



Featured Application: Volatile Amines on Rtx-Volatile Amine

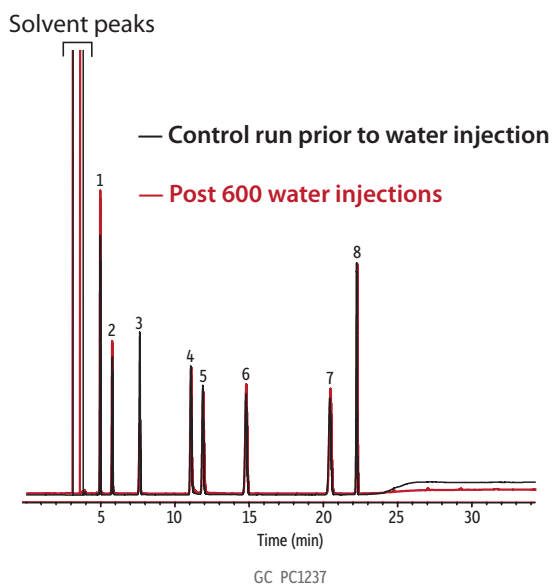
Robust GC Analysis of Volatile Amines on the Rtx-Volatile Amine Column

- Highly robust phase withstands harsh matrices for longer column lifetime.
- Stable column chemistry produces excellent reproducibility.
- QC tested with a specially designed test mix to ensure performance.

Volatile amines are used as gas-scrubbing agents to remove hydrogen sulfide from refinery gas streams, as well as for removing carbon dioxide during the production of ammonia. While accurate data on volatile amine content is vital for optimizing the manufacture of compounds from many different classes, GC analysis of volatile amines can be quite challenging due to their basic nature and high polarity. Because of these characteristics, volatile amines will interact with active sites in the analytical column and along the sample pathway, resulting in broad, tailing peaks that are difficult to accurately integrate.

In order to ensure good chromatography for the GC analysis of volatile amines, capillary columns must be highly inert and offer good retention and efficiency. In addition, the GC column phase must be able to withstand tough matrices because volatile amines are often analyzed in the presence of water, alcohol, or ammonia. Base-modified polyethylene glycol columns are sometimes used, but they suffer from relatively poor stability and a loss of efficiency below 60 °C. Siloxane columns can also be used, as long as relatively pure samples are being analyzed. However, most siloxane columns break down in the presence of harsh matrices, such as water, resulting in short column lifetimes and poor reproducibility. Restek's Rtx-Volatile Amine column is a better alternative that offers greater stability and improved chromatographic performance for the GC analysis of volatile amines.

The Rtx-Volatile Amine column was designed specifically for analyzing volatile amines in difficult matrices. As shown here, the stable bonded phase yields a column that is not only retentive and highly selective for basic compounds, but is also very robust and able to withstand repeated water injections. Every Rtx-Volatile Amine column is held to stringent quality specifications and QC tested to ensure consistent performance, making Rtx-Volatile Amine columns the best choice for GC analysis of volatile amines.



Peaks	<i>t_R</i> (min)	Peaks	<i>t_R</i> (min)
1. Pyridine	4.95	5. Diethanolamine	11.90
2. 1,2-Butanediol	5.76	6. 2-Nonanol	14.80
3. Nonane	7.62	7. 2,6-Dimethylamine	20.45
4. Diethylenetriamine	11.07	8. Dodecane*	22.25

Column	Rtx-Volatile Amine, 60 m, 0.32 mm ID (cat.# 18078)	Oven	Oven Temp.: 160 °C (hold 21 min) to 290 °C at 40 °C/min (hold 10 min)
Sample	Volatile amine column test mix (cat.# 35008)	Carrier Gas	He, constant flow
Diluent:	Methanol:dichloromethane (50:50)	Flow Rate:	3.4 mL/min
Conc.:	900-1,800 µg/mL snap and shoot	Linear Velocity:	44 cm/sec @ 160 °C
Injection		Detector	FID @ 300 °C
Inj. Vol.:	1 µL split (split ratio 17.8:1)	Make-up Gas	30 mL/min
Liner:	Premium 4 mm single taper w/wool (cat.# 23303.1)	Make-up Gas	
Inj. Temp.:	250 °C	Type:	N ₂
Split Vent		Data Rate:	50 Hz
Flow Rate:	60 mL/min	Instrument	Agilent/HP6890 GC
		Note	*Peak responses are normalized on dodecane.



Rtx-Volatile Amine Columns (fused silica)

- Unique selectivity for baseline resolution of all volatile amines.
- Excellent inertness assures accuracy and sensitivity for volatile amines, including free ammonia.
- Highly robust phase withstands repeated water injections, resulting in longer column lifetime.
- High temperature stability (290 °C) ensures elution of amines up to C16 and allows contaminants to be removed by “baking out” the column.

Description	temp. limits	qty.	cat.#
15 m, 0.32 mm ID	-60 to 270/290 °C	ea.	18076
30 m, 0.32 mm ID	-60 to 270/290 °C	ea.	18077
60 m, 0.32 mm ID	-60 to 270/290 °C	ea.	18078



Base-Deactivated Guard/Retention Gap Columns

(fused silica)

- Tested with a basic amine test mix.
- Excellent inertness for basic compounds.
- Recommended for use with Rtx-5 Amine, Rtx-35 Amine, Rtx-Volatile Amine, and Stabilwax-DB capillary columns.
- Batch test chromatogram included.
- Maximum temperature: 315 °C.

Nominal ID	Nominal OD	L	qty.	cat.#
0.25 mm	0.37 ± 0.04 mm	5 m	ea.	10000
0.25 mm	0.37 ± 0.04 mm	5 m	6-pk.	10000-600
0.32 mm	0.45 ± 0.04 mm	5 m	ea.	10001
0.32 mm	0.45 ± 0.04 mm	5 m	6-pk.	10001-600
0.53 mm	0.69 ± 0.05 mm	5 m	ea.	10002
0.53 mm	0.69 ± 0.05 mm	5 m	6-pk.	10002-600



Volatile Amine Column Test Mix (8 components)

Certified reference materials (CRMs) manufactured and QC-tested in ISO-accredited labs satisfy your ISO requirements.

(C9) <i>n</i> -Nonane (111-84-2), 900 µg/mL	Diethylenetriamine (111-40-0), 1,800 µg/mL
(C12) <i>n</i> -Dodecane (112-40-3), 900 µg/mL	2,6-Dimethylaniline (87-62-7), 900 µg/mL
1,2-Butanediol (584-03-2), 900 µg/mL	2-Nonanol (628-99-9), 900 µg/mL
Diethanolamine (DEA) (111-42-2), 1,800 µg/mL	Pyridine (110-86-1), 900 µg/mL

In methanol:dichloromethane (50:50), 1 mL/ampul

cat.# 35008 (ea.)

Topaz 4.0 mm ID Single Taper Inlet Liner w/ Wool

for Agilent GCs equipped with split/splitless inlets



ID x OD x Length	qty.	cat.#
Single Taper, Premium Deactivation, Borosilicate Glass with Quartz Wool		
4.0 mm x 6.5 mm x 78.5 mm	5-pk.	23303

*** 100% SATISFACTION GUARANTEE:** If your Topaz inlet liner does not perform to your expectations for any reason, simply contact Restek Technical Service or your local Restek representative and provide a sample chromatogram showing the problem. If our GC experts are not able to quickly and completely resolve the issue to your satisfaction, you will be given an account credit or replacement product (same cat.#) along with instructions for returning any unopened product. (Do not return product prior to receiving authorization.) For additional details about Restek's return policy, visit www.restek.com/warranty

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