

Low limits, high standards

Elemental limits of detection

The Thermo Scientific™ Niton™ XL5 Plus handheld XRF analyzer is built for your most demanding applications. Where low detection limits and high sample throughput are critical, the Niton XL5 Plus' combination of hardware and software provide you with solutions to meet your most difficult analytical requirements.

The chart below details the typical sensitivity, or limits of detection (LODs)¹ of the Niton XL5 Plus in parts per million (PPM) for various elements in pure silica (SiO₂). LODs are calculated as three standard deviations (99.7% confidence interval) for each element, using 60-second analysis times per filter (120 seconds total analysis time).



Limits of Detection in ppm (mg/kg)

Time: 60s per filter

Mining (4 filters)		Soils (4 filters)	
Element	LOD	Element	LOD
Mg	820	S	40
Al	190	K	15
Si	N/A	Ca	19
P	140	Sc	4
S	35	Ti	6
Cl	22	V	2
K	14	Cr	4
Ca	16	Mn	13
Ti	8	Fe	9
V	3	Co	5
Cr	4	Ni	5
Mn	16	Cu	3
Fe	11	Zn	1
Co	6	As	1
Ni	4	Se	1
Cu	3	Rb	1
Zn	2	Sr	1
As	1	Zr	1
Se	1	Mo	1
Rb	1	Pd	1
Sr	1	Ag	1
Y	1	Cd	2
Zr	1	Sn	3
Nb	1	Sb	4
Mo	1	Te	6
Pd	1	Cs	11
Ag	1	Ba	13
Cd	2	Au	3
Sn	3	Hg	2
Sb	3	Pb	1
Ba	20	Th	1
Au	2	U	1
Hg	2		
Pb	1		
Bi	1		
Th	1		
U	1		

N/A = Not Applicable

Limits of detection (LODs) are dependent on the following factors:

- Testing time
- Interferences/matrix
- Level of statistical confidence
- Line overlaps

Please note:

Ongoing research and advancements in our Niton XL5 Plus analyzers will lead to continual improvement in many of the values detailed in this chart. Contact a Thermo Fisher Scientific office or your local representative for the latest performance specifications.

Actual analysis time is based on your requirements. In most cases, shorter times will provide you with the detection limits required. For example, if analysis time is reduced from 60 seconds per filter to 15 seconds per filter, then the detection limits obtained would be twice the values shown in the chart. Similarly, increasing the time of analysis will reduce the detection limits by the square root of the increased time.



1. Definition and Procedure for the Determination of the Method of Detection Limit, 40 CFR, Part 136, Appendix B, Revision 1.11 U.S. Environmental Protection Agency. U.S. Government Printing Office, Washington, DC, 1995.

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