

Graphitized Carbon Blacks

Carbotrap/Carbopack - Unlike activated charcoals, which are porous, graphitized carbon blacks (GCBs) generally are non-porous. Consequently, the entire surface of these materials is available for interactions that depend solely on dispersion (London) forces.

Tubes containing *Carbotrap*, *Carbotrap C*, and *Carbotrap F* graphitized carbon blacks trap a wide range of airborne organic compounds, from C4-C5 hydrocarbons to polychlorinated biphenyls and other large molecules. *Carbotrap* adsorbent has a surface area of 100m²/g and can be used for monitoring many airborne C5-C12 compounds. The smaller surface areas of *Carbotrap C* and *Carbotrap F* adsorbents, 10m²/g and 5m²/g, respectively, make these materials useful for trapping and efficiently releasing larger molecules, in the C9-C30 range.

Unlike most GCBs, *Carbopack X* is porous. Its surface area of 240m²/g gives it greater adsorption strength than other GCBs, hence it is a unique bridge between GCBs and carbon molecular sieves. *Carbopack Y*, with a surface area of 24m²/g, bridges the characteristics of *Carbopack B* and *Carbopack C*.

These adsorbents offer excellent thermal stability, which ensures minimal bleed at thermal desorption temperatures, and their coarse 20/40 and 40/60 mesh particle size prevents high pressure drop across the tube. Hydrophobic properties minimize sample displacement by water, enabling you to obtain accurate samples despite high humidity. Trapped compounds can be desorbed by solvent or thermal desorption, at virtually 100% desorption efficiency.

Carbopack B, *Carbopack C*, and *Carbopack F* GCBs are essentially the same adsorbents as *Carbotrap*, *Carbotrap C*, and *Carbotrap F*, respectively, but in a 60/80 mesh size. These materials often are used in narrow bore tubes (1- 2mm ID), for sample refocusing or very low flow sampling (e.g., <20mL/min).

SORBENT CROSS REFERENCE

SORBENT	SUPELCO EQUIVALENT OR SUBSTITUTE
Ambersorb 347	Carboxen 564
Anasorb C300	Hopcalite
Anasorb CMS	Carboxen 564, Carboxen 1000, Carbosieve S-III
Anasorb CSC	coconut charcoal
Anasorb GCB1	Carbopack B, Carbotrap B
Anasorb GCB2	Carbopack C, Carbotrap C
Anasorb 708	Chromosorb 108
Anasorb 727	XAD-4
Anasorb 747	Carboxen 564, Carboxen 1000, Carbosieve S-III
Carbograph 1	Carbopack B, Carbotrap B
Carbograph 2	Carbopack C, Carbotrap C
Carbosphere	Carboxen 1000
Graphpac-GC	Carbopack B, Carbotrap B, Carbopack C, Carbotrap C
Hydrar	Hopcalite
Purosieve	Carboxen 1000
Spherocarb	Carboxen 1000
Tenax GC	Tenax TA

Carbon Molecular Sieves

A carbon molecular sieve is the carbon skeletal framework remaining after the pyrolysis of a polymeric precursor. These materials are primarily used for collecting very small molecular-sized compounds (e.g., chloromethane, vinyl chloride, and Freon compounds). The size and shape of the analyte molecule and the size and shape of the pores in the adsorbent particle determine how well the analyte is adsorbed and desorbed. Our *Carbosieve S-III* and *Carboxen* carbon molecular sieves have upper temperature limits of at least 400°C.

Carbosieve S-III - A large surface area (approximately 820m²/g) and 15-40Å pores make *Carbosieve S-III* spherical carbon molecular sieve excellent for trapping small airborne molecules, such as chloromethane. Although hydrophobic, *Carbosieve S-III* retains slightly more water during sampling than does *Carboxen-569*. The pure carbon framework permits thermal desorption of analyte molecules without loss.

Carboxen - *Carboxen* carbon molecular sieves are highly hydrophobic, ensuring accurate sampling at high humidities.

Carboxen-563 and *Carboxen-564* adsorbents are our preferred versions of *Ambersorb XE-340* and *Ambersorb XE-347* adsorbents - the *Carboxen* adsorbents have higher capacity (breakthrough volume) for many volatile organic compounds (VOCs). *Carboxen-563* adsorbent is used for analyzing water quality or airborne compounds. Its range for airborne compounds is similar to that for *Carboxen-564* adsorbent, but with a somewhat lower capacity. *Carboxen-564* adsorbent is effective for monitoring many C2-C5 VOCs.

Carboxen-569 adsorbent is a 20/45 mesh material with no *Ambersorb* equivalent. High hydrophobicity makes it useful for sampling in high humidity (use a 4mm ID or larger tube). Relative to *Carboxen-563* and *Carboxen-564* adsorbents, *Carboxen-569* has greater capacity for organic molecules and less capacity for water.

Carboxen-1000 adsorbent is for low volume sampling of very volatile compounds, such as vinyl chloride. Its large surface area and optimized microporosity enable it to effectively and efficiently adsorb and desorb smaller molecular size compounds, providing excellent chromatography without a need for cryogenic cooling. This 60/80 mesh adsorbent is used primarily in narrow bore tubes that are desorbed directly into the chromatographic column.

