

## Basic Compounds Analysis

**Rtx®-5 Amine** (low polarity phase; Crossbond® 5% diphenyl/95% dimethyl polysiloxane)

- Application-specific columns for amines and other basic compounds, including alkylamines, diamines, triamines, ethanolamines, and nitrogen-containing heterocyclics.
- Stable to 315°C.

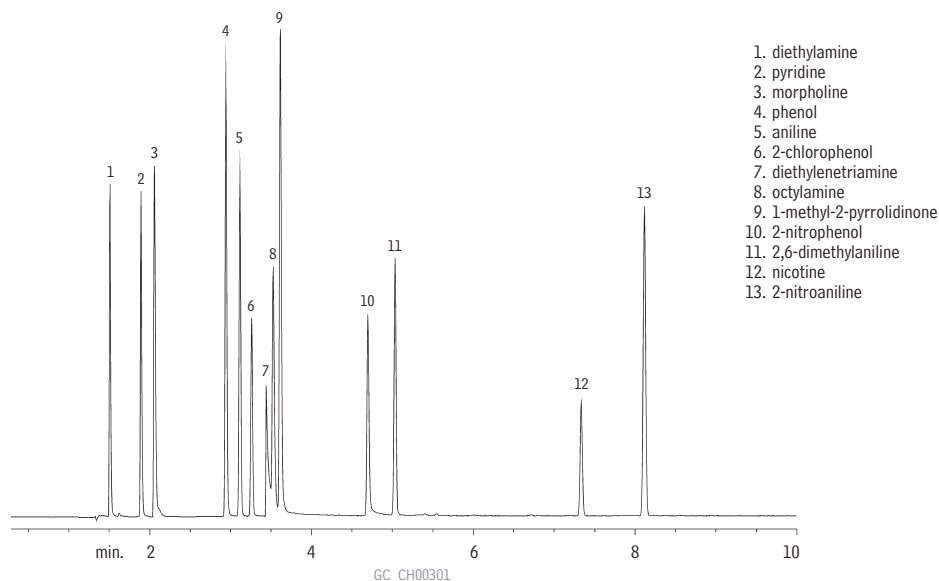
Active basic compounds that otherwise require derivatization, or an alternative analytical technique, can be analyzed on an Rtx®-5 Amine column. The tubing surface is chemically altered to reduce tailing of basic compounds, eliminating the need for column priming. An Rtx®-5 Amine column is ideal for analyzing a wide variety of basic compounds, but breakthrough technology also allows the analysis of neutral compounds, adsorptive compounds with oxygen groups susceptible to hydrogen bonding, or even weakly acidic compounds such as phenols. Every Rtx®-5 Amine column is tested to ensure that it exceeds the requirements for analyzing ppm levels of amines, without priming, and to ensure low bleed at maximum operating temperature.

**Rtx®-5 Amine Columns** (fused silica)

(Crossbond® 5% diphenyl/95% dimethyl polysiloxane)

ID	df (µm)	temp. limits	15-Meter	30-Meter
0.25mm	0.25	-60 to 300/315°C	12320	12323
	0.50	-60 to 300/315°C	12335	12338
	1.00	-60 to 300/315°C	12350	12353
0.32mm	1.00	-60 to 300/315°C	12351	12354
	1.50	-60 to 290/305°C	12366	12369
0.53mm	1.00	-60 to 290/305°C	12352	12355
	3.00	-60 to 280/295°C	12382	12385

### Excellent peak shapes for amines & phenols on an Rtx®-5 Amine column.



Column: Rtx®-5 Amine, 30m, 0.32mm ID, 1.0µm (cat.# 12354)  
 Inj.: 1.0µL split injection of amines and phenols in water  
 On-column conc.: 22ng  
 Oven temp.: 120°C to 220°C @ 10°C/min.  
 Inj./det. temp.: 305°C  
 Carrier gas: hydrogen  
 Linear velocity: 38cm/sec. set @ 120°C  
 FID sensitivity: 6.4 x 10<sup>-11</sup> AFS  
 Split ratio: 25:1

restek  
innovation!

similar **phase**

PTA-5

also **available**

See **page 58** for Rtx®-35  
Amine columns.

please **note**

We recommend using base-deactivated fused silica guard columns (**page 29**) and base-deactivated liners (Instrument Supplies section of this catalog) with Rtx®-5 Amine columns.

