

Analytical Reference Materials for Explosives Analysis

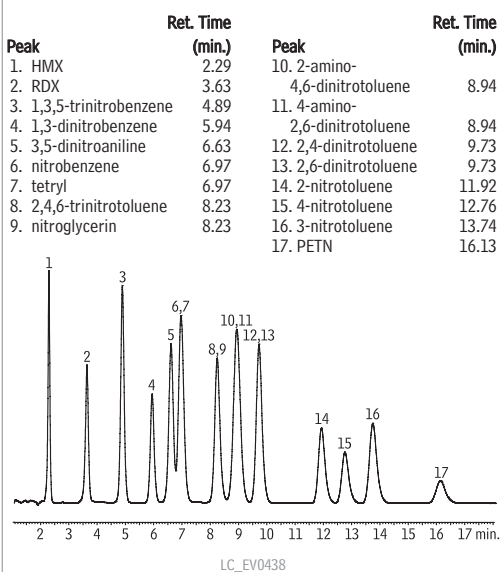
- Supports US Department of Defense base closures and remediation.
- Mixtures, singles, internal standards and surrogates for HPLC US EPA Method 8330.
- Mixtures, singles, internal standards and surrogates for GC-ECD US EPA Method 8095.

Restek analytical reference materials for explosives are formulated to support nitroaromatic, nitroamine, and nitroester analyses. These materials can be analyzed using high performance liquid chromatography (HPLC-UV) according to US EPA Method 8330¹ or using gas chromatography (GC-ECD) according to Method 8095², developed by the US Army Cold Regions Research and Engineering Laboratory.³

EPA Method 8330B has all the same target compounds as Method 8095, including 3,5-dinitroaniline, nitroglycerin, and pentaerythritol tetranitrate (PETN). Our Method 8095 calibration mixtures contain the components at the concentration ratios appropriate for ECD.

Compounds listed are explosives, intermediates that are used in the manufacture of explosives, or degradation products of explosive compounds.

Figure 1 Explosives by EPA Method 8330B on Pinnacle™ II C18.



Sample:
Inj.: 10 μ L
Conc.: 50 μ g/mL each component
Sample diluent: acetonitrile

Column: Pinnacle™ II C18
Cat. #: 9214575
Dimensions: 250 x 4.6 mm
Particle size: 5 μ m
Pore size: 100Å

Conditions:
Mobile phase: water:methanol, 50:50
Flow: 1.5mL/min.
Temp.: 30°C
Det.: UV @ 210nm

Single-Component Explosives Solutions

Compound	CAS#	Solvent Code	μ g/mL	cat.#
2-amino-4,6-dinitrotoluene	35572-78-2	ACN	1,000	31670
4-amino-2,6-dinitrotoluene	19406-51-0	ACN	1,000	31671
ammonium picrate	131-74-8	ACN	2,000	31890
3,5-dinitroaniline	618-87-1	ACN	1,000	31661
1,3-dinitrobenzene	99-65-0	ACN	1,000	31662
1,4-dinitrobenzene	100-25-4	ACN	2,000	33205
2,4-dinitrotoluene	121-14-2	ACN	1,000	31663
2,6-dinitrotoluene	606-20-2	ACN	1,000	31664
EGDN	628-96-6	M	1,000	31601
HMX	2691-41-0	ACN	1,000	31665
nitrobenzene	99-95-3	ACN	1,000	31657
nitroglycerin	55-63-0	M	1,000	31498
nitroguanidine	556-88-7	M	1,000	31602
2-nitrotoluene	88-72-2	ACN	1,000	31659
3-nitrotoluene	99-08-1	ACN	1,000	31660
4-nitrotoluene	99-99-0	ACN	1,000	31658
PETN	78-11-5	M	1,000	31600
picric acid	88-89-1	M	1,000	31499
propylene glycol dinitrate (PGDN)	6423-43-4	M	1,000	31821
RDX	121-82-4	ACN	1,000	31666
tetryl	479-45-8	ACN	1,000	31667
1,3,5-trinitrobenzene	99-35-4	ACN	1,000	31668
2,4,6-trinitrotoluene	118-96-7	ACN	1,000	31669

ACN = acetonitrile, M = methanol

Nitroaromatics and Nitramine Explosives by HPLC, EPA 8330B (17 components)

2-amino-4,6-dinitrotoluene	2-nitrotoluene
4-amino-2,6-dinitrotoluene	3-nitrotoluene
3,5-dinitroaniline	4-nitrotoluene
1,3-dinitrobenzene	PETN
2,4-dinitrotoluene	RDX
2,6-dinitrotoluene	tetryl
HMX	1,3,5-trinitrobenzene
nitrobenzene	2,4,6-trinitrotoluene
nitroglycerin	
1,000 μ g/mL each in acetonitrile, 1mL/ampul	
cat. # 33204	

References

1. US Environmental Protection Agency. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. SW-846 Update III, Office of Solid Waste, Washington, DC, 1997.
2. US Environmental Protection Agency. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. SW-846, Proposed Draft Update IVB, Office of Solid Waste, Washington, DC, 1999.
3. M. E. Walsh, T. Ranney. *Determination of Nitroaromatic, Nitramine, and Nitrate Ester Explosives in Water Using Solid-Phase Extraction and Gas Chromatography-Electron Capture Detection: Comparison with High-Performance Liquid Chromatography*. J. Chromatogr. Sci., Vol. 36, pp. 406-416, August 1998.



custom standards

Restek is your #1 source for custom analytical reference materials!

- Made to your exact specifications.
- Quotations supplied free of charge.
- Most orders shipped within 5–10 working days.

Call our reference materials department, use the form at www.restek.com/solutions, or contact your Restek representative for more information.

also available

For guard cartridges for these columns, visit our website at www.restek.com.

