

Thermo Scientific™ Dionex™ IonPac™ AmG-3μm C18 column

## Rugged reversed-phase PEEK columns designed for aminoglycoside antibiotic analysis

### Benefits

- High-efficiency, high-throughput column
- Flexibility to use eluent across a pH range of 1–9 for the analysis of a wider range of aminoglycosides
- Available in PEEK hardware for use with HPAE-PAD or HPLC-PAD methods

### Keywords

C18, high-performance anion-exchange chromatography, pulsed amperometry analysis, derivatization-free, direct detection

The Thermo Scientific™ Dionex™ IonPac™ AmG-3μm C18 column is a high performance silica-based C18 column specifically designed for ion-pairing reversed-phase liquid chromatographic analysis of various aminoglycoside based antibiotics, including drug purity, impurity characterization and quantification, as well as residual control testing in different matrices. The unique column chemistry provides unusual tolerance toward low pH, high temperature, and aqueous mobile phases.

### Product Highlights:

- Excellent selectivity for aminoglycosides
- Superior tolerance towards acidic eluents
- High efficiency and throughput

## Introduction

Aminoglycosides are a group of antibiotics with similar amine-modified sugar structures. They are capable of inhibiting protein synthesis, so are widely used as clinical and veterinary medicines to treat bacterial infections. However, these antibiotics have serious side effects and can cause varying degrees of ototoxicity and nephrotoxicity. Therefore, it is important to develop sensitive and reliable analytical methods to characterize and quantify drug purity to determine and monitor aminoglycoside residues in different matrices, including blood, urine, and different animal-derived foods.

Pulsed amperometric detection (PAD) is a sensitive and selective electrochemical detection method. Table 1 shows the quadruple-potential waveform detection that can be used for detection of aminoglycosides.

Time (s)	Potential (V)	Integration
0.00	+0.10	
0.20	+0.10	Start
0.40	+0.10	End
0.41	-2.00	
0.42	-2.00	
0.43	+0.60	
0.44	-0.10	
0.50	-0.10	

A waveform is a series of voltage steps that work to charge the electrode, detect the analyte, clean the electrode, and then restore the surface.<sup>1</sup> The entire process takes milliseconds and is ongoing throughout the run. This repeated cleaning and detecting is called pulsing; the process is known as pulsed amperometric detection, or PAD. The pulsing waveform ensures the electrode surface is always clean and the results are reproducible.

## Applications

### Analysis of Gentamicin

Gentamicin is a widely used broad spectrum antibiotic. It is produced by the fermentation process of *Micromonospora purpurea* and consists of a mixture of related gentamicin components and fractions. The major components of the gentamicin C complex are: C1, C1a, C2, C2a and C2b. Figure 1 shows an isocratic separation of gentamycin sulfate using a simple mobile phase consisting of 100 mM TFA and 0.025% PFPA/ CH<sub>3</sub>CN (97:3, pH 2.6). The chromatogram shows the five cogeners C1, C1a, C2, C2a and C2 are well separated.

Figure 1 shows the separation of gentamicin and related impurities using the Dionex IonPac AmG-3 $\mu$ m C18 column.

