

# 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

## 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.

- » 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)

MDL SOIL (PPM)	
Compound	MDL
RDX	0.8
HMX	2.4
PETN	1.0
Nitroglycerine	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

### 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

## 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

## 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