

Providing Innovative Solutions to Analytical Chemists

1.0 DESCRIPTION: Matrix Reference Material *AgroMAT - Sandy Soil (AG-2)*
 Catalogue Number: 140-025-102
 Lot Number: S131024029
 Expiration Date: 2 years from date of shipment (See Ship Date label on bottle)

2.0 CONSENSUS VALUES (See section 8 for additional details):

Parameters	Extraction Method	Units	Consensus Value	Uncertainty (+/-)	Confidence Interval	Tolerance Interval
Phosphorus	Bray P1	ppm	(47.3)	----	----	----
	Mehlich III	ppm	89.9	4.1	85.8 - 94.0	64.3 - 115.5
	Olsen	ppm	45.6	4.5	41.1 - 50.2	20.8 - 75.5
Potassium	Ammonium Acetate pH 7	ppm	364	23	341 - 387	224 - 504
	Mehlich III	ppm	398	18	380 - 416	286 - 511
Calcium	Ammonium Acetate pH 7	ppm	1370	65	1305 - 1435	995 - 1746
	Mehlich III	ppm	1484	58	1426 - 1543	1110 - 1859
Magnesium	Ammonium Acetate pH 7	ppm	134	10	124 - 144	72.9 - 195
	Mehlich III	ppm	186	8	178 - 194	133 - 238
Sodium	Ammonium Acetate pH 7	ppm	35.4	2.6	32.8 - 38.0	19.7 - 51.2
	Mehlich III	ppm	37.8	2.6	35.2 - 40.4	23.5 - 52.1
Zinc	DTPA	ppm	0.79	0.06	0.73 - 0.85	0.47 - 1.11
	Mehlich III	ppm	2.84	0.11	2.72 - 2.95	2.12 - 3.55
Manganese	DTPA	ppm	16.8	2.3	14.5 - 19.1	4.17 - 29.5
	Mehlich III	ppm	156	8	147 - 164	103 - 209
Copper	DTPA	ppm	1.26	0.09	1.17 - 1.35	0.791 - 1.72
	Mehlich III	ppm	1.25	0.16	1.09 - 1.41	0.270 - 2.23
Iron	DTPA	ppm	64.4	7.5	57.0 - 71.9	23.6 - 105
	Mehlich III	ppm	700	40	660 - 740	437 - 963
Boron	Hot Water	ppm	0.39	0.10	0.28 - 0.49	0 - 0.95
	Mehlich III	ppm	0.45	0.06	0.39 - 0.51	0.16 - 0.74
Sulfur	Mehlich III	ppm	15.2	0.6	14.6 - 15.8	11.9 - 18.5
Aluminum	Mehlich III	ppm	1354	33	1322 - 1387	1168 - 1541
pH	1 :1 (Soil:Water)	----	6.89	0.04	6.86 - 6.93	6.67 - 7.12
	1 :2 (Soil:Water)	----	7.02	0.04	6.98 - 7.07	6.76 - 7.29
	Saturated Paste	----	6.85	0.11	6.74 - 6.96	6.33 - 7.37
	Buffer SMP	----	7.06	0.11	6.95 - 7.17	6.53 - 7.59
Organic Matter	LOI	%	3.77	0.20	3.57 - 3.97	2.26 - 5.27
	Walkley Black	%	2.79	0.15	2.63 - 2.94	1.96 - 3.61
Nitrogen as Nitrate	KCl	ppm	27.3	0.7	26.6 - 28.0	22.3 - 32.3
Soluble Salts	1 :1 Soil :Water	uS/cm	(334)	----	----	----
	1 :2 Soil :Water	uS/cm	199	12	188 - 211	121 - 277
	Saturated Paste	uS/cm	(551)	----	----	----

Note : Values in bracket are not certified. They are listed for information only.

3.0 APPROVAL AND REVISION:

Approval: Daniel Boisvert, Chemist
 Date of Issue of Report: April 14th, 2014
 Date of revision: June 23rd, 2020




4.0 DESCRIPTION AND INTENDED USE:

The Matrix Reference Material (MRM) AG-2 is a naturally agricultural sandy soil (not spiked or fortified) with a particle size of -200 mesh. It is designed to be used for quality control verification, internal standards validation or methods development for the analysis of the listed parameters using the indicated extraction methods. Not intended for calibration.

5.0 INSTRUCTIONS FOR USE AND STABILITY:

Instructions for use: Before weighing, mix the material by shaking the container to avoid segregation in the bottle. In order to have a representative sample, the minimum use quantity must be 1 g to conform to previous homogeneity testing. Analysis has been performed on a dry weight basis.

Stability: This MRM is guaranteed to be stable up to 2 years from the shipping date provided the material is kept sealed, stored under normal laboratory conditions and used according to good laboratory practices. Shipping date will be stamped on container at time of shipping. **SCP SCIENCE** will monitor the stability of representative samples regularly and if any changes occur that invalidate the reported results, **SCP SCIENCE** will notify purchasers.

Date of last verification: **March 26th, 2020**

6.0 HAZARDOUS INFORMATION:

Please refer to the associated Safety Data Sheet (SDS) for information regarding this product (available at <http://www.scpscience.com/ecert>).