Restek Trademarks:
Pinnacle, Rtx, Restek logo.

Method 8330 Reference Materials

Nitroaromatics and Nitramine Explosives

by HPLC (14 components)

1,3-dinitrobenzene	2-nitrotoluene
2-amino-4,6-dinitrotoluene	3-nitrotoluene
4-amino-2,6-dinitrotoluene	4-nitrotoluene
2,4-dinitrotoluene	RDX
2,6-dinitrotoluene	tetryl
HMX	1,3,5-trinitrobenzene
nitrobenzene	2,4,6-trinitrotoluene

1,000µg/mL each in acetonitrile, 1mL/ampul
cat. # 33905

8330 Calibration Mix #1 (7 components)

1,3-dinitrobenzene	RDX
2,4-dinitrotoluene	1,3,5-trinitrobenzene
HMX	2,4,6-trinitrotoluene
nitrobenzene	

1,000µg/mL each in acetonitrile, 1mL/ampul
cat. # 31450

8330 Calibration Mix #2 (7 components)

2-amino-4,6-dinitrotoluene	3-nitrotoluene
4-amino-2,6-dinitrotoluene	4-nitrotoluene
2,6-dinitrotoluene	tetryl
2-nitrotoluene	

1,000µg/mL each in acetonitrile, 1mL/ampul
cat. # 31451

8330 Internal Standard (3,4-dinitrotoluene)

1,000µg/mL in methanol, 1mL/ampul
cat. # 31452

May also be used as a surrogate for Method 8095.

8330 Surrogate (1,2-dinitrobenzene)

1,000µg/mL in methanol, 1mL/ampul
cat. # 31453

HPLC Columns

Pinnacle™ II C18 Columns (USP L1)

5µm Column, 4.6mm	cat. #
250mm	9214575
250mm (with Trident Inlet Fitting)	9214575-700

Pinnacle™ II Cyano Columns (USP L10)

5µm Column, 4.6mm	cat. #
250mm	9216575
250mm (with Trident Inlet Fitting)	9216575-700

Ultra C18 Columns (USP L1)

5µm Column, 4.6mm	cat. #
250mm	9174575
250mm (with Trident Inlet Fitting)	9174575-700

Pinnacle™ II Biphenyl Columns (USP L11)

5µm Column, 4.6mm	cat. #
250mm	9209575
250mm (with Trident Inlet Fitting)	9209575-700

Method 8095 Reference Materials

8095 Calibration Mix A (10 components)

2-amino-4,6-dinitrotoluene	HMX
4-amino-2,6-dinitrotoluene	RDX
1,3-dinitrobenzene	tetryl
2,4-dinitrotoluene	1,3,5-trinitrobenzene
2,6-dinitrotoluene	2,4,6-trinitrotoluene

1,000µg/mL each in acetonitrile, 1mL/ampul
cat. # 31607

8095 Calibration Mix B (7 components)

3,5-dinitroaniline*	3-nitrotoluene
nitrobenzene	4-nitrotoluene
nitroglycerine	PETN
2-nitrotoluene	

5,000µg/mL in acetonitrile (*3,5-dinitroaniline at 1,000µg/mL), 1mL/ampul
cat. # 31608

8095 Matrix Spike Mix A (10 components)

2-amino-4,6-dinitrotoluene	HMX*
4-amino-2,6-dinitrotoluene	RDX
1,3-dinitrobenzene	tetryl
2,4-dinitrotoluene	1,3,5-trinitrobenzene
2,6-dinitrotoluene	2,4,6-trinitrotoluene

200µg/mL in acetonitrile (*HMX at 2,000µg/mL), 1mL/ampul
cat. # 31609

8095 Matrix Spike Mix B (7 components)

3,5-dinitroaniline*	3-nitrotoluene
nitrobenzene	4-nitrotoluene
nitroglycerine	PETN
2-nitrotoluene	

1,000µg/mL in acetonitrile (*3,5-dinitroaniline at 200µg/mL), 1mL/ampul
cat. # 31610

Surrogates:

2-methyl-4-nitroaniline
1,000µg/mL in methanol, 1mL/ampul
cat. # 31612

3,4-dinitrotoluene
1,000µg/mL in methanol, 1mL/ampul
cat. # 31452

GC Columns

- Better resolution of Method 8095 analytes in 20 minutes.
- Eight elution order differences between Rtx®-TNT and Rtx®-TNT2 columns .

Rtx®-TNT Columns (fused silica)

ID	df (µm)	temp. limits	length	qty.	cat. #
0.53mm	1.50	-20 to 300/310°C	6-Meter	3-pk.	12998

Rtx®-TNT2 Columns (fused silica)

ID	df (µm)	temp. limits	length	qty.	cat. #
0.53mm	1.50	-20 to 300/310°C	6-Meter	3-pk.	12999



Lit. Cat.# 59381B

© 2007 Restek Corporation.

Restek U.S. • 110 Benner Circle • Bellefonte, PA 16823 • 814-353-1300 • 800-356-1688 • fax: 814-353-1309 • www.restek.com

Restek France • phone: 33 (0)1 60 78 32 10 • fax: 33 (0)1 60 78 70 90 • e-mail: restek@restekfrance.fr

Restek Ireland • phone: 44 2890 814576 • fax: 44 2890 814576 • e-mail: restek@restekfrance.fr

Thames Restek U.K. LTD • phone: 44 1494 563377 • fax: 44 1494 564990 • e-mail: sales@thamesrestek.co.uk

Restek GmbH • phone: +49 (0) 6172 2797 0 • fax: +49 (0) 6172 2797 77 • e-mail: info@restekgmbh.de

