



NEW Agilent J&W Ultra Inert
Capillary GC Columns



Proven performance
that raises the bar on
consistent
column inertness.

Our measure is your success.





Finally – a column technology

that gives you better
sensitivity and peak shape
for challenging analytes...
plus reliable results for trace
level analysis and unknown
sample screening.

Whether you are identifying semivolatiles in water and soil... quantifying amine pharmaceuticals... detecting narcotics and other drugs of abuse... or screening for unknown samples, you are likely under pressure to analyze active compounds that are present in extremely small quantities.

However, if your GC column lacks inertness, active compounds such as acids and bases will exhibit severe peak tailing, leading to inaccurate quantification.

In addition, the column might “eat up” the very compounds you are trying to analyze. As a result, the amount of sample injected into the column will not be the same as the amount that reaches the detector. This could lead to false negatives when screening for unknown samples.

To remedy this problem, Agilent has developed an exclusive column technology that offers a higher, more consistent level of inertness than ever before. Even better... we can prove it.

Introducing Agilent J&W Ultra Inert GC Capillary Columns.

The only GC columns proven to deliver on the promise of consistent column inertness and exceptionally low column bleed.

Agilent J&W Ultra Inert GC Columns allow you to perform trace level analysis – including the analysis of acids, bases, or other active compounds – with the utmost confidence. Together with Agilent's **Renewable** gas purification system and MS certified liners, these columns also help ensure an inert GC flow path, which is essential for sensitivity, performance, and the integrity of your results.

With Agilent J&W Ultra Inert GC Columns, you can count on:

- **The industry's highest degree of column inertness** for sharper peaks, better signal-to-noise ratios, and longer column lifetime.
- **Minimal compound adsorption** for more accurate quantification.

- **Superior column-to-column consistency** for improved productivity and reliable, reproducible results.

- **The industry's lowest level of column bleed** for increased detector sensitivity, faster baseline stabilization, and reduced instrument downtime.

What's more, Agilent has once again set a new industry standard for column inertness testing – one that surpasses our most stringent demands for bleed, sensitivity, and efficiency. In fact, Agilent J&W Ultra Inert GC Columns are the only GC columns that are individually tested for inertness against a new – and challenging – test probe mixture. So you can be sure that they will meet the rigorous requirements of today's demanding applications.

Always Quality.
Always Innovative.
Always Agilent.

For over 40 years, Agilent – *the world leader in capillary column technology* – has broken new ground with innovations that benefit individual labs... and entire industries.

1973: Hewlett-Packard (now Agilent) introduces the first commercial GC with microprocessor control.

1979: Agilent invents fused silica GC tubing, which revolutionizes GC analysis through a powerful combination of flexibility and chemical inertness. Also that year: J&W Scientific creates the first cross-linked bonded stationary phase.

1991: J&W Scientific introduces DB-5ms – the first commercial GC phase to lower column bleed using arylene technology.

1992: Agilent introduces HP-5ms columns, once again raising the bar on low-bleed performance.

2000: Agilent merges with J&W Scientific to unite J&W Scientific's DB Columns with Agilent's HP Column family. The result: Agilent J&W GC Columns – the industry's best columns for sensitivity and performance.

2008: Agilent ushers in a new era of column inertness testing with a more rigorous test probe mixture.

Whether you need reliable hardware and flexible software for complex research... robust systems for routine production environments... or fast, rugged solutions for real-time measurements... Agilent can help you meet your analytical and business challenges.

Set a new standard for your trace-level analysis.
Go to www.agilent.com/chem/ultrainert

Any company can tell you that their columns are low-bleed and inert. But only Agilent delivers on these promises. And we can *prove* it.

Like all Agilent columns, Agilent J&W Ultra Inert GC Columns must pass through strict quality control checkpoints for column bleed, theoretical plate efficiency, and retention index.