7.0 PREPARATION METHOD AND HOMOGENEITY:

Preparation Method: The initial sample has been dried, crushed and sieved through a 0.5 inch sieve. The "fines" portion has been further crushed and sieved with 80% of the material passing through a 200 mesh screen. This portion has been re-pulverized and sieved through a 200 mesh sieve to obtain 100% less than 200 mesh. The final material has then been packaged in 175 g containers and tested for homogeneity.

Homogeneity: The homogeneity of the material has undergone third party verification by Particle Size Analysis and by metals oxides analysis using X-ray fluorescence spectrometer. The method used for material homogeneity determination is based on ISO Guide 35.

8.0 ANALYSIS AND DETERMINATION OF CONSENSUS VALUES:

These values were the result of an inter-laboratory study involving forty-five laboratories. Each laboratory was asked to supply analysis data for a specific list of parameters employing specific extraction methods. Not all the laboratories supplied data for the different parameters. Consensus Values are based on an average of 29 values per parameter (52 values being the highest and 12 values being the lowest). Values in brackets are not certified as less than 9 values were received. They are provided for information only.

Several extraction methods have been used by lab participants. Mehlich III, Olsen, Ammonium Acetate at pH 7 and DTPA are methods that we had enough results to do statistical calculation. Almost all labs did their sampling by weight rather than by calibrated scoop. Extraction method soil ratio used by most labs is: Mehlich III (1:10), Olsen (1:20), Bray P1 (1:10), Ammonium acetate pH 7 (1:10), DTPA (1:2).

Agricultural extraction methods for all elements are listed on section 2.0 of this certificate. Most participating labs used ICP or AA to test metals. ICP and colorimetric method have been used for phosphorus testing: Colorimetric for Bray P1 and Olsen extraction methods, ICP for Mehlich III extraction method. For nitrates analysis, cadmium reduction with colorimetric method, ionic chromatography and segmented flow analyser have been used by most participating laboratories.



The outliers were removed using the Dixon Test and data comparison after confirmation that there was neither a connection between outliers and the methods used for analysis nor between the outliers and the nature of the sample.

The Confidence Interval has been calculated using the 95% Confidence Level (equivalent to 2σ) using the following formula:

$\bar{x} \pm ts/\sqrt{n}$ where

n:	number of data
s:	Standard Deviation of the Average
t:	factor for Student Test
x:	Reference Value

The Confidence Interval should be used for routine quality control.

The Tolerance Interval has been calculated using again a 95% probability with a 95% inclusion of the population. The following formula was used:

$\bar{x} \pm ks$ where

k:	factor for two-sided Tolerance Limits
s:	Standard Deviation of the Average
x:	Reference Value

The Tolerance Interval is an indication of the lowest possible value and the highest possible value based on the complete set of data, exclusive of outliers, used to calculate the Consensus Value.

The following table is a guideline on how to interpret the results:

Results within Confidence Interval	Method working properly
Results outside Confidence Interval but within Tolerance Interval	Method may need improvement
Results outside Tolerance Interval	Method not working properly

9.0 REFERENCES:

ISO Guide 30: Terms and definitions used in connection with reference materials
ISO Guide 31: Reference materials – Contents of certificates, labels and accompanying documentation
ISO Guide 35: Certification of reference materials--General and statistical principles
Standard Reference Materials-Handbook for SRM Users - John K. Taylor
Quality Assurance of Chemical Measurements - John K. Taylor
Handbook on Reference Methods for Soil Analysis (1992) - Soil and Plant Analysis Council



10.0 QUALITY SYSTEM CERTIFICATIONS:

ISO 9001 Certification: This standard was produced in a facility which operates under a **registered** ISO 9001 Quality Management System. Please consult our web site for a copy of the most recent revision of our certificate of registration.

ISO 17025 Accreditation: **SCP SCIENCE (Corporate Headquarters)** operates an ISO 17025 **accredited** laboratory. Please consult our web site for a copy of the most recent revision of our certificate and scope of accreditation.

ISO 17034 Accreditation: **SCP SCIENCE (Corporate Headquarters)** is an ISO 17034 accredited Reference Material Producer. Please consult our website for a copy of our most recent certificate and scope of accreditation.

**CORPORATE
HEADQUARTERS**

21800 Clark Graham
Baie D'Urfé (Montréal), Quebec,
H9X 4B6 Canada
Phone: +1 (800) 361-6820
Fax: +1 (800) 253-5549

USA

3rd Party Distribution Center
348 Route 11, Champlain,
N.Y. 12919-4816

Phone: +1 (800) 361-6820
Fax: +1 (800) 253-5549

FRANCE

12 Ave. de Québec, Bat. IRIS
SILIC 642, 91965
Villebon sur Yvette, France
Phone: +33 (0) 1 69 18 71 17
Fax: +33 (0) 1 60 92 05 67

GERMANY

Alte Marktoberdorfer Straße 14, 87616
Marktoberdorf

Phone: +49 (0) 8342-89560-61
Fax: +49 (0) 8342-89560-69

CORPORATE :

Phone: +1 (514) 457-0701 | Fax: +1 (514) 457-4499

www.scpscience.com | sales@scpscience.com

