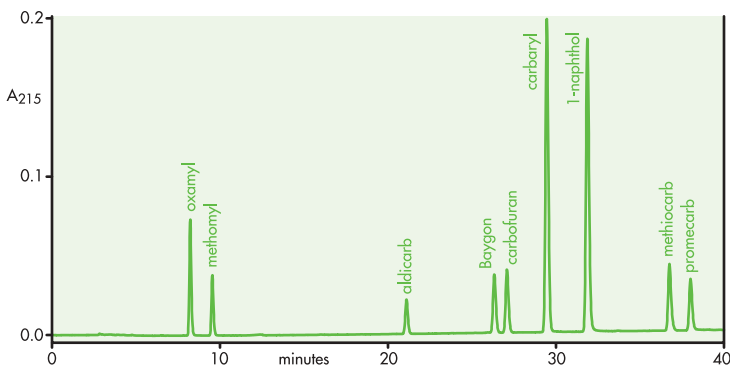


## Columns for Environmental Analyses

### Pesticides and Explosives

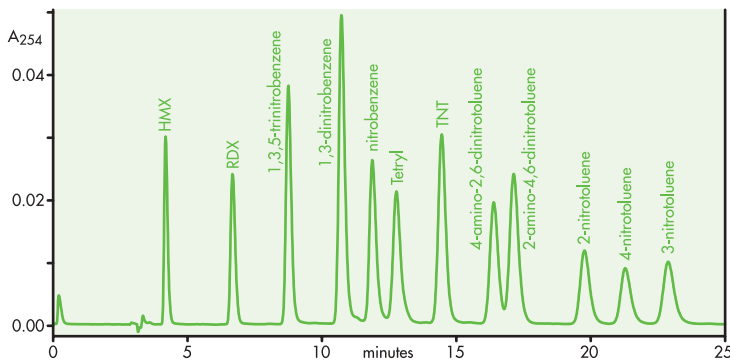
The US Environmental Protection Agency specifies use of reversed-phase chromatography on C18 columns for determination of N-methylcarbamoyloxime and N-methylcarbamate pesticides in water (Method 531) and for trace analysis of nitroaromatic and nitramine explosive residues in water, soil, or sediment (Method 8330). The chromatograms of Figures 1 and 2 show a representative selection of substances separated as specified by these methods on VYDAC® 201SP54 90 Å pore-size C18 reversed-phase column.

#### EPA Method 531. Pesticides.



**Figure 1.** Separation of N-methylcarbamoyls oximes and N-methylcarbamates according to EPA Method 531. Column: VYDAC 201SP54 90 Å, 5 µm, C18 reversed-phase, 4.6 mm ID x 250 mm. Mobile phase: A = 5% acetonitrile/95% water (v/v). B = 90% acetonitrile/10% water (v/v). Flow rate: 1.0 mL/min. Gradient: Linear from 10% to 60% B over 35 minutes.

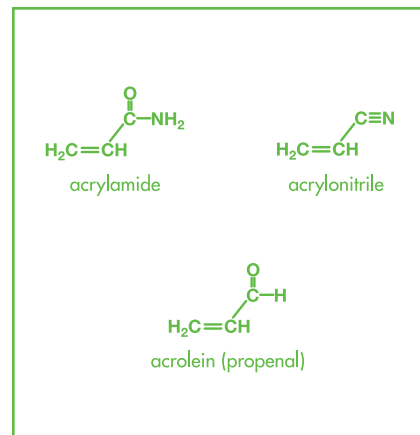
#### EPA Method 8330. Explosives.



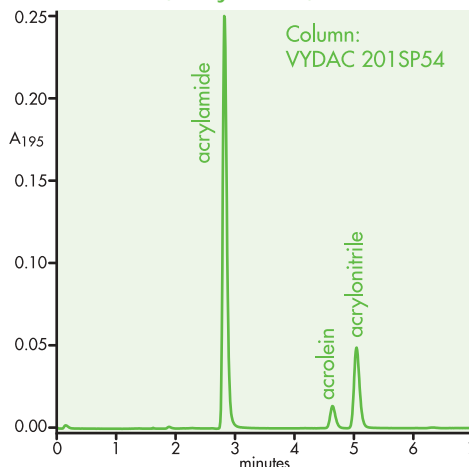
**Figure 2.** Separation of nitroaromatics and nitramines according to EPA Method 8330. Column: VYDAC 201SP54 90 Å, 5 µm, C18 reversed-phase, 4.6 mm ID x 250 mm. Mobile phase: Isocratic. 50% methanol/50% water (v/v). Flow rate: 1.0 mL/min.

