TNT Soil Test System

Ensys® explosives kits are rapid field or laboratory colourimetric tests for the analysis of explosives in soil. The kits are based on a method developed by Dr. Thomas Jenkins at the US Army Corps of Engineers - CRREL.

Test result type
- Quantitative data

Samples per kit
- 20 soil samples

Assay range
- Soil: 1 ppm to 30 ppm total TNT
- Higher sample concentrations can be quantified by sample extract dilution

Sampling preparation
- Soil samples require prior extraction using the included extraction components
- Soil samples should be dried prior to analysis
- Soil sample extracts may be saved for use with the RDX soil test kit

Sampling time
- ‘Dirt-to-Data’ in approximately 30 minutes
- Typically about ten samples can be run in about 40 minutes
- Soil extraction time is typically 2 - 10 minutes per sample plus test run time of approximately 2 minutes

- Detects TNT, DNT and related explosives
- Convenient and rapid testing in the field or laboratory
- Extractions can be performed simultaneously with analysis in singlicate
- TNT extracts can be used with Ensys RDX test
- Training available
- EPA SW-846 Method #8515
Specificity

The Ensys® TNT test is specific for TNT and related explosive compounds and exhibits the following sensitivities. The TNT test does not measure RDX or HMX.

<table>
<thead>
<tr>
<th>Compound</th>
<th>MDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2, 4, 6 trinitrotoluene</td>
<td>0.7</td>
</tr>
<tr>
<td>2, 4 dinitrotoluene</td>
<td>0.5</td>
</tr>
<tr>
<td>2, 6 dinitrotoluene</td>
<td>2.1</td>
</tr>
<tr>
<td>1, 3, 5 trinitrobenzene</td>
<td>0.5</td>
</tr>
<tr>
<td>Tetryl</td>
<td>0.9</td>
</tr>
<tr>
<td>2 nitrotoluene</td>
<td>&gt;100</td>
</tr>
<tr>
<td>3 nitrotoluene</td>
<td>&gt;100</td>
</tr>
<tr>
<td>4 nitrotoluene</td>
<td>&gt;100</td>
</tr>
<tr>
<td>4 amino 2, 6 dinitrotoluene</td>
<td>&gt;100</td>
</tr>
<tr>
<td>Nitrobenzene</td>
<td>&gt;100</td>
</tr>
</tbody>
</table>

Test kit components

- 20 weigh boats and wooden spatulas
- 20 extraction jars
- One 50mL graduated tube
- 20 - 30cc syringes and syringe filters
- 1 bulb pipette
- 1 TNT control vial and ampoule cracker
- Developer solution
- Test kit instructions

Storage & precautions

- Shelf life is typically one year from date of manufacture, with specific kit expiration date information provided on product packaging.
- Store at ambient temperature 64° to 81°F (18° to 27°C)
- Operate the test at temperature greater than 40°F /4°C and less than 100°F/ 39°C (4°C)

Required test materials

- Ensys TNT explosives soil test kit 7002000

Required test equipment

- Ensys TNT accessory kit (rental, includes HACH DR2800) 6999700
- Acetone: hardware or laboratory grade (min 50mL per sample)

Other recommended materials

- Hach DR/2000, DR/2010 or DR/2800
- 2 matched hach cuvettes
- 2 cuvette stopper plugs
- Balance
- Tap or laboratory grade water for cuvette rinsing
- Marker pen, calculator
- Absorbent paper
- Liquid waste container
- PPE: Disposable gloves, eyewear

Basic Test Procedure

- Clean cuvettes and set spectrophotometer
- Extract soil sample:
  - Weigh 10 grams of soil sample
  - Add sample to extraction jar
  - Measure 50mL acetone into 50mL tube
  - Pour acetone into extraction jar and shake for three minutes
  - Allow to settle for five minutes
- Draw 25mL liquid into the syringe from above the sediment layer in extraction jar
- Attach filter tip to syringe and transfer 25mL of sample extract into a cuvette.
- Place cuvette in spectrophotometer and record initial absorbance
- Add one drop of developer solution, cap and shake for three seconds.
- Remove stopper and place the ‘sample’ cuvette in cell holder and read sample absorbance.
- NOTE: For analysis of samples containing DNT, and/or where DNT concentration is of concern, samples must be allowed to develop for 10 minutes before reading sample absorbance. This will not affect colour development for other nitroaromatics.
- Record data and calculate results.