



Designation: **C 759 – 9804**

Standard Test Methods for Chemical, Mass Spectrometric, Spectrochemical, Nuclear, and Radiochemical Analysis of Nuclear-Grade Plutonium Nitrate Solutions¹

This standard is issued under the fixed designation C 759; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 These test methods cover procedures for the chemical, mass spectrometric, spectrochemical, nuclear, and radiochemical analysis of nuclear-grade plutonium nitrate solutions to determine compliance with specifications.

1.2 The analytical procedures appear in the following order:

	Sections
Plutonium by Controlled-Potential Coulometry	2
Plutonium by Amperometric Titration with Iron(II)	2
~~Plutonium by Diode Array Spectrophotometry~~	~~4~~
Plutonium by Diode Array Spectrophotometry	
Free Acid by Titration in an Oxalate Solution	8 to 15
Free Acid by Iodate Precipitation-Potentiometric Titration Test Method	16 to 22
Uranium by Arsenazo I Spectrophotometric Test Method	23 to 33
Thorium by Thorin Spectrophotometric Test Method	34 to 42
Iron by 1,10-Phenanthroline Spectrophotometric Test Method	43 to 50
~~Impurities by ICP-AES~~	
Chloride by Thiocyanate Spectrophotometric Test Method	51 to 58
Fluoride by Distillation-Spectrophotometric Test Method	59 to 66
Sulfate by Barium Sulfate Turbidimetric Test Method	67 to 74
Isotopic Composition by Mass Spectrometry	75 to 76
Plutonium — ²³⁸ Isotopic Abundance by Alpha Spectrometry	
Americium-241 by Extraction and Gamma Counting	77 to 85
Americium-241 by Gamma Counting	86 to 94
~~Gamma-Emitting Fission Products, Uranium, and Thorium by —Gamma-Ray Spectroscopy~~	~~94 to 102~~
Gamma-Emitting Fission Products, Uranium, and Thorium by Gamma-Ray Spectroscopy	94 to 102
Rare Earths by Copper Spark Spectrochemical Test Method	103 to 105
Tungsten, Niobium (Columbium), and Tantalum by Spectrochemical Test Method	106 to 114
Sample Preparation for Spectrographic Analysis for General Impurities	123 to 126

¹ These test methods are under the jurisdiction of ASTM Committee C-26 on Nuclear Fuel Cycle and are the direct responsibility of Subcommittee C26.05 on Methods of Test.

Current edition approved Feb. 10, 1998; Jan. 1, 2004. Published May 1998; February 2004. Originally published as C 759 — 73; approved in 1973. Last previous edition approved in 1998 as C 759 — 928.