

DIN EN ISO 17294-1:2024-07 (E)

Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS) - Part 1: General requirements (ISO 17294-1:2024)

Contents		Page
European foreword	.....	4
Foreword	.....	5
Introduction	.....	6
1 Scope	.....	7
2 Normative references	.....	7
3 Terms and definitions	.....	7
4 Principle	.....	9
5 Apparatus	.....	10
5.1 General	.....	10
5.2 Sample introduction	.....	10
5.2.1 General	.....	10
5.2.2 Pump	.....	11
5.2.3 Nebulizer	.....	11
5.2.4 Spray chamber	.....	12
5.2.5 Other systems	.....	12
5.3 Torch and plasma	.....	12
5.4 Gas and gas control	.....	13
5.5 Generator	.....	13
5.6 Transfer of the ions to the mass spectrometer	.....	13
5.7 Mass spectrometer	.....	14
5.7.1 General	.....	14
5.7.2 Lens system	.....	14
5.7.3 Collision or reaction cell	.....	14
5.7.4 Analyser	.....	14
5.7.5 Detector	.....	15
5.7.6 Alternative mass spectrometers and types of instruments	.....	16
5.8 Signal processing and instrument control	.....	17
6 Interferences by concomitant elements	.....	17
6.1 General	.....	17
6.2 Spectral interferences	.....	17
6.2.1 General	.....	17
6.2.2 Possible elimination strategies for polyatomic ion interferences	.....	18
6.3 Non-spectral interferences	.....	19
6.3.1 General	.....	19
6.3.2 Interferences in the nebulization process	.....	19
6.3.3 Interferences in the plasma	.....	19
6.3.4 Interferences in the interface or lens area	.....	20
6.3.5 Possible elimination strategies for non-spectral interferences (matrix effects)	.....	20
7 Adjustment of the apparatus	.....	23
7.1 General	.....	23
7.2 Tuning the apparatus	.....	23
7.2.1 General	.....	23
7.2.2 Alignment of the plasma	.....	24
7.2.3 Mass calibration	.....	24
7.2.4 Resolution	.....	24
7.2.5 Detector	.....	24
7.3 Verification of instrument performance criteria	.....	25

8	Preparatory steps	25
8.1	General.....	25
8.2	Choice of isotopes.....	26
8.3	Choice of instrumental settings.....	26
8.4	Choice of integration time.....	27
8.5	Choice of reference elements — Internal standards.....	28
8.6	Linearity and working range.....	28
8.7	Composition of calibration solutions.....	29
8.8	Method development for cool plasma conditions.....	29
8.9	Determination of the method performance.....	29
8.9.1	General.....	29
8.9.2	Instrument detection limit.....	30
8.9.3	Method detection limit.....	30
8.9.4	Precision of the method.....	30
9	Procedure	30
9.1	General.....	30
9.2	Calibration.....	30
9.3	Necessary solutions.....	31
9.4	Measurement.....	31
Annex A (informative) Spectral interferences, choice of isotopes and instrument detection limits for quadrupole ICP-MS instruments		33
Bibliography		38