

Packed Column Instruction Sheet

Important Notes

1. The packing materials used in stock packed columns are conditioned for 16 hrs at 5 °C below the maximum liquid phase operating temperature; however, stock packed columns still require conditioning prior to use following the steps outlined in the Installation Instructions below.
2. Custom packed columns require conditioning following the steps outlined in the Installation Instructions below.
3. All molecular sieve columns are fully activated and end-capped to prevent moisture diffusion.
4. Columns configured for on-column injection have a 2" void at the inlet (unless otherwise noted). A column specified as "packed full" does not contain this void.
5. Occasionally, to minimize static charge, a small volume of a proprietary solvent may be used to aid in the packing of the column. This will not affect column performance; however, care should be taken when installing the column for the first time as a small volume of liquid may be expelled from the column.
6. For GCs designed for capillary columns, an adaptor or "pigtail" will be needed to install a column. Contact Restek's Technical Service Team or your instrument manufacturer for details.
7. Operating temperature limits for most liquid phases available from Restek are listed in Table I.
8. Never cut or trim either end of a packed column.

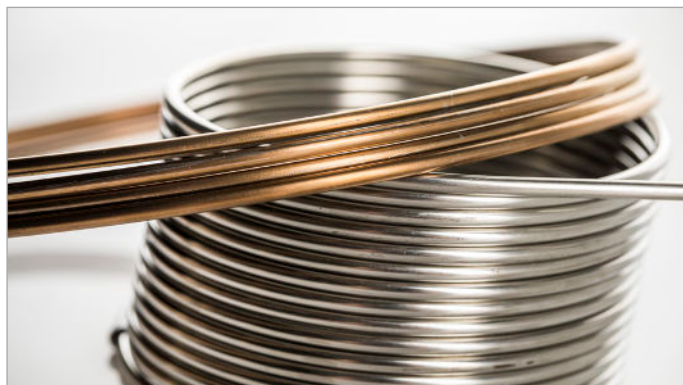
Installation Instructions

1. Remove the column end-caps (and silicone ferrule, if present) and connect the column to the injector by using a Restek packed column inlet adaptor, installation kit, or the instrument manufacturer's adaptor.
2. Stock columns or preconditioned columns may be immediately connected to the detector following the instructions specified by the detector manufacturer.

Do not connect a custom packed column to the detector unless it has been preconditioned at Restek, or you condition it yourself following the instructions in Step 3.

3. Condition the column using the following procedure.
 - a. Slowly turn on the carrier gas and adjust to the desired flow rate. Do not increase at a rate exceeding 10 psi/min or you may compact the packing and plug the column.
 - b. Purge the column at ambient temperature for 10 min to remove any trapped air, then elevate to the operating temperature and hold for 30-60 min (for porous polymers and liquid phase coated supports) or 3 hrs (for molecular sieves). Do not exceed the maximum temperature for the packing (Tables I and II) and do not condition overnight.
 - c. If your column has not been connected to the detector prior to conditioning, it can be connected now by following the installation instructions in Step 2. Your column is now ready to use.

Warning: If using hydrogen as the carrier gas, be sure to safely vent the gas exiting the column.



Helpful Hints

Injector and Detector Temperatures

Be certain the heated zones do not exceed the maximum temperature of the packing. If the column contains multiple packings, the lowest maximum temperature sets the limit for the column. See Table I for a list of temperature limits.

GC Maintenance and Column Removal

Allow the oven to cool. Turn off the carrier gas flow and allow sufficient time for the pressure in the column to reach 0 psig: removing the column or the septum under pressure will expel packing material from the column.

CarboBlack Columns

Avoid rough handling to prevent damage to the CarboBlack B or CarboBlack C packing. Note that these columns can be overloaded easily. Neat samples require on-column injection volumes of less than 0.2 µL. When injecting diluted samples, do not exceed 70 µg on-column (each component) for CarboBlack B packing, or 35 µg on-column for CarboBlack C packing.

Temperature Limits

Never exceed the recommended maximum temperature (Tables I and II).

Molecular Sieve Columns

Occasionally, 5A and 13X molecular sieve columns need to be dried to remove moisture. To dry, we recommend using clean, dry nitrogen. With 25 mL/min nitrogen flowing through the column, set the GC oven temperature to 300 °C and bake the column for 3 hrs.

GC Head Pressure

Please note that the carrier gas head pressure will differ for packed columns, even among those with the same mesh size. This is due to differences in particle shapes and sizes. Irregularly shaped particles will pack more densely than spherical particles. In addition, because mesh size is actually a range of particle sizes and not simply a single size, each column will have a unique pressure drop. Therefore, carrier gas head pressure may need to be adjusted for each packed column, even for columns that contain the same packing.