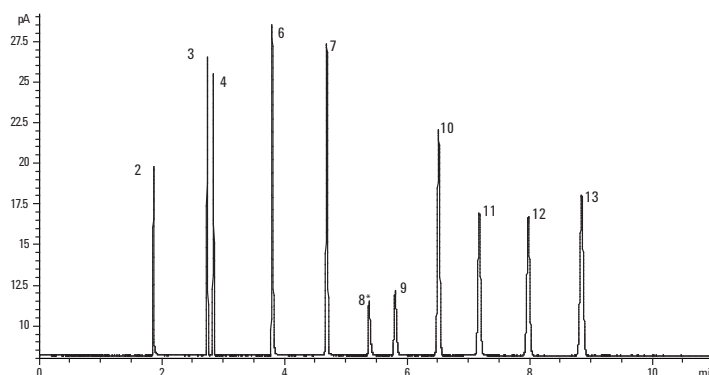
But we don't stop there. Agilent J&W Ultra Inert GC Columns are *also* individually tested under "worst-case-scenario" conditions with the industry's most demanding test probe mixture for column inertness testing. So you can be certain you're getting:

- The highest – and most consistent – level of column inertness, resulting in improved analyte detection.
- Minimal peak tailing for active compounds.
- Low column bleed and minimal compound adsorption for more accurate quantification.
- Longer column lifetime.

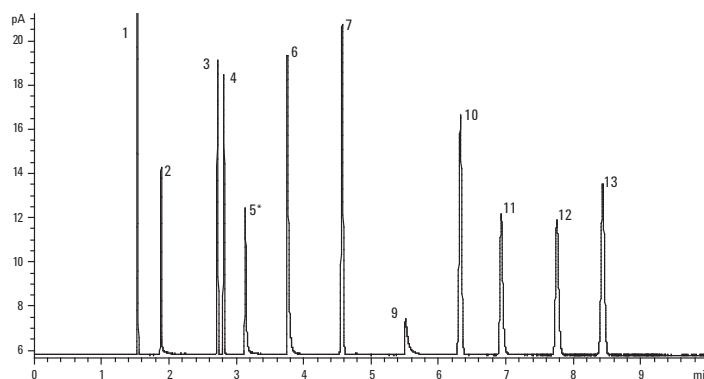
The examples to the right clearly demonstrate how Agilent J&W Ultra Inert GC Columns measure up to the competition under stringent testing conditions.