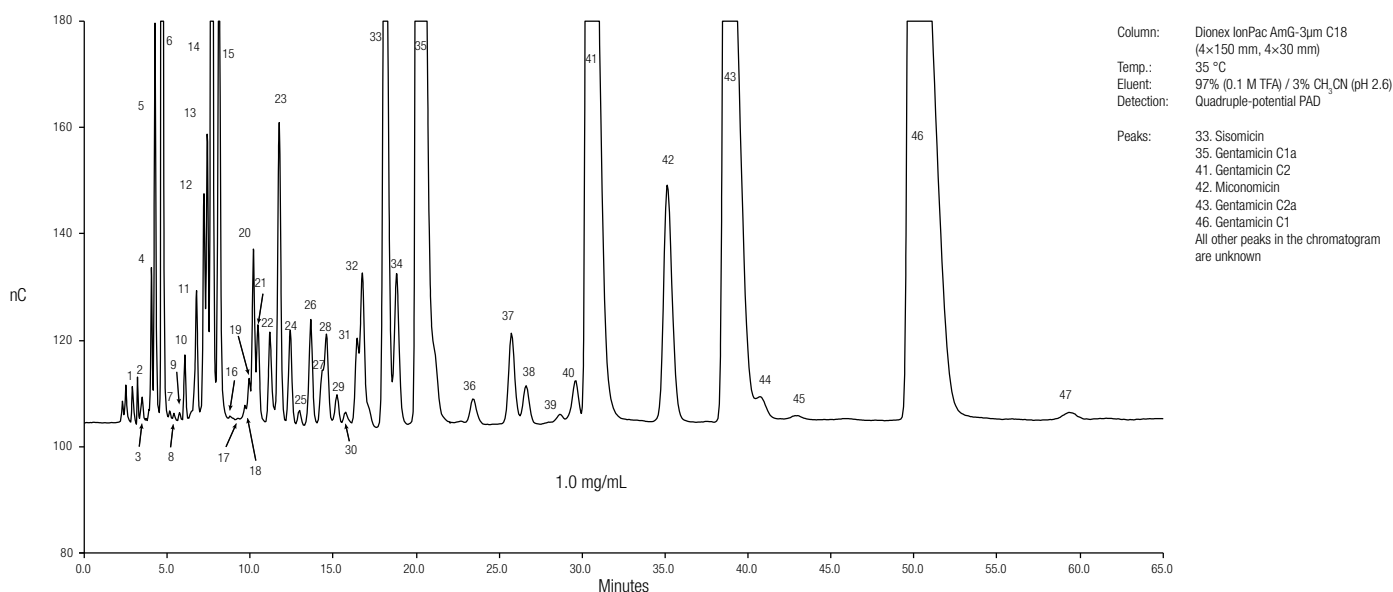


Figure 1. Gentamicin analysis using the Dionex IonPac AmG-3 $\mu$ m C18 Column

## Analysis of Etimicin

Etimicin is an aminoglycoside that is structurally related to gentamicin and is used in the treatment of severe infections, particularly those resistant to gentamicin. Figure 2 shows the separation of etimicin and related impurities using the Dionex IonPac AmG-3 $\mu$ m C18 column.

## Analysis of Spectinomycin

Spectinomycin is a water-soluble broad-spectrum aminoglycoside antibiotic. It is industrially produced by

fermentation of the bacterium *Streptomyces spectabilis*. Spectinomycin is also produced in nature by many organisms including cyanobacteria and various plant species. It is used for intravenous administration to treat infections. Spectinomycin must be analyzed and all impurities must meet specified limits before a manufactured lot is used clinically. Figure 3 shows the separation of spectinomycin under isocratic conditions using 100 mM TFA.

