# HPLC SEPARATION GUIDE



## Analysis of Nitroaromatic Explosives

Energetic materials such as explosives have become an environmental concern due to some of their toxic properties[1,2]. The need for disposal of aging military munitions and an increased concern about their distribution in the environment have become a priority for the United States Environmental Protection Agency. There is a need for rapid analysis of these compounds in environmental samples.

Most explosive materials are nitrated compounds such as the Nitroaromatic and Nitroamine derivatives shown in Figure 1. The difficulty in their separation is due to their isomeric nature. The standard test method for the analysis of Nitroaromatic and Nitramine explosives in soil by high performance liquid chromatography (HPLC) has been published[3]. The method specifies the use of two reversed-hase Columns (C18 and CN) in series for the separation of seven relatively different explosive analytes. The method offers reliable and reproducible qualitative analytical measurements of each of the seven explosives in soil. However, quantitative analysis requires baseline resolution of all the analytes of interest.

A new HPLC method developed using the SMT-TNT1 column has shown strong potential in resolution of more difficult isomers of nitroaromatic explosives (Figure 1). The chromatogram and experimental conditions for the separation are shown in Figure 2. This method ensures high resolution of the eight nitroaromatic derivatives in eighteen minutes or less with a single column, and as such, may offer the possibility for a more accurate quantitative analysis of explosives.

**Figure 1.**

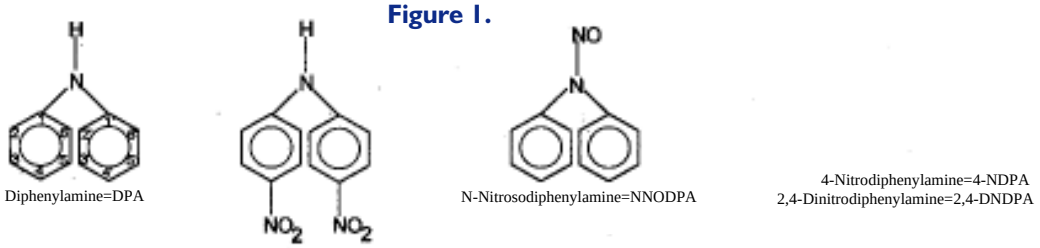
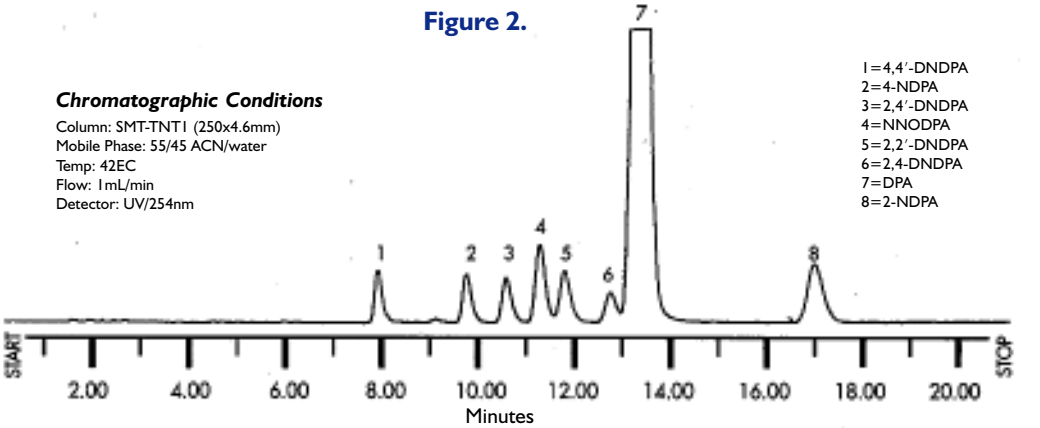



**Figure 2.**




### Column Specifications:

Particle: Spherical silica, 5 $\mu$m
Pore Size: Proprietary
% Carbon: 22%
pH range: 1-12

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1. Mussenbrock et. al. J. Microcol. Sep. 1995, 7, 107.
2. Grant et. al. Environ. Sci. Technol. 1995, 14, 1865.
3. D5143-90. In annual Book of ASTM Standards, 1993, Vol. 04.08. Philadelphia, PA, P.1256

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INCORPORATED
2311 Ogletown Road, Newark, DE 19711 .302.368.0610 Fax 302.368.0282