A side-by-side comparison: Agilent vs. two leading competitors

Agilent, DB-5ms Ultra Inert, Part No. 122-5532UI

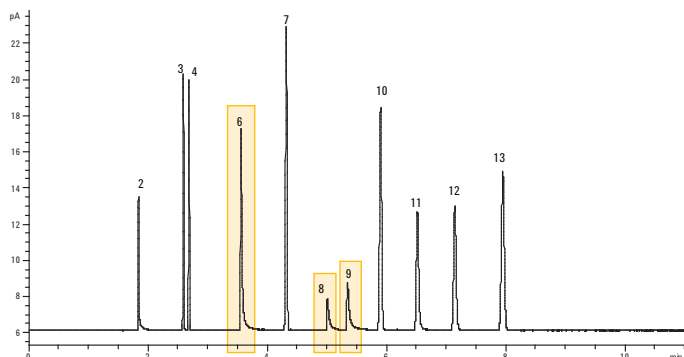


Agilent, HP-5ms Ultra Inert, Part No. 19091S-433UI

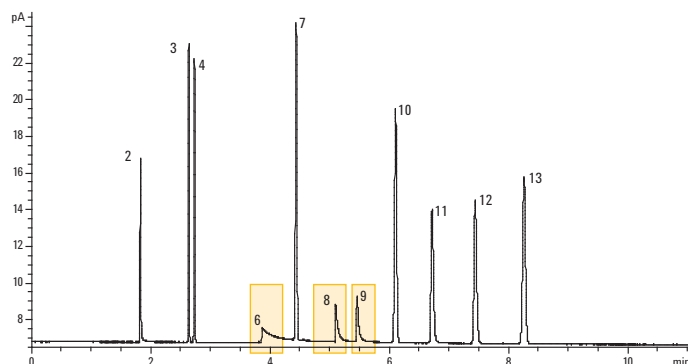


GL Science, InertCap 5ms/Sil

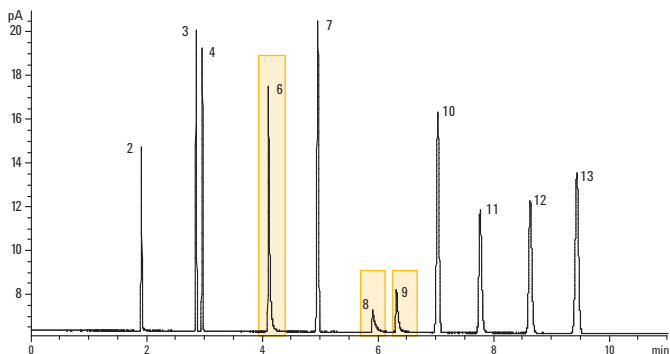
(similar to DB-5ms Ultra Inert)



Restek, Rtx-5Sil MS (similar to DB-5ms Ultra Inert)



Varian, VF-5ms (similar to DB-5ms Ultra Inert)



As you can see, Agilent J&W Ultra Inert GC Columns significantly reduce peak tailing and test probe adsorption for these challenging analytes.

Note, too, that the competitors' peaks (highlighted in yellow) show severe tailing, resulting in reduced analyte sensitivity. When you compare these poor peaks with the sharp peaks produced by the Agilent columns, it becomes clear that Agilent low-bleed columns are also the most inert.

Experimental Conditions:

GC	Agilent 6890N
Sampler	Agilent 7683, 0.5 µL syringe (Agilent Part No. 5188-5246), 0.02 µL injection
Carrier	Hydrogen (38 cm/sec)
Inlet	Split/splitless; 250° C, split flow 900 mL/min, gas saver flow 75 mL/min at 2 minutes; 1 ng each component on-column
Inlet Liner	Deactivated single taper w/ glass wool (Agilent Part No. 5183-4647); gold-plated seal with cross (Agilent Part No. 5182-9652)
Column	30 m x 0.25 mm x 0.25 µm
Oven	65° C isothermal
Detection	FID

Über One Test Probe Mixture

- | | |
|---------------------------------|------------------------|
| 1. Methylene Chloride (solvent) | 8. 1,2-Pentanediol* |
| 2. 1-Propionic acid | 9. Trimethyl phosphate |
| 3. 1-Octene | 10. n-Propylbenzene |
| 4. n-Octane | 11. 1-Heptanol |
| 5. 1,3-Propanediol* | 12. 3-Octanone |
| 6. 4-Picoline | 13. n-Decane |
| 7. n-Nonane | |

*Due to differences in selectivity between DB-5ms Ultra Inert and HP-5ms Ultra Inert, 1,2-Pentanediol has been replaced by 1,3-Propanediol in the HP-5ms Ultra Inert Über One test probe mixture.

Highlighted peaks are poorly shaped, indicating column activity toward these compounds.

To learn how Agilent J&W Ultra Inert GC Columns can help you minimize adsorption and maximize productivity, go to www.agilent.com/chem/ultraintert

The industry's most rigorous test probe mixture ensures consistent column inertness – and results.

A strong test probe mixture can highlight deficiencies in column activity, while a weak mixture can actually mask such deficiencies.

That is why the test probes in **Agilent's Über One Test Probe Mixture** have low molecular weights, low boiling points, and no steric shielding of their active groups. These characteristics allow the probative portion of the test molecules to penetrate – and fully interact with – the stationary phase and column surface.