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## Basic Compounds Analysis

restek  
innovation!**Rtx®-35 Amine** (midpolarity phase; Crossbond® 35% diphenyl/65% dimethyl polysiloxane)

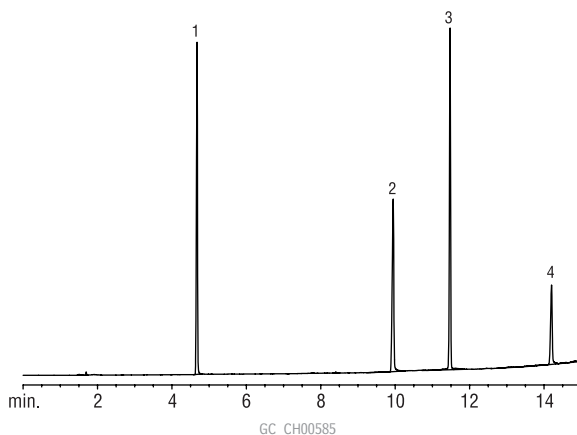
- Application-specific columns for amines and other basic compounds, including alkylamines, diamines, triamines, ethanolamines, and nitrogen-containing heterocyclics.
- Stable to 220°C.

Active basic compounds that otherwise require derivatization, or an alternative analytical technique, can be analyzed on an Rtx®-35 Amine column. The tubing surface is chemically altered to reduce tailing of basic compounds, eliminating the need for column priming. An Rtx®-35 Amine column is ideal for analyzing a wide variety of basic compounds, but breakthrough technology also allows the analysis of neutral compounds, adsorptive compounds with oxygen groups susceptible to hydrogen bonding. Every Rtx®-35 Amine column is tested to ensure that it meets the requirements for analyzing ppm levels of amines, without priming, and to ensure low bleed at maximum operating temperature.

**Rtx®-35 Amine Columns** (fused silica)

(Crossbond® 35% diphenyl/65% dimethyl polysiloxane)

ID	df (µm)	temp. limits	15-Meter	30-Meter
0.25mm	0.50	0 to 220°C	11335	11338
	1.00	0 to 220°C	11350	11353
0.32mm	1.00	0 to 220°C	11351	11354
	1.50	0 to 220°C	11366	11369
0.53mm	1.00	0 to 220°C	11352	11355
	3.00	0 to 220°C	11382	11385

**Sharp ethanolamine peaks, low bleed: Rtx®-35 Amine column.**

1. monoethanolamine
2. diethanolamine
3. triethyleneglycol monomethylether
4. triethanolamine

Column: Rtx®-35 Amine, 30m, 0.32mm ID, 1.0µm (cat.# 11354)  
 Sample: 500µg/mL ethanolamine standard in water  
 Inj.: 1.0µL split (split ratio 10:1),  
 cup splitter inlet liner (cat.# 20709)  
 Inj. temp.: 300°C  
 Carrier gas: helium, constant pressure  
 Linear velocity: 40cm/sec. @ 50°C  
 Oven temp.: 50°C (hold 0.50 min.) to 280°C @15°C/min.  
 Det.: FID @ 300°C

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## Basic Compounds Analysis

**Stabilwax®-DB** (polar phase; Crossbond® base-deactivated Carbowax® polyethylene glycol)

- Application-specific columns for underivatized amines and other basic compounds, including alkylamines, diamines, triamines, nitrogen-containing heterocyclics. No need for column priming.
- Temperature range: 40°C to 220°C.

Stabilwax®-DB columns reduce adsorption and improve responses for many basic compounds, without analyte derivatization or column priming. For different selectivity of basic compounds, or higher oven temperatures, use an Rtx®-5 Amine or Rtx®-35 Amine column.

Stabilwax®-DB is a bonded stationary phase, but avoid rinsing these columns with water or alcohols.

### Stabilwax®-DB Columns (fused silica)

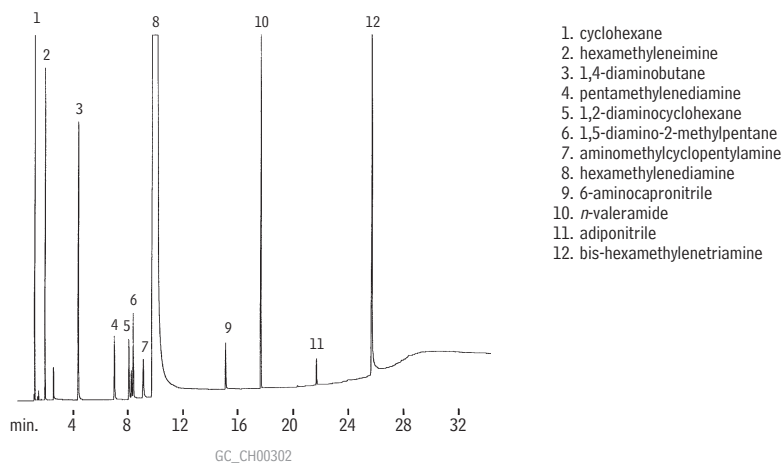
(Crossbond® Carbowax® polyethylene glycol for amines and basic compounds)

