thermo scientific

LIMITS OF DETECTION - MINING & SOILS

Thermo Scientific Niton XL5 Analyzer

Low limits, high standards

Elemental limits of detection

The Thermo Scientific™ Niton™ XL5 handheld XRF analyzer is built for your most demanding applications. Where low detection limits and high sample throughput are critical, the Niton XL5's 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 in parts per million (PPM) for various elements in pure silica (SiO_2). LODs are calculated as three standard deviations (99.7% confidence interval) for each element, using 60-second analysis times per filter.

Limits of Detection in ppm (mg/kg)
Time: 60s per filter

Mining (4 filters)		Soils (3 filters)	
Element	**LOD**	**Element**	**LOD**
Mg	2500	S	112
Al	487	K	19
Si	N/A	Ca	8
P	47	Sc	8
S	54	Ti	8
Cl	38	V	3
K	28	Cr	4
Ca	15	Mn	13
Ti	9	Fe	9
V	4	Co	5
Cr	4	Ni	11
Mn	17	Cu	3
Fe	14	Zn	2
Co	9	As	2
Ni	5	Se	1
Cu	5	Rb	1
Zn	4	Sr	1
As	2	Zr	1
Se	1	Mo	1
Rb	1	Pd	2
Sr	2	Ag	2
Y		Cd	2
Zr	2	Sn	4
Nb	1	Sb	4
Mo	1	Te	8
Pd	2	Cs	22
Ag	2	Ba	18
Cd	2	W	5
Sn	3	Au	4
Sb	4	Hg	3
Ba	29	Pb	1
W		Th	1
Au	3	U	2
Pb	1		
Bi	2		

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 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, and, in most cases, shorter times will give you the detection limits you require. For example, if analysis time was reduced from 60 seconds to 15 seconds, then the detection limits obtained would be twice the values shown in the chart. Similarly, increasing the analysis time 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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