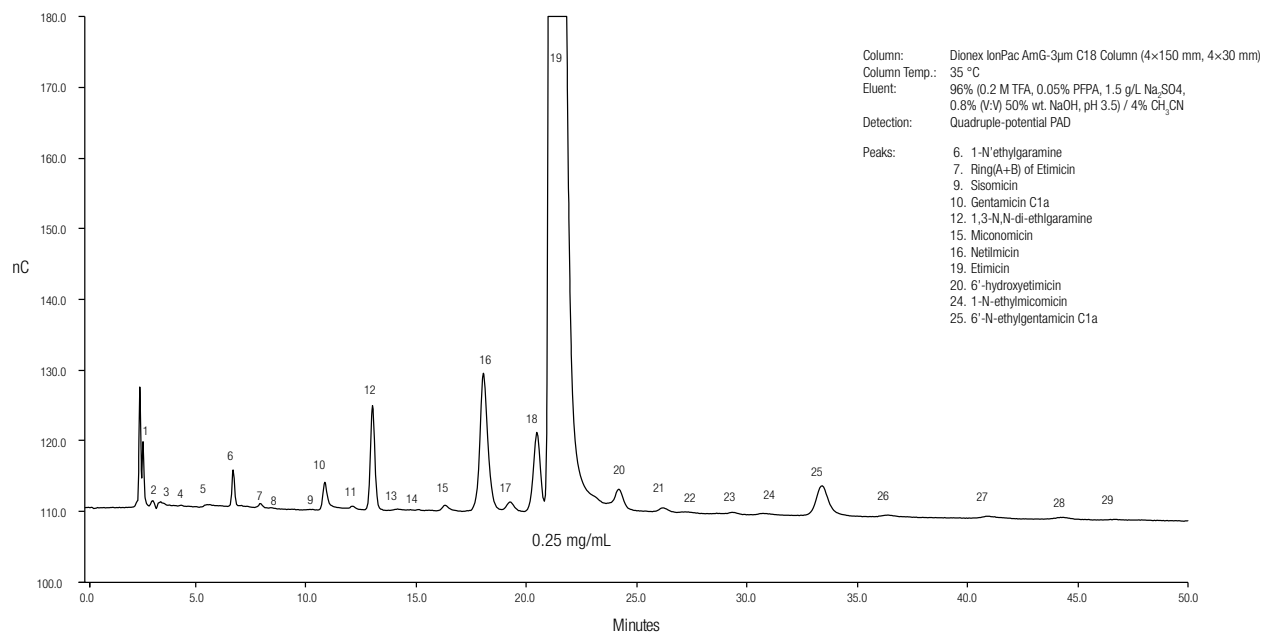


Figure 2. Analysis of etimicin and related impurities using the Dionex IonPac AmG-3 $\mu$ m C18 column

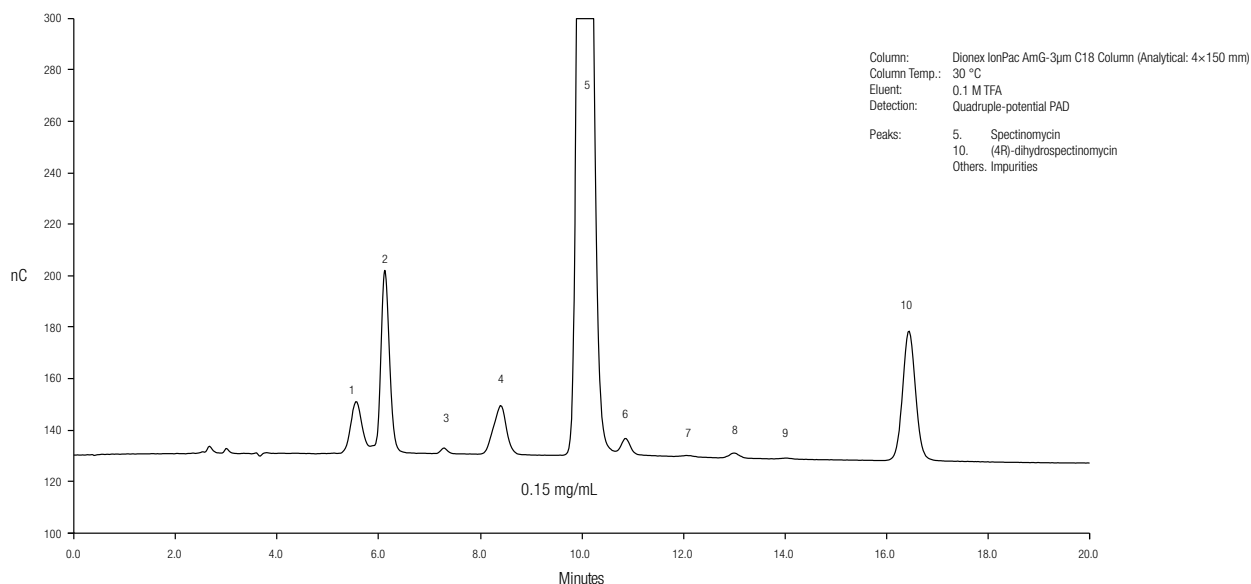


Figure 3. Analysis of spectinomycin using the Dionex IonPac AmG-3 $\mu$ m C18 column

## Product Specification

Specification	Value
Diameter (Metric)	4 mm
Flow Rate	0.8 to 1.1 mL/min
Max. Pressure	5000 psi
Packing Material	Silica, Spherical high purity
Particle Size	3 µm
Pore Size	120 Å
pH	1–9
Length (Metric)	150 mm
Column Construction	PEEK
Temperature	< 60°C

## Ordering Information

Product Description	Part Number
Dionex IonPac AmG-3µm C18 PEEK (4.0 x 150 mm) Analytical Column	302693
Dionex IonPac AmG-3µm C18 PEEK (4.0 x 30 mm) Guard Column	302694

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