

*pe***CHECK** Performance Evaluation Standards are used for routine compliance testing analysis. With 3 levels of concentration, select the concentration level that meets your needs.

**Performance Evaluation Standards**

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**Certificate of Analysis**

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## peCHECK Performance Evaluation Standards - Solids

peCHECK standards are cost effective performance evaluation standards for routine analysis compliance testing. These standards are available for minerals, nutrients, and solids in water/wastewater matrices and are certified through a comprehensive round-robin study providing independent verification from multiple laboratories.

- 20 ml vials. No pipetting necessary. Just dilute to volume. Each standard dilutes to 1 L
  - Eliminate a source of potential error, save time with single step preparation
- Certificate of Analysis listing consensus values as well as confidence and tolerance intervals.
  - Monitor lab performance in a cost effective, simple manner
- Prepared in large batches
  - Same lot number available time after time allows the possibility of control charting



Level 1 Solids			
Parameter	Unit	Consensus Value	Confidence Interval
Suspended Solids	mg/l	238	235 - 242
Dissolved Solids	mg/l	33.0	18.7 - 47.3
Total Solids	mg/l	254	242 - 267

Catalog Number	Code	Volume
140-702-101		20 ml

Level 2 Solids			
Parameter	Unit	Consensus Value	Confidence Interval
Suspended Solids	mg/l	380	374 - 385
Dissolved Solids	mg/l	44.8	21.3 - 68.3
Total Solids	mg/l	400	380 - 419

Level 3 Solids			
Parameter	Unit	Consensus Value	Confidence Interval
Suspended Solids	mg/l	1928	1895 - 1961
Dissolved Solids	mg/l	46.0	25.3 - 66.8
Total Solids	mg/l	1970	1942 - 1999

Catalog Number	Code	Volume
140-702-102		20 ml

Catalog Number	Code	Volume
140-702-103		20 ml

⊗ Glass Container  
✓ Dangerous Goods\*

Ⓢ Poison  
Ⓢ Corrosive

Ⓢ Flammable  
Ⓢ Oxidant

\* as defined by :

\* Hazardous Materials Regulations of the U.S. Department of Transportation, Tariff No. BOE-6000-R  
\* Canadian Transportation of Dangerous Goods Act and Regulations, Revision December 2000  
\* International Air Transport Association - Dangerous Goods Regulation, 40th Edition

## peCHECK Performance Evaluation Standards - Nutrients

Parameter	Level 1 Nutrients		
	Unit	Consensus Value	Confidence Interval
Ammonia (as N)	mg/l	0.97	0.91 - 1.03
Nitrate (as N)	mg/l	1.40	1.34 - 1.45
O-Phosphate (as P)	mg/l	0.74	0.69 - 0.80
Total Kjeldahl Nitrogen	mg/l	1.04	0.93 - 1.16
Total Phosphorus (as P)	mg/l	0.79	0.74 - 0.84

Catalog Number	Code	Volume
140-701-101		20 ml

Parameter	Level 2 Nutrients		
	Unit	Consensus Value	Confidence Interval
Ammonia (as N)	mg/l	8.59	7.98 - 9.21
Nitrate (as N)	mg/l	13.3	12.9 - 13.7
O-Phosphate (as P)	mg/l	4.42	4.17 - 4.66
Total Kjeldahl Nitrogen	mg/l	20.2	19.2 - 21.2
Total Phosphorus (as P)	mg/l	4.64	4.31 - 4.98

Catalog Number	Code	Volume
140-701-102		20 ml

Parameter	Level 3 Nutrients		
	Unit	Consensus Value	Confidence Interval
Ammonia (as N)	mg/l	14.7	14.2 - 15.2
Nitrate (as N)	mg/l	26.5	25.6 - 27.3
O-Phosphate (as P)	mg/l	9.33	9.11 - 9.55
Total Kjeldahl Nitrogen	mg/l	45.3	42.8 - 47.8
Total Phosphorus (as P)	mg/l	9.76	8.75 - 10.77

Catalog Number	Code	Volume
140-701-103		20 ml

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• International Air Transport Association - Dangerous Goods Regulation, 40th Edition

### AccuSPEC Solutions for APHA Methods

- Prepared as per guidelines from "Standard Methods for the Examination of Water & Wastewater", 20th Edition
- Supplied with comprehensive Certificate of Analysis
- Manufactured and tested under an ISO Certified Quality Program



peCHECK Performance Evaluation Standards - Minerals

Performance Evaluation Standards

Level 1 Minerals			
Parameter	Unit	Consensus Value	Confidence Interval
Conductivity	µS	188	183 - 193
Total Hardness (CaCO <sub>3</sub> )	mg/l	11.6	11.3 - 12.0
Total Dissolved Solids	mg/l	102	91 - 112
Calcium (Ca)	mg/l	2.62	2.50 - 2.75
Potassium (K)	mg/l	8.77	8.46 - 9.08
Magnesium (Mg)	mg/l	1.22	1.16 - 1.27
Sodium (Na)	mg/l	18.1	17.4 - 18.7
Chloride (Cl)	mg/l	19.7	19.1 - 20.2
Fluoride (F)	mg/l	0.50	0.48 - 0.53
Sulfate (SO <sub>4</sub> )	mg/l	8.41	7.90 - 8.92

