

STANDARDS CONCIL OF CANADA CAN-P-1579 Appendix A (Rev.: 2) PSA-MA Criteria for Assessment of Proficiency Testing Performance

PURPOSE

This CAN-P-1579 Appendix A document outlines the Standards Council of Canada (SCC) Mineral Analysis Working Group (MAWG) proficiency testing measurand list and criteria for the assessment of proficiency testing performance for accredited laboratories in the SCC Program Specialty Area - Mineral Analysis (PSA MA) program.

AUTHORSHIP

This publication has been compiled and approved by the SCC MAWG.

FURTHER INFORMATION

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TABLE OF CONTENTS

CRITERIA FOR ASSESSMENT OF PROFICENCY TESTING PERFORMANCE 3

1 Proficiency Testing Measurand List 3

2 Summary of evaluation criteria 44

 a) The laboratory’s responsibilities 44

 b) General criteria for reviewing and evaluating data 44

 c) General statistical information for the laboratories 55

3 Performance rating criteria 66

 a) General performance assessment criteria 66

 b) Provisional Accreditation Status within each individual proficiency testing cycle 66

4 Factors in determining recommendation of suspension 77

CRITERIA FOR ASSESSMENT OF PROFICIENCY TESTING PERFORMANCE

The following is a list of the proficiency testing measurands in the designated proficiency testing program and an amplification of the criteria the SCC MAWG shall employ in assessing the individual proficiency testing performance of laboratories accredited test methods to the requirements of section 6 in CAN-P-1579. In case of disagreement between this document and CAN-P-1579, the current version of CAN-P-1579 will take precedence.

1 Proficiency Testing Measurand List

(Date of Issue: 2008-07-08)

Measurand	Target Concentration Range	Target Concentration Range (Alternate units)
Gold	100 ppb to 15 g/metric ton	100 µg/kg to 15 mg/kg
Silver	1000 ppb to 1000 ppm	1000 µg/kg to 1000 mg/kg
Copper	1000 ppb to 2%	1000 µg/kg to 2%w/w
Lead	1000 ppb to 2%	1000 µg/kg to 2%w/w
Zinc	1000 ppb to 3%	1000 µg/kg to 3%w/w
Cobalt	1000 ppb to 0.1%	1000 µg/kg to 0.1%w/w
Nickel	1000 ppb to 2%	1000 µg/kg to 2%w/w
Palladium	100 ppb to 3 ppm	100 µg/kg to 3 mg/kg
Platinum	100 ppb to 3 ppm	100 µg/kg to 3 mg/kg

NOTE:

- 1) The Canadian Certified Reference Material Project (CCRMP) - CANMET-MMSL is the currently designated Proficiency Testing Provider for this proficiency testing scheme.
- 2) This list of minerals and normal target concentration ranges may change from time to time by agreement between CANMET-MMSL and the SCC MAWG. Amendments may be obtained, on request, from either the SCC MAWG or from the documentation provided by CANMET-MMSL concerning the current proficiency testing program.
- 3) This list is the normal target concentration range for the measurands within each sample. However, in order to prepare representative samples generally within these ranges, the proficiency testing coordinator may, at their sole discretion, exceed (higher or lower) these limits on an individual measurand(s) in an individual sample. Hence it may happen that not all measurands in all 4 samples within a specific proficiency testing cycle will fall within these exact target concentration ranges.

2 Summary of evaluation criteria

a) The laboratory's responsibilities

In general, the laboratory's responsibilities include the following:

- identifying the methodology for each measurand.
- reporting one result on each measurand per each proficiency testing sample for each test method for requested/ongoing accreditation.
- reporting results to at least 2 significant figures

Laboratories shall declare their test method detection limit for each measurand of every accredited test method to the proficiency testing coordinator.

