VOLUME 21 | NUMBER 4 | SEPTEMBER 2008

DB-5ms Ultra Inert column delivers accurate, trace-level results in drugs of abuse

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The analysis of drugs of abuse is of major importance to law enforcement agencies throughout the world. Analysts are continuously faced with analyzing several classes of drugs of abuse, for unknown and structurally complex compounds within a sample at trace levels. Small sample sizes make the task of uncovering the information that helps to solve crimes exceedingly difficult, and that makes choosing the right column especially important.

When analyzing samples with a Gas Chromatograph (GC), you must be fully confident that your system is able to provide accurate information about the compounds present in the sample. This means the flow path must be chemically inert to ensure that the compounds being analyzed do not negatively interact with it, and lead to erroneous results in the detector.

Agilent J&W Ultra Inert GC columns help to provide the optimal inert flow path that ensures greater confidence in results. Each Agilent J&W Ultra Inert column is tested with an Über One Test Probe Mixture. These test mixes are comprised of the most demanding test probes, and designed to elicit any active sites on the column. (For further information on Über One Test Probe Mixture and testing of the Ultra Inert columns, please refer to 5989-8665EN.)

When choosing the right GC column for an application, it is necessary to select a column that provides both low column bleed and a high level of inertness. Considered separately, neither confers a significant advantage in trace level analysis. Lower column bleed translates to less background interference and a better signal-to-noise ratio, which allows you to identify compounds at lower levels. But, if your GC column is not inert, it may adsorb active analytes such as acids, bases and diols and render your results inaccurate. Similarly, if your column has a high degree of inertness, but exhibits even a moderate level of column bleed, any gain in inertness will be masked by a decreasing signal-to-noise ratio. Only when your column exhibits both low bleed and low activity will you achieve reliable results.

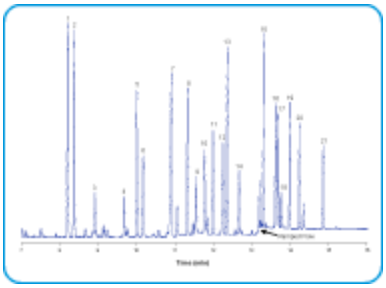

Figure 1. Benzodiazepines shown on an Agilent J&W DB-5ms Ultra Inert column, 30 m x 0.25 mm x 0.25 µm. (Click here to see this image larger.)

Figure 1 illustrates the analysis of some benzodiazepines on a DB-5ms Ultra Inert column. Benzodiazepines are a family of depressants that slow down the central nervous system and are used therapeutically in the treatment of insomnia, anxiety, muscle spasms, and seizures. In high dosages, these compounds also act as hypnotics. Benzodiazepines are a controlled substance in section IV of the Controlled Substances Act (CSA).

According to the Drug Enforcement Agency (DEA), there are fifteen benzodiazepines marketed in the US, and an additional 20 marketed in other countries. While they are similar in structure, the functional groups with which they are associated vary. This in turn changes the activity of the compounds making them challenging to analyze. The peaks in this chromatogram show no tailing, which is a good indication of an inert column. Chromatographic conditions are illustrated in **Table 1** and a compound list is seen in **Table 2**. [Click figure to see large view with Tables.]

Figure 2 illustrates a more common drug screen including various types of drugs ranging from anesthetics, to opioids and stimulants. This illustration covers several classes of drugs with differing functionality than the benzodiazepines in Figure 1. Not all of these drugs are controlled substances, but they do represent the compounds that may be seen by a medical examiner, or forensic scientist. Chromatographic conditions are illustrated in **Table 3** and a compound list is shown in **Table 4**. [Click figure to see large view with Tables.] Again, the DB-5ms Ultra Inert column shows exceptional peak shape for a broad range of structurally diverse drugs.

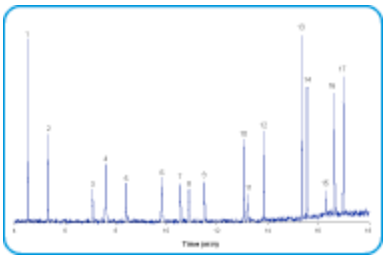

Figure 2. Common Drug Screen shown on an Agilent J&W DB-5ms Ultra Inert column, 30 m x 0.25 mm x 0.25 µm. (Click here to see this image larger.)

The analysis of drugs can be challenging, and the illustrations above cover only a handful of the compounds that are routinely analyzed. When combinations of acidic and basic compounds are present in a sample, optimum peak shape is essential to obtaining accurate, reproducible, trace level data. The exceptionally high level of inertness, combined with the extremely low level of column bleed of the Agilent Ultra Inert columns makes it possible to meet or exceed analytical requirements, especially in the analyses of active compounds. This makes Ultra Inert columns a valuable tool in the quest for truly accurate results.

Learn more about what makes Agilent J&W Ultra Inert GC Capillary columns so reliable. Then put them to work in your lab.