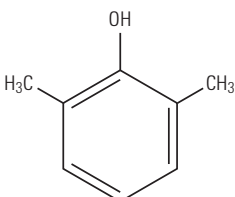
Less Demanding Test Mix Components

- | | |
|------------------------|--------------------|
| 1. 1-Octanol | 6. Naphthalene |
| 2. n-Undecane | 7. 1-Decanol |
| 3. 2,6-Dimethylphenol | 8. n-Tridecane |
| 4. 2,6-Dimethylaniline | 9. Methyldecanoate |
| 5. n-Dodecane | |

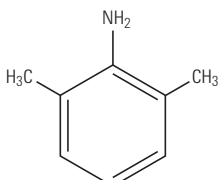
Agilent's New, More Demanding, Über One Test Probe Mixture

Test Probe	ng on column	Column Functional Test
1. 1-Propionic acid	1	Basicity
2. 1-Octene	0.5	Polarity
3. n-Octane	0.5	Hydrocarbon marker
4. 4-Picoline	1	Acidity
5. n-Nonane	1	Hydrocarbon marker
6. Trimethyl phosphate	1	Acidity
7. 1,2-Pentanediol	1	Silanol
8. n-Propylbenzene	1	Hydrocarbon marker
9. 1-Heptanol	1	Silanol
10. 3-Octanone	1	Polarity
11. n-Decane	1	Hydrocarbon marker

Chemical Structures

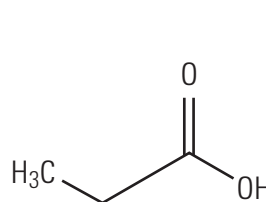


2, 6-Dimethylphenol

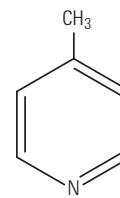


2, 6-Dimethylaniline

Weak probe molecules: The acidic and basic portions of these molecules are shielded by the two methyl groups on their phenyl rings, making them less probative.



1-Propionic acid



4-Picoline

Strong probe molecules: The probes in Agilent's Über One Test Probe Mixture are highly probative of the stationary phase and surface. Note, too, that the active end of each compound is available to interact with any active sites on the column.

"[Agilent's] breakthroughs in surface pretreatments and improvements in surface deactivation came much more rapidly than I had anticipated. The quality of the new Inert series of columns exceed my wildest dreams."

"I am satisfied that customers with the most demanding analyses of active analytes can have confidence that the DB-5ms and HP-5ms Ultra Inert Columns will provide the highest level of performance."

– **Walt Jennings,**
Professor Emeritus, University of California;
Co-Founder, J&W Scientific, Inc.

Less Demanding Test Probe Mixture

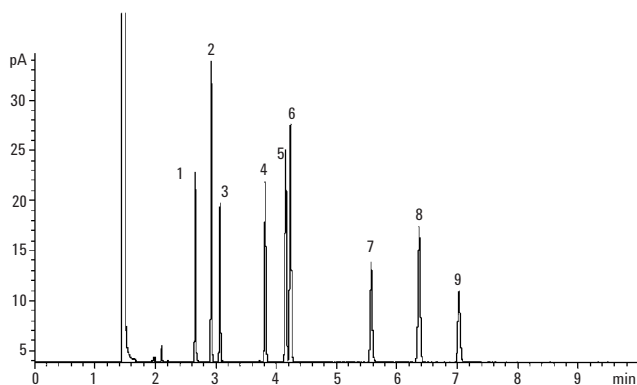


Figure 1: Here you can see the separation of a series of probes that are undemanding by today's standards – and which are used by many GC column manufacturers.

Experimental Conditions for Figure 1:

GC	Agilent 6890N
Sampler	Agilent 7683B, 5 µL syringe (Agilent Part No. 5181-1273), 1.5 µL split injection, 4 ng each component on column
Carrier	Hydrogen, constant pressure, 38 cm/s
Inlet	Split/splitless; 250° C, 1.4 ml/min; column flow, split flow 75 ml/min
Inlet Liner	Deactivated single taper with glass wool (Agilent Part No. 5183-4647)
Column	5%-Phenyl column 30 m x 0.25 mm x 0.25 µm
Oven	120° C isothermal
Detector	FID at 325° C; 450 ml/min air, 40 ml/min hydrogen, 45 ml/min nitrogen makeup