The laboratory may lose one sample only once in a 3 year period. If this occurs more than once then the test method(s) shall be suspended until the corrective action is investigated and corrected

The laboratory shall, under normal circumstances, submit 8 results on each measurand (a < or < DL is a valid result) for each test method/relevant proficiency testing sample combination over the 2 proficiency testing cycles. However, if unforeseen circumstances occur, they shall submit a minimum of 4 results for 2 proficiency testing cycles - i.e. 4 results on each measurand for each test method over 2 cycles/year. Note that currently only 4 proficiency testing samples are made available per year for the measurands platinum and palladium

Laboratories shall provide the SCC MAWG Secretary (with a copy to the proficiency testing coordinator), within 10 working days from the first date of receiving any preliminary "Performance Report" (in what ever format first reported to the laboratory) from the proficiency testing provider, an initial corrective action report (CAR) for any unsatisfactory measurand result. This shall be done by electronically and the laboratory shall immediately initiate corrective action(s).

Laboratories failing to accurately report their performance in any proficiency testing round within this timeline shall be immediately subject to suspension.

b) General criteria for reviewing and evaluating data

The SCC MAWG proficiency testing subcommittee will use the following evaluation criteria for reviewing and evaluating the data and any trigger actions to be taken:

- employ the individual and absolute z-score data to assess the performance of the laboratory.
- target values for assessing laboratory performance are outlined in the following tables:

Table 1: Z -scores (Individual measurand test result for each sample)

z-score	Rating
$ z \leq 2.0$	Satisfactory (S)
$2.0 < z < 3.0$	Questionable (Q)
$ z \geq 3.0$	Unsatisfactory (U)

**STANDARDS CONCIL OF CANADA CAN-P-1579 Appendix A (Rev.: 2)
PSA-MA Criteria for Assessment of Proficiency Testing Performance**

Table 2: Absolute values of a set of z-scores: (for each PT cycle set)

Absolute z-scores	Rating
All z-scores < 2.0	Good
All z-scores < 3.0	Satisfactory (S)
Only one z-score \geq 3.0	Questionable (Q)
Two or more z-scores \geq 3.0	Unsatisfactory (U)

c) General statistical information for the laboratories

The SCC MAWG has requested the proficiency testing provider to continue to calculate and report the RZS and SSZ values and evaluate them in their reports according to the criteria in the following tables. These **RSZ and SSZ values** effective July 2008 **will no longer be employed to evaluate and assess the performance of accredited SCC mineral analysis laboratories.**

These statistical data and evaluations are provided solely for the information of the laboratory.

Table 3: Re-scaled Sum of z-scores (RSZ) (for each PT cycle set)

RSZ Range	Rating
$RSZ \leq 2.0$	Good
$2.0 < RSZ \leq 3.0$	Satisfactory (S)
$3 < RSZ < 4.0$	Questionable (Q)
$RSZ \geq 4.0$	Unsatisfactory (U)

Table 4: Sum of Squared z-scores (SSZ) (for each PT cycle set)

Confidence Limit	Rating
95%	Satisfactory (S)
99%	Questionable (Q)
> 99%	Unsatisfactory (U)

Table 5: Table of Chi Squared versus Confidence Interval (for each PT cycle - used for Table 4 above)

Confidence Limit	N=2	N=3	N=4	N=5	N=6
95%	$x \leq 5.99$	$x \leq 7.82$	$x \leq 9.49$	$x \leq 11.07$	$x \leq 12.59$
99%	$5.99 < x \leq 9.21$	$7.82 < x \leq 11.34$	$9.49 < x \leq 13.28$	$11.07 < x \leq 15.09$	$12.59 < x \leq 16.81$
> 99%	$x > 9.21$	$x > 11.34$	$x > 13.28$	$x > 15.09$	$x > 16.81$

3 Performance rating criteria

a) General performance assessment criteria

The SCC MAWG proficiency testing subcommittee will use the following performance assessment criteria on every proficiency testing cycle to evaluate the laboratory's requirement for corrective action(s) concerning Unsatisfactory Performance:

