



Standard Test Method for Analysis of Nitroaromatic and Nitramine Explosive in Soil by High Performance Liquid Chromatography¹

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1. Scope

1.1 This test method describes a procedure for the laboratory determination of the concentration of nitroaromatic and nitramine explosives in soil. The explosives involved in this test method are as follows: HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine), RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine), TNT (2,4,6-trinitrotoluene), TNB (1,3,5 trinitrobenzene), DNB (1,3 dinitrobenzene), tetryl (methyl-2,4,6-trinitrophenylnitramine), and 2,4-DNT (2,4-dinitrotoluene).

1.2 The values stated in SI units are to be regarded as the standard.

1.3 *This standard does not purport to address the safety concerns associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

C 670 Practice for Preparing Precision Statements for Test Methods for Construction Materials²

D 653 Terminology Relating to Soil, Rock, and Contained Fluids³

E 11 Specification for Wire Cloth Sieves for Testing Purposes⁴

E 682 Practice for Liquid Chromatography Terms and Relationships⁵

3. Terminology

3.1 Definitions:

3.1.1 Refer to Terms and Symbols D 653 for the definitions of standard terms relating to soil and rock.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 HPLC—high power liquid chromatography.

4. Significance and Use

4.1 This test method can be used to make reliable and reproducible measurements in soil in the range from the detection level to the percent levels of each of seven explosive compounds.

4.2 This test method does not attempt to quantify the reactivity or mobility of the explosive content, only the concentration of these compounds in the soil.

4.3 This test method can be used to determine the extent of contamination resulting from the use, misuse, or spillage of explosive compounds. It is useful to determine the effectiveness of clean-up actions at disposal sites, and to determine the environmental impact at explosives disposal, manufacturing, or storage sites.

5. Apparatus

5.1 *Liquid Chromatograph*, conforming to the description and requirements of Practice E 682 and equipped with two 25 cm by 4.6 mm reversed-phase HPLC columns (one LC-18, one LC-CN); a fixed 254 nm UV detector; an integrator and a 100 μ L sample loop injector.

5.2 Solvent Delivery Module, should be reliable enough for isocratic analysis with flow range capability from 0.1 to 3.0 mL/min.

5.3 *Volumetric Pipets*.

5.4 *Scintillation Vials*.

5.5 *Plastic B-D Syringe*, fitted with a disposable 0.5 μ m filter assembly.

5.6 *Vortex Mixer*.

5.7 *Amber Injector Vials*.

5.8 *Mortar and Pestle*.

5.9 *Rubber Tipped Pestle*.

¹ This method is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.06 on Physico-Chemical Properties of Soils and Rocks.

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² *Annual Book of ASTM Standards*, Vol 04.02.

³ *Annual Book of ASTM Standards*, Vol 04.08.

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

⁵ *Annual Book of ASTM Standards*, Vol 14.01.