Peak Shapes

If you experience irregular peak shapes or tailing peaks, verify that the column is not overloaded by injecting less sample or standard.

Leak Checking

Always leak check every connection/fitting and around the injection port using an electronic leak detector.

Table I: Liquid phases available for Restek packed columns. Inquire about others.

Phase	min/max temp. (°C)	Phase	min/max temp. (°C)
Apiezon L	50/300	OV-7, phenyl methyl dimethyl, 20% phenyl	0/350
<i>p,p'</i> -Azoxydiphenetole	132/140	OV-11, phenyl methyl dimethyl, 35% phenyl	0/350
BC-120	0/125	OV-17, phenyl methyl, 50% phenyl	0/375
Bentone-34	0/180	OV-25, phenyl methyl diphenyl, 75% phenyl	0/350
bis (2-ethoxyethyl) adipate	0/150	OV-101, dimethyl (fluid)	0/350
bis (2-ethylhexyl) phthalate	150 max.	OV-210, trifluoropropyl (fluid)	0/275
bis (2-methoxyethyl) adipate	20/100	OV-225, cyanopropyl methylphenyl methyl	0/265
Carbowax 1000	40/150	OV-275, dicyanoallyl	25/250
Carbowax 20M	60/225	OV-351	50/270
Carbowax 20M-terephthalic acid	60/225	Phenyldiethanolamine succinate	0/230
Carbowax 400	10/100	Polyphenyl ether (5 rings) OS-124	0/200
Carbowax 600	30/125	Polyphenyl ether (6 rings) OS-138	0/225
Cyclohexanedimethanol succinate	100/250	Polypropylene glycol	0/150
DC-200	0/200	Rtx-1 (Rt-101)	0/350
DC-550	20/250	Rt-1000	50/250
DEGS-PS	20/200	Rt-1200	25/200
Di(2-ethylhexyl)sebacate	0/125	Rt-1500, Rt-1510	50/230
Diethylene glycol succinate (DEGS)	20/200	Rt-2100	0/350
Diethylene glycol adipate (DEGA)	0/200	Rt-2300	20/275
Diisodecyl phthalate	0/175	Rt-2330, Rt-2340	25/275
2,4-Dimethylsulfolane	0/50	Rt-Sebaconitrile	25/110
Dinonyl phthalate	20/150	Rt-XLSulfur	250 max.
Ethylene glycol adipate	100/225	SE-30, SE-52, SE-54	50/300
Ethylene glycol phthalate	100/200	Sorbitol	150 max.
Ethylene glycol succinate	100/200	Squalane	20/100
FFAP	50/250	Squalene	0/100
Igepal CO-880 (Nonoxynol)	100/200	Stabilwax	40/240
Krytox	-30/260	Tetracyanoethylated pentaerythritol	30/175
Neopentyl glycol adipate	50/225	THEED (Tetrahydroxyethylenediamine)	0/125
Nonoxynol (Igepal CO-880)	100/200	β,β-Thiodipropionitrile (TDPN)	100
<i>n</i> -Octane on Res-Sil C	150 max.	Tricresyl phosphate	20/125
OPN on Res-Sil C	150 max.	1,2,3-Tris (2-cyanoethoxy) propane (TCEP)	0/175
β,β-Oxydipropionitrile	0/75	UCON 50-HB-2000	0/200
OV-1, dimethyl (gum)	100/350	UCON 50-HB-280-X	0/200
OV-1, vinyl	100/350	UCON 50-HB-5100	0/200
OV-3, phenyl methyl	0/350	Versamid 900	190/275

Table II: Packing materials available for Restek packed columns. Inquire about others.

Packing Material	Temp. Limit (°C)	Packing Material	Temp. Limit (°C)
HayeSep A	165	Porapak P	250
HayeSep B	190	Porapak PS	250
HayeSep C	250	Porapak Q	250
HayeSep D	290	Porapak QS	250
HayeSep DIP	290	Porapak R	250
HayeSep DB	290	Porapak S	250
HayeSep N	165	Porapak N	190
HayeSep P	250	Porapak T	190
HayeSep Q	275	Tenax-TA	350
HayeSep R	250	Tenax-GR	350
HayeSep S	250		
HayeSep T	165		

Questions about this or any other Restek product?
Contact us or your local Restek representative (www.restek.com/contact-us).

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