length of the bed or the quantity of resin desired. The most common packing technique of high performance sorbent in this type of column is the rapid pack method.

The slurry or rapid pack method uses 60 % or less of the available column bed length. In this method, no reservoir is required; the slurry is introduced into the column, the end cap attached, and the slurry solvent removed through hydraulic compression. When the compression pressure is reached, the compression piston can be locked (SAC) in place. This packing method requires minutes, is residue free, and uses the entire aliquot of resin.

**Flexibility – the only system that can perform both dynamic axial compression and static axial compression**

The Load & Lock column is unique in that it offers both DAC and SAC.

- With DAC, the packed bed is constantly compressed while being used.
- With SAC, the column is compressed by a plunger held in position with a locking mechanism.

Axial compression is used in the column packing process to compress the sorbent particles into a tightly packed, void-free bed for high performance purifications.

DAC columns are often preferred by uninformed users, who are often unaware of SAC capabilities. Users are more familiar with the traditional packing procedure that has been around for approximately 20 years. In general, spherical particle sorbents in the 5–10 µm size range, which can withstand substantial compression forces, are used for these applications. For this situation, Agilent suggests using the Load & Lock columns in the DAC mode.

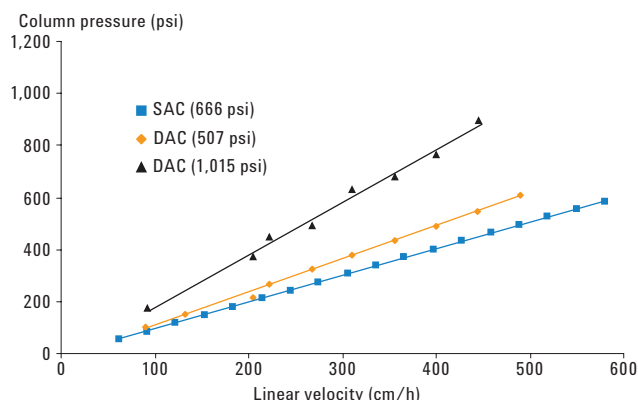
In contrast, SAC-type Load & Lock columns are recommended for use:

- With particle sizes of 10 µm or larger
- With easily-damaged media, for example, for 300 Å materials where the particle can be easily broken into fines when exposed to continual hydraulic cycling typical of the DAC mode
- With irregular shaped sorbent particles
- With sensitive gels like the 300 Å type particles that are used for biological applications as in the Agilent Bio-LC Load & Lock columns

If the separation efficiency (resolution) of the chromatography column begins to deteriorate in the SAC packed columns, due to the bed wearing, the Load & Lock columns may simply be recompressed, by placing the column back on the packing station, recompressing the column, and relocking the holding mechanism.

The flexibility of performing in either mode ensures the delivery of consistently high quality results, and the stable packed bed ensures excellent permeability and extended column lifetimes. PLRP-S media are packed using DAC mode and then operated in SAC mode so there is no requirement for DAC to be used to eliminate voids generated during operation.

All the 1, 2, and 3-in id Load & Lock columns use the same Agilent 123 MultiPacker Station (123MPS). This unique design feature provides for the establishment of a central packing zone, which can be located away from the sample preparation and purification areas. In the SAC mode, columns can be removed from the packing station, and used anywhere in your facility without the packing station. This frees up the packing station and gives you the flexibility to pack an unlimited number of columns.



This plot of pressure against linear velocity demonstrates the improved permeability and wider linear velocity range of Load & Lock columns. In this example, the column was packed with PLRP-S 100 Å, 10–15 µm material, at a pressure of 666 psi (46 bar) in DAC mode, and operated in SAC mode with an eluent of 80 % acetonitrile and 20 % water. For comparison, the plots of conventional DAC columns packed at pressures of 507 and 1,015 psi (35 and 70 bar) are shown.

## Specifications

Description		Specification		
		500 × 27 mm	500 × 50 mm	500 × 75 mm
Internal diameter		27 mm	50 mm	75 mm
Minimum bed length		50 mm	50 mm	50 mm
Maximum recommend bed length (60 % of tube length)		300 mm	300 mm	300 mm
Total volume		190 mL	980 mL	2,200 mL
Maximum sorbent capacity		114 grams	590 grams	1,325 grams
Column plunger compression		Bottom up	Bottom up	Bottom up
Maximum working pressure (psi/bar)		2,000/134	2,000/134	2,000/134
Maximum hydraulic pressure (psi/bar)		500/33	1,500/100	3,000/200
Ratio hydraulic pressure to mechanical pressure on bed		0.5:1.0	1.5:1.0	3.0:1.0
Utilities required to operate column		90 psi clean compressed air	90 psi clean compressed air	90 psi clean compressed air
Column	Width	18 in/46 cm	16 in/41 cm	15 in/38 cm
	Height	37 in/94 cm	40 in/102 cm	36 in/91 cm
	Depth	18 in/46 cm	16 in/41 cm	15 in/38 cm
	Weight	21 lb/9.5 kg	45 lb/20 kg	81 lb/37 kg
MultiPacker Station	Width	24 in/60 cm	24 in/60 cm	24 in/60 cm
	Height	39 in/100 cm	39 in/100 cm	39 in/100 cm
	Depth	16 in/41 cm	16 in/41 cm	16 in/41 cm
	Weight	136 lb/62 kg	136 lb/62 kg	136 lb/62 kg

## Ordering Details

Description	Order number		
	500 × 27 mm	500 × 50 mm	500 × 75 mm
Column without water jacket	PCG93LL500X25	PCG93LL500X50	PCG93LL500X75
Column with water jacket	PCG93LL500X25WJ	PCG93LL500X50WJ	PCG93LL500X75WJ
MultiPacker Station	PCG93STAND123	PCG93STAND123	PCG93STAND123
Spare parts kit	PCG931AAKIT	PCG932AAKIT	PCG933AAKIT

[www.agilent.com/chem/purification](http://www.agilent.com/chem/purification)

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