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EnSys™

## RDX 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 RDX
- 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 from TNT soil test kit may be used

### Sampling time

- 'Dirt-to-Data' in approximately 30 minutes
- Typically about six samples can be run in about one hour
- Soil extraction time is typically 2 - 10 minutes per sample plus test run time of approximately 20 minutes

- Detects RDX, HMX and related explosives
- Convenient and rapid testing in the field or laboratory
- Extractions can be performed simultaneously with analysis in singlicate
- Can test sample extract from EnSys TNT test
- Training recommended
- EPA SW-846 Method #8510 (proposed status final with 4th update)



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## Specificity

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

MDL SOIL (PPM)	
Compound	MDL
RDX	0.8
HMX	2.4
PETN	1.0
Nitoguanadine	8.9
Nitroguanadine	10.1
Nitrocellulose	42.2

## 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 into syringe 5.5mL liquid from above the sediment layer in extraction jar
- Attach filter tip to syringe and transfer 5mL of sample extract into a 13mL tube
- NOTE: if nitrate/ nitrate interferents are present, attach an Alumina-A cartridge to the syringe and dispense through this
- Cut open an acetic acid bulb and add contents to the 13mL tube. Cap and shake
- Cut open a NitriVer pillow and add it to a 50mL reaction vial containing water
- Quickly pour acetic acid and sample into 13 mL zinc tube and cap. Invert twice and expose sample to zinc for EXACTLY 15 seconds
- With the filter attached to syringe and plunger removed, hold over reaction vial and pour zinc solution into it
- Rapidly filter the solution into the 50mL reaction vial, cap and shake for 30 seconds
- Incubate for 15 minutes for colour development and transfer contents to 30mL syringe barrel. Attach syringe filter and dispense into spectrophotometer cuvette
- Place cuvette in spectrophotometer and record absorbance
- Calculate results



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## Test kit components

- 20 weigh boats and wooden spatulas
- 20 extraction jars
- One 50mL graduated tube
- 20 - 50mL reaction vials with H<sub>2</sub>O
- 20 - 13mL zinc tube in foil pouches
- 20 - 10cc, 20cc and 30cc syringes
- 20 - 30mL tubes
- 20 NitriVer pillows
- 20 acetic acid bulb pipettes
- 60 syringe filters
- 1 bulb pipette
- 1 RDX control vial and ampoule cracker
- 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 kits at room temperature (less than 80°F (27°C))
- Operate the test at temperatures greater than 40°F/ 4°C and less than 100°F/ 39°C
- Do not expose the kits to direct sunlight

## Required test materials

### Part #

- EnSys RDX explosives soil test kit 7085000
- Ensys TNT explosives soil test kit 7002000

## Required test equipment

- Acetone: hardware or laboratory grade (min 50mL per sample)
- Alumina-A cartridges (if nitrate/ nitrate interferents present) 6021200

## Other recommended materials

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