- two (2) or more questionable (Q) ratings for any measurand within the proficiency testing cycle invokes the SCC MAWG proficiency testing subcommittee to closely monitor the performance of this measurand. Continued questionable performance over several cycles may invoke clause 6.4.4.
- two (2) unsatisfactory (U) ratings within the proficiency testing cycle (i.e. z-scores unsatisfactory twice for the same measurand in different samples) invokes clauses 6.4.4, 6.4.5, 6.4.6 and 6.4.7 and a definite suspension of specific test method/measurand(s) accreditation status pending confirmation of satisfactory corrective action(s) which almost always means satisfactory proficiency testing performance on remedial samples.
- three (3) unsatisfactory (U) ratings (for the same measurand in different samples, different measurands in the same sample) invokes clause 6.4.9 and a definite withdrawal of that test method/measurand(s) accreditation status pending investigation and corrective action(s) by laboratory.

b) Provisional Accreditation Status within each individual proficiency testing cycle

For evaluation and tracking a Provisional Accreditation Status (PAS) shall be defined using the symbols \checkmark (satisfactory), ? (questionable) and x (unsatisfactory) where:

- \checkmark indicates z-scores or absolute z-scores status are ALL Satisfactory (S) i.e. no z-scores > 2.0 and the absolute z-scores are ≤ 3.0 .
- ? indicates any z-score or absolute z-score status are Questionable(Q) and none are Unsatisfactory(U).
- x indicates any z-score or absolute z-score status are Unsatisfactory (U).

The SCC MAWG proficiency testing subcommittee will employ a **summary spreadsheet** to track the individual performances of each accredited/applicant laboratory. This spreadsheet will contain columns indicating the Provisional Accreditation Status. The PAS will be used with the above performance assessment criteria to evaluate the complete set of samples in that proficiency testing cycle to determine any required corrective action(s) (under CAN-P-1579 clauses 6.4.4 – 6.4.7) such that:

- \checkmark = laboratory maintains accreditation
- ? = laboratory maintains accreditation
- ?? = laboratory maintains accreditation. The SCC MAWG Convener will monitor the performance and may consult with the proficiency testing subcommittee to determine if the laboratory requires any corrective action(s)

**STANDARDS CONCIL OF CANADA CAN-P-1579 Appendix A (Rev.: 2)
PSA-MA Criteria for Assessment of Proficiency Testing Performance**

- x = laboratory must forward their CAR within 10 working days of receipt of the cycle proficiency testing performance report to SCC MAWG Secretary to maintain accreditation
- xx = laboratory must forward their CAR within 10 working days of receipt of the cycle proficiency testing performance report to SCC MAWG Secretary. Suspension of specific test method/measurand(s) accreditation status pending confirmation of satisfactory corrective action(s) which almost always means satisfactory proficiency testing performance on remedial samples.
- xxx = laboratory must forward their CAR within 10 working days of receipt of the cycle proficiency testing performance report to SCC MAWG Secretary. Withdrawal of specific test method/measurand(s) accreditation status until satisfactory proficiency testing performance on remedial samples is confirmed.

4 Factors in determining recommendation of suspension

SCC MAWG will consider several factors in determining whether the suspension of a test from the scope of an applicant laboratory or withdrawal of accreditation of an accredited laboratory is necessary:

- a) unsatisfactory performance or failure to participate in a proficiency testing round
- b) failure to take immediate corrective action(s) on unsatisfactory proficiency testing performance(s).
- c) failure to properly correct the unsatisfactory proficiency testing performance(s) in a timely manner
- d) failure to report proficiency testing results within the timeline outlined by the Proficiency Testing Provider
- e) failure to report unsatisfactory proficiency testing results to the SCC MAWG Secretary within the timelines outlined in section 6.3.1.5
- f) failure to accurately report their performance in any proficiency testing round

Failure of a laboratory to participate in a proficiency testing scheme round or to accurately report their performance in any proficiency testing round will result in immediate suspension. The laboratory will not be reinstated until demonstrated satisfactory proficiency testing performance is confirmed.

The first date of “Receipt of notification” by the laboratory of any unsatisfactory measurand result from the proficiency testing provider in that proficiency testing round places the onus directly upon the laboratory to immediately initiate corrective action(s). Any preliminary “Performance Report” issued by whatever means by the proficiency testing provider and in what ever format first reported to the laboratory constitutes this “receipt of notification” of the proficiency testing results to the laboratory.

Refer to all specific requirements and responsibilities outlined in CAN-P-1579 section 6.4