Agilent's Über One Test Probe Mixture

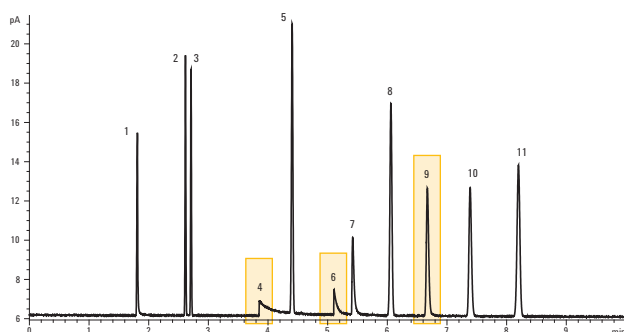


Figure 2: When the column in Figure 1 was evaluated with Agilent's new Über One mix, very poor performance was observed for both the 4-picoline and the trimethylphosphate (peaks 4 and 6, respectively). There was also increased tailing of the 1,2-pentanediol (Peak 9), indicating poor deactivation or possible oxygen damage to the stationary phase.

Contrary to the results of the QC test in Figure 1, this column would not perform well with demanding analytes, and would fail Agilent's new column inertness QC testing.

Experimental Conditions for Figure 2 and 3:

GC	Agilent 6890N
Sampler	Agilent 7683B, 0.5 µL syringe (Agilent Part No. 5188-5246), 0.02 µL split injection
Carrier	Hydrogen, constant pressure, 38 cm/s
Inlet	Split/splitless; 250° C, 1.4 ml/min; split column flow 900 ml/min; gas saver flow 75 ml/min at 2.0 min
Inlet Liner	Deactivated single taper with glass wool (Agilent Part No. 5183-4647)
Column 1 (Figure 2)	5%-Phenyl column 30 m x 0.25 mm x 0.25 µm
Column 2 (Figure 3)	DB-5ms Ultra Inert 30 m x 0.25 mm x 0.25 µm (Agilent Part No. 122-5032UI)
Oven	65° C isothermal
Detection	FID at 325° C; 450 ml/min air, 40 ml/min hydrogen, 45 ml/min nitrogen makeup

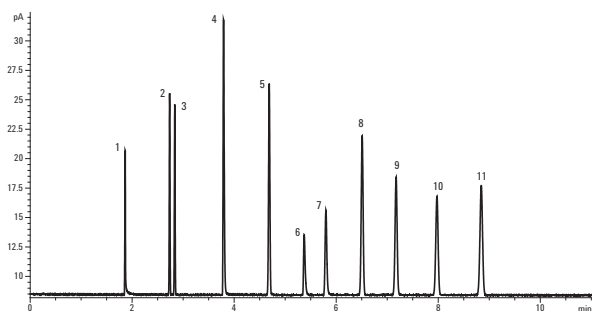


Figure 3: A properly deactivated DB-5ms Ultra Inert Column delivers symmetrical peak shapes, along with increased peak heights, which allow for accurate integration and detection of trace analytes.

Peak tailing or lost response of the acids indicates that the column is basic; conversely, poor peak behavior of the bases confirms that the column is acidic. The alcohol uncovers any oxygen damage or exposed silanols. If the peak shapes for all of these compounds are symmetrical, then the column is considered to be inert toward them.

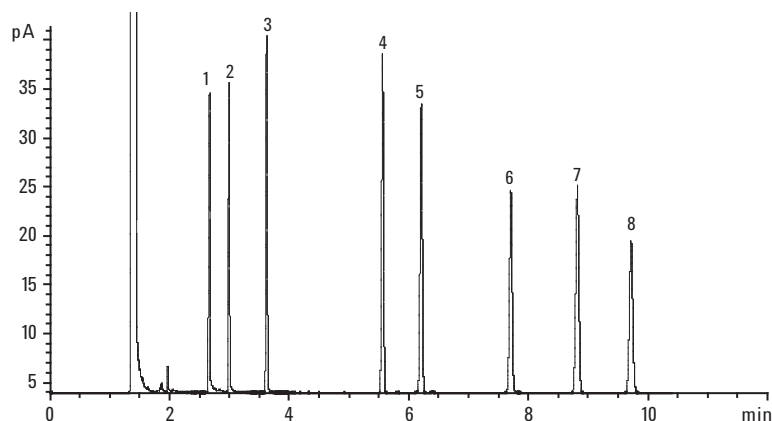
To learn more about our groundbreaking test probe mixture, go to www.agilent.com/chem/ultrainert

Confidently analyze active compounds, trace level samples, and unknowns without changing selectivity.