### EPA Method 8316: Acrylamide, Acrylonitrile, Acrolein (Propenal)

These three toxic and related substances are widely used in industry as intermediates in a variety of processes. Products include polymers, fabrics, dyes, thickeners, coatings, and adhesives used in a variety of consumer, construction, and water and wastewater treatment applications. Their measurement in environmental samples is of considerable interest. They can be separated by chromatography on a VYDAC 201SP54 C18 90 Å pore-size reversed-phase column.



#### Acrylamide, Acrylonitrile, Acrolein



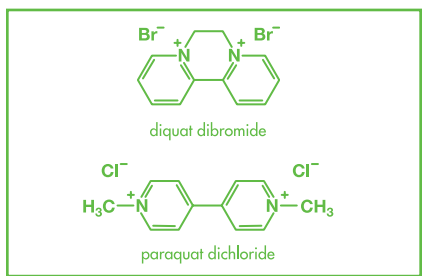
**Figure 3.** Separation of acrylamide, acrolein, and acrylonitrile on 90 Å pore-size C18 reversed phase. Column: VYDAC 201SP54 (C18, 5 µm, 90 Å, 4.6 mm ID x 250 mm). Flow rate: 1.5 mL/min. Mobile phase: A = H<sub>2</sub>O. B = 70% ACN. Isocratic at 7% B. Detection: UV, 195 nm.

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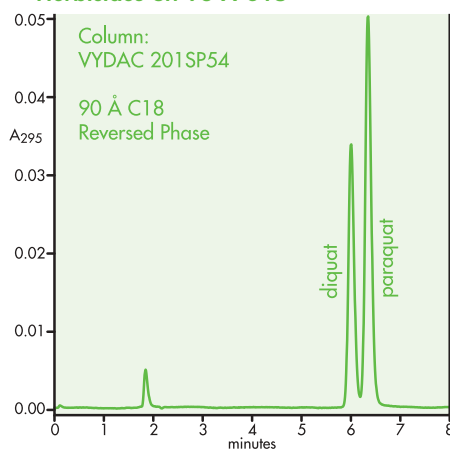
**GRACE VYDAC**  
Enhancing the Science of Separations

## Herbicides

AOAC Official Method 992.17 describes measurement of diquat and paraquat residues in potatoes using a reversed-phase column. Grace Vydac offers two columns for complete resolution of these agents. The 90 Å C18 column provides higher retentivity and separates the two compounds with an isocratic mobile phase containing 5% methanol. The 300 Å diphenyl column is less retentive. However, it provides better resolution (with reversal in elution order) using a mobile phase containing no organic solvent.