ID	df (µm)	temp. limits	15-Meter	30-Meter	60-Meter
0.25mm	0.25	40 to 210/220°C	10820	10823	
	0.50	40 to 210/220°C		10838	
0.32mm	0.25	40 to 210/220°C	10821	10824	
	0.50	40 to 210/220°C		10839	
	1.00	40 to 210/220°C	10851	10854	10857
0.53mm	0.50	40 to 210/220°C		10840	
	1.00	40 to 210/220°C	10852	10855	10858
	1.50	40 to 210/220°C		10869	

### similar phases

DB-CAM, Carbowax® Amine, CP Wax 51 for amines

### Hexamethylenediamine on a Stabilwax®-DB column.



Column: Stabilwax®-DB, 30m, 0.32mm ID, 0.25µm (cat.# 10824)  
 Inj.: 0.4µL direct injection of a neat hexamethylenediamine sample  
 On-column conc.: 10 to 1000ng/component  
 Oven temp.: 95°C (hold 6 min.) to 235°C @ 7°C/min. (hold 4 min.)  
 Inj./det. temp.: 250°C  
 Carrier gas: hydrogen  
 Linear velocity: 40cm/sec.  
 FID sensitivity: 2 x 10<sup>-11</sup> AFS

## Acidic Compounds Analysis



**Steve Allison**  
R&D Group Leader  
1+ year of service!

**Stabilwax®-DA** (polar phase; Crossbond® acid-deactivated Carbowax® polyethylene glycol)

- Application-specific columns for free (underivatized) acids, some inorganic acids.
- Resistant to oxidative damage.
- Temperature range: 40°C to 250°C.
- Equivalent to USP G25, G35 phases.

Stabilwax®-DA bonded polyethylene glycol has an acidic functionality incorporated into the polymer structure. This permits analysis of acidic compounds without derivatization, significantly reduces adsorption of acids, and increases sample capacity for volatile free acids. Stabilwax®-DA columns last longer and give better peak shapes for high molecular weight acids. Some inorganic acids also chromatograph well on a Stabilwax®-DA column; the limitation is the volatility of the acidic compound.

**Stabilwax®-DA Columns** (fused silica)

(Crossbond® Carbowax® polyethylene glycol for acidic compounds)

ID	df (µm)	temp. limits	15-Meter	30-Meter	60-Meter
0.25mm	0.10	40 to 250°C	11005	11008	11011
	0.25	40 to 250°C	11020	11023	11026
	0.50	40 to 250°C	11035	11038	11041
0.32mm	0.10	40 to 250°C	11006	11009	11012
	0.25	40 to 250°C	11021	11024	11027
	0.50	40 to 250°C	11036	11039	11042
	1.00	40 to 240/250°C	11051	11054	11057
0.53mm	0.10	40 to 250°C	11007	11010	11013
	0.25	40 to 250°C	11022	11025	11028
	0.50	40 to 250°C	11037	11040	11043
	1.00	40 to 240/250°C	11052	11055	11058
	1.50	40 to 230/240°C	11062	11065	11068

## similar phases

DB-FFAP, HP-FFAP, NUKOL,  
OV-351, CP-Wax 58 CB, FFAP

crossbond®  
technology

reduces bleed, prolongs  
column lifetime, and allows  
rejuvenation through solvent  
rinsing.

## Underivatized alcoholic beverage acids and methyl esters on a Stabilwax®-DA column.

Peak List	Conc. (ppm)
1. ethyl octanoate	100
2. acetic acid	100
3. propionic acid	100
4. isobutyric acid	100
5. 3-decanol	50
6. ethyl decanoate	50
7. ethyl laurate	50
8. cis-lactone	100
9. 2-phenylethanol	50
10. trans-lactone	100
11. methyl myristate	50
12. ethyl myristate	50
13. octanoic acid	100
14. ethyl palmitate	50
15. decanoic acid	100
16. dodecanoic acid	100
17. vanillin	100

Column: Stabilwax®-DA, 30m, 0.18mm ID, 0.18µm (cat.# 550752)  
Inj.: 1µL splitless (hold 0.5 min.) at conc. shown in peak list, in ethyl acetate, 4mm ID splitless liner w/wool (cat.# 20814-202.1)  
Inj. temp.: 240°C  
Carrier gas: hydrogen  
Make-up gas: nitrogen  
Linear velocity: 28psi @ 240°C  
Oven temp.: 70°C to 240°C at 12°C/min. (hold 3 min.)  
Det.: FID