Catalog Number	Code	Volume
140-704-101	✓ ®	20 ml

Level 2 Minerals

Parameter	Unit	Consensus Value	Confidence Interval
Conductivity	µS	1980	1915-2044
Total Hardness (CaCO <sub>3</sub> )	mg/l	221	215-227
Total Dissolved Solids	mg/l	998	949-1048
Calcium (Ca)	mg/l	62.0	59.3-64.6
Potassium (K)	mg/l	164	155-172
Magnesium (Mg)	mg/l	15.3	14.8-15.8
Sodium (Na)	mg/l	90.9	88.2-93.6
Chloride (Cl)	mg/l	95.7	92.2-99.1
Fluoride (F)	mg/l	4.20	4.03-4.37
Sulfate (SO <sub>4</sub> )	mg/l	150	144-156

Catalog Number	Code	Volume
140-704-102	✓ ®	20 ml

Level 3 Minerals			
Parameter	Unit	Consensus Value	Confidence Interval
Conductivity	µS	5803	5603-6002
Total Hardness (CaCO <sub>3</sub> )	mg/l	531	520-542
Total Dissolved Solids	mg/l	3051	2990-3111
Calcium (Ca)	mg/l	136	132-140
Potassium (K)	mg/l	466	434-497
Magnesium (Mg)	mg/l	45.4	44.9-46.0
Sodium (Na)	mg/l	342	331-353
Chloride (Cl)	mg/l	430	420-441
Fluoride (F)	mg/l	12.3	11.8-12.9
Sulfate (SO <sub>4</sub> )	mg/l	397	384-411

Catalog Number	Code	Volume
140-704-103	✓ ®	20 ml

⊗ Glass Container  
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Ⓔ Poison  
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Ⓟ Oxidant

\* as defined by :

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• Canadian Transportation of Dangerous Goods Act and Regulations, Revision December 2000  
• International Air Transport Association - Dangerous Goods Regulation, 40th Edition

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**Certificate of Analysis:**  
*pe*CHECK Minerals

# Certificate of Analysis

Sample

*pe*CHECK MINERALS, level 1  
Certified Performance Evaluation Standard  
140-704-101

**Organization responsible for the certification:**

**SCP SCIENCE**  
Manufacturing Division  
21800 Clark Graham  
Baie d'Urfé, QC, Canada  
H9X 4B6

Phone: (514) 457-0701  
Fax: (514) 457-4499

**Date of initial Certification:** January 16, 2001

**Date of last Verification:** February 8, 2005

**Description:**

*pe*CHECK MINERALS level 1 is a concentrated performance evaluation standard in two bottles (Alpha and Beta) for drinking and waste water analysis. This standard was designed specifically for periodic quality control verification, and methods development for water analyses of the listed parameters.

**Stability:**

This certification is valid for 12 months from the shipping date or 24 months after the verification date, whichever comes first, provided the material is kept sealed and stored under normal laboratory conditions. **SCP SCIENCE** will monitor the stability of representative samples annually and if any changes occur that invalidate this certification, **SCP SCIENCE** will notify purchasers.

**Certification and Calculation Methods:**

The Certification Method is based on a round-robin analysis involving 28 North American laboratories. Each laboratory was asked to supply analysis data in duplicate for a specific list of parameters. Not all the laboratories supplied data for the different parameters. Certified Values are based on an average of 22 values per parameter (25 values being the highest and 17 values being the lowest).

The outliers were removed using the Dixon Test 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  $2\sigma$ ) using the following formula:

$$x \pm \frac{ts}{\sqrt{n}}$$

where    n: Number of data  
          s: Standard Deviation of the Average  
          t: Factor for Student Test  
          x: Consensus value

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

$$x \pm ks$$

where    k: Factor for two-sided Tolerance Limits  
          s: Standard Deviation of the Average  
          x: Consensus 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 Certified Value.

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

Results within Confidence Interval	Method working properly
Results consistently outside Confidence Interval but within Tolerance Interval	Method needs improvement
Results outside Tolerance Interval	Method not working properly

**References:**

ISO Guide 30 (1992): Terms and definitions used in connection with reference materials  
 ISO Guide 35 (1989): Certification of reference materials--General and statistical principles  
 Quality Assurance of Chemical Measurements - John K. Taylor



## Certificate of Analysis:

### peCHECK Minerals

#### Instructions:

1. Shake each bottle well before use;
2. Put 600ml of deionized water into a 1-liter volumetric flask;
3. Open both bottles (Alpha and Beta) carefully and transfer all contents of each bottle into the volumetric flask;
4. Ensure that all the standard is added to the flask by carefully rinsing each bottle AND each cap three times with deionized make-up water;
5. Dilute to the mark with deionized water, and mix;
6. Test as soon as possible for the listed parameters.

#### Consensus Values:

#### peCHECK MINERALS, level 1

Parameter	Unit	Consensus Value	Confidence Interval	Tolerance Interval
Conductivity	μS	188	183 – 193	158 – 218
Total Hardness (as CaCO <sub>3</sub> )	mg/l	11.6	11.3 – 12.0	9.8 – 13.5
Total Dissolved Solids	mg/l	102	91 – 112	37 – 166
Calcium (Ca)	mg/l	2.62	2.50 – 2.75	1.88 – 3.36
Potassium (K)	mg/l	8.77	8.46 – 9.08	6.89 – 10.65
Magnesium (Mg)	mg/l	1.22	1.16 – 1.27	0.89 – 1.55
Sodium (Na)	mg/l	18.1	17.4 – 18.7	14.1 – 22.0
Chloride	mg/l	19.7	19.1 – 20.2	16.2 – 23.1
Fluoride	mg/l	0.50	0.48 – 0.53	0.35 – 0.65
Sulfate	mg/l	8.41	7.90 – 8.92	5.32 – 11.50
Lot number : SC1018915			Catalogue number : 140-704-101	

Manufactured according to an ISO 9001:2000 Quality System and ISO 17025 (in-process)

#### SCP SCIENCE

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