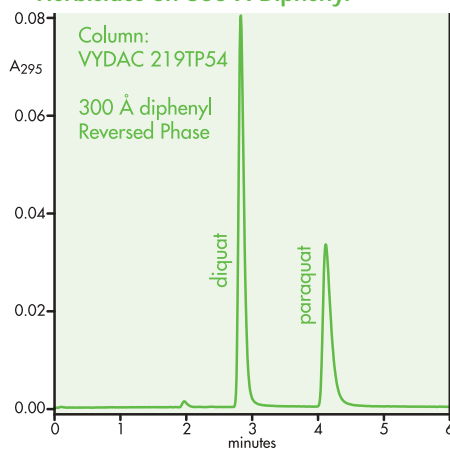


### Herbicides on 90 Å C18



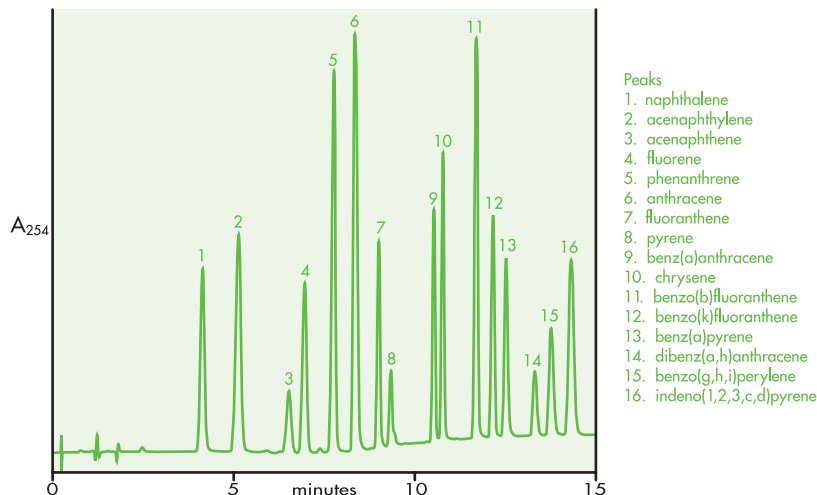
**Figure 4.** Separation of diquat and paraquat on 90 Å pore-size C18 reversed phase. Column: VYDAC 201SP54 (C18, 5 µm, 90 Å, 4.6 mm ID x 250 mm). Temperature: 35°C. Flow rate: 1.5 mL/min. Mobile phase: Isocratic. 0.2 N phosphoric acid, 0.1 M diethylamine, 0.016 M 1-hexanesulfonic acid sodium salt, 5% methanol in water. Detection: UV, 295 nm.

### Herbicides on 300 Å Diphenyl



**Figure 5.** Separation of diquat and paraquat on 300 Å pore-size diphenyl reversed phase. Column: VYDAC 219TP54 (diphenyl, 5 µm, 300 Å, 4.6 mm ID x 250 mm). Temperature: 35°C. Flow rate: 1.5 mL/min. Mobile phase: Isocratic. 0.2 N phosphoric acid, 0.1 M diethylamine, 0.016 M 1-hexanesulfonic acid sodium salt in water. Detection: UV, 295 nm.

## EPA Methods 550, 550.1, 610, & 8310. Priority-Pollutant Polyaromatic Hydrocarbons



**Figure 6.** Reversed-phase analysis of priority-pollutant polyaromatic hydrocarbons (PAHs) in accordance with US EPA Methods 550, 550.1, 610, and 8310. Column: VYDAC 201TP5415 (C18, 5 µm, 4.6 mm ID x 150 mm). Flow rate: 1.5 mL/min. Mobile phase: A = 50% ACN in water. B = ACN. Gradient: Equilibrate and hold at 0% B for 3 minutes after sample injection, then linear ramp to 100% B over 7 minutes. Detection: UV, 254 nm. Sample: Priority-pollutant PAH mixture.

## Polyaromatic Hydrocarbons (PAHs)

PAHs are large organic molecules, many of them carcinogenic, produced during combustion. Government agencies have formulated regulations for measurement and control of PAHs in air, water, food, and other environmental components.

The US EPA has designated sixteen PAHs as priority pollutants (Fig. 6). EPA Methods 610 and 550 deal with measurement of PAHs in drinking water. Method 8310 deals with their measurement in wastewater. Reversed-phase HPLC is specified as the standard method of analysis.

## Ordering Information

### Cat. No. Description

201SP54	Reversed-Phase Column. C18. 90 Å. 5 µm. 4.6 mm ID x 250 mm.
201TP5415	Reversed-Phase Column. C18. 300 Å. 5 µm. 4.6 mm ID x 150 mm.
219TP54	Reversed-Phase Column. Diphenyl. 300 Å. 5 µm. 4.6 mm ID x 250 mm.

To place an order, call (800) 347-6378, fax (508) 485-5736 your local Grace Vydac distributor.  
The Nest Group, Inc. ■ 45 Valley Road ■ Southborough, MA 01772 ■ [www.nestgrp.com](http://www.nestgrp.com)