Carboxen-1001 adsorbent also is a 60/80 mesh material used to trap and retain small compounds. It often is used as the final bed in multi-bed adsorbent tubes, to minimize breakthrough. It is similar to *Carboxen-569* in strength and hydrophobicity.

Carboxen-1003 adsorbent is a carbon molecular sieve with a large surface area and hydrophobic surface characteristics, which provide a combination of efficient adsorption/desorption and good hydrophobicity.

Porous Polymers

Supelpak-2 - Supelpak-2 adsorbent is a purified form of Amberlite XAD-2 resin, designed for minimal background interference when monitoring semivolatile contaminants.

It meets USEPA-recommended criteria for purity, as outlined in the EPA's Level 1 Environmental Assessment Procedures Manual. Supelpak-2 adsorbent is used in the following USEPA methodologies: SW-846 Method 0010, Modified Method 5 Sampling Train for Principal Organic Hazardous Compounds (POHCs); TO-13 - PAHs in ambient air; IP-7 - PAHs in indoor air.

Supelpak-2B is a form of Amberlite XAD-2 resin specially cleaned to USEPA specifications for the Great Lakes National Program Office (GLNPO) program, for sampling and analysis of PCBs from large volumes of water.

Tenax - Tenax TA is a porous material based on 2,6-diphenylene oxide polymer. It is used to trap volatile and semivolatile compounds with an upper temperature limit of 350°C. The material has a low affinity for water and methanol. When sampling for very volatile analytes with



Tenax TA, a carbon molecular sieve typically is used as a backup.

Tenax GR is a composite material containing 30% graphite carbon and 70% Tenax TA. Compared to Tenax TA, it has a higher retention volume for most compounds and is twice as dense. Like Tenax TA, it has a low affinity for water or methanol and has an upper temperature limit of 350°C.

Chromosorb 106 - Chromosorb 106 is a styrene-divinylbenzene polymer used to trap small molecules. It has a surface area of 750m²/g and an upper temperature limit of 250°C.

Glass Beads

Glass beads are used primarily as a filter at the inlet end of a multibed adsorbent tube. They provide a thermally stable, inert, low surface area (<5m²/gram) adsorption site for very large molecules to condense upon, preventing them from reaching a stronger adsorbent where they will not be readily desorbed. Glass beads often are packed in cryogenically cooled traps to increase surface area.

Bulk Adsorbents for Air Monitoring and Purge-and-Trap

ADSORBENT	MESH SIZE	SURFACE AREA (m ² /g)	DENSITY (g/mL)	MAXIMUM TEMP. (°C) ¹	APPLICATION	QTY. (g)	CAT. NO.
GRAPHITIZED CARBON BLACKS							
Carbotrap B	20/40	100	0.36	>400	C5-C12	10	20287
Carbotrap C	20/40	10	0.72	>400	C12-C20	10	20309
Carbotrap F ²	20/40	5	0.66	>400	>C20	—	—
Carbotrap X	20/40	250	0.41	>400	C3-C5	10	10435-U
Carbotrap Y	20/40	25	0.42	>400	C12-C20	10	10460-U
Carbopack B	60/80	100	0.36	>400	C5-C12	10	20273
Carbopack C	60/80	10	0.72	>400	C12-C20	10	10257
Carbopack F ²	60/80	5	0.66	>400	>C20	—	—
Carbopack X	40/60	250	0.41	>400	C3-C5	10	10436
Carbopack X	60/80	250	0.41	>400	C3-C5	10	10437-U
Carbopack Y	40/60	25	0.42	>400	C12-C20	10	10461-U
Carbopack Y	60/80	25	0.42	>400	C12-C20	10	10462
CARBON MOLECULAR SIEVES							
Carbosieve S-III	60/80	820	0.61	>400	C2-C5	10	10184
Carboxen 563	20/45	510	0.53	>400	C2-C5	10	10263
Carboxen 564	20/45	400	0.60	>400	C2-C5	10	10264
Carboxen 569	20/45	485	0.58	>400	C2-C5	10	10269
Carboxen 1000	45/60	1200	0.44	>400	C2-C5	50	10477-U
Carboxen 1000	60/80	1200	0.44	>400	C2-C5	10	10478-U
Carboxen 1001 ²	60/80	500	0.61	>400	C2-C5	—	—
Carboxen 1002 ²	40/60	1100	0.43	>400	C2-C5	—	—
Carboxen 1003	40/60	1000	0.46	>400	C2-C5	10	10471
POROUS POLYMERS							
Supelpak-2	20/60	300	1.02	200	>C12	100	20279
Supelpak-2	20/60	300	1.02	200	>C12	120	13359-U
Supelpak-2B	20/60	300	1.02	200	>C12	100	13670
Tenax TA	60/80	35	0.25	350	C5-C26	10	11982
OTHER							
Coconut Charcoal	20/40	1070	0.44	220	C2-C5	10	10275
Silica Gel 15 ²	35/60	750	0.74	180	C2-C5	—	—
3% SP2100/ Chromosorb W AW ²	60/80	<5	—	350	>C12	—	—

¹ May be a limitation of the instrumentation, not the adsorbent.

² Not available as a bulk packing.

Air Monitoring

Refer to inside back cover for prices.