Agilent J&W Ultra Inert 5ms Columns leverage the unique polymer chemistry and proprietary surface deactivation that are the hallmarks of Agilent J&W DB-5ms and HP-5ms Columns. So you can be sure they adhere to the industry's toughest specifications for bleed, selectivity, and efficiency.

Additionally, our leading-edge manufacturing processes – combined with our optimization of chemistries and advancements in manufacturing equipment design – improve the inertness of our Ultra Inert 5ms Columns while maintaining the selectivity of their DB-5ms and HP-5ms counterparts. (Note that the Agilent DB-5ms and HP-5ms Columns will be maintained in our portfolio of column phases.)

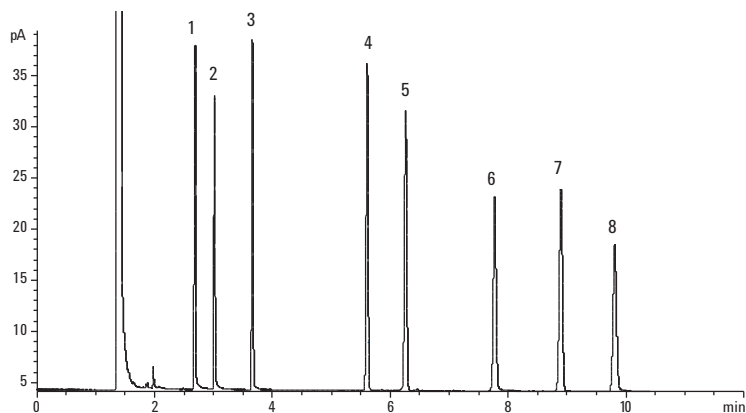
DB-5ms



DB-5ms Test Mix

- | | |
|-------------------------|------------------------|
| 1. 2-Ethylhexanoic acid | 5. 1-Methylnaphthalene |
| 2. 1,6-Hexanediol | 6. 1-Undecanol |
| 3. 4-Chlorophenol | 7. n-Tetradecane |
| 4. n-Tridecane | 8. Dicyclohexylamine |

DB-5ms Ultra Inert



Compared to existing DB-5ms Columns, Ultra Inert 5ms Columns provide the same selectivity, so there's no need for method re-development. And like all Agilent J&W Ultra Inert Columns, they are rigorously tested with our Über One Test Probe Mixture to ensure consistent inertness.

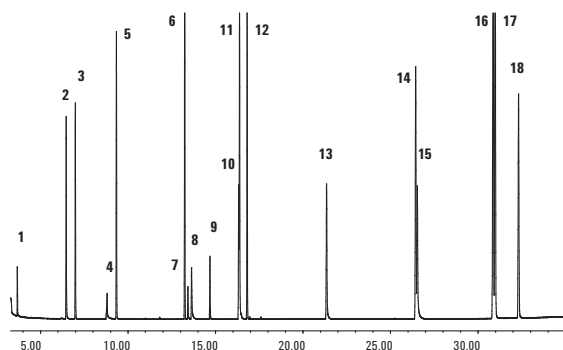
The proof is in the performance.

These real-world separations demonstrate how Agilent J&W Ultra Inert 5ms Columns put even “impossible” analyses well within your reach.

Semi-volatile analysis using methods similar to US EPA Method 8270 is becoming increasingly important in environmental laboratories worldwide. Acidic compounds such as benzoic acid or 2,4-dinitrophenol – along with strong bases such as pyridine or benzidine – are examples of active species found in the semi-volatile sample set.

