

The General Environmental Technos Co., Ltd.

**Analysis Identification****Reference Material**  
**RMNS Lot.BT****Reference Material for Nutrients in Seawater (RMNS)**

This reference material (RM) was produced using treated natural seawater on the basis of quality control system under JIS Q 0034 (ISO GUIDE 34). It can be used to manage analysis precision and method or to verify performance of analytical instruments for measurements of nutrients in sample with seawater matrix or matrix similar to seawater.

**1. Name and Location of the Manufacturer/Analysis Facility**

The General Environmental Technos Co., Ltd.

Laboratory for Instrumentation and Analysis

3-1-1, Higashikuraji, Katano, Osaka, 576-0061, Japan

**2. Name of Reference Material and Package Description**

Name: Reference Material for Nutrients in Seawater (RMNS)

Package: In a 100 mL polypropylene bottle (vacuum-sealed in aluminum-film bag). This RM is an aqueous solution prepared using treated natural seawater. About 90 mL of this RM is in the bottle.

**3. Analytical Values and Analysis Methods**

A table below shows the concentrations ( $\mu\text{mol kg}^{-1}$ ) of 4 types of nutrients. The expanded uncertainties for the analytical values represent combined standard uncertainty and uncertainty determined by coverage factor ( $k$ ) set at  $k = 2$  which is estimated to cover about 95 % level of confidence. A standard deviation (SD) for in between bottle was determined following JIS Q 0035 guideline. The value represents the results of 120 bottles measured in duplicates. Analysis methods are also described in the table below.

	Analytical Value ( $\mu\text{mol/kg}$ )	Expanded Uncertainty ( $\mu\text{mol/kg}$ )	Between-Bottle SD ( $\mu\text{mol/kg}$ )	Analysis Method
Nitrate	18.15	0.24	0.056	Colorimetric method described in Japan Meteorological Agency's Manual on Oceanographic Observation (1999); Cu-Cd reduction Naphthylethylenediamine photometric method
Nitrite	0.471	0.011	0.0033	Colorimetric method described in Japan Meteorological Agency's Manual on Oceanographic Observation (1999); Naphthylethylenediamine photometric method
Phosphate	1.296	0.027	0.007	Colorimetric method described in Japan Meteorological Agency's Manual on Oceanographic Observation (1999); Molybdenum blue method
Silicate	42.02	0.64	0.21	Colorimetric method described in Japan Meteorological Agency's Manual on Oceanographic Observation (1999); Molybdenum blue method

#### 4. Traceability

The determination of values for nitrate, nitrite, and phosphate uses Japan Calibration Service System (JCSS) standard materials as standard solutions. Silicate value is determined by sodium hexafluorosilicate standard solutions prepared using balances calibrated with JCSS standard weights. The purity of sodium hexafluorosilicate (Wako special grade, Wako Pure Chemical Industries, Ltd.) is determined following a method described in Japanese Industrial Standards' (JIS) "JIS K8336: 1995". The salinity for standard solutions were adjusted to the salinity of this RM  $\pm$  0.5 psu then analyzed using continuous flow analysis (CFA) method

#### 5. Raw Material and Processing Method

Collected location: (1) Suruga Bay, Japan; 397 meters depth.

(2) Atlantic Ocean (59 ° 59.881 ' N, 34 ° 59.850 ' W); 1490 meters depth

Source seawater was filtered (0.45  $\mu\text{m}$  membrane filter), 51% of seawater (1) and 49% of seawater (2) were mixed by weight ratio, two autoclave treatments (120 °C for 2 h each time) were conducted, and about 90 mL aliquots of treated seawater were transferred into 100 mL polypropylene bottles in a clean room (Class 10 000) environment. (No additives)

**6. Intended Use**

Seawater nutrient reference material solution for nutrients analysis  
(Please do not use for other purposes)

**7. Storage and Usage Specifications of Reference Material**

Do not freeze (the composition of the product may change).

Store at room temperature below 40 °C.

Because no additives or preservatives are used, the quality is not maintained for reuse after opening the outer seal.

Do not dilute or concentration the product.

Please shake well and open the seal right before use.

When sampling the product, please do not insert pipette related objects to prevent contamination of the product.

**8. Analysis Date**

2011/03/28

**9. Production Date**

2010/12/21

**1 0. Expiration and Guarantee Date**

Under unopened and stored condition described in section 7, this reference material's expiration and guarantee date is 2016/12/21.

**1 1. Homogeneity**

Out of 2000 bottles produced, four sets, each set consisting of randomly selected 30 bottles were analyzed (one set analyzed per month; thus, total of 120 bottles analyzed). The level of homogeneity was assessed from the results and confirmed acceptable homogeneity. Uncertainty associated with sample homogeneity is reflected in the uncertainties of the values. The standard deviations in between bottles for 120 bottles analyzed are shown in a table in section 3.

**1 2. Additional Information**

(1) Salinity **34.413 psu** (standard deviation 0.0004 psu; n = 10)

An electrical conductivity measurement method described in Manual on Oceanographic Observation (1999), Japan Meteorological Agency, was used to measure salinity.

**1 3. Health and Safety**

Do not eat or drink the product.

Because the product is seawater, generally, it can be disposed by diluting; however, please follow local jurisdictions when carrying out the disposal procedure.

**1 4. Limitations of Copied Analysis Identification**

When copying this analysis identification, please make clear indication as such in the copied version.

**1 5. Technical Information**

The buyer of this RM shall be notified when changes in property values and/or any important changes are made in relation to this product. For more technical information, contact us at the address or webpage below.

**1 6. Name and Signature of Party Responsible for Production and Certification**

The General Environmental Technos Co., Ltd.  
Laboratory for Instrumentation and Analysis  
Director: Masanobu KATAGIRI

For any inquiry, please contact us



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Revision History