

## CERTIFICATE OF ANALYSIS

Thermo Fisher Scientific's Quality System has been found to conform to Quality Management System Standard ISO9001:2015 by TUV SUD America Inc.  
 Certificate Number. 951001163

Catalogue Number	045130
Lot Number	Z01L023
Description	Manganese pieces, 10mm down, ultrapure, 99.9998% (metals basis)
CAS Number	7439-96-5
Quality Test/Release Date	01/Dec/2025
Suggested retest date	01/Dec/2055
Country of Origin	Poland

Result Name	Units	Specifications	Test Value
Assay	ppm	Al $\approx$ 0.5 ppm (Spark Source Mass Spectrometry).	$\approx$ 0.50
Assay	ppm	B < 0.01 ppm (Spark Source Mass Spectrometry).	<0.01
Assay	ppm	C < 0.1 ppm (Spark Source Mass Spectrometry).	<0.10
Assay	ppm	Ca < 0.08 ppm (Spark Source Mass Spectrometry).	<0.08
Assay	ppm	Cl < 0.1 ppm (Spark Source Mass Spectrometry).	<0.10
Assay	ppm	Cr < 0.08 ppm (Spark Source Mass Spectrometry).	<0.08
Assay	ppm	Cu < 0.2 ppm (Spark Source Mass Spectrometry).	<0.20
Assay	ppm	F < 0.1 ppm (Spark Source Mass Spectrometry).	<0.10
Assay	ppm	Fe < 0.5 ppm (Spark Source Mass Spectrometry).	<0.50
Assay	ppm	K < 0.08 ppm (Spark Source Mass Spectrometry).	<0.08
Assay	ppm	Li < 0.05 ppm (Spark Source Mass Spectrometry).	<0.05
Assay	ppm	Mg < 0.06 ppm (Spark Source Mass Spectrometry).	<0.06
Assay	ppm	Na < 0.03 ppm (Spark Source Mass Spectrometry).	<0.03
Assay	ppm	Ni < 0.1 ppm (Spark Source Mass Spectrometry).	<0.10
Assay	ppm	P < 0.1 ppm (Spark Source Mass Spectrometry).	<0.10
Assay	ppm	S < 0.07 ppm (Spark Source Mass Spectrometry).	<0.07
Assay	ppm	Si $\approx$ 0.8 ppm (Spark Source Mass Spectrometry).	$\approx$ 0.80

Note: The data listed is valid for all package sizes of this lot of this product, expressed as an extension of the catalogue number listed above.

Assay	%	Spark Source Mass Spectrometry ≥99.9997%	>99.9999+
Assay	ppm	Zn < 0.2 ppm (Spark Source Mass Spectrometry).	<0.20
Form		Granules, ≥10mm.	Granules, ≥10mm.



Derek Roy  
Quality Manager, LCD

Products are processed under ISO 9001:2015 quality management systems and samples are tested for conformance to the noted specifications. Certain data may have been supplied by third parties. We disclaim the implied warranties of merchantability and fitness for a particular purpose, and the accuracy of third-party data or information associated with the product. Products are for research and development use only. Products are not for direct administration to humans or animals. It is the responsibility of the final formulator or end user to determine suitability, and to qualify and/or validate each product for its intended use.

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