US EPA Method 8270 Short Mix

1. N-nitrosodimethylamine
2. Aniline
3. 1,4-dichlorobenzene-D4
4. Benzoic acid
5. Naphthalene- D8
6. Acenaphthene-D10
7. 2,4-dinitrophenol
8. 4-nitrophenol
9. 2-methyl-4,6-dinitrophenol
10. Pentachlorophenol
11. 4-aminobiphenyl
12. Phenanthrene- D10
13. Benzidine
14. Chrysene-D12
15. 3,3'-dichlorobenzidine
16. Benzo [b] fluoranthene
17. Benzo [k] fluoranthene
18. Perylene-D12



Here, we injected a “short mix” of the most active analytes in a semi-volatile set to demonstrate application-specific column inertness.

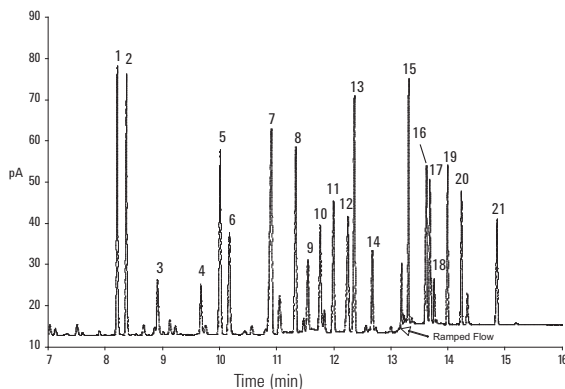
Experimental Conditions:

GC	Agilent 6890N/5975B MSD
Sampler	Agilent 7683B, 5.0 µL syringe (Agilent Part No. 5188-5246) 1.0 µL splitless injection, 5 ng each component on column
Carrier	Helium constant flow 30 cm/s
Inlet	Split/splitless; 260° C, 53.7 ml/min. total flow, purge flow 50 ml/min. on at 0.5 min., gas saver flow 80 ml/min. on at 3.0 min.
Inlet Liner	Direct Connect Single Taper Deactivated Inlet Liner, (Agilent Part No. G1544-80730)
Column	DB-5ms Ultra Inert 30 m x 0.25 mm x 0.25 µm (Agilent Part No. 122-5532UI)
Oven	40° C (1 min) to 100° C (15° C/min), 10° C to 210° C (1 min), 5° C/min. to 310° C (8 min)
Detection	MSD source at 300° C, quadrapole at 180° C, transfer line at 290° C, full scan m/z 50-550

Analysis of benzodiazepines and other drugs is particularly challenging because of their high level of activity. For this reason, all aspects of the sample path – particularly the GC Column – must be as inert as possible.

Benzodiazepines

1. Medazepam
2. Halazepam
3. Oxazepam
4. Lorazepam
5. Diazepam
6. Desalkyl Aurazepam
7. Nordazepam
8. Clonazepam
9. Oxazepam
10. Temazepam
11. Flunitrazepam
12. Bromazepam
13. Prazepam
14. Lormetazepam
15. Nitrazepam
16. Chlordiazepoxide
17. Clonazepam
18. Demoxepam
19. Estazolam
20. Alprazolam
21. Triazolam



Agilent J&W Ultra Inert Columns provide superior inertness for these demanding analytes, as this chromatogram demonstrates.

Experimental Conditions:

Column	DB-5ms Ultra Inert 122-5532UI 30 m x 0.25 mm x 0.25 µm
Carrier	Hydrogen, 53 cm/sec, constant flow
Flow Program (mL/min)	1.6 for 11 min 1.6 to 2.4 at 60 mL/min ² hold 2 min 2.4 to 5.0 at 50 mL/min ² hold 9 min
Oven	170° C for 3.2 min 170-250° C at 24.7° C/min, hold 5.3 min 250-280° C at 18.6° C/min, hold 4.0 min 280-325° C at 50.0° C/min, hold 4 min
Injection	Pulsed Splitless, 280° C 20 psi pulse pressure for 0.38 min 50 mL/min purge at 0.40 min Direct Connect liner G1544-80730
Detector	FID, 350° C
Sample	1 µL of 5-10 ppm

For additional proof chromatograms and performance examples, go to www.agilent.com/chem/ultraintert

The Agilent 5975C Series GC/MSD is the perfect partner for our Ultra Inert GC Columns.



Welcome to the next generation of performance and productivity! Agilent's 5975C Series GC/MSD brings together all the elements for perfect chemistry, including a **solid inert ion source**, a **proprietary quartz quadrupole analyzer**, and a **high signal-to-noise Triple-Axis Detector**. This powerful combination delivers better MS resolution, exceptional spectral integrity, and lower detection limits – while advanced intelligence features enable predictive support, enhanced self-maintenance, and powerful remote diagnostics.

What's more, our **Deconvolution Reporting Software (DRS)** package, together with Retention Time Locking, can reduce your data review time from hours of tedious work to *minutes* of automated analysis.

For detailed instrument specifications go to:
www.agilent.com/chem/5975C/specs

Agilent sample introduction supplies
When it comes to your trace analysis, little things can make a big difference.

- **NEW MS-Certified liners** are tested with both FID and MSD to ensure inertness, purity, and consistency. In addition, they are deactivated using Agilent's proprietary liquid deactivation process, and are GC-tested for acid and base inertness. Each liner is also clearly labeled with its part number for easy identification.
- **Certified vials, caps, septa, ferrules, gold seals, and other inlet supplies** are designed to extend the inert flow path – and to minimize oxygen contamination that could damage the column and corrupt your trace analysis results.
- **Our Renewable Gas Purification system** prevents bleed and sustains column performance by improving the quality of gas that enters the column.



Agilent J&W Ultra Inert GC Columns can help you meet your most challenging application demands.



	Part Number	I.D. (mm)	Length (m)	Film Thickness (µm)
DB-5ms Ultra Inert	121-5522UI	0.18	20	0.18
	121-5523UI	0.18	20	0.36
	122-5512UI	0.25	15	0.25
	122-5513UI	0.25	15	1.0
	122-5522UI	0.25	25	0.25
	122-5532UI	0.25	30	0.25
	122-5533UI	0.25	30	1.0
	122-5536UI	0.25	30	0.50
	122-5552UI	0.25	50	0.25
	122-5562UI	0.25	60	0.25
	122-5563UI	0.25	60	1.0
	123-5532UI	0.32	30	0.25
	123-5533UI	0.32	30	1.0
	123-5536UI	0.32	30	0.50
	123-5563UI	0.32	60	1.0
	HP-5ms Ultra Inert	19091S-577UI	0.18	20
19091S-133UI		0.25	30	0.50
19091S-213UI		0.32	30	1.0
19091S-233UI		0.25	30	1.0
19091S-413UI		0.32	30	0.25
19091S-431UI		0.25	15	0.25
19091S-433UI		0.25	30	0.25
19091S-436UI		0.25	60	0.25

To learn how Agilent J&W Ultra Inert Columns can help you unmask trace levels of compounds, go to www.agilent.com/chem/ultra inert



Always Quality.
Always Innovative.
Always Agilent.

SDi 2008 Worldwide Report named Agilent the top GC Column supplier in its "Most Favorable" category, based on column selection, batch-to-batch reproducibility, price, delivery time, and application support.

When you buy
instruments, columns,
and supplies from Agilent,
you get more than just
reliability.

You also get:

- Over 40 years of chromatography expertise.
- Unmatched technical support – on the Web, by phone or in person.
- A 90-day warranty from the date of shipment.

For more information

To learn more about Agilent J&W Ultra Inert GC Columns – or Agilent products and services – visit us online or call toll free:

www.agilent.com/chem/ultrainert

1-800-227-9770, option 3, then option 3 again
(in the US and Canada)

In other countries, please call your local Agilent Representative or Agilent Authorized Distributor.

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Our measure is your success.